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Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.01

Topic: J.01. History of Neuroscience

Title: Recent updates in the role of extracellular vesicles in neurological disorders

Authors: M. F. KIRMANI[1], *M. F. KIRMANI[2], A. K. SHETTY[1];
[1]Inst. for Regenerative Medicine, Dept. of Mol. and Cell. Med., [2]Sch. of Publ. Health, Dept. of Envrn. Hlth., Texas A&M Univ., College Station, TX

Abstract: Extracellular vesicles (EVs) are primarily involved in maintaining cellular homeostasis. In neurodegenerative disease conditions, EVs spread the disease in the brain by disseminating pathological proteins. The EV categories include microvesicles and exosomes. The therapeutic potential of EVs has been explored in several neurological disorders, including Alzheimer's disease, multiple sclerosis, and epilepsy. Animal model studies in each of these disorders have reported beneficial effects and suggest EVs as an emerging effective treatment. Recent results have revealed that EVs modulate immune response and neuroinflammation and facilitate cellular repair within the nervous and immune systems. The beneficial effects of EVs included remyelination of axons in models of multiple sclerosis, reduced accumulation of amyloid plaques, modulation of microglia, reduced neurodegeneration in models of Alzheimer's disease, and reduced chronic neuroinflammation and better cognitive function in models of status epilepticus. However, further investigation is required to determine the interactions of current pharmacological treatments in each disorder with EVs and the potential impact of EV treatment on relapse in multiple sclerosis, long-term cognitive and mood outcomes in Alzheimer's disease, and chronic seizure outcomes in epilepsy.

Disclosures: M.F. Kirmani: None. **M.F. Kirmani:** None. **A.K. Shetty:** None.

Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.02

Topic: J.01. History of Neuroscience

Title: Code breaking cognition: the history and philosophy of information theory's use in neuroscience

Authors: *N. DICOLA;
Univ. of Florida, Gainesville, FL

Abstract: Information theory is widely used in many disciplines of neuroscience, particularly in studies of the visual system and hippocampal neurons with spatially selective firing (i.e, “place cells”). Many of the assumptions necessary for the use of information theory tools, however, have not been discussed by modern neuroscientists despite their broad implementation, potentially questioning the validity of these tools for understanding brain dynamics. Here we will discuss the history of how information theory made its way from the code breakers of World War II to the theoretical models of the nervous system and artificial intelligence. Furthermore, I will summarize how these tools influenced our first insights into the visual system as well as its modern usage in hippocampal neurophysiology. Each step of this transition was accompanied by assumptions and simplifications, stated or not, that are still hotly debated today. Particular focus will be placed on the use of firing rates as the syntactical code of the nervous system, and that the same neural syntax is assumed to exist for all brain regions despite vast differences in degrees of recurrent connections, neuronal function, neurotransmitter presence, etc. Such factors, at least those known of at the time, were carefully considered in the first attempts to use an “information theoretic approach”, yet this discourse is largely missing from modern publications. It is our hope that by highlighting the history of deep philosophical thought that surrounds information theory we can encourage the neuroscience community to rigorously examine how this tool is used and the conclusions that can be drawn from its implementation.

Disclosures: N. DiCola: None.

Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.03

Topic: J.01. History of Neuroscience

Support: NSFC Grant U1805263
FJNU Grant Z0205109

Title: What may represent subjective fear and automatic defensive behavior in rodents? A systematic review

Authors: *B. YIN, B. ZHENG, L. BAO;
Sch. of Psychology, Fujian Normal Univ., Fuzhou, China

Abstract: At present the majority of rodent research on fear adopts the fear conditioning (FC) paradigms in which the time percentage of body freezing in a given trial is regarded the sole indicator for fear expression. This may not be the case in the history of neuroscience, in which heart rate and body temperature, ultrasonic sound, freezing and flight, urination and defecation, etc. were all used as indicators for fear. Recently the model for two systems of fear proposed by

J. E. LeDoux has brought us new insights on the issue. In this model, fear is regarded as a kind of subjective emotional experience that can be consciously perceived but be independent of survival-oriented physiology and behavior. Therefore, we aimed to systematically review what may represent subjective fear and automatic defensive behavior in rodents historically. Through an analysis of 2,609 articles related to the assessment of rodent fear and defensive behavior since 1930s, we found that, 1) there was a trend in the neuroscience field from adopting multiple indicators for fear to converging on body freezing, especially with the development of automatic scoring system and neural circuit techniques which had shifted researchers' attention to dissecting the brain mechanisms underlying fear learning and memory. 2) Different types of defensive behavior were thought to be an indicator for fear prior to and after the encounter of threat, though direct report of fear by rodents was less obvious. 3) Although rodents are not able to express fear via self-report, studies have shown that the 22kHz ultrasonic call emitted by rodents may be identical to human crying both functionally and with similar neural basis. Together with our own data, we concluded that the two systems of fear proposed by LeDoux may also present in rodents.

Disclosures: B. Yin: None. **B. Zheng:** None. **L. Bao:** None.

Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.04

Topic: J.01. History of Neuroscience

Title: Horner eponyms

Authors: *B. W. BAKKUM;
Illinois Col. of Optometry, Chicago, IL

Abstract: The eponym: Horner is commonly used for several terms in the health sciences, but they are not honorifics for the same person. Also, some of the terms should probably be for other people since one of the doctors Horner was not always the original person to publish about them. Probably the best-known eponym is Horner syndrome. This term is generally understood to refer to the clinical presentation of oculosympathoparesis, which usually presents with the triad of symptoms: miosis, ptosis/enophthalmos, and impaired vasomotor/sudomotor activity in the face and neck. It is caused by an interruption of the sympathetic supply of the head/face anywhere along the pathway. This syndrome was first described as early as 1727 by François Pourfour du Petit by cutting the intercostal nerves in dogs. The first clinical description of this problem was by Edward Hare in 1838. In 1852, Claude Bernard accurately described the clinical presentation in dogs in which different portions of the sympathetic nervous system were sectioned. It is common in France to refer to the condition as Bernard-Horner syndrome. Silas Weir Mitchell described in 1863 a case of an American Civil War soldier with a bullet wound to the neck with this same problem. It was not until 1869 that Johann Friedrich Horner gave a careful and very

descriptive account of a woman with this syndrome. Dr. JF Horner was actually the first to recognize that a man with red-green color blindness transmitted this anomaly to his male grandchildren through his daughter who was not color blind. This pattern is sometimes known as Horner law and was eventually recognized as sex-linked genetic transmission. The musculus orbicularis oculi pars lacrimalis is commonly referred to as the Horner muscle. The first published description of this muscle was by Jacques-François-Marie Duverney in 1730. 1n 1805, Johann Christian Rosenmüller published an atlas that included illustration of what he called the Muskel des Thränensackes or musculus sacci lacrymalis. William Edmonds Horner described a small muscle located on the posterior part of the lachrymal ducts in 1822. He later called it the tensor tarsi muscle. On April 28, 1922, Alfred Baker Spalding presented a paper in which he described that overlapping of fetal skull bones as seen on plain film x-ray was a pathognomonic sign of intra-uterine death. This paper was published later that same year which led to the commonly used eponym: Spalding sign. On December 16, 1921, David Alfred Horner presented a paper in which he also described the same phenomenon. This paper was also published in the same journal as Spalding's manuscript but a month later. The, maybe more appropriate, eponym Horner sign can sometimes be found.

Disclosures: B.W. Bakkum: None.

Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.05

Topic: J.01. History of Neuroscience

Title: Retelling the story of neuroscience: toward a more inclusive history of the study of the brain, mind and behavior

Authors: *E. P. WIERTELAK, J. M. HOOVER, J. V. IYER, C. E. MCCABE, B. H. OVERLID;
Psychology and Neurosci., Macalester Col., Saint Paul, MN

Abstract: What is the story of Neuroscience? The information we have gathered about the brain, the nervous system, and behavior is ever-expanding. As it does, is the work that contributed to what we understand (Done where? By whom?), the foundation of this knowledge-- fading from, or neglected in-- the story? Many are familiar with the range of quotes about who writes history, but as the historian Eugen Weber wrote: "If cats could write history, their history would be mostly about cats." Mehmet Murat ildan asks us first to remember: "History of science is a relay race" and Evelyn Fox Keller cautions: "To know the history of science is to recognize the mortality of any claim to universal truth." As part of an advanced undergraduate neuroscience seminar focused on retelling the history of neuroscience to include the diversity of information that contributes to our understanding of the nervous system, behavior and the mind, students researched and developed more inclusive oral and multidraft written histories of focal topics in

neuroscience. Post-course evaluations revealed that students felt their understanding of neuroscience and its history were augmented and their ability to communicate about their science improved. Four presentations are discussed.

Disclosures: E.P. Wiertelak: None. **J.M. Hoover:** None. **J.V. Iyer:** None. **C.E. McCabe:** None. **B.H. Overlid:** None.

Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.06

Topic: J.01. History of Neuroscience

Title: Overcoming the failure of neoclassical economics to capture excessive demand: Potential neuroimaging biomarkers for monitoring excessive demand

Authors: *J. L. HARACZ;
Indiana Univ., Bloomington, IN

Abstract: Objective: According to price theory, supply and demand determine prices (Jaffe et al., 2019). Excess demands sum to zero when equilibrium is reached and markets clear, according to general equilibrium theory (Arrow, 1974; Debreu, 1984). Neoclassical economists address the "important and⋯difficult" methodological treatment of demand (Knight, 1944, p. 289) by invoking balanced "excess demand" in general equilibrium theory (Arrow, 1974, p. 266; Debreu, 1984, p. 270) and supply-demand balance in price theory (Stigler, 1990 [1942]; Friedman, 2007 [1962]). However, dynamic stochastic general equilibrium models have been widely criticized for failing to forecast the Global Financial Crisis (Yellen, 2010; Guzman & Stiglitz, 2020; Vines & Wills, 2020). This and other flaws of neoclassical economics are presently proposed to arise from the failure of equilibrium-based models to capture *excessive demand*, which exceeds the balanced excess demand in general equilibrium theory. The present theoretical study seeks potential neuroeconomic biomarkers of excessive demands. Methods: A systematic literature review focused on neuroimaging or behavioral economics studies of tasks that elicit demands (i.e., choices) by subject groups that may be prone to show excessive demands (e.g., subjects 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 from potentially any era in neuroscience history. Results: Compared to healthy controls, the above subject groups typically show altered neural activity in valuation-related brain areas (e.g., nucleus accumbens [NA] and ventromedial prefrontal cortex) during anticipation, choice, or outcome phases of demand-elicitation tasks. Substance abusers show behaviorally relevant results: drug cue-related NA activation predicted relapse in patients with stimulant use disorders (MacNiven et al., 2018); among subjects with opioid use disorder, hypothetical purchase tasks revealed that proneness to recent illicit opioid use was associated with high demand intensity for heroin and low sensitivity to heroin price (Schwartz et al., 2021). Conclusions: Neuroimaging

(e.g., fMRI and near-infrared spectroscopy) 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 [Guzman & Stiglitz, 2020] or multiple equilibrium models [Vines & Wills, 2020]).

Disclosures: J.L. Haracz: None.

Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.07

Topic: J.01. History of Neuroscience

Title: A brief history of the inclusion of female participants in neuroscience research

Authors: T. WHITTAKER[1], B. YOUNG[1], B. SCHUSTER[1], ***J. A. BOYETTE-DAVIS**[2]; [2]St. Edward's Univ., [1]St. Edward's Univ., Austin, TX

Abstract: Scientific endeavors are most effective when they are representative of the population being sampled, and this may be especially true for the field of neuroscience given its translational aims. Yet, 49.6% of the world's population - women - have been noticeably excluded from neuroscience research. Even prior to the FDA's recommendations in 1977 to exclude "women with childbearing potential" from early clinical trials, females were significantly underrepresented in human and animal-based biomedical research. The FDA's protectionary measures had the unfortunate effect of solidifying existing beliefs about the challenges of including females in biomedical investigations. Overestimations of increased variability due to the menstrual cycle, concerns about fertility and fetal harm, and implicit beliefs about the male body being the default norm have persisted. While the 1993 NIH Revitalization Act and the more recent NIH Policy on Sex as a Biological Variable (SABV) have promoted inclusive gender and sex practices, research within neuroscience continues to display a sex bias. This is most prominent in rodent studies, with single-sex studies of male animals outnumbering those of females 5.5 to 1. These ratios do not represent the rates of disease or disorders in men and women, and these unequal samples have been postulated to be a primary reason for the high prevalence of failed clinical trials. Given the known sex-based physiological differences between men and women, combined with significant gender differences in disease prevalence, it is essential that inclusion efforts continue. Importantly, researchers can apply the lessons learned on female inclusion to other underrepresented groups, including racial minorities, those with disabilities, and those who do not fit within dichotomous gender categories. This poster will present a more detailed discussion of these issues, along with a timeline of female inclusion efforts in neuroscience-based research.

Disclosures: **T. Whittaker:** None. **B. Young:** None. **B. Schuster:** None. **J.A. Boyette-Davis:** None.

Theme J Poster

021. The Historical Evolution of the Study of Neurons

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Program #/Poster #: 021.08

Topic: J.01. History of Neuroscience

Support: NIH 5U54MD013376
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R29 NS31857-01A1

Title: A historic overview of the society for neurosciences abstracts on HIV neurologic disorders.

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

Abstract: The first published report on what was to be known as AIDS or HIV infection was in 1981 (CDC, *Morbidity and Mortality Weekly Report* in June 1981). Little was known about the disease, but it soon became evident that there was a marked neurological component. By 1982 the CDC had a name for the disease: acquired immunodeficiency syndrome (AIDS), and in 1984 the HIV virus was identified as the cause. Early descriptions of CNS involvement characterized it as a subcortical dementia. Eventual HIV would be known to affect the entire nervous system. We reviewed the Society for Neurosciences conference abstracts from this early period to the present. In this way we identified research trends and developments. What appears to be the first Society for Neurosciences Abstract with AIDS in its title was in 1985 (Denaro, F.J., The Immunocytochemical Localization of Fungi in the Brain of AIDS Patients. Society for Neurosciences, Abstract II: 931, 1985). This presentation occurred four years after the CDC report. After this initial time point, neuropathology presentations focused on the identification of opportunistic infections of the CNS and the application of new techniques. Techniques such as in situ hybridization were applied to identify the infected cell types with greater sensitivity. Neuropathologic techniques demonstrated neurodegeneration and apoptosis. After this period of characterization, focus was on mechanistic explanations for the development of the neuropathology and cognitive problems. This brought about the introduction of animal models. The SCID mouse model, and primate models, were introduced and continue to contribute to our understanding of HIV CNS pathology. To popularize these models a Neurosciences seminar was sponsored by NIH. This was reported in: Vitkovic, Ellen Stover, and Stephen H. Koslow, Animal Models Recapitulate Aspects of HIV/CNS Disease. *AIDS Research and Human Retroviruses*, Vol. II, Number 6, pg. 753-759, 1995. This report underscores the value of animal models. Models opened up research to mechanistic studies and also drug treatment development. With the advent of very effective antiviral treatments the character and pathophysiology of the

neurologic disorders changed. No longer do the opportunistic infections produce significant pathology. Now it is believed that long lasting HIV reservoirs are contributing to HIV noninfectious comorbidities. To address these changes new models and neuroprotectants are being developed and investigated. It has been 37 years since the first Neurosciences abstract on HIV neurologic disorders was presented. But HIV neurologic disorders still present a tremendous health care challenge.

Disclosures: S. Williams: None. **M. Worthington:** None. **F.J. Denaro:** None.

Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.09

Topic: J.01. History of Neuroscience

Title: The history of using animal models to study schizophrenia

Authors: *T. DIAZ[1], C. BRENNER[2], R. E. HARTMAN[3];
[2]Psychology, [1]Loma Linda Univ., Loma Linda, CA; [3]Psychology, Loma Linda Univ., Temecula, CA

Abstract: Neuroscience has greatly benefited from its use of animal models, including non-human primates, rodents, zebrafish, insects, and even nematodes. Animal models for psychiatric disorders, such as schizophrenia, date as far back as the 1950s and include a variety of pharmacologic, developmental, and genetic manipulations. Different models are associated with different behavioral and neuroanatomical phenotypes so that various aspects of schizophrenia can be characterized. Research using animal models first began with the discovery of pharmaceuticals (e.g., amphetamine and ketamine) that mimicked symptoms of schizophrenia in humans. Rodents administered amphetamine or ketamine experience social and attentional impairments, modeling the negative and cognitive symptoms observed in humans with schizophrenia. Neurodevelopmental animal models were the next to emerge, following evidence that a stressful prenatal environment could lead to increased risk of schizophrenia for human fetuses. The offspring of rodents exposed to environmental stressors were found to have impairments in social behavior and memory, much like the previous models, and displayed abnormal brain development. More recently, genetic models have been developed. These are particularly important, because several schizophrenia risk genes have been identified so far. Studies using genetically modified (e.g., transgenic and/or knockout) animals have characterized behavioral and neuroanatomical phenotypes associated with specific risk genes, such as Dysbindin-1 and Disrupted-in-Schizophrenia 1 (DISC1). For example, Dysbindin mutant mice show deficits in locomotion and lower levels of dopamine in various parts of the brain. Dysbindin-1 mutant drosophila demonstrate deficiencies in serotonergic, glutamatergic, and dopaminergic transmission, and DISC1 mutant zebrafish possess abnormal brain ventricles. Combinations of pharmacological, developmental, and genetic manipulations should prove

useful in the development of therapeutic treatments for schizophrenia. Thus, the historical evidence demonstrates that animal models have produced valuable findings related to the etiology and treatment of psychiatric diseases such as schizophrenia, and should continue to do so in the foreseeable future.

