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Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.01SA/WW52

Topic: J.01. History of Neuroscience

Title: A historical overview of the medial vestibular nucleus of Schwalbe

Authors: I. DEMIRCUBUK[1], E. CANDAR[2], ***G. SENGUL**[3];
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Abstract: Medial vestibular nucleus (MVe, nucleus of Schwalbe), a component of the vestibular nuclear complex, extends between the fourth ventricle and inferior cerebellar peduncle in the human brainstem. In the late 19th and early 20th century, the terms "dorsal nucleus", "principal nucleus of the vestibular nerve" and "nucleus nervus vestibularis" were used to describe this nucleus by well-known neuroanatomists such as Koelliker, Bechterew, and Edinger. In 1909, Cajal described the shapes and dendritic extensions of cells in this region. In 1926, Guillain and Bertrand used the term "nucleus of Schwalbe" in their publication titled "Anatomie topographique du système nerveux central". Later on, Ferraro et al. (1940) indicated that damage to the medial vestibular nucleus caused ocular, postural, and kinetic abnormalities in rhesus monkeys. In 1998, Alvarez et al. reported age-related neuronal loss and reduced nuclear diameter of surviving neurons in MVe of the human brainstem using the formaldehyde-thionine method. Although many studies like these have pointed out the clinical and functional significance of this nucleus, more detailed knowledge of the anatomical relationships of this nucleus to other nuclei in the human brainstem was lacking. More recently, Paxinos et al. (2011) demonstrated MVe in comprehensive cytoarchitectonic diagrams, based mainly on the distribution of acetylcholinesterase in the human.

Disclosures: I. Demircubuk: None. **E. Candar:** None. **G. Sengul:** None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.02SA/WW53

Topic: J.01. History of Neuroscience

Title: The gasserian ganglion: a true honorific.

Authors: *B. BAKKUM;
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Abstract: The trigeminal (or semilunar) ganglion has an eponym associated with it: Gasser or gasserian. This eponymous term is a true honorific since Johann Lorentz Gasser (1723-1765) had very little to do with the discovery or description of the ganglion that bears his name. The fifth nerve ganglion was discovered by Raymund de Vieussens (1635-1715) in 1684. He described the "plexus ganglio-formis" (the ganglion) that a foveola (small pit) encompassed within thick meninges. However, he noted that only 2 major branches emerged from the ganglion. In 1695, Humphrey Ridley (1653-1708) correctly identified that 3 branches arise from the fifth nerve ganglion but only described the ganglion as "a kind of thickness". Several decades later, Jacob Benignus Winslow (1669-1760) in 1732 regarded the ganglion as an irregular structure. He also coined the term "nerf trijmeaux". The Austrian born Johann Gasser attended the University of Vienna and became professor of anatomy there. In late 1764, Gasser contracted a lung disease. At that time, he had a student named Antonius Balthazar Raymundus Hirsch (1744-1778), and the 2 of them discussed the trigeminal ganglion and its further study. Gasser briefly recovered and resumed working but died in April 1765. Meanwhile, Hirsch had been methodically studying the trigeminal nerve and ganglion and finished his doctoral dissertation in February 1765. Dr. Gasser died before Hirsch could defend his thesis on July 31, 1765. Even though he did the vast majority of the work, Hirsch chose to honor his teacher and mentor by crediting his work to Gasser and naming the fifth nerve ganglion the gasserian ganglion. Hirsch included references for 23 authors that had done previous work on cranial nerves and explained the meticulous dissection method he used to study the fifth nerve and its ganglion. He described and illustrated the ganglion in detail with near modern precision, including its semilunar shape. Dr. Hirsch did not pursue an academic career, choosing rather to go into private practice. Dr. Gasser left no writings, and there is no evidence that Dr. Hirsch wrote any other books. In fact, there has been confusion well into the 20th Century regarding the identity of the Gasser after which the ganglion was named. Possibly because of the relative lack of notoriety of these gentlemen, the term gasserian ganglion does not appear to have been used in any publications until 1811 by Charles Bell in his famous text: The Anatomy of the Human Body. Since that time, this term has been commonly used. Although, with the recent trend in decreasing the general usage of eponyms in anatomical terminology, the term gasserian ganglion and the story behind it may be destined to return to obscurity.

Disclosures: B. Bakkum: None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.03SA/Web Only

Topic: J.01. History of Neuroscience

Title: Benjamin Franklin's Experiment (Reported in 1765) on Positive and Negative Visual Afterimages

Authors: *C. WU;
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Abstract: The life of Benjamin Franklin (1706-1790) is so many-splendored: a founding father of the U.S., a businessman, an inventor, a scientist, and more. In science, the story about him flying a kite to obtain electricity from heaven has probably been told as many times as that about a young Isaac Newton being hit by a falling apple. Relevant to neuroscience in general and to visual neuroscience in particular, Franklin's observation on positive and negative (+&-) afterimages appears not well known. On June 2, 1765, in a letter to Lord Kames, Franklin described the following observation: "A remarkable circumstance attending this experiment, is, that the impression of forms is better retained than that of colors; for after the eyes are shut, when you first discern the image of the window, the panes appear dark, and the cross bars of the sashes, with the window frames and walls, appear white or bright; but, if you still add to the darkness in the eyes by covering them with your hand, the reverse instantly takes place, the panes appear luminous and the cross bars dark. And by removing the hand they are again reversed." (in "The writings of Benjamin Franklin, Vol.4, 1760-1766", 1906, p.380). This phenomenon (i.e., there is a mutual transition between +&- afterimages) apparently indicates that +&- afterimages may be due to the same underlying cause in the human visual system. Many years after Franklin, the British psychologist William McDougall (1871-1938) independently discovered the phenomenon of mutual transition between +&- afterimages; furthermore, he claimed: "...all afterimages, negative and positive, same-colored and complementary-colored alike, are primarily due to the persistence in the retina of X-substances ..." (in "Some new observations in support of thomas young's theory of light- and color-vision part III", 1901, p.365). His claim consists of two parts: (1) +&- afterimages are both due to some material persistence in our visual system; (2) this persistence resides in the retina. Here our concern is only with the first part. In contrast to McDougall, most contemporary vision researchers (e.g., R. Gregory in "Afterimage", 1987, p.13, in "Oxford Companion to the Mind"; R. De Valois and K. De Valois in "Neural coding of color", 1997, p.127, in "Readings on Color, Vol. 2: The Science of Color") treat +&- afterimages as due to different underlying causes: the former due to retinal or neural persistence, and the latter due to fatigue / adaptation. Having observed many afterimage-related visual phenomena like those described by McDougall, I believe that his conclusion concerning +&- afterimages is true while the view ascribing +&- afterimages as due to different causes is false.

Disclosures: C. Wu: None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.04SA/WW54

Topic: J.01. History of Neuroscience

Title: Albert Kuntz, Ph.D., M.D.,and his contributions to neuroscience history

Authors: *D. DALY, Y. TAN, M. RANA;
St. Louis Univ. Sch. of Med., Saint Louis, MO

Abstract: Professor Albert Kuntz (3/19/1879 - 1/19/1957) was one of the United States' leading Neuro-Anatomists in the first half of the 20th century authoring nearly 200 papers related to the autonomic nervous system. His contributions to the foundational knowledge of the structure and function of the autonomic nervous system were critical to our current understanding of basic science and clinical application of neuroanatomy. His first book, "*The Autonomic Nervous System*" (1929) provided a comprehensive knowledge of this system which led many surgeons to explore the utility of sympathectomy and rami-sectioning in the treatment of a number of neurological related diseases. His second text, "*Neuro-Anatomy*" (1936), elaborated on the neuroanatomy of not only the autonomic nervous system, but the intricacies of all aspects of the central and peripheral components of the nervous system. In addition to being a leading researcher in basic science related to the autonomic nervous system, and providing an anatomical basis for clinical interventions, Professor Kuntz was an ardent advocate of educating and training anatomists and clinicians. As the Director of the Department of Anatomy at Saint Louis University School of Medicine from 1946 until his passing in 1957 he prioritized the maintenance and expansion of a strong graduate program resulting in the conferral of 39 master's degrees and 17 doctoral degrees. He and his graduated students performed intricate dissections of the sympathetic system that are still showcased in the gross lab at St. Louis University School of Medicine. Professor Kuntz collaborated with Frank Netter on multiple articles, and oral tradition passed down by anatomists within Saint Louis University indicates that Kuntz's dissections were used as the basis for artwork found in Netter's atlases of human anatomy and CIBA collection. Professor Kuntz fervently supported the development of future anatomists and clinicians, realizing that they would be the individuals to expand on the existing body of scientific knowledge in the quest for an understanding of the normal structure and function of the human body with application to clinical practice always in mind. Professor Kuntz is remembered as a prominent figure in many aspects of anatomical education, and his work in embryology and neuroanatomy related to the autonomic nervous system has informed many of his successors. His influence guided a generation of anatomists and neuroscientists who have undoubtable influenced further generations of academics and patients alike.

Disclosures: D. Daly: None. **Y. Tan:** None. **M. Rana:** None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.05SA/WW55

Topic: J.01. History of Neuroscience

Title: Brain tumor surgery under hypnosis in Germany

Authors: *D. M. WEINERT[1], E. KRAUS[2];
[1]Neurosurg. and Neurol., Mediclin Clin., Bad Elster, Germany; [2]Neurosurg., Vogtland-Clinic, Plauen, Germany

Abstract: In recent years, several publications have appeared on neurosurgical operations under hypnosis. The first operation of this kind was performed in 1998 at the Vogtland-Clinic Plauen in Germany. For years, surgeons have been using hypnosis as an alternative to anesthesia for shorter procedures. This is mainly done in dentistry, gynecology, and orthopedics. This procedure offers the possibility to perform the operations without anesthesia, pain, and fear for the patients.
In 1890 a brain tumor was surgically removed for the first time in Heidelberg by the surgeon Vincenz Czerny. In Munich, brain tumor operations under local anesthesia were performed by Hans-Jürgen Reulen in 1990, followed by Kiel (H. Maximilian Mehdorn) and Berlin (Mario Brock) in 1994. Preservation of speech and language function by sparing the brain areas was also the reason why the brain tumor surgery reported here was performed under hypnosis. It was of crucial importance to minimize the burden and hassle of prolonged positioning, which was expected to last several hours, especially since in brain tumor surgery the patient's head is in the Mayfield clamp, which alone is unbearable in connection with lying motionless in an uncomfortable position on the operating table. To avoid the disadvantages, the surgeon preferred hypnosis as an alternative to anesthesia.
The operation performed in Plauen in 1998 was for a left fronto-temporal malignant astrocytoma with perisylvian growth in a 33-year-old man. The 4-hour procedure was performed under hypnosis. It was successful, and the motor and sensory language centers were spared. Seven years later, the patient returned to the clinic with a secondary glioblastoma, now one that could not be meaningfully operated on, and from which the patient died in 2005 at the age of 40.
The first neurosurgical operation under hypnosis performed in Plauen in 1998 is inconceivable without the experience of earlier operations with patients in the awake state. Otfried Foerster (1873-1941) performed electrical stimulations on the cortex of the exposed cerebral regions during therapeutic brain operations as early as in the 10's and 20's of the last century to investigate the localization of brain functions. Wilder Penfield (1891-1976), who was observing with Foerster in Breslau for 6 months in 1927, subsequently performed 750 procedures on epilepsy patients while awake. Noting patients' responses to weak electrical stimulation of the brain, with no pain reported but often complex sensory input such as hearing, vision, dreams, and hallucinations, Penfield made the key contribution to mapping brain function. The sensory and motor homunculus can be traced back to his research.

Disclosures: D.M. Weinert: None. **E. Kraus:** None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.06SA/WW56

Topic: J.01. History of Neuroscience

Title: Forward translation of transgenic models of Alzheimer's Disease - a systematic review of the literature

Authors: C. D. CAGGIANO[1], ***J. RODEFER**[2,1];
[1]Neurosci., Mercer Univ., Macon, GA; [2]Wake Forest Univ. Sch. Med., Winston Salem, NC

Abstract: In the process of creating animal models for Alzheimer's disease (AD), researchers have utilized genetic methodologies to insert human genes known to cause the development of early-onset AD. These models are shown to develop pathological hallmarks of the disease and display some of the symptoms associated with AD and have thus been taken as acceptable models to utilize in the search for efficacious treatment. Nevertheless, treatments based on research done with these models have shown limited success (Breijyeh & Karaman, 2020). A feasible explanation for this situation is that the models are created from genes discovered in a small subsection of the AD patient population: early-onset AD cases represent 5% of the total number of AD cases, and approximately 5-10% of early-onset cases have known genetic etiologies (Cacace et al., 2016). The result being an assertion that approximately 0.5% of AD cases can be seen as representative of more than 99% of cases. This assertion ignores the heterogeneity of the disease in favor of an oversimplification that has failed to reliably produce disease modifying therapy or even symptomatic treatment — with cholinergic drugs remaining the frontline treatment (Breijyeh & Karaman, 2020). Early-onset AD and late-onset AD have non-identical symptom profiles, progressions, and pathological developments — and we will endeavor to use these differences as a metric for evaluating the applicability of different animal models of AD. A possible contributing factor to the failure of AD clinical trials may be the attempt to apply these therapeutics to the general patient population rather than stratifying treatment application based on similarity of patient pathology to model pathology: drugs designed on early onset genetic models may be best applied to early onset cases. To further examine these ideas, this project reviews different patient sub-types and their pathology/symptomology. The results of the literature search revealed that certain models within each category received a disproportionate degree of attention, namely the Tg2576, 5xFAD, and 3xTg mice. It is these three models which were examined to determine if they better represented one form of AD. From there, the difficulties and ramifications of translation between model and patient studies were compared and contrasted. In general, it was found that models utilizing FAD causing genes superficially appeared similar to AD, but this relationship tended to break down upon closer examination. The greatest risk factor for AD is aging, and a model which arbitrarily bypasses this temporal constraint may seem enticing but may sacrifice validity and translatability in the process.

Disclosures: C.D. Caggiano: None. **J. Rodefer:** None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.07SA/WW57

Topic: J.01. History of Neuroscience

Title: A historical review of interventions for Alzheimer's disease

Authors: *G. G. CELAYA, R. E. HARTMAN;
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Abstract: We reviewed the published research on treatment strategies for Alzheimer's disease (AD). This presentation provides a comprehensive educational overview of the historical developments in the treatment of AD, including both pharmacological and nonpharmacological approaches. It explores various strategies, including the use of pharmacotherapeutic combinations and multimodal lifestyle interventions. The presentation aims to provide insights into the effectiveness of AD treatment strategies and the need for further research on AD treatment recommendations to provide optimal care for patients.

In 1993, the United States Food and Drug Administration (FDA) approved tacrine, a cholinesterase inhibitor, as the first drug for treating AD. Subsequently, the FDA granted approval to several other drugs for AD treatment, including additional cholinesterase inhibitors like donepezil in 1996, rivastigmine in 1998, and galantamine in 2001. In 2003, memantine, a glutamate receptor antagonist, also received FDA approval. The literature indicates that these FDA-approved pharmacological interventions have modest effects in slowing the progression and symptoms of AD.

However, controversy arose in 2021 when the FDA granted accelerated approval to aducanumab, the first monoclonal antibody treatment for AD. Concerns regarding its efficacy and potential side effects were raised. In 2023, lecanemab, another monoclonal antibody treatment, also received FDA accelerated approval, despite criticism concerning its efficacy and safety. Nevertheless, published data suggest that pharmacological treatments for AD are effective in treating symptoms of AD. Additionally, clinical trials demonstrate that monoclonal antibody treatments for AD show clinical benefits in slowing disease progression.

Although there is currently no cure for AD, significant effort has gone into developing effective treatment options, including non-pharmacological interventions such as behavioral lifestyle modifications. Several studies have demonstrated that behavioral lifestyle modifications, such as aerobic exercises, can be a treatment recommendation for AD. For instance, physical exercise has long been recognized to promote improved memory function and cognitive health, presumably by protecting against hippocampal volume loss in older adults.

Although there are significant advancements in developing treatment recommendations for AD, further research is warranted on the efficacy of AD treatments, including both pharmacotherapy and non-pharmacotherapy options.

Disclosures: G.G. Celaya: None. **R.E. Hartman:** None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.08SA/WW58

Topic: J.01. History of Neuroscience

Support: JSPS KAKENHI (#18K03182)

Title: William James's theory of emotion as a pioneer work of affective neuroscience: What changed in James's theory of emotion from The Principles of Psychology (1890) to Psychology: Briefer Course (1892)

Authors: *T. SATO;
Psychology, Edogawa Univ., Nagareyama, Japan

Abstract: William James (1884), an American philosopher and psychologist, proposed a theory of emotion that became famous but was modified in later papers published with regard to several important issues. This study compares *Psychology: Briefer Course* (1892) with *The Principles of Psychology* (1890), and understands how his theory of emotion was developed. The *Briefer Course*, as it is named, has been considered a condensed form of the *Principles*; however, especially in the chapter on emotions, important points such as the mechanisms of subtler emotions have been modified. Though James emphasized various sensory inputs as a basis for subtler emotions in the *Principles*, he considered them irrelevant in the *Briefer Course*. James also wrote about "incoming currents" as the basis of emotion in the *Briefer Course* and did not address "incoming sensation," which he used to detail mechanisms of subtler emotions in the *Principles*. James shifted from the various sensory inputs to the currents of neural mechanisms; however, neural currents are an abstract idea, which makes it difficult to image these currents clearly and in an objective manner. In addition, the main perspectives on coarser emotion also showed some changes. Some critical questions of coarser emotion indicated that the emotion ceases after the same emotion occurs (James, 1890), and repressed coarser emotions end up getting worse (James, 1892). In the *Briefer Course*, James discussed the latter problem compactly. On the other hand, in the *Briefer Course*, James did not include several sections that can be found in the *Principles*. In these missing sections—specifically one titled "No special brain-centres for emotion" in the *Principles*—James insisted that no brain center for emotion existed, and processes with motor and sensory systems were useful as emotional functions. Furthermore, James used the "sounding-board" three times in the *Principles* but not in the *Briefer Course*. Of the several changes in the *Briefer Course*, the mechanisms of the subtler emotion were greatly modified, while some changes in the coarser emotions were relatively minor.

Disclosures: T. Sato: None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.09SA/WW59

Topic: J.01. History of Neuroscience

Title: An FDA-Approved Blood Test for Concussion: From Inception to Implementation

Authors: D. SHEAR[1], K. L. CAUDLE[2], K. SCHMID[3], K. CURLEY[2], J. B. PHILLIPS[4], D. HOFFMAN[2], K. MORITZ[4], L. JASPER[2], D. L. ROSARIUS[5], D. HACK[6];
[1]Brain Trauma Neuroprotection Program, Ctr. for Military Psychiatry and Neurosci., Walter Reed Army Inst. of Res., Silver Spring, MD; [2]U.S. Army Med. Materiel Develop. Activity (USAMMDA), Fort Detrick, MD; [3]U.S. Army Headquarters, Dept. of the Army (U.S. HQDA), Arlington, VA; [4]Combat Casualty Care Res. Program Area Directorate, Fort Detrick, MD; [5]U.S. Army Med. Res. and Material Command, Fort Detrick, MD; [6]VirTech Bio, Natick, MA

Abstract: GFAP (glial fibrillary acidic acid protein) and UCH-L1 (ubiquitin C-terminal hydrolase-L1) were recently approved by the United States Federal Drug Administration (FDA) as blood-based biomarkers for traumatic brain injury (TBI). The inception of the TBI biomarker field began in 2001 with a partnership formed between scientists at the University of Florida (UF) and Walter Reed Army Institute of Research (WRAIR). The discovery, development, and validation process that led to FDA approval 2 decades later was immense, involving multiple stakeholders, and recently culminated in Abbott Diagnostics obtaining FDA clearance in 2021 for marketing of a point-of-care i-STAT Alinity™ plasma blood test using GFAP and UCH-L1 as an aid to diagnosing concussion. Abbott's i-STAT TBI plasma test also received CE Mark from the European Medical Authority, paving its way for commercial launch in Europe. The test was based on data generated from plasma samples obtained from the TRACK-TBI clinical study. This study population included a cohort of 1901 mild TBI patients. In that study, the test accurately diagnosed 115 of the 120 CT+ subjects as "elevated". The most recent published results from TRACK TBI NET have further indicated that GFAP and UCH-L1 levels in blood are predictive of patient outcome at 6 months post injury. The FDA approval of a blood test for GFAP and UCH-L1 to aid in diagnosing concussion represents a significant advance for the field. The importance of having a capability to be provide objective/quantitative assessment of the effects of exposure to blast or impact concussion at the point of injury cannot be over-emphasized. The i-STAT TBI plasma test rapidly provides a quantitative analysis from just a few droplets of blood. This capability is important for guiding triage decisions, but also for monitoring the progression of brain injury throughout all stages of enroute care including the potential effects of aeromedical evacuation on TBI and will become part of the TBI patient's permanent medical record. Most importantly, this is just the tip of the iceberg because there still remains a critical need for research on TBI-specific biomarkers that are sensitive to the chronic evaluation of TBI pathology and that can serve as diagnostic, prognostic, and perhaps most importantly, theranostic indicators.
Disclaimer: Material has been reviewed by the Walter Reed Army Institute of Research. There is no objection to its presentation and/or publication. The opinions or assertions contained herein

are the private views of the author(s), and are not to be construed as official, or as reflecting true views of the Department of the Army or the Department of Defense

Disclosures: **D. Shear:** None. **K.L. Caudle:** None. **K. Schmid:** None. **K. Curley:** None. **J.B. Phillips:** None. **D. Hoffman:** None. **K. Moritz:** None. **L. Jasper:** None. **D.L. Rosarius:** None. **D. Hack:** None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.10SA/Web Only

Topic: J.01. History of Neuroscience

Title: Possible First Depiction of Animal Assisted Therapy for Posttraumatic Stress Disorder in a Painting by Sanford Robinson Gifford (1823-1880)

Authors: *E. ALTSCHULER;
Metropolitan Hosp., New York, NY

Abstract: Neuroscience has benefitted greatly from advanced technologies such as CRISPR, high resolution fMRI and multi-photon microscopy. However, along with their intrinsic interest, historical sources can still provide perspective and information useful in addressing current issues in neuroscience. Posttraumatic stress disorder (PTSD) affects eight percent of Americans sometime during their lifetime and further understanding of PTSD assessing treatments for the condition. Features of PTSD, e.g., nighttime awakenings in those who have suffered war trauma, can be found as far back as ancient Sumerian texts. Animals have interacted with humans in health and disease for millennia. The first case of animal assisted therapy (AAT) for PTSD was published in 1999 (Altschuler, Ann. Clin. Psy., 1999). Since then, pilot studies and a randomized controlled trial has found service dogs and emotional support dogs beneficial for veterans with PTSD. Here I note what may be the first depiction of AAT for PTSD in the painting Kauterskill Falls (1862, later renamed Kauterskill Clove, Metropolitan Museum of Art, Public Domain) by Sanford Robinson Gifford (1823-1880). Gifford was born in Greenfield, New York and grew up in Hudson, New York. From 1861 to 1863 Gifford served as a corporal in the 7th Regiment of the New York Militia during the U.S. Civil War, guarding Washington, D.C., and Baltimore, Maryland. His brother Charles committed suicide at the start of the Civil War. He returned to his boyhood home in the Hudson River Valley during breaks from fighting. In the bottom left corner of the painting (see Figure, https://www.metmuseum.org/art/collection/search/10946) a man is seen climbing the rocks, back turned to us, accompanied by his dog. Gifford may be illustrating a therapeutic benefit of a canine companion. Interestingly, the former soldier in Winslow Homer's The Veteran in a New Field (1865) also faces away from the viewer. It would be interesting to look for other depictions or descriptions of AAT for PTSD in artistic, literary and history sources.

Disclosures: E. Altschuler: None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.11SA/WW60

Topic: J.01. History of Neuroscience

Title: Circadian rhythm and depressive disorders

Authors: *S. KHAN[1,2], R. SIDDIQUE[3];
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Abstract: Daily changes in behavior and physiology have been known, since prehistoric times with the belief that they are driven by external temporal cues. Nathanial Kleitman and Bruce Richardson spent over a month in Mammoth Cave, Kentucky, 150 feet below ground, in constant

temperature and light to synchronize their sleep-wake cycle to a 28-h day. The younger Richardson successfully modified his behavior to a 28-day. Kleitman's behavior and temperature oscillated with a 24 h cycle in the face of 28-h time cues suggesting the existence of an endogenous clock. Circadian rhythms are generated by an endogenously organized timing system that drives daily rhythms in behavior, physiology and metabolism. In mammals, SCN is synchronized to environmental changes in the light: dark cycle by direct, monosynaptic innervation via the retino-hypothalamic tract. In turn, the SCN coordinates the rhythmic activities of innumerable subordinate clocks in virtually all bodily tissues and organs. Signals from peripheral tissues inform the SCN of the internal state of the organism and the brain's master clock is modified accordingly. A consequence of this hierarchical, multilevel feedback system is that there are ubiquitous effects of circadian timing on genetic and metabolic responses throughout the body. This overview examines landmark studies in the history of the study of circadian timing system, and highlights our current understanding of the operation of circadian clocks with a focus on topics of interest to the neuroscience community.
Variations in work rotation schedules between day and night, such as shiftwork can disrupt normal rhythms, and thus lead to profound mood-related changes in vulnerable individuals. Indeed, there is a high incidence of major depressive disorder observed during and after shift work experience with increased risk associated with the duration of exposure. Unipolar depression has a strong relationship with the severity of circadian misalignment. Circadian disruptions can precipitate mood and psychotic episodes more strongly in people with symptoms of psychiatric disorders, where mood symptoms occur in a seasonal pattern such as seasonal affective disorder and bipolar disorder. However, these disorders are very heterogeneous, hence it is unlikely to identify a common circadian-related mechanism that is causal for all bipolar disorder or major depression. In this presentation, I discuss how circadian rhythms phenomena evolved, and how shiftwork can disrupt circadian rhythm which can further cause depressive disorders.

Disclosures: S. Khan: None. **R. Siddique:** None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.12SA/WW61

Topic: J.01. History of Neuroscience

Title: Systematic review on human consciousness from 1970 to 2023.

Authors: *C. A. CASTAÑEDA NAVARRETE;
Univ. of Guadalajara, Guadalajara, Mexico

Abstract: SYSTEMATIC REVIEW ON HUMAN CONSCIOUSNESS1970 – 2023.
Castañeda Navarrete Cesar A.11.Doctorado en Derechos Humanos Centro Universitario Cutonala, Universidad de Guadalajara.

Email: myxomatosis_dr@hotmail.com**Introduction**Consciousness is one of the greatest mysteries for the human being, the search for its explanation have been a constant within the different branches of human knowledge.**Aim**The purpose of this work is to carry out a systematic bibliographic review on the development and evolution of knowledge of human consciousness, covering different theoretical disciplines and taking the work of different authors related to the field of neurosciences.**Methodology** The PRISMA statement (20202) is used as a guide for the selection of various publications, however, this project consists of two parts: 1) A theoretical selection was made using electronic databases (PubMed, science direct, nature, science, springer), using conscience as a keyword, from the background; philosophical-psychological, physiological and functional neuroanatomical and Neurobiological, by various authors, covering publications from 1970 to 2023.**Results**An exhaustive search was carried out on the publications and authors who have worked on human consciousness, starting from the works of the year 1970 until 2023, which led us to separate the work into 4 sections; Antecedent; Philosophical, Psychological, Physiological-Functional Neuroanatomical, Neurobiological and Projections for the Future of Research on Human Consciousness.

Disclosures: C.A. Castañeda Navarrete: None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.13SA/WW62

Topic: J.01. History of Neuroscience

Support: NIH Grant KL2TR001432
NIH 1R01NS133441

Title: Review: Behavioral paradigms in Xenopus laevis tadpoles in studies of neurodevelopment and experience-dependent plasticity

Authors: M. HAYES[1], **N. TODOROVIC**[1], *H. HE[2];
[1]Biol. Dept., [2]Gorgetown Univ., Washington, DC

Abstract: *Xenopus laevis* has served as a major model for studies in embryonic development and is a cornerstone to our current understanding of cellular and molecular mechanisms underlying neurodevelopment, including the formation and refinement of neural circuits during early development. Such core mechanisms are highly conserved between *Xenopus* and human. In recent years, there have been considerable efforts to leverage the great accessibility and amenability of the *Xenopus* system to model neurodevelopmental and neurodegenerative disorders in humans for higher-throughput investigations of genetic as well as environmental risk factors. Behavioral paradigms are indispensable tools to assess functional output in whole animals. Here we review some of the established behavioral paradigms in *Xenopus laevis* tadpoles that have been used to elucidate how neural circuits give rise to specific behaviors over

development and evaluate functional deficits resulting from cellular and molecular abnormalities in the nervous system. **I**. Visual avoidance response (VAR). VAR is characterized by the tendency of tadpoles to change swimming trajectory in response to approaching visual stimuli. VAR is mediated by the optic tectum, the visual processing center in the tadpole brain, and improves over development as the retinotectal circuit matures. Visual conditioning (a brief period of enhanced visual experience), which promotes synaptic maturation and circuit refinement in the retinotectal circuit, also improves VAR performance. Thus, VAR has been used widely in tadpoles to assess both basic visuomotor behavior and training-induced behavioral plasticity related to various mechanisms affecting synaptic development and maturation in the retinotectal circuit, as well as functional recovery following tectal injury. **II**. Polarized schooling. Characterized by tadpoles aggregating in groups and swimming in the same direction, quantification of the schooling behavior is used as a measurement for social interaction and sensory integration, and has been used to evaluate behavioral deficits in neurodevelopmental disorder models. **III.** Aversive training. By introducing electric shocks to tadpoles swimming in petri dishes illuminated by red light, animals are conditioned to avoid red light illuminated area. This aversive training paradigm has been used to study circuits and molecular mechanisms involved in learning and memory. These behavioral paradigms provide crucial information on the functional relevance of mechanistic studies at molecular and cellular levels, and can be used to assess the effectiveness of genetic or pharmacological interferences in disease models.

Disclosures: **M. Hayes:** None. **N. Todorovic:** None. **H. He:** None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.14SA/WW63

Topic: J.01. History of Neuroscience

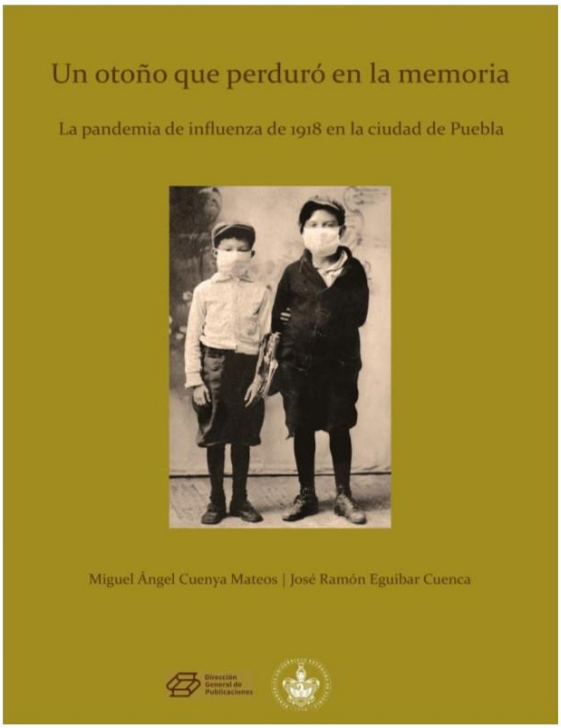
Support: VIEP-BUAP grant to CA en Neuroendocrinología BUAP-CA-288

Title: The pandemic Spanish flu of 1918 at Puebla, México

Authors: *J. R. EGUIBAR[1], M. A. CUENYA-MATEOS[2];
[1]Benemerita Univ. Autonoma De Puebla, Puebla, Pue., Mexico; [2]Univ. for Adults and Social Sci. and Humanities Inst., Benemérita Univ. Autonoma de Puebla, Puebla, Pue., Mexico

Abstract: The pandemic Spanish flu of 1918 at Puebla, México.Jose R. Eguibar[1,2], and Miguel A. Cuenya[3,4]. Institute of Physiology[1] andinternational Office[2], Institute of Social Sciences and Humanities and University forAdults. Benemérita Universidad Autónoma de Puebla.We analyzed with detail the causes of death during the pandemic flu of 1918,called Spanish flu, at the State of Puebla, México. For this purpose we review thehistorical archive through certificates of the causes of death in the two maingraveyards of the city. It is important to emphasize that the virus that caused thedeadliest pandemic in the world, was recovered from a corpse in the

permafrost fromBrevig Mission in the Arctic Circle. Nowadays, we know that the influenza virus wasof the type H1N1, and after recovering the virus and it was capable to induce cytokinestorm and organic failure in infected mice, with the flu 1918 pandemic virus.The city of Puebla is located 2,250 meters above sea level and in 1918 had100,000 inhabitants with a mean income level among the states in México. We candetermine a significant increase in the number of deaths in the fall of 1918 betweenOctober to November, with respect to previous and subsequent years. The maincauses of death were complications such as: pneumonia, pleural effusion, pleurisy,bronco-pneumonia, or bronchitis. Most of the deaths were reported in children fromone to five years old, and males from 30 to 60 years of life, being the great majoritythem were men. Importantly, neurological symptoms are not common, but deathcertificates reported delirium due to high fever, disorientation in time and space,
headache and in some of them anxiety and depression supporting that inflammatoryprocess and cytokine storm are capable to induce mental changes in the flu patientssince this pandemic episode. The detail analysis of the effects of Spanish flu in oneof the states in the central plateau of Mexico allow us to contribute to the generalknowledge in the History of Infectious diseases and neuroscience due to its effectson the central nervous system and allow us to publish a book in Spanish.



Disclosures: **J.R. Eguibar:** None. **M.A. Cuenya-Mateos:** None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.15SA/WW64

Topic: J.01. History of Neuroscience

Title: Vanquishing your fears - past and future: Desensitizing to Wolpe - Recent brain science that helps explain life-numbing neophobia and reciprocal inhibition.

Authors: *S. D. CURTIS;
True North, LLC, Bloomington, IN

Abstract: In 1958, after working with WWII PTSD veterans, South African psychiatrist Joseph Wolpe published his *Psychotherapy By Reciprocal Inhibition* which advocated for the use of his 'systematic desensitization' for the treatment of PTSD and phobias. Based on his research, Wolpe proposed that environmental stimuli that were associated with intense fear or panic, e.g., phobias of snakes, closed spaces, crowds, etc., could be gradually reconditioned to elicit more normal emotions. Many believe that such phobias are examples of 'single synapse' classical conditioning and are established without cognitive input. Wolpe demonstrated, however, that eliminating such disruptive fear responses does require rational, cognitive input, i.e., "I realize that I have nothing to fear". To ensure such rationality, Wolpe required that his phobia patients create and sustain emotional calm while being exposed to a series of stimuli that were increasingly similar to that eliciting the phobic response. Although at the time it was simply assumed that calm encouraged rationality, there is now evidence that calm is, in fact, required for rational thought and that the prefrontal cortex that allows such thinking is impaired with even moderate levels of anxiety or fear. Amy Arnsten and her colleagues and others have established that acute fear 'takes the prefrontal cortex offline' and that chronic stress results in atrophy of prefrontal regions, e.g., dorsolateral prefrontal cortex. This author presents findings that support the possibility that a similar cognitive-based, desensitization strategy can be used to reduce the significant neophobia that blocks prefrontal function and the acquisition of new cognitions and behaviors in both chronic stress/anxiety and PTSD populations, i.e., overcome resistance to change. Sources of chronic stress and fear in current culture will then be described, e.g., social media/technology, personal finances, politics/news, climate, etc. and current behavioral and pharmacological treatments for chronic stress will be discussed.
Wolpe, J. (1958). Psychotherapy by reciprocal inhibition. Stanford University Press: Stanford CA

Disclosures: S.D. Curtis: None.

Theme J Poster

TJP01. History of Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP01.16SA/WW65

Topic: J.01. History of Neuroscience

Title: Neuroeconomic data for the calibration of disequilibrating excessive demand in macroeconomics and finance models: Potential neuroeconomic biomarkers of excessive demand

Authors: J. L. HARACZ[1], M. S. ZAKARIA[2], *J. N. WILKINS[3];
[1]Dept. of Psychological and Brain Sci., Indiana Univ., Bloomington, IN; [2]Dept. of Econ., Columbia Univ., New York, NY; [3]Dept. of Psychiatry and Biobehavioral Sci., David Geffen Sch. of Med. at UCLA, Los Angeles, CA

Abstract: Objective: Dynamic stochastic general equilibrium models have been criticized for failing to forecast the Global Financial Crisis (Yellen, 2010; Vines & Wills, 2020). This and other flaws of neoclassical economics were proposed to arise partly from the failure of equilibrium-based models to capture *excessive demand* (Haracz, 2021, 2022), which exceeds the balanced "excess demand" in general equilibrium theory (Arrow, 1974; Debreu, 1984). Excessive demand is defined as demand that promotes disequilibria in asset or goods markets and drives prices above fundamental values. The present theoretical study seeks: 1) potential neuroeconomic biomarkers of excessive demand; 2) to develop modeling methodology that calibrates excessive demand from neuroeconomic data. Methods: A literature review focused on neuroeconomic studies of tasks that elicit demands (i.e., choices) by subject groups that may be prone to show excessive demands (e.g., individuals with substance use disorders, eating disorders, or gambling disorder, as well as investors or lab-market subjects who trade excessively). Inclusion criteria were applied to studies throughout neuroscience history. The studies' results were assessed for their potential to enable the calibration of excessive demand in an adaptation of the dynamic disequilibrium model with randomness (Stiglitz & Guzman, 2021; henceforth "SG model") for analytic and policymaking applications in macroeconomics and finance. Results: Compared to healthy control groups, the above subject groups typically show altered fMRI-measured activity in the brain reward system (e.g., ventral tegmental area, nucleus accumbens, and ventromedial prefrontal cortex) during anticipation, choice, or outcome phases of demand-elicitation tasks. These activity changes (e.g., Smith et al., 2014; Moeller et al., 2018) show a potential for calibrating excessive demand in the SG model, especially when accounting for fMRI measurement error in predicting demand (Webb et al., 2021). To model excessive demand, the SG model's τ variable, denoting downward pressure on demand (Stiglitz & Guzman, 2021), could be supplemented with another Λ variable, denoting upward pressure on demand. Conclusions: Neuroimaging research may yield biomarkers of traders' or consumers' excessive demands. A high biomarker prevalence could indicate that financial- or commodity-market demands have exceeded boundary conditions, beyond which equilibrium-oriented models are less applicable than alternatives (e.g., novel disequilibrium [Stiglitz & Guzman, 2021], multiple equilibrium [Vines & Wills, 2020], or temporary equilibrium models [Brunnermeier et al., 2021]).

Disclosures: **J.L. Haracz:** None. **M.S. Zakaria:** None. **J.N. Wilkins:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.01SU/WW66

Topic: J.02. Teaching of Neuroscience

Support: NIH NINDS R25NS120283
SUNY Downstate College of Medicine Alumni Association

Title: The Research Experience in Autism for College and High School Students: The REACH Pathway Program

Authors: J. LI[1], D. MISHAN[3], S. TORRES BERTORELLI[1], T. KHANDAKER[1], D. ROSENTHAL[1], J. ALARCON[2], *J. LIBIEN[4,2];
[1]Col. of Med., [2]Dept. of Pathology, SUNY Downstate Hlth. Sci. Univ., Brooklyn, NY; [3]Sch. of Grad. Studies, Downstate Med. Ctr., Brooklyn, NY; [4]Downstate Med. Ctr., Dobbs Ferry, NY

Abstract: Despite interest among underrepresented minority (URM) students for STEM and neuroscience career paths, URM students are less likely to earn undergraduate or higher education STEM degrees than their white peers. The Research Experience in Autism for College and High School students (REACH) program aims to provide URM students with the resources and skills to pursue STEM education and careers in neuroscience. The REACH model integrates four core modules of laboratory research, interactive lectures, clinical shadowing, and career development. Discussions surrounding cultural competence and health disparities are embedded within the career development core and help students to understand neuroscience from social and scientific perspectives. The program culminates in an independent research project where students formulate hypotheses, design, and implement experiments. Structurally, the REACH program uses a team-based approach where 16-20 high school and college students are split into teams of 4-6 students and engage with mentors with the aim of developing a research project in the field of Autism. Mentors include scientists, physicians, PhD students, medical students, and previous REACH alumni. Each team has a mix of high school and college students and has a graduate student and medical student mentor to encourage teamwork and peer-mentoring and near-peer mentoring as they develop their projects. Survey data after completion of the REACH program indicates a strong inclination among participants to pursue advanced degrees in STEM. Regarding future applications to PhD programs, 7 students indicated they were likely, and 2 students stated they were extremely likely to apply. The combined MD PhD program also garnered significant interest, as 11 students expressed likelihood and 1 student stated they were extremely likely to apply. Our survey data aligns with the program's long-term goals of enhancing access and retention of URM in neuroscience and biomedical fields. By actively engaging URM students, REACH serves as a catalyst for positive change, aiming to create a lasting impact on both the students and their communities. The REACH program has

successfully nurtured the aspirations of URM college and high school students, equipping them with the necessary skills, knowledge, and motivation to pursue higher education and careers in neuroscience, biomedicine, and STEM.