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Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.10

Topic: J.01. History of Neuroscience

Support: The Council of Higher Education (CoHE) of Turkey funded Esra Candar under "100/2000 CoHE Ph.D. Scholarship Program" in the field of "Translational Medicine."

Title: Historical perspective on the discovery of the calretinin

Authors: *E. CANDAR[1], I. DEMIRCUBUK[2], G. SENGUL[3];
[1]Dept. of Neurosci., [2]Ege Univ. Inst. of Hlth. Sci., Izmir, Turkey; [3]Ege Univ., Izmir, Turkey

Abstract: Calretinin is one of the 29 kDa vitamin D-dependent calcium-binding proteins (D-CaBP). Since the beginning of the 20th century, the interactions between vitamin D and calcium metabolism have been explored. After 1960, calcium-binding proteins were found dependent on vitamin D. In 1966, Wasserman and Taylor revealed the existence of D-CaBP by measuring calcium binding in a rachitic chick model. After that, consequent studies demonstrated D-CaBP in retina, cerebellum, kidney, duodenum, and uterus of various species such as chicks, rats, mice, rabbits, frogs, pigeons, and humans. In 1985, Rabie et al. showed D-CaBP in the form of 28 kDa in rat retina. In 1987, Pocket et al. mentioned the two calbindins of 27 and 29 kDa CaBP as CALB1 and CALB2, which were shown in the brains of various vertebrate classes. Rogers published the first calretinin article, "Calretinin: a gene for a novel calcium-binding protein expressed principally in neurons" in 1987. He isolated the calretinin gene from the retina of a chick, which was known as CALB2 at 29 kDa. Rogers termed it "calretinin" due to "cal" for calbindin homology and "retinin" for its source. In 1988, Wilson et al. showed CALB1 and CALB2 in chick chromosomes. Later in 1989, Parmentier et al. revealed CALB2 on chromosome 16 in humans and rodents. This was followed by the work of Chen et al. (1991) that mapped the cytogenetic location of the calretinin gene to 16q22.1 and then by Permantier et al. (1991) showed this gene to 16q22; q23. Calretinin has been found in a variety of nervous system structures, including the retina, brain, cerebellum, spinal cord, brainstem, reticular formation, hypothalamus, cerebral cortex, forebrain, dorsal root ganglia, pineal gland, and inner ear. A significant number of animal species have been used to investigate interspecies differences and it is noted that the human calretinin genome is highly conserved in the evolutionary process.

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Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.11

Topic: J.01. History of Neuroscience

Title: The habenular complex: past, present and future

Authors: M. GADDAM[1], *X. LE[2], *J. S. KANWAL[1];
[1]Georgetown Univ., Washington, DC; [2]Hwa Chong Inst., SIngapore, Singapore

Abstract: At the beginning of the 20th century, C.J. Herrick (Herrick, 1910, 1913) divided the diencephalon into four dorsoventrally arranged longitudinal zones. The most dorsal zone of the diencephalon contains the habenular complex, which is among the evolutionarily most conserved parts of the brain. The habenula is grossly divisible into a dorsal and a ventral division in fish and amphibians. In mammals, these are organized respectively as the medial (with five subnuclei) and lateral (with ten subnuclei) habenula. Not much progress was made during the middle of the 20th century towards understanding the functioning of the habenular complex. In 1977, a study by Wang and Aghajanian demonstrated that the lateral habenula may serve a pivotal role in funneling information from the forebrain to the midbrain raphe through its GABAergic suppression of serotonergic neurons. This supported connectomics data obtained using newly developed tract-tracing methodologies by Nauta and others in the 1970's, building on the earlier work of Cajal (1911). After several decades of little activity, scientific interest in the habenula has grown dramatically, as indicated by an increase in annual publications from <40 before 2010 to >150 in 2021 (*pubmed.gov search for* "habenula"). This was triggered in part by detailed evidence of asymmetric development of the habenula (first reported in bone fish by Goronowitsch in 1883), it's role in pain and analgesia, memory retrieval as well as in stress evasion and value-based decision-making. The finding that habenula activity in zebrafish can prevent helpless behavior (Lee et al., 2010) supported its possible role in treating depression and has likely contributed to a burst of studies over the last decade on the cellular organization, mechanism of action and gene expression (e.g. for kisspeptin and protocadherin 10a) in the habenula. More recently, the habenula has been considered as an integrated switchboard for concertedly controlling behavior either as a winner with self-centered (idiothetic) attention or a loser with others-oriented (allothetic) attention (Okamoto et al, 2021). This focus on its role in sustaining attention and subsequently influencing attentional shifts is particularly interesting given its strategic location and input-output connections with multiple brain regions for modulating activity of monoaminergic neurons. In short, the "habenula" or "little rein", as described by its morphological characteristics is perhaps, more appropriately termed as the "hubenula" from a functional perspective given its role as a "central hub" for integrating information on motivational brain states before initiating decisive action.

Disclosures: **M. Gaddam:** None. **X. Le:** None. **J.S. Kanwal:** None.

Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

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Program #/Poster #: 021.12

Topic: J.01. History of Neuroscience

Title: History of Stress Research and Models in Neuroscience

Authors: *K. LAWRENCE, N. SALMASO;
Neurosci., Carleton Univ., Ottawa, ON, Canada

Abstract: Stress is an essential physiological process that occurs throughout the lifespan. Identification of the stress response and its role in exacerbating disease by Hans Selye in 1935 spearheaded research devoted to the neurobiological and behavioural changes induced by stress. Selye's General Adaptation Syndrome defined stress as a disturbance in homeostasis resulting from the release of noxious substances to induce nonspecific physiological changes. Selye's work was expanded upon by Kendall, Hench and Reichstein who jointly won the 1950 Nobel Prize for their isolation and synthesis of cortisone, the first glucocorticoid (GC) hormone to be associated with stress. In the 1950s, the discovery of corticotropin releasing hormone and adreno-corticotropic hormone resulted in a rudimentary understanding of the hypothalamic-pituitary-adrenal (HPA) axis. Stress research was largely confined to limbic and basal structures until 1968 when McEwen discovered glucocorticoids in rat hippocampal neurons, implicating involvement of cortical structures in HPA processes. This groundwork gave investigators variables to target, creating the need for accurate models of HPA axis dysfunction to manipulate. Liddle's dexamethasone (DEX) suppression test for human use involved administration of DEX and several hours later plasma cortisol levels were measured to determine HPA axis activity. Ethical constraints in human research prompted the introduction of behavioural models and tests as well as the development of inbred animal strains to investigate the pathophysiology of stress in rodents. Animal models of stress reliably induce aberrations in HPA-axis activity and include but are not limited to chronic stress paradigms, social defeat, and early life stress. These models expose rodents to stress (physiological or psychological) to induce activation of the HPA axis and related behavioural shifts that are quantifiable in rodents using tests such as the forced swim test and the sucrose preference test. These tests measure sickness behaviours such as anhedonia and learned helplessness that are each characteristic of stress. In order to mimic HPA axis dysfunction without employing stress paradigms per se, inbred animal strains have been developed such as the hypertensive Wistar Kyoto rat strain first introduced in 1963. Much like the neurobiology of stress research, animal models and tests have evolved and continue to evolve to most accurately mimic the human condition.

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Theme J Poster

021. The Historical Evolution of the Study of Neurons

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Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.13

Topic: J.01. History of Neuroscience

Title: Inter-level processes in behavioural explanation: A case study of an auditory localization circuit in the barn owl (Tyto alba)

Authors: *C. DEWEY;
Univ. of Arizona, Tucson, AZ

Abstract: Behaving systems present a behavioural relevance problem: there are too many internal processes to include all of them in any explanation, so relevance criteria are required to determine which processes should be included in and excluded from explanations of their behaviour. One simple solution is to (a) *include* only information at a single level (e.g., cellular processes at the cell level) and (b) *exclude* information at all other levels. The problem with such solutions is that they exclude inter-level processes that are relevant to explaining behaviour. But some research programs in neuroscience have found better, tacit solutions that include relevant inter-level processes in their explanations of behavioural circuits without opening the floodgates to irrelevant information. In this poster, I review the neuroethology work by Knudsen, Konishi, and colleagues in the 70-90s. This work identified the behavioural circuit that the barn owl (*Tyto alba*) uses to localize sound sources in the frontal azimuth. I integrate their results into a complete, input-to-output model of this circuit and show that the circuit has many inter-level processes: its 11 relevant computations are distributed across 8 levels. Second, I reconstruct novel relevance criteria that decide which of its processes—both inter- and intra-level—are relevant to explaining behaviour. I argue that there are two main criteria. The first identifies which computations are relevant: computations over states that (a) function to encode task information and (b) stand in distal (vs. proximal) functional relations with each other. By comparison, computations over states that don't function to encode task information or stand in proximal functional relations with each other may be relevant to explanations of components of the behavioural circuit but aren't relevant to explaining the whole behavioural circuit itself. The second identifies what anatomy is relevant: anatomical relations between parts that enter states that stand in relevant computational relations. By comparison, anatomical properties of single parts or anatomical relations between different parts that don't stand in relevant computational relations may be relevant to various anatomical explanations, but they aren't relevant to explaining behaviour. Finally, I argue that this novel, historically-informed theory of behavioural relevance suggests a novel kind of empirical analysis—level plotting—which plots the trajectory of behaviourally-relevant computations across anatomical levels. I consider the use of level plotting for studying other, more complicated neural systems.

Disclosures: C. Dewey: None.

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Topic: J.01. History of Neuroscience

Support: JSPS KAKENHI (#18K03182)

Title: William James's theory of emotion as a pioneer work in affective neuroscience: Changes in James's theory of emotion from 1884 to 1890

Authors: *T. SATO;
Social Welfare, Nagano Univ., Ueda, Japan

Abstract: William James, an American philosopher and psychologist, and Carl Lange, a Danish physician, proposed their independent theories of emotion in the late 19th century. These theories made prominent contributions in the fields of affective neuroscience and psychology of emotion, emphasizing the role of afferent neural input, that is, information transmitted from various peripheral body responses to the brain, to produce subjective experiences of emotion. Using his accurate and detailed introspection, James described not only the afferent neural processes but also the bodily perception or perception of organic disturbance that produces such subjective experiences. While both theories were considered to be similar and placed in the same category, called the "James-Lange theory," there were some obvious differences between their theories of emotion. This report compares the contents of James' theory presented in his paper titled "What is an emotion?" published in the journal *Mind* in 1884 and the one described in a chapter of his famous book, *The Principles of Psychology*, in 1890, focusing on how his theory of emotion changed, pointing out four most important issues. At first, James proposed a classification of two types of emotions in the mentioned paper, but he gave new names to each type of emotion in *The Principles*. Thus, he labeled a type of emotion with strong bodily changes, including grief, fear, and rage, as "coarser emotions" and a type of emotion in which bodily changes were less obvious and strong as "subtler emotions." Second, James attempted to explain the genesis not only of the coarser emotions but also of the subtler emotions by posing the hypothesis of no special center of emotion in the brain. Third, he displayed a belittling attitude to the effects of cardiovascular functions, such as blood pressure and heart rate, on the genesis of an emotion, in addition to criticizing relatively gently a part of Lange's theory that emphasizes such functions. Finally, his theory of emotion was loosely combined with his theories regarding other psychological functions, including instinct and will, and it became a part of a new broad range theory of psychological functions.

Disclosures: T. Sato: None.

Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.15

Topic: J.01. History of Neuroscience

Title: Sir Wilfrid Le Gros Clark and his postulate concerning a relation between LGN laminae and color vision in primates

Authors: *C. WU;
Perception and Cognition Res., San Francisco, CA

Abstract: Sir Wilfrid Le Gros Clark, F.R.S. (1895-1971) was a British anatomist, surgeon, primatologist, and palaeoanthropologist, today best remembered for his contribution to the study of human evolution. In 1940, he published a short article [Le Gros Clark, W.E. (1940). Anatomical basic of colour vision. Nature, 146, pp.558-559] proposing a relation between LGN (lateral geniculate nucleus) of the thalamus and color vision in primates (including the humankind) - that is, the three laminae per retina in the LGN correspond to the three primary color sensations as encompassed by the Young-Maxwell-Helmholtz trichromatic theory. He proposed this relation mainly based on the following three lines of reasoning and evidence: (1) The trichromatic theory needed three conducting units from the eye to the visual brain, and he was seeing a three-laminae-per-retina organization in the LGN - this numerical equivalence led him to pronounce that such an organization in the LGN provides "quite definite anatomical support" for the trichromatic theory. Is this reasoning based a numerical equivalence (which some investigators might consider as a coincident) superficial? No at all! Thomas Young (1802) reasoned: "Now, as it is almost impossible to conceive each sensitive point of the retina to contain an infinite number of particles, ⋯". As a matter of fact, Young's argument applies to the visual cortex as well. If we consider that there must some parallelism between the retina and the visual cortex, we would certainly further consider that the connections and the stations between them preserve this parallelism as well. (2) A clearly marked organization of 3 layers per eye (or retina) exists only in those primates that are known to have trichromatic vision. (3) The LGN consists of zones of layers in various numbers; and such zones seem to correspond to the different zones of color vision known to exist in human color vision. Some years after Le Gros Clark proposing his postulate on color vision, Gordon L. Walls (1953) published a monograph "The lateral geniculate nucleus and visual histophysiology", severely criticizing Le Gros Clark's idea - possibly due to Walls' attack, Le Gros Clark's postulate had never been well received; by now it has largely been forgotten or dismissed. Today, in view of many new neuroanatomical and neurophysiological facts that have been established after the Le Gros Clark versus Walls controversy some 70 years ago, we can find that many of Walls' arguments are invalid; therefore, now it may be a good time for current neuroscientists to re-examine this controversy, to determine whether some components of his hypothesis are correct, and to give Le Gros Clark the credit that he deserves.

Disclosures: C. Wu: None.

Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.16

Topic: J.01. History of Neuroscience

Support: The Council of Higher Education (CoHE) of Turkey funded Esra Candar under "100/2000 CoHE Ph.D. Scholarship Program" in the field of "Translational Medicine."

Title: The lateral cervical nucleus and lateral spinal nucleus: a historical perspective

Authors: *I. DEMIRCUBUK[1], E. CANDAR[2], G. SENGUL[3];
[1]Dept. of Anat., [2]Dept. of Neurosci., Ege Univ. Inst. of Hlth. Sci., Izmir, Turkey; [3]Ege Univ., Izmir, Turkey

Abstract: The gray and white matters of the spinal cord contain several described nuclei. Bror Rexed and Alf Brodal described the "lateral cervical nucleus" in the C1-C2 segments of the cat spinal cord in 1951. It was later shown by different researchers in the spinal cord of raccoon, dog, and macaca fuscata, between 1965 and 1967. In 1968, David G. Gwyn and H. A. Waldron reported a group of cells in the dorsolateral funiculus of the spinal cord of the rat demonstrated with acetylcholinesterase staining. They described this structure as "a nucleus in the dorsolateral funiculus of the spinal cord" and noted that it extended throughout all segments of the spinal cord, situated in a similar location to that defined in the cervical segments of other species. A year later, they reported the presence of the nucleus in the guinea pig, rabbit, ferret, and cat. In 1985, Glenn J. Giesler and Robert P. Elde for the first time termed the group of cells in the dorsolateral funiculus of the C2 segment as the "lateral cervical nucleus" and the group of cells below the C2 segment as the "lateral spinal nucleus", distinguishing these two nuclei from each other terminologically. Later on, the projections of the lateral spinal and lateral cervical nuclei to higher centers in the central nervous system and their chemoarchitecture were demonstrated. The lateral spinal nucleus and lateral cervical nucleus were mapped by Molander et al. (1984, 1989) in the rat, Watson et al. in the rat and mouse (2009, 2013, 2022), rhesus, and marmoset monkeys (Watson et al., 2013, 2022), and humans (Sengul et al., 2013, 2022) using Nissl staining and a variety of immunohistochemical markers.

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

Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.17

Topic: J.01. History of Neuroscience

Support: John Templeton Foundation #61283
Fetzer Institute, Fetzer Memorial Trust #4189

Title: Neuroscience and the free-will debate: a newcomer's guide to the history of the neuroscience of volition

Authors: *T. DOMINIK[1], A. MELE[2], A. SCHURGER[1], U. MAOZ[1];
[1]Brain Inst., Chapman Univ., Orange, CA; [2]Dept. of Philosophy, Florida State Univ., Tallahassee, FL

Abstract: Imagine yourself reaching for a cup of tea while reading a book in your favorite armchair. For such a mundane event, you probably do not pause and ponder why you decided to reach for the cup of tea at that particular moment. However, a series of neural events occurred while you did so, in a fashion that tells us something important about how the brain produces voluntary movements. Central to the elucidation of the neural underpinnings of voluntary action is a 4-part series of papers published by Benjamin Libet and colleagues in the early 1980's. Participants were instructed to carry out a simple, meaningless, self-initiated movement—e.g., wrist flexion—while reporting when they experienced the first urge or intention to move. EEG was simultaneously recorded. Libet and his team found that an EEG component—termed the readiness potential—known to precede voluntary action, started several hundreds of milliseconds before subjects reported deciding to move. Many took this to mean that the actions in the Libet experiment and possibly in general are initiated unconsciously. Others disagreed on conceptual or methodological grounds. Nevertheless, this experiment laid the groundwork for a host of research, now collectively termed the neuroscience of volition.
Here we summarize key findings in this field over the last four decades. For example, the subjects in the original experiment reported the onset of the urge to move using a clock composed of a spot rotating at constant speed. But, following severe criticism, researchers instead proposed methods such as a continuous stream of letters, probe-based methods, or the external stimulus adjustment method. The role of the readiness potential also came under increasing scrutiny, targeting the notion that the onset of the readiness potential might not reflect the beginning of a volitional process. Researchers also expanded the number of methods for studying the neural substrate of volition to include machine-learning-based EEG decoding, event-related desynchronization, hemodynamic methods, and intracranial recordings. Inspired by these new developments, we propose new directions for the field of the neuroscience of volition.