Disclosures: **J. Li:** None. **D. Mishan:** None. **S. Torres Bertorelli:** None. **T. Khandaker:** None. **D. Rosenthal:** None. **J. Alarcon:** None. **J. Libien:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.02SU/WW67

Topic: J.02. Teaching of Neuroscience

Support: R25NS120283
SUNY Downstate College of Medicine Alumni Association funding

Title: The REACH Program: Empowering Underrepresented Minority Students in STEM through Near-Peer Mentorship in Neuroscience

Authors: *S. TORRES BERTORELLI[1], J. LI[1], D. ROSENTHAL[1], T. KHANDAKER[1], D. MISHAN[2], J. ALARCON[3], J. LIBIEN[3];
[1]Col. of Med., [2]Sch. of Grad. Studies, [3]Dept. of Pathology, Downstate Med. Ctr., Brooklyn, NY

Abstract: Efforts to diversify the United States STEM workforce often fall short in primarily due to the academic system's failure to retain underrepresented minority (URM) students in STEM majors and careers. Research has highlighted the benefit of near-peer mentors in STEM education and research, however URM students face challenges in obtaining mentorship opportunities (Haggins et al, J Natl Med Assoc., 2018). The REACH (Research Experience in Autism for College and High School students) program was developed to help bridge the gap in mentorship for URM students. It is an 8-week summer program for URM college and high school students interested in neuroscience designed to increase pursuance of future careers in research and healthcare.The REACH program fosters an enriching environment for students through peer mentorship, where MD and PhD students, along with REACH alumni provide guidance to mentees at a 1:2 ratio. Mentorship focuses on enhancing neuroscience knowledge, expanding research skills, and fostering career development. First, medical students hold daily recitations where mentees reinforce their understanding of interactive lectures conducted by SUNY Downstate faculty. Second, PhD students conduct hands-on workshops, where mentees practice skills such as pipetting, working with mouse models, and utilizing neuron-based computer programs. Students then work closely with mentors to design hypotheses and implement independent experiments. Lastly, mentor-led panels inform students on topics such as career development, health disparities, and cultural competence within neuroscience. These panels help mentees to gain practical knowledge and receive guidance from experienced peer mentors within various career paths. Survey data was obtained from the participants pre- and

post-program from the 2021-2022 cohorts to assess changes in interest in research and healthcare careers. Survey responses indicated continued interest in future research careers and demonstrated sustained interest from 76% to 78%. Moreover, participants expressed significant interest in applying to future PhD (47%) and MD PhD programs (63%) after completing the REACH program.Our analysis of the REACH program highlights the positive impact of near peer mentorship on URM students in STEM fields through promoting continued interest in research. Further study will be necessary to follow the participants' STEM retention and continued use of near-peer mentors through higher education.

Disclosures: S. Torres Bertorelli: None. **J. Li:** None. **D. Rosenthal:** None. **T. Khandaker:** None. **D. Mishan:** None. **J. Alarcon:** None. **J. Libien:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.03SU/WW68

Topic: J.02. Teaching of Neuroscience

Support: NIH NINDS R25NS120283
SUNY Downstate College of Medicine Alumni Association funding

Title: The Neuroanatomy Olympics and Its Impact on Underrepresented Students' Understanding of Functional Neuroanatomy

Authors: *D. A. ROSENTHAL[1], T. KHANDAKER[1], J. LI[1], S. TORRES BERTORELLI[1], J. ALARCON[2], J. LIBIEN[2], J. KUBIE[3];
[1]Col. of Med., [2]Dept. of Pathology, Downstate Med. Ctr., Brooklyn, NY; [3]Dept. of Cell Biol., SUNY Downstate Med. Ctr., Brooklyn, NY

Abstract: The REACH program at SUNY Downstate Health Sciences University offers an 8-week summer course specifically designed for underrepresented college and high school students interested in neuroscience. Throughout previous summers, REACH has provided a comprehensive learning experience, including lectures on functional neuroanatomy, engaging hands-on sessions utilizing specimens in the anatomy lab, and interactive exploration facilitated by a digital brain atlas. Now, REACH incorporates a gamified approach called the Neuroanatomy Olympics. This game-based learning program promotes active learning, self-paced learning, and immediate feedback. Student teams compete in a Jeopardy-style format, identifying neuroanatomy structures based on their function or clinical correlates. The Neuroanatomy Olympics encourages teamwork, critical thinking, and application of knowledge. This study evaluates the educational efficacy of the Neuroanatomy Olympics by assessing participants' performance through pre- and post-intervention tests about functional neuroanatomy. Seven participants completed both tests, revealing a significant improvement in performance (p-value = 0.002989, Cohen's d = -2.2454436). The gamified approach enhanced

participants' understanding of functional neuroanatomy, likely due to active learning, focused practice, self-paced learning, and immediate feedback. Integrating gamification in educational programs, like the REACH pipeline, increases engagement and learning outcomes. The Neuroanatomy Olympics' team-based competition and real-world application promote active learning in neuroscience. This study supports the continued implementation of the Neuroanatomy Olympics in the REACH pipeline program to improve understanding and retention of functional neuroanatomy among underrepresented minority students in neuroscience careers.

Disclosures: D.A. Rosenthal: None. **T. Khandaker:** None. **J. Li:** None. **S. Torres Bertorelli:** None. **J. Alarcon:** None. **J. Libien:** None. **J. Kubie:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.04SU/WW69

Topic: J.02. Teaching of Neuroscience

Support: NIH Grant R25 GM146300

Title: Brain Explorer Academy: Empowering Underserved High School Students for STEM success through neuroscience education

Authors: *R. D. VILLAREAL[1], M. O. YASSA[2];
[1]Neurobio. and Behavior, [2]Ctr. for the Neurobio. of Learning and Memory, Univ. of California Irvine, Irvine, CA

Abstract: Diversity is critical to innovation and the advancement of society. Yet despite our best efforts, the United States has been unable to achieve STEM workforce diversity goals, which have been long attributed to the failure of the “academic pipeline” to recruit and retain students from underrepresented minorities (URM), a phenomenon often described as a “leaky pipeline”. Recent studies have shown that choosing a STEM major in college is directly influenced by academic interactions during high school, suggesting that involvement in a college-based STEM education program can enhance recruitment and retention into STEM disciplines. Programs that use college-based academic experiences to engage underserved individuals during high school can steer their educational path to college STEM majors. The Brain Explorer Academy (BEA), a comprehensive, multi-year, socio-ecological informal science education program addresses the challenges in STEM diversity by using neuroscience to instill curiosity and foster interest in STEM careers. The BEA will marshal high school students in a Title 1 School through a multi-stage intervention that fosters interest in STEM, knowledge and skill development, critical thinking, scientific communication, and quantitative/analytical competencies. We hypothesize that the staged approach of the BEA, which proceeds from highly structured learning in the first year, to highly individualized mentoring in the third year, will lead to the following quantifiable

outcomes:(1) Competency development through augmenting the science learning experience to enhance competencies in quantitative, analytical, critical thinking, team science and scientific communication skills; (2) Knowledge, attitudes and practices by increasing interest and positively modify attitudes towards STEM disciplines and potential careers in health-related research; and (3) Workforce capacity building, increasing the success of recruitment of students from underserved communities to college STEM majors. In addition to program evaluation by an independent third-party evaluator , we will generate a repository of digital and material resources to be used to create a "program-in-a- box" that can be widely implemented, constantly improved and reproduced at other institutions.

Disclosures: R.D. Villareal: None. **M.O. Yassa:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.05SU/WW70

Topic: J.02. Teaching of Neuroscience

Support: Stavros Niarchos Foundation
Pinkerton Foundation RG-2109-16527
NIH NINDS R25 1R25NS115551-01

Title: Brain Research Apprenticeships In New York At Columbia (BRAINYAC) strengthens STEM identity and self-efficacy in high school students through coursework and mentored research

Authors: *D. H. LI[1], M. GUMNIT[1], A. SHAH[1], I. BRAVO[2], B. M. SILVER[3], P. PATEL[1], M. M. MILLER[1], K. REMOLE[4], J. IMBIMBO[5], D. SHOHAMY[1], P. L. CROXSON[1], A. MAYERS[1];
[1]Zuckerman Inst., [2]Psychiatry, [3]Psychology, Columbia Univ., New York, NY; [4]Wu Tsai Inst., Yale Univ., New Haven, CT; [5]Relearning Curve, Brooklyn, NY

Abstract: We present Columbia University's high school neuroscience research program, BRAINYAC, and describe the structure, implementation, and impact of this pathway program for preparing the next generation of professionals in science, technology, engineering, and math (STEM). BRAINYAC is hosted by Columbia's Zuckerman Institute, a neuroscience research institute located in a geographical area (upper Manhattan and the South Bronx), which contains neighborhoods with many challenges in terms of income, disability, and academic performance. These populations are also primarily composed of individuals who have been minoritized in STEM at every level of education.
To address this disparity, we aim to: 1) recruit and retain high-potential students from low-resourced neighborhoods, with a focus on underrepresented minorities; 2) foster science skills and STEM self-confidence in students; 3) support students' career development and college

applications.
To achieve these aims, we recruit the majority of our students from low-income neighborhoods in the Bronx and upper Manhattan through an inclusive application process. In the spring, we teach weekend courses for students to strengthen their confidence, technical skills, and tools for navigating academia. Under 1:1 mentorship with full-time scientists and guidance of near peer alumni mentors, students complete summer research internships culminating in a final poster presentation.
Established in 2013, BRAINYAC has enrolled 183 students (>80% have been from minoritized groups). Since 2020, we have used ongoing mixed-methods research, including pre- and post-survey data and focus groups, to measure the impacts of BRAINYAC on students' identity and self-efficacy in STEM (N=31), which we found increased significantly (p<0.001) after the program, driven largely by significant gains in scientific skill competence (p<0.001) and recognition by oneself and others as a scientist (p<0.01). BRAINYAC succeeds through a combination of strategies creating an ecosystem of support for not only our students but also our mentors. We provide culturally responsive mentor training to help mentors cultivate meaningful and positive relationships with their mentees. Our students also benefit from BRAINYAC's partnerships with other programs that bolster college and career readiness, stipends on par with external employment opportunities, and alumni fellowships to support continued work in host labs or on our instructional team. Our findings support the idea that early exposure to authentic, meaningful experiences in scientific research can play a large role in future intent to pursue a career in STEM fields.

Disclosures: D.H. Li: None. **M. Gumnit:** None. **A. Shah:** None. **I. Bravo:** None. **B.M. Silver:** None. **P. Patel:** None. **M.M. Miller:** None. **K. Remole:** None. **J. Imbimbo:** None. **D. Shohamy:** None. **P.L. Croxson:** None. **A. Mayers:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.06SU/WW71

Topic: J.02. Teaching of Neuroscience

Support: NIH R25 GM132961
University of Kentucky College of Medicine
University of Kentucky Department of Neuroscience
University of Kentucky Chellgren Center

Title: Broadening participation through increased START Program partnerships and collaborations

Authors: *L. H. BRADLEY[1], M. M. TUCK[3], J. A. BRADLEY[3], A. P. SINAI[2], M. MOHR-SCHROEDER[4];

[1]Neurosci., [2]Univ. of Kentucky Col. of Med., Lexington, KY; [3]Integrated Success Coaching, [4]STEM Educ., Univ. of Kentucky, Lexington, KY

Abstract: Despite increased demand to pursue STEM occupations, individuals from underrepresented groups lack access to the key experiences necessary to consider long-term careers in STEM and neuroscience. The University of Kentucky's STEM Through Authentic Research and Training (START) Program seeks to strengthen and diversify the STEM community by supporting a pathway to higher education for underrepresented, historically marginalized students, from elementary to high school, through authentic learning and research experiences. Programmatic goals exist around outcomes for individuals participating in the START Program and the development of a cohesive ecosystem of support among school districts, academic and student service departments at the University of Kentucky, as well as STEM-based organizations in the Fayette County area. Given the often-siloed nature of institutions of education, the START program identified gaps in experiential offerings due to structural barriers and explored previously undeveloped pathways of collaboration among stakeholders. This paper presents a case study in the creation of the START pipeline, chronicling the partnerships that have emerged from the START Program both on-campus and across the Lexington community. As a result of this work, the program has provided opportunities to more than 2,000 students within the local school systems. During 2022, high-school START Apprentices accessed research labs and near-peer mentors at the University of Kentucky. For students unable to conduct research on-campus, START partnered with Higher Orbits, a national non-profit organization focused on space exploration, to provide hands-on STEM experiences at home to an additional 20 high school students during the spring semester. Furthermore, understanding that the START pipeline needed to incorporate additional elements beyond student participation to produce extensive outcomes, the program also offered professional development opportunities to STEM teachers working in high schools around Lexington through the START Teacher Scientist Program. Our results of these and other partnerships established across the START pipeline highlight the benefits of promoting belongingness through collaboration and future directions for expanding the involvement of stakeholders.

Disclosures: L.H. Bradley: None. **M.M. Tuck:** None. **J.A. Bradley:** None. **A.P. Sinai:** None. **M. Mohr-Schroeder:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.07SU/WW72

Topic: J.02. Teaching of Neuroscience

Support: Stiles-Nicholson Foundation
Heidenreich Family Foundation
Cox Science Center and Aquarium

Palm Health Foundation
Sharron and Joseph Ashby Hubert Fund

Title: Taking it to the streets: Lessons from the Stiles-Nicholson Brain Institute's "MobileMinds" Program

Authors: *N. L. BAGANZ[1,2], D. A. CINALLI[1], A. PAZ[1], C. O. BENNICE[1], C. L. RUDZINSKI[1], R. D. BLAKELY[1,2];
[1]Stiles-Nicholson Brain Inst., [2]Col. of Med., Florida Atlantic Univ., Jupiter, FL

Abstract: According to the U.S. National Report Card, 2 out of 3 middle school students score at or below proficiency in STEM subjects, and the statistics are even worse for low-income children in underserved communities. The Florida Atlantic University Stiles-Nicholson Brain Institute (SNBI) is addressing the national shortage in STEM career-oriented students with ASCEND (Advancing STEM-Community Engagement through Neuroscience Discovery), a novel and innovative program targeting middle school students in Palm Beach County (PBC). Since its launch in 2017, ASCEND has grown into an umbrella program with multiple sub-programs, including a one-day neuroscience mini-camp, a semester-long after-school program, and, with the acquisition of a "brain van", a traveling education program, *MobileMinds*. *MobileMinds* is designed to take ASCEND-validated lessons and technologies on the road to support schools in PBC and particularly reach students whose participation may be limited for geographical or socioeconomic reasons. The ASCEND team is composed of graduate student and postdoctoral neuroscience trainees interested in gaining additional training in teaching youth in the community and developing content related to brain science and health in the form of fun, engaging activities through in-person lectures, online media, podcasts, webcasts, and virtual reality (VR) applications. Curricula and activities developed by ASCEND fellows are screened for success with small groups at the SNBI and then delivered to schools and community centers via *MobileMinds* lessons. Interactive media content is programmed onto transportable, museum-grade, touch-screen tables. Recently, we created a VR lab tour that is uploaded into a classroom VR kit, allowing a teacher to take an entire class of up to 30 students on a virtual visit to an SNBI neuroscience lab. In addition, *MobileMinds* works in partnership with the Cox Science Center and Aquarium, incorporating elements of a $2.5 M permanent exhibit *Journey through the Human Brain*. In just 2 years, *MobileMinds* has visited over 20 Title I and charter schools and reached over 2,000 students and educators across PBC. We recently received additional philanthropic support to further broaden our reach to schools and community centers in underserved communities of southern PBC and north Broward County.

Disclosures: N.L. Baganz: None. **D.A. Cinalli:** None. **A. Paz:** None. **C.O. Bennice:** None. **C.L. Rudzinski:** None. **R.D. Blakely:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.08SU/WW73

Topic: J.02. Teaching of Neuroscience

Title: Mneurospark: praxes for nurturing and guiding future urm neuroscientists.

Authors: A. MEJIA[1], A. HENRY[2], D. A. FAIR[2], ***A. RANDOLPH**[3];
[1]Masonic Inst. for the Developing Brain, [2]Univ. of Minnesota, [3]Univ. of Minnesota, Minneapolis, MN

Abstract: Neuroscience research has the potential to impact wellness, learning, and mental health acceptance and care, as well as the treatment of neurological disorders for global populations. The application and impact of neuroscience innovation depend on multiple perspectives, diversity of thought, and cultural awareness. Specifically, recruiting, retaining, and training a diverse pool of highly skilled individuals in neuroscience is imperative for maximizing the impact of our research and education. However, the effort is compromised by existing race and ethnicity imbalances in the field. Despite many national efforts, underrepresented minorities (URM) experience barriers to participation in neuroscience research. In this proposed work, we will target middle school-aged youth, as these years are a critical time in youth's identity, self-concept, and accomplishment orientation formation processes, which will play a significant role in shaping their experience in community, school, work, and life. The primary goal of this proposal is to provide meaningful, reinforcing experiences and a supportive network for URM 6th-8th grade students as they explore potential opportunities in neuroscience. We will do this by integrating successful yet disparate single-organization practices into a unified and longitudinal statewide model. Our proposal incorporates and expands upon our team's past success in (1) creating and delivering a novel neuroscience curriculum to be delivered statewide through Minnesota in a "Train-the-Trainer" model that will create a new generation of neuroscience educators, (2) creating and executing an immersive neuroscience summer camp for interested youth to help them begin to take steps toward aspiration achievement that include relying on supports, navigating barriers, and reimagining what is possible for them, and (3) developing a year-long mentorship program aimed at diversifying the field of neuroscience through underrepresented mentors connecting and forming long-term bonds with underrepresented students. For the first time, we will integrate three forms of engagement experiences into a single, cohesive ecosystem for participants to better understand potential synergistic benefits of multiple modes of engagement for students. We believe that these consistent and reinforcing experiences provide the next generation of underrepresented minorities, disadvantaged and/or disabled, and rural leaders with a transformative opportunity for educational and research success in neuroscience fields.

Disclosures: A. Mejia: None. **A. Henry:** None. **D.A. Fair:** None. **A. Randolph:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.09SU/WW74

Topic: J.02. Teaching of Neuroscience

Support: New York State Education Department
Pinkerton Foundation
New York City Department of Education

Title: From desk to bench, a two-year high school program designed to prepare students for successful integration and contribution to neuroscience discovery.

Authors: *H. ALEYASIN[1], D. E. CROOTE[2], A. JOSEPH[3], T. R. FRANZ[4], K. THOWNSEND[3];
[1]Icahn Sch. fo Med. at Mount Sinai, New York, NY; [2]Neurosci., [3]Ctr. for Excellence in Youth Educ., [4]Icahn Sch. of Med. at Mount Sinai, New York, NY

Abstract: Introducing high school students to scientific discovery is an invaluable goal but challenging task for students, educators, and scientists. There are major challenges for this transition both in content and style. The two-academic-year programs designed and implemented by the Center for Excellence in Youth Education (CEYE) at the Icahn School of Medicine at Mount Sinai are an integrated approach to transition students from classrooms into research laboratories. The academic programs are instructed by scientist educators and designed to prepare high school juniors and seniors (grades 11 and 12) with skills necessary for working in research laboratories. The course work covers critical thinking, understanding the steps of scientific path to discovery, and cellular and molecular principles of biomedical research. The first year of the program is focused on teaching biomedical science literacy, scientific reading and writing, and communication skills. The instructors guide students through independent research projects, through which they learn how to search and use reliable sources for scientific information including NCBI databases and platforms such as PubMed, Nucleotides, Structure, Genes, OMIM. Students also learn basic laboratory techniques and biosafety with standard equipment used in research laboratories. DYAD pedagogy, which pairs students for projects and laboratory exercises, prepares students for cooperation, collaboration, and building interpersonal relationships. At the end of the first-year students are matched with research laboratories and clinical placements across the Mount Sinai Health system for 6-12-month internships. Department of neuroscience laboratories contribute to the highest number of research placements in the program. Students work in the labs during their school day and contribute to the discovery process, from collecting data through presenting their work in lab meetings and preparing reports and manuscripts. The CEYE formally partners with two public high schools in New York City Department of Education to offer this academic credit-bearing course over 2 year to a selected cohort of students. The programs exist alongside the CEYE's robust portfolio of programming built to uphold the principles of diversity, equity, and inclusion, and introduce groups that are underrepresented and or economically disadvantaged in science and medicine to STEM careers. We strongly believe the CEYE's overall programmatic goals represents a best practice approach and model for developing and sustaining the "be a scientist" mindset.

Disclosures: H. Aleyasin: None. **D.E. Croote:** None. **A. Joseph:** None. **T.R. Franz:** None. **K. Thownsend:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.10SU/WW75

Topic: J.02. Teaching of Neuroscience

Support: Patricia C. Perna Fellowship
Kavita and Mahajan Research Award

Title: Utilizing storytelling to create a magical, permanent association with neuroscience in children

Authors: *E.-M. ABISAMRA;
Undergraduate Neurosci. Program, Virginia Tech., Blacksburg, VA

Abstract: Kids Can Write (KCW) (kidscanwrite.net) is a global outreach organization that aims to bridge the gap between the arts and STEM (science, technology, engineering, and mathematics) by helping elementary school kids learn about science and then create their own stories that are published for free. More than fifty kids have been published through the KCW Programs. Due to the success of the KCW programs, a new program called KCW Neuroscience was developed and established to introduce children to neuroscience and guide them to incorporate neuroscience into their stories. The first iteration of this program was facilitated by Neuroscience majors at Virginia Tech who volunteered to mentor 2nd-5th grade students at Gilbert Linkous Elementary School in Blacksburg, VA. This 6-week program had fifteen children actively participating in it for one hour a week. The college student mentors follow the KCW Neuroscience curriculum, teaching the kids fundamentals of writing and lessons on the brain. Students create a character summary, timeline map, and their own stories with one-on-one interactions with their tutors. They learn about neurons, neurotransmitters, and functions of the lobes of the brain and then apply this knowledge to create their own fantastical worlds inside the brain, which their characters travel through. Children learn how creativity is essential to science and our endeavor to understand the brain. They are also encouraged to use their imagination as they use neuroscience concepts as a launching pad for their stories. After the program concludes, children publish their books for free with guidance from KCW. They realize the joy of publishing and their ability to accomplish this huge feat, which will increase their self-confidence in their ideas and ability to publish future work as neuroscientists or researchers. The program also provides volunteering, mentorship, leadership, and publishing experience for Neuroscience majors, via an impactful, positive outreach experience that can strengthen their appreciation for neuroscience overall. The KCW Neuroscience program is a unique and innovative extracurricular opportunity for children around the world to learn about neuroscience, utilize their creativity as a superpower, and become published authors while engaging in STEM education.

Disclosures: E. Abisamra: None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.11SU/WW76

Topic: J.02. Teaching of Neuroscience

Title: Usa brain bee championship 2023

Authors: *N. MYSLINSKI[1], M. O. YASSA[2];
[1]Neural and Pain Sci., Univ. of Maryland Dent. Sch., Baltimore, MD; [2]Univ. of California, Irvine, Univ. of California, Irvine, Irvine, CA

Abstract: The USA Brain Bee is a Neuroscience Competition for teenage students. Its purpose is to inspire them to learn about the human brain, and apply those lessons to their daily lives, and to motivate them to pursue careers in neuroscience so they can help treat and find cures for brain disorders. Each Brain Bee Local Chapter conducts a competition involving many schools. This year forty Chapter Winners from twenty-seven states competed in-person in the 16th annual USA Championship. It was held April 21-23 at the University of California, Irvine Center for the Neurobiology of Learning and Memory. In first place, is Srijan Velamuri, 12th grader from Philadelphia who aspires to become a neurologist or neurosurgeon. Srijan participated in the USA Brain Bee Championship after winning the Philadelphia Brain Bee. He plans to begin his undergraduate studies in neuroscience this fall at the Johns Hopkins University. Srijan will be representing the United States this year at the 2023 World Brain Bee Championship hosted by the American Psychological Association. The 2023 USA Brain Bee 2nd place winner was 11th grader Navneeth Murali, who represented the Northeast Pennsylvania Bee. In 3rd place was 9th grader Sanjay Adireddi, who represented the St. Louis Brain Bee. The three-day competition involved a neuroanatomy lab practical, patient diagnosis, neurohistology, neuroimaging, a written and a final oral Q & A with Dr. Michael Yassa and Dr. Norbert Myslinski as the judges. The keynote speakers were Dr. Katherine Thompson-Peer and Dr. Oswald Steward, the President of the Society for Neuroscience. Dr. Norbert Myslinski, Brain Bee Founder, proudly proclaims that “The Brain Bee Builds Better Brains to Fight Brain Disorders.”

Disclosures: N. Myslinski: None. **M.O. Yassa:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.12SU/WW77

Topic: J.02. Teaching of Neuroscience

Support: TMC Foundation Grant #22013

Title: Social & Emotional Neurodevelopment (SEND) curriculum

Authors: *W. I. SCHNAPP[1,2], M. A. CARDENAS[1,2], A. PENA[1,2], L. A. OLAND[1,2];
[1]Univ. of Arizona, Tucson, AZ; [2]Ctr. for Neurosciences Fndn., Tucson, AZ

Abstract: The Center for Neurosciences Foundation (CNSF), a Tucson-based local non-profit organization, is committed to fostering neuroscience education among communities in Southern Arizona. Its primary objective is to enhance public understanding of brain functionality and raise awareness regarding neurological disorders. Since its establishment in 2010, CNSF has actively engaged with the public through various outreach initiatives, including community events, museum visits, library programs, and science/health festivals. In pursuit of this mission, and in response to the rapidly increasing incidence of mental health issues among our young people, the Foundation has developed a Social & Emotional Neurodevelopment (SEND) curriculum. The curriculum is designed to educate elementary, middle, and high school students on fundamental neuroscience concepts and the brain's role in emotions, behavior, and social interactions. We also have developed at each level a session for parents, teachers, and counselors that provides an overview of brain development as well as a discussion of typical behaviors and issues, with strategies for addressing them. Our objective is to transform attitudes surrounding mental health, enhance general knowledge of neuroscience, and equip students with the information necessary to make informed decisions for their mental well-being and to develop resilience. The curriculum is tailored to suit each age group, with elementary school modules focusing on interactive activities, middle school lessons striking a balance between activities and lectures, and high school sessions emphasizing critical thinking through instruction and discussion. Each curriculum level concludes with science-based guidelines aimed at fostering resilience and highlighting four pillars of optimal brain health: physical activity, sleep, healthy eating, and social interaction. This undertaking holds the potential to empower students and contribute to a healthier society overall.

Disclosures: W.I. Schnapp: None. **M.A. Cardenas:** None. **A. Pena:** None. **L.A. Oland:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.13SU/WW78

Topic: J.02. Teaching of Neuroscience

Support: NSF Grant DRL-1948591

Title: Neuroscience for neurodiverse learners: accessible and inclusive neuroscience education

Authors: *E. H. CHUDLER[1], P. HAWLEY[4], S. BELLMAN[2], T. TIDWELL[2], S. BURGSTAHLER[2], R. P. N. RAO[3];
[1]Bioengineering; Anesthesiol. & Pain Medicine; Ctr. for Neurotechnology, [2]Disabilities, Opportunities, Internetworking and Technol., [3]Computer Sci. & Engineering; Ctr. for

Neurotechnology, Univ. of Washington, Seattle, WA; [4]Western Washington Univ., Bellingham, WA

Abstract: Neuroscience for Neurodiverse Learners (NNL) is a collaborative effort between the Center for Neurotechnology and the Disabilities, Opportunities, Internetworking and Technology (DO-IT) Center at the University of Washington. NNL is designed to provide hands-on experiences in neuroscience, networking opportunities, and resources to high school and early postsecondary students identified as "neurodiverse" learners (e.g., those with academic challenges related to conditions such as dyspraxia, dyslexia, attention deficit hyperactivity disorder, dyscalculia, autism spectrum disorder, and Tourette syndrome). NNL disseminates its findings to teachers of courses related to neuroscience and, more broadly, science, technology, engineering, and mathematics (STEM). The goal of NNL is to enhance student interest in postsecondary STEM and neuroscience programs, while helping students build skills in areas such as articulating challenges, requesting accommodations, utilizing new technology, and working together. Neurodiverse students participate in summer and academic year activities where they are introduced to basic concepts in neuroscience and neural engineering, neuroethics, and college preparation. The project also works to empower educators to serve these students more effectively. NNL provides Capacity Building Institutes where people work to increase their knowledge, skills, and actions for working with neurodiverse learners. Principles of universal design and opportunities for hands-on learning are incorporated into all programming. Programmatic materials include student-driven content such as 1) Meditation and the Brain; 2) Neuroscience in Film and Television and 3) Music and the Brain. Important factors for a successful program include providing both online and in-person opportunities; space for reflection and quiet; physically accessible rooms, labs, and buildings; properly trained staff to support students; offering materials in a variety of formats; and captioning of videos and videoconferences. Near peer leaders, who participated in past NNL programs, serve to provide feedback on scheduling, prepare work and examples, participate in online discussions and lead by example.

Disclosures: E.H. Chudler: None. **P. Hawley:** None. **S. Bellman:** None. **T. Tidwell:** None. **S. Burgstahler:** None. **R.P.N. Rao:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.14SU/WW79

Topic: J.02. Teaching of Neuroscience

Support: NIH P60-AA011605

Title: Building DIY Microscopes: A Simple and Enriching Neuroscience Activity for Teaching and Outreach

Authors: *S. FACCIDOMO[1], J. L. HOFFMAN[2], S. ASHBURN[3], R. PINK[4], E. STRAUSBERG[4];
[1]Psychiatry & Bowles Ctr. for Alcohol Studies, Univ. of North Carolina - Chapel Hill, Chapel Hill, NC; [2]Alcohol Studies Ctr., Univ. of North Carolina-Chapel Hill, Chapel Hill, NC; [3]Psychology & Neurosci., Univ. of North Carolina at Chapel Hill, Cary, NC; [4]Summer SpringBoard, San Diego, CA

Abstract: ***Background*:** The continued success of our neuroscience outreach activities relies on partnerships we have established with local community organizations. Together with NC museums, planetariums, school districts and non-profits, we co-host and lead dozens of neuroscience outreach activities each year and interact with hundreds of K-12 students and families to share and spread our love of neuroscience. Historically, most of our outreach activities have been geared to younger kids (K-5), with some programming in middle school. However, reaching older populations of students (grades 9-12), especially at ages when interest in science starts to wane, is an important extension of our outreach program. ***Event:*** This year we were offered an opportunity, via the inaugural Summer Springboard Psychology and Neuroscience Program hosted by Duke University, to create a hands-on, interactive outreach activity for high school students enrolled in their summer program. ***Goals and Approach:*** Our goals were to showcase a "day in the life of a neuroscientist" and to give students an opportunity to perform a simple lab task that would illustrate the types of experiments that we conduct in our specialized field of research. Given the limited time we had to interact with the students, this activity needed to be simple and discrete. For these reasons, we decided to have the students each build a simple DIY microscope, in accordance with workshop ideas supplied by www.diymicroscopes.org and design by Kenji Yoshino. They were also shown three ways to slice mouse brain tissue and were given an opportunity to slice and mount the brain tissue to view under their microscope. Finally, they were given a detailed tour of the behavioral equipment used to perform a diverse array of behavioral neuroscience tests for rodents and an opportunity for Q & A with a panel of scientists. ***Observations:*** Students were motivated and showed great enthusiasm for all activities. We found that they needed guidance to assemble the DIY microscopes. For greater efficiency, we also had students take slices from a brain that had been prepared in advance for each of the slicing methods. They were interested in learning about mouse histology and brain regions and were enthusiastic about having a "souvenir" from the excursion to explore at their leisure. ***Conclusions:*** This was a successful partnership with the Summer Springboard program and a fun and stimulating activity for the students that could easily be adapted for different age groups and curriculum as well. We look forward to continually engaging with students in this age demographic to encourage and grow the next generation of neuroscientists.

Disclosures: S. Faccidomo: None. **J.L. Hoffman:** None. **S. Ashburn:** None. **R. Pink:** None. **E. Strausberg:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.15SU/WW80

Topic: J.02. Teaching of Neuroscience

Support: Funded by the Friedman Brain Institute, Icahn School of Medicine at Mount Sinai

Title: Empowering young learners through neuroscience: a curriculum developed from an educator-neuroscientist partnership

Authors: *E. BLEAKMAN[1,2], V. SZAREJKO[2], E. J. NESTLER[2], D. CROOTE[2];
[1]Teachers Col., New York, NY; [2]Nash Family Dept. of Neurosci. and Friedman Brain Inst., Icahn Sch. of Med. at Mount Sinai, New York, NY

Abstract: The importance of teaching young learners about the brain is becoming increasingly evident in the elementary school classroom. However, there are minimal resources that allow neuroscience content to be brought to elementary students. The material that is available to teachers is often inaccurate, difficult to incorporate into the demanding curriculum, and not engaging or developmentally appropriate. The lack of quality neuroscience curricula leads to the missed opportunity to empower students to better understand themselves, which in turn can increase motivation, resilience, and skills to self-regulate. The foundation of a neuroscience curriculum is grounded in the combination of social-emotional learning and neurobiology. This two-fold approach creates a common language to support young learners, ameliorate the stigma around mental health, and inspire the next generation of scientific thinkers. First-hand experience in the elementary classroom and in academic neuroscience underpinned the emergence of an illustrated neuroscience children's book. Embedding science content in children's literature provides an interdisciplinary and inclusive approach to learning - one that builds science comprehension through language and engages students in authentic learning experiences. Following the development of the book's foundation, a partnership was established between Columbia's Teachers College and the Friedman Brain Institute at Mount Sinai. Consultations with neuroscientists provided insight, feedback, and advice for the initial framework of the curriculum. The language used to communicate the structures and functions of the brain was peer reviewed by experts. In addition to collaborating with principal investigators, elementary teachers shared their opinions on accessibility and usability based on first-hand experiences. This comprehensive approach provided opportunities for a research-based analysis of the curriculum's accuracy and effectiveness through both a neuroscience and pedagogical lens. Future directions include bringing the book to an elementary classroom environment to explore the interaction students and teachers have with the material. Data collected, such as semi-structured interviews, pre-/post-testing, and rubrics, will then be analyzed and evaluated to measure the ease and effectiveness of this curriculum. After fine-tuning the curriculum, the book and lesson plans will be available to teachers, allowing them to seamlessly integrate neuroscience into their curricula.

Disclosures: E. Bleakman: None. **V. Szarejko:** None. **E.J. Nestler:** None. **D. Croote:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.16SU/WW81

Topic: J.02. Teaching of Neuroscience

Title: Active Learning Pedagogy and Core Concepts in the Emory-Tibet Science Initiative Neuroscience Sustainability Phase

Authors: *M. P. BLACK[1], J. J. PURCELL[2], G. E. HUE[3];
[1]Neurosci. Inst., Georgia State Univ., Atlanta, GA; [2]Maryland Neuroimaging Ctr., Univ. of Maryland, College Park, MD; [3]Neuroscience& Behavioral Biol., Emory Univ., Atlanta, GA

Abstract: The Emory-Tibet Science Initiative started in 2008 as an historic initiative to develop and implement a comprehensive science education curriculum for Tibetan monastics. The initiative originated from the longstanding vision of the Dalai Lama, who believes that science education within Buddhist monasteries and nunneries will not only offer Tibetan monastics new tools but also advance the effort to share time-tested Buddhist contemplative wisdom with others. The initial Implementation phase involved having a team of Western scientists travel to Tibetan monasteries in India to teach science over the course of six years from 2013-2019. At the end of 2019, the Sustainability Phase began with pedagogical instruction of monastics, so that they could begin to teach science with progressively less reliance on direct Western scientist instruction, teach with more science education autonomy and facilitate the cross-cultural communication across Western Scientific and Buddhist ways of inquiry. COVID put a hold on the Sustainability phase progress, but, through the use of online education, Year 1 of this phase happened in 2022. This year the Sustainability Phase went back to in person at Drepung Loseling Monastic University with monastic and Tibetan teaching students from Rato, Losel Ling, Gomang, Sakya, Gaden Shartse, Gaden Jangtse, Sera Jey, Sera Mey, and Tashi Lhunpo Monasteries and Jangchub Choeling Nunnery. To help students review the six-year curriculum and build skills in teaching the neuroscience they had learned, we used the Society for Neuroscience Core Concepts as a framework for the learning in the Sustainability Phase. In 2023, we focused on Core Concepts 1, 3, and 5. Students were given assignments on using analogy to help explain difficult concepts in neuroscience and a teaching assignment using the 5Es, the Teaching Cycle, and active learning techniques. Critical to this process was the active feedback provided to the monastics as they provided scientific instruction on a variety of topics ranging from neurotoxicity to meditative practices. With one more year in the Sustainability Phase, we discuss lessons learned, resources being translated into Tibetan, our plans for Year 3, and hopes for the monastic students and the future of the program in neuroscience. The principles learned in this pioneering endeavor offer insights into cross-cultural neuroscience education from a broader perspective.

Disclosures: M.P. Black: None. **J.J. Purcell:** None. **G.E. Hue:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.17SU/WW82

Topic: J.02. Teaching of Neuroscience

Title: Building realistic neurons: a middle school lesson plan

Authors: *G. WILLIAMS[1], C. GAMLIN[1], A. WIENER[2], K. CASIMO[2], R. DALLEY[1], S. SORENSEN[1];
[1]Allen Inst. For Brain Sci., Seattle, WA; [2]Allen Inst., Seattle, WA

Abstract: The classic morphological model of the neuron is ubiquitous, but reductive. Real neuron morphologies are highly complex and diverse, but they can be difficult to describe realistically without such simple models. We have created a hands-on lesson plan geared toward a middle school audience (grades 6-8) in which students, using actual images of neurons as their guide, make their own realistic neuron models using pipe cleaners. The lesson is a collaboration between the Neuroanatomy department and the Education & Engagement program at the Allen Institute for Brain Science. It is an extension of "Neurons: Beyond the Textbook," an existing curriculum created by the Neuroanatomy department for use by students, educators, and researchers. We have designed two realistic cortical neuron models using pipe cleaners, one excitatory neuron and one inhibitory neuron, for students to create. The models expand upon the existing classical model of the neuron, reflecting real data, and have the advantage of being low-cost and low-waste. The lesson plan has been piloted with local teachers and will be introduced to schools and community organizations in the 2023-24 school year. Accessibility in science education is crucial. As the field advances, so must education. We demonstrate that it is possible to introduce more complexity to curricula in a way that is accessible, engaging, and efficient. Building Realistic Neurons can be found on the Allen Institute website at http://www.alleninstitue.org/education.

Disclosures: G. Williams: None. **C. Gamlin:** None. **A. Wiener:** None. **K. Casimo:** None. **R. Dalley:** None. **S. Sorensen:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.18SU/Web Only

Topic: J.02. Teaching of Neuroscience

Support: NSERC PDF - 546008-2020 to SS

Title: Evaluation of attitudes towards science, health literacy, and mental wellbeing in non-traditional middle school adolescents: an InSciEd Out case study

Authors: *S. SHAMS[1,2], S. FARNAN[2], T. BAIN[3], K. PALMBY[3], L. SANER[3], C. SHORTISS[2], C. K. PIERRET[1,2];
[1]Biochem. and Mol. Biol., Mayo Clin., Rochester, MN; [2]InSciEdOut, Rochester, MN; [3]Rochester Publ. Sch., Rochester, MN

Abstract: Academics, educators, and clinicians recognize an urgent and critical need of educational practices that allow effective delivery of mental health information and reduce barriers in recognizing and receiving help. Providing beneficial education for vulnerable youth populations remains difficult to design and execute. Nonetheless, objective and reliable analysis of such interventions is required for durable policymaking and for better youth mental health outcomes. Herein, through Integrated Science Education Outreach (InSciEd Out), we describe a unique scientist-educator-clinician partnership to address youth mental wellbeing and mental health literacy in an alternative middle school student population (individualized and specially designed instruction; grades 6-8). In a pre-post intervention design, we measured changes in attitudes towards science, mental health knowledge, and general participation through student-reported surveys (Health Literacy Survey (HLS), Student Attitudes Toward STEM Survey (S-STEM), Strengths and Difficulties Questionnaire (SDQ)). Additionally, classroom artifacts and teacher interviews were used to further clarify student outcomes. The intervention included an inquiry-based, student-designed, and youth-relevant science curriculum studying effects of vaping on zebrafish development, as well as a modified social and emotional learning unit and resilience training with breathing, attention, and movement-based components. Preliminary analyses (n = 25) exhibited small gains in attitudes towards science, modest improvement in mental health literacy and stress management, as well as a modest increase in classroom-participation. Our findings provide further support for feasibility and effectiveness of InSciEd Out strategies as a science education tool for mental health and resiliency curricula in non-traditional grade schools and for students with diverse educational needs. The InSciEd Out programs are curated to be readily scaleable, translatable, and accessible for neurodiverse students and integrating these programs within the regular curriculum can be an efficient means to achieve better mental health literacy and sustainable resilience in youth.

Disclosures: S. Shams: None. **S. Farnan:** None. **T. Bain:** None. **K. Palmby:** None. **L. Saner:** None. **C. Shortiss:** None. **C.K. Pierret:** None.

Theme J Poster

TJP02. K-12 Teaching and Outreach

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP02.19SU/WW83

Topic: J.02. Teaching of Neuroscience

Support: TRIO Clatsop arranged housing and meals
Roundhouse Foundation

Title: Nw noggin: signal from noise on the oregon coast

Authors: *W. S. GRIESAR, J. J. LEAKE;
Northwest Noggin, Portland, OR

Abstract: Science needs investment. Engaging the public communicates discoveries and builds support for education and research. Integrating arts in STEM (STEAM) and community members from varied fields fosters interdisciplinary engagement, and draws in people not currently overrepresented in neuroscience. Nonprofit NW Noggin (nwnoggin.org) organizes undergraduates and graduates to collaborate, build community networks and inspire people about neuroscience and art. We bring diverse students excited by research and their own arts-integrated study of the brain and behavior into K-12 public schools, correctional facilities, Congress, houseless youth centers, coffee shops and pubs to hear what people already know and what they'd like to know, and to see where our stories and discoveries from labs and classrooms intersect. We've talked with over 65,000 people since 2012! Our volunteers left labs and lecture halls in spring 2023 to learn from bar pilots, cardiologists, graduate students, curious pre-K kids and 250 engaged 9th - 12th graders with inspiring, challenging questions from rural Oregon public schools. We love to learn from people with knowledge and experience we do not have, and find where our research might apply. These efforts have deepened connections. Noggin has been invited to Oregon's North Coast every year since 2019, with meals and housing provided by local businesses and TRIO Clatsop. Eleven volunteers and 100+ people came to the Fort George Brewery in Astoria, Oregon for a free Noggin talk about energy in waves. We introduced three speakers, each skilled in extracting essential signals from noisy swells. Mark Hails, a Columbia River bar pilot, described wave signals permitting safe navigation around an infamous bar; Tom Hernandez, a PA cardiologist at Columbia Memorial Hospital, taught us to appreciate and measure a blood-borne wave relevant to health and disease; and Randall Olson, a graduate student in Behavioral/Systems Neuroscience at OHSU, explored brain waves contributing to conscious experience and perception.This presentation began a week of visits to pre-K's and high schools in Knappa and Astoria. We made brain-related art, examined brain specimens, and discussed diverse topics of local interest, including sleep, psychedelics, fentanyl, elk behavior in response to different hunting techniques, ADHD, anxiety, depression, autism, alcohol, epigenetic impacts of multi-generational trauma, forest bathing, education and career pathways in neuroscience and the development of adolescent brains! Interdisciplinary outreach informs community understanding, reaches more people, and builds support for investment in research and art.

Disclosures: W.S. Griesar: None. **J.J. Leake:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.01SA/XX1

Topic: J.02. Teaching of Neuroscience

Support: Scholarship of Teaching and Learning Grant, Virginia Tech Center for Excellence in Teaching and Learning

Title: The Brain: An Owner's Manual for College Success

Authors: *J. R. RAINVILLE[1], T. LIPUMA[3], R. A. DIANA[2];
[1]Sch. of Neurosci., [2]Psychology, Virginia Tech., Blacksburg, VA; [3]Psychology, Indiana University-Purdue Univ. Indianapolis, Indianapolis, IN

Abstract: The COVID-19 pandemic forced students and instructors into distance education. Some students began their college instruction during the midst of the pandemic, and had not had in-person instruction for over a year. Much of the research on COVID-19 and education focuses on coping with and adapting to distance learning, but to our knowledge, little research has been done on the transition back to in-person learning, or the long-term effects of this period of remote learning on student perceptions of success.
We posit that there is an untapped approach to bolstering student attainment. Although many interventions point to psychological and neurobiological outcomes related to improved learning outcomes, e.g., neuroplasticity and the growth mindset, to our knowledge, there are no interventions that equip students with both evidence-based tools to studying, along with the neurobiological and psychological mechanisms by which these tools are efficacious.
Our seminar-style intervention for neuroscience and psychology students, who take a variety of STEM and general education courses, included a short survey to assess students' existing study strategies, knowledge of learning concepts, and confidence prior to attending the seminar. Across Fall 2022 and Spring 2023, we have collected 335 responses to that survey (all from undergraduate students at Virginia Tech). The pre-seminar survey indicated that approximately 50% of students think their studying is effective, but approximately 54% indicated that they feel somewhat unprepared for exams. 54% of students also described themselves as procrastinators. Of the students who completed the survey in the fall, there was more endorsement of procrastination among first-generation students than others.Among the study strategies we asked about in the pre-survey, 49% of students said that they re-write their class notes word-for-word more than occasionally, which is known to be an ineffective study strategy. The highly effective strategy of re-writing previous quiz or test questions to use for practice, is only used regularly by 42% of the respondents. Our preliminary confirmatory factor analysis of the pre-seminar survey data indicated two reliable factors on the survey: preparation self-efficacy and practice test-taking behaviors. These results indicate that many students could benefit from implementing new study strategies to increase their confidence in learning material for classes. A follow-up survey is in development and will be used to evaluate changes in student study habits and perceptions of learning post-seminar.

Disclosures: **J.R. Rainville:** None. **T. Lipuma:** None. **R.A. Diana:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.02SA/XX2

Topic: J.02. Teaching of Neuroscience

Title: Creation of an open, free, adaptable neuroscience textbook

Authors: *J. HUTCHINS, M. ALLEN, J. BURR, A. O'HARE;
Weber State Univ., Ogden, UT

Abstract: Weber State University is primarily a teaching institution with 29,000 students, most of whom work full- or part-time. We currently offer a minor in neuroscience with courses including Introduction to Neuroscience, Cell & Molecular Neuroscience, Clinical Neuroscience, Cognitive/Behavioral Neuroscience, Human Neuroanatomy, and the Neuroscience of Sex, Romance, and Gender. A neuroscience major is currently in the proposal stages. About 1/3 of the students who attend Weber State University are the first in their families to attend college. In this context, we have a critical need for an affordable, adaptable set of learning materials (textbook, PowerPoints, learning activities, and exam questions). The current offerings from legacy publishers fail to meet either affordability and/or adaptability standards. It is our intention to create such a set of learning materials with the help of the neuroscience community. The basic foundation of such a course has been created by faculty in the neuroscience program but our expectation is that those who wish to use the materials will help in their creation, adding their expertise to the mix -- a sort of "friendship cake" of learning materials. All materials will be of consistent quality and comprehensiveness, and all materials will be Creative Commons CC BY licensed so that anyone may use them. For example, exam questions will be validated using standard psychometric measures to ensure they are actually measuring learning. The expectation is that each topic will be covered at three levels, representing Bloom's Taxonomy: remember & understand (e.g. for an Intro course); apply & analyze (e.g for an upper-division college course); and evaluate & create (e.g. for an advanced undergraduate or basic graduate course). Examples of the type of materials we have created and the methods we will use to ensure we meet adaptability and quality standards will be presented.

Disclosures: **J. Hutchins:** None. **M. Allen:** None. **J. Burr:** None. **A. O'Hare:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.03SA/XX3

Topic: J.02. Teaching of Neuroscience

Support: NSF Grant 2216386

Title: Improving Neuroanatomy Learning Using Perceptual and Adaptive Learning Technology

Authors: C. MASSEY[1], ***W. GRISHAM**[1], S. KRASNE[2], J. WONG[1], P. J. KELLMAN[1]; [1]Psychology, [2]Dept. of Physiol., UCLA, Los Angeles, CA

Abstract: Learning to recognize neuroanatomical structures and to understand their functions and interrelationships is foundational in neuroscience education. But this learning poses serious challenges—a heavy burden of memorization, the need to discern structures with similar appearance and subtle differences, and the demands of difficult perceptual discriminations among densely packed structures. To address these challenges, we are developing and testing innovative Perceptual Adaptive Courseware (PAC) for undergraduate neuroanatomy. Building on earlier research showing the benefits of perceptual-adaptive learning modules (PALMS) in other STEM and medical learning domains, PACs more fully integrate aspects of traditional instruction with interactive learning. The PAC divides the targeted material into conceptual units that are introduced in short segments of video instruction interleaved with active practice items. Perceptual learning components accelerate key classifications, discriminations, and fluency. Adaptive components employ spacing, interleaving, and mastery criteria that more fully optimize factual learning as well as perceptual classifications. Interleaving didactic and interactive components of learning in PACs promotes consolidation of newly introduced material and readiness for subsequent content. The PACs use each student's performance data to pace the presentation of new topics and to guide interactive practice, mixing both older and new learning categories until mastery criteria are met for all categories. Undergraduates (n=137) used PAC training as a substitute for traditional lecture and lab instruction in Week 1 of a 3-week neuroanatomy module. A second business-as-usual (BAU) group (n = 102) took the same course in a different quarter and participated in standard instruction closely matched for content. Both groups completed a pretest before Week 1, an immediate posttest at the end of Week 1, and a delayed posttest two weeks later. Assessments consisted of questions related to but not previously presented in either the PAC or BAU instruction. Students in both conditions had similar pretest scores and made significant learning gains on the posttests, but the PAC group scored significantly higher than the BAU group on both the immediate ($t(236) = 8.79$, $p < .0001$) and delayed posttest ($t(236) = 5.34$, $p < .0001$), with large effect sizes. Student surveys suggested that PAC learning also took less time than typical study routines. Data from this first implementation indicate that the Neuroanatomy PAC clearly enhanced student performance and showed definite advantages over standard lecture and lab instruction.

Disclosures: C. Massey: None. **W. Grisham:** None. **S. Krasne:** None. **J. Wong:** None. **P.J. Kellman:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.04SA/XX4

Topic: J.02. Teaching of Neuroscience

Title: A modern CURE for a long-standing undergraduate neuroscience methods course

Authors: *A. FRICKS-GLEASON, J. MANISCALCO;
Psychology & Neurosci., Regis Univ., Denver, CO

Abstract: Our Neuroscience Methods course has long been the most anticipated and loved course in the Neuroscience major at Regis University, but the format was quickly becoming outdated and stale; a change was needed. We found ourselves facing two challenges: 1) our faculty and students were no longer fulfilled by simply conducting replication studies in this course, and 2) the number of students enrolling in the neuroscience major - and consequently, student interest in independent research with faculty - was outpacing the available spots in faculty member research labs. Our students desired more authentic research experiences and our faculty needed a way to combine their teaching and research efforts more efficiently. We needed a CURE! Course-based undergraduate research experiences (CUREs) have been gaining popularity as a way to integrate research experiences into the undergraduate curriculum. In contrast to independent research in a faculty mentor's lab, CUREs provide a means to scale the experience of engaging in authentic research to a much broader population of students. This increased accessibility was attractive to us as faculty because it would allow us to provide a higher-quality educational experience to a wider swath of our student population, while also increasing our scholarly productivity. CUREs allow students to move away from traditional "cookbook" lab activities - or in our case, forgo replication experiments - and embrace the opportunity to work on novel neuroscience questions with unknown answers. Not only does this invigorate the course experience for students, but it provides the type of "real world" research experience that better prepares students for graduate/medical school and careers in the sciences. CUREs have been demonstrated to benefit both the students and the instructors and it's easy to see why they are growing in popularity; however, this transition was not without significant challenges. Here we discuss the hurdles we faced in reimagining this course as a CURE, share some of the solutions we developed, and invite conversation around ways to further improve this course moving forward.

Disclosures: A. Fricks-Gleason: None. **J. Maniscalco:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.05SA/XX5

Topic: J.02. Teaching of Neuroscience

Support: Supported by the University of Kentucky Office of Undergraduate Research (OUR)

Title: Authentic curriculum undergraduate research experience (ACURE) for freshman college students: the physiological effects of excess Zn^{2+}

Authors: *E. ELLIOTT, K. E. BROCK, A. C. TAUL, R. L. COOPER;
Univ. of Kentucky, Lexington, KY

Abstract: As part of the STEMCats program, students with science, technology, engineering, or mathematics (STEM) majors are introduced to various scientific and research-oriented concepts in a number of hands-on laboratory classes; in this case, an interactive, inquiry-based laboratory protocol was devised to introduce students to a wide array of these concepts while examining the physiological effects of zinc exposure and toxicity. Two model organisms — fruit flies (*Drosophila melanogaster*) and crawfish (*Procambarus clarkii*) — were used, allowing students to understand both how animal models can provide insight into human physiology, and how such models can differ amongst themselves. Students learned to examine fruit fly behaviors through a dose-response examination of larval crawling rate, mouth-hook-movement rate, and touch sensitivity. They also learned how to dissect various preparations according to their specific purpose (i.e. how to dissect for cardiac observation as opposed to nervous observation, etc.) in order to examine the hearts, neuromuscular junctions, and the sensory muscle receptor organs of the model organisms (only in crawfish). Finally, they also learned how to expose organisms to the compounds of interest (i.e. zinc) through various methods — that is, through diet, environment, etc. — and to examine survival rate afterwards. After these directed experiments, students developed their understanding of how to analyze data, develop new research questions, and write/publish research in a journal-article format. Additionally, students presented their research as four distinct posters at various symposiums and showcases once data collection was complete.

Disclosures: E. Elliott: None. **K.E. Brock:** None. **A.C. Taul:** None. **R.L. Cooper:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.06SA/XX6

Topic: J.02. Teaching of Neuroscience

Support: Beckman Scholar's Program

Title: Authentic curriculum undergraduate research experience (ACURE) for a neurophysiology course: the physiological effects of excess Li+

Authors: *K. BROCK, E. ELLIOTT, R. COOPER;
Univ. of Kentucky, Lexington, KY

Abstract: Through the accompanying course material, students use stains to visualize the primary sensory neurons of a proprioceptor in the walking legs of a large arthropod (*Callinectes sapidus*). This material also supported investigation of action potentials signaling joint position and joint movement, and further insight into how altering the ionic composition of the bathing medium affects electrical activity. Proprioceptors in vertebrate joints and limbs consist of both position and kinesthetic receptors, which supply the brain with information on joint position, direction, speed, muscle tension, and muscle length. Arthropods likewise maintain proprioceptive organs referred to as chordotonal organs. The sensory endings use stretch activated channels (SACs) to detect movement and position. The graded receptor potential allows axonal conduction of action potentials. In this educational module, students observe how replacing sodium (Na+) directly with lithium (Li2+) alters activity and the mechanism of action. Students also research how the pharmaceutical applications of lithium have been used to treat an assortment of mental illnesses such as bipolar disorder, schizophrenia, and depression. Though it is classified as a mood-stabilizing medication, the mechanisms through which lithium treats such conditions remains unknown. The PD organ and nerve of a crab may serve as an experimental model, as they are easy to access, and the dissected preparation lives well in a basic salt saline at room temperature. Students record neural activity with suction electrodes while moving the joint before and after changing the bathing medium. The learning objectives are to learn the anatomy and physiological properties of this organ. Students also learn how Li+ affects neural activity and can relate the findings to basic properties of therapeutic clinical applications. In this preparation, Li+ was observed to decrease neural activity (N=6, P>0.05) and decrease conduction velocity in axons. Students give presentations of their findings in the course and work on a team presentation at local scientific meetings; they also prepare the findings for scientific peer-reviewed publication. This fits well as an ACURE module but extends the concept through publication.

Disclosures: K. Brock: None. **E. Elliott:** None. **R. Cooper:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.07SA/XX7

Topic: J.02. Teaching of Neuroscience

Support: Women for DeSales

Title: An Affordable Open-Source Apparatus For Assessing Thermal Nociception in Rats

Authors: J. BUENTELLO, J. S. CAMPO-VIRGIL, A. FERGUSON-RICHARDS, A. ALEXANDER, K. NACIPUCHA, *A. J. KRUPKA;
Biol., DeSales Univ., Center Valley, PA

Abstract: Nociception assays are regularly used to assess sensitivity to different pain modalities. One classic assay designed for use in rodents is the Hargreaves Test, where a radiant heat source is focused on a rodent paw to elicit a pain withdrawal response. There are several commercially available systems for performing the Hargreaves test, though these are expensive, typically costing thousands of dollars. We designed a novel testing apparatus suitable for undergraduate use with a focus on affordability, simplicity, and openness. This apparatus uses a combination of open-source circuitry, off-the-shelf components, and 3D printed hardware to reduce costs and allow users to collaborate and rapidly iterate on design. The core of this apparatus is a low-power near-infrared laser diode (800-900nm) designed for consumer electronics which provides direct infrared stimulation of the plantar hindpaw. In this poster, we present a low-cost Hargreaves apparatus that includes photodiode sensors to detect paw movement. We found that the photodiode sensor withdrawal latencies closely matched those we obtained from high-speed video recordings of the trials. The results of this development will be provided to the scientific community as an open-source build. Our hope is that widespread use and testing will improve the system and lead to wide adoption as a low-cost alternative for education and small labs.

Disclosures: J. Buentello: None. **J.S. Campo-Virgil:** None. **A. Ferguson-Richards:** None. **A. Alexander:** None. **K. Nacipucha:** None. **A.J. Krupka:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.08SA/XX8

Topic: J.02. Teaching of Neuroscience

Support: NSF #1732075

Title: Crescent Loom: A flexible neurophysiology online simulation for teachingneural circuits and behavior

Authors: *E. LEININGER[1], O. PERRY[2], E. ZORNIK[3];
[1]St. Mary's Col. of Maryland, Saint Marys City, MD; [2]WickWorks, Portland, OR; [3]Reed Col., Reed Col., Portland, OR

Abstract: Simulations are useful tools for teaching principles of neurophysiology, circuit-thinking, and hypothesis testing in contexts where wet-lab activities may be inaccessible. The

Crescent Loom Connectome Explorer is an in silico tool in which players can relate the structure and function of central pattern generators to animal behavior. Students are given a circuit with obscured connectivity and the tools to do experiments (e.g. blocking neurotransmitters, stimulation) while recording from neurons and observing the animal's behavior in order to generate a prospective connectivity map. Students can also use the tool to build their own creatures to relate neural circuit structure to function. We have used the flexibility of this tool to develop and implement activities to teach a range of concepts in neuroscience for introductory through advanced undergraduate student audiences (5 courses at 2 institutions; >200 students). Activities illustrate concepts such as models of CPG organization, the role of intrinsic properties in CPG function, and the role of comparative approaches in understanding links between physiology and behavior. We will discuss assessment results of selected classroom activities and present choices for implementing the Crescent Loom Connectome Explorer given particular learning goals and contexts.

Disclosures: E. Leininger: None. **O. Perry:** None. **E. Zornik:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.09SA/XX9

Topic: J.02. Teaching of Neuroscience

Title: You're Getting on my Nerves! A board game that teaches cable properties and action potential conduction

Authors: *A. NEMES-BARAN;
Case Western Reserve Univ., Cleveland, OH

Abstract: Electrophysiology is probably the most intimidating topic within the foundational neuroscience curriculum to most undergraduate students. As an educator, keeping student attention and engagement during these lectures is equally challenging. Therefore, the "You're Getting on my Nerves" board game was created to help students learn about cable properties and action potential conduction in a fun way. Students compete with each other to reach the axon terminal as they navigate through areas of demyelination and changes in axon diameter as their action potential decays while they propagate forward. Luckily, they can reduce this signal decay through the help of myelin sheaths and recharge their signal at the Nodes of Ranvier. This board game was created with inexpensive products and can be used in a classroom from an introductory level - even high school - to a more advanced classroom. It has been tested in a neuroscience course with sophomores, juniors and seniors with positive feedback, and more importantly, it highly impacted their ability to grasp concepts of action potential propagation and cable properties. Students learned what aspects increase and decrease the action potential's ability to propagate down the axon and how to use proper vocabulary when describing cable properties. This gameboard is set up with game pieces starting at the axon hillock which must

move forward to reach the axon terminal. Each player draws a card that instructs them what to do - stay in place, back-propagate, propagate forward, etc. Where the game piece lands will determine their fate, such as demyelination causing a reduction in membrane resistance increasing signal decay without forward propagation. Each turn that a player takes also decreases the action potential signal to demonstrate decay with propagation. Students are thrilled when their game piece lands on a Node of Ranvier which recharges the action potential, or a myelin sheath that increases membrane resistance and allows them to propagate forward without signal decay. Overall, this board game offers educators a fun and informative way to apply a difficult concept without the need for expensive equipment and provides students with a break from lectures and a chance to enjoy learning with their peers.

Disclosures: A. Nemes-Baran: None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.10SA/XX10

Topic: J.02. Teaching of Neuroscience

Support: Internal Grant Dartmouth Center for the Advancement of Learning (DCAL)

Title: Seeing the Light: A relatively low-cost, robust optogenetics activity for student lab demonstrations and behavioral data collection using rats.

Authors: *S. S. WINTER[1], K. S. SMITH[1], J. S. TAUBE[1], R. A. MAUE[2];
[1]Psychological and Brain Sci., [2]Biochem. and Cell. Biol., Dartmouth Col., Hanover, NH

Abstract: Optogenetic control of neural activity *in vivo* has become a widely used tool in neuroscience research. However, while many students learn about optogenetics in the classroom few have exposure to this powerful technique in person nor demonstration of its precise timing, localization, and ability to control behavior. To address this, as part of an undergraduate course we developed a relatively inexpensive, highly replicable optogenetic lab demonstration that involves obvious behavioral effects under precision control. Using standard stereotaxic equipment and injection techniques, neural expression of Channelrhodopsin-2 (ChR2) in subregions of the periaqueductal grey (PAG) occurred upon injection with and transduction by a readily available viral reagent (AAV5-hSyn-hChR2(H134R)-EYFP from Univ. N. Carolina Vector Core). The ChR2-expressing neurons were then stimulated using blue (465 nm) compact LEDs (PlexBright Optogenetic Stimulation System) and previously reported protocols used for stimulating the lateral (LPAG) and ventrolateral (VLPAG) PAG and inducing escape reflexes (Assareh et. al 2016). Robust behavioral responses were obtained in 100% (12/12) of the injected female rats. Unilateral stimulation initially caused rats to spin (right stimulation caused clockwise spins, left stimulation counterclockwise spins). Over time the spinning rate slowed and the rats would freeze. The speed and duration of spinning positively correlated with LED output

intensity (ranging from 1.64 - 7.55 mW). In the VLPAG, unilateral stimulation produced tight spins while remaining in place whereas bilateral stimulation produced freezing. In the LPAG, unilateral stimulation resulted in large spins, with the rat running in a circle around the edge of the enclosure, while bilateral stimulation led to full speed running and squealing. All behaviors began immediately upon onset of the light stimulus. Upon cessation of the light spinning stopped immediately and freezing stopped within 1-2 sec. Interestingly, following repeated stimulations within a session and across multiple sessions, none of the rats appeared to demonstrate fear of the apparatus. This suggests that optogenetic stimulation of the PAG is restricted to inducing behaviors associated with fear without conditioning the rats to fear the testing apparatus or room. More broadly, the results suggest this relatively simple, inexpensive optogenetics approach can be used to stimulate neurons *in vivo* and routinely elicit robust behavioral outputs that are obvious to undergraduate students irrespective of their familiarity with rodent behavior.

Disclosures: S.S. Winter: None. **K.S. Smith:** None. **J.S. Taube:** None. **R.A. Maue:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.11SA/XX11

Topic: J.02. Teaching of Neuroscience

Title: A capstone-level course in cognitive neuroscience for students using meta-analysis and open data

Authors: *A. KRAFNICK;
Dominican Univ., River Forest, IL

Abstract: As student interest in undergraduate neuroscience programs continues to increase, there remains a need for ways to engage these students in meaningful research experiences throughout the curriculum. Including course-based undergraduate research experiences (CUREs) in a program can help increase access to this high impact practice to a larger number of students (Bangera & Brownell, 2014; Penner et al., 2021). Engaging with neuroimaging data in these experiences can be challenging, especially at smaller, primarily undergraduate institutions. However, the availability of meta-analysis tools, and increased publicly accessible data means that faculty with the knowledge and skillset to do neuroimaging analysis can bring these experiences to their students more readily than before. Here, a small capstone-level course (8 students in Fall 2022) engaged psychology and neuroscience students in a three tiered CURE aimed at: further developing literature search and reading skills, further developing scientific writing and presentation skills, and demonstrating basic understanding of structural MRI methods. On a topic related to brain structure and behavior of their choosing, students completed: 1) a literature review, 2) a meta-analysis of structural MRI studies, and 3) used data from the Human Connectome Project to ask and answer a question during the 15 week semester. Each of these components was assessed with a written paper and a twelve to fifteen minute oral

presentation to the class. At the end of the semester, students completed the Undergraduate Research Student Self-Assessment (URSSA; Weston & Laursen, 2015), and two open-ended questions asking about their knowledge and confidence about MRI, and how they felt about their own research abilities. On the URSSA survey (from 1 being no gains, to 5 being great gains), students indicated gains on each of the four components: thinking and working like a scientist (M=4.58, s=0.540, N=6), personal gains (M=3.97, s=0.931, N=5), skills (M=4.15, s=0.602, N=5), and attitudes and behaviors (M=3.80, s=0.849, N=5). Open ended questions suggest that most students felt more confident and knowledgeable about MRI methods at the end of the course, and enjoyed the opportunity to engage with a research question of their own choice. While being a small course at a small private undergraduate institution, this response suggests that engaging students with minimal previous experience in this type of CURE may change perceived research skills and attitudes. Future iterations can work specifically toward helping students feel more engaged with the broader scientific community and build on presentation skills beyond the classroom.

Disclosures: A. Krafnick: None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.12SA/XX12

Topic: J.02. Teaching of Neuroscience

Support: Emmanuel College

Title: Academic performance and student preference for different textbook formats: digital versus paper textbooks in higher education

Authors: *M. P. LEUSSIS[1], J. LADAS[2];
[1]Psychology & Neurosci., [2]Emmanuel Col., Boston, MA

Abstract: Digital textbooks are increasingly being adopted across many disciplines in higher education including neuroscience. The rapid adoption of digital technology and lower associated costs suggest these electronic textbooks (e-texts) are likely here to stay in higher education. Thus, it is important to understand the effect of e-text use on student performance, to determine if there is a detriment to learning following the adoption of digital format textbooks over paper. At present, current perceptions of faculty and students are largely influenced by anecdotal evidence and personal preferences as there is relatively little empirical emphasis on whether student performance is impacted by the adoption of e-texts as compared to standard paper textbooks. This review examined two main elements associated with the potential use of e-texts over printed textbooks, based on the literature available. The first element to be assessed was the impact of the two different textbook mediums on performance in a higher education setting, where performance could include overall grades as well as other assessments of learning. In this

analysis, we found that while historical studies looking at short-term learning often showed a deficit when learning was from a digital text rather than on paper, longer-term studies looking at performance over an entire semester indicate that neither learning nor grades seem to be impacted by e-text use when considered in this context. In fact, some studies demonstrate that newer interactive e-texts may even enhance learning, though this can be modified substantially by the level of faculty engagement in textbook usage. Second, this review examined existing preferences for e-text versus printed textbooks as these continue to factor into both faculty and student choices, when such choices are available. In terms of student preference, the literature suggests that students across multiple disciplines and different types of institutions overwhelmingly prefer paper textbooks, citing factors such as dependability and readability (e.g. decreased eye strain compared to screens). However, many students still choose to use e-texts for a variety of factor that can include cost or accessibility. Overall, it appears that e-text usage does not significantly impact learning or student performance across an entire course, even as students continue to indicate a preference for paper textbooks. As e-texts become ever more prevalent in higher education, there is a need to evaluate which aspects of e-texts most influence student learning and seek to emphasize or incorporate these elements whenever possible as new textbooks are developed for digital formats.

Disclosures: **M.P. Leussis:** None. **J. Ladas:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.13SA/XX13

Topic: J.02. Teaching of Neuroscience

Support: R25NS120283
SUNY Downstate College of Medicine Alumni Association

Title: Bridging the Gap through REACH: The Impact of Teaching Computational Modeling to Foster Diversity in Neuroscience

Authors: *T. KHANDAKER[1], J. LI[1], C. KELLEY[2], S. TORRES BERTORELLI[1], D. ROSENTHAL[1], J. ALARCON[3], J. LIBIEN[3];
[1]Col. of Med., [2]Sch. of Grad. Studies, [3]Dept. of Pathology, Downstate Med. Ctr., Brooklyn, NY

Abstract: A lack of diversity currently exists within Neuroscience fields. Underrepresented minority (URM) students face many barriers including the increasing complexity of neuroscience data which may discourage pursuance of neuroscience careers. Having a basic understanding of programming languages and computational programs can serve to help URM students overcome this obstacle. Courses that teach coding, however, are rarely offered in neuroscience degree programs. In a recent study of undergraduate neuroscience majors, only 6 of 118 institutions required computer science classes, and an additional three schools offered

computer science as an elective. The Research Experience in Autism for College and High School Students (REACH) program is an 8-week pipeline program designed to provide URM students exposure and resources to pursue research in neuroscience. REACH provided exposure to coding to help URM students foster an interest in Neuroscience careers. Students were divided into three research method subgroups: computational modeling, electrophysiology, and wet laboratory work. Students on the computational team were educated in basic programming languages such as python and computational neuroscience programs such as NEURON and NetPyNE. With this computational background, students were better equipped to understand neuronal behavior and pathophysiology. Next students designed and implemented an experiment investigating autism under the guidance of medical and graduate student mentors. For the 2022 project, students used NEURON to develop a hippocampal CA3 model focusing on the impact of HCN channel manipulations on gamma oscillations of the BTBR mouse, a mouse model of autism. The results were compared to electrophysiological data obtained from BTBR and wild-type mice. The students also learned how to formally present and defend their findings in front of their peers, graduate and medical student mentors and faculty. Students gained practical experience stimulating and analyzing neuronal activity using computational approaches rarely covered in other neuroscience education programs. By comparing computational predictions with actual electrophysiological data, students were able to appreciate the benefits and limitations of neurocomputational modeling. In conclusion, the REACH program demonstrates how computer programming and neuroscience complement each other to augment interest and pursuance of neuroscience careers among URM high school and college students.

Disclosures: **T. Khandaker:** None. **J. Li:** None. **C. Kelley:** None. **S. Torres Bertorelli:** None. **D. Rosenthal:** None. **J. Alarcon:** None. **J. Libien:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.14SA/XX14

Topic: J.02. Teaching of Neuroscience

Title: Parkinson's Pals: Teaching College Students About Parkinson's Disease Through Patient Interaction

Authors: *J. GUJRAL, O. H. GANDHI, U. GARG, W. W. AAMODT;
Univ. of Pennsylvania, Philadelphia, PA

Abstract: Parkinson’s disease (PD) is a neurodegenerative disorder affecting millions worldwide. Undergraduate neuroscience education often touches upon the biomedical aspects of PD, delving into its clinical manifestations and available treatments. While this approach provides essential knowledge, it fails to capture the nuanced experiences and the true impact PD has on patients. A vital element is missing: the human connection. To address this educational shortcoming, we developed a novel program called Parkinson’s Pals, a student-led non-profit

organization that pairs over 200 college students across 9 universities with PD patients and facilitates 1-on-1 conversations. Once students and patients are matched based on personal and professional interests, students must undergo an educational and clinical training session provided by the Davis Phinney Foundation for PD. Then, each student and patient pair meet virtually once per week for one hour. Discussions often involve childhood stories, common interests and hobbies, career aspirations, and lived experiences. The program seeks to broaden college students' understanding of PD beyond just medical aspects by stressing the importance of patient interaction. Through this experience, students gain valuable insights into the social and psychological dimensions of the condition, fostering empathy and strengthening communication skills. Our initiative aims to cultivate future medical professionals' instinctive desire to comprehend patients' experiences and challenges. One patient participant stated, “I was very impressed by how well you obviously understood the need for Parkinson’s patients to get more social contact than they usually get. I’m sure that you will be a better doctor as a result of your interest in understanding your patients better and what they are going through.” In the future, we hope to continue expanding globally and to high schools, enroll more patients through partnerships with PD centers, and integrate this program into college neuroscience curricula. Ultimately, we hope that Parkinson’s Pals fuels a transformative wave of empathy-driven teaching, where the power of human connection revolutionizes the landscape of PD education and fosters a new generation of compassionate healthcare professionals.

Disclosures: **J. Gujral:** None. **O.H. Gandhi:** None. **U. Garg:** None. **W.W. Aamodt:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.15SA/XX15

Topic: J.02. Teaching of Neuroscience

Title: Evaluation of SiO2/DA hydrogel matrix in an induced hemiparkinsonism model

Authors: G. REYNOSO GÁLVEZ[1], ***E. RODRIGUEZ PEREZ**[3], A. VEGA GARCÍA[1], P. VERGARA ARAGÓN[2], R. BUSTAMANTE GARCÍA[1];
[2]Fisiologia, [1]UNAM, MEXICO CITY, Mexico; [3]Univ. Nacional Autonoma De Mexico, México City, Mexico

Abstract: Parkinson's disease (PD) is a neurodegenerative disorder of the central nervous system, characterized by the progressive death of dopaminergic neurons in the substantia nigra pars compacta (SNpc), is usually characterized by cardinal motor impairments. The gold standard therapy of levodopa is based on restoring dopaminergic neurotransmission, thereby alleviating motor symptoms, whereas non-motor symptoms remain undertreated. Objective. The purpose of the present study was to evaluate the toxicity of SiO2/DA loaded hydrogel, before been implanted in the brain (caudate) of rat in an induced hemiparkinsonism model. It is work mentioning that SiO2 with dopamine (SiO2/DA) hydrogel has achieved to reduce the dopamine

oxidation and it allows its release in tissue through the nanopores that has. Results. Significant dopamine depletion in the caudate ipsilateral to the side of infused with 6-hydroxydopamine (6-OHDA) in the substatia nigra. These animals displayed apomorphine-induced contralateral rotational behavior, when examined on the 21 day and attenuate motor abnormalities in 6-OH/DA model of hemiparkinsonism was observed after 7 days SiO2/DA implantation. Conclusions. The analysis of results showed a beneficial effect on fine and gross motor behavior, likely caused by the release of dopamine from the SiO2/DA matrix. So, It has justice more investigations about it's the potential use of hydrogel as biomaterial for storing and releasing drugs.

Disclosures: G. Reynoso Gálvez: None. **E. Rodriguez Perez:** None. **A. Vega García:** None. **P. Vergara Aragón:** None. **R. Bustamante García:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.16SA/XX16

Topic: J.02. Teaching of Neuroscience

Support: LTi Incubator Grant UVA

Title: Does Insomnia Cause Revenge Seeking Behavior? Using a Puzzle-Based Sleep Lab Educational Escape Room to Teach Circadian Rhythms in a Large Introductory Neuroscience Course

Authors: B. NAKASHYAN, *E. CLABOUGH;
Univ. of Virginia, Charlottesville, VA

Abstract: Traditional large lecture classes can be passive experiences for students. Instead, imagine that several of those learners work at a sleep laboratory and admit four new patients. Within hours, the entire facility is on lockdown, and a mysterious voice on the intercom proclaims that all researchers will lose their ability to sleep within the next hour. This story is the plot of an interactive educational escape room (EER) where students work together and apply concepts related to the history of sleep research, circadian rhythms, and neuropsychological concepts of sleep to solve puzzles. Conventionally, escape rooms are an entertainment experience that requires participants to escape a room in a limited timeframe. We have created a neuroscience EER designed to educate students about the neural basis of sleep, while providing small groups of students an immersive and interactive experience. Students follow a specially designed digital escape room framework to review sleep pathways, researchers, and brain regions involved with sleep. Unlike conventional escape rooms that can accommodate a limited number of participants, this sleep lab EER is scalable to hundreds of students without the need for a specialized room. Puzzles are enhanced by digital technology that allows instructors to track the progress of every team and note how the entire classroom is doing. Students and

teaching assistants report very positive experiences with this EER activity, solidifying course concepts while using creativity, collaboration, and critical thinking skills. We find that EERs are an easy, useful tool to increase engagement and boost inclusivity within large classroom settings, with potential to also be used as an assessment tool.

Disclosures: B. Nakashyan: None. **E. Clabough:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.17SA/XX17

Topic: J.02. Teaching of Neuroscience

Support: NSF HITS RCN network (NSF award 1730317)

Title: Sleepymice case study: analyzing data from the allen institute

Authors: *S. PAREKH[1], M. GAUDIER-DIAZ[1], R. PENTON[1], S. ROBERTSON[1], A. THOMAS[2];
[1]Univ. of North Carolina, Chapel Hill, NC; [2]Crown Col., St. Bonifacius, MN

Abstract: Case studies are high impact teaching practices that allow for the development of problem solving and critical thinking skills in students. These offer valuable teaching lessons to engage students in course content using real-world scenarios. As part of the High-throughput Discovery Science and Inquiry-based Case Studies for Today's Students (HITS) Research Coordination Network, our team generated the Sleepy Mice Case Study, with the intent to teach sleep-related content knowledge and introduce science data processing skills. During the case study, students independently complete pre-case work, which includes 1) exploring and summarizing primary literature discussing the effect of sleep deprivation on attention, emotion, memory and/or neurological conditions, and 2) using RStudio to generate a histogram demonstrating the number of publications on sleep deprivation through 2021. During class, students work in groups to 1) collect gene expression data from the Allen Brain Institute for Brain Science's open access high-throughput sleep dataset on mice, 2) use RStudio to generate a graph comparing brain gene expression between control and sleep deprived animals, and 3) use their results to write a letter to enact local policy change in school times as well as evaluating their own sleep hygiene practices. This case was implemented in multiple synchronous and asynchronous courses and can be used to teach course-specific learning objectives such as sleep-related content and/or science data processing skills. This case study improves students' content knowledge and their confidence level regarding their ability to complete all case associated learning objectives.

Disclosures: S. Parekh: None. **M. Gaudier-Diaz:** None. **R. Penton:** None. **S. Robertson:** None. **A. Thomas:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.18SA/XX18

Topic: J.02. Teaching of Neuroscience

Title: Metacognitive quiz resubmissions (MQRs) as an instructional strategy to enhance learning

Authors: *T. TAN;
Harvard Med. Sch., Boston, MA

Abstract: Metacognition, the understanding and regulation of one's own thinking, is a critical factor in helping students think like biologists and learn most effectively. However, many students struggle to use metacognition to guide their learning, often due to a lack of knowledge of effective learning strategies or knowing when and how to employ appropriate strategies. Instructors can therefore further support student learning and success by intentionally incorporating metacognitive activities into their courses. The Metacognitive Quiz Resubmission (MQR) learning activity was developed and implemented in an upper-division undergraduate neuroscience course to engage students in metacognition and to promote learning. The optional MQR activity was offered alongside required weekly multiple-choice quizzes that assessed students' content knowledge and provided a means for students to improve their initial quiz grades. MQRs aim to promote learning through multiple mechanisms: 1) by encouraging students to employ retrieval practice - an effective learning strategy - during the quizzes, rather than simply looking up the answer for fear of being penalized for wrong answers; 2) by incentivizing students to revisit and correct initial errors; and 3) by developing students' knowledge of effective learning strategies and their metacognitive awareness of how and why they initially arrived at incorrect answers. Across the entire course (n=26 students and n=11 quizzes, with students able to drop their lowest quiz score) students earned back 57.7% of missed quiz points through completion of the optional MQRs. The majority of students each week did not initially earn perfect scores on the quiz and were therefore eligible to submit an MQR (n ranging from 16-21 students). On average, 67% of eligible students improved their weekly quiz scores by completing the MQR activity (range: 56-95%, corresponding to n=9-20 students). On the standard end-of-course evaluation survey, 50% of the respondents (n=7/14) included MQRs in their response to the question, "What elements of the course most contributed to your learning?" Together, the student completion data and course evaluation survey responses indicate that the MQR activity had a beneficial impact on student learning in the course.