Disclosures: T. Dominik: None. **A. Mele:** None. **A. Schurger:** None. **U. Maoz:** None.

Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.18

Topic: J.01. History of Neuroscience

Title: Current Achievement of Neuroscience in Mongolia

Authors: *T. JADAMBA[1], C. ERDENEBAATAR[2], E. TUMURBAATAR[4], B. BAYANMUNKH[3], U. GANZORIG[5], B. OIDOV[6], B. DAGVAJANTSAN[7], O. BYAMBASUKH[8], B. LKHAGVASUREN[9];
[1]Brain and Mind Res. Institute, MAS, Ulaanbaatar, Mongolia; [3]Depatmnet of psychology, [2]Brain and Mind Res. Institute, Mongolian Acad. of Sci., Ulaanbaatar, Mongolia; [4]Dept. of clinical neuroscience, Brian and Mind Res. Institute, MAS, Ulaanbaatar, Mongolia; [5]Mongolian Natl. Univ. of Med. Sci., Ulaanbaatar, Mongolia; [6]Dept. of infectious disease, [7]Dept. of neurology, [8]Dept. of endocrinology, Mongolian national university of medical sciences, Ulaanbaatar, Mongolia; [9]Hlth. Sci. Univ., Ulaanbaatar, Mongolia

Abstract: In 2014, neuroscientists established the Mongolian Neuroscience Society (MNS) to develop and support brain science in Mongolia. In 2015, MNS became a member of the International Brain Research Organization (IBRO), which comprises over 90 neuroscience societies across the globe. MNS belonged to the Asia-Pacific Region of the IBRO and was the first member organization from Central Asia. In 2018, MNS organized the Honored Public Lectures supported by the IBRO in Ulaanbaatar to increase the awareness of brain science in the Mongolian population. The lectures took place in the Parliament House under the Auspice of the President of Mongolia. As a result, the first research institution for neuroscience, Brain Science Institute (BSI), was established at the Mongolian National University of Medical Sciences (MNUMS) on April 24, 2019. BSI designed a nationwide, multicenter, multidisciplinary, population-based cohort study (Mon-Timeline) and completed its first stage to study brain-related disorders in the general population of Mongolia. In 2021, the Government of Mongolia established a national research institute for brain science, Brain and Mind Research Institute (BMRI), affiliated with the Mongolian Academy of Sciences. BMRI includes research departments for systems neuroscience, clinical neuroscience, and psychology and a multidisciplinary center for translation and innovation. The current research project of BMRI focuses on intensifying the Mon-Timeline study to investigate brain-related disorders using fundamental technology in brain science. The institute has built a research platform for interdisciplinary studies that enables neuroscientists, clinicians, and psychologists to collaborate on research projects, particularly on circadian rhythms and sleep disorders. As a short-term goal, we will establish a key laboratory for molecular and cellular neuroscience and behavioral sciences center. For a long-term goal, BMRI will introduce an interdisciplinary brain research system to contribute to national and global development.

Disclosures: **T. Jadamba:** None. **C. Erdenebaatar:** None. **E. Tumurbaatar:** None. **B. Bayanmunkh:** None. **U. Ganzorig:** None. **B. Oidov:** None. **B. Dagvajantsan:** None. **O. Byambasukh:** None. **B. Lkhagvasuren:** None.

Theme J Poster

021. The Historical Evolution of the Study of Neurons

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 021.19

Topic: J.01. History of Neuroscience

Title: The transdiagnostic perspective: a scoping review of child maltreatment and neurobiology

Authors: *S. LAWLER[1], K. NELSON[2], E. LOZORAITIS[3], J. BLACK[3];
[1]Arizona State Univ., Chevy Chase, MD; [2]Boston Col., Chestnut hill, MA; [3]Boston Col., Chestnut Hill, MA

Abstract: Childhood maltreatment can cause persistent neurobiological abnormalities and functional neurological changes that can lead to lifelong behavioral and cognitive challenges. This study investigates previously published results to support integrating neuroscience and social work to advance treatment options. We conducted a systematic scoping review to map persistent neurobiological abnormalities among maltreated children and related functional outcomes.
We searched six databases (MEDLINE, EMBASE, CENTRAL, CINAHL, PsycINFO, and Sociological Abstracts) for relevant papers. Each database had a high chance of indexing articles, reports, and dissertations linked to social science and neuroscience. All articles utilized a functional neuroimaging approach and a novel experimental or quasi-experimental study design. CM adolescents had reduced functional connectivity between the amygdala (AMY) and prefrontal cortex (PFC), which enhanced emotional processing circuitry and decreased

hippocampal activity. Impacted adults had decreased hippocampal volume, PFC modulation, and AMY-PFC connectivity. Respondents reported stronger reward-related anterior cingulate cortex sensitivity, less PFC activation during learning, and more AMY activation in response to emotional faces; overall, emotional reactivity increased adults' tendency to internalize symptoms. CM's functional and behavioral effects continue into adulthood and worsen over time. Early intervention is key to preventing damage to the brain. We advise combining imaging-backed neuroscientific results into social work therapeutic interventions. Applying social workers' cultural awareness to scientific data will explain neurobiological changes. Applying a social work perspective to neuroscience is expected to offer substantial implications for understanding the brain underpinnings of early maltreatment and implementing effective preventative action. Advances in child psychology have helped social workers improve the bio-psycho-social model of human behavior. Social work and neuroscience can contribute to neuroscience studies by addressing environmental and systemic factors that affect children's development and racial/ethnic differences. This integration will help expose underlying issues by studying neuro-biological systems in social work and applying neuroscience to human development.

Disclosures: **S. Lawler:** None. **K. Nelson:** None. **E. Lozoraitis:** None. **J. Black:** None.

Theme J Poster

022. Neuroscience Outreach and Education (K-12)

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 022.01

Topic: J.02. Teaching of Neuroscience

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

Title: MobileMinds: a mobile approach to delivering neuroscience education to youth in the community

Authors: *N. L. BAGANZ, D. A. CINALLLI, C. O. BENNICE, R. D. BLAKELY;
Stiles-Nicholson Brain Inst., Florida Atlantic Univ., Jupiter, FL

Abstract: According to the U.S. National Report Card, two out of three middle schoolers score at or below proficiency in STEM (Science, Technology, Engineering and Math), and the statistics are even worse for low-income children who attend Title I schools. The Florida Atlantic University Stiles-Nicholson Brain Institute 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. Established in 2017, ASCEND is a broad, umbrella program that includes multiple branches, including a neuroscience mini-camp and a semester-long, after-school

program. The ASCEND teaching team is comprised of graduate student and postdoctoral neuroscience trainees who develop and deliver curriculum in the form of fun, engaging activities and lessons using a combination of in-person and online lectures; online media, podcasts, and videocasts; and virtual reality applications. The ASCEND program has been very successful in Jupiter, Florida, and we recently received funding to purchase a "brain van", allowing us to expand the program to include another branch, *MobileMinds*. *MobileMinds* is designed to take ASCEND lessons on the road to deliver directly to schools in Palm Beach County and reach students whose participation may be limited by means and/or distance to travel to Jupiter. Working in partnership with the Cox Science Center and Aquarium, *MobileMinds* incorporates elements of a $2,000,000 *Journey through the Human Brain* permanent exhibit featuring the latest neuroscience research and innovations, with high-tech displays, immersive experiences, and state-of-the-art equipment into the program. Some of the exhibit content, along with additional neuroscience games and activities developed by ASCEND fellows, has been programmed onto transportable, museum-grade, interactive touch-screen tables. In addition, using a 360-degree camera, we recently created a virtual reality lab tour that has been uploaded into a classroom VR kit, allowing a teacher to take an entire class of up to 30 students on a virtual visit to a Stiles-Nicholson Brain Institute science lab. Since its implementation in Fall 2021, *MobileMinds* has visited more than 10 Title I and charter schools and reached over 600 students and educators across east Palm Beach County. We are currently expanding our reach to visit other Title I schools in the western part of the county, where there is limited access to academic and scientific resources, including science laboratories and Science Centers.

Disclosures: N.L. Baganz: None. **D.A. Cinallli:** None. **C.O. Bennice:** None. **R.D. Blakely:** None.

Theme J Poster

022. Neuroscience Outreach and Education (K-12)

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 022.02

Topic: J.02. Teaching of Neuroscience

Support: Schmidt Futures

Title: Remote experiment-based neuroscience education enabled through the Internet of Things

Authors: *P. V. BAUDIN[1], R. SACKSTEDER[1], A. WORTHINGTON[1], K. VOITIUK[1], V. LY[1], R. HOFFMAN[1], M. A. T. ELLIOT[1], D. F. PARKS[1], R. WARD[2], S. TORRES MONTOYA[1], F. AMEND[1], N. M. DURAN[3], P. VARGAS[3], L. E. ALVARADO-ARNEZ[4], D. EHRLICH[1], Y. ROSEN[1], A. BREEVOORT[5], S. KURNIAWAN[1], D. HAUSSLER[1], M. TEODORESCU[1], M. ANDRES MOSTAJO RADJI[1];
[1]Univ. of California Santa Cruz, Santa Cruz, CA; [2]Alisal High Sch., Salinas, CA; [3]Univ. Catolica Boliviana San Pablo, Santa Cruz de la Sierra, Bolivia, Plurinational State of; [4]Franz Tamayo

Univ., La Paz, Bolivia, Plurinational State of; [5]Univ. of California San Francisco, San Francisco, CA

Abstract: Project-based learning (PBL) has long been recognized as an effective approach to teaching complex Biology concepts. However, not all institutions have the resources to facilitate effective project-based coursework for students. Whether it be due to a remote learning format, or a lack of necessary equipment in the classroom, many students lack opportunities to learn in this way. We have developed a framework for facilitating PBL using remote-controlled internet-connected microscopes. Through this approach, one lab facility can run an experiment that can be interacted with by many students around the world simultaneously. Experiments on this platform can be run on long timescales and with materials that could be dangerous to handle in a classroom. This allows students the opportunity to take part in experiments that look more like professional biology research than a classroom project. To investigate the use of this framework, we designed and ran a supplemental section to two existing courses, a high school Advanced Placement Biology course in the Central Valley of California and a university-level General Biology course in Bolivia. The students investigated the effects of retinoic acid and neurodazine treatment in cell culture models of neuroblastoma. All experiments were executed in Santa Cruz, California, with observations done remotely by the students using their personal computers and cellphones. Through this project, the students were exposed to complex concepts in experimental design, neurodevelopment, cancer biology, drug screenings, and computer programming. They generated hypotheses, performed the analysis of cell survival, migration, and morphological changes, drew conclusions, and presented their findings. In surveys gathered after the experiment's conclusion, students reported increased excitement for science and a greater desire to pursue a career in STEM. Survey results were comparable to another PBL study done with similar cohorts in an in-person setting. This framework represents a novel, scalable, and effective PBL approach that has the potential to democratize neuroscience and STEM education around the world.

Disclosures: **P.V. Baudin:** None. **R. Sacksteder:** None. **A. Worthington:** None. **K. Voitiuk:** None. **V. Ly:** None. **R. Hoffman:** None. **M.A.T. Elliot:** None. **D.F. Parks:** None. **R. Ward:** None. **S. Torres Montoya:** None. **F. Amend:** None. **N.M. Duran:** None. **P. Vargas:** None. **L.E. Alvarado-Arnez:** None. **D. Ehrlich:** None. **Y. Rosen:** None. **A. Breevoort:** None. **S. Kurniawan:** None. **D. Haussler:** None. **M. Teodorescu:** None. **M. Andres Mostajo Radji:** None.

Theme J Poster

022. Neuroscience Outreach and Education (K-12)

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 022.03

Topic: J.02. Teaching of Neuroscience

Support: DGAPA-PAPIIT IN208722
PAPIME PE306318

Title: Perception of course-based undergraduate research experience of psychology-neuroscience students: post-pandemic perspectives.

Authors: *P. TORRES-CARRILLO[1], Y. B. VIDAL-DE LA O[1], D. B. PAZ-TREJO[2], H. SANCHEZ-CASTILLO[3];
[1]Univ. Nacional Autónoma De México, Ciudad de Mexico, Mexico; [2]Univ. Nacional Autonoma de Mexico, Mexico City, Mexico; [3]Psychobiology and Neurosciences, Univ. Nacional Autonoma De Mexico. Fac Psicologia, Mexico City, Mexico

Abstract: The undergraduate research experiences (UREs) and course-based undergraduate research experiences (CUREs) are an integral component of learning for all students. Many reports show all benefits of that courses. One of those benefits is engaged students to pursue further education or science-related career or increases their interest in research training. Other studies report that UREs can attract, retain, and improve success of undergraduates in science careers. Nevertheless, the structure of UREs, in which undergraduates work hand-to-hand with researcher, postdoctoral or graduated student, limits the number of undergraduates that can participate in research. On the other hand, CUREs involve undergraduates in research activities in the context of class. This allows to undergraduates watch in first line what does a researcher do without the limits of UREs. Additionally, it is important considerate that one of challenges of this century and after pandemic conditions are involve the remote learning as a tool in neuroscience education. Also, it is important know the perception that undergraduates have about the implementation of CUREs in their academic training and if the online experience is enough or if practical experience it could be necessary for them. We organized three short face-to-face and online/distance mode CUREs and after requiring to students a self-report about them. The undergraduate reports that this type of activities are many important in their training career and it allows known, watch, and explore examples of what does researchers do. So, is necessary developing and implementation of CUREs to improve the success of undergraduate in science-related careers.

Disclosures: P. Torres-Carrillo: None. **Y.B. Vidal-De La O:** None. **D.B. Paz-Trejo:** None. **H. Sanchez-Castillo:** None.

Theme J Poster

022. Neuroscience Outreach and Education (K-12)

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 022.04

Topic: J.02. Teaching of Neuroscience

Support: NIH Grant DC007695

Title: Citizen Science Meets Virtual Reality: A Collaborative Incubator for High School Student Interest and Participation in Neuroscience

Authors: B. BARRAGAN[1], D. JACKSON[2], G. SPIROU[2], K. WHITTENBURG[1], ***J. E. OSBORNE**[1];
[1]Ector County ISD, Odessa, TX; [2]Univ. of South Florida, Tampa, FL

Abstract: A collaborative group of educators and neuroscience researchers piloted, within an existing high school neuroscience course, a public contribution to active science research, aka citizen science. The learning consisted of utilizing student-student and student-professor interactions in virtual reality (VR). Eight Ector County ISD senior students, enrolled in a neuroscience course taught by Bernadette Barragan, participated in an eight-week module to analyze 3D movies over time (4D) of neural circuit formation in the developing mouse brain. 4D data sets (100-300 GB each) were collected by the Spirou lab at the University of South Florida, copied to the hard drives of eight computers equipped with nVidia graphics processing units and VR head-mounted displays (HMD). Students were introduced to the researchers (Drs. Jackson and Spirou) and the topic of early brain development via two PowerPoint lectures delivered utilizing Zoom. Students were instructed in the use of the VR software syGlass (IstoVisio, Inc.) by Dr. Jackson and Ms. Barragan over the following two weeks. Students were then introduced to the 4D data sets by meetings in VR with Drs. Jackson and Spirou, using the Multiplayer capability of syGlass, and were assigned growth cones to track over time. Students spent the next three weeks collecting data, with feedback for quality control, and learned to export their data into Excel to analyze and plot growth cone direction and velocity. Students presented and discussed the data they collected with Drs. Jackson and Spirou during the final week with the result of the data compiled by the students contributing to the Spirou laboratory. In addition to sharing the data collected with the research lab, students were also asked to present their work to high school juniors who were considering registering for the neuroscience course. The interest in the neuroscience course has increased as evidenced by the number of neuroscience course requests. The contribution to science as well as the engaging learning platforms has shown to be a powerful engagement tool. According to the school district survey results 76.6% of students strongly agree that utilizing VR tools allows for an increase in comprehension of challenging concepts and 91.5% expressed that utilizing VR made learning fun and engaging.

Disclosures: B. Barragan: None. **D. Jackson:** None. **G. Spirou:** E. Ownership Interest (stock, stock options, royalty, receipt of intellectual property rights/patent holder, excluding diversified mutual funds); syGlass. **K. Whittenburg:** None. **J.E. Osborne:** None.

Theme J Poster

022. Neuroscience Outreach and Education (K-12)

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 022.05

Topic: J.02. Teaching of Neuroscience

Support: NIH SEPA Grant GM132961
University of Kentucky College of Medicine Office of Diversity, Equity, and

Inclusion
University of Kentucky Chellgren Endowment

Title: START program provides authentic research and training to increase sense of belonging in neuroscience and stem for underrepresented populations.

Authors: *L. H. BRADLEY[1], A. P. SINAI[2], R. RUDD[1], M. J. LAUER[3], M. MCANDREW[4], J. A. BRADLEY[4], M. MOHR-SCHROEDER[5];
[1]Neurosci., [2]Microbiology, Immunology, and Mol. Genet., Univ. of Kentucky Col. of Med., Lexington, KY; [3]STEAM Acad., Lexington, KY; [4]Integrated Success Coaching, [5]STEM Educ., Univ. of Kentucky, Lexington, KY

Abstract: The STEM Through Authentic Research and Training (START) Program is an integrated partnership bringing together academic, social, and real-world professional experiences to establish a STEM pipeline for first generation and traditionally underrepresented students into college by providing year-round authentic research opportunities and professional development for students and teachers. The disruption of in-person education, due to the COVID-19 pandemic, forced our programming to virtual content, which resulted in the program expanding and reaching more students in the community than imagined. As the possibility of in-person activities resumed, the program adopted a hybrid approach to provide content with our local school partners and beyond. This past year, nearly 800 students (START Ambassadors) were engaged with near-peer virtual and in-person demonstrations from University of Kentucky students on neuroanatomy, brain injury, Parkinson's disease, COVID-19 and immunology, nutrition, and other STEM topics. In addition, the START Program partnered with Higher Orbits to provide at home learning kits and an in-person 'Go for Launch' event, for students to learn and develop teamwork and science communication. START Apprentices continued with mentored, in-person authentic learning experiences in neuroscience, while START Teachers participated in STEM professional development. Near-peer mentors will have completed a College Reading and Learning Association (CRLA)-certified online mentor training program to provide START Apprentices insight into the college experience, academic strategies, soft skills, and available pathways, while modeling academic resilience and success. Collectively, our findings support that a sense of belonging in neuroscience and STEM is increased for high school students from underrepresented backgrounds through engagement, providing opportunity and minimizing barriers to authentic learning experiences, and trained near-peer mentoring to build a coaching-based partnership.