Disclosures: T. Tan: None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.19SA/XX19

Topic: J.02. Teaching of Neuroscience

Title: Build-a-zombie: an active learning game for students of neuroanatomy

Authors: *B. R. FRY;
Burnett Sch. of Biomed. Sci., Univ. of Central Florida, Orlando, FL

Abstract: The application of game design principles to elements outside of gaming has become a hot topic in pedagogical theory. Evidence has shown that as a subset of active learning, gamification enhances student engagement and learning outcomes. Here, I describe a novel tabletop style roleplaying game designed for students of neuroanatomy to demonstrate their knowledge of common nervous system pathologies in an environment that allows for both creativity and competition. ZOO4743C (Clinical Neuroanatomy) is a course in the Burnett School of Biomedical Sciences at the University of Central Florida which includes both a lecture and lab component. The aim of the course is to provide students with a detailed view of the human nervous system in both normative and pathological states as relevant to future careers in medicine and research. *Build-a-Zombie* is designed for use in lab as a means of complimenting the lecture series for the week with the ultimate goal of allowing students to create their own functional, yet pathological nervous system. Each week, students are tasked with making decisions related to their zombie's nervous system; they are told in advance that various decision lines will lead to buffs or debuffs to their zombie stats. For example, at a point in the course in which students have completed modules related to the neuromuscular junction, basal ganglia, and cerebellum, students must make a decision related to their zombie's movement abilities—will you choose to make a slow zombie or fast zombie? Slow zombies get +5 added to all defensive rolls while fast zombies get +5 added to attack rolls. Decision made, students must then give a brief, 5-minute presentation in which they describe the neural mechanism by which their zombie pathology yields a given effect. Students that have chosen to build a slow zombie might discuss a hypothetical mechanism that leads to cerebellar ataxia, while students going the route of the fast zombie might discuss alterations in the function of NAchRs and the sarcoplasmic reticulum of skeletal muscle. Throughout the semester, students continue to make decisions that come with tradeoffs for a variety of functions (e.g., sensory systems, feeding behaviors, cognition, and autonomic function), this culminates in a final game day in which students have a finite amount of time to grow their horde and survive in a variety of scenarios with outcomes dependent on a given zombie's stat rolls. Awards are given at the end for the group whose zombie horde is the largest and the group whose zombie consumes the most brains. Full description of course content integration, assessment rubrics, game design mechanics, and a live demo will be available at the poster.

Disclosures: B.R. Fry: None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.20SA/XX20

Topic: J.02. Teaching of Neuroscience

Support: NSF RCN-UBE Grant 2217333

Title: Connectomes for Undergraduate Neuroscience Education and Learning: Leveraging the Drosophila Female Adult Fly Brain electron microscopy data set to teach neuroscience principles

Authors: *A. BELLEMER[1], J. H. SIMPSON[2], D. BOCK[3], A. DACKS[4], D. SITARAMAN[5], K. COLODNER[6];
[1]Appalachian State Univ., Boone, NC; [2]Neurosci. Res. Institute/MCDB, Univ. of California, Santa Barbara, CA; [3]Neurolog. Sci., Univ. of Vermont, Burlington, VT; [4]West Virginia Univ., Morgantown, WV; [5]California State Univ. East Bay, hayward, CA; [6]Mount Holyoke Col., South Hadley, MA

Abstract: Connectomics is a growing subfield of neuroscience in which researchers seek to create comprehensive maps of synaptic connectivity within the nervous system to provide the anatomical framework with which to understand brain circuitry and function. As this field has provided significant advances in our understanding of nervous system organization and function, it has also created important opportunities for the incorporation of cutting-edge research into undergraduate education. It is well understood that undergraduate students who have access to authentic research experiences gain understanding of scientific concepts, fluency with the research process, and a deeper personal connections to science. Unfortunately, the ability to provide course-based research experiences often requires significant investment in hardware, instrumentation, and instructor time and training. These barriers can preclude adoption of these experiences at institutions where infrastructure or human resources are limited. With the goal of making connectomics data and methods accessible for instructional purposes at a wide variety of undergraduate institutions, we have assembled the Connectomes for Undergraduate Neuroscience Education and Learning (CUNEL) network to bring together scientists and instructors who are interested in incorporating connectomics research into their undergraduate teaching. We have used a complete serial section electron microscopy volume of a Female Adult Fly Brain (FAFB) and the Collaborative Annotation Toolkit for Massive Amounts of Image Data (CATMAID) software platform to design laboratory modules that teach students how to navigate within and analyze a connectomics dataset while reinforcing fundamental neuroscience concepts. We have designed laboratory modules that focus on neuroanatomy, neuronal cell biology, synaptic connectivity, network organization, and annotation of the FAFB data set. During the 2022-2023 academic year, these laboratory modules have been implemented in undergraduate courses at four institutions, which range from private liberal arts college to public R1 university. Our initial assessment of the effectiveness of these modules suggests that they provide students with a deepened connection to and understanding of the neuroscience research process and a more complete understanding of neuroscience course content. We are currently working to expand the CUNEL network to additional courses and institutions in order to bring our

instructional tools to a broader population of students. We are also continuing to develop connectomics curriculum that incorporates additional concepts, tools, and analyses.

Disclosures: **A. Bellemer:** None. **J.H. Simpson:** None. **D. Bock:** None. **A. Dacks:** None. **D. Sitaraman:** None. **K. Colodner:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.21SA/XX21

Topic: J.02. Teaching of Neuroscience

Support: NSF-RCN Grant #1730317

Title: You are what you eat: A case study to engage students in metagenomics resarch design and ethics

Authors: *M. M. GAUDIER-DIAZ[1], C. CAROLL ALEXANDER[2], A. J. KLEINSCHMIT[3], S. D. ROBERTSON[1];
[1]Psychology & Neurosci., Univ. of North Carolina at Chapel Hill, Chapel Hill, NC; [2]Biol., Univ. of North Carolina, Pembroke, Pembroke, NC; [3]Natural and Applied Sci., Univ. of Dubuque, Dubuque, IA

Abstract: Case studies are high impact practices that allow for the development of problem solving and critical thinking skills in students. Supported by the High-throughput Discovery Science & Inquiry-based Case Studies for Today's Students (HITS) Research Coordination Network, our interdisciplinary team designed, implemented, and assessed two case study modules entitled "You are what you Eat". Collectively, the case study modules present students with an opportunity to engage in experimental research design and the ethical considerations regarding microbiome research and society. To date, the case has been implemented in three courses (Microbiology, Physiology and Neuroscience), engaging over 200 undergraduate students. Particularly, in the Neuroscience course, students learn about the gut-brain axis and choose a paper examining the gut microbiota in relation to a brain disorder. Overall, assessment data demonstrate gains in content knowledge and students' perception of learning following case study implementation. Thus, we trust the "You are what you Eat" case study modules can be exploited to promote problem solving and critical thinking in the traditional classroom or laboratory setting when discussing next-generation sequencing and/or metagenomic research in neuroscience courses and beyond.

Disclosures: **M.M. Gaudier-Diaz:** None. **C. Caroll Alexander:** None. **A.J. Kleinschmit:** None. **S.D. Robertson:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.22SA/XX22

Topic: J.02. Teaching of Neuroscience

Support: NSF HITS RCN network (NSF award 1730317)

Title: Hits leveraging an nsf research coordination network to integrate high-throughput discovery science and complex datasets into neuroscience classrooms

Authors: *S. ROBERTSON[1], C. C. GOLLER[2];
[1]Univ. of North Carolina Chapel Hill, Chapel Hill, NC; [2]North Carolina State Univ., Raleigh, NC

Abstract: Modern neuroscience increasingly leverages high-throughput (HT) approaches to yield complex datasets and propel discovery. HT neuroscience includes single cell sequencing to inventory brain cell diversity, drug discovery for neurobiological disease, automated imaging, connectomics, genomics, machine learning, etc. This rapid evolution and adoption of HT technology necessitates new pedagogical tools to better equip neuroscience students for their futures. We created an NSF-funded research coordination network, HITS, to develop case studies that bring HT science into curricula. The HITS network includes >80 educators from 34 institutions that have created, implemented, assessed, and disseminated HT cases. Case studies use a narrative to engage students with real-world scenarios and are an evidence-based, high impact practice that promote cooperative and problem-based learning. Given the large, complex data generated by HT, HITS cases also build students' analytical and data science skills. Here we highlight five neuroscience cases created by HITS. The first, available via the National Science Teaching Association, hooks students with the story of a patient who experiences neurological symptoms. Students learn about neurological disorders, next generation sequencing, and a CRISPR-Cas 9 genome editing screen. The second, has been implemented, assessed and is in preparation for publication, and has students imagine themselves as researchers in search of new drugs for epilepsy. Students collect real human neuron electrophysiology data from the Allen Cell Types Database, perform statistical analyses, and discuss implications. The third, available at the Journal for Undergraduate Neuroscience Education, leverages Allen Institute sleep deprivation data to engage students with RStudio. This case was implemented in three courses with >400 students at multiple institutions. The fourth explores the impact of the microbiome on the brain and the ethics and research design of metagenomics work. It was created by seven interdisciplinary faculty, assessed at multiple institutions with >200 undergraduates, and is under review at the Journal of Microbiology and Biology Education. The fifth, still in development, engages students in the creation of a figure for a textbook using the Allen Brain Mouse Connectivity Database. In summary, we share five ready to use educational resources to help instructors integrate HT science into their neuroscience curricula and build their students' quantitative skills. We also showcase how a research coordination network can be leveraged to spur pedagogical innovation and transform the STEM education community.

Disclosures: S. Robertson: None. **C.C. Goller:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.23SA/XX23

Topic: J.02. Teaching of Neuroscience

Title: Neuroscience and the good life: Integrating neuroscientific concepts into an undergraduate course on positive psychology

Authors: *M. S. PUJARA;
Psychology, Sarah Lawrence Col., Bronxville, NY

Abstract: The past two decades has seen a rapid rise in the development of positive psychology courses at many universities. Positive psychology is the scientific study of human well-being and optimal functioning ("flourishing") via the cultivation of positive emotions, meaningful relationships, and purposeful living. In the same way that anatomy and physiology is integrated into physical education classes to help students connect exercises to tangible health outcomes, I predict that incorporating lessons from neuroscience will enhance the retention of key concepts and application of interventions from the field of positive psychology. However, with the exception of the well-documented benefits of neuroplasticity in growth mindset interventions (Sarrasin et al., 2018), this remains to be tested. I therefore developed an undergraduate positive psychology course that integrates additional neuroscientific concepts. Here I describe preliminary findings from a post-semester survey that assessed the extent to which these concepts enhanced student learning. Of the students who completed the survey (n = 51), 69% agreed or strongly agreed that the connections between neuroscientific and psychological information helped them understand the material. Of the specific topics covered, 80% of students reported reward prediction error (Schultz, 1998) as the neuroscientific concept that helped them connect with the psychological concepts, specifically as it relates to the Hedonic Adaptation Prevention Model (Sheldon & Lyubomirsky, 2012), gratitude, and savoring. Neuroplasticity and growth mindset (78%), 'wanting' vs. 'liking' in the context of extrinsic vs. intrinsic rewards (63%), and the neuroscience of flow (57%) were also endorsed as helpful for making deeper connections to the material. Less than half of students considered the connection between neuronal reward responses and altruism; prefrontal cortex maturation in the context of goal-setting and procrastination; amygdala structure and the 'caring continuum' in empathy; mirror neurons in conformity and social comparisons; and the cortico-basal ganglia-thalamo-cortical loop in the context of habit formation to be as useful. Based on these preliminary findings, I propose a structure for a course that more closely and intentionally bridges neuroscientific evidence with concepts in positive psychology. Pre- and post-class surveys will be administered to assess the efficacy of this approach for teaching undergraduate students about the science of happiness and well-being.

Disclosures: M.S. Pujara: None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.24SA/XX24

Topic: J.02. Teaching of Neuroscience

Support: Schreyer Institute for Teaching Excellence
Tewksbury Endowment for Teaching Excellence

Title: Engaging Experiential Learning for Remote Undergraduate Students

Authors: *R. HANLEY[1], W. J. HORTON[2];
[1]Pennsylvania State Univ., Woodland Hills, CA; [2]Biobehavioral Hlth., Pennsylvania State Univ., State College, PA

Abstract: Online degrees hold the promise to expand the college experience to underserved populations. One of the most impactful aspects of an undergraduate degree in STEM fields is the opportunity for lab experience, with mentor-mentee relationships and experiential learning. Unfortunately, these opportunities are almost non-existent in online settings, which may, in part, explain the success-gap between traditional and online students. It has been found that applicants with online degrees received fewer callbacks for a job than those who listed no degree at all. The switch to remote learning during the COVID-19 pandemic led to a unique opportunity to compare in-person to online learning. Studies showed that students taking STEM courses reported negative beliefs about learning opportunities, and lower student subjective emotional engagement in STEM courses, as well as attitudes towards science. The effects of online learning may disproportionately impact female STEM majors since they are more likely to take online courses than other demographics. To address these inequities, we formed an online laboratory group, the Virtual Behavioral Neuroscience Lab (VBNL), translating a typical lab experience for remote students. In addition to weekly journal clubs and synthesizing literature into review papers, we designed wet lab benchwork components. This included an online live tutorial on quantitative PCR in a collaborative campus lab. In addition, a tactile component that was shipped to student's homes and completed remotely. A case study was conducted to examine the success of this virtual lab experience for remote learners in STEM. The pilot resulted in subjective feelings of emotional engagement in science and a larger understanding of science. The student reports, because of VBNL, knowledge of post-graduate opportunities and successful PhD applications. What we propose is a larger cohort to examine the success of The Pennsylvania State University World Campus students involved in utilizing online research assistance and "Science in a Box".

Disclosures: R. Hanley: None. **W.J. Horton:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.25SA/XX25

Topic: J.02. Teaching of Neuroscience

Support: •Teaching and Learning (TLTC) Grant Award. University of Maryland.

Title: Developing virtual experiential neuroanatomy educational resources

Authors: *A. NAVARRO-CEBRIAN, S. HALE, H. TUJJAR, A. CLOSE, A. LYU, **J. PURCELL**;
Univ. of Maryland, College Park, MD

Abstract: Experiential learning is important for teaching undergraduate neuroscience. In this project we worked to create virtual materials for experiential learning to teach brain navigation and neuroanatomy. Specifically, we developed hand drawn brain images that can be used for neuroscience instruction. These materials included (1) identifying and removing specific brain regions from a 3-dimensional standard brain file, and (2) identifying and drawing unique brain regions that are often taught, but not overlayed on typical neuroanatomy 3-dimensional atlases. These materials will be incorporated into tutorial videos and on-line neuroanatomy assignments. Versions of these materials were successfully used in the Fall semester 2022 in an Introduction to Neuroscience course taught at the University of Maryland. Notably the overall performance in the Fall improved $t(266) = 3.05$, $p = 0.002$, and specifically that for the exam which focused most on neuroanatomy $t(268) = 3.27$, $p = 0.001$. These materials will be made available to the large neuroscience community and will contribute to the flexibility of implementation (at home or in-class) to experiential neuroscience learning.

Disclosures: A. Navarro-Cebrian: None. **S. Hale:** None. **H. Tujjar:** None. **A. Close:** None. **A. Lyu:** None. **J. Purcell:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.26SA/Web Only

Topic: J.02. Teaching of Neuroscience

Support: Duke University and the Charles Lafitte Foundation Program in Psychological and Neuroscience Research at Duke University
Duke Learning Innovation- Carry the Learning Forward

Title: Student Performance in Emergency Remote Collaborative Learning Courses

Authors: *T. NEWPHER, Y. AZIZI, J. HESSION;
Duke Univ., Durham, NC

Abstract: In the spring of 2020, students in K-12 and higher education experienced a sudden shift of course delivery from face-to-face (F2F) to emergency remote teaching (ERT). The impacts of ERT on student wellbeing and learning are currently being explored and, in the future, it will be important to identify teaching practices that improved student outcomes. Here we address student performance and measures of course satisfaction in collaborative learning courses taught by ERT. Specifically, we compared student performance on formative and summative assessments, as well as team activities and peer evaluations in course versions taught during ERT and after the return to F2F instruction. The analysis included three different undergraduate neuroscience courses all taught by the same instructor. Surprisingly, we found little difference in any of the measures for individual or team performance. Taken together, our findings suggest that the students in the collaborative ERT courses performed at levels similar to an in-person classroom.

Disclosures: T. Newpher: None. **Y. Azizi:** None. **J. Hession:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.27SA/XX26

Topic: J.02. Teaching of Neuroscience

Title: Impulse is 20 years old and continues to provide neuroscience publishing and editorial opportunities for undergraduates

Authors: A. E. STODDARD[1], J. T. CLAPP[1], J. L. MCMANUS[2], R. M. SOUDERS[2], T. M. STRONG[2], ***M. C. ZRULL**[2];
[1]Biol., [2]Psychology, Appalachian State Univ., Boone, NC

Abstract: *IMPULSE- The Premier Undergraduate Neuroscience Journal* allows undergraduate students the experience of manuscript submission, revision, and publication. This experience prior to graduate education gives undergraduate students the opportunity to develop their scientific writing skills in a publication setting. While undergraduate students may often have the ability to gain experience in research, empirical writing, and presentation, the process of manuscript revision and publication is often not easily accomplished at the undergraduate level. *IMPULSE* provides an accessible avenue for attaining publication at the undergraduate level as well as allowing motivated students the opportunity to gain experience in the editing process as peer reviewers and associate editors (AEs). *IMPULSE* is made up of a number of review teams based out of various colleges and universities spread across the country as well as satellite reviewers, who are more widely dispersed. Undergraduate students who wish to be a part of a

review team, but are located at a college or university without an established reviewer training site can be assigned to an established RTS and work with that team electronically. The undergraduate review teams have designated AEs as well as faculty advisors (FAs). These teams, or Reviewer Training Sites (RTSs), work together to create a review of the manuscript submission with oversight and guidance of their FAs. Each AE works to compile their team's collective and individual reviews of a submission and submit that compiled review to the undergraduate Executive Editor on the *IMPULSE* editorial board. The Executive Editor assembles the various RTS reviews into a single document of suggested revisions which is sent to the manuscript author(s). The entire review process is overseen by the journal's undergraduate Editor-In-Chief, who leads the editorial board. This revision process allows the manuscript author(s) to learn what scientific journals require and look for in publications. This additionally increases access to scientific knowledge and learning, and prepares students for future publication in their academic careers. *IMPULSE* is an open-access journal indexed within the Directory of Open Access Journals. Authors retain ownership of their manuscripts after publication through *IMPULSE*. *IMPULSE* is proud to celebrate its 20th issue in 2023, continuing to provide students with an avenue of preparation in skillful writing, peer review editing, and the process of submitting neuroscience literature to a scientific journal.

Disclosures: A.E. Stoddard: None. **J.T. Clapp:** None. **J.L. McManus:** None. **R.M. Souders:** None. **T.M. Strong:** None. **M.C. Zrull:** None.

Theme J Poster

TJP03. Innovation in Teaching Undergraduate Neuroscience

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP03.28SA/XX27

Topic: J.02. Teaching of Neuroscience

Support: NSERC Mobilize Grant CCMOB-2021-00190
Cash contribution from industry partner
In-kind contribution from industry partner

Title: Collaborative research on joyi: evaluating the cognitive-behavioral science and impact of a happiness-building app through academic-industrial partnerships

Authors: *M. C. TUCCI, A. CANALE-PAROLA, A. SIMONEAU;
Seneca Polytechnic, King City, ON, Canada

Abstract: Academic partnerships with industry can provide a fruitful opportunity for undergraduate training, teaching and research with benefits to society. Colorful Zone is a company that developed the app 'Joyi'. Joyi attempts to help users build sustainable happiness using bite-sized lessons, tips and skills. The content is heavily based on dialectical behavioral therapy, which attempts to change dysfunctional patterns of thought, behavior and emotion towards healthier ones (Linehan, 2015), and The Personality Inventory for DSM-5 (Krueger et

al., 2012). Altogether, the content is hypothesized to form five cognitive-behavioral elements for sustainable happiness: mindfulness, togetherness, health, curiosity and meaningfulness. While Joyi has over twelve thousand users and continues to grow, the creators wanted to collaborate with behavioral scientists to evaluate the cognitive-behavioral science underlying it. Seneca Polytechnic is a post-secondary institution in Toronto, Canada. Seneca facilitates collaborative opportunities with industry partners by connecting them with academic resources. For the present study, one full-time professor with a PhD in behavioral neuroscience acted as the primary investigator. Two undergraduate research assistants were hired providing training and mentorship opportunities. The collaboration provided an opportunity for behavioral scientists to work with engineers and artists. We learned about cognitive-behavioral science from a different perspective and shared our knowledge on designing and executing a rigorous scientific study to evaluate our partners hypotheses. Hence, teaching and learning opportunities were reciprocal among everyone involved. Following research ethics board approval, our study evaluated whether participants would experience an enhancement in scores related to mood and emotion following interaction with the app. Over 300 individuals between the ages of 16-65 participated. Participants were assigned to interact with the app for 3, 6 or 9 minutes. Before and after interacting with the app, participants completed the Positive and Negative Affect Scale (Watson et al., 1988) and a custom survey designed to assess scores related to mood and emotion. The results showed that across the 3, 6 and 9 minute interaction conditions, participants experienced an enhancement in scores related to mood and emotion. Colorful Zone can use this data to grow Joyi as a 'digital vitamin' with potential benefits to society. Furthermore, there is a possibility for future studies to dissect the functional neural and cognitive-behavioral units related to use of the app.

Disclosures: **M.C. Tucci:** B. Contracted Research/Research Grant (principal investigator for a drug study, collaborator or consultant and pending and current grants). If you are a PI for a drug study, report that research relationship even if those funds come to an institution.; Colorful Zone. C. Other Research Support (receipt of drugs, supplies, equipment or other in-kind support); Colorful Zone. Other; Colorful Zone. **A. Canale-Parola:** B. Contracted Research/Research Grant (principal investigator for a drug study, collaborator or consultant and pending and current grants). If you are a PI for a drug study, report that research relationship even if those funds come to an institution.; Colorful Zone. C. Other Research Support (receipt of drugs, supplies, equipment or other in-kind support); Colorful Zone. Other; Colorful Zone. **A. Simoneau:** B. Contracted Research/Research Grant (principal investigator for a drug study, collaborator or consultant and pending and current grants). If you are a PI for a drug study, report that research relationship even if those funds come to an institution.; Colorful Zone. C. Other Research Support (receipt of drugs, supplies, equipment or other in-kind support); Colorful Zone. Other; Colorful Zone.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.01SU/XX28

Topic: J.02. Teaching of Neuroscience

Title: A research practice course that serves as a valuable adjunct to undergraduate directed study research

Authors: *T. FISCHER[1], V. H. MELLER[2], L. PILE[2], K. L. MYHR[2], K. HUNTER[2]; [1]Psychology, [2]Biol. Sci., Wayne State Univ., Detroit, MI

Abstract: Directed study, in which undergraduates conduct research in the laboratory of a faculty mentor, is a high-impact educational practice that helps to create the next generation of scientists. This experience is also highly valued by health professional schools. We created a course to supplement the directed study lab experience to provide students with a broader view of research that they might not obtain within the demands of a laboratory. This is a one-credit online seminar course that combines students from our Biological Sciences and Neuroscience programs. Covered topics include lab safety, library research, research ethics, record keeping and data ownership, science careers, and principles of communication to both scientific and lay public audiences. Course meetings consisted either of group discussions between students or sessions led by guest speakers from the campus community including a science librarian, a lab safety officer, a journal editor, and a communication specialist. Student assessments based upon course learning outcomes were highly favorable and indicated that their level of understanding of research improved even if they felt that they had knowledge of course topics prior to enrollment. We will share the general structure of the course, which we feel can readily be implemented in any institution that offers directed study research.

Disclosures: T. Fischer: None. **V.H. Meller:** None. **L. Pile:** None. **K.L. Myhr:** None. **K. Hunter:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.02SU/XX29

Topic: J.02. Teaching of Neuroscience

Title: The Neuroscience Club at Portland State University: Fostering engagement and collaboration in neuroscience education and outreach

Authors: *D. JANG, C. J. SWALLOW, A. L. CONN, M. CHENARD, B. P. BOLEN; Portland State Univ., Portland, OR

Abstract: The Neuroscience Club at Portland State University (PSU) has established itself as a vibrant and dynamic organization within the academic year of 2022-2023. With an impressive repertoire of over twenty-five weekly NeuroEvents, the club has engaged its members and the wider community in diverse activities related to neuroscience. These events encompassed a range of social, educational, and outreach initiatives, creating an immersive experience for

participants.
The NeuroEvents included a wide array of engaging activities. An ongoing "Book Club" provides a platform for roundtable discussions on neuroscience literature, while "Research in Review" sessions offer students the opportunity to learn about the state-of-the-art in specific neuroscience topics. The club's creative spirit is exemplified through events such as "Neuroscience Jeopardy" and a lively "Halloween Party" with a neuroscience twist. Embracing the intersection of neuroscience and technology, an "Artificial Intelligence and Machine Learning" event with coding activities provided insights into cutting-edge advancements. The club also hosted guest speakers, organized "White Elephant" parties, facilitated neuroscience-themed movie nights, and put on social events. Furthermore, collaborations were fostered by hosting events with other STEM and pre-med student groups.
Through collaborations with NW Noggin, a nonprofit neuroscience outreach organization, the club participated in sessions at two elementary schools, and at a unique combined art gallery and neuroscience lab, during our trip to the Society for Neuroscience (SfN) 2022 conference. The club's partnership with NW Noggin extended to "Nogginfest 2023," a large-scale, student-run celebration of music, art, and interdisciplinary neuroscience. This accessible, all-ages event fostered public awareness and engagement with the field, making it a highlight of the Pacific Northwest's neuroscience calendar.
The Neuroscience Club is also undertaking a survey initiative to gauge student interest in PSU offering a neuroscience major. The preliminary hypothesis suggests a significant interest in the establishment of a neuroscience major program at PSU. If true, the club plans to leverage faculty support and engage in strategic advocacy to encourage the school administration to consider implementing a neuroscience major.
The Neuroscience Club's remarkable achievements reflect its commitment to promoting neuroscience education and outreach. Through its continuous efforts, the club aspires to cultivate a passion for neuroscience while inspiring future leaders in the field.

Disclosures: **D. Jang:** None. **C.J. Swallow:** None. **A.L. Conn:** None. **M. Chenard:** None. **B.P. Bolen:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.03SU/XX30

Topic: J.02. Teaching of Neuroscience

Support: Faculty for Undergraduate Neuroscience

Title: The Journal of Undergraduate Neuroscience Education (JUNE): a peer-reviewed, PubMed-listed and open-access journal published by the Faculty for Undergraduate Neuroscience

Authors: *E. R. REYNOLDS[1], R. L. RAMOS[2], B. R. JOHNSON[3], C. F. GAVIN[4], I. A. HARRINGTON[5], A. NICHOLAS[6], S. SERAPHIN[7];
[1]Lafayette Col., Easton, PA; [2]New York Inst. of Technol. Col. of Osteo. Med., Old Westbury, NY; [3]Neurobio. and Behavior, Cornell Univ. Neurobio. and Behavior, Ithaca, NY; [4]Neurobio., Univ. of Alabama, Birmingham, Birmingham, AL; [5]Augustana Col., ROCK ISLAND, IL; [6]Univ. of California, Irvine, Irvine, CA; [7]Trinity Col., Hartford, CT

Abstract: The Journal of Undergraduate Neuroscience Education (JUNE; www.funjournal.org) is a peer-reviewed, PubMed-listed and open-access journal published by the Faculty for Undergraduate Neuroscience (FUN; www.funfaculty.org). First established in 2002, JUNE presents and seeks articles addressing a wide range of topics focusing on innovation and best practices in undergraduate neuroscience education. These include topics around class design such as innovative ideas; student assessment; laboratory exercises using animal models and computer simulations; instructions for production of inexpensive, high-quality lab equipment; reviews and assessment of media and teaching resources; classroom-based diversity, inclusion and equity practices; and outreach and service-learning activities. Papers on structural issues such as developing programs and departments, and structural approaches to diversity, inclusion and equity are welcome. Finally, opinion pieces and editorials on issues of general concern for neuroscience education are published. In the late fall JUNE is pleased to publish a special issue on the FUN summer workshop held in July 2023. JUNE seeks submissions in any of the above areas and formats and is especially interested in the changing educational environment, including approaches to inclusive teaching and tools such as generative AI and other technologies. Please visit the JUNE homepage for more details, submission instructions, and free access to JUNE articles.

Disclosures: E.R. Reynolds: None. **R.L. Ramos:** None. **B.R. Johnson:** None. **C.F. Gavin:** None. **I.A. Harrington:** None. **A. Nicholas:** None. **S. Seraphin:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.04SU/XX31

Topic: J.02. Teaching of Neuroscience

Title: Group exams in large science courses

Authors: *R. BRANCO;
Univ. of Notre Dame, Notre Dame, IN

Abstract: Implementing group exams can offset some of the drawbacks of traditional exams. Some positive aspects of incorporating a group component to exams is that they may reduce student stress, increase motivation for studying, increase retention of material, reduce temptation for academic dishonesty, and provide more of a sense of community within the classroom. Even

so, there is a perception that a group component to exams is not practical in large classes. I implemented quasi-group exams -- in which students took each exam once individually and again in a group setting within the same testing period - in a 150-student sophomore-level introductory Neuroscience course and again in a 250-student senior-level Biochemistry survey course. I report outcomes related to stress, social connection, learning, and motivation as a result of a quasi-group exam assessment model in these two different large science courses. I also outline how to practically implement this system such that positive attributes of group exams are maintained while minimizing logistical turbulence and instructor workload.

Disclosures: R. Branco: None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.05SU/XX32

Topic: J.02. Teaching of Neuroscience

Title: Long-term learning in a college neuroscience class not impaired by ungrading

Authors: *A. NEFF;
Psychological & Brain Sci., Indiana Univ., Bloomington, IN

Abstract: This study investigated the effects of ungrading, the removal of traditional grading systems, on long-term learning outcomes in an undergraduate neuroscience class. The study was conducted in a sophomore-level course called Clinical Neuroscience over the course of two semesters involving approximately 100 students. In this study, two types of exams were administered: traditionally graded multiple-choice exams and exams graded for completion (this group received their actual score, but their final grade was later revised to 100%). To test long-term learning, a surprise re-test was administered 1-2 months after being originally tested. Using a student's t-test, there were no significant differences in performance in the exam re-test in any semester for any test. This research extends the findings of two prior studies in introductory psychology classes which similarly showed that students who take ungraded practice quizzes score no worse on later exams than students who take graded quizzes. These data support the testing or implementation of narrative transcripts, and further experimentation with completion-grading in neuroscience classes. The experiment from semester two was preregistered at https://osf.io/6d4c7/, which also provides pre-registration for a final replication study that is currently underway.

Disclosures: A. Neff: None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.06SU/XX33

Topic: J.02. Teaching of Neuroscience

Support: Brown University Karen T. Romer Undergraduate Teaching and Research Award (UTRA)

Title: Equitable implementation of an "ungrading", pass/no record system in an undergraduate neuroscience course

Authors: N. F. LIN, ***M. L. LINDEN**;
Neurosci., Brown Univ., Providence, RI

Abstract: Inequities exist in neuroscience classrooms, particularly for students with historically excluded identities. As educators, we hope to provide pedagogical interventions to reduce these inequities. Here, we present two years of data evaluating our implementation of an "ungrading" (pass/no record) system in our undergraduate neuroscience course beginning in 2021. These changes were intended to increase student motivation to learn and decrease stress. Students were required to accrue assessment points from seven in-class assessments and a final exam. Students could review and resubmit the in-class assessments. Students also earned non-assessment points for homework, section attendance, and reflections. Students receiving above a threshold of assessment and non-assessment points passed the course. At the end of the semester, we administered in-class surveys to capture perceptions of the "ungrading" system using a five-point Likert scale, along with student demographics. We analyzed these data to determine if perceptions of the course or course performance varied by identity group. Overall, the "ungrading" system was well-received by students, perceived as less stressful and preferable to an A/B/C grading system, and helped students obtain skills in figure analysis and applying concepts to new situations. Some differences were present, however. Male students perceived higher confidence and levels of preparation, but female students participated more in the course as measured by non-assessment points (84.9% vs. 89.4%). Regardless, male and female students performed similarly during in-class assessments (69.8% vs. 68.6%) and on the final exam (76.3% vs. 75.9%). Black students participated similarly to non-Black students (86.5% vs. 87.5%) but scored lower on in-class assessments (64.1% vs. 69.7%) and the final exam (68.7% vs. 78.2%). However, after resubmissions, Black students (86.5%) performed on par with white (85.5%) and Asian (89.2%) students, indicating a potential remedy. While minor differences between identity groups were present, we feel all students who passed the course were prepared for future neuroscience coursework. Future iterations of this course will build on these results with the goal of continuing to minimize disparities faced by students from underrepresented identity groups.

Disclosures: N.F. Lin: None. **M.L. Linden:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.07SU/XX34

Topic: J.02. Teaching of Neuroscience

Title: The national honor society in neuroscience nurhopsi

Authors: T. M. FISCHER[1], S. N. CASSELLA[2], M. P. BLACK[3], D. A. MITRANO[4], N. ALESAWY[5], ***M. KERCHNER**[6];
[1]Wayne State Univ., Wayne State Univ., Detroit, MI; [2]Loras Col., Loras Col., Dubuque, IA; [3]Georgia State Univ., Georgia State Univ. Neurosci. Inst., Atlanta, GA; [4]Christopher Newport Univ., Newport News, VA; [5]Univ. of Michigan, Ann Arbor, MI; [6]Washington Col., Chestertown, MD

Abstract: Nu Rho Psi, The National Honor Society in Neuroscience, is a non-profit, grass-roots organization comprised of neuroscientists, at all stages of their careers. With more than 11,000 members, from 111 chapters in 33 States and the Nation's capital, Nu Rho Psi is a dynamic organization that aims to support the professional growth of its members. Most members are invited to join Nu Rho Psi during their undergraduate training. But qualified graduate students, faculty, and alumni are also welcome to join. Membership in Nu Rho Psi is granted exclusively through local Nu Rho Psi chapters. Nu Rho Psi has become a vibrant contributor to the neuroscience community through: (1) encouragement of professional interest and excellence in neuroscience, (2) recognition of outstanding scholarship, (3) advancement of the discipline of neuroscience, (4) encouragement of intellectual and social interaction between students, faculty, and professionals, (5) promotion of career development in neuroscience and related fields, (6) increased public awareness of neuroscience and its benefits for society, and (7) encouragement of service to the community. Nu Rho Psi goes beyond providing recognition of excellence in neuroscience scholarship and research. We offer our members a variety of grants and awards including competitive research grants to facilitate senior theses or other scholarly projects. Our chapters may apply for Nu Rho Psi Chapter Activity Grants to promote their educational and community outreach initiatives, including those that address our annual theme. The 2023-24 theme is *Exercise and The Brain.* Members are also eligible for Nu Rho Psi travel grants to present their original research at the annual Society for Neuroscience meeting. Schools wishing to foster a chapter of Nu Rho Psi may contact the National Office located at Washington College. Information regarding the charter application process may be found on our web page: https://nurhopsi.org.

Disclosures: T.M. Fischer: None. **S.N. Cassella:** None. **M.P. Black:** None. **D.A. Mitrano:** None. **N. Alesawy:** None. **M. Kerchner:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.08SU/XX35

Topic: J.02. Teaching of Neuroscience

Title: Hosting a one-day neuroscience research conference for undergraduate students: lessons learned while benefiting students.

Authors: E. R. HAMSHER, S. E. KLINGSHIRN, G. DINUOSCIO, ***C. M. MATHES**; Neurosci., Baldwin Wallace Univ., Berea, OH

Abstract: Since 2009, the Midwest & Great Lakes Undergraduate Research Symposium in Neuroscience (mGluRs) has provided a platform for undergraduate students from schools in and in states bordering Ohio to present their research in neuroscience and learn about what others are doing. After a pandemic-induced hiatus, Baldwin Wallace University (BW) volunteered to host. Here we provide our planning, execution, and assessment of the process, as well as lessons learned. We sought to assess the impact of the conference on student attitudes and perspectives regarding research involvement and accessibility, as well as thoughts on career options, by having them fill out a survey before the start of and at the end of the one-day conference. Conference planning involved attaining sponsorship from universities with support from the previous host institution, coordination with BW Offices, and integration and execution by a Neuroscience Department faculty member and laboratory manager, a graduate research assistant, and a team of 11 undergraduate students who took a 1-credit half-semester class during the Fall. The team submitted an IRB protocol, constructed a pre- and post-conference survey based on associated literature, communicated the event with universities in the surrounding area, created the day's program, recruited a keynote speaker, and assembled panelists for a career-focused seminar, as well preparing day-of information packets and setting up the event space. The conference was a success with over 100 participants and 30 posters, and pre- to post-conference survey results (n=34) suggest that participation increased knowledge about and comfort level with discussing research, as well as increased knowledge of and comfort in discussing careers. Involvement was especially impactful for underclassmen (n=10), which suggests benefits from including more freshmen and sophomores; however, space and time concerns may prevent increasing the size of the conference. For the second year of the conference, a similar team will 1) plan earlier, 2) devote more time to poster viewing, 3) make the survey electronically accessible, as well as code for identifying within-subject pre- to post- measures, 4) make poster feedback electronic, and 5) have a tighter and earlier deadline for registration to accommodate meal planning. With these data we once again show the positive impact of the involvement of undergraduate students in the entirety of the research process that includes conference-going and presentation opportunities, as well as provide some advice on a journey through our success story.

Disclosures: E.R. Hamsher: None. **S.E. Klingshirn:** None. **G. DiNuoscio:** None. **C.M. Mathes:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.09SU/XX36

Topic: J.02. Teaching of Neuroscience

Title: Global perspectives in neuroscience and medicine - a study abroad program in neuroscience

Authors: *K. F. PHILLIPS;
Sch. of Neurosci., Virginia Tech., Blacksburg, VA

Abstract: The American Association of Colleges & University (AAC&U) lists studying abroad as one of its 11 high impact practices. Studying abroad provides students with the opportunity to interact with other cultures, expand their worldviews, and increase intercultural competence. Students also develop independence, adaptability, and problem-solving skills. Popular study abroad options for pre-health professional students include medical internships and abroad shadowing opportunities. However, these experiences often do not satisfy degree major requirements for students. Further, strict curricular plans to satisfy pre-medical prerequisites often preclude students from participating in semester-long programs. At Virginia Tech, undergraduate students can participate in an innovative 3-week summer study abroad program called Global Perspectives in Neuroscience and Medicine, an intensive and challenging program that surveys various neurological diseases in a global context. Based out of Riva San Vitale, Switzerland, the program elevates a traditional approach to studying neurological diseases by exploring how factors such as socioeconomic disparities, cultural stigmas, genetic variations, and lifestyle contribute to epidemiological differences in disease incidence, prevalence, and prognosis. Students enrolled earn 6 credits of required neuroscience courses in 3 intense weeks. The structure of the program is rigorous with daily group work, writing assignments, literature discussion, and presentations. The intensity of the program prepares students for the pace of medical or graduate school. Outside of classroom instruction, students travel to various research and clinical facilities such as translational research laboratories in Bellinzona, Switzerland; a Swiss neurorehabilitation facility outside Lucerne, Switzerland; a psychiatric hospital in Milan; and the dementia village outside of Amsterdam. The program has been running since 2019 and is currently one of the most popular study abroad programs at Virginia Tech. Students consistently report the program is one of the most impactful experiences of their college careers. This poster will provide details about the program, feedback from students, and future adaptations to the program to expand access.