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Theme J Poster

022. Neuroscience Outreach and Education (K-12)

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 022.06

Topic: J.02. Teaching of Neuroscience

Title: The impact on quality of life due to post-COVID-19 sequelae

Authors: L. B. VÁZQUEZ-ELIZARRARAZ[1], D. L. ORTEGA-PANIAGUA[1], L. J. RODRÍGUEZ-HERNÁNDEZ[1], J. HERNÁNDEZ-AGUILAR[2], M. JIMÉNEZ-LEMUS[1], A. E. HERRERA-RIVAS[1], M. FERNÁNDEZ-MOYA[3], *O. A. JARAMILLO-MORALES[4]; [1]Dept. de Enfermería y Obstetricia, [2]Dept. de Enfermería y Obstetricia., Univ. de Guanajuato, Irapuato, Guanajuato, Mexico; [3]Enfermería, Univ. de Guanajuato, Irapuato, Mexico; [4]Univ. de Guanajuato, Ciudad de México, Mexico

Abstract: The SARS-COV 2 virus infection is a public health problem of great importance worldwide due to its complications and the sequelae that have occurred. It is important to mention that the main sequelae reported by COVID-19 survivors are persistent dyspnea, fatigue, insomnia, anxiety and a significant deterioration in physical and psychological functioning, resulting in a low quality of life, since physical health is closely related to quality of life. The persistence of physical and mental symptoms of COVID-19 has further challenged the concept of quality of life and likely contributes to loss of quality of life. In this context, the impact of SARS-CoV-2 infection on physical and mental health, as well as social and emotional well-being, deserves international attention, considering that at present it is not well described how the quality of life is affected in COVID-19 survivors, mainly with post-COVID-19 sequelae.

Disclosures: **L.B. Vázquez-Elizarraraz:** None. **D.L. Ortega-Paniagua:** None. **L.J. Rodríguez-Hernández:** None. **J. Hernández-Aguilar:** None. **M. Jiménez-Lemus:** None. **A.E. Herrera-Rivas:** None. **M. Fernández-Moya:** None. **O.A. Jaramillo-Morales:** None.

Theme J Poster

022. Neuroscience Outreach and Education (K-12)

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 022.07

Topic: J.02. Teaching of Neuroscience

Support: #1840
#797660
#744576

Title: Linking arts and neuroscience in advanced courses: A case report in the Universidad Veracruzana

Authors: *P. B. PENSADO GUEVARA[1], A. BARRIENTOS BONILLA[2], R. NADELLA[4], L. ZAVALA FLORES[5], D. HERNÁNDEZ BALTAZAR[3,6];
[1]Inst. de Neuroetología, Univ. Veracruzana, xalapa, Mexico; [2]Ctr. de Investigaciones Biomédicas, [3]Inst. de Neuroetología, Univ. Veracruzana, Xalapa, Veracruz, Mexico; [4]Intl. collaboration, International collaboration, India; [5]Ctr. de Investigación Biomédica del Noreste, Monterrey, Nuevo León, Mexico; [6]Investigadores e investigadoras por México, CONACYT, CdMx, Mexico

Abstract: *Introduction.* The creative process in basic and applied science involves observation, knowledge, the development of motor and cognitive skills. Encouraging the general public and academic sector with activities such as workshops, contests and artistic exhibitions allow the establishment of an efficient strategy for the public socialization of science. *Objective.* The main goal of our group in the Instituto de Neuroetología from Universidad Veracruzana, is to generate a teaching strategy focusing the concept learning regarding cellular and molecular neurobiology through artistic activities such as music, literature, drawing and painting. *Method.* From 2015 at date, we have performed 15 advanced courses and 1 workshop both in-person and in online mode. *Results.* To date, a total of 600 students have been attended, within which, some have published articles and book chapters using drawings; which evidences that they have used their skills as scientific illustrators. Furthermore, two art exhibitions, and 5 writing, drawing and painting contest were performed. *Perspectives.* Recollecting the fact that visualization is faster to learning in brain concept, linking art and neuroscience has been enriching for all scientists and students involved. However this link is required to 1) expand the coverage area to Universities that will not have art degrees, 2) collaborate with national and/or international groups with experience in evaluating the achievements of this strategy in terms of the teaching-learning process, 3) involve more teachers so that they incorporate artistic activities in their neuroscience teaching strategy.

Disclosures: P.B. Pensado guevara: None. **A. Barrientos Bonilla:** None. **R. Nadella:** None. **L. Zavala Flores:** None. **D. Hernández Baltazar:** None.

Theme J Poster

022. Neuroscience Outreach and Education (K-12)

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 022.08

Topic: J.02. Teaching of Neuroscience

Title: State of Diversity, Equity, and Inclusion in Affective Neuroscience Research Study Populations and Proposed Interventions in K-12 Education

Authors: T. SATHISH[1], *T.-T. HUANG[2];
[1]Irvington High Sch., Fremont, CA; [2]Neurol. and Neurolog. Sci., Stanford Univ., Palo Alto, CA

Abstract: Affective neuroscience is a field of study concerned with researching emotion or affect. The study is necessary to understand the physiology and neuroscience of emotions and their effects on various tasks and aspects of the functional human body. There is a wide range of research conducted in the field of affective neuroscience from studies on the emotions of schizophrenia to how racial bias is linked to emotional reasoning. Despite the requirement of inclusion in the research subjects by funding agencies in recent years, there are clear disparities in research study populations as certain socio-demographical groups are underrepresented and are not being reported in these studies. Funding agency policies have failed to distinguish between different ethnic minorities, leaving many minorities still underrepresented. Linguistic minorities and those with immigrant backgrounds have also been excluded from these requirements, and thus from research studies. Emotion regulation and expression greatly varies by people of different ethnic and cultural backgrounds, and certain patients may respond to medications differently; men may respond differently to a medication compared to women or one racial group may respond differently compared to another. Diversity in research populations is needed to ensure that the research is representative of the general populations to which it applies to. Currently, there is a lack of adequate research addressing the homogenous nature of the study populations in affective research. There is little being done to address this issue though it remains prevalent throughout the field of affective science, resulting in inaccuracies when study results may not be applicable to diverse populations. Another key observation is that the few solutions that exist to address this problem are very limited in scope and reach. These solutions only exist at the graduate level of education. The biggest problem with solutions focused on the graduate level is that this age is not the most impactful for learning. A wide range of studies have shown adolescence as a critical period for social cognition, learning, and affective development. We propose a novel intervention to address this issue on a wide scale by incorporating Diversity, Equity, and Inclusion (DEI) programs at the middle and high school level focused on not only educating students on the issue itself, but also on the field of affective science to promote more diverse students entering the field.

Disclosures: T. Sathish: None. **T. Huang:** None.

Theme J Poster

022. Neuroscience Outreach and Education (K-12)

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 022.09

Topic: J.03. Public Awareness of Neuroscience

Support: Dana Foundation Brain Awareness Week
STEM Advocacy Institute
International Brain Research Organization

Title: Simply Neuroscience: prioritizing early access to interdisciplinary neuroscience education

Authors: *C. BALUSU[1], S. TUNSIRICHAROENGUL[2], A. KRISHNAN[3], I. ATHREYA[4]; [1]Epidemiology, Columbia Univ., New York, NY; [2]Mol. and Cell. Biol., Harvard Univ., Cambridge, MA; [3]Biol., Univ. of Pennsylvania, Philadelphia, PA; [4]Psychology, Univ. of Warwick, Coventry, United Kingdom

Abstract: Neuroscience's potential stems from the youth of today – the future scientists, ethicists, technologists, artists, and clinicians who are driven to explore interdisciplinary thought and creatively confront difficult questions about the brain.
However, the field significantly lags behind other scientific domains in the quantity and quality of resources available to youth. Outside of North America and Europe, it is rare for relevant courses such as "Introduction to Neuroscience" to be offered at public schools. Not only do most neuroscience resources contain intimidating jargon, but they are hidden behind paywalls or academic institutions. Beyond this, resources do not take into account the learning needs of pre-college students, students with disabilities, and those from non-English backgrounds. The noticeable lack of early learning materials also emphasizes the need for comprehensive, accessible resources outside of the classroom.
In response, we have developed Simply Neuroscience, a student-led non-profit organization investing in young students' passion for the brain. Through diverse initiatives such as The Synapse Podcast, Humans of Neuroscience series, and Action Potential Advising Program, we help students navigate their individual "brain" journey rather than implementing a one-size-fits-all approach. We recognize that aspiring neuroscientists have different means for engaging with the field and accommodate this need by developing virtual "fireside chat" events with speakers, informal learning interviews, jargon-free visual materials, etc. Our social media post and guide series highlight intersections of neuroscience from computational systems to architectural psychology and beyond, building a welcoming atmosphere that transcends traditional learning boundaries.
Since our start in 2019, our efforts have reached 25,000 students from across 50 U.S. states/territories and 119 countries, with our social media presence gathering over 1,000,000 impressions. Now, we are working to bridge the gap between global and grassroots communities through our on-the-ground ambassador program as well as bolstering newly hybrid learning environments across the world.
Join us in pursuing the brain and unlocking the future – one neuron at a time.

Disclosures: C. Balusu: None. **S. Tunsiricharoengul:** None. **A. Krishnan:** None. **I. Athreya:** None.

Theme J Poster

022. Neuroscience Outreach and Education (K-12)

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 022.10

Topic: J.03. Public Awareness of Neuroscience

Title: The Southern California Youth Neuroscience Association (SCYNA) as a model for engaging high school students in neuroscience

Authors: N. KAUSHIK[1], D. MACCHIA[1], *E. HUBBARD[1], M. O. YASSA[2];
[1]Univ. of California, Irvine, IRVINE, CA; [2]Ctr. for the Neurobio. of Learning and Memory, Univ. of California, Irvine, Irvine, CA

Abstract: Neuroscience, with all its wonder and curiosity, is a magnet for engaging high school students in STEM, but it is rarely taught in K-12 curricula. The Southern California Youth Neuroscience Association (SCYNA) was founded in 2020 with the vision to become a platform for high school students to learn, participate, and grow as aspiring neuroscientists. SCYNA aims to achieve two goals. The first is to build a community of junior scholars who strive to further their interest and passion in neuroscience. The second is to give back to the community by fostering a fascination for the brain in the curious minds of elementary schoolchildren.
SCYNA is an entirely student-led organization, supported by the infrastructure and resources of the UC Irvine Center for the Neurobiology of Learning and Memory. This innovative support model combines institutional resources with private philanthropic fundraising as well as support from nonprofit organizations such as the Dana Foundation, and federal sponsors including NIH and NSF. SCYNA members (now over 100) regularly interact with UC Irvine faculty through dedicated seminars and workshops to learn about their research as well as career paths in neuroscience. They plan and participate in various activities including journal clubs, debates, competitions, lab tours and hands-on activities such as sheep brain dissections and neurophysiology experiments. They also design and implement innovative activities such as a Shark Tank-style competition where teams pitch their neuroscience education ideas to a panel of expert judges.
During Brain Awareness Week 2021, SCYNA hosted the inaugural SCYNA Virtual Symposium where members presented brief lectures on neuroscience topics to an audience of over 150 community members. The week culminated in SCYNA's NeuroArt Competition, a national contest that beautifully integrated neuroscience with the arts. The colorful results offered a window into the various ways neuroscience inspires awe in inquisitive minds. Overall, SCYNA is a powerful demonstration of how youth's creativity, passion and drive can be harnessed to build an effective and sustainable vehicle for community education and outreach.

Disclosures: **N. Kaushik:** None. **D. Macchia:** None. **E. Hubbard:** None. **M.O. Yassa:** None.

Theme J Poster

022. Neuroscience Outreach and Education (K-12)

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 022.11

Topic: J.03. Public Awareness of Neuroscience

Title: The USA national brain bee championship

Authors: *N. MYSLINSKI;
Neural and Pain Sci., Univ. of Maryland Dent. Sch., Baltimore, MD

Abstract: The Fifteenth USA Brain Bee Championship was hosted this year by the University of Maryland in Baltimore. The 2022 USA Champion is Anmol Bhatia representing the Newark, New Jersey Chapter coordinated by Dr. Steve Levison. The Brain Bee is a neuroscience competition for teenagers, ages 13 to 19 years of age. Each Brain Bee Chapter conducts a competition in the winter involving many schools. Forty-four Chapter winners from 31 states then competed in the USA Championship in the spring to test their knowledge of the human brain including such topics as intelligence, emotions, memory, sleep, vision, hearing, sensations, Alzheimer's disease, Parkinson's disease, schizophrenia, addictions and brain research. The competition involved nine subtests, including Neuroanatomy, Neurohistology, General Neuroscience, Neuropathology, Neuropharmacology, Patient Diagnosis, Neuroscience Methods, Neuroscience History and Everyday Applications. It was a remote, proctored, paper & pencil, multiple choice exam with 130 questions. The top 10 Chapters were: 1. Newark, NJ. 2 Tie: Harrisonburg, VA and Miami, FL, 4. Los Angeles, CA, 5. St. Louis, MO, 6. Indianapolis, IN, 7. Princeton, NJ, 8. Chapel Hill, NC, 9. Hayward, CA, and 10. Hershey, PA. USA Champion Anmol Bhatia then represented the United States in the virtual World Brain Bee Championship the summer of 2022. The 2023 USA Championship will be held in-person at the University of California in Irvine.

Disclosures: N. Myslinski: None.

Theme J Poster

022. Neuroscience Outreach and Education (K-12)

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 022.12

Topic: J.03. Public Awareness of Neuroscience

Support: IBRO

Title: Taking - Neuroscience at home - to school

Authors: E. MICHELSTAEDTER, L. F. JAIMES, *G. S. PEREIRA;
Univ. Federal de Minas Gerais, Belo Horizonte, Brazil

Abstract: The Brain Awareness Week (BAW) has been implemented in Belo Horizonte, Brazil, by our laboratory, since 2015 and plays the important role of bringing neuroscientists and lay people together. In the 2021 edition, due to COVID-19, BAW activities were conducted entirely

online, bringing up the challenge to elaborate interactive tasks in a virtual setting. On the other hand, a positive outcome from online activities was the possibility to organize joint initiatives with the Colombian Universidad de Santander (UDES). Teams from both countries, Brazil and Colombia, compiled the most common experiments carried out during the in-person BAW and created a booklet for children entitled: Neuroscience to do at home (in Portuguese and Spanish). The booklet comprehends 6 practical experiments and a game in which the functioning of human senses and memory, and the neuropathology of the most prevalent diseases are addressed. The booklet was made available in our website, which prevented us from being able to estimate its reach. Therefore, we asked whether offering it as an official pedagogical material would increase its use and application. To address that, we prepared a manual for teachers, in which the experiments from the booklet were associated to at least one of the general competences foreseen by the Brazilian Common National Curriculum Base. In addition, an audiovisual material is being produced so that the practice, explanation and deepening of each part of the booklet reaches students in a general and inclusive way. Our intent is to produce a pedagogical material in Portuguese and Spanish to be applied in Brazil and Colombia to enforce educational practices that nurture scientific reasoning. Financial support: IBRO, Dana Brain Awareness Week Grant.

Disclosures: E. Michelstaedter: None. **L.F. Jaimes:** None. **G.S. Pereira:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.01

Topic: J.02. Teaching of Neuroscience

Title: Assessment of a Pre-Health Program for Undergraduate Students at the University of California, Irvine

Authors: *A. C. NICHOLAS[1], J. TRAN[3], L. MELLER[2], J. TAM[2], V. LE[2];
[1]Univ. of California Irvine, [2]Univ. of California, Irvine, Irvine, CA; [3]Neurobio. & Behavior, Universtiy of California, Irvine, Irvine, CA

Abstract: This project investigates the effectiveness of group learning in an undergraduate pre-health major. Our goal is to assess learning outcomes and student sentiment regarding the implementation of group work in a highly enriched course. Student learning outcomes on course subjects were assessed by quizzes administered before and after participation in three courses: Intrinsic Diseases, Extrinsic Diseases, and Diseases of the Nervous System. Data was analyzed using T-test, Cohen's D and Hake's G. Thus far, findings revealed a 17.3% (t-test: $p<0.001$, Cohen's D: 1.43, Hake's G: 0.302) and 14.9% (t-test: $p<0.001$, Cohen's D: 1.45, Hake's G: 0.266) increase in content learning for the first two courses respectively (data analysis for the Spring quarter is ongoing). Similarly, pre- and post- course surveys were administered to gather opinion data on the effectiveness of group work. These surveys aimed to capture changes in student perceptions after working intensively with fellow peers on Human Biology writing

assignments, in-class activities, and group presentations. Combined results from the sentiment survey revealed that student opinions towards group work became more positive following course participation. As the major employs senior learning assistants, we also assessed ways that undergraduate mentorship responsibility influences opinions about personal growth and skills. In addition, as active learning in the major involved medical case study presentations, we assessed students over the series for improvements in: use of medical and scientific terminology, group communication, professionalism, critical thinking, medical knowledge and approach to diagnosis. Videos at the beginning of the first and third quarters of mini medical case exams were scored to assess student development. Senior students returned to the class, posing as patients and presenting with a variety of symptoms. Major students were asked to approach the patient in order to discern a diagnosis. Students' approach to diagnoses were recorded and are currently being scored individually by four research team members. This study aims to present an assessment model of instructional design and iterative improvement for other institutions with growing pre-health and neurobiology major programs.