Disclosures: K.F. Phillips: None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.10SU/XX37

Topic: J.02. Teaching of Neuroscience

Title: Developing a Neuroscience-Themed Study Abroad Course to Develop Intercultural Competence in an Undergraduate Neuroscience Curriculum.

Authors: *G. HERIN, G. M. LEWIS;
Interdisciplinary Program in Neurosci., George Mason Univ., Fairfax, VA

Abstract: Many institutions seek to train their students in diversity, equity, and inclusion including a focus on intercultural competence. Study abroad courses develop intercultural competence, and neuroscience-focused study abroad courses can fulfill multiple undergraduate curricular goals simultaneously. Here we describe the initial development of a faculty-led, short-term study abroad program for Neuroscience students in Germany. We describe our scientific and cultural curricular goals, our development of learning objectives, our itinerary, and survey results for the first iteration of the program. We had 16 students and a rigorous three-week itinerary including 5 scientific site visits, multiple cultural sites, and preparatory and reflective assignments.Results were very positive. 87.5% of students agreed or strongly agreed with the statement “Overall, I feel that the learning objectives for this program were met”. We asked about the relevance of specific activities and the benefit to student learning. Most students agreed or strongly agreed that the scientific visits (87.5%) and academic lectures (81.25%) were relevant to the scientific learning objectives. In qualitative feedback about academic lectures, students expressed the desire for more background material and that the 2-4 hours long lecture sessions be broken into shorter pieces. Additional cultural activities that students found relevant were German lessons, the Deutsches Museum, and a Ravensbrueck Memorial visit, with ≥70% agreeing or strongly agreeing that these were relevant to the learning objectives. Other highly ranked activities were guided tours of the Roentgen Memorial and Munich, and a day trip to the Zugspitze, with ≥60% agreeing or strongly agreeing that these were relevant to the cultural learning objectives.Responses were variable regarding the balance of scientific and cultural activities, 25% of students felt there was “slightly too much science”, 31.25% felt there was “a good balance”, 37.5% felt there was “slightly too much culture”, and 1 student (6.25%) felt there was “far too much culture”.Lastly, we asked students whether this program led to their personal growth. Nearly all students (15; 93.75%) agreed or strongly agreed that this program led to their personal growth. When asked for additional qualitative feedback on how this program impacted their personal growth, students wrote extensively, reporting that they learned about themselves, increased their self-confidence and independence, developed an ability to navigate in a foreign country, improved their ability to communicate with others, and increased their cultural awareness.

Disclosures: G. Herin: None. **G.M. Lewis:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.11SU/XX38

Topic: J.02. Teaching of Neuroscience

Title: Neuroscience and Medicine Study Abroad Trip to Austria and Germany: Course Design and Student Feedback

Authors: *A. L. HAWTHORNE, T. L. CHIARELLI;
Burnett Sch. of Biomed. Sci., Univ. of Central Florida, Orlando, FL

Abstract: In spring 2023, we created and taught a 3 credit hour class ZOO 4955 Historical Contributions to Medicine that took 22 undergraduate students to Vienna, Austria, and Leipzig and Berlin, Germany, for 9 days over spring break. We designed this 3 credit hour course to prepare students for the scientific and cultural content of the trip and to discuss and reflect on the trip afterwards, applying their knowledge in a final ePortfolio project that they presented at the end of the course. Objectives of the course included: Understand the origins, history, and evolution of modern medicine; Gain an appreciation for the trials and tribulations of early physicians and scientists; Describe the major contributions to STEM based on trip experiences; Experience the culture of Germany and Vienna, understanding the historical context; Learn the significant contributions within world history; Become proficient in basic German language. Assignments before the trip included German language lessons, scientific reading and discussion posts, menu translations, and presentations on topics that we would see in Austria or Germany. The scientific highlights of the trip included Ancient Egyptian medical texts, Franz Joseph Gall's skull collection in support of phrenology, Sigmund Freud's house, The Narrenturm Museum of Pathology and Anatomy, where students saw one of the few remaining iron lungs for treatment of Polio, the Josephinum's medical wax models, and a visit to Dr. Michael Brecht's neuroscience lab at the Humboldt University of Berlin. Cultural highlights included the bust of Queen Nefertiti, Humboldt University of Berlin's Museum of Natural History, World War II Memorials, the Berlin Wall, Klimt's Kiss and other works of art at the Belvedere Palace. During the trip, students were required to journal about their experiences. After the trip, students participated in discussions and peer reviews of their course work. Informal feedback on the course and trip was largely positive and focused on ways to improve the course and trip in the future. Students felt prepared for the trip abroad and valued the language and translation exercises. Results from extra credit student surveys will also be shared. The students learned about some of the actual reasons behind medical advances, the effects of rickets and hydrocephalus, and the struggles of early women in medicine. Culturally, students learned more about the impact of World War II and the cold war and experienced different lifestyles, language, and food. Travel over spring break allowed students to take a full course load. Studying abroad gave students a greater appreciation for science and medicine and broadened cultural understanding.

Disclosures: A.L. Hawthorne: None. **T.L. Chiarelli:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.12SU/XX39

Topic: J.02. Teaching of Neuroscience

Title: Perceived academic stress in Mexican medical students. The role of sex, mental health, motivation, burnout, and past-current abuse experiences

Authors: *D. GUÍZAR[1], V. INCLAN-RUBIO[2], R. SAMPIERI CABRERA[3];
[1]Physiol. Dept., Univ. Nacional Autónoma De México, México, Mexico; [2]UNAM, Mexico DF, Mexico; [3]Physiol. Dept., Univ. Nacional Autónoma de México, MEXICO CITY, Mexico

Abstract: Introduction. Academic stress is a common problem among medical students that has a negative physiological, social, and learning impact. Perceived academic stress (PAS) indicates how stressed a student is about academic issues over a given period of time and the ability to manage that stress. Objective. To determine the prevalence of PAS and assess potential risk factors, focusing on gender differences, burnout, motivation, mental health, and past/current abuse experiences. Method. A cross-sectional, retrospective, comparative study was conducted through an online survey with medical students (MS) willing to participate anonymously. The perceived academic stress scale, Maslach scale of burnout in students, PHQ-9 depression scale, academic motivation scale in students, past and current violence scale (inside and outside the school environment) were used. Results. All students referred PAS and most of them in moderate-severe degree. When comparing the presence of mistreatment in the academic setting between men and women, differences were found in the frequency of reporting emotional and sexual abuse. Multiple logistic regression analysis showed that sex and current in-school sexual abuse had the strongest association with PAS in MS, (adjusted odds ratio [AOR] = 3.47, 95% confidence intervals [CI]: 3.09-3.86, AOR= 3.09, 95% CI: 2.89-3.40), personal history of depression (AOR = 2.12, 95% CI: 2.01-2.68),and low motivation (AOR = 1.17, 95% CI: 1.01-1.68). Discussion and conclusion. Timely identification of at-risk individuals will be critical to establish preventive strategies to limit the impact of PAS in MS, stress management programs, coping skills training, and offer timely therapeutic alternatives when necessary.

Disclosures: D. Guízar: None. **V. Inclan-Rubio:** None. **R. Sampieri Cabrera:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.13SU/XX40

Topic: J.02. Teaching of Neuroscience

Support: This research project was supported by CONAHCYT Grant: 319578.

Title: Effectiveness of a mindfulness-based programme on perceived stressin medical students.

Authors: *M. VELAZQUEZ-PANIAGUA, M. CARDENAS-AGUAYO;
Physiology, Sch. of Med., UNAM, Ciudad de México, Mexico

Abstract: Introduction. Chronic stress produces physiological alterations, in the medical students, stress derived from academic demands plus external psychosocial demands, can lead the students to experience high-level stressful states that produce an emotional exhaustion that directly impacts the student's personal and academic performance. The aim of this study was to implement a MBSR (Mindfulness Based Stress Reduction) program to reduce stress in medical students. The MBSR program has been developed in different educational and health contexts. The MBSR program is based on reflection and Mindfulness practices, allowing the student to train in more conscious states that promote emotional self-regulation. Methodology. Through the communication channels of the School of Medicine of the UNAM, students were invited to participate in the workshop "STRESS REGULATION BY MINDFULNESS", about 34 students registered, and divided into 2 groups, only 15 students finished the MBSR program. The students were given a MBI test before and after the workshop, MBI "Maslach Burnout Inventory", which assesses Burnout Syndrome. Results. The pre-workshop MBI data were as follows: 72% showed high emotional exhaustion, 65% showed a lack of personal efficiency in their school performance and 50% showed high depersonalization. In contrast, the data obtained from the post-workshop MBI, after 8 weeks, showed a reduction in the percentage of emotional exhaustion of 32%, a decrease in the percentage of lack of personal efficiency in school performance of 22% and finally, the presence of depersonalization was also reduced to 16%. Conclusion. According to the data obtained from the MBI, the students after the MBSR program showed an improvement in the reduction of stress after the workshop.

Disclosures: M. Velazquez-Paniagua: None. **M. Cardenas-Aguayo:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.14SU/XX41

Topic: J.02. Teaching of Neuroscience

Support: NSF Grant IOS 175111

Title: Evaluation of a structured approach to mentorship and training in neuroscience research at a Hispanic-serving institute.

Authors: *S. C. FURTAK;
Psychology, Sacramento State, Sacramento, CA

Abstract: Teaching-focused universities introduce students to scientific research in small laboratory settings and provide a high level of direct contact between undergraduate students and their faculty members. A common notion is that these close student-faculty interactions increase the pursuit of a scientific career and provide critical hands-on skill training. Here we implemented a structured framework for mentorship and skill building in a neuroscience laboratory environment and evaluated it as part of a National Science Foundation (NSF) grant over a five-year period. The trifurcated program structure focused on: 1) building belongingness and community, 2) identifying individual career goals and creating a personalized plan for professional development, and 3) training in theoretical concepts and hands-on skill building in neuroscience research. The research examined cortical processing of conditioned stimuli during a Pavlovian fear extinction paradigm in rats. This type of stimulus-stimulus association learning is important for animal survival and is relevant to understanding the neurobiology underlying some anxiety-related disorders. A total of 24 students were tracked across 1-5 semesters based on how long the student was affiliated with the laboratory. At the end of each semester, the student completed a self-report survey that assessed the amount of growth in technical laboratory skills, engagement with the scientific method, theoretical concepts, and professional development. Demographic information was also collected. The results indicate that students identified the most beneficial component of the program as being able to build a community of like-minded peers and receiving professional development through one-on-one meetings with the faculty. The majority of participants indicated they did not feel confident in their ability to "think like a scientist" until they were involved in the laboratory for more than two semesters. Additional results are discussed regarding the utility of program evaluations, where improvements can be made in both the program structure and the assessment, and the value of mentorship as a primary outcome of federally-funded science. In general, the findings have motivated a restructuring of the program to focus on building scientific thinking skills and community interactions earlier in the mentorship and training process.

Disclosures: S.C. Furtak: None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.15SU/XX42

Topic: J.02. Teaching of Neuroscience

Title: Faculty for Undergraduate Neuroscience (FUN): promoting advances in undergraduate neuroscience education and research for over 30 years

Authors: *E. RHINEHART[1], K. R. ILLIG[2], Y. KANG[3];
[1]Susquehanna Univ., Selinsgrove, PA; [2]Biol. Dept. and Neurosci. Program, Univ. of St. Thomas, Saint Paul, MN; [3]Dept. of Natural Sci., Univ. of Houston Downtown, Houston, TX

Abstract: Since 1992, Faculty for Undergraduate Neuroscience (FUN) has been the premier international society devoted to supporting undergraduate neuroscience education and research (funfaculty.org). The mission of FUN is to support neuroscience faculty and enhance undergraduate participation in neuroscience research, while also developing national and regional networks for disseminating information that enhance undergraduate neuroscience education, research, and faculty development. FUN accomplishes these goals through multiple mechanisms, working with a network of dedicated volunteers. To promote undergraduate participation in Neuroscience research, FUN works with sponsoring organizations to grant travel awards to outstanding undergraduates to allow them to present their research at the annual Society for Neuroscience (SfN) meeting. For students who are unable to attend the annual SfN meeting, FUN also supports a variety of regional undergraduate Neuroscience research symposia, such as “MidBrains,” “NEURON,” and “mGluRs.” To support undergraduate Neuroscience faculty research endeavors, FUN orchestrates an Equipment Loan Program which allows researchers to borrow state-of-the-art equipment from a variety of vendors to provide undergraduate Neuroscience faculty an opportunity to generate preliminary data for federal grant proposals. In addition, FUN annually recognizes exceptional faculty accomplishments in neuroscience education, mentorship, and service. To disseminate information to enhance undergraduate neuroscience education, FUN publishes the online, peer-reviewed, PubMed-indexed Journal of Undergraduate Neuroscience Education (JUNE), devoted to the scholarship of Neuroscience pedagogy for use in undergraduate neuroscience curricula (www.funjournal.org). FUN organizes triennial, in-person faculty development workshops, which bring neuroscience educators together to develop and share evidence-based, high-impact pedagogical practices to enhance the learning experiences resulting from multiple types of instructional modalities (in-person lecture/discussion, laboratory, and online teaching). FUN members and those interested in learning more about FUN are encouraged to attend our SfN-sponsored social and our annual business meeting, visit us at our booth or online (funfaculty.org), or contact the authors.

Disclosures: E. Rhinehart: None. **K.R. Illig:** None. **Y. Kang:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.16SU/XX43

Topic: J.02. Teaching of Neuroscience

Support: Quinnipiac University College of Arts and Sciences
Quinnipiac University Psychology Department
UCONN

Title: The 36th Northeast Undergraduate and Graduate Research Organization for Neuroscience (NEURON) conference held at Quinnipiac University's Frank H. Netter M.D. School of Medicine in North Haven, CT

Authors: *J. L. HAIGHT[1], A. J. BETZ[1], R. M. SHANSKY[3], A. ECEVITOGLU[4], V. P. FRANCONE[2], E. M. KLINE[5], R. A. ROTOLO[7], G. R. TANNER[6], J.-H. YANG[8], T. H. AHERN[1];
[1]Psychology, [2]Med. Sci., Quinnipiac Univ., Hamden, CT; [3]Behavioral Neurosci., Northeastern Univ., Boston, MA; [4]Psychological Sci., [5]Mol. and Cell Biol., [6]Physiol. and Neurobio., UCONN, Storrs, CT; [7]Sage Therapeut., Boston, MA; [8]Yale Univ., New Haven, CT

Abstract: The NEURON conference has a long history of supporting undergraduate and graduate neuroscientists' professional development and educational opportunities as well as serving as a platform for students to share their research. The 36th NEURON conference was held on April 23rd, 2023, at Quinnipiac University's Frank H. Netter, M.D., School of Medicine. The keynote address was given by Dr. Rebecca Shansky, Associate Professor of Psychiatry at Northeastern University. In her talk, titled, "What have we been missing? New insights into Pavlovian fear conditioning from careful consideration of sex as a biological variable", Dr. Shansky discussed her research on sex differences in classical fear conditioning. Following the keynote, students and faculty participated in workshop sessions including Careers in Science Panel, Detectives of Undiagnosed Disease, Effective Resume Writing, Context and Conflicts in the Research Lab Setting, and Intraoperative Neuromonitoring and Surgical Neurophysiology. In parallel, undergraduate and graduate poster sessions, data blitz talks, and grad recruitment and networking took place. The Tieman Outstanding Poster Awards were given to undergraduate and graduate students to honor the quality of their work, an additional poster awards were offered by Nu Rho Psi, the national undergraduate neuroscience honor society. Awards were also given for the best undergraduate and graduate data blitz talks. Quinnipiac University hosts the website for the NEURON conferences, which includes links to registration, abstract submission, archives of previous talks, and image galleries (www.quinnipiac.edu/neuron). The 37th NEURON conference will be held Sunday, April 21st, 2024 at Quinnipiac University's Frank H. Netter, M.D., School of Medicine. With continued local and regional support from faculty dedicated to student outreach and mentorship, and co-sponsorship from Quinnipiac University, particularly the College of Arts and Sciences and the Psychology Department, and the University of Connecticut, NEURON has continued to expand beyond its original Boston locations to include greater representation from the northeast region and beyond. Follow us on Twitter @NEURONconferenc for updates.

Disclosures: **J.L. Haight:** None. **A.J. Betz:** None. **R.M. Shansky:** None. **A. Ecevitoglu:** None. **V.P. Francone:** None. **E.M. Kline:** None. **R.A. Rotolo:** None. **G.R. Tanner:** None. **J. Yang:** None. **T.H. Ahern:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.17SU/XX44

Topic: J.02. Teaching of Neuroscience

Title: Undergraduate laboratory course in behavioral neuroscience

Authors: *H. H. LOPEZ;
Psychology, Skidmore Col., Saratoga Spgs, NY

Abstract: As part of our undergraduate Neuroscience and Psychology majors at Skidmore College, we offer an advanced laboratory course in behavioral neuroscience. The core learning goals of the course are to have students: 1) learn about some prominent behavioral models used within neuroscience, 2) acquire experience working with laboratory rats, 3) further develop their scientific literacy and critical reading skills, and 4) improve their scientific communication skills. Students complete three experiments across a 15-week semester, using rodent subjects (Sprague-Dawley female rats). Each student "adopts" a single rat and is responsible for running that subject through all experiments. Experiment 1 explores the anxiolytic properties of diazepam using an elevated plus maze. In Experiment 2, students use a conditioned place preference procedure to assess the rewarding properties of d-amphetamine. In Experiment 3, students use a radial arm maze to study spatial learning and the development of cognitive maps; each year, the effect of a different pharmacological or hormonal agent on spatial learning is examined (e.g., nicotine, estradiol, CP-55940, caffeine). Through these experiments, students learn numerous research skills, including how to administer subcutaneous and intraperitoneal injections, how to code and quantify behavioral variables, and how to conduct advanced statistical analyses on compiled data-sets. Bi-weekly lectures provide a historical and theoretical background for each experiment, as well as critical pharmacological information. Students write up the results of each experiment in an APA-style scientific manuscript. As a final project, each student generates and presents (both orally and written) a formal grant proposal on a novel hypothesis that falls within the broad domain of behavioral neuroscience. This course has been particularly valuable for students who wish to acquire experience working with non-human subjects prior to initiating a senior thesis, starting a post-graduation technician position, or entering a doctoral program in psychology/neuroscience.

Disclosures: H.H. Lopez: None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.18SU/XX45

Topic: J.02. Teaching of Neuroscience

Title: Developing an Undergraduate Computational Neuroscience Major: Brown University

Authors: L. ZIMBALIST[1], M. L. LINDEN[1,2], ***D. L. SHEINBERG**[1,2];
[1]Neurosci., Brown Univ., Providence, RI; [2]Carney Inst. for Brain Sci., Providence, RI

Abstract: Computational Neuroscience is an ever-growing field of research in modern neuroscience, especially with today's constantly evolving technological landscape. Despite this, very few undergraduate institutions offer a major in computational neuroscience, and even among those who do, many include it as a track of study within a larger neuroscience degree. This project describes how we designed a new undergraduate major in computational neuroscience at Brown University. We describe the process of developing learning outcomes for the major and creating an appropriate required course list that works to achieve those learning outcomes. This project also discusses the difficulties of creating a major that is inherently so interdisciplinary in nature, focusing on how to work across multiple academic departments in order to develop a program which accurately reflects all related areas of study. We also tell the story of this collaborative project, which was worked on primarily by an intergenerational team of Neuroscience faculty, a Neuroscience administrator, and an undergraduate student. Our conceptual framework and general structure of this undergraduate major can be easily adapted by other institutions who hope to develop a similar program.

Disclosures: L. Zimbalist: None. **M.L. Linden:** None. **D.L. Sheinberg:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.19SU/XX46

Topic: J.02. Teaching of Neuroscience

Support: George Mason University Curriculum Impact Grant

Title: A series of course-based undergraduate research experiences in neuroscience at George Mason University

Authors: *G. M. LEWIS, L. R. GUERRIERO, G. HERIN;
Interdisciplinary Program in Neurosci., George Mason Univ., Fairfax, VA

Abstract: Research experience improves undergraduate outcomes such as concept comprehension, feelings of belonging, and provides transferable skills for future careers. However, many undergraduates struggle to access research opportunities, particularly those with significant work or family responsibilities that impede their ability to volunteer in laboratories. To this end, we developed a series of three-credit Course-based Undergraduate Research Experiences (CUREs), where students use model systems to investigate the nervous system. In

each of these labs, students learn techniques for working with their model system, design novel research projects, collect and analyze data, and present their findings at an internal research symposium. In the *Zebrafish Neurodevelopment Laboratory*, students investigate the effects of a chosen variable on neural development in *Danio rerio* embryos. In *Lab Methods of Behavioral Neuroscience,* students investigate novel sleep-related genes in *Drosophila melanogaster*. And in *Lab Investigations Using Voltage Clamp Electrophysiology*, students use two-electrode voltage clamp to examine the pharmacology of compounds on neurotransmitter receptors using *Xenopus laevis* oocytes. Here, we compare and contrast the curriculum and research approach for each course and present data from student surveys and evaluations. The oldest of these courses has been taught since 2017 with great success, and student evaluations of all three CURE courses are consistently high. Recently, we assessed students' impressions of their improvement in research skills, such as design, data analysis, presentation, etc. for one of the CURE courses. All students agreed or strongly agreed that the course improved their research skills in every area assessed, and 100% strongly agreed that the course was a valuable learning experience. Approximately 75% of students had no research experience at the start of the course, despite nearly all students being seniors, suggesting the course successfully improved access to research opportunities. These courses demonstrate how a CURE format can be used to engage students with the research process from start to finish and may be used as models to help other faculty develop CUREs in their area of expertise.

Disclosures: G.M. Lewis: None. **L.R. Guerriero:** None. **G. Herin:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.20SU/XX47

Topic: J.02. Teaching of Neuroscience

Support: NSF-REU 2050194
UC-HBCU

Title: Impact of authentic neuroscience research experiences on neuroscience workforce diversity

Authors: *M. YASSA;
Univ. of California, Irvine, Irvine, CA

Abstract: Neuroscience workforce diversity continues to be a major challenge today and the striking difference between the composition and diversity of those who actively engage in neuroscience research and those who make up our society stifles progress in fundamental discovery and translation to improve the human condition. While all students may enter and leave the science path throughout their journeys, disparities in who leaves the path during the undergraduate years may be at least partly responsible for the underrepresentation of individuals

from minoritized groups in the neuroscience workforce.Evidence suggests that engaging in authentic hands-on research during undergraduate training enhances retention of students in STEM as well as their recruitment to graduate school. Intensive summer programs that engage undergraduate students in research and provide opportunities for professional development has been one approach that is used to address the disparities in the attrition of individuals from minoritized groups.
The Irvine Summer Institute in Neuroscience is an 8-week long residential research program at the University of California Irvine's Center for the Neurobiology of Learning and Memory. The program is funded by the National Science Foundation's Research Experiences for Undergraduates (NSF REU) mechanism as well as the University of California-Historically Black Colleges and Universities (UC-HBCU) Initiative. The program's overall goals are: (1) to increase the number of undergraduate students, particularly women, students from underrepresented ethnic/racial groups, students with disabilities and first-generation college students who pursue degrees in neuroscience and biomedical research, (2) to grow and diversify the future pool of students applying to advanced degree programs in neuroscience and biomedical fields; and (3) to increase the diversity of the workforce in neuroscience and biomedical research. The program's activities are designed to bolster the spectrum of competencies that are necessary for success in science and concurrently target and improve mentoring practices that have long contributed to systemic barriers to success in minoritized groups.
Here we report lessons learned as well as results of outcomes evaluations from 3 cohorts of participants. Lessons learned can be useful to colleagues building similar programs and the outcomes contribute to our understanding of the impact of intensive summer research programs on student participants and their mentors as well as the long-term diversification of the neuroscience workforce.

Disclosures: M. Yassa: None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.21SU/XX48

Topic: J.02. Teaching of Neuroscience

Title: Neurodiversity: From student awareness and perceptions to programming and the greater community

Authors: *M. JARVINEN, B. CASTLEMAN;
Dept. of Pharmaceut. and Administrative Sci., Western New England Univ., Springfield, MA

Abstract: A traditional view of "neurodiverse" individuals includes those who fall outside the medical and social boundaries of "the norm", including those with autism, ADHD, or dyslexia. A more contemporary view is one that embraces neurological differences, encompassing all

"neurotypes" differentiated into neurodiverse or neuroaverage, including more specific diagnoses/identifiers like autistic or dyslexic. The goal of this study was to investigate student awareness and perception of neurodiversity. Students enrolled in Introduction to Behavioral Neuroscience (N=150) over several semesters were required to read or view several different information sources (popular, academic, TED talks, or own choice) on the topic of neurodiversity. They then wrote a response paper that summarized: a) their source on the topic, b) their ideas to better support a neurodiverse society, and c) their opinions on aspects of neurodiversity. Several important trends were noted. First, 64% of the sample had never heard of the term neurodiversity and this was their first exposure to the topic. Second, students who found information sources from their own searches had the highest level of optimism ($p < 0.05$) that society was ready to accept the concept of neurodiversity. Third, students identified even higher rates of receptivity (85%) amongst their friends. We report sources of information used by students as “first exposure” to neurodiversity and discuss avenues of programming to enhance neurodiversity awareness on college campuses and in the greater community.

Disclosures: M. Jarvinen: None. **B. Castleman:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.22SU/XX49

Topic: J.02. Teaching of Neuroscience

Support: ADInstruments

Title: Crawfly: celebrating a decade of teaching workshops for neuroscience educators

Authors: *B. JOHNSON[1], R. R. HOY[1], D. DEITCHER[1], R. A. WYTTENBACH[2], J. RYAN[3], I. VILINSKY[4], K. HIBBARD[5];
[1]Neurobio. and Behavior, Cornell Univ., Ithaca, NY; [2]Neurosci. & Behavioral Biol., Emory Univ., Atlanta, GA; [3]Biol., Hobart- William Smith Colleges, Geneva, NY; [4]Biol. Sci., Univ. of Cincinnati, Cincinnati, OH; [5]Janelia Res. Farms, Howard Hughes Med. Inst., Ashburn, VA

Abstract: The CrawFly Invertebrate Neurophysiology Workshop starts its second decade of training neuroscience educators in lab exercises that teach fundamental principles of signal transmission in the nervous system. The exercises address action potential conduction, motor network organization, synaptic transmission and plasticity, and sensory physiology in crayfish and Drosophila. A neurogenetic focus extends classical neurophysiology training to examine the control of behavior and synaptic transmission through opto-genetic stimulation of mutant and wild-type Drosophila. To date, 220 faculty or trainees from 122 institutions in 7 countries have attended CrawFly workshops. To help bring neurophysiology into classrooms with limited resources, do-it-yourself (DIY) sessions include construction of precision micromanipulators, optogenetic light boxes, electrode holders, and digital oscilloscope/signal generators. Workshop

participants also build and use an inexpensive DIY fluorescence microscope to observe prepared slides of *Drosophila* neurons and muscles engineered for fluorescence imaging. This is followed by simple lab exercises to quantify fluorescence calcium concentration changes in synaptic terminals and motor neurons after membrane depolarization. CrawFly faculty and workshop participants brainstorm best practices in laboratory and classroom teaching, with topics addressing virtual instruction, interdisciplinary training for students and educators for big data neuroscience, and the implementation of diversity, equity, and inclusion goals. Workshop scholarships are provided for educators who may incorporate CrawFly lab exercises into their lab class and who may be from groups underrepresented in neuroscience or who work at institutions that serve such groups.

Disclosures: B. Johnson: None. **R.R. Hoy:** None. **D. Deitcher:** None. **R.A. Wyttenbach:** None. **J. Ryan:** None. **I. Vilinsky:** None. **K. Hibbard:** None.

Theme J Poster

TJP04. Undergraduate Neuroscience Programs

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP04.23SU/XX50

Topic: J.02. Teaching of Neuroscience

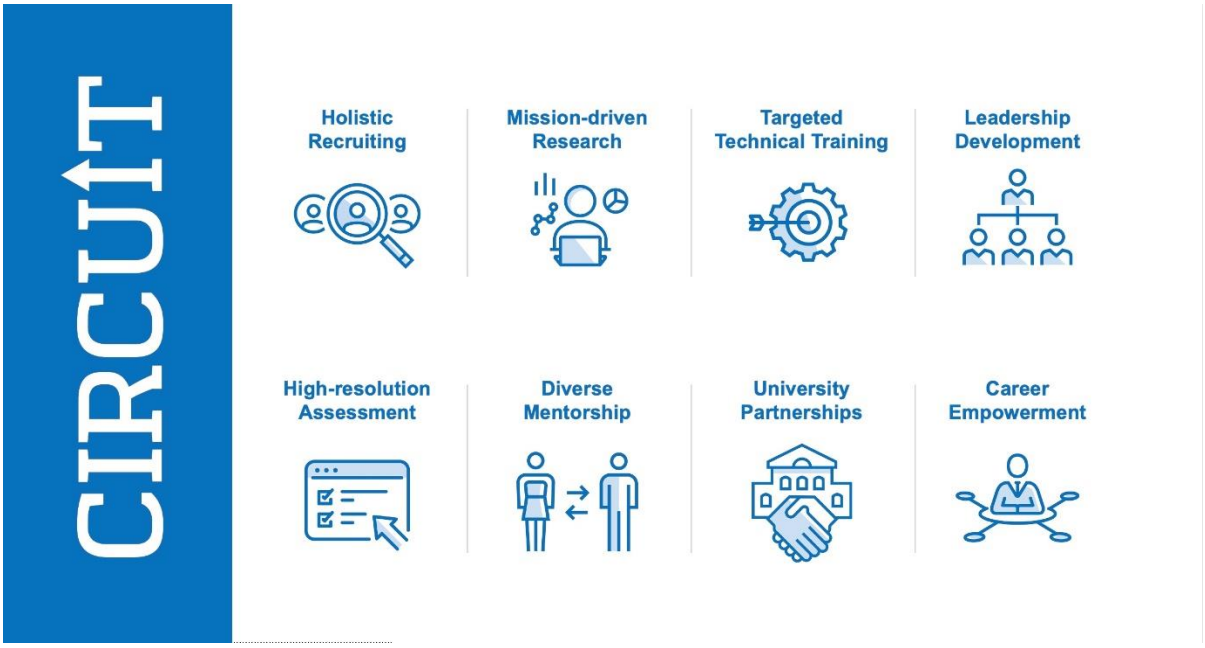
Support: JHU/APL Internal Funding.

Title: A systemized approach to activate and support diverse STEM student leaders

Authors: M. CERVANTES[1], S. FLORYANZIA[1], J. RIVERA[1], J. BURROUGHS[1], K. CARR[1], J. SHARP[1], C. WILEY[1], E. C. JOHNSON[1], ***W. GRAY RONCAL**[2];
[1]Johns Hopkins Univ. Applied Physics Lab., Laurel, MD; [2]Johns Hopkins Univ., Laurel, MD

Abstract: We have developed our CIRCUIT model to effectively recruit and support diverse, trailblazing students in computational neuroscience and other Science, Technology, Engineering, and Math fields. Over the past seven years, we have distilled our methods into eight pillars: holistic recruiting, mission-driven research, targeted technical training, leadership development, high-resolution assessment, diverse mentorship, university partnerships, and career empowerment. Our student fellows are selected based on their capabilities, rather than their previous opportunities, and supported holistically during a year-long program. A substantial majority of our students are from under-resourced (e.g., first-generation, low-income) or under-represented backgrounds. We support the development of professional and technical skills through both intensive mentoring and by embedding student cohorts within cutting-edge computational neuroscience and other STEM research efforts.
Critical to our approach is the application of engineering and scientific tools, which enable us to effectively explore research areas to promote increased engagement, belonging, and learning. Rapid assessment methods create opportunities to quickly identify and revector challenges. Our preliminary results suggest that our framework is both effective and scalable and can be used to

identify, activate and nurture talented individuals from different backgrounds. This leads to new opportunities to make immediate and future impacts in scientific discovery.



Disclosures: **M. Cervantes:** None. **S. Floryanzia:** None. **J. Rivera:** None. **J. Burroughs:** None. **K. Carr:** None. **J. Sharp:** None. **C. Wiley:** None. **E.C. Johnson:** None. **W. Gray Roncal:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.01SA/XX51

Topic: J.02. Teaching of Neuroscience

Support: AG073040
GM139413

Title: Teaching organ models from design through experiments to applications in Neuroscience

Authors: ***J. COLLINS**[1], J. A. J. JOSE[1], G. KATARA[1], V. S. SUBRAMANIAN[2], M. KITAZAWA[2], T. TEAFATILLER[2], S. LIM[2], J. FERNANDO[3];
[1]Biopico Systems Inc, Irvine, CA; [2]Univ. of California, Irvine, CA; [3]Dept. of Special Educ., California State Univ. Fullerton, Fullerton, CA

Abstract: Involving the college students and professionals in the design and implementation and application of an experimental paradigm promotes their creativity and encourages them in

effective participation. Emerging research has reiterated the importance of 3-D organ models and our effort is to engage them in research and STEM capstone projects focused on the 3d organ model research approach. Thus in the present project we bring out a students-friendly and innovative organ model development as case study-based instructional methods to help students increase retention of information and apply their knowledge in novel situations.To implement this, we developed a web-based design tool to determine the elements of 3-D gel and co-culture cell density calculations for blood-brain-barrier organ and brain-liver-gut-kidney multiorgans. This will be useful for neurosciences courses in pharmacology, cellular and molecular biology, and neurobiology students to design, experiment and interpret the results. We will share the results of how we utilized the design of subsequent experiments in neuroscience research and evaluation of the students for neuroscience understanding. The confidence levels of the students to understand the materials and how the course will build a foundation for their career will be quantified. The students are expected to gain a deeper understanding of the scientific process and expand knowledge in a research tool. The learning objectives include the ability of the students to synthesize information to investigate hypotheses, critically evaluate experimental design, ability to explain the origin, construction and future goal of scientific research and understand the interdisciplinary biology required for advancing neuroscience.

Disclosures: **J. Collins:** A. Employment/Salary (full or part-time):; Biopico Systems Inc. **J.A.J. Jose:** A. Employment/Salary (full or part-time):; Biopico Systems Inc, University of California Irvine. **G. Katara:** None. **V.S. Subramanian:** None. **M. Kitazawa:** None. **T. Teafatiller:** None. **S. Lim:** None. **J. Fernando:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.02SA/XX52

Topic: J.02. Teaching of Neuroscience

Support: Hope For Depression Research Foundation (HDRF) Data Center, Phase IV
Pritzker Neuropsychiatric Disorders Research Consortium (#AWD000006)
NIDA U01 DA043098
Grinnell College Center for Careers, Life, and Service
University of Michigan Undergraduate Research Opportunities Program

Title: The Brain Data Alchemy Project: Teaching research reproducibility and discovery science while mining gold from archived genomics data

Authors: *M. H. HAGENAUER[1], C. RHOADS[2], J. XIONG[2], E. HERNANDEZ[2], D. NGUYEN[2], A. SAFFRON[3], E. FLANDREAU[4], A. KONDUR[1], T. Q. DUAN[2], A. BADER[2], T. M. GYLES[5], C. A. MCLAIN[5], E. J. NESTLER[5], S. J. WATSON[1], H. AKIL[1];
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Baltimore, MD; [4]Grand Valley State Univ., Allendale, MI; [5]Icahn Sch. of Med. At Mount Sinai, New York, NY

Abstract: During the past decade, the landscape of neuroscience research has undergone two major transformations in the way that data are collected, analyzed, and interpreted. First, there has been an intensive push to reform scientific practices to improve research reproducibility. Second, accelerated growth in computing power and omics knowledge has led to a blossoming of "discovery science". In this new landscape, trainees need to acquire skills that are not included in traditional curricula. We have addressed this need by creating an intensive summer program that provides direct, hands-on experience with experimental design and statistical issues related to research reproducibility and discovery science. Within the program, trainees conduct a systematic meta-analysis focused on a chosen neuroscience topic using a burgeoning trove of publicly available transcriptional profiling datasets (more than 15,000 microarray and RNA-Seq datasets). We successfully piloted the program in 2022 (n=6 trainees) and 2023 (n=5 trainees). We found that over the course of a single summer (10 weeks), trainees were able to learn to code in R, survey scientific literature, and run a full genomics meta-analysis that could serve as a small publication or preliminary data for a grant. The topics chosen by the trainees included chronic stress, sleep deprivation, early life stress, antidepressant usage, sex differences, chronic pain, viral and bacterial inflammation. Each of the meta-analyses revealed an extensive set of differentially expressed genes that can shed light on neuropsychiatric disorders. These gene sets will be released within reference databases compiled by the PI (Brain.gmt) and broader curation efforts (Geneweaver, MSigDB, Enrichr, PhenoCarta) to advance genomic science.

Disclosures: M.H. Hagenauer: None. **C. Rhoads:** None. **J. Xiong:** None. **E. Hernandez:** None. **D. Nguyen:** None. **A. Saffron:** None. **E. Flandreau:** None. **A. Kondur:** None. **T.Q. Duan:** None. **A. Bader:** None. **T.M. Gyles:** None. **C.A. Mclain:** None. **E.J. Nestler:** None. **S.J. Watson:** None. **H. Akil:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.03SA/XX53

Topic: J.02. Teaching of Neuroscience

Title: Aligning with the predecessors: anatomical correlates for the newly discovered meningeal layer in the existing literature

Authors: *C. KUMARI[1], R. KUMAR[2], R. K. JHA[2], A. ASGHAR[2], A. RASTOGI[3], P. KUMAR[5], R. K. NARAYAN[6], A. KUMAR[4];
[1]Post Grad. Inst. of Med. Educ. and Res., Chandigarh, India; [2]Dept. of Anat., [3]Dept. of Forensic Med. and Toxicology, [4]AIIMS-Patna, Patna, India; [5]IGIMS-Patna, Patna, India; [6]Dept. of Anat., ESIC-Bihta, Patna, India

Abstract: Introduction: A recent study reported the existence of a new meningeal layer between the arachnoid and pia mater in mice and human brains dividing the subarachnoid space (SAS) into two functional compartments. Despite being a macroscopic structure, how it missed detection in previous studies, specifically that used specialized imaging methods, is surprising. **Methods:** A scoping review of the published reports of dissection, neuroimaging, histological, and ultrastructural studies of meninges in animals and humans was performed following the PRISMA guidelines. An electronic search was conducted using combinations of *MeSH* terms and keywords. Boolean operators were used to combine search terms. PubMed, Embase, Web of Science, and Google Scholar were searched from inception to 31 March 2023. **Results:** Sixty articles were included in the final analysis. The results were organized into four categories: **1. Macroscopic and microscopic anatomy:** Dissection-based neuroanatomical studies have no previous descriptions of this structure. Møllgård et al. provided the first distinctive microscopic evidence for a thin impermeable intermediate meningeal layer with immunogenic properties in SAS of human and mouse brains. **2. Embryogenesis:** Møllgård et al. proposed recognizing the new meningeal layer as mesothelium, which needs more evidence. Prior evidence suggests it will more suitably fit into the category of leptomeninx, primarily derived from ectoderm-derived neural crest cells. **3. Neuroimaging data:** The analysis of the imaging data from the scanning electron microscopic (SEM) and magnetic resonance imaging (MRI) studies of the subarachnoid space (SAS) gives a faint albeit affirmative indication of its existence. **4. Physiological/Clinical relevance:** This discovery introduces an additional component in the protective barrier of the central nervous system (CNS), likely to redefine the dynamic circulation of CSF and the pathogenesis of immune-based neurodegenerative diseases. **Conclusion:** The prior indications for the newly discovered meningeal layer are limited in the existing literature. Its detection in neuroanatomical and imaging-based studies could have been missed for various reasons, such as extreme thinness, loss during tissue processing, and confounding with the arachnoid trabeculae and blood vessels in the SAS. Considering the significant physiological/clinical implications, exploring its further structural and functional details and developing advanced imaging methods that can enable its detection in diagnostic tests is a need of the hour.

Disclosures: C. Kumari: None. **R. Kumar:** None. **R.K. Jha:** None. **A. Asghar:** None. **A. Rastogi:** None. **P. Kumar:** None. **R.K. Narayan:** None. **A. Kumar:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.04SA/XX54

Topic: J.02. Teaching of Neuroscience

Support: NSF grant for NeuroNex C3NS 2015317

Title: Sensory Afferent Database: Advancing towards a comprehensive understanding of sensory afferents and motor control

Authors: *B. P. BOLEN[1], A. J. HUNT[1], K. DENG[2];
[1]Mechanical and Materials Engin., Portland State Univ., Portland, OR; [2]Mechanical Engin., Case Western Reserve Univ., CLEVELAND, OH

Abstract: The Sensory Afferent Database is a pioneering tool aimed at facilitating comprehensive research on the interplay between sensory afferents and motor control. This large-scale database, currently hosted on Airtable, offers researchers a centralized platform to access and share papers that investigate the influence of afferent feedback (e.g., mechanosensory and proprioceptive) on locomotion in diverse animal species. Its primary objective is to include all high-quality papers that discuss the intricate relationship between sensory afferent feedback and motion control.
The database's user-friendly interface allows for seamless navigation and exploration. Researchers can organize papers based on categories, including models, review papers, and animal studies. Furthermore, the papers are tagged with essential metadata, such as sensory system involved (e.g., Ib, Chordontonal Organs), animal species used or modeled (e.g. cat, cockroach), feedback rules modeled (e.g., Ib stance to swing transition, Ia inhibition), behavior studied (e.g., posture or locomotion), and whether the feedback effect is intraleg or interleg. With an extensive collection of papers encompassing various research categories, the Sensory Afferent Database facilitates multidisciplinary collaboration and encourages the exchange of ideas among researchers investigating organism motion control. This database may be used as an instructional tool to train both new and experienced scientists as to the different sensory systems used in a wide variety of animals. Currently, this tool is primarily used within the NeuroNex group Communication, Coordination, and Control in Neuromechanical Systems to compare and contrast feedback mechanisms used by animals in different phyla. By harnessing this diverse range of literature, we are working to gain insights into the governing mechanisms that facilitate effective neural-motor control.

Disclosures: B.P. Bolen: None. **A.J. Hunt:** None. **K. Deng:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.05SA/XX55

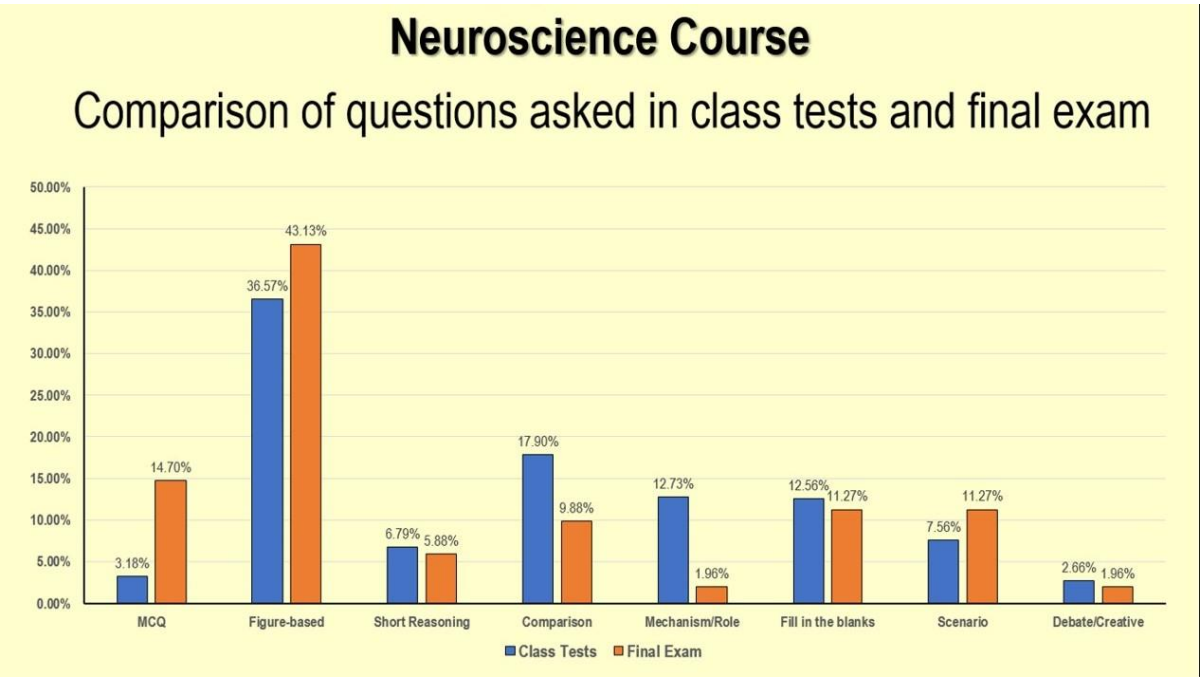
Topic: J.02. Teaching of Neuroscience

Title: Teaching multidisciplinary neuroscience elective course with Bloom’s taxonomy and beyond: A narrative experience

Authors: *M. RAZA;
Neurol., Baqiyatallah Univ. of Med. Sci., Tehran, Iran, Islamic Republic of

Abstract: Neuroscience teaching usually involves lecture-based classroom instruction with limited practical experience for focused group of students. Here I briefly narrate experience of

designing and imparting a multidisciplinary, elective, 8 units Neuroscience Course for diverse group of students in a small group (max. 8 participants) interactive, skill-based, learner-centered setting. The students (top 5%) are selected from any discipline and institution after passing entry test from the book Brain facts with minimum 55% marks and interview. Classes are held at weekends with mutual consent of all, focused besides Neuroscience knowledge, on several meta-skills including team-based learning, communication skills, responsible behavior, critical thinking, taking challenges, discussions and formal debate, application of instructed knowledge and out of the box, lateral thinking. The participants undergo a rigorous objectively designed experience of interactive media-based teaching, class tests and home works in every session, challenge questions, over 450 videos and animations, creative essay, topic and paper presentation, team-based learning activities, visit to sleep lab, practical orientation to several techniques such as fMRI, tDCS, TMS, EEG-EMG, Sleep-lab etc. and visit to startups manufacturing neurodiagnostic equipment. The participants also visit patients with selected neurological and psychiatric disorders such as epilepsy, Parkinson's disease, Alzheimer's disease, bipolar disorder, schizophrenia, autism and ADHD. A formal debate is organized between two teams at the end of course. The outcomes of this course include engineering students pursuing neuroscience career and designing and patenting new gadgets, medical students pursuing neurology, neurosurgery or psychiatry while others pursuing neuroscience related thesis research. Though it is difficult to organize, instruct and manage this course at departmental level and beyond, however, experience shows its success in the long run for successful career development of participants.



Disclosures: M. Raza: None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.06SA/Web Only

Topic: J.02. Teaching of Neuroscience

Support: Brain and Behavior Research Foundation Grant 29025
Kennedy Krieger Institute Intellectual and Developmental Disabilities Research Center P50 HD103538

Title: A Systematic Review of the Neural Mechanisms Underlying Speech and Language Development in Infants at Elevated Likelihood for Autism

Authors: *J. MORREL[1], K. SINGAPURI[2], R. LANDA[1,3], R. REETZKE[1,3];
[1]Ctr. for Autism and Related Disorders, [2]Ctr. for Neurodevelopmental and Imaging Res., Kennedy Krieger Inst., Baltimore, MD; [3]Dept. of Psychiatry and Behavioral Sci., The Johns Hopkins Univ. Sch. of Med., Baltimore, MD

Abstract: Delays in speech and language development are some of the earliest reported parent concerns associated with autism spectrum disorder, often reported before a child's second birthday. Understanding the neurodevelopmental divergence of such delays is important for the improvement of early detection and intervention targets. This systematic review synthesizes the literature on the application of neuroimaging techniques to evaluate the neurobiological correlates and predictors of speech and language development in infants with an older sibling diagnosed with autism (elevated likelihood [EL-infants]) and those without (low likelihood [LL-infants]). Due to the high rate of recurrence of autism in siblings, prospective studies following EL-infants early in life allow researchers to monitor neurodevelopmental pathways before symptoms emerge. Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, a comprehensive search of electronic databases was conducted to identify relevant peer-reviewed articles published in English between 01/01/2012-01/18/2023. A total of 24 studies were identified for inclusion in the review, spanning structural magnetic resonance imaging (MRI; n=2), functional MRI (fMRI; n=4), functional near-infrared spectroscopy (fNIRS; n=4), or electroencephalography (EEG; n=14). Across these 24 studies, the following trends were evident in EL- relative to LL-infants during the first year of life: (1) atypical language-related lateralization, (2) altered structural and functional connectivity, and (3) reduced neural sensitivity to speech stimuli. This review sheds light on the current state of science regarding early neural mechanisms underlying speech and language delays in EL-infants and highlights both the challenges and promise of implementing such neuroimaging techniques. Future studies are needed to further evaluate the observed trends, while being mindful of the feasibility and acceptability of imaging research in this population.

Disclosures: **J. Morrel:** None. **K. Singapuri:** None. **R. Landa:** None. **R. Reetzke:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.07SA/XX56

Topic: J.02. Teaching of Neuroscience

Title: Linking neuroscience with language education

Authors: *E. RUIZ ALANIS;
Sch. of Psychology, Natl. Autonomous Univ. of Mexico, Mexico City, Mexico

Abstract: In recent years, interest in linking knowledge of neurosciences with different areas has increased, especially in the educational field. Although brain research has the potential to support the teaching-learning process, there is still a huge gap between neuroscience and teaching. Likewise, the way to transfer such knowledge from the laboratory to the classroom, if it is even possible, is still not entirely clear.
In order to bring the different participants in the educational process closer to neurosciences, various initiatives have been carried out. In the case of professors, intersemester courses have been taught on general aspects of neuroscience, as well as relevant aspects for teaching practice. In addition, an optional module on the neuroscience of learning was taught as part of a teacher training course. For students, research-based workshops on study techniques and reflection materials have been developed.

Disclosures: **E. Ruiz Alanis:** A. Employment/Salary (full or part-time):; National School for Languages, Linguistics and Translation, National Autonomous University of Mexico.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.08SA/Web Only

Topic: J.02. Teaching of Neuroscience

Support: Tibi Health - Career Development Grant

Title: Call to Action and a Proposed Model to Attract Neuroscientists to Perinatal Mental Health Field

Authors: *S. OZEN IRMAK;
TIBI HEALTH INC, San Francisco, CA

Abstract: This is is a call to action around a proposed model to all administrators at the graduate level institutes to integrate perinatal mental health related curriculum and opportunities to their programs to provide basic training, to attract interest and to create the next-generation of neuroscience workforce to address the huge unmet need in perinatal mental health. Perinatal mental health disorders (PMHDs) are extremely common; 1 in 5 expecting and new mothers suffer from perinatal- depression, anxiety, panic disorder, obsessive compulsive disorder, bipolar disorder, psychosis or post-traumatic stress disorder.[1,2] But only, 25 percent of those with a clinical disorder is estimated to receive timely treatment. Seventy five percent of the cases (estimated as 1 million moms yearly) are either undiagnosed, misdiagnosed and mis-treated or under-treated. Suboptimal treatment of PMHDs lead to serious problems ranging from health comorbidities to suicides and infanticides.[3,4] The poor performance at the clinical level stems from limited knowledge on the multifactorial disease etiology, changing symptomatology within cases, the complexities around treating a pregnant or breastfeeding individual, and co-morbid physical and emotional challenges arising from the perinatal period itself. Not surprisingly, the neural mechanisms behind PMHDs are poorly understood. We can change this by increasing the engagement of neuroscientists to this field. To facilitate this, we developed an 8-weeks career development course targeted for senior-level graduate students and postdocs. The course includes a series of virtual modules on perinatal mental health, managing effective collaborations, use-inspired research, communication skills, and virtual field work with patients and ecosystem partners. The final deliverable is developing work groups around research proposals that might be feasible to run at participants' home institutions. Parts of this model has been tested on similar initiatives with promising success at eliciting and retaining engagement and promoting group work. A pilot of the final model will be completed and feedback from participants will be discussed at the meeting. We hope that our model can be an inspiration and example to other institutions. References: [1]Earls. Pediatrics. 2010;126(5). [2]Wisner et al. JAMA Psychiatry. 2013;70(5). [3]Creanga et al. J. Women's Health. 2014;23(1). [4]Glazer and Howell. Arch. Women's Mental Health. 2021;24(5).

Disclosures: **S. Ozen Irmak:** A. Employment/Salary (full or part-time):; Tibi Health Inc. E. Ownership Interest (stock, stock options, royalty, receipt of intellectual property rights/patent holder, excluding diversified mutual funds); Tibi Health Inc.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.09SA/XX57

Topic: J.02. Teaching of Neuroscience

Title: Reorganizing and redistributing the Neuroscience content across the components of an integrated dental school curriculum

Authors: *C. STEFAN[1], M. H. LEVINE[2], A. VEITZ-KEENAN[3];
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Abstract: As part of the extensive curricular reform that started at the New York University College of Dentistry in 2018, the Neuroscience component went through a thorough process of revision, changes and adjustments regarding its content, format, time allocated, and timing of sessions / classes. The main purpose was to create a stronger horizontal and vertical integration between disciplines. This reform has been a significant step regarding curricular advancement in general and also a very timely action, taking into consideration the major changes at national level regarding the board exam format (Integrated National Board Dental Examination), which came fully into effect in 2023. The process of reorganizing the Neuroscience course at our college included the redistribution of its content across several components of the first and second-year dental curriculum. It relied on carefully establishing the sequence of topics, followed by the selection / prioritization of key concepts of practical relevance for each topic, and then deciding where and when each of these topics were introduced, merged and/or expanded within various courses / units / sessions in order to create a logical flow. Information was added, reinforced or applied as needed, while eliminating redundancy. By building the concepts on each other, interconnecting / correlating them with other subjects, and progressing in an orchestrated manner, students were constantly encouraged to navigate back and forth through the material and adopt an integrative approach. In many instances, the time was more efficiently utilized by emphasizing the clinical implications related to a certain concept, applying the knowledge to different contexts, promoting active learning, and stimulating critical thinking. The same principles were increasingly used for both teaching and testing. This new design provided the much needed opportunities for a multidisciplinary approach and offered additional perspectives for understanding the relation between structure and function; molecular, microscopic and macroscopic levels; development and its immediate and long-term consequences; normal and pathological; local and systemic; mechanisms of disease and clinical manifestations; medical conditions and preventive and/or therapeutic measures. The entire process as well as the implementation of the instructional methodology associated with it greatly benefited from an interdisciplinary collaboration among faculty. Moreover, the fact that a number of faculty members have participated in more than one course has played an important role in both the planning and running of this program.

Disclosures: C. Stefan: None. **M.H. Levine:** None. **A. Veitz-Keenan:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.10SA/Web Only

Topic: J.02. Teaching of Neuroscience

Title: Acetylsalicylic acid shows better binding affinity to depression susceptibility genes than its parent compound, standard antidepressant, and DNA methyl transferase inhibitor

Authors: *H. O. JIMOH-ABDULGHAFFAAR[1], I. Y. JOEL[2], M. T. AYINLA[3], O. S. JIMOH[4], L. S. OJULARI[3];
[1]Dept. of Physiol., Univ. of Ilorin, Ilorin, Nigeria; [2]Dept. of Biochem., Federal Univ. of Agr., Makurdi, Nigeria; [3]Dept. of Physiol., Univ. of Ilorin, Ilorin, Nigeria, Ilorin, Nigeria; [4]Dept. of Obstetrics and Gynaecology, Federal Med. Center, Idi-aba, Abeokuta, Nigeria

Abstract: The precise mechanisms of susceptibility and resilience to stressors that lead to depression are yet to be fully understood. Epigenetic modifications have been hypothesized to mediate a lasting increase in the risk for depression after exposure to adverse life events (Penner-Goeke & Binder, 2022). Increased or decreased expression of several genes has been associated with susceptibility to depression. Hence, the aim of this study was to compare the binding affinity of acetylsalicylic acid and its parent compound on the binding sites of genes associated with susceptibility to depression against that of escitalopram and RG108. The crystal structures of GRIN2B and WASH genes were downloaded from the protein data bank (PDB ID: 5EWJ and IT84) and those of LRP1 and SOX2 from the Alphafold protein database (https://alphafold.ebi.ac.uk). The proteins were prepared according to standard procedure using the Schrodinger module. The 3D structures of the ligands were downloaded from PubChem and prepared using the Schrodinger Ligprep module. Ligand docking was done using the Glide ligand docking module, and the binding free energy of the docked protein-ligand complex was calculated using the binding affinity calculation Schrödinger Prime MM-GBSA module. The binding affinity of acetylsalicylic acid against GRIN2B, SOX 2, LRP1, RASGRP1, and WASH genes were -9.68, -27.96, -27.09, -26.25, and -44.11 respectively unlike that of salicylic acid (-12.69, -20.31, -23.22, -18.116, and -35.91); escitalopram (-46.54, -35.92, -59.28, -43.72, and -32.22); RG108 (-19.12, -32.41, -42.44, -38.25, and -43.49). In conclusion, acetylsalicylic acid has better binding affinity than its parent compound, escitalopram, and RG108 against the depression susceptibility genes of interest.

Disclosures: H.O. Jimoh-Abdulghaffaar: None. **I.Y. Joel:** None. **M.T. Ayinla:** None. **O.S. Jimoh:** None. **L.S. Ojulari:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

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Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.11SA/XX58

Topic: J.02. Teaching of Neuroscience

Support: R29 NS31857-01A1
5U54MD013376
5UL1GM118973

Title: Artificial intelligence for diagnosis of HIV associated eye symptoms and its relevance for the diagnosis of HIV-associated neurocognitive disorder: A new methodology

Authors: *M. D. WORTHINGTON[1], F. J. DENARO[2];
[2]Morgan State Univ., [1]Morgan State Univ., Baltimore, MD

Abstract: Even with treatment, HIV still contributes to an evolving pathology in several organs. These pathologic conditions are known as Noninfectious HIV comorbidities. These comorbidities are believed to be the result of the chronic production of low levels of HIV and HIV associated proteins such as gp120, Tat, and Nef. Consequently, over time the toxic effect of these viral proteins produce pathology in a number of organ systems. For example, the CNS, heart, and kidneys are among organs effected. The eye too is affected even when the patient is under treatment. Antiretroviral therapy (ART), formerly known as combination antiretroviral therapy (cART), has reduced the incidence of infectious retinopathy such as cytomegalovirus. But non-infectious retinopathy which includes cotton wool spots, retinal nerve fiber layer thinning, retinal thickening, loss of neuro-retinal structure and function, persist. These are believed to be due to HIV. In this presentation we review the HIV associated comorbidities of the eye to support the hypothesis that AI analysis of the eye in HIV infected patients may also provide a way of monitoring the course of this HIV comorbidity with increased accuracy. This is because many changes of the eye are amenable to observation and with the current AI programs increased identification and clarification of the changes can be made possible. Moreover, the diagnosis and monitoring of HIV-Associated Neurocognitive Disorder (HAND) remains a problem for HIV health care. Currently, there is no standardized quantitative test. It was hoped that neural imaging techniques would have become the “gold standard”, but the image resolution has not proven to be informative. In the era of post ART patients have very low opportunistic infections, thus their morphologic changes are not of first order relevance when identifying HAND. The subtleties of morphologic changes post HAND typically cannot be identified in the patient. Some of these brain changes can be detected with postmortem analysis of histological sections. The changes can include, neuronal loss, gliosis, and endothelial cell changes. Such neural associated changes can be found in the eye as well. This parallel presentation of pathology suggests that careful monitoring of eye changes may give insight to HAND and with AI processing may give insight to the progress and evaluation of HAND even in post ART patients. The effectiveness of neuroprotectants might also be monitored. Deep learning algorithms have been used to diagnose cataracts by identifying morphological changes among patients (Long et al, 2017) and a similar program can be developed to detect morphology associated with HAND seen in the eye.

Disclosures: M.D. Worthington: None. **F.J. Denaro:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.12SA/XX59

Topic: J.02. Teaching of Neuroscience

Title: A focused, skills-based doctoral program for neuroscience and life science candidates

Authors: *A. PAYNE;
Biomed. Sci., Noorda Col. of Osteo. Med., Provo, UT

Abstract: Certain subdisciplines in the neurosciences and other life sciences require a significant investment of time at the bench to overcome the learning curve and successfully collect data. Consequently, doctoral candidates in these areas are likely to spend a significant majority of their educational time at the bench collecting data. While these are useful skills in running a lab, one of the primary aims of PhD programs is to train researchers, and the skills a researcher typically employs are focused less on bench work and more on higher level tasks such as mentoring, troubleshooting, writing and grantsmanship, teaching, service, and negotiation. While some of these skills are taught more effectively than others in a typical PhD program, it is evident that a program focused more on developing researcher skills and less on developing bench skills would be advantageous to many students. One such potential program design is proposed here. Core to this program are focus, intention, and consistency. In agreement with many existing programs, it focuses first on didactics but with an emphasis on collaboration between institutions to provide the most useful and customized educational experience possible. Rotations that are typically intended to aid in discovering student interest are replaced with brief lab observations followed by rotations that are hyper focused on learning specific techniques with great proficiency. Regular counseling visits are scheduled during this time to mentor students in self-discovery and the selection of a lab and research program. A prospectus that is typically submitted prior to beginning work on the dissertation is replaced by the submission of a grant application on a project of interest. Further grant submissions are strongly encouraged. The final years are, consistent with most programs, aimed at completion of the research project but with an emphasis on researcher skills rather than on bench work. This is facilitated by the incorporation of undergraduate research assistants to collect a majority of the data. PhD candidates lead out in troubleshooting, mentoring, designing experiments, analyzing and interpreting data, and writing manuscripts and grant applications. In this way they continue to develop expert-level knowledge of techniques while spending less time performing the techniques. Courses and resources are provided to educate students in these and other skills pertinent to being a researcher. Additional features of this potential program design are presented here. It is anticipated that pursuing such a course will lead to enhanced preparation of PhD graduates for a career in academia or research.

Disclosures: A. Payne: None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.13SA/XX60

Topic: J.02. Teaching of Neuroscience

Support: Provost's Graduate Academic Engagement Fellowship at the Netter Center (E.M.P.)
Netter Center for Community Partnerships (L.M.F.C. & E.M.P.)
Klein Family Grant for Social Justice (L.M.F.C.)

Title: Development and implementation of a formalized academic program for community-engaged scholarship within neuroscience graduate education

Authors: *E. M. PURVIS[1,2,3,4], L. M. FLANAGAN-CATO[1,2,3,5];
[1]Univ. of Pennsylvania, Philadelphia, PA; [2]Neurosci. Grad. Group, Perelman Sch. of Medicine, Univ. of Pennsylvania, Philadelphia, PA; [3]Netter Ctr. for Community Partnerships, Univ. of Pennsylvania, Philadelphia, PA; [4]Neurosci., Perelman Sch. of Medicine, Univ. of Pennsylvania, Philadelphia, PA; [5]Psychology, Sch. of Arts & Sciences, Univ. of Pennsylvania, Philadelphia, PA

Abstract: Governmental and philanthropic agencies provide resources to scientists with the expectation that the knowledge we generate will benefit society in an equitable fashion. It is clear, however, that scientists are not adequately sharing their discoveries with the public, given the disparities in health care, technology access, and environmental conditions, particularly for marginalized groups. A partial explanation for scientists falling short in translating their expertise with the broader community is the lack of training and experience they have received in science communication as part of their doctoral education. Here, we describe the creation of a new program, Community-Engaged STEM, in the Neuroscience Graduate Program at the University of Pennsylvania (Penn). As a first step, we launched an academic course for graduate students entitled "Research & Community: Biomedical Science in the Urban Curriculum." The course partnered with Paul Robeson High School, a nearby public high school that has inadequate resources to offer grade-appropriate lab activities, leaving students disadvantaged in their access to a STEM education. In the course, seven graduate students created and conducted engaging, hands-on science activities with ninth-grade students. The course also required critical readings and small group discussions about the historical role of science in underrepresented communities, the connection between their biomedical research at Penn and the local Philadelphia community, and opportunities to increase science-oriented engagement throughout their doctoral training. At the end of the semester, the graduate students reported feeling better equipped to communicate with the broad community and were more interested in incorporating community concerns into their future research programs. Building on this initiative, we have created a new Graduate Certificate in Community-Engaged STEM that will be launched in Fall 2023. Completion of this certificate will require graduate students to engage in course work experiences, direct community partnerships, and an independent community-based scholarship project. The goal of the certificate is to allow trainees to individualize their community-engaged work to align their research projects with relevant needs of the local community. We believe this certificate will both provide valuable professional skills for the graduate students and ensure that the local community benefits from our research resources and endeavors.

Disclosures: E.M. Purvis: None. **L.M. Flanagan-Cato:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.14SA/XX61

Topic: J.02. Teaching of Neuroscience

Support: Chan Zuckerberg Initiative 2022-316731

Title: The Neurodegeneration Computational Fellows Program: A multi-institution approach to recruiting and training computational biologists

Authors: *D. PRITCHETT[1], K. MANAYE[2], V. MENON[3], C. SIFUENTES[4], K. BROSE[5]; [1]Biol., [2]Physiol., Howard Univ., Washington, DC; [3]Neurol., Columbia Univ., New York, NY; [4]Neurodegeneration, Chan Zuckerberg Initiative, Ypsilanti, MI; [5]Sci., Chan Zuckerberg Initiative, Berkeley, CA

Abstract: With the advent of large-scale epidemiological, social, genetic, and molecular studies of neurodegenerative diseases, there has been a revolution in our understanding of the genetic, genomic, and socioeconomic determinants underlying diseases of aging. However, most large cohort studies in the United States have been predominantly composed of individuals of European descent. Recent initiatives at federal and private funding agencies are working to increase the diversity of aging and neurodegenerative disease cohorts. However, there remain two major gaps: a need for computational scientists to spearhead the analysis of these increasingly large data sets, and a lack of representative populations of such computational biologists critically needed for better understanding and interpretation of results from increasingly diverse cohorts. To address these gaps, we have developed the Neurodegeneration Computational Fellows (NDCF) Program to establish a cohort of bioinformaticians, biostatisticians, and computational biologists recruited from Historically Black Colleges and Universities (HBCUs) and Minority Serving Institutions (MSIs) to broaden the community of researchers within the field of neurodegeneration. To achieve our goals, we are recruiting graduates with strong computational backgrounds from these institutions to participate in a two-year research-intensive post-Baccalaureate/master's program as a computational scientist in a lab studying neurodegeneration. Fellows are fully funded and are paired with a research laboratory at Howard University or with a lab sponsored by the Chan Zuckerberg Initiative's (CZI) Neurodegeneration Challenge Network. The NDCF Program provides a computational biology and neuroscience boot camp, recurring workshops, and webinars on state-of the-art computational approaches to research in neurodegeneration, career development, and one-on-one updates with computational and career path mentors. Through this integrated program, we aim to develop a model to increase the recruitment and representation of researchers from a variety of backgrounds to engage in neurodegenerative disease research, ultimately building capacity and skills in the emerging generation of computational scientists.

Disclosures: D. Pritchett: None. **K. Manaye:** None. **V. Menon:** None. **C. Sifuentes:** None. **K. Brose:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.15SA/XX62

Topic: J.02. Teaching of Neuroscience

Support: NIH Grant R25NS124530

Title: Advancing Research Careers (ARC) of neuroscientists underrepresented at the postdoc to to faculty transition

Authors: *K. WEBSTER[1], A. M. VAN WART[2], J. RITT[1], J. KIMBERLY[2], C. D. AIZENMAN[3], D. LIPSCOMBE[1];
[1]Carney Inst. for Brain Sci., [3]Dept Neurosci, [2]Brown Univ., Providence, RI

Abstract: Advances in all areas of neuroscience depend on a continuous cycle of new ideas, diverse perspectives, skills, knowledge, and novel technologies. The underrepresentation of groups of skilled scientists limits the potential for knowledge gain. As a community of neuroscientists, we will continue to underperform in neuroscience research if we fail to address the barriers that disproportionately impact individuals from historically underrepresented groups, including persons excluded due to ethnicity or race (PEER) and women. Barriers to career advancement can vary depending on career stage and discipline, but the negative impact in biomedical and STEM fields is evident. The documented attrition of talented scientists from the pool of qualified researchers in neuroscience is unacceptable and economically unsound; in 2013 women earned 56% of the PhDs in neuroscience / neurobiology, yet only make up 39% of the faculty in life sciences departments and those underrepresented based on ethnicity and race are in the minority at all career levels (NSF Survey of Earned Doctorates 2013, Lambert et al. 2020). This program focuses on senior postdoctoral trainees and junior faculty with the overarching goal of stemming the unacceptable attrition rates of PEER and women at pivotal career stages. Structured, cohort programs for mentorship and career development for scholars at these career stages are limited compared to programs that target predoctoral trainees. We designed the Advancing Research Careers (ARC) Program to address this gap by attending to three foundational pillars that recognize the critical importance of peer cohorts, an inclusive culture that promotes belonging, strong mentor network, and opportunities to excel in research for retention and advancement in neuroscience research. The ARC Program aims to improve the success rates for PEER and women in attaining and excelling in independent positions, receiving federal research funding, promotion, and recognition. In this presentation, we will share evaluation data and lessons learned from the first two years of the ARC program from our cohorts consisting of senior postdocs and early career faculty and their mentors.

Disclosures: K. Webster: None. **A.M. Van Wart:** None. **J. Ritt:** None. **J. Kimberly:** None. **C.D. Aizenman:** None. **D. Lipscombe:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.16SA/XX63

Topic: J.02. Teaching of Neuroscience

Title: International neuroinformatics coordinating facility (INCF): A doorway into big data for educators

Authors: *M. ABRAMS[1], W. E. GRISHAM[2];
[1]INCF, Karolinska Institutet, Stockholm, Sweden; [2]Dept Psychol, UCLA Chapter, Los Angeles, CA

Abstract: The International Neuroinformatics Coordinating Facility (INCF) has a great diversity of educational resources available for educators at both the undergraduate and graduate levels, particularly in TrainingSpace (TS; training.incf.org). TS is an open access, online hub that aims to make educational materials for neuroscience available to the global neuroscience community at no cost to the end user. TS features guidance via tracks of study, allowing users to chart a curriculum for themselves through the resources presented. These tracks include: Open Neuroscience Starter Kit, Introduction to FAIR neuroscience, Introduction to Computational Neuroscience, Introduction to Neurobiology, Introduction to Brain Medicine, Introduction to Neuroethics, and an International Brain Initiative (IBI) Collection. These tracks do an excellent job of providing bottom-up skill building, starting at the basics/refresher (if needed) and working their way up. Students can utilize a series of stand-alone lectures on relevant topics and/or entire courses on a given topic. These courses range from Cognitive Psychology to conference lectures and laboratory exercises from some of the world's leading neuroscience institutes and societies. Students/users can search by topic, category, and/or course.Browsing by topic will open up a menu of hundreds of lectures as well as an index that divides the topics into those that are appropriate for beginners, intermediate, or advanced users. Educational Resources in TS can also be found by browsing the collections, which features recordings from prior INCF assemblies, the Canadian Open Neuroscience Platform, the Virtual Brain Platform, Neuromatch Academy, and NeurotechEU. Students can also employ targeted searches for specific topics. Often, these courses contain tutorials that utilize open-access data resources so that students can get hands-on experiences with neuroinformatic tools. Among these tutorials is Jupyter Notebook, which is a good way for instructors to teach and create lessons in just about any STEM discipline needing computation, writing, and mathematics. For the purposes of teaching computational tools in neuroscience, instructors can use this notebook format for students to learn Python to analyze/model neural data. Further, if instructors are looking for datasets/content, INCF hosts KnowledgeSpace, which lists open access datasets, descriptions of research concepts, publications, and more. Finally, if instructors get really stuck, we also host Neurostars, in which knowledgeable neuronerds/brainiacs can answer questions for the perplexed.

Disclosures: **M. Abrams:** None. **W.E. Grisham:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.17SA/XX64

Topic: J.03. Public Awareness of Neuroscience

Title: Neurorehabilitation program for military and civilian patients with post-traumatic post-coma short-term and long-term disorders of repressed conciousness.

Authors: *O. KULYK, O. MAYDANNYK;
Neurosurgical Neurorehabilitation Clin. Ctr. Nodus, Bravary, Ukraine

Abstract: The Ukrainian medical system currently faces a significant influx of patients requiring neurorehabilitation following severe traumatic brain and spinal cord injuries, necessitating a specialized and personalized approach. This presentation focuses on achieving optimal daily patient activation and minimizing the consequences of post-coma immobilization syndrome, particularly the syndromes of repressed consciousness. The key emphasis lies in highlighting the crucial role of individualized rehabilitation programs in addressing these challenges.
The primary objective of this presentation is to introduce a system of differentiated medical rehabilitation for patients with post-traumatic post-coma long-term disorders of consciousness. This system operates based on fundamental principles and provides essential guidelines for specialized rehabilitation at the Neurosurgical Neurorehabilitation Center "Nodus," which provided rehabilitation services to military and civilian trauma patients since 2014.
The presentation will outline the main rehabilitation strategies used in the Nodus Center, tailored to the severity of the trauma and the stage of recovery, including verticalization, mechanotherapy, ergotherapy, transcranial magnetic stimulation (TMS), and neuropsychological correction. The goal is to demonstrate rehabilitation methods that can be implemented across different regions of Ukraine following discharge while yielding great outcomes.
The presentation will provide a detailed description of individual programs implemented at each stage of the rehabilitation process to address the specific clinical challenges patients face. By showcasing the applied effectiveness of this rehabilitation system, this presentation aims to show insights into effective rehabilitation strategies for patients with post-traumatic post-coma short-term and long-term disorders of consciousness. These insights can contribute to developing comprehensive and accessible rehabilitation programs nationwide, enabling improved patient outcomes and quality of life for Ukrainian patients suffering from post-trauma post-coma syndromes of repressed consciousness.

Disclosures: O. Kulyk: None. **O. Maydannyk:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.18SA/XX65

Topic: J.02. Teaching of Neuroscience

Support: NIH Contract 75N95021C00010

Title: The National Institute on Drug Abuse Diversity Scholars Network: Success for a Diverse Addiction Neuroscience Workforce

Authors: *W. M. COMPTON[1], J. H. WEIXELBAUM[2], A. CRUMP[1], I. ELLENWOOD[1], L. FRIEND[1], K. R. GOGGANS[2], A. H. AVILA[3];
[1]NIH/National Inst. On Drug Abuse, Bethesda, MD; [2]Rose Li Associates, Chevy Chase, MD; [3]NIH/National Inst. of Biomed. Imaging and Bioengineering, Bethesda, MD

Abstract: Addressing the lack of diversity in neuroscience is an important issue for the field because we need the new and creative ideas that diverse groups of scientists provide. The gap in awarded grants for scientists from underrepresented populations at the early stages of their careers contributes significantly to this lack of diversity. The National Institute on Drug Abuse (NIDA) Diversity Scholars Network program implemented a new model in 2016 to provide support to underrepresented early-career investigators by equipping them to navigate the competitive NIH grant process. Scholars are matched with both NIDA Program Officials and extramural scientist to provide mentoring and guidance in developing their ideas into full grant submissions. The final stage is a mock review of prepared applications to help assess the readiness of applications for submission to the National Institutes of Health. With this comprehensive and personalized program, the NIDA Diversity Scholars Network has a demonstrable track record of providing equity through educational opportunities by enhancing the grant funding success of early-career scientists. Of 59 participants from 2016 through 2021, 53% received funding within the first two years after completing the program and 69% by four years. NIDA Diversity Scholars Network participants surmount systemic funding barriers by building relationships with scientific coaches, mentors, and NIDA Program Officials and by intentionally engaging in network building, which all contribute to the funding success of early career investigators. The NIDA Diversity Scholars Network program provides a model for retaining underrepresented early-career investigators that not only benefits individual scholars, but also the institutions they serve and society as a whole. The 2023 cohort of scholars is just completing their program; their work across neuroscience and other areas of addiction science research is poised to contribute to science and to support career development.

Disclosures: W.M. Compton: None. **J.H. Weixelbaum:** None. **A. Crump:** None. **I. Ellenwood:** None. **L. Friend:** None. **K.R. Goggans:** None. **A.H. Avila:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.19SA/XX66

Topic: J.02. Teaching of Neuroscience

Title: Nidcr research training and career development grant opportunities

Authors: A. J. BROWN, R. SARE, *M. GHIM;
Res. Training & Career Develop. Br., NIH/NIDCR, Bethesda, MD

Abstract: The mission of the National Institute of Dental and Craniofacial Research (NIDCR) is to advance fundamental knowledge about dental, oral, and craniofacial (DOC) health and disease and translate these findings into prevention, early detection, and treatment strategies that improve the overall health for all individuals and communities across the lifespan. We fund neuroscience work including development and function of neuronal circuits that influence somatosensation and/or pain. The NIDCR Research Training and Career Development Branch (RTCDB) supports programs (spanning all career stages) for extramural fellowships, training grants, career development awards, loan repayment awards, and diversity supplements in the areas of basic, clinical, behavioral, and other research related to the NIDCR mission. We are celebrating 75 years of catalyzing scientific advances that have increased our understanding of the basic biological mechanisms of diseases and disorders and the application of such knowledge to the practice of dentistry and health care. NIDCR is committed to developing a research workforce that represents our nation's demographics across all aspects of race, ethnicity, gender/sexual identify, disability, socioeconomic status, and life experiences.

Disclosures: A.J. Brown: None. **R. Sare:** None. **M. Ghim:** None.

Theme J Poster

TJP05. Neuroscience Outreach and Education

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP05.20SA/XX67

Topic: J.02. Teaching of Neuroscience

Support: Lundbeck Foundation R389-2021-1596

Title: Fostering interdisciplinarity and translational research in tomorrow's neuroscientists

Authors: *N. PETERSEN, K. B. NIELSEN;
Neurosci. Acad. Denmark, Copenhagen, Denmark

Abstract: Neuroscience research is becoming increasing reliant on interdisciplinary and translational efforts, meaning that the training of the future neuroscientists must ensure to instill these ways of thinking and working to solve the biggest challenges going forward. Neuroscience Academy Denmark are pioneering a new model for PhD education in Denmark, where interdisciplinary and translational research is incorporated into the very structure of a 4-year programme and where project funding follows the candidates, who are, as such, afforded a unique level of agency over their scientific project.The programme is structured as a pre-PhD year, followed by a 3-year PhD, all fully funded. During the pre-PhD year, candidates will rotate between 3 laboratories of their own choosing, where they will have the opportunity to learn new techniques and familiarize themselves with new topics and environments. The candidates will subsequently select a primary supervisor (PI) and a laboratory in which to conduct their PhD studies. They will have 2 months to collaborate with their chosen supervisor(s) on a research proposal. Candidates are required to form a supervisory team consisting of both basic and clinical scientists to ensure that their project is translational in nature. During the pre-PhD year, candidates participate in tailored courses and workshops aimed at exposing them to the neuroscience community as it relates to techniques, topics, and research profiles. These courses, along with the rotations, serve the purpose of instilling an interdisciplinary work style and fostering novel collaborations in the resulting PhD projects.Taken together, the Neuroscience Academy Denmark PhD programme aims to promote interdisciplinary and translational neuroscience research, by training talented junior scientists to incorporate these values into their work from the very onset of their careers.

Disclosures: N. Petersen: None. **K.B. Nielsen:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.01SU/XX68

Topic: J.03. Public Awareness of Neuroscience

Title: Neuroscience outreach for middle and high school students: Bop-It! Test your reaction time.

Authors: *B. PUDER[1], **J. ARLANTICO**[2];
[1]Foundational and Biomed. Sci., [2]Touro Univ., Vallejo, CA

Abstract: A neuroscience education outreach station regarding reaction time and the nervous system was created to educate children in grades 7 - 12. The purpose of the station was to educate and inspire curiosity regarding neuroscience in the participants. The station included an informative poster presentation, a hands-on activity using a gaming device called Bop-It to reinforce the material, and an educational worksheet to review key concepts from the station. To assess the effectiveness of the station, a pre- and post-test was administered to evaluate the efficacy of the educational experience. Additionally, a survey was given at the end of the

program to obtain student participants' experience and opinions. The station was presented to a total of 68 seventh grade students, 68 ninth and tenth grade students and 37 eleventh and twelfth grade students. Quantitative data from the pre- and post-test revealed that the students who participated in the reaction time station showed highly statistically significant increases in their knowledge on reaction time and the nervous system after participating in the station. Qualitative data from the student experience survey administered at the end of the Brain Outreach Program revealed that the participating students found the reaction time education station fun, enjoyable, and easy to understand. Therefore, educational outreach programs such as the one executed are effective in engaging students and increasing interest in neuroscience.