Disclosures: **A.C. Nicholas:** None. **J. Tran:** None. **L. Meller:** None. **J. Tam:** None. **V. Le:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.02

Topic: J.02. Teaching of Neuroscience

Support: A&S Summer Research Fellowship (MW)
Chellgren Fellowship (RLC)
Department of Biology, University of Kentucky

Title: Developing an ACURE to investigate the effects of iron on physiological processes

Authors: *M. WAGERS[1], A. STARKS[2], R. L. COOPER[3];
[1]Univ. of Kentucky, Univ. of Kentucky, Whitewright, KY; [2]Biol., [3]Univ. of Kentucky Dept. of Biol., Univ. of Kentucky, Lexington, KY

Abstract: To engage college students in research and STEM, we have utilized an authentic course based undergraduate research experience (ACURE) approach through a focused research project. Involvement in the design and implementation of an experiential paradigm promotes student creativity and encourages classroom engagement. Emerging research has repeatedly demonstrated that overexposure to iron in humans can lead to acute cardiovascular disorders and a series of symptoms related to neurological disorders. Thus, in the present class project we chose to study the effects of iron on behavior, neural function and cardiovascular physiology of Drosophila melanogaster larvae and neurobiological concepts in crayfish (Procambarus clarkii) and blue crab (Callinectus sapidus) models to gain a multifaceted understanding of iron overload.

Students first examined larval D. melanogaster development and behavior when exposed to various concentrations of dietary iron. Iron potentially blocks voltage gated ionic channels; thus, students also studied the effect of iron on D. melanogaster heart rate and synaptic transmission at neuromuscular junctions of D. melanogaster and crayfish. Finally, students studied the effect of iron on sensory neural activity in the chordotonal organ of C. sapidus in response to extension at the joint. Throughout the course, our student driven authentic research approach is aimed at promoting student engagement, fostering a deeper understanding of the scientific process, and expanding knowledge in clinical and basic research.

Disclosures: M. Wagers: None. **A. Starks:** None. **R.L. Cooper:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.03

Topic: J.02. Teaching of Neuroscience

Support: NSF 1624104

Title: Impacts of role playing case studies on student success in undergraduate neuroscience courses

Authors: *J. C. WILHELM;
Col. Charleston, Col. of Charleston, Charleston, SC

Abstract: Case-based instructional methods have been shown to help students increase retention of information by requiring students to critically analyze and apply their knowledge to novel situations. They can also be powerful tools to help students role play various identities. In a series of short case studies developed for three 300-level neuroscience courses (pharmacology, cellular and molecular neuroscience, and systems neuroscience), students were asked to role play and imagine themselves as physicians, research scientists, forensic examiners, and emergency medical technicians as they attempted to discern the important facts in each case and answer critical thinking questions. For example, when asked to think of themselves as a neurologist, students noted clinical symptoms exhibited by a patient, decided on neurological or lab tests to perform, and interpreted the results of neurological and lab test results. In the role of the neuroscientist, students read primary scientific literature and designed laboratory experiments to help them solve each case. The goal of this approach was to allow students to evaluate the cases from diverse points of view and encourage discussion among students about their differing opinions, leading to a deeper understanding of the content. After completing case studies that required role playing and ones that did not, students were surveyed on multiple items including their confidence in the understanding of the material as well as their feelings about pursuing a future career in the role that they played in the case. Student ratings of confidence in their abilities to successfully complete the case or their abilities to have a career in science field were

lower among some groups of students after the role playing case studies than after experiencing a case study that did not ask the student to imagine themselves in a particular role. Preliminary results suggest an interaction with race, ethnicity, and gender in how students responded to various types of cases. Further research is necessary to understand the consequences of using role playing case studies with students with various identities.

Disclosures: J.C. Wilhelm: None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.04

Topic: J.02. Teaching of Neuroscience

Support: NSF RCN-UBE 1624104

Title: Teaching neuroscience using case studies of famous artists

Authors: *K. K. O'TOOLE, K. E. FRENZEL;
Emory Univ., Atlanta, GA

Abstract: The use of Case Studies and Problem Based Learning is an educational approach that uses stories as the launching point for guiding student inquiry, dialogue, and critical thinking. Here, I present an undergraduate neuroscience course that uses Case Studies of famous artists to teach core concepts and introduce process skills. Highlighted materials include [1] an experiential activity about Claude Monet, which introduces students to the anatomy of the eye and the pathophysiology of cataracts; and [2] a case study that uses primary sources (family letters, paintings, etc.) from the life of Vincent Van Gogh, which leads students through a discovery of psychological disorders. Finally, I present several adaptations to the course that made this material accessible to non-major freshmen vs. upper division neuroscience majors and at Emory University in Atlanta, GA USA vs. in a study-abroad setting taught in France. Student learning was assessed in several ways including traditional quizzes and both formative and summative writing assignments. Students had low stakes journal writing prompts each class and choose two topics for blog posts that incorporated the primary literature and are published online (https://scholarblogs.emory.edu/artsbrain/posts/). Students were highly engaged in class activities, for example in one semester specifically for the Monet cataract activity, I recorded positive experiences from 24/25 students, with 1 neutral experience. Participation as a Neuroscience Case Network Fellow (NSF RCN-UBE 1624104) provided support to create course materials that are also in preparation for submission to JUNE.

Disclosures: K.K. O'Toole: None. **K.E. Frenzel:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.05

Topic: J.02. Teaching of Neuroscience

Title: Connecting science to social justice: a mirror neuron case study adaptable to recruitment events and introductory and upper-level courses

Authors: *K. WIENS, G. SEMPREBON;
Bay Path Univ., Longmeadow, MA

Abstract: The goal of this project is to create culturally relevant course content as part of a system to increase recruitment and retention of African American/Black, Hispanic/Latino(a) and Native American/Alaskan Native students in neuroscience. Course content that directly relates to values and experiences of a diverse range of students can create a more inclusive environment within the classroom that helps link science identity to racial identity. We have created a case study using three short readings related to mirror neurons, mini group discussions and an activity that allows student groups to 1) identify a social justice issue that could relate to mirror neuron activity, 2) develop a program to counteract bias related to their chosen issue, 3) pitch their idea to the class and 4) further develop their initial idea or join a different group based on their interests. We have incorporated this case study into multiple introductory and upper-level neuroscience courses, and we have also used it as a recruiting tool during a yearly scholarship competition held for high school seniors. Student response to this case study has been overwhelmingly positive at our small, diverse, all-women's institution.

Disclosures: K. Wiens: None. **G. Semprebon:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.06

Topic: J.02. Teaching of Neuroscience

Support: NSF RCN-UBE grant #1624104

Title: Creating neuroscience: A multifaceted case study

Authors: *J. M. OGILVIE;
Biol., St. Louis Univ., St. Louis, MO

Abstract: A growing body of research has demonstrated that case studies increase student engagement, motivation, and self-confidence. Notably, case studies have been found to be particularly beneficial for women and minority students that are underrepresented in scientific professions. A new case study will be presented that weaves animal behavior together with the history and process of creating neuroscience as well as diversity and equity in neuroscience. The narrative focuses on a graduate student who is working with her mentor to prepare a review article on neural mechanisms in animal behavior that will incorporate historical background. In addition, she is working with an undergraduate preparing an independent research project. In this four-part case study, students will gain insights into the process of science as they develop their own hypotheses and grant proposals followed by peer review, modeled after NIH or NSF panels. Students will read and critically evaluate primary literature by Charles Turner, the first Black to earn a PhD from University of Chicago, and Nobel Laureate Nikolaas Tinbergen. Similarities in their approaches are discussed, providing an opportunity for discussion of structural barriers and how they can be addressed. Learning objectives for students completing this case study include (1) the ability to synthesize information to formulate a well-developed hypothesis; (2) the ability to create and critically evaluate an experimental design; (3) the ability to explain where scientific knowledge comes from, how it is constructed, and changes over time; (4) an increased ability to critically read primary scientific literature; (5) increased knowledge of animal homing behavior; and (6) an increased awareness of the different kinds of people that contribution to the body of neuroscientific knowledge. Direct and indirect assessment measures demonstrate effectiveness in achieving the learning objectives and enthusiasm for the case study approach.

Disclosures: J.M. Ogilvie: None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.07

Topic: J.02. Teaching of Neuroscience

Support: NSF RCN-UBE grant #1624104

Title: Blind or binding? Exploring visual perception through a case study on Balint's syndrome in an undergraduate neuroscience course.

Authors: *D. G. EHLINGER;
Psychological Sci., Univ. of Wisconsin-River Falls, River Falls, WI

Abstract: Balint's syndrome is a severe neuropsychological disorder affecting spatial attention that can result from bilateral parietal lobe damage. In this interrupted case study designed for use in upper-level undergraduate neuroscience courses, students assess the symptomology of this condition and build on prior knowledge of dorsal versus ventral stream visual functions. Throughout this case, students must generate evidence-based hypotheses regarding the location

of a subject's visual system lesion by sequentially assessing symptomology, results of visual field, object recognition and spatial attention testing, and published primary research data regarding the role of the parietal lobes in object feature binding. By the end of this case study, students develop understanding of basic concepts in visual object recognition and attention, the symptomology of Balint's syndrome, and gain insight into how the dorsal and visual streams work together for visual perception. This case study was assessed for achievement of learning outcomes and quality of student experience over several semesters following implementation in an upper-level sensory neuroscience course taught in an asynchronous online format. However, this case has also been successfully implemented in an in-person classroom, and strategies for successful implementation in either format are presented. Acknowledgements: The authors would like to thank the Neuroscience Case Network for their valuable discussions and comments.

Disclosures: D.G. Ehlinger: None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.08

Topic: J.02. Teaching of Neuroscience

Title: Three case studies to teach anosmia causes and outcomes to introductory neuroscience students in large or small classes

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

Abstract: Neurobiology ZOO3744 is our introductory neuroscience course in the Burnett School of Biomedical Sciences at the University of Central Florida (UCF). I have taught the class in the fall and spring, with class sizes ranging around 250-300 undergraduates for the regular class and 16-22 undergraduates for the honors class. Students ranged from first semester at UCF to seniors. The mode of instruction has varied from face-to-face/mixed mode, virtual, and hybrid, where I taught the class live in the classroom (mixed mode) and simultaneously on Zoom. In our chapter on the chemical senses, I developed three case studies to help students learn about anosmia, with causes including physical damage to the cribriform plate, traumatic brain injury (TBI), and coronavirus-19 (COVID-19). Two of the case studies were developed from medical reports in the literature: cribriform plate damage (Mueller and Hummel (2009) J Med Case Reports) and COVID-19 (Cecchini et al. (2021) Neurological Sciences). The traumatic brain injury case study was fictional, created be me. Full case studies and questions will be shared at the poster. Each case study began with a situation, and then students were asked analysis questions about the diagnosis, imaging needed, cause, mechanism, etc. Case studies were given to the class ahead of time. During class, students worked in small groups or breakout rooms online to discuss the answers to the questions. We then discussed the answers as a large group. At the end, we

discussed the impact of anosmia on a person's life and the lower overall satisfaction with life that they may experience. Student chapter and final exam performance related to smell or COVID over multiple semesters will be compared, and responses were variable. For the final exam, students had great retention of the timing of loss of smell with COVID and that it can be a long-term symptom but struggled with remembering the cell type that COVID-19 infected in the nasal epithelium, which I will emphasize more in the future. Students were given an optional anonymous feedback survey at the end of the class that would give them 2% extra credit on their final exam. From the survey in spring 2022, 84% of students reported that case studies were extremely effective, very effective, or moderately effective in helping them learn the material. 82% of students were extremely likely or somewhat likely to recommend to include the class activities, which included case studies, in the course in the future. When asked what they really liked about the course, case studies were mentioned several times. These case studies can be easily accomplished in both large and small classrooms, in both face-to-face and online modes of instruction.

Disclosures: A.L. Hawthorne: None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.09

Topic: J.02. Teaching of Neuroscience

Title: Can I have my CURE and publish, too?: Pros and cons of integrating a faculty member's behavioral neuroscience research project using rats into a course-based undergraduate research experience.

Authors: S. J. TERRILL[1], J. P. TABORDA[1], L. A. SCHIER[2], ***C. M. MATHES**[1];
[1]Neurosci., Baldwin Wallace Univ., Berea, OH; [2]Biol. Sci., USC, Los Angeles, CA

Abstract: Course-based undergraduate research experiences provide documented benefits; however, they require more time and effort than traditional labs. Here we sought to integrate an authentic project from a faculty's research program into an undergraduate behavioral neuroscience lab course. Our goals were to 1) generate publishable behavioral and neurobiological data and 2) foster engagement and learning in our students. Our study sought to evaluate indicators of reward in response to taste stimulation. We hypothesized that appetitive orofacial responses (e.g., taste reactivity [TR]) and nucleus accumbens (NAc) Fos expression in rats would occur after oral infusions of the sugar fructose (1 ml of 0.6 M across 1 min) at levels similar to that seen after oral infusions of the sugar sucrose (0.3 M), both of which would produce higher TR and Fos than that seen after water infusions. During the weekly 3-h lab sessions across a 16-week semester, the students (n=6) reviewed the literature and approved IACUC, engaged in procedures involving rat handling, surgery, intraoral infusions, perfusions, and immunohistochemistry (IHC), and performed statistical analyses, graphing, and presentation

of the data. The students quantitatively scored TR from recordings taken during the in-class infusions (n=15), plus those from a previous experimental iteration (n=13), as well as qualitatively ranked NAc Fos expression in brain slices from the previous iteration; problems with IHC performed in the lab prevented analysis. We observed high student engagement with surgery and IHC, but low engagement with procedures involving awake rats and behavioral assessment. The data as quantified by the students were highly variable, making it difficult to assess validity. Nevertheless, statistical analysis of the most consistent student data sets supported our hypotheses. Students reported skill building and appreciation of the opportunities, including that to present a poster at a campus-wide event, but efficacy of learning remains to be assessed. By using the time dedicated to the lab session, we were able to perform authentic behavioral and neurobiological procedures and collect data beneficial to the faculty member's research program. However, the student quantification of these data may not be usable, and it remains unclear whether student learning was higher due to their engagement in this research than it would have been in a less authentic project. Intertwinement of faculty research and student learning provided some tangible benefits and maximized the utility of rat subjects used in teaching, and in future iterations, we seek to assess benefits to a larger student enrollment.

Disclosures: S.J. Terrill: None. **J.P. Taborda:** None. **L.A. Schier:** None. **C.M. Mathes:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.10

Topic: J.02. Teaching of Neuroscience

Support: Emory University CFDE FIT grant
NSF 1624104
NIH NS129168
NIH ES012870

Title: The case of the marble burying mice is an effective problem based learning case for teaching adrenergic receptor neurochemistry.

Authors: A. F. IANNITELLI[1], *L. A. ROESCH[2];
[1]Human Genet., [2]Emory Univ., Atlanta, GA

Abstract: Active-learning pedagogy is beneficial for undergraduate neuroscience education, and previous reports indicate increased learning and retention in an active classroom. One such method, Problem Based Learning (PBL), is an active learning method that encourages students to explore core concepts by solving open-ended cases in small groups. Using PBL as the primary framework, we developed a novel case study for the advanced Neurochemistry elective in the Neuroscience and Behavioral Biology (NBB) major at Emory's College of Arts and Sciences.

Rather than focusing on a clinical anomaly, this case provides students with the perspective of a graduate student researcher investigating a mouse model of anxiety. As students work through the case, they explore the structure and function of adrenergic receptors in the brain, and how drugs that bind these receptors have downstream effects on animal behavior. They use this information to develop new, testable hypotheses for follow-up experiments to the case. Here, we present learning objectives and assessment data from two cohorts of students. Overall, students reported enjoying the case and demonstrated mastery of the learning objectives.

Disclosures: A.F. Iannitelli: None. **L.A. Roesch:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.11

Topic: J.02. Teaching of Neuroscience

Title: Familiarity with use of primary literature sources may lead to improved writing overall

Authors: *A. PACK;
Utica Univ., Utica, NY

Abstract: In an undergraduate neuroscience course for occupational therapy majors (200-level, "neuroanatomy and neurophysiology"), most students in the cohort have not had previous experience writing term papers based on primary science literature. Previously, we have documented interventions that were successful at increasing students' comfort and familiarity with the primary literature, measured in part by number of correct/incorrect citations, and number of direct quotes. Here, we examined if comfort with the primary literature may result in increased comfort with the assignment overall, resulting in better writing overall. The cohort (32 students) was split randomly into two groups, who received either specific exercises to increase confidence using primary literature ("literature" group), or exercises to review lecture material ("exam" group). Students, as in other years, were asked to write a ~3,000 word paper on a neuroscience topic of their choice, and instructed to base their papers on the primary literature. First drafts of the papers were forwarded to a humanities (communication) professor who was blind to both treatment, and author identity. Papers were graded on a scale of 1-5 using a rubric for Voice, Clarity, and Style. Attempts to grade based on Logic/strength of Argument were complicated by the blind grader's lack of familiarity with the subject matter and those results were discarded. Students who received "literature" exercises scored higher as a group in all three categories (two-tailed t test). Since that group received no additional training in writing that could account for the difference, we conclude that the more competent writing is a result of comfort with the assignment.

Disclosures: A. Pack: None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.12

Topic: J.02. Teaching of 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], I. A. HARRINGTON[4], A. CECALA[5], A. C. NICHOLAS[6], C. F. GAVIN[7], K. E. FRENZEL[8], L. A. ROESCH[9]; [1]Biol., Lafayette Col., Easton, PA; [2]Biomed. Sci., New York Inst. of Technol., Old Westbury, NY; [3]Neurobio. and Behavior, Cornell Univ. Neurobio. and Behavior, Ithaca, NY; [4]Augustana Col., Rock Island, IL; [5]Univ. of Western Ontario, London, ON, Canada; [6]Neurobio. & Behavior, Univ. of California, Irvine, Irvine, CA; [7]Neurobio., Univ. of Alabama, Birmingham, Birmingham, AL; [8]Neurosci. and Behavioral Biol. Program, [9]Neurosci. & Behavioral Biol. Program, Emory Univ., Atlanta, GA

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 articles addressing a wide range of topics focusing on innovation and best practices in undergraduate and graduate neuroscience education. These include course design and student assessment; laboratory exercises using animal models and simulations; instructions for production of inexpensive, high-quality and sophisticated lab equipment; outreach and service-learning activities; and opinion pieces and editorials on issues of general concern for neuroscience education. The features “Amazing Papers” in neuroscience and “Case Studies” are curricular tools that engage students by providing narrative context to core neuroscience principles. JUNE manuscripts also review media and print teaching resources for both classroom and laboratory teaching. Recent highlights include important discussions of curricula and professional development, particularly on the development of online/remote teaching over the last few years and diversity, inclusion and equity. JUNE seeks submissions in any of the above areas and formats. 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. **I.A. Harrington:** None. **A. Cecala:** None. **A.C. Nicholas:** None. **C.F. Gavin:** None. **K.E. Frenzel:** None. **L.A. Roesch:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.13

Topic: J.02. Teaching of Neuroscience

Title: Reviewing Evidence for Science Fiction as an Educational Tool to Improve Learning Outcomes in Neuroscience

Authors: *A. RATNAKAR;
Boston Univ., Boston, MA

Abstract: Research evaluating student reflections on Science Fiction Prototyping (SFP) assignments shows science fiction improves learning outcomes in STEM university students [8]. Impact of science fiction on neuroscience education has not been the subject of a review. We conducted a literature review for evidence that science fiction as an educational tool improves learning outcomes in neuroscience. We constructed a rubric, each category evaluating an aspect of the relationship between neuroscience, education and science fiction. Search terms ("Neuroscience and Science Fiction," "Diversity in Science Fiction," "SciFi Influence on Neuroscience", "Entertainment influence on Perception of STEM", "Media representation of Neuroscience", "Science Fiction STEM Education," "Neuroscience Career Paths and Trends") were established for the categories. Results were ranked with Google Scholar relevance rankings, the first 10 ranked articles per search scored with the rubric. For some categories, 2 searches were conducted. Our methods yielded 80 results. After removal of repeated articles, we had 77 publications, publication years 1988 to 2022. Each scored as 0 to 5 per category, 0 being irrelevant and 5 being highly relevant. 5 peer review publications scored 5 in our "Science Fiction in Neuroscience Education and Research" category. A paper uses science fiction to teach neuroimaging research into empathy [1]. An essay collection evaluates how "neurofiction" applies to fields of study [4]. A book discusses how science fiction predicts neuroscience developments [6]. A qualitative study examines how science fiction inspires developments Silicon Valley investors fund [2]. Another book discusses influence science fiction has on neuroscience research [7]. Science fiction themes stem from neuroscience research, giving science fiction power to shape sociocultural opinions of neuroscience. [10] With this bidirectional influence, evidence of science fiction's role in improving learning outcomes for STEM students and proposals for using science fiction in education [3][5][9] our conclusion is more research is needed and we include a suggestion to utilize SFP in neuroscience.

Disclosures: A. Ratnakar: None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.14

Topic: J.02. Teaching of Neuroscience

Title: Portable, Low-Cost Laboratory Exercises for Investigating both Wave and Event-Related Electroencephalogram Potentials Increases Undergraduate Interest in Neuroscience

Authors: G. J. GAGE[1], *A. P. STEINER[2];
[1]Backyard Brains, Ann Arbor, MI; [2]Psychology, Minnesota State Univ., Mankato, MN

Abstract: Electroencephalography (EEG) has given rise to myriad new discoveries over the last 90 years. EEG is a non-invasive technique that has revealed insights into the spatial and temporal processing of brain activity over a large number of neuroscience disciplines including sensory, motor, sleep, and memory formation. However, most undergraduate students lack laboratory access to EEG recording equipment or lack the skills to perform an experiment on their own. Here, we provide easy-to-follow instructions to measure both wave and event-related EEG potentials using a portable low-cost amplifier (Human Spikerbox, Backyard Brains, Ann Arbor, MI) that connects to smartphones and PCs. Using open-source software (Spike Recorder) and analysis tools (Python, Google Colaboratory) we demonstrate tractable and robust laboratory exercises for students where they can gain insights into the scientific method and discover multidisciplinary neuroscience research.
We tested two laboratory exercises in three, different undergraduate psychology courses at Minnesota State Unviersity, Mankato for a total of 31 participants. First, we analyzed power differences in the alpha band (8-13Hz) when participants alternated between eyes open and eyes closed states. We found students could robustly see an alpha power increase during eyes closed, suggesting this would make a reliable introductory experiment. Next we describe an exercise that uses the SpikerBox to evoke an event-related potential (ERP) during an auditory oddball task. In classrooms, this P300 exercise worked well with 96.1% of respondents stating they could see a difference in the oddball and standard event averaged signals. Specific knowledge of this ERP also increased with 84% reporting they had a better understanding of what the P300 means. Finally, 96.1% of students stated they had increased their interest in neuroscience after the lab. These laboratory exercises cover the two methods of analysis (frequency power and ERP) which are routinely used in neurology diagnostics, brain-machine interfaces, and neurofeedback therapy. Arming students with these methods and analysis techniques will enable students to investigate variants of this laboratory exercise or test their own hypotheses.

Disclosures: **G.J. Gage:** E. Ownership Interest (stock, stock options, royalty, receipt of intellectual property rights/patent holder, excluding diversified mutual funds); Co-founder and co-owner of Backyard Brains, Inc., a company that manufactures and sells equipment used in this study.. **A.P. Steiner:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.15

Topic: J.02. Teaching of Neuroscience

Support: Google, in kind support for coding study

Title: Open science for education: Leveraging open resources from the Allen Institute to teach neuroscience concepts and skills

Authors: K. CASIMO;
Allen Inst., Seattle, WA

Abstract: The Allen Institute is a biological sciences nonprofit research institute with focus research areas in neuroscience, cell biology, and immunology. The Institute practices open science, releasing data, analysis tools, and other resources publicly, which are largely used for research applications. The Allen Institute education program leverages these open resources to provide students with unique learning opportunities that use research-grade data and tools to give exposure to cutting-edge science and enable fully virtual or hybrid research experiences. Resources are primarily aimed at the college level, with some suitable for high school as well. All program resources are available at alleninstitute.org/learn.
The signature resource of the education program is a series of open educational resources (OERs) developed at the Allen Institute that use open data to support learning experiences at a variety of scales and levels of complexity. Additional OERs developed by external educators are also featured. Other resources include webinars for educators demonstrating the scientific background and activities from the OERs, webinars for students on science careers, and additional classroom resources.
The OERs focus on using the open data and tools to provide interactive, meaningful experiences for students. These low cost, highly scalable learning experiences require only a computer and internet connection, which are far more widely available than access to lab spaces. The program supports equity in science education through expanding access to meaningful learning and research opportunities. For example, our Neurons: Beyond the Textbook OER, developed in partnership between the education program and the Allen Institute for Brain Science morphology research team, introduces students through foundational concepts in neuron morphology and specific research skills in neuron digital reconstructions and quantification. Our Exploring Pathways in the Brain OER supports students through an activity that develops their understanding of the relationship between gene expression and brain region function and guides them through an experiment using the Allen Mouse Brain Connectivity Atlas. We are also investigating the impact of using code vs. an online GUI for data analysis on student learning outcomes using variants on this lesson.
In summary, the Allen Institute education program extends the impact of the Institute's open science into education. Program resources such as OERs and webinars support unique, meaningful, high-impact learning experiences for students.

Disclosures: K. Casimo: C. Other Research Support (receipt of drugs, supplies, equipment or other in-kind support); Google.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

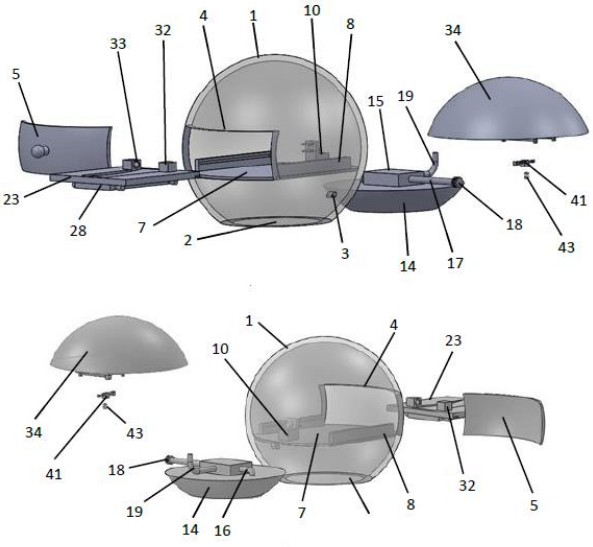
Program #/Poster #: 023.16

Topic: J.02. Teaching of Neuroscience

Title: Automated portable stereotaxic device for surgery training

Authors: *R. BELTRAN-RAMIREZ[1], J. MARTINEZ-MENDOZA[2], M. MACIEL ARELLANO[2], V. LARIOS-ROSILLO[2], J. ORIZAGA TREJO[2], J. DOMÍNGUEZ- RAMIREZ[2], X. BECERRA-GONZÁLEZ[2], X. JIMENEZ ROMAN[2];
[1]Univ. de Guadalajara, Zapopan, Mexico; [2]Univ. De Guadalajara, Zapopan, Mexico

Abstract: The teaching of neurosciences today is a multidisciplinary work that is why innovation in technology is of utmost importance so that new students can improve their learning process in a more efficient and less costly way using simulation techniques and equipment. that allows you to visualize important parameters in the process The present invention describes an automated portable stereotaxic device that has a light and easily transportable structure, which allows interventions to be carried out anywhere, in addition to its spherical crest shape, it is possible to maintain safety inside the device, another One of the characteristics of the present invention is that it can be operated remotely from any type of intelligent device, allowing contamination to be eliminated from the outside to perform surgeries free of infection, in addition to the fact that by remote programming it is possible to establish the parameters operation of the device, including the extraction of the plate to place the animal to be operated on, its introduction and the operation of the intervention instruments, performing the surgery automatically. The automated portable stereotaxic device also has an anesthetic solution container that is manipulated from the outside, which allows the animal inside the device to be sedated without having contact with it. It also has the characteristic of monitoring in real time the vital signs of the animal that is in the intervention.



Disclosures: **R. Beltran-Ramirez:** None. **J. Martinez-Mendoza:** None. **M. Maciel Arellano:** None. **V. Larios-Rosillo:** None. **J. Orizaga Trejo:** None. **J. Domínguez- Ramirez:** None. **X. Becerra-González:** None. **X. Jimenez Roman:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.17

Topic: J.02. Teaching of Neuroscience

Support: College of A&S University of Kentucky (KEB)
Summer Research Fellowship in Neuroscience (KEB)
Chellgren Fellowship (RLC)
Department of Biology University of Kentucky

Title: Developing an understanding in measurement techniques to monitor bioelectricity and changes in electrical signals due to physiological perturbations.

Authors: *K. BROCK[1], M. THOMAS[1], D. MCLETCHIE[2], R. L. COOPER[3];
[2]Biol., [3]Univ. of Kentucky Dept. of Biol., [1]Univ. of Kentucky, Lexington, KY

Abstract: To introduce college students majoring in biology and neuroscience to concepts in bioelectricity, we developed an engaging, interactive and inquiry-based laboratory protocol. The standard differential electrical measure, commonly used for measuring membrane potentials in animal cells, detects a voltage differential between the recording lead and ground lead using an intracellular glass microelectrode. The other technique implements an impedance measure used to detect a change in electrical field by measure the resistance of the plant tissue being recorded. To demonstrate these concepts, we begin by measuring electrical signals among plants using two different techniques. To invoke an electrical response in a plant, a mechanical movement of a leaf or an injury to a leaf is imposed. After demonstrating such concepts in plants, a field potential with surface electrodes is used on student participants to record either an EMG, EEG or ECG while maneuvering the associated organ. This is then followed with intracellular recordings of crayfish muscle while altering either temperature or external potassium concentration. We then discuss how these electrophysiological events occur by introducing the Nernst and Goldman-Hodgkin-Katz equations which model the ionic driven gradients illustrated in the recordings. After these directed experiments, the students then develop inquiry-based research questions regarding these preparations and techniques for independent projects. The labs have been modified to be used in plant and neuro- physiology classes.

Disclosures: **K. Brock:** None. **M. Thomas:** None. **D. McLetchie:** None. **R.L. Cooper:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.18

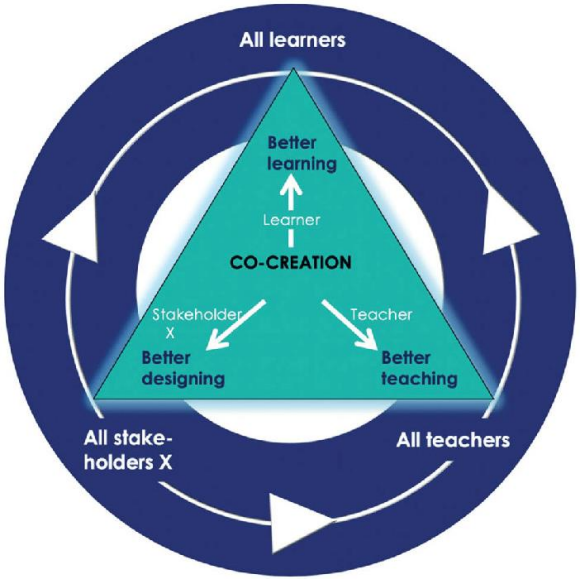
Topic: J.02. Teaching of Neuroscience

Support: Ministry of Education, Singapore, MOE TRF, MOE2016-2-TRP01
Yong Loo Lin School of Medicine, METE funding

Title: Learners' Involvement in co-creating and collaborative knowledge building in developing an educational tool, virtual integrated patient

Authors: *J. C. G. SNG[1], J. K. LEE[2], K. LEONG[2], T. W. ONG[2], J. KONG[1];
[1]Dept. of Pharmacology, Yong Loo Lin Sch. of Med., [2]Yong Loo Lin Sch. of Med., Natl. Univ. of Singapore, Singapore, Singapore

Abstract: Successful learning involve the interplay of multiple processes, ranging from cognitive, affective, social environmental and metacognitive domains. Given its complexity and cognition load theory helps to address issues observed in medical education, as the tasks and professional activities to be learned, require the simultaneous integration of multiple and varied sets of knowledge, skills and behaviours at a specific time and place. These tasks may overload the learner. The Virtual Integrated Patient (VIP) is an educational tool developed by my team and serves as a simulator to help students master the complex concepts and developing toward expertise seen in medicine. It is an artificial intelligence (AI)-enabled platform, random patient generator based on natural language processing (NLP) to create naturalistic conversations. This tool is co-created with learners and our team had the opportunity to mentor Phase IV medical students for their elective, "Inspiring Health for All". Using the framework of stakeholders' involvement in co-creation (Konings, 2021), we fostered a psychosocial learning environment, where thereis enhanced learner-teacher relationships, a stronger sense of identity, and an increased sense of belongingness and cohesion. Our team guided the learners through the process of creating cases, giving them feedback and they consulted our team clinician to check on their accuracy. We are also open to their feedback and their bi-directional conversations provided psychological safety net and this looped feedback improved the quality of this educational tool. The co-creation of VIP build confidence in them to foster mutual learning, autonomy and a sense of ownership. They were motivated by this project and introduced more juniors to us over the last two years. Our co-created product was featured in several university's publications: a testimony of how co-creation improves the quality of our educational design and a product built with students and made for students in mind.



Disclosures: **J.C.G. Sng:** None. **J.K. Lee:** None. **K. Leong:** None. **T.W. Ong:** None. **J. Kong:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.19

Topic: J.02. Teaching of Neuroscience

Title: Investigating neurotransmitter receptor genes and insecticide resistance in an undergraduate laboratory

Authors: *C. P. TORO;
Biol., Sarah Lawrence Col., Bronxville, NY

Abstract: The nicotinic acetylcholine receptor alpha 6 (nAChRα6) and the GABA receptor (Rdl) are common targets of insecticides. Two readily available lines of *Drosophila melanogaster*, nAChRα6^{DAS1} and Rdl^{MD-RR}, contain point mutations that confer insecticide resistance. These lines afford a unique opportunity to develop undergraduate teaching labs focused on a neurobiology-based real-world topic. Because of the versatility of *Drosophila*, experiments can be performed which reinforce many concepts fundamental to an introductory biology curriculum and include inquiry-driven experimentation. Here, I describe a semester-long project in which students investigate the role of neurotransmitter receptors in fruit fly susceptibility to insecticides from molecular, behavioral, and evolutionary perspectives. Students work in small groups to extract DNA from wild-type and mutant flies, use PCR to amplify regions of *nAChRα6* and *Rdl* that contain mutations, perform gel electrophoresis, and prepare

samples for sequencing. Students analyze and translate sequencing data, then identify and characterize mutations. To study proteins in an organismal context, students conduct bioassays to monitor susceptibility to the insecticides Dead Bug Brew and Zevo, and create survival curves to quantify insecticide resistance. Students then prepare to engage in independent research: they read primary literature and craft a testable hypothesis about the effects of receptor mutations on a fly behavior, such as learning or locomotion. They design experiments and collect data over multiple weeks. At the end of the semester, students develop conclusions, linking genes to proteins to behavior, and are asked to discuss their data while considering how random mutations drive natural selection; their project culminates in a poster presentation. Overall, these labs were designed to engage inexperienced students in the excitement of novel research by facilitating deep exploration of a single topic, confidence through iterative protocols, and inquiry-driven independent experimentation.

Disclosures: C.P. Toro: None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.20

Topic: J.02. Teaching of Neuroscience

Title: Incf knowledgespace indexes easy-to-use mri tools for remote teaching

Authors: *W. E. GRISHAM[1], M. B. ABRAMS[2];
[1]UCLA, Los Angeles, CA; [2]INCF, INCF, Stockholm, Sweden

Abstract: The International Neuroinformatics Coordinating Facility (INCF) indexes resources that are useful in remote instruction (INCF https://www.incf.org/resources/tools). Two of these are KnowledgeSpace (https://knowledge-space.org/) and Bioimage Suite (https://bioimagesuiteweb.github.io/webapp/). KnowledgeSpace is a neuroscience encyclopedia linking descriptions of neuroscience concepts with publicly available data, models, and supporting literature. KnowledgeSpace allows instructors to find data sets to include in instruction while Bioimage Suite allows instructors and students the ability to analyze structural MRIs with little/no training.
Bioimage Suite is a JAVA-web-based app, so it can be used on any computer. Students just drag and drop a zipped MRI file into the window and the scan will open. Thus, the need to set up more elaborate MRI packages needing command-line computing is not needed. Bioimage Suite segments and measures gray and white matter volume, but other brain structures must be hand-segmented and measured. This provides an excellent opportunity to teach neuroanatomy, particularly when utilizing other resources indexed by INCF KnowledgeSpace (https://knowledge-space.org/) such as the Michigan State Human Brain Atlas https://knowledge-space.org/dataspace/scr_006131_hba_atlas?q=human%20brain%20atlas&term=human%20brain%20atlas. We use Bioimage Suite in conjunction with CANDIshare, a scan set that is also

readily accessible via NITRC https://www.nitrc.org/projects/cs_schizbull08. CANDIshare is a set of pediatric scans from both boys and girls with early-onset schizophrenia, bipolar disorder--with and without psychosis, and healthy controls. We compare students' data to a publication based on this set (Frazier et al. doi: 10.1093/schbul/sbm120). Due to the heterogeneity of the subjects in the scan set, we also use it as an opportunity to teach ANCOVA and reinforce students' statistical skills. Students find this module interesting because it directly relates to humans and it touches on psychopathology. Other scan sets are available via indices in KnowledgeSpace.
The COVID crisis required innovative lab teaching to retain hands-on, inquiry driven aspects. But, the COVID crisis also provided an opportunity to develop this novel lab module that can be utilized either in remote or in-person learning.

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

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.21

Topic: J.02. Teaching of Neuroscience

Title: Roivert: analysis software designed for gfp and gcamp signals recorded with an inexpensive fluorescence microscope built by undergraduate students

Authors: J. RYAN[1], ***B. R. JOHNSON**[2], F. A. LI[2], D. DEITCHER[2];
[1]Biol., Hobart William Smith Colleges, Ithaca, NY; [2]Cornell Univ., Cornell Univ. Neurobio. and Behavior, Ithaca, NY

Abstract: We are developing low cost, Do-It-Yourself (DIY) student laboratory equipment to expand the teaching, learning and research toolbox for students and faculty. We previously reported student construction and use of a DIY fluorescence imaging microscope for gathering GFP and GCaMP signals (Ryan et al. 2020. J. Undergrad. Neurosci. Edu. 19(1), A134-A140; Ryan et al. 2021. Soc. Neurosci. Program 2021 Abstract Viewer/Itinerary Planner, Society for Neuroscience Global Virtual Conference). Here we describe improvements to our DIY microscope design and ROIVert (http://roivert.net/). ROIVert is open source, student friendly software developed with a software consultant for analysis of GCaMP signals in larval Drosophila preparations displaying fictive locomotion. The microscope was redesigned to reduce its build cost to about $800. The redesign includes adding the course and fine focus to a new vertical column (eliminating need for a precision lab jack), and new 3D printed parts that eliminate the need for infinity corrected objectives. ROIVert loads both single and multi-page TIFF files as 8-bit grayscale images with user defined frame rate and frame and pixel subsets. The ROIVert interface displays multiple toolbars, a video player and dockable windows that can be arranged in a variety of configurations. Multiple regions of interest (ROIs) are drawn as rectangular, elliptical or polygonal shapes on an image or movie to visualize fluorescence

intensity changes (df/f) in specific image regions over time. The calculated image intensity values over time (traces) are plotted as graphs whose multiple ROI traces of x (time) and y (fluorescence intensity) axes have adjustable ranges. The image settings window allows image contrast and image smoothing adjustments, applying colormaps to traces, and other stylistic user adjustments. The traces and ROIs are exportable in CSV and JSON formats and can be further analyzed in Python, MATLAB and Julia software. Individual ROIs can be read back into ROIVert for later analysis or sharing with other ROIVert users. The software is implemented in C++ to be platform agonistic, with distributions available for Windows, MacOS and Linux operating systems. The implementation leverages a Qt front-end to allow manipulation of custom controls and views, and an OpenCv back-end to provide performant computation. The software is backed by a custom test suite with greater than 90% code coverage. ROIVert has broad application potential for fluorescence and time-lapse microscopy.

Disclosures: **J. Ryan:** None. **B.R. Johnson:** None. **F.A. Li:** None. **D. Deitcher:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.22

Topic: J.02. Teaching of Neuroscience

Support: University of Virginia Center for Teaching and Excellence A&S Learning Design & Technology Incubator grant

Title: Learning by Integration: Incorporating an Active Learning Component into a Large Neuroscience Lecture Course

Authors: *E. CLABOUGH, J. CHAJES;
Univ. of Virginia, Charlottesville, VA

Abstract: Colleges and universities are increasingly moving away from traditional lecture-only course setups in favor of more intimate, hands-on experiences, but these types of learning environments can be difficult to implement effectively, especially in large introductory classes. Despite the challenges, the integration of more neuroscience-friendly active or project-based learning methods is worth exploring, as these teaching techniques can increase both learning and engagement levels. This work tells the story of the conversion of a large 300-person neuroscience lecture course into a hybrid active learning experience. We describe the active learning sessions, explain how undergraduate teaching assistants effectively graded in real-time using rubrics, and provide concrete methods to tackle difficult lecture material in order to enhance student understanding. Exam performance and belonging attitudes are compared between the traditional lecture format and this new structure. Our course structure can be easily adopted by other introductory courses by the insertion of active learning elements, keeping existing lecture experiences intact, without adding additional readings/homework.

Disclosures: **E. Clabough:** None. **J. Chajes:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.23

Topic: J.02. Teaching of Neuroscience

Support: Office of Undergraduate Research, Weber State University
Research, Scholarship, and Professional Growth Committee, Weber State University
Neuroscience Program

Title: Straightforward diagrams of the sonic hedgehog (SHH) signaling pathway as effective teaching tools

Authors: A. STEED[1], E. J. SANDQUIST[2], *J. HUTCHINS[1,3];
[1]Neurosci., [2]Zoology, [3]Hlth. Sci., Weber State Univ., Ogden, UT

Abstract: The sonic hedgehog (SHH) signaling pathway is an example of a cell signaling cascade associated with homeobox genes and fundamental neurodevelopmental mechanisms. Theoretically, teaching introductory neuroscience students about the SHH pathway should be a foundational part of their education, with supplemental details presented in a cell and molecular or developmental neuroscience class. Current figures from the primary literature are often difficult to interpret — even for experts. Diagrams tend to attempt a comprehensive view of the pathway when breaking the pathway into discrete components is, in our view, a more understandable and transparent approach. We have created new images that take the reader through the SHH pathway in a step-by-step manner. We have done this for the canonical and non-canonical pathway. This promotes both a deeper understanding of the material and better retention of essential information. This is a specialized application of encoding consistency as described in the chunking method of Young and Bellezza (1982). Making images more understandable and accessible to memory will help educate neuroscientists at all levels of expertise and will allow readers of the primary literature to better understand the figures presented in those publications. It is our belief that this concept can be translated to many different disciplines within neuroscience and cell biology — making this a powerful approach for the teaching of complex pathways beyond SHH. While these images would take up more space than is practicable for a primary research paper, they can be referenced and cited in both open source neuroscience texts and in primary research articles.

Disclosures: **A. Steed:** None. **E.J. Sandquist:** None. **J. Hutchins:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.24

Topic: J.02. Teaching of Neuroscience

Title: Student presentations - are they effective teaching tools?

Authors: *K. PHILLIPS;
Virginia Tech., Blacksburg, VA

Abstract: Student presentations of scientific literature are a common assignment in upper level neuroscience courses at Virginia Tech. Student presenters learn to effectively organize information into a coherent narrative and practice their public speaking and presentation skills. These presentations are intended to teach their peers about a scientific discovery relevant to the topic, thus requiring the presenters to comprehend the paper well. However, it is not clear whether the students in the audience effectively learn from their presenting peers. End-of-semester feedback indicated that students in the audience have a difficult time following student presentations and questioned whether they are an effective teaching tool. In the spring of 2022, I compared two sections of the 4000-level course Diseases of the Nervous System to determine how well students learn from student presentations compared to discussing the papers in small groups. In section A (n=30), two honors students were paired to develop a 20-minute presentation on an assigned paper. Presenters were provided with detailed instructions and feedback on slides was provided before the presentation. In section B (n=31), students were assigned the paper to be read on their own. In class, they worked in groups of 4 to respond to discussion questions related to the paper. In both sections, students took a brief quiz (5 questions) in the following class to assess their comprehension of the paper. Questions were broad and focused on the hypothesis, the major results, and conclusions. In section A, only 33.3% of respondents could accurately indicate the hypothesis for the study compared to 80.6% in section B. When asked to select the response(s) that accurately described the results, 69.5% of students in section B were able to accurately do so while 43.3% of students in section A responded accurately. Nearly half (43.3%) of students in section A indicated they were “honestly not sure which is/are correct” while no students in section B indicated they were unsure. Student presenters answered all questions accurately indicating that presenting the paper is an effective way of learning. The results clearly indicate that students who discussed the papers in small groups understand the paper better than those who learned from student presentations. This assessment was repeated for two additional papers with similar results. The results are important to take into consideration when assigning student presentations as an instructional tool. Challenging scientific papers may be best understood in small groups while simpler papers might be suitable for student presentations.

Disclosures: K. Phillips: None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.25

Topic: J.02. Teaching of Neuroscience

Title: Radical indoctrination: an immersion model for undergraduate neuroscience

Authors: *J. GAUTHIER;
Biol. Dept., Swarthmore Col., Swarthmore, PA

Abstract: Is neuroscience a set of facts? Is it an iterative process of conducting experiments and weighing evidence? Or is it a community of scholars, working collaboratively to approach problems from different angles? The answer is of course all three, but undergraduate neuroscience education has traditionally focused mainly on facts, occasionally on process, and rarely on community. Yet the latter two most strongly embody the critical thinking and scholarly dialogue that constitute the true work of neuroscience and knowledge production more generally. I have begun teaching an experimental course that weaves all three aspects together in an immersion model of learning. Students read research articles, converse directly with a primary author, and ultimately present and defend their own evaluation of the work. Initially, students worry they won't have enough background knowledge to understand, let alone critique, advanced research. But with scaffolding, encouragement, and working with peers in small groups, they become comfortable with the format and the material. The best students perform at the graduate level, asking questions and forming evaluations that would be appropriate in a journal club or lab meeting. All students learn to digest complex research, question assumptions, and communicate their perspective, skills critical for neuroscience and beyond.

Disclosures: J. Gauthier: None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.26

Topic: J.02. Teaching of Neuroscience

Support: NSF Grant 2025257

Title: Supporting First-Year Student Success through a Combination of High Impact Educational Practices

Authors: *A. CAMARILLO[1], P. VIEIRA[2], M. DE LA TORRE[3];
[1]Clin. Sci., [2]Psychology, [3]Biol., California State University, Dominguez Hills, Carson, CA

Abstract: A disparity exists for first-generation minority students pursuing degrees and careers in the Science, Technology, Engineering, and Math (STEM) when compared to their white counterparts. Currently, there is a barrier between accomplishing goals in STEM due to the lack of availability of resources and opportunities such as: access to mentorship, quiet areas to study, financial support for exams and applications, amongst others. Additionally, many students feel disengaged with their coursework, particularly those from minority households who are the first in their family to pursue higher education. By students not being supported with proper resources and opportunities we observe a decrease retention rate of minority freshmen in STEM majors. With a decrease of minorities staying in STEM during their academic career, this directly impacts the STEM workforce. A study by Excelencia in Education showed between 2012 and 2022 there will be a 11% projected growth in the STEM occupations, concurrent with the projected growth of the Hispanic population in the United States. Consequently, Hispanics students obtaining certificates and degrees in STEM will be vital for the STEM workforce. To address the need, a pedagogical study using transformative exploratory sequential mixed methods was utilized. This included designing a first-year seminar for the career development of entering undergraduate students at California State University Dominguez Hills, a Hispanic-serving institution. The seminar helped determine student interest in STEM careers and retention in STEM education. Titled *Sex, Drugs, and Rock and Roll: The Neuroscience of Hedonism (UNV 101),* the course-seminar included a variety of pedagogical strategies. One of pedagogical strategies utilized is Design Thinking (DT) training and Course-based Undergraduate Research Experiences (CUREs). Additionally, introductory EEG technology, Backyard Brains, was used for students to explore their research interests in the field of neuroscience. We examined whether students pursue extracurricular activities related to their career interests, made connections with a STEM mentor, joined STEM related clubs, and applied to entry level STEM jobs. The impact of this study could include potentially providing a framework for which STEM departments can create a survey course to recruit incoming first-year students and encourage retention in STEM majors and careers. Lastly, this develops a pipeline for students to enter and graduate as a STEM major at this university and across the CSU-system to retain interest in STEM and join the STEM workforce.

Disclosures: **A. Camarillo:** None. **P. Vieira:** None. **M. De La Torre:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.27

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 focused 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. Even before the pandemic, student attainment has been widely examined through a variety of approaches, including Carol Dweck's growth mindset, metacognition, and practice of high-yield study approaches. 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 intervention focuses on neuroscience and psychology students, who take a variety of STEM and general education courses. Students will be given an initial survey to assess their study practices/strategies, metacognition, and growth mindset. Students will then participate in a seminar that is designed to teach them mechanisms of studying, learning, and performance, both from a neuroscience and psychology perspective. Students will be taught several practices, such as self-testing, SMART goals, and attention management. A follow-up survey will be administered to the same students one month later, to assess changes in their study practices/strategies, metacognition, and growth mindset. An end of semester follow-up will be conducted to see if the intervention had long-term impacts on any of the intervention measures, as well as course grades and overall GPA.

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

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.28

Topic: J.02. Teaching of Neuroscience

Support: Herbst Endowment and College of Science Dean's Innovation and Education Award, University of Arizona
CURE Institute, Office of Undergraduate Research, University of Arizona

Title: Enhancing student self-efficacy and research participation through a vertically integrated project (VIP) course on neuron-glia communication in neurodegenerative diseases

Authors: S. M. DAVIS[1], R. FRIESEN[2], A. D. CIMETTA[2], ***M. R. BHATTACHARYA**[3]; [1]Entomology, [2]Educational Psychology, [3]Neurosci., Univ. of Arizona, Tucson, AZ

Abstract: Long-term student involvement in scientific research is a strong predictor of undergraduate student persistence in science. However, significant time outside of class is required to perform independent projects in faculty laboratories, which excludes students with sizable work or childcare responsibilities from the benefits of such experience. Vertically integrated project (VIP) courses are a type of course-based undergraduate research experience (CURE) that allows students to enroll for multiple semesters while earning college credits, enabling them to pursue longer-term projects and to become peer research mentors. Because VIP courses were originally developed in engineering disciplines, few studies have documented the effects of participating in VIP courses in the life sciences. We developed a VIP course in Neuroscience with a focus on identification of ligands and receptors in neuron-glia communication in the context of Alzheimer's Disease (AD) and Amyotrophic Lateral Sclerosis (ALS) using the *Drosophila* model system. Students first download and organize RNAseq and other data from publicly available databases (NCBI, Cell Atlas, FlyBase) to predict genes that could be signaling factors in AD or ALS. Next, students build fly strains to express RNAi or over-expression transgenes of their genes of interest in control and disease backgrounds. Finally, students test whether their genetic manipulations alter disease associated behaviors. Predicted AD genes are tested for learning and memory using a classic T-maze olfactory association task, while predicted ALS genes are tested for locomotor behavior using a negative geotaxis test. We surveyed students over two semesters of enrollment to evaluate self-efficacy and intent to persist in research using a validated survey instrument called the Persistence in Science Survey (Hanauer et al, 2016). Of 24 students enrolled, 15 consented for data collection in this IRB-approved study. Our preliminary data after two semesters show gains in self-efficacy and persistence, with students enrolled for multiple semesters showing slightly stronger effects than those enrolled for only a single semester. Student self-reflections highlighted teamwork and iteration as key activities that enhanced positive experiences in the course. Impressively, 9 of 24 enrolled students were accepted into competitive summer research programs following their participation in the VIP course. Overall, our newly developed VIP course framework showed strong positive effects on student self-efficacy and persistence in science and could be used as a framework for increasing research participation in Neuroscience.

Disclosures: S.M. Davis: None. **R. Friesen:** None. **A.D. Cimetta:** None. **M.R. Bhattacharya:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.29

Topic: J.02. Teaching of Neuroscience

Support: Charles Lafitte Foundation
Duke Learning Innovation- Carry the Learning Forward

Title: Class Size and Student Performance in a Team-Based Learning Course

Authors: M. NG, ***T. NEWPHER**;
Duke Univ., Duke Univ., Durham, NC

Abstract: Growing evidence indicates that Team-Based Learning (TBL) increases student content knowledge outcomes when compared to lecture-based courses. However, the factors affecting the student experience in TBL have yet to be fully explored. In particular, it remains unknown how the size of a TBL classroom affects content knowledge outcomes and classroom dynamics. Here, we analyzed student performance on summative assessments, as well as measures of perceived learning and classroom dynamics from a single TBL-taught undergraduate neuroscience course with a range of enrollment sizes (19-103 students). The small course term produced higher student ratings for course and instructor quality when compared to its corresponding large enrollment term, even though both terms were taught by the same instructor. Student ratings in the medium enrollment term were also higher for course quality when compared to the corresponding large enrollment term. Despite these differences in student perception of course quality, student performance on exams, self-reported learning, and several measures of classroom dynamics were similar across course term sizes. Taken together, our data suggest that the content knowledge outcomes in this TBL course were not negatively impacted when enrollment size increased from small or medium to large.

Disclosures: M. Ng: None. **T. Newpher:** None.

Theme J Poster

023. Innovations in Teaching Undergraduate Neuroscience

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 023.30

Topic: J.02. Teaching of Neuroscience

Title: The neuroscience of everyday life: An undergraduate course with service learning

Authors: *E. M. STOUFFER;
Bloomsburg Univ. of PA, Bloomsburg Univ. of PA, Bloomsburg, PA

Abstract: During the Spring 2019 (*n* = 18 students) and Spring 2022 (*n* = 20 students) semesters I developed and taught an undergraduate course in the Department of Psychology at Bloomsburg University of Pennsylvania on The Neuroscience of Everyday Life. My aim was to develop a course that would allow undergraduate students opportunities to gain a greater understanding of neuroscience information by relating that information to their everyday life experiences. After presenting information on the fundamentals of neuroscience, we then discussed topics such as "Coffee and cigarettes: How commonly used substances affect your brain", "Thirsty Thursdays:

How alcohol affects your brain", "While you were sleeping: The many functions of sleep", "You are what you eat: Nutritional neuroscience", "I got 99 problems: How stress and anxiety change your brain", and others. In addition to discussing these topics, students also completed several exercises to relate what they were learning in class to their own lives. These included journals in which they kept track of their sleep patterns (and related their dreams to recent experiences and memories), their consumption of foods high in antioxidants and beneficial to the gut-brain axis, and their aerobic exercise habits. They also completed a social media misinformation assignment in which they had to find a social media post about a neuroscience-related topic and then evaluate the accuracy of that post by using the information they learned in class. In addition to these exercises, students were also required to conduct a review of literature on a topic of their choice and then give a 15-min presentation of the information that they learned in a TED Talk format, which they could either do live in front of the class or as a video recording presented to the class. Finally, the course involved the service-learning component of participating in Brain Awareness Week (BAW) presentations to either middle-school and high-school students (Spring 2019) or college students (Spring 2022). Students created activities and poster presentations of topics that they learned during the class that were age-appropriate for the audience. These topics included dealing with stress through meditation and art therapy, and the importance of sleep, exercise, and nutrition on brain functioning. Survey results of the middle-school and high-school students showed that their favorite BAW presentation was "Are you stressed?" and that they learned the most from the "Feeding the brain" presentation. Survey results from the students in the course showed that the BAW presentations improved their public speaking abilities and their confidence in their knowledge of neuroscience.

Disclosures: E.M. Stouffer: None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.01

Topic: J.02. Teaching of Neuroscience

Title: Education and implementation of a ketogenic diet in the treatment of autism spectrum disorder

Authors: *E. REZNIK, R. TABAZA, R. E. HARTMAN, S. KAUR;
Loma Linda, Loma Linda, CA

Abstract: Autism spectrum disorder (ASD) affects millions of people every year, but pharmacological and behavioral treatments remain limited. Adjunctive therapies such as diet intervention that target autism spectrum disorder symptoms may provide beneficial symptomatic relief to those with ASD. Ketogenic diets, which are high in fat and low in carbohydrates, have shown effectiveness in ameliorating some of the metabolic and neurologic disorders often comorbid with ASD. Hence, we reviewed published research on results and methods of various

animal and human studies that investigated the effects of a ketogenic diet in managing ASD symptoms. The data, although somewhat limited, suggest that implementation of a ketogenic diet can improve core and other associated symptoms of autism spectrum disorder such as repetitive behaviors, social behaviors, communication, anxiety, speech, hyperactivity, and cognition. From a research perspective, the information in this review highlights the need for more randomized control trials in human subjects, as well as better methodologies and/or animal models when looking at the efficacy of dietary treatments for managing ASD. From a clinical perspective, however, the implementation of a ketogenic diet within the ASD population has several hurdles, including treatment disparity amongst minority communities, myths surrounding effects of ketogenic diet in children, and stigma surrounding disclosure of alternative treatments between the medical community and families affected by ASD. Therefore, distribution of the information in this review will educate caregivers and those within the medical community treating minority ASD populations regarding the potential clinical utility of a ketogenic diet as a safe and low-cost intervention.

Disclosures: **E. Reznik:** None. **R. Tabaza:** None. **R.E. Hartman:** None. **S. Kaur:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.02

Topic: J.02. Teaching of Neuroscience

Support: Fonds de développement pédagogique de la Société des Médecins de l'Université de Sherbrooke

Title: A 3D audio simulator of auditory hallucinations in psychiatric training: a pilot study

Authors: K. M. ZEMMOUR[1], L. Z. PELLETIER[2], S. ROUSSEAU[6], S. TRACY[6], C. LEJEUNE[7], A. BERRY[3], S. AUDRY[8], K. WHITTINGSTALL[4], ***S. GRIGNON**[5], P.-A. GAUTHIER[7];
[1]Psychiatry, Mc Gill Univ., Montreal, QC, Canada; [2]Psychiatry, [3]Groupe d'Acoustique de l'Université de Sherbrooke, [4]Diagnos. Radiology, [5]Psychiatry & Pharmacology/physiology, Univ. De Sherbrooke, Sherbrooke, QC, Canada; [6]Assn. Québécoise de Réadaptation Psychosociale, Quebec, QC, Canada; [7]École des arts visuels et médiatiques, [8]École des médias, UQAM, Montreal, QC, Canada

Abstract: Therapeutic relationship (TR) is a cornerstone of schizophrenia treatment. Auditory hallucinations (AH) are scarce in non clinical populations and most mental health professionals (MHP) have no direct experience of them; this may limit their empathy and the fostering of a positive TR. Previous work has tried to circumvent this through the use of voice simulators (VS) on MHP, which, however, do not emulate part of the embodied experience of voice hearers (VH) - namely, the spatialization of AH - since they cannot externalize sounds. To address this

limitation, our team (VH, psychiatrists, qualitative researchers, acoustic researchers, and actors), developed a 15 minutes 3-dimensional VS (3DV) using binaural sound reproduction technology that provides a realistic experience of spatial sound.
MethodsThe script was written during extended sessions with active input from the VH members of the research team, with emphasis on content relevant to the participants (12 psychiatry residents (7F, 5M; PGY2-5)).Recording. The actors performed the scripts around a binaural Neuman KU 100 Dummy Head or B&K torso for acoustical measurements, plus stereophonic microphone setup (standard ORTF arrangement) in a semi-anechoic sound studio. All sounds were recorded using professional equipment and configurations, montaged and mixed to retain the most accurate takes, and edited to preserve the binaural and spectral cues associated with Head-Related Transfer Functions (HRTF) that encode sound localization cues in the binaural recordings. Assessment. The 20 items Jefferson Scale of Physician Empathy, health professional version (JSPE©) was self-administered before and after the 3DV session. Participants were also invited to a debriefing session.
Results. JSPE global score was unchanged. Item 1 (*My understanding of how my patients and their families feel does not influence medical or surgical treatment*) scores increased significantly after 3DV administration (p=0.024). By contrast, participants' debriefing verbatims mentioned a significant emotional impact, a better grasp of VH experience, and an acknowledgment of the simulator as a valuable teaching tool.
Discussion. This pilot study suggests that (1) a 3DV is a valuable teaching tool to get a better grasp of the VH experience (2) current empathy instruments may be inadequate, because of a ceiling effect in trained MHP, and of the specific nature of the AH phenomenon, which may be poorly intercepted by generic empathy measurement.

Disclosures: K.M. Zemmour: None. **L.Z. Pelletier:** None. **S. Rousseau:** None. **S. Tracy:** None. **C. Lejeune:** None. **A. Berry:** None. **S. Audry:** None. **K. Whittingstall:** None. **S. Grignon:** None. **P. Gauthier:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.03

Topic: J.02. Teaching of Neuroscience

Title: An Educational Review on the Neuroprotective Benefits of Phytochemicals

Authors: *M. MORGAN[1], R. E. HARTMAN[2];
[1]Psychology Dept., [2]Dept. of Psychology, Loma Linda Univ., Loma Linda, CA

Abstract: Plants provide an essential source of nutrition but can also be a source of preventative health measures and may even be used therapeutically. The aim of this poster is to review the evidence base of studies investigating the effects of dietary phytochemicals (compounds derived from plants) and the clinical implications for brain aging and neurodegeneration, with a focus on

polyphenols (e.g., ellagic acid, ellagitannins, and gallic acid), flavonoids (e.g., quercetin and kaempferol), terpenes (e.g., ginkgolides), and vanilloid compounds (e.g., capsaicin).These compounds may protect against neurodegeneration through a variety of mechanisms, including, but not limited to, anti-inflammatory, antioxidant, and hormetic effects. Increasing evidence has demonstrated that diets containing high levels of these compounds may prevent the deterioration of nervous tissue and other cells in the body.Both human and animal model studies have empirically shown that phytochemical-rich diets can provide neuroprotection from the cognitive and motor deficits associated with neurodegenerative disorder pathology. Bright, colorful, spicy, and odorific foods, including ginseng, pomegranate juice, broccoli, chili peppers, garlic, and others, seem to be particularly effective. For example, turmeric and pomegranate juice contain compounds that protect against Alzheimer's neuropathology in animal models. Similarly, capsaicin, a vanilloid compound found in chili peppers, has displayed positive benefits towards cognitive impairment and motor function. Dissemination of the information from this review will provide healthcare providers and researchers with a framework for looking at diet as a potential therapeutic vector in the treatment of neurodegenerative diseases.

Disclosures: **M. Morgan:** None. **R.E. Hartman:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.04

Topic: J.02. Teaching of Neuroscience

Title: Integrating Clinical Skills with Basic Sciences

Authors: *L. BENJAMIN[1], G. C. BENJAMIN[2], G. C. BENJAMIN, JR[2];
[1]Ross Univ. Sch. of Med., St Michael, Barbados; [2]Family Med. Clin., Roseau, Dominica

Abstract: Background: Medical education involves several steps to train competent physicians. According to the Association of American Medical Colleges (AAMC), medical schools should "adopt a developmental approach to the design of the skills education curriculum, ... throughout the four year curriculum"[1]. The aim of this study is to review the clinical skills teaching and learning methodologies during delivery of the basic sciences curriculum. **Work:** This is a retrospective analysis of medical education research, conducted by the authors over the past fifteen years on the basic sciences with clinical skills curriculum[(2,3,4,5)]. The results of these studies are reviewed and conclusions summarized. **Results:** Several methodologies have evolved in the clinical skills curriculum. These include apprenticeship, discipline-based, problem-based learning, medical simulation, small group learning interviewing skills, enhanced standardization patient program, advanced interviewing skills and team based learning. Although each stage of curricular development brought noteworthy improvements in medical education, innovations continue to be necessary for curricular growth[2]. Integration of clinical in basic sciences improved scores. For example, in the tendon reflexes study, students who did the clinical skills lab scored

2.2.% better than those did not on the reflex arc questions (p=0.04)[5]. Furthermore, students who spent more hours reviewing lectures on media site (video-streaming) were more likely to have higher Neuroscience grades[6]. **Take Home Message** With several emergent teaching methodologies, integration of basic sciences into clinical skills teaching and video-streaming are effective methods for improving scores. **References** 1. Recommendations for Clinical Skills Curricula for Undergraduate Medical Education. Benjamin Liris, Benjamin Griffin, Benjamin Carlita & Selfridge Nancy. STEPS in the basic clinical skills curriculum, Medical Teacher, 2018. DOI: 10.1080/0142159X.2018.1438592
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Disclosures: L. Benjamin: None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.05

Topic: J.02. Teaching of Neuroscience

Title: Master of Science in Surgical Neurophysiology: An Exciting Frontier in Clinical Neuroscience

Authors: *R. FILIPOVIC[1], P. ANDALIB[2];
[1]PNB, Univ. of Connecticut, Storrs Manfld, CT; [2]Univ. Of Connecticut, Storrs Mansfield, CT

Abstract: Master of Science in Surgical Neurophysiology: An Exciting Frontier in Clinical Neuroscience Radmila Filipovic, Ph.D. and Payam Andalib, Physiology and Neurobiology Department; UCONN Intraoperative neurophysiological monitoring (IONM) is the utilization of a variety of neurodiagnostic tests that allow ongoing assessment of the functional integrity of certain neural structures during surgical procedures. The information provided by trained neurophysiologists is aimed to assist the surgical team in reducing the risk of damage to the patient's nervous system and at times provide functional guidance to them. PNB Department at UCONN in collaboration with an industry partner has created the Master of Science in Surgical Neurophysiology, a one-year program that provides students with a relevant course curriculum and clinical internships that allow the graduates to be eligible to take the national certification exam (CNIM). One of the challenges but at the same time advantages of the program is the diversity of the students, in their background knowledge, age, and race. In the curriculum, we

utilize a variety of active learning methods, including online drawing tutorials for neuroanatomy, virtual human dissector software (VHD), and Sectra Tables. This is the only master's program in Intraoperative Neurophysiological monitoring in the country and presents an example of a successful collaboration between academia and industry.

Disclosures: R. Filipovic: None. **P. Andalib:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.06

Topic: J.02. Teaching of Neuroscience

Title: A review of human clinical trials of stem cell transplantation as treatment for traumatic brain injury

Authors: *S. KAUR, R. TABAZA, E. REZNIK, R. E. HARTMAN;
Psychology, Loma Linda Univ., Loma Linda, CA

Abstract: An in-depth review of human clinical trials of stem cell transplantation for treatment of traumatic brain injury (TBI) was conducted. Primary damage from TBI includes mechanical damage leading to immediate neuronal and glial death, whereas secondary injury involves a cascade of biochemical and physiological events evolving over time, including inflammation, apoptosis, free radical generation, leading to delayed cell injury and/or death. To date, treatment for TBI has been limited to pharmacological methods, brain surgery, maintenance of oxygenation, proper ventilation, etc., but no effective treatment has been found as these treatments have focused on targeting a single cell death mechanism when there is an overlap of cell death mechanisms and pathways that occur simultaneously during brain injury. Stem cells have shown great promise in treatment of traumatic brain injury. Due to their multipotent capacity to both self-renew and differentiate into different cell types (ex. neurons, glial cells, and oligodendrocytes), they can release neurotrophic factors, engage in gene and protein transfer, and promote the regeneration of damaged nerve tissue. An important aspect of stem cell therapy is to understand their different mechanisms of action and direct stem cell therapy to recipients that are likely to respond to treatment. This includes the detection of a penumbra which serves as a specific “biomarker” to predict the presence of an active niche for salvageability which was recently discovered. Specifically, human clinical trials of stem cell transplantation into damaged brains have demonstrated the efficacy of bone-marrow and umbilical-cord derived mesenchymal stem cells in areas of the brain that have been damaged. Not only has the safety and feasibility of the transplantation of these cells been established, but studies have demonstrated positive treatment effects including reduction of intracranial pressure, higher serum production of neurotrophic factors, brain structure preservation, and more. This is done through a reduction of inflammation, suppression of apoptosis, restoration of metabolic homeostasis, etc. Stem cell therapy as a treatment for TBI is increasingly backed by evidence. Dissemination of the

information in this review will provide education on future directions of TBI treatment and stem cell therapy.

Disclosures: S. Kaur: None. **R. Tabaza:** None. **E. Reznik:** None. **R.E. Hartman:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.07

Topic: J.02. Teaching of Neuroscience

Support: National Institute of Neurological Disorders and Stroke
NIH Office of Research on Women's Health

Title: In Their Own Words: What Matters to Neuroscience Trainees in Choosing Their Careers?

Authors: A. EBRAHIMI, L. E. ULLRICH, J. R. OGAWA, *M. MATTHEWS, M. D. JONES-LONDON;
Office of Programs to Enhance Neurosci. Workforce Diversity, Natl. Inst. of Neurolog. Disorders and Stroke, Bethesda, MD

Abstract: The National Institute of Neurological Disorders and Stroke conducted a survey in 2017 of early-career neuroscientists to ensure their programming optimally supports the needs of a diverse research workforce. In this study, free-response survey questions were analyzed to understand what neuroscientists share about their career journey, and what differences exist across social identities. Current or recent doctoral recipients were asked to anonymously respond to three open-ended questions on 1) how NIH funding impacted their research training, 2) the "why" of their career choice, and 3) any additional comments. 3,521 responses from 1,753 participants were coded (MAXQDA) and analyzed for overarching themes by demographic variables. In their own words, trainees expressed a passion for neuroscience that is oft diminished through structural barriers in academic training and other factors