Disclosures: B. Puder: None. **J. Arlantico:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.02SU/XX69

Topic: J.03. Public Awareness of Neuroscience

Support: This work was supported by the Dana Foundation.

Title: New tools for neuroethics engagement: mutual learning through card games & more

Authors: *C. WEICHSELBAUM[1], A. ANDERSON[2], J. DAS[3], D. PORCELLO[4], R. OSTMAN[5];
[1]Allen Inst., Seattle, WA; [2]Museum of Sci., Boston, MA; [3]The Franklin Inst., Philadelphia, PA; [4]Children's Creativity Museum, San Francisco, CA; [5]Arizona State Univ., Tempe, AZ

Abstract: As the field of neuroscience rapidly advances, members of the public and scientists alike are often ill-equipped to engage with the social and ethical questions raised by this work. "Neuroethics engagement" combines best practices in public engagement with the principles of neuroethics to promote reflection and dialogue at the intersection of neuroscience research and our values and beliefs. Here we share findings from the development of scalable, inclusive new neuroethics engagement tools, designed to facilitate these conversations among a variety of audiences. While our initial evaluation was conducted in a science museum context, these activities may also be used to promote mutual learning among scientists, ethicists, policymakers, trainees, patient groups, and others. Our findings suggest that participants were able to practice skills such as collaboration, empathy, and reflexivity, while exploring their own and others' viewpoints on emerging neurotechnology and modeling human attributes. By reducing the need for extensive discipline-specific knowledge to engage with the societal impacts of neuroscience research, such activities enable broader participation and greater diversity of perspectives brought to these issues - ultimately to the benefit of both society and the science itself. These neuroethics engagement tools and associated training materials are freely available at nisenet.org/brain for all to use.

Disclosures: **C. Weichselbaum:** None. **A. Anderson:** None. **J. Das:** None. **D. Porcello:** None. **R. Ostman:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.03SU/XX70

Topic: J.03. Public Awareness of Neuroscience

Title: With our Powers Combined: A Collaboration between UAB CNC and McWane Science Center to create impactful Brain Awareness Week experiences

Authors: *A. COACHMAN[1], A. GWINN[2], E. JONES[1], G. SAMSON[1], M. COOPER[1], D. GREY[1], A. GRYSHYNA[1], M. DEL CARMEN MUNOZ BALLESTER[1], A. DELGADO[1], M. TELES[1], K. VISSCHER[1];
[1]Univ. of Alabama, Birmingham, Birmingham, AL; [2]McWane Sci. Ctr., Birmingham, AL

Abstract: UAB CNC and McWane Science Center have partnered to provide outreach experiences for Brain Awareness Week (BAW) in the Birmingham community for over a decade. This partnership and our public engagement efforts have developed over the years with our 2023 BAW programs reaching over 2000 participants interested in learning more about the brain and neuroscience. This abstract outlines the conceptual framework that led to the development of better methods for engaging and educating participants during BAW.
The success of BAW can be attributed to the combination of in-depth knowledge and passion for neuroscience at UAB and the community engagement expertise of a science center. By incorporating key elements of impactful STEM experiences, the BAW team created experiences that were social, connected, inclusive, engaging, needed, conversational, and evidence-based. These elements were intentionally included in each BAW activity alongside opportunities to connect with experts in the field. We will discuss some best practices, found by trial and error. One of the main challenges was communicating complex neuroscience concepts in an accessible and engaging manner. To address this challenge, an organized website was created to help BAW volunteers and community members understand the goals and objectives of BAW. This website, https://www.brainawarenessuab.com/, provides a platform for promoting the event, sharing resources, and facilitating communication between organizers and participants.
Overall, the success of BAW can be attributed to the thoughtful planning and execution of a comprehensive outreach strategy. By focusing on accessibility, engagement, and meaningful learning experiences, BAW has become a valuable resource for promoting public awareness and understanding of neuroscience.

Disclosures: **A. Coachman:** None. **A. Gwinn:** None. **E. Jones:** None. **G. Samson:** None. **M. Cooper:** None. **D. Grey:** None. **A. Gryshyna:** None. **M. del Carmen Munoz Ballester:** None. **A. Delgado:** None. **M. Teles:** None. **K. Visscher:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.04SU/XX71

Topic: J.03. Public Awareness of Neuroscience

Support: Alzheimer's Research UK Inspire Fund
British Neuroscience Association
University of Sussex HEIF fund
University of Sussex Widening Participation Grant

Title: Bring Your Own Brain Brighton: Brains, buses and building communities

Authors: *S. L. KING[1], C. LANCASTER[1], O. G. STEELE[2], R. STARAS[1];
[1]Univ. of Sussex, Brighton, United Kingdom; [2]Brighton and Sussex Med. Sch., Brighton, United Kingdom

Abstract: In Spring 2023, Sussex Neuroscience (www.sussex.ac.uk/research/centres/sussex-neuroscience/) organised a massive programme of public outreach (www.meetings.bna.org.uk/byobbrighton/) in association with the British Neuroscience Association's biennial international Festival of Neuroscience, which took place in Brighton at the end of April. This poster seeks to tell of the events we organised and the lessons we learnt. The Sussex Brain Bus: With an Alzheimer's Research UK Inspire grant, we hired a local artist Daniel Locke (www.daniellocke.com) to design the livery for a local public bus. The bus (www.sussexbrainbus.org) design was informed by local community workshops where we spoke about dementia and the simple steps that can be taken to reduce dementia risk. The participants then worked with Dan to come up with images and messages for the bus. The bus runs a normal route through coastal communities of West Sussex, spreading a positive message to local residents, a high proportion of which are older adults and people with dementia. We have also used the bus for outreach events, its launch, at conferences and a bus rally. Mental Health, a photography exhibition: Sussex Neuroscience commissioned the Brighton and Hove Camera Club to take photographs for a seafront exhibition on display from April - October. It created great exposure for the subject, the club and Sussex Neuroscience. A reception at the exhibition facilitated wonderful discourse between neuroscientists and artists. Building Brains: Connecting Communities: Sussex Neuroscientists (from UG to Professors) went to the local high school and ran five weeks of science classes, teaching 13-14 year olds about the brain. The following week, four junior schools were invited to the high school where 10-11 year olds were introduced to the wonders of the brain by the neuroscientists and high school students. Alongside this the school children contributed to a giant brain sculpture that went on display at the local library (see below) and a Brain Science Fair, run on a Saturday in the centre of Brighton, where over a hundred of the general public visited and learnt all things brain. Sussex Neuroscientists also took up residence in the main Brighton Library for three weeks in April, where we had a brain bus exhibition, ran neuroscience demos, comic-making workshops, book talks and more. All together

we had a fun-filled, exhausting and exhilarating April, we learnt a lot and have plans for lots more in the future.

Disclosures: S.L. King: None. **C. Lancaster:** None. **O.G. Steele:** None. **R. Staras:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.05SU/XX72

Topic: J.03. Public Awareness of Neuroscience

Title: The International Brain Bee - Creating the Next Generation of Neuroscientists

Authors: *I. DUMITRU[1], M. ASSFALG[2], A. EBERHART[2];
[1]Intl. Brain Bee, Baltimore, MD; [2]Intl. Brain Bee, Washington, DC

Abstract: The 2023 IBB World Championship marks the 25th anniversary of the International Brain Bee and the 5th anniversary of the formal establishment of the IBB organization. The World Championship will be held virtually in August, in conjunction with the American Psychological Association (APA) Annual Convention. Brain Bee Champions from across the globe will come together for an exciting competition and educational social program. Each participant will have previously won the highest level of Brain Bee competition in their country to qualify for the World Championship. The international competition is conducted in two parts: 1) online testing period (written test, neuroanatomy, neurohistology, and patient diagnosis), and 2) a Live Judging Session for the finalists. The IBB was founded in 1998 to motivate students to learn about the brain and to inspire them to pursue careers in neuroscience. In 2018, the IBB was incorporated as a non-profit educational organization and is governed by six international neuroscience organizations: the Alzheimer's Association, APA, the Dana Foundation, FENS (Federation of European Neuroscience Societies), IBRO (International Brain Research Organization), and SfN. The IBB will celebrate its two major milestones by announcing a new initiative and three-year strategy designed to further the IBB's mission. It will amplify the IBB as an important global outreach and educational initiative, and as a catalyst for career development with the field of neuroscience.

Disclosures: I. Dumitru: None. **M. Assfalg:** None. **A. Eberhart:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.06SU/XX73

Topic: J.03. Public Awareness of Neuroscience

Title: The Inclusion, Diversity, and Equity Activities (IDEA) Committee at the National Institute on Drug Abuse Intramural Research Program (NIDA IRP)

Authors: *K. PITTS, S. CLAYPOOL, K. SAVELL, A. AGARWAL, M. TIROLE, J. HILL, K. WOODS, Z. DEMKO, D. PHAM;
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Abstract: Inclusion, Diversity, and Equity Activities (IDEA) is a trainee-led committee established in 2019 at the National Institute on Drug Abuse Intramural Research Program (NIDA IRP). Our mission is to foster an environment of diversity, equity, and inclusion (DEI) in scientific research and training. Here, we highlight our progress over the past year.*Seminars:* We invite scientists from underrepresented backgrounds with a strong record of advocating for diversity, equity, and inclusion to give talks at the weekly NIDA IRP seminars. This initiative increases the representativeness of the annual roster of seminar speakers and gives trainees the opportunity to meet with the speakers and ask questions about the science itself and the speaker's experiences as a scientist from a minoritized group. One recent speaker was Dr. Devin Banks from the University of Missouri, St. Louis, whose seminar "Addressing Racial Inequities in Opioid Use Disorder: Community-Engaged Research Approaches" was directly relevant to DEI. *Journal Club:* We recently introduced a monthly journal club where we discuss articles addressing DEI themes. Recent articles have included: "Gender bias in (neuro)science: Facts, consequences, and solutions," "Disabled in academia: to be or not to be, that is the question," and "Confronting Racism in All Forms of Pain Research: Reframing Study Designs."*Newsletters:* We write and design informative newsletters for online distribution to all NIDA IRP staff. The newsletters celebrate national heritage months and other observances, they also acknowledge traumatic current events in what we intend to be a culturally informed and sensitive manner. Newsletter topics covered this year include Black History Month, Women's History Month, and Mental Health Awareness Month. *Outreach Initiatives:* We organize outreach opportunities to raise awareness about substance use disorders and combat stereotypes and misconceptions surrounding them. This year's activities include visiting local high schools to discuss research and training opportunities offered at NIDA, participating in a high school career fair, and offering peer mentorship to NIDA summer students. As these initiatives progress, our goal is to establish pipelines that improve access to careers in science for people in underrepresented communities. We believe that incorporating principles of diversity, equity, and inclusion is essential for the advancement of scientific knowledge and improving public health. Our committee strives to ensure that people from underrepresented groups, especially people who are not yet established in science, have equal opportunities to thrive and succeed in science.

Disclosures: K. Pitts: None. **S. Claypool:** None. **K. Savell:** None. **A. Agarwal:** None. **M. Tirole:** None. **J. Hill:** None. **K. Woods:** None. **Z. Demko:** None. **D. Pham:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.07SU/XX74

Topic: J.03. Public Awareness of Neuroscience

Title: Increasing the accessibility of neuroscience and improving public confidence in brain research through early education, art, and storytelling

Authors: *D. E. CROOTE[1,2], V. SZAREJKO[1], A. OSMAN[3], A. KARKI RAJBHANDARI[4], D. SCHILLER[4], E. J. NESTLER[1];
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Abstract: Public trust in science and scientists has fallen in the wake of the Covid-19 pandemic. This has created a strong need for institutions to not only engage with their communities, but to also train their research workforce to be skilled science communicators. Through hands-on learning in schools, storytelling-based science communication, and art initiatives, the Friedman Brain Institute at Mount Sinai is committed to deepening public awareness of neuroscience research and supporting publicly-engaged scientists. School courses, run through MiNDS (Mentoring in Neuroscience Discovery at Sinai) and the Center for Excellence in Youth Education, cover the anatomy of brain cells through complex neurological and psychiatric disorders and deliver content via monthly experiments. The courses are intended to show 150+ NYC public school students per year that curiosity is the sole prerequisite for science, and to provide neuroscience trainees with an opportunity to hone their teaching skills. Further, scientists at all career stages can enroll in a storytelling workshop, Stories of Brain and Beyond, offered in collaboration with The Story Collider. This 8-part course teaches scientists how to craft personal stories of their scientific paths and present their science in an engaging format. The workshop culminates in a public storytelling show, which draws an audience of 120+ attendees and is intended to bring forward the human journeys behind the science headlines. Lastly, the Art of the Brain Exhibition provides scientists with an outlet to share photographs, paintings, illustrations, and videos that celebrate the beauty of neuroscience. The exhibition is available to the global community via a museum-style virtual gallery and hopes to erode artificial divides between science and art. In summary, we aim to increase the accessibility of science and to improve public confidence in research through this ever-growing portfolio. These programs also serve to provide Mount Sinai researchers with robust training opportunities to grow as skilled science educators and communicators. We plan to continually expand our public programming and we hope this work will inspire others to create programs that ignite excitement for scientific discovery in their own communities.

Disclosures: D.E. Croote: None. **V. Szarejko:** None. **A. Osman:** None. **A. Karki Rajbhandari:** None. **D. Schiller:** None. **E.J. Nestler:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.08SU/XX75

Topic: J.03. Public Awareness of Neuroscience

Support: ASUW Special Appropriations Fund
UW Department of Neurology
UW GPSS Special Allocations Fund
UW HUB RSO Fund
UW Student Technology Fee

Title: Grey Matters Journal: Advancing the neuroscience community through accessible scientific communication and diversity-oriented outreach

Authors: *J. N. BHATEJA, B. C. WU, M. C. BOTTOMS, B. ARNOLD, E. B. SHIU, A. SCIOCCHETTI, M. EPSTEIN-O'ROURKE, H. A. GOLDBERG, E. D'CESSARE, E. PATEL, S. P. DHARAP, D. MAO, E. D. LASSITER, K. YADAV, S. A. GOLDEN;
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Abstract: Public understanding of neuroscience is hindered by the increasing divide between scientific language and general comprehension, a situation aggravated by socioeconomic barriers such as the cost of accessing scientific literature and a lack of diversity among neuroscience leaders. Grey Matters Journal is an undergraduate neuroscience journal with over 500 students at the University of Washington (UW) dedicated to addressing these barriers by providing free, high-quality neuroscience education to all, while guiding future science communicators and leaders.

Each quarter, we mentor students through writing, editing, illustrating, and designing a freely disseminated issue that accessibly and accurately communicates neuroscience topics. We also organize and host events across the Seattle area to promote educational accessibility. Our outreach team of over 100 undergraduate and physician volunteers has provided over 2,000 PreK-12th grade students at over 20 events with the opportunity to dissect sheep brains, interact with neurotechnology, and ask questions to Q&A panels. We also engage the public through our annual “Evening with Neuroscience,” a free event hosted on the UW campus and online. In recent years, we have seen audiences of over 500 participants connect with interdisciplinary faculty, observe human brain dissections, and appreciate neuroscience art.

Looking forward, we are committed to broadening our impact equitably, culturally, and geographically. We plan to leverage public data on student demographics to concentrate outreach efforts on schools with reduced access to STEM education. We are developing cultural events that blend traditional arts and the neuroscience behind their evolution to engage a more diverse student audience. Beyond Seattle, we will streamline the formation of new chapters across the country with a comprehensive Grey Matters chapter guide.

As part of our ongoing commitment, we are registering as a 501(c)(3) nonprofit to promote a verifiable mission among other organizations. Our hope is that by expanding our chapters,

partnerships, and collaborations nationally, we can help address the persistent issue of neuroscience accessibility and inspire the next generation of neuroscience learners and educators.

Disclosures: **J.N. Bhateja:** None. **B.C. Wu:** None. **M.C. Bottoms:** None. **B. Arnold:** None. **E.B. Shiu:** None. **A. Sciocchetti:** None. **M. Epstein-O'Rourke:** None. **H.A. Goldberg:** None. **E. D'cessare:** None. **E. Patel:** None. **S.P. Dharap:** None. **D. Mao:** None. **E.D. Lassiter:** None. **K. Yadav:** None. **S.A. Golden:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.09SU/XX76

Topic: J.03. Public Awareness of Neuroscience

Title: Creating Opportunities for Middle and High School Students to Participate in Science and Engineering Fairs

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Abstract: Science and engineering fairs (SEFs) are a great opportunity and experience for middle and high school students. Participants learn to apply the scientific method to a topic of their interest (such as neuroscience), to design and run their own experiments and to build communication skills by presenting their work to judges who are experts in the field. Kids can compete with their project presentations to win prizes such as scholarships. Through SEFs they also get to meet like-minded established research scientists in their field as well as peer student scientists from their schools, community or region, and possibly from around the State and World. Participation in SEFs boosts confidence and helps to build self-identity as a scientist, and the experience is often wonderful. Yet only 5% of high school students that were surveyed had participated in a science fair, according to the 2009 National longitudinal study conducted by the National Center for Education Statistics (Grinnel et al., 2022, PLoS ONE 17(3): e0264861). In the Alamo Regional Area, many public schools had discontinued science fair programs in the last decade, and teachers were often not rewarded for fostering students wanting to do science fair projects. Also many students are not aware of the fairs, especially those attending the public schools that are not hosting fairs. To create opportunities for interested students from schools without science fairs to participate in regional SEF competitions that feed into State and National competitions, last year I partnered with my Regional SEF and local Girl Scout council to create a Girl Scout high school level science fair. Among the challenges faced were a lack of willing adult teachers or parent volunteers to serve on safety review committees and institutional review boards, which limited the scope of possible projects. Two students were able to participate and advance to the Alamo Junior Academy of Sciences and Alamo Regional SEF in 2022-2023. The goal for next year is to expand participation in the local Girl Scout fair. The plan is: (1) to open a middle school level Girl Scout SEF, (2) to stage an information booth about it at a local Girl

Scout-hosted Science Technology Engineering Art and Math (STEAM) festival, and (3) to hold an information session for all interested students, teachers and parents in Fall 2023 to answer questions and provide registration information and project guidelines.

Disclosures: J.E. Schultz: None. **G.G. Gould:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.10SU/XX77

Topic: J.03. Public Awareness of Neuroscience

Support: Dana Foundation BAW-0000000281

Title: Neuroscience & Society for the 21st Century: Building a global partnership beyond borders and into communities

Authors: *T. WISHARD[1], M. GARCÉS[2], N. TURGUT[2];
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Abstract: Societal understanding of neuroscience is paramount for public support of research initiatives and helps build trust in scientific discovery. Connections between neuroscientists and their communities are essential to dispel neuromyths and disinformation campaigns that can devastate public health. These inequities are compounded by insufficient resources appropriately conveying neuroscience topics targeted for specific age groups with assessable language and multiple translations. We formed a global partnership between neuroscience research centers in the United States and Ecuador to address these factors. We present the design and framework of our collaborative outreach initiatives at the Instituto de Neurociencias at Universidad San Francisco de Quito (USFQ) and the Brain Research Institute at the University of California Los Angeles (UCLA). With the support of the Dana Foundation, we developed publicly available resources illustrating a variety of neuroscience career opportunities and hands-on demonstrations. Our programs complement undergraduate neuroscience education and bridge the campus learning environment with local communities. We solicit advice from the broader neuroscience community to improve our programs and offer an open invitation to develop additional collaborations to create an inclusive and representative collective for neuroscientists and educators.

Disclosures: T. Wishard: None. **M. Garcés:** None. **N. Turgut:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.11SU/XX78

Topic: J.03. Public Awareness of Neuroscience

Support: The John Templeton Foundation Grant: 61823

Title: Global BRAIN Initiatives: a decade of progress advancing human neuroscience research

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Abstract: Control # 2023-J-6361-SfN
International BRAIN Initiatives (IBI) have revolutionized the collaboration and diffusion of neuroscience research. Originally, the **B**rain **R**esearch Through **A**dvancing **I**nnovative **N**eurotechnologies (BRAIN) Initiative was launched with the goal to accelerate and exploit new technologies for the treatment of brain disorders and diseases. The NIH BRAIN Initiative bolstered the movement by forging multi-level collaborative networks that project beyond academic research institutions to industries, private organizations and governments agencies. The effort led to a new era in the field of neuroscience, witnessed over the past decade. As emerging technologies continue to expand beyond clinical facilities into the consumer market, BRAIN Initiatives are integral in human neuroscience. Increasing efforts to promote cross-disciplinary research, project coordination and dissemination reached many milestones globally. Similarly, IBIs joined forces to call on governments to address the social, ethical and legal challenges pose by emerging technologies. Intrinsic principles of neuroethics are implemented as core values, and are part of the ongoing conversations, and roundtable discussions. Formations of expert groups, working groups and ethics panel committees led by BRAIN Initiatives have bridged may gaps in neuroscience and continue to break barriers in this ecosystem. **Aim/objective**: To evaluate and assess the delivery, outcome and impact of global BRAIN Initiatives over the past 10 years. To highlight the progress, and outcome of BRAIN Initiatives and their unique position in the advancement of human neuroscience worldwide. **Method**: Systematic analysis using six major databases and keywords search; BRAIN Initiative, International BRAIN Initiative, Impact. **Results:** Thematic evaluation reveals specific trends and modalities in BRAIN Initiatives that produce significant breakthroughs over the past 10 years. Numerous efforts led to the creation of interdisciplinary facilities, state-of-the art infrastructure and multi-dimensional models with high level computings for data science. International collaborations create innovative platforms for effective outreach, partnership, and integration. **Conclusion:** BRAIN Initiatives contributed to many advancements and progress in neuroscience. New methods and practices transform traditional neuroscience into a more inclusive, equitable, and future-oriented community to impact and benefit the wider public.

Disclosures: J. Moonga: None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.12SU/XX79

Topic: J.03. Public Awareness of Neuroscience

Title: Removing language barriers in Neuroscience Education: Knowing Neurons, a multilingual project

Authors: *A. HOGAN[1], J. HARTSTEIN[2], A. PERIS-YAGUE[3], N. PADILLO-ANTHEMIDES[4], L. VALENCIA[5], B. LEYVA[6], S. CHATURVEDI[7];
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Abstract: In the past 30 years, the field of neuroscience has emerged at the forefront of scientific research worldwide. In 2003, the Society for Neuroscience, along with other organizations like the Dana Foundation and the International Brain Research Organization, established a strategic plan to promote neuroscience education and outreach. While tremendous efforts have been invested in the creation and promotion of initiatives to promote neuroscience education, like Brain Awareness Week or the International Brain Bee, the vast majority of educational resources for neuroscience exist in English. Considering that only 15% of the world speaks English, this means that information about neuroscience is largely inaccessible to most of the world.
To make neuroscience more accessible to the non-English-speaking world, in 2021 Knowing Neurons established our outreach and translation team, now composed of 13 members from 5 different countries, and growing. The project's main goals are to: 1) increase the availability of engaging neuroscience content (articles, infographics, and podcasts) in non-English languages, and 2) help team members develop their neuroscience communication skills in non-English languages through translation activities. We achieve these goals with the following efforts: 1) Translation of English-language content to Spanish by UCLA undergraduates for upper-division Spanish course credit through an active partnership between Knowing Neurons, the UCLA Brain Research Institute, and the UCLA Spanish & Portuguese Department, 2) The publication of Spanish-language neuroscience lesson plans on our site, for use in high school classrooms, 3) In-house German translations supplemented by student volunteers at the University of Tübingen in Germany, 4) In-house translations from English to Italian, and 5) Partnerships with other science communicators and active participation in outreach activities to disseminate translated content. As a result of this project, the team has published over 100 translated articles and infographics into different languages (Spanish, Italian, and German). This enabled our recent launch of a complete Spanish-language version of our website, with German and Italian websites currently under construction. Furthermore, resources created by our team were a key component of bilingual activities, for the first time, during Brain Awareness Week 2023 at UCLA. With ongoing efforts, we hope to create a platform for bilingual students to learn about neuroscience

and to reach students around the world who have limited resources to learn about the brain in their native languages.

Disclosures: **A. Hogan:** None. **J. Hartstein:** None. **A. Peris-Yague:** None. **N. Padillo-Anthemides:** None. **L. Valencia:** None. **B. Leyva:** None. **S. Chaturvedi:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.13SU/XX80

Topic: J.03. Public Awareness of Neuroscience

Title: The neuromyths issue among teachers: which effects on public understanding of neuroscience?

Authors: *C. SARACINI[1], J. NEIRA MORALES[2], D. BASSO[3];
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Abstract: As interest in neuroscience has grown, so have misconceptions among laypersons related to the understanding of neuroscience. Neuromyths are defined as “a misconception generated by a misunderstanding, a misreading, or a misquoting of facts scientifically established (by brain research) to make a case for use of brain research in education and other contexts” (Organisation for Economic Co-operation and Development; OECD, 2002). Barely based on scientific facts, they are difficult to eradicate and, when involving education professionals, may have adverse effects on educational practice. Although it may seem a niche topic, it has many important societal, ethical, political and even economical implications. The relevance of the neuromyths issue raised scholars’ attention from 2004-2005 and has shown a further growth in the number of published papers between 2008 and 2021, with a peak of publications in 2019. This rapid-review explored the latest findings on the neuromyths prevalence and predictors, revising studies published in the last 5 years (2018-2023). In an exploratory phase, PubTrends.net has been used to reveal historical trends and influential papers in literature. WoS database has been then explored with “neuromyths” keyword in the “Topic” field (Title, Abstract, Keywords); after removing non-english publications, conference proceedings, reviews and meta-analyses, corrigenda, editorial materials and commentaries from the database search results, Rayyan.ai has been used for the de-duplicating, screening and extraction processes obtaining an agreement score between the 3 authors and resolving the divergent decisions through discussion. PRISMA statement has been used to guide the reviewing process. Results show that the topic still draws interest in many countries. Tools to investigate and assess the phenomenon, such as quantitative instruments (either measuring the know-that or the know-how about the most acknowledged misleading beliefs amongst teachers) and intervention proposals, have been developed. A positive aspect, presented in the ongoing discussion within the

neuroscience community, is that strategies have been proposed to overcome the neuromyths impact in the education field, amongst which interdisciplinary efforts in teachers training and initiatives fostering neuroscience dissemination talks in schools. A summary of the recommendations proposed by the reviewed authors is also provided, supporting scholars and policymakers in the education field to visualize potential strengths and weaknesses of the emerging field of neuroscience in the field of education (NIE) or, as it has also been called, "neuroeducation".

Disclosures: C. Saracini: None. **J. Neira Morales:** None. **D. Basso:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.14SU/XX81

Topic: J.03. Public Awareness of Neuroscience

Support: FAPERJ Grant E26/111.862/2013
PR3 UERJ

Title: Enhancing Neuroscience knowledge in Basic Education: A Playful Approach to CNS Development and Influencing Factors

Authors: G. M. DINIZ-TAVEIRA[1,3], A. P. COSTA[1], M. L. M. ROCHA[1], E. L. N. COSTA[1], L. O. R. FELGUEIRAS[1], C. R. A. PINTO[1], B. LOTUFO-DENUCCI[2], ***M. C. CUNHA-RODRIGUES**[1], P. C. BARRADAS[1];
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Abstract: The integration of universities with school environments has gained momentum, promoting the dissemination of science and fostering critical thinking and problem-solving skills. The development of the central nervous system (CNS) can be influenced by various factors, such as hypoxia-ischemia (HI), alcohol and cigarette use, and malnutrition. However, the development of the CNS, as well as the factors that influence it are crucial topics often neglected during the years of Basic Education in Brazil. This study aimed to disseminate and discuss CNS development and its influencing factors among high school students in the Rio de Janeiro metropolitan region using a playful approach. The intervention involved multiple stages: raising awareness through the display of four posters on cigarette use, malnutrition, and HI in schools two weeks prior to the visit. Each poster featured the phrase "Did you know..." to provoke student curiosity. A lecture comprising 56 slides was presented to students, focusing on the factors affecting CNS development. This was followed by the implementation of a board game, featuring questions related to the lecture content, enabling teams of up to four students to participate. Lastly, a post-intervention tool, an app called "Quiz Neurotico," was introduced. To

evaluate the effectiveness of the intervention, we administered a questionnaire that included objective and open-ended questions assessing students' comprehension and ease of understanding of the topics covered, as well as their perception of the didactic game. The game underwent validation by Basic Education teachers, who deemed it suitable for implementation. Our findings revealed that students were most familiar with the topics "Effects of Alcohol" and "Effects of Cigarettes," while "Effects of HI" remained relatively unknown. Notably, 85.71% of 1st Year students, 100% of 2nd Year students, and 79.17% of 3rd Year students reported that the board game facilitated their understanding of the lecture content and found it easy to play. Our results indicate that incorporating a didactic game as a strategy for science dissemination effectively promotes engagement, making the learning experience more enjoyable and increasing students' interest and retention of the subject matter. As a result, the intervention fostered a stronger connection between the school and the university, enhancing the dissemination of neuroscience knowledge in Basic Education.

Disclosures: G.M. Diniz-Taveira: None. **A.P. Costa:** None. **M.L.M. Rocha:** None. **E.L.N. Costa:** None. **L.O.R. Felgueiras:** None. **C.R.A. Pinto:** None. **B. Lotufo-Denucci:** None. **M.C. Cunha-Rodrigues:** None. **P.C. Barradas:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.15SU/XX82

Topic: J.03. Public Awareness of Neuroscience

Title: Knowing Neurons: A creative neuroscience education and outreach organization by young neuroscientists

Authors: *L. WAGNER[1], C. AMIR[1], A. HOGAN[1], M. HALL[2], A. GRYSHYNA[3], K. Y. LIM[1]; [1]Univ. of California Los Angeles, Los Angeles, CA; [2]Translational Genomics Res. Inst., Phoenix, AZ; [3]Univ. of Alabama at Birmingham, Birmingham, AL

Abstract: Knowing Neurons is an award-winning neuroscience communication and outreach non-profit organization (registered 501(c)(3)) that was founded in 2012 by PhD students from the University of California, Los Angeles and the University of Southern California. Our organization was established with the understanding that high-quality information about neuroscience fundamentals, recent discoveries, and cutting-edge ideas are typically published in academic journals, whose jargon and hyper-technical style make neuroscience research largely inaccessible to youth and laypeople. At the same time, even though scientists have a responsibility to accurately and accessibly communicate their work to the general public, few graduate programs offer training in science communication. Therefore, Knowing Neurons' mission is twofold: 1. To educate the public about all things brain science in an informative, exciting, and engaging manner, and 2. To provide a platform where young neuroscientists can develop their science communication skills.

Today, our team consists of 60 early-career neuroscientists from 7 different countries and 16 different academic institutions around the globe. The content produced at Knowing Neurons spans diverse media formats, including written articles, podcasts, science art, and educational lesson plans, with a diverse array of topics including basic neuroscience, neurotechnology, science policy, and science fiction. Our contributors and team members have the creative freedom to explore novel modes of scientific communication that casual learners, neuroscience enthusiasts, and professional educators alike can use at home or in the classroom. We also have a thriving translation project, which works to increase the accessibility of neuroscience content around the globe for Spanish, German, Italian, and Portuguese speakers.
With approximately 600,000 website visits every year, Knowing Neurons reaches a large online audience. More recently, our organization has increased efforts to bring our educational content from the web to the community in order to provide educational opportunities in neuroscience for local students and youth. This year alone, Knowing Neurons has conducted several outreach events in Los Angeles and Birmingham, two of our hubs. These included neuroscience education presentations in Spanish and English at UCLA's Brain Awareness Week, as well as workshops in science communication for students at a high school in Los Angeles, university students at UCLA, and university students at the University of Alabama, Birmingham.

Disclosures: L. Wagner: None. **C. Amir:** None. **A. Hogan:** None. **M. Hall:** None. **A. Gryshyna:** None. **K.Y. Lim:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.16SU/XX83

Topic: J.03. Public Awareness of Neuroscience

Title: Come be BraiNY! Increasing public awareness of brain science in the greater New York City area.

Authors: *J. PATHAN[1], C. LARDNER[2], J. M. BRETON[3], K. R. ANDERSON[4], D. CROOTE[5], C. MOBINI[6], B. M. SILVER[3], A. CORREDER ASENSIO[7], A. GIANI[8], A. ZUANAZZI[7]; [1]CUNY Sch. of Med., New York, NY; [2]Genspace, New York, NY; [3]Columbia Univ., New York, NY; [4]Natl. Univ. of Ireland, Galway, Ireland; [5]Icahn Sch. of Med. at Mount Sinai, New York, NY; [6]Albert Einstein Col. of Med., New York, NY; [7]New York Univ., New York, NY; [8]Weill Cornell Med., New York, NY

Abstract: The Greater New York City (NYC) SfN Chapter, BraiNY, engages the public and scientific community in conversations about the benefits of neuroscience research. BraiNY is committed to promoting inclusion, equity, and representation in science and works to dismantle barriers that block participation and access to scientific discovery and its benefits. BraiNY makes these values actionable through initiatives that a) advance understanding of the brain by promoting neuroscience education to a general audience in the greater NYC area, b) advocate for

both the support of neuroscience research and its importance, c) provide professional development opportunities for early career researchers, d) partner with like-minded academic, cultural, and social organizations to support and amplify innovations in science communication and education. Some of the main initiatives of BraiNY are Brain Awareness Week (BAW) participation, BraiNY Bunch, and BraiNY Blog. Each March, BraiNY partners with the Dana Foundation and local NYC institutions to participate in BAW, an annual, global campaign dedicated to fostering public enthusiasm for brain health and neuroscience research by building relationships between neuroscience researchers and their communities. BraiNY organized events such as NeuroYoga, The Happiness Experiment, and Beauty and the Brain for BAW 2023, which brought together hundreds of people from diverse NYC communities. Additionally, BraiNY hosts the BraiNY Bunch each month. This is an open, virtual journal club co-led by high school and/or early college students, mentored by a graduate student, postdoc, or research staff. BraiNY Bunch provides attendees with the opportunity to learn about different areas of neuroscience through careful reading and discussion of scientific findings. Additionally, the monthly BraiNY Blog hosts pieces from science communicators of all ages and backgrounds about brain topics, neuroscience research projects, personal experiences in STEM/academia, and thoughts on how neuroscience intersects with society. BraiNY is committed to expanding its impact and plans to focus on the importance of mentoring and the intersection between science and art in future initiatives. We believe that BraiNY is a model for neuroscience outreach that can be expanded to other institutions in the NYC area and beyond.

Disclosures: **J. Pathan:** None. **C. Lardner:** None. **J.M. Breton:** None. **K.R. Anderson:** None. **D. Croote:** None. **C. Mobini:** None. **B.M. Silver:** None. **A. Correder Asensio:** None. **A. Giani:** None. **A. Zuanazzi:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.17SU/XX84

Topic: J.03. Public Awareness of Neuroscience

Title: Low cost approaches in neuroscience to quantify animal behavior in cockroaches

Authors: J. E. MOORE[1], V. TRUONG[2], U. M. RICOY[1], *J. VERPEUT[3];
[1]Dept Neurosci., Univ. of Arizona, Tucson, AZ; [2]Psychology, [3]Arizona State Univ., Tempe, AZ

Abstract: Increasing access to neuroscience education in underserved communities is a priority in Arizona (Ramadan and Ricoy, 2023). Arizona State University, in collaboration with the Grass Foundation, proposed open source free software to track animal movements and behavior in invertebrates (i.e. cockroaches) while simultaneously recording neural signals. The cockroach is a valuable model in assessing motor behaviors in response to chemical stimuli (Adedara et al., 2022). However, characterizing behavior is challenging and inaccessible for non-experts new to behavioral research. Recently, machine learning pose tracking algorithms have proposed

automated, precise data collection, but until recently, these required computational experts and expensive graphics processing units (GPU). Our collaboration proposes to create an educational program that combines highly sophisticated machine learning algorithms with neural recordings using cloud-based (i.e. Google Colab) low-cost platforms intended for beginner coders. Using a cloud-based coding platform also allows for the unique opportunity for streamlined collaboration and version control. Here we used the Social LEAP Estimates Animal Poses (SLEAP) program to measure cockroach (Gromphadorhina portentosa) locomotion in a nicotine runway model, which was validated against hand-scored data. SLEAP was used to collect metrics of behavior. Now, non-experts can score animal behavior automatically, calculate velocity of movement and behavior ethograms. In addition, an analysis file was created on Google Colab to visualize all animal tracks and calculate measurements, including distance traveled, velocity, time spent in regions of interest, and grooming. This model and analysis code can now be used in the classroom on Google Colab for students to collect their own videos of animals performing the nicotine place-preference and to analyze their data without the need for coding expertise. Our program is unique in that students still learn to read and work with code, while simultaneously collecting and analyzing new data in the matter of hours. It is imperative to use free and accessible tools for data analysis in order to mitigate socioeconomic barriers for researchers and encourage equitable collaboration in neuroscience. Our trained model tracking cockroach behavior can be reused in the future on an unlimited number of samples to introduce early researchers to machine learning and pose tracking. Therefore, this program incorporates modern techniques to motivate diverse students in neuroscience and provides them with the resources and training necessary to continue in the field.

Disclosures: **J.E. Moore:** None. **V. Truong:** None. **U.M. Ricoy:** None. **J. Verpeut:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.18SU/XX85

Topic: J.03. Public Awareness of Neuroscience

Support: FAPERJ Grant E26/111.862/2013
PR3/Fellowship to LCV
PR3/Fellowship to LSC

Title: Understanding Central Nervous System Development in Health and Disease: Assessing the Impact of a Neuroscience Outreach Project on Adolescents

Authors: L. C. VIEIRA, L. S. DE CARVALHO, C. R. PINTO, A. P. COSTA, M. C. CUNHA-RODRIGUES, ***P. C. BARRADAS**;
Pharmacol. and Psychobiology, IBRAG/UERJ, Rio de Janeiro, Brazil

Abstract: The project "Understanding Central Nervous System (CNS) Development in Health and Disease", conducted by Developmental Neurobiology Laboratory team from State University of Rio de Janeiro, aims to disseminate neuroscience research findings to students in basic education. The project focuses on the influence of external factors on CNS development, addressing topics such as alcohol and cigarette abuse, malnutrition, and intrauterine complications leading to oxygen and nutrient deprivation in children. The primary target audience is adolescents, and several methodologies have been developed to engage them. In addition to delivering lectures in schools within the Rio de Janeiro metropolitan region, the project utilizes a didactic game and a mobile app, which serve as its main activities. Furthermore, content is produced and shared on social media platforms, including Facebook (https://www.facebook.com/conhecerneuro/) and Instagram (https://www.instagram.com/conhecerneuro/), as well as videos available on YouTube (https://youtube.com/@conhecerneurouerj3871/). This study aims to evaluate the reach of the project among the adolescent population. The composition of social media followers is as follows: 71.2% female and 28.7% male. Regarding age distribution, 0.5% of followers are aged 13-17, 32.1% are aged 18-24, 37.7% are aged 25-34, 7.2% are aged 45-54, 2.9% are aged 55-64, and 0.1% are aged 66 or above. In terms of location within Brazil, 25% are from Rio de Janeiro, 8.7% are from São Gonçalo, 4.3% are from Niterói, and 2.3% are from Magé, all cities within the state of Rio de Janeiro. Additionally, 2.5% are from São Paulo. As for international distribution, 97.2% of followers are based in Brazil, 0.5% in Portugal, 0.3% in the Netherlands, 0.3% in Canada, and 0.1% in Hong Kong. Analyzing this distribution, we conclude that adolescents represent a minority among the followers, emphasizing the importance of school visits for reaching students in our society. However, the distribution of followers demonstrates that the project's topic is of interest to the population regardless of age group, and that dissemination through social media is an important strategy for reaching a broader audience.

Disclosures: L.C. Vieira: None. **L.S. de Carvalho:** None. **C.R. Pinto:** None. **A.P. Costa:** None. **M.C. Cunha-Rodrigues:** None. **P.C. Barradas:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.19SU/XX86

Topic: J.03. Public Awareness of Neuroscience

Title: Closing the gap between neurosciences and the general population with @theneuosc, a scientific outreach project on social media

Authors: *G. HERRERA-LOPEZ;
KAUST-BESE, Thuwal, Saudi Arabia

Abstract: We live in a society fully dependent on science but lacking in most notions of scientific knowledge. This sentence is represented around the globe and Latin American

countries like Mexico are not an exception, where people trust more in faith (72.3%) and pseudoscience (77%) than in science (≈30%) and believe that scientists are dangerous due to their knowledge. In this context, I created an outreach project on social media entitled THE neuroSCIENTIST (@theneurosc), a friendly way to approach neurosciences to the Spanish-speaking population. This project surged as a measure to reduce the gap between science, scientists, and the general population through the creation of graphic and audiovisual material posted on social media about any neuroscience-related, with a focus on mental health, neurophysiology, pharmacology, and nutrition. The project started three years ago in the middle of the COVID-19 pandemic and has reached thousands of people from Latin America and Spain through 6 different platforms on the web, including the website https://theneurosci.com. During this time the project has hosted 2 different Brain Awareness weeks online with the participation of science communicators and neuroscientists from Mexico, Canada, the United States, Peru, and Spain; La Semana de la Salud mental (Mental health awareness week) hosting Mexican science communicators and, was recently awarded the prize “Ciencia en redes” (Science on social media) to the best outreach project on health by the Benemerita Universidad Autonoma de Puebla, Mexico.

Disclosures: **G. Herrera-Lopez:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.20SU/XX87

Topic: J.03. Public Awareness of Neuroscience

Title: Engaging teens in neuroscience: Lessons from the Southern California Youth Neuroscience Association

Authors: *N. KAUSHIK[1], J. PARIKH[1], A. MIZRAHI[1], M. YASSA[2];
[2]UCI Ctr. for the Neurobio. of Learning and Memory, [1]Univ. of California, Irvine, Irvine, CA

Abstract: During the summer of 2020, in the midst of a global pandemic and after many weeks of isolation, a high schooler began planting the seeds for what would become the Southern California Youth Neuroscience Association - a network of teens who actively engage with neuroscience and neurosceintists throughout the year. At the foundation of SCYNA is a partnership between adolescents and their local university where ideas, programs, evaluations and dissemination are co-created and where the the voices of the community are elevated and valued. The Southern California Youth Neuroscience Association (SCYNA) was founded with the vision to become a platform for high school students to learn, participate, and grow as aspiring neuroscientists. SCYNA aims to build a community of junior scholars who strive to further their interest and passion in neuroscience and to give back to the community by fostering a fascination for the brain in the curious minds of elementary school children. Here we report lessons learned from the development and implementation of the program as well as results from outcomes evaluations of student participants and their parents. We hope that our process for co-creating and implementing SCYNA can serve as a model for successful university-community partnerships that engage teens in meaningful neuroscience activities and that results from our evaluation provide evidence for the impact of these types of programs on students and their families.

Disclosures: N. Kaushik: None. **J. Parikh:** None. **A. Mizrahi:** None. **M. Yassa:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.21SU/XX88

Topic: J.03. Public Awareness of Neuroscience

Title: Using TikTok to communicate science-based information about the brain and brain disorders: An example series on trauma and trauma-related disorders

Authors: *M. S. CAGLE;
Neuroscience/Psychology, Wayne State Univ., Detroit, MI

Abstract: Psychoeducation is a therapy technique that has been shown to improve treatment outcomes and decrease stigma surrounding mental illnesses. The effects of stigma (i.e. low self-esteem, delaying seeking treatment) can be debilitating to those with mental health conditions and may be a result of misinformation or lack of knowledge about mental disorders. Effective science communication by researchers and medical professionals regarding mental health and mental disorders may help reduce stigma, which in turn may help to improve outcomes and awareness. Social media provides a platform in which scientists, researchers, and medical professionals can quickly reach a wide audience. Unlike other social media platforms, TikTok allows users to post content that is engaging, and visually and audibly stimulating for up to three minutes. This is in contrast to Twitter, in which characters are limited, and Instagram, in which users tend to prefer images. The Wayne State THINK Lab launched a TikTok account in January of 2022, with the goal of communicating science-based information to a lay audience. As of May 30, 2023, the THINK Lab TikTok account has garnered over 700 likes and over 20,000 views. Here, we describe an example TikTok series that was designed to improve understanding of the neurobiological effects of psychological trauma and adversity, and to reduce stigma surrounding trauma-related disorders. The series includes seven episodes hosted by undergraduate student Micala Cagle in which she will first introduce and explain trauma and adverse childhood experiences, discuss the impact of these experiences on the brain, then describe the epidemiology and symptoms of trauma-related disorders, such as posttraumatic stress disorder. The target audience includes both laypeople, of all ages, and neuroscientists. This series is the first step towards educating the general public on clinical trauma and builds on the THINK lab's goal of improving outcomes for those affected by trauma and providing easy-to-understand evidence-based information to a wide audience. In publishing this series, we hope to increase viewership and overall reach while simultaneously promoting the importance of effective scientific communication, providing psychoeducation, and reducing stigma.
Current Character Count: 2,289

Disclosures: M.S. cagle: None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.22SU/XX89

Topic: J.03. Public Awareness of Neuroscience

Title: Use of information technologies in the Brain Awareness Week during the COVID-19 pandemic at the Faculty of Medicine of the Universidad Nacional Autónoma de México (UNAM).

Authors: *A. HERNANDEZ CHAVEZ, L. VERDUGO-DIAZ, L. NAVARRO, F. ESTRADA-ROJO, R. MARTÍNEZ-TAPIA;
Physiol., Univ. Nacional Autonoma de Mexico, Coyoacan, Mexico

Abstract: Introduction. Brain Awareness Week is a global campaign of the DANA Foundation and the Mexico City Chapter Society for Neuroscience to increase public access to the progress and benefits of brain research by joining the efforts of educational organizations worldwide for one week each year in mid-March. Due to the world health emergency, it was necessary to migrate from a face-to-face to a virtual and hybrid format following the of the health authorities' recommendations. Objective. To promote and disseminate knowledge and research on the brain at all educational levels of our university (undergraduate and postgraduate), but also to the general public.Material and Methods. Through 4 or 5 master conferences with experts in the area and the participation of medical students from all over the country in a poster contest, the Brain Awareness Week is held at the Faculty of Medicine of the UNAM. Due to the health emergency, it was held virtually using the OBS Studio software and the virtual platforms Zoom® and Stream yard® under license, broadcast live on social networks, Facebook and YouTube through the channel @semcer.facmed (https://youtube.com/@semcer.facmed).Results. The Brain Awareness Week 2020, 2021 and 2022 were held within the context of the pandemic, reaching 12 speakers and more than 5000 attendees reaching for the first time internationally to countries such as Guatemala, Bolivia, Argentina, Peru and Colombia. On the other hand, students presented posters in three categories, undergraduate, clinical and postgraduate, with the participation of more than 15 schools and faculties from Mexico and 80 students in the different categories.Conclusion. Through digital resources and information technologies, it was possible to hold and maintain the event active, increasing the reach of the academic activity exponentially. Every year, the organizing committee of the Brain Awareness Week will continue to promote this activity encouraging and disseminating science, as one of the substantive tasks of our university and therefore of the Department of Physiology.

Disclosures: A. Hernandez Chavez: None. **L. Verdugo-Diaz:** None. **L. Navarro:** None. **F. Estrada-Rojo:** None. **R. Martínez-Tapia:** None.

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.23SU/XX90

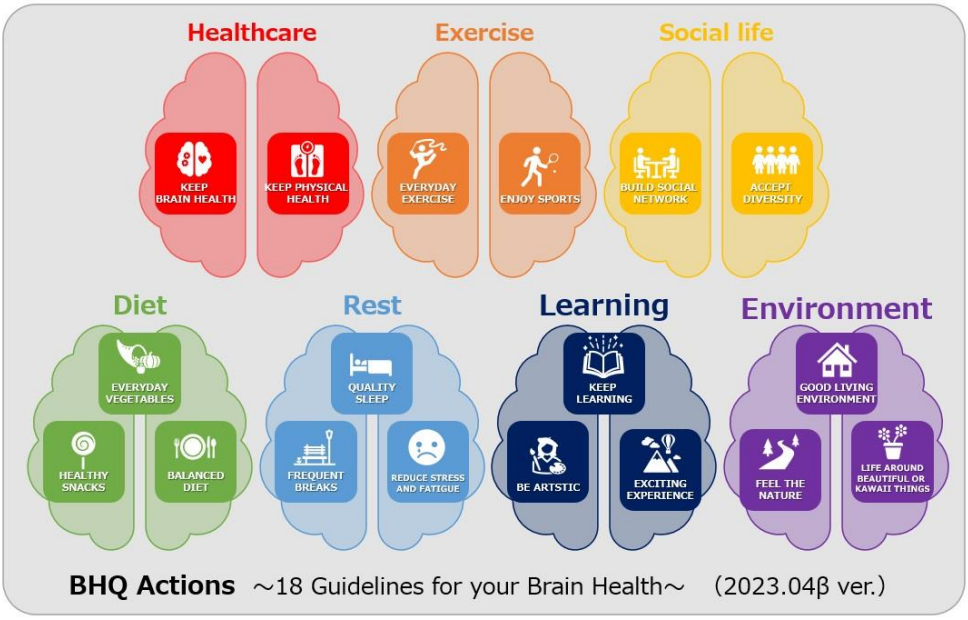
Topic: J.03. Public Awareness of Neuroscience

Support: 2022 Urban Innovation Kobe from Universities (Grant-in-Aid for Research Activities of Young Researchers)

Title: Outreach activities on brain health in collaboration with a local government in Japan

Authors: *M. OKAMOTO[1], K. KOKUBUN[1], A. KATANO[2], N. FUJII[2], K. TOMITA[2], Y. YAMAKAWA[1,2,3,4];
[1]Grad. Sch. of Mgmt., Kyoto Univ., Kyoto, Japan; [2]Kobe Univ., Kobe, Japan; [3]Tokyo Inst. of Technol., Meguro, Tokyo, Japan; [4]Brain Impact, Kyoto, Japan

Abstract: The Brain Healthcare Quotient (BHQ) is an index that assesses brain health through MRI images. It was developed by the Yamakawa Program of the Impulsing Paradigm Change through Disruptive Technologies Program (ImPACT) in Japan and has been recognized as an international standard since 2018 (ITU-TH.861.0). Although BHQ helps individuals understand their brain health status, effective measures for maintaining brain health are not widely known to the public, which has hindered people from taking action. Our team has developed a scientifically based guideline for brain health, which has been linked to local public services, products, and services in cooperation with the local government in Japan. The guidelines consist of 18 "BHQ Actions" selected from seven categories (Healthcare, Exercise, Social life, Diet, Rest, Learning, and Environment), which have been proven to be effective in maintaining brain health through cognitive function tests or brain volume measurement using MRI. We have created corresponding icons for each guideline to make it easy to understand and follow. We have collaborated with nine organizations, including local government, universities, general associations, general foundations, and private companies to create a trial website with 16 activities related to agriculture in Kobe. Sixteen of these activities are linked to nine of the 18 BHQ Actions, with seven activities such as agricultural training linked to "Exciting experience" and six activities such as a retail outlet for organic vegetables linked to "Everyday vegetables". Our outreach activity aims to increase awareness of the 18 guidelines for maintaining brain health and link them to local products and services. Our team plans to expand our outreach activities to areas other than agriculture, covering the 18 guidelines and increasing diversity in our future outreach activities. By doing so, we aim to contribute to people's brain health worldwide.



Disclosures: **M. Okamoto:** A. Employment/Salary (full or part-time):; BHQ Corp.. **K. Kokubun:** None. **A. Katano:** None. **N. Fujii:** None. **K. Tomita:** None. **Y. Yamakawa:** E. Ownership Interest (stock, stock options, royalty, receipt of intellectual property rights/patent holder, excluding diversified mutual funds); BHQ Corp..

Theme J Poster

TJP06. Public Outreach, Education, and Broad Dissemination of Scientific Knowledge

Location: WCC Halls A-C

Time: Sunday, November 12, 2023, 8:00 AM - 12:00 PM

Program #/Poster #: TJP06.24SU/XX91

Topic: J.03. Public Awareness of Neuroscience

Title: Monocular vision in 3D motion perception provides more accurate visual timing than binocular one.

Authors: *O. LEVASHOV;
Brain & Body Develop. Ctr., Da Lat City, Viet Nam

Abstract: To return the tennis ball after your opponent's service we need to obtain a good feeling of visual estimation of time before our kick. This feeling is called “reaction to a moving object” or “timing”. To measure the timing in real 3D we have designed an experimental device that consisted of an inclined gutter with rolling small balls, two sensors, and an electronic timer. In the 1st experiment, we measured the accuracy of timing in “monocular condition” (MC), when the stimulus (ball) rolled from the left to the right along the gutter for crossing the “finish gate”. The task of a subject (S) was to trace visually the movement of the stimulus and to stop the timer at a moment when the ball was passed through the gate. In the 2nd experiment, we measured the accuracy of timing in “binocular condition” (BC), when a gutter was located perpendicular to S’s body, the ball rolled straight towards his eyes. In this configuration, S can use only binocular vision to determine the moment the ball passes through the finish gate. We compared the scatter of timer data in both MC and BC conditions. The measure of timing accuracy was the number of successful attempts inside the time interval {-10 ms + 10 ms}. This interval is a data scatter relative true moment of finish line crossing. A total of 14 Ss participated in both experiments. 12 Ss showed the superiority of MC compared to BC. The results of 2 Ss were similar in both conditions. The results obtained can be explained by a slow velocity of convergent eye movement in BC compared with eye tracking in MC.

Disclosures: **O. Levashov:** None.

Theme J Poster

TJP07. Ethical Issues, Policy Issues, and Interactions with Society

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP07.01SA/XX92

Topic: J.04. Ethical and Policy Issues in Neuroscience

Support: Independent Funding Contributions by JWPhD LLC

Title: Overcoming Neuroscience Research Hurdles in Native American Tribal Health Systems

Authors: *J. WINCHESTER[1,2,3,4,5];
[1]Applied Statistics, Indiana Univ., South Bend, IN; [2]JWPhD LLC, Orlando, FL; [3]Hlth. Regulation and Law, Florida State Univ., Tallahassee, FL; [4]Pokagon Hlth. Services, Pokagon Band of Potawatomi, Dowagiac, MI; [5]Intl. Human Rights, STEMM & Publ. Hlth. Law, Abraham Lincoln Univ., Glendale, CA

Abstract: Large populations of northern federally-recognized Native Americans have key genomic and phenomic traits that present as unique and necessitate integration into our current medical and pharmacological interventions. Research has demonstrated the unique contribution of the Denisovan and other unique hominid genetic profiles in the progression of diseases and disorders; e.g. Amyotrophic Lateral Sclerosis (ALS; Course et al., 2020) Since 2019, though, humanity has been plagued by the Sars-Cov-2 global pandemic and Native American populations have been hit harder than most. Foxworth et al. (2021) note that Native American Tribal nations have experienced disproportionate effects from prior health epidemics and pandemics, greater rates of infection, hospitalization, and death from COVID-19 (Chen et al., 2022; Doran et al., 2022; D'Alessandro et al., 2021; De Boer et al. 2021; Elman et al., 2020; Farooqi et al. 2022; Gee et al., 2022; Hagerty & Williams, 2022; Hill et al., 2021; Kone et al., 2022; Manolis et al., 2021; Thienprayoon et al., 2022; Ward et al., 2022; Wilensky, 2022). In the present discussion, the unique Denisovan genomic and phenomic profiles will be discussed as they relate to the specific modern federally-recognized profiles of the Anishinaabe, Uto-Nuatal, Na Dene, and Pacific Islander Native American populations. Further, this discussion elucidates the contribution of those genomic profiles to likely health outcomes in response to the specific diseases noted, above, and others. Lessons from working directly in Indian Health Services (IHS) and other Native American-focused clinical trials are noted (Winchester, 2015, 2016, 2019, 2020abc). Directed actions, tips, and other useful guidance are provided to facilitate the researcher's ability to overcome common hurdles when working in Native American Tribal populations. Finally, community, policy, legal, regulatory, procedural, and broader perspectives are documented, focusing on the active integration of Denisovan and other Native American-focused scientific research in the clinical translational scientific community's future goals; with a greater emphasis on neuroscience-based clinical investigations.

Disclosures: J. Winchester: None.

Theme J Poster

TJP07. Ethical Issues, Policy Issues, and Interactions with Society

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP07.02SA/XX93

Topic: J.04. Ethical and Policy Issues in Neuroscience

Support: NSF DUE 1832338

Title: Analysis of federal funding databases reveals disparities in neuroscience grant support for Hispanic-serving institutions

Authors: S. SANCHEZ, H. J. GATICA-GUTIERREZ, *E. SERRANO;
Biol., New Mexico State Univ., Las Cruces, NM

Abstract: The federal Hispanic-serving institutions (HSI) designation is assigned to degree-granting, accredited public or private nonprofit institutions with 25% or more Hispanic undergraduate full-time equivalent students. HSIs comprise about 14% of the over 4000 institutions of higher education and are among the most diverse institutions in the nation. HSIs enroll 2/3 of Hispanic college students and serve 1 million students of Black, Indigenous, and Asian-American heritage. Although HSIs educate almost 3 million students from historical minority populations, HSIs receive on average $87 in federal funds per student. These low funding levels can disadvantage HSI students because grants help develop STEM environments with strong research and educational experiences that prepare students for a competitive STEM workforce in areas such as neuroscience. Specifically, HSI funding gaps for neuroscience research have the potential to impede progress toward growing a diverse and inclusive community. Here we provide a pre-COVID estimation of NSF and NIH neuroscience funding to HSIs. NSF Award Search and NIH Reporter were queried for awards with start dates between 01/01/2020 and 12/31/2020 with keywords such as "*neuroscience*", "*neuron*", "*brain*". Exported files were annotated using lists of institutions designated as HSI in 2020 and in 1999 (historical HSIs; HHSIs). Results suggest that HSIs received a disproportionately low amount of neuroscience grant dollars and awards. Moreover, funds are primarily awarded to the very few R1-HSIs that are new to the HSI ecosystem and have low Hispanic student enrollments as compared with HHSIs that typically enroll between 50 to 95% Hispanic students. For example, NIH 2020 funding for neuroscience related research was issued to 30 HSIs, comprised 4.5% of all awards, and 3.7% of total funds. Eleven HHSIs received 0.7% of the NIH awards and 0.3% of the funding, while R1-HSIs received 3.8% of the awards and 3.4% of the HSI funding. NSF 2020 neuroscience-related awards showed a similar trend; a few HSIs received 7% of the awards and 9% of the funds with most awards to R1-HSIs. Results highlight the need for practices that mitigate institutional inequities and reduce participation barriers for HSI students. Policies such as the NSF congressionally-mandated HSI Program and the BRAIN Initiative's Plan for Enhancing Diverse Perspectives (PEDP) are emerging efforts to reduce funding gaps and strengthen research at HSIs and MSIs. To promote institutional change, neuroscientists are encouraged to forge partnerships with colleagues at HSIs, especially those at HHSIs, for scientific collaborations and student training.

Disclosures: **S. Sanchez:** None. **H.J. Gatica-Gutierrez:** None. **E. Serrano:** None.

Theme J Poster

TJP07. Ethical Issues, Policy Issues, and Interactions with Society

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP07.03SA/XX94

Topic: J.04. Ethical and Policy Issues in Neuroscience

Support: NIH Grant R01NS119160
The Cleveland Clinic

Title: What women and minorities are afraid to speak up about

Authors: *D. M. TAYLOR[1,2], E. L. CASTAGNOLA[3,4];
[1]Neurosciences, Cleveland Clin., Cleveland, OH; [2]Louise Stokes Cleveland VA Med. Ctr., Cleveland, OH; [3]Biomed. Engin., Louisiana Tech. Univ., RUSTON, LA; [4]Bioengineering, Univ. of Pittsburgh, Pittsburgh, PA

Abstract: We were invited to host the Power Hour™ at a recent Gordon Conference on Neuroelectronic Interfaces. The Power Hour™ is a discussion/workshop with the goal of promoting women and underrepresented minorities (URMs) in our field. Since many people don't feel comfortable speaking up at these workshops, prior to the conference, we set up a website to collect anonymous anecdotes about the challenges women and URMs face as well as suggestions for improvement as a way to jumpstart the discussion (https://www.inequalitystoriesinstem.org/). The web link was shared with all the registered conference attendees by the organizers and forwarded to the greater Neural Engineering research community by an NIH program officer associated with the conference. Recipients were encouraged to forward the link to additional colleagues worldwide of any gender. To date, we have received ~150 anonymous anecdotes, and the results have been both *enlightening and heartbreaking!* As anticipated, we received numerous anecdotes about implicit bias as well as overt racism, sexism, and hate speech. We also received numerous stories about conflicting attitudes about family leave and women's parental roles. What we didn't anticipate, but probably should have, was the alarming number of anecdotes reporting *sexual misconduct* or *sexual assaults* in the workplace many ending in statements like—*'I never told anyone about this before'.* Reasons given typically included, '*I didn't think I would be believed*', '*speaking up would put my career in jeopardy*', or '*the stress/embarrassment associated with speaking up was too much*'. Some of the most vulnerable to both sexual abuse and bullying/intentional harm are people with the most to lose by speaking up. The academic research system itself facilitates this type of abuse as graduate students are reliant on their advisors for their degrees and pay checks, junior faculty are reliant on senior faculty for promotion and tenure, and most researchers are reliant on their peers who serve on grant review panels and editorial boards for funding and to get published. International scientists are even more vulnerable as they may risk deportation and many don't have a local support network and face language or cultural barriers to speaking up.

People from lower socioeconomic groups are also more vulnerable especially if they have a family to support and no alternative support options. We are initiating these important discussions beyond the Gordon conference via other venues like this one to create awareness, support those who feel alone, and motivate efforts to improve the system for all.

Disclosures: D.M. Taylor: None. **E.L. Castagnola:** None.

Theme J Poster

TJP07. Ethical Issues, Policy Issues, and Interactions with Society

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP07.04SA/YY1

Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: Lifting as We Climb: Experiences and Recommendations from Women in Neural Engineering

Authors: *M. K. JANTZ[1,2], J. MAK[1,2], A. N. DALRYMPLE[4,5], J. FAROOQUI[2,6], E. M. GRIGSBY[3,2], A. J. HERRERA[1,2], E. PIRONDINI[2,1,3], J. L. COLLINGER[2,1,3];
[1]Bioengineering, [2]Rehab Neural Engin. Labs, [3]Physical Med. and Rehabil., Univ. of Pittsburgh, Pittsburgh, PA; [4]Biomed. Engin., [5]Physical Med. and Rehabil., Univ. of Utah, Salt Lake City, UT; [6]Neurosci. Inst., Carnegie Mellon Univ., Pittsburgh, PA

Abstract: Despite years of awareness, women and gender minorities still face significant barriers in STEM fields. Neural Engineering, as a relatively new discipline, has an opportunity to improve future conditions by addressing these concerns early. Here, we explore the impact of gender discrimination in the field of Neural Engineering and provide recommendations to improve gender equity.
We interviewed 6 women neural engineers who are advocates for diversity in the field, and who represent many different identities, experiences, and career stages. We identified several key themes based on these interviews and a review of the relevant literature that describe the barriers women face in the field. Additionally, we analyzed the gender balance of first and last authors in Neural Engineering journals.
Women face many career hurdles in Neural Engineering; they are underrepresented at all career stages as well as receiving less credit for their work than their male peers. For example, current trends suggest that at the faculty level, the field will not reach gender parity until the year 2067. Women make up a lower proportion of first and last authors in Neural Engineering journals than is expected for the field, and their work is less frequently cited. Women faculty have less lab startup funding and access to financial resources and are simultaneously expected to uphold more familial and service obligations, which often go unrecognized and uncompensated. Pervasive negative stereotypes based on identity can have a profound impact on their success and sense of belonging in the field, particularly for women from multiple marginalized backgrounds. Mentorship and professional networks can mitigate some of these issues by providing essential career development and support but are less readily available for women than men.

The first and most essential step to improve gender equity is for all members of the field to engage actively with diversity and inclusion efforts. In all areas of research, people must seek out continued learning opportunities, advocate for women on an individual level, and work to implement policies that improve gender equity. Further necessary changes include improving hiring transparency, family leave policies, methods of evaluating work at all academic stages, mentorship networks, and recognition and compensation of service work. By implementing these recommendations, the field can foster a more equitable landscape for future generations of neural engineers.

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Theme J Poster

TJP07. Ethical Issues, Policy Issues, and Interactions with Society

Location: WCC Halls A-C

Time: Saturday, November 11, 2023, 1:00 PM - 5:00 PM

Program #/Poster #: TJP07.05SA/YY2

Topic: J.04. Ethical and Policy Issues in Neuroscience

Support: NIH Grant U54AG062334

Title: Training in the implementation of sex and gender research policies: An evaluation of online courses

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Abstract: To redress a longstanding androcentric bias in biomedical research, funding agencies and journals around the world have implemented policies requiring the inclusion of females and males in most research studies involving humans and vertebrate animals. These policies have created an urgent need for effective training materials on how to consider sex and gender in research designs, analyses, and reporting. Here, we evaluated three publicly available online courses related to the incorporation of sex (or sex and gender) as variables into research: (1) *Sex as a Biological Variable: A Primer*, offered by the U.S. National Institutes of Health (NIH); (2) *Integrating Sex & Gender in Health Research*, offered by the Canada Institutes of Health Research (CIHR); and (3) *The Sex and Gender Dimension in Biomedical Research*, developed as part of "Leading Innovative Measures to Reach Gender Balance in Research Activities (LIBRA)," offered by the European Commission. These materials comprised slideshows with narration or recorded lectures, as well as quiz questions and answers. Two members of our research team independently reviewed all material in each course, coding the content into 75 topics broadly encompassing (1) Importance of sex and gender research policies; (2) Handling of the concepts "sex" and "gender"; (3) Research design and analysis; and (4) Interpreting and reporting data. Overall, we found that all three courses covered largely the same ground. Each discussed the importance of including males and females to better generalize results, discover

sex differences, and tailor treatments to men and women. The operationalization of sex itself was covered only minimally, particularly in the NIH and LIBRA trainings, which focused on chromosomes and to a lesser extent, hormones. Each course drew a sharp distinction between sex and gender, defining the former as "biological" and the latter as "cultural." Sex/gender entanglement was acknowledged but minimally discussed; the CIHR training in particular emphasized that male-female differences in "biological" measures, such as kidney function, are nearly always driven by sex rather than gender. Notably, all three courses explicitly endorsed comparing statistical significance across subgroups, an invalid analytical approach known to be biased toward false positive findings of difference. Little space was given to potential caveats or downsides to the policies. We recommend that users supplement these trainings with other resources that cover strategies for precise operationalization of sex, rigorous analytical methodologies, and how to look beyond sex and gender for the mechanisms that underlie diversity.

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Theme J Poster

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Program #/Poster #: TJP07.06SA/YY3

Topic: J.04. Ethical and Policy Issues in Neuroscience

Support: Fred B. Snite Foundation

Title: Brain Sex 2023: Null hypothesis, nuisance variable, or the key to gender health disparities?

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Abstract: Human brain sex differences have fascinated scholars for centuries, and re-surged in interest since the dawn of MRI. Growing attention to gender disparities in neurobehavioral health (e.g., autism, depression, Alzheimer's disease) along with institutional policies (e.g., SABV) and targeted funding initiatives have further bolstered research on brain sex differences. But the singular focus on this binary dimension of human difference raises concerns, particularly given the long history of "neurosexism" in the academy and current misuse of biomedical findings to limit the rights of sexual and gender minorities. Given these potent impacts, it is critical to carefully assess and accurately disseminate contemporary findings on brain sex differences AND similarities, and to avoid over-interpreting findings from any single study or population. I recently published a large analysis of human MRI and post-mortem studies showing that—beyond an 11% difference in overall brain volume —most male-female differences are very small and few have been reliably replicated, especially across diverse populations. Although praised for its thoroughness, our analysis was attacked in the journal *Biology of Sex Difference* as

denying “biological reality.” This presentation will provide an update on the considerable jitter in findings on sex differences in regional brain volumes, cortical thickness, lateralization, and functional imaging across the imaging literature. The small absolute differences (<2% volume) coupled with methodological variance across the complex MRI processing pipeline likely contribute to this jitter, along with genuine population differences in male and female head size and shape and sociocultural experience. In other words, sex is important, but best treated as a “nuisance variable” (like age and brain size) in most MRI-based brain research. When it comes to gender differences in behavior and neuropsychiatric health, neuroscientists are still seeking simple answers in brain sex difference or gonadal hormones when the accumulated evidence indicates such approaches are unfruitful. Behavioral gender health disparities are non-binary and multifactorial, in need of correspondingly nuanced approaches that avoid fueling biological sexism.

Disclosures: L. Eliot: None.

Theme J Poster

TJP07. Ethical Issues, Policy Issues, and Interactions with Society

Location: WCC Halls A-C

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Program #/Poster #: TJP07.07SA/YY4

Topic: J.04. Ethical and Policy Issues in Neuroscience

Support: Kavli Foundation

Title: Birds of a feather: scientific and ethical challenges of interspecies brain engraftment converge on a common path forward

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Abstract: Transplantation of human brain organoids into nonhuman animals has the potential to advance our molecular understanding of human neurobiology. Yet nervous systems that originate from two species, whether through transplantation or other methods, raise novel scientific and ethical questions that appear to be in tension with one another-as models become more humanlike, they also become more ethically problematic. I posit that scientific and ethical issues arising from human brain engraftment may, in fact, be more ‘birds of a feather’ that are not necessarily in tension, but rather fellow travelers. The scientific value of brain chimeras depends on the extent to which they provide insights into features of human neurobiology, while ethical concerns tend to focus on the wellbeing of animals with enhanced cognitive capacities. Based on a synthesis of empirical and theoretical evidence from neuroscience and philosophical bioethics, respectively, I argue that scientific and ethical challenges converge on a common path forward. Specifically, the conditions which are favorable to the wellbeing of animals with advanced cognitive capacities, and therefore of high(er) moral status, are consistent with the factors that contribute to the elaboration of neuronal features during development and capacity to engage in

complex behaviors. Treating human brain models as if they already possess higher moral status may be crucial for them to serve as ethologically-relevant proxies for the human brain in the first place. Studies have shown that enriched environments provide the conditions necessary for neurons to mature, more fully, into neural circuits that contribute to complex behaviors, while also supporting the wellbeing and individuation of animals. Here, I conceptualize an 'enriched' approach for research using human brain chimeras and offer a case study examining the use of enriched environments to study the neurobiology of human speech circuits in grafted animals. The challenges posed by interspecies brain engraftment illustrates how joint consideration of scientific and ethical perspectives can reveal convergent pathways for advancing our understanding of the human brain.

Disclosures: L. Boyd: None.

Theme J Poster

TJP07. Ethical Issues, Policy Issues, and Interactions with Society

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Program #/Poster #: TJP07.08SA/YY5

Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: The CRISPR Cognition Genes Database: A Policy Framework For Anticipatory Neuroethics and Diverse Stakeholder Engagement

Authors: M. W. NESTOR[1], ***R. L. WILSON**[2];
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Abstract: Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) technologies used to edit genes that drive human cognitive attributes represent a unique ethical conundrum. On the one hand, scientists need to continue developing this powerful gene editing technique and refining its capabilities to advance therapeutic interventions. On the other hand, germline editing of genes involved in human cognition carries a phenomenological burden that editing genes to treat cancer, for example, does not. Namely, altering the expression of genes that affect cognition, even in pursuing a positive clinical outcome, can change the nature of the lived experience for all stakeholders. As CRISPR technology is adopted to treat human cognitive conditions (cogCRISPR) beyond disease states, it has the potential to redefine the nature of personhood because of the intimate relationship between human cognitive states and the delineation of the self.Due to the potential importance of cogCRISPR in the lived experience of future stakeholders, an anticipatory ethical and policy framework is needed to drive discussion and debate with the most diverse set of stakeholders possible. Here, we propose a new framework to engage diverse stakeholders representing the lay public, scientists, and private and government institutions concerning the use of CRISPR on genes involved in cognition and mental traits. This system is called the CRISPR-cognition genes database (CCGD). This review process and database is built on a peer-to-peer review system. The CCGD is a dynamically

updated system of genes pulled from studies in the scientific literature and validated by a scientific review board. The database additions and subtractions are subject to public peer review and discussion gathered from diverse stakeholders to provide feedback into the review process. The CCGD would engage the public with private and governmental institutions in a process to provide oversight on what genes are altered using CRISPR concerning cognitive states and provides a starting point for diverse stakeholder engagement in the use of this disruptive technology to treat neurological conditions.

Disclosures: M.W. Nestor: None. **R.L. Wilson:** None.

Theme J Poster

TJP07. Ethical Issues, Policy Issues, and Interactions with Society

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Program #/Poster #: TJP07.09SA/YY6

Topic: J.04. Ethical and Policy Issues in Neuroscience

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New England Landscape Futures subaward

Title: Community wilds and brain health

Authors: *S. A. MASINO;
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Abstract: We face unprecedented global crises and navigating them requires protecting and restoring ecosystems *in parallel* with prioritizing health, particularly brain health. Diverse accounts of health benefits of spending time in nature are consistent throughout history, and the volume of peer-reviewed research quantifying nature-based brain health benefits has increased significantly in recent years. The uptick in research activity aligns with enduring and non-partisan public values and a dramatic increase in visits to public nature during the COVID-19 pandemic. National Parks and “Community Wilds” - smaller areas of wild nature - represent opportunities to address climate, biodiversity and public health at the same time and represent an approach called “multisolving.” Multisolving was developed by Climate Interactive at MIT to develop climate solutions with near-term benefits. It requires engaging the whole “system” and is highly interdisciplinary and requires diminishing conflicts of interest. This is an issue that affects everyone because identifying and protecting key pieces of our natural systems is an urgent imperative: this is our lifeline, and a proven way to reduce depression, anxiety, and more serious mental illnesses. The first step is delineating areas prioritized for natural processes and for proforestation - letting existing forests grow and evolve. Despite the simplicity of the common-sense approach, we lack clear processes and policies for strategic interdisciplinary decision-making even in the progressive parts of the United States. For example, a recent landmark analysis called *Wildlands in New England: Past, Present and Future* outlines the importance of

natural areas and lays bare their scarcity and their lack of strong protection, particularly in Southern New England. Here we make the case for Community Wilds for brain health and outline two approaches. One is designating new National Parks with a focus on areas that have no national parks and are near populated areas. The second is a logical landscape recipe that can be used by any municipality. We seek to align with the precautionary principle and the principles of evidence-based medicine to best support brain health, biodiversity and the climate in parallel. To date we have found ongoing roadblocks to progress that include habits, financial incentives and conflicts, and silo-based approaches. The most significant roadblock is widespread public misunderstanding and a lack of public education and awareness regarding unequal access and the overall lack of Community Wilds.

Disclosures: S.A. Masino: None.

Theme J Poster

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Program #/Poster #: TJP07.10SA/YY7

Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: Shifting Perspectives: Exploring Changes in Epilepsy Terminology and Discourse in South Korea

Authors: *S. KOH[1], S. SUH[2], S.-I. PYO[2], G. KIM[1], S. KWON[2], J. CHOI[1];
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Abstract: This study investigates the evolving discourse and societal perceptions of epilepsy in South Korea over three distinct time periods. We analyzed online news articles from NAVER, covering 2001-2004, 2011-2012, and 2020-2022, to capture the changing terminology from "간질" to "뇌전증." The data underwent preprocessing and analysis using Latent Dirichlet Allocation topic modeling and network mapping. Dementia was included as a control group due to its similar societal challenges.To assess the implementation status, we conducted a frequency analysis. In 2001-2004, the term "간질" was exclusively used. In 2011-2012, where "뇌전증" was first introduced and announced as the official term for epilepsy, it was used approximately 60.9% of the time. In 2020-2022, the usage shifted to approximately 81.5% for "뇌전증" to describe epilepsy. These findings suggest a significant shift in terminology preference over time, with "뇌전증" gradually gaining dominance.During 2001-2004, articles predominantly focused on the social expenses associated with epilepsy, including difficulties in the job market, registration for disabilities, insurance issues, and grades of disability. In the transitional period of 2011-2012, there was a notable shift in discourse, with increased emphasis on children with epilepsy, family dynamics, and objective topics related to seizure semiology, treatment, consciousness, and diagnosis. The period of 2020-2022 witnessed further changes in the discourse, with a greater presence of scientific terminology such as focal seizures, sleep

deprivation, drug withdrawal, provocation factors, vagus nerve stimulation, hippocampus, channels, proteins, and gene expression. A more comprehensive understanding of seizure semiology other than tonic-clonic seizure emerged, encompassing emotional, behavioral, and sensory aspects. We observed that the discourse patterns related to dementia remained relatively stable, focusing only on its societal burden, while epilepsy discourse showed significant shifts. This suggests that changes in epilepsy discourse were likely influenced by the terminology transition, indicating a positive step towards destigmatization and promoting a scientific understanding of the condition.In conclusion, this study reveals an evolving landscape of epilepsy discourse in South Korea, with changes in terminology reflecting a broader understanding of the medical and personal aspects of epilepsy, moving away from a narrow focus on the societal burden. The changes in terminology in epilepsy can be seen as a positive step towards destigmatization through neutralizing language and promoting scientific understanding of the disease.

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Topic: J.04. Ethical and Policy Issues in Neuroscience

Support: ZIACL090033

Title: Methodological challenges during Phase I clinical trials in patients with advanced cancer pain

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Abstract: Clinical trial participation for refractory cancer pain in end-of-life patients presents numerous barriers that challenge study design and execution. By intent, patient recruitment involves participants that are medically unstable, with a multitude of complex issues, both physical and emotional. Patients with refractory pain often are taking opioid pain medications of various formulations, durations of action, and routes of administration that can complicate recruitment, pain measurement and produce an unacceptable set of side effects. Given this complex background and the high risk of disease-related serious adverse events, targeted development of analgesics in this patient population has been a neglected indication. The objective of this abstract is to examine the multiple considerations that can impede drug testing in this population spanning psychosocial issues to clinical trial design.
End of life patients with refractory pain often are taking extraordinarily large doses of pain medications resulting in sedation and confusion which, together with elements of delirium from

their disease, can complicate the informed consent process and data collection. Cancer patients can be overly optimistic regarding longevity or prognosis leading to seeking curative or experimental therapies regardless of the potential benefit. Thus, opting for additional studies offering treatment verses only palliation may not be considered. Decision making in end of life patients can be complex involving personal beliefs and input from family and care providers. Even if opting for a concurrent palliative study, the oncological treatment research could worsen the quality of life and prevent or confound the interpretation of any adverse events from the pain investigation. Similarly, scheduling multiple studies given the time constraints is challenging and possibly overwhelming for the patient.
All studies involving patients at the end of life require a delicate balance of collecting data while minimally impacting their remaining life. In a phase I study, a patient may not receive benefit if treated early in a study (e.g. sub-therapeutic dose or placebo). Patient study visits and frequency as well as types of interventions need to be thoughtful and minimized. These studies are essential for improving the quality of life for this patient population but it is essential that all efforts are made to lessen interference with family interaction and end of life issues.

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Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: Post-ssri sexual dysfunction: epidemiological estimation, pathophysiology mechanisms and management strategies

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Abstract: Selective serotonin reuptake inhibitors (SSRIs) are a group of medications commonly used as the first choice for treating various mental health conditions, with around 12% of people in the US using them continuously. One of the most common side effects of this class of medication is sexual dysfunction, estimated to be present in up to 75% of users. However, in recent years, enduring sexual dysfunction upon SSRI discontinuation has been extensively reported, culminating in the recognition of Post-SSRI sexual dysfunction (PSSD) as an iatrogenic syndrome by the European Medicines Agency and Health Canada. In this review, we aim to provide an overview of the PSSD syndrome, including the main features of the condition, epidemiological estimation, pathophysiology mechanisms, management strategies, patient's experiences with health care, and future perspectives. PSSD is an iatrogenic syndrome of

enduring sexual dysfunction that arises following antidepressant use, whereby sexual function does not return to normal after the discontinuation of SSRI. Epidemiological data is scarce, but some preliminary studies indicate that up to 14.36% of males and 26.24% females may continue to experience sexual dysfunction after stopping the medication. Symptoms include reduction or loss of libido, genital hypesthesia, inability to orgasm or pleasureless orgasm, erectile dysfunction in men and lack of vaginal lubrication in women. In some cases, symptoms commence while on the medication; in others, symptoms commence upon discontinuation. Currently, there are no studies on the pathophysiology of the condition and no consensus on treatment. Possible pathological mechanisms may include epigenetic changes in gene regulation, receptor downregulation, and desensitization of receptors. Patients often encounter disbelief from health professionals when reporting PSSD. Transparency about the risk of PSSD is a key component of true informed consent, as well as assess long-term effects of antidepressants on the patient's sex life.

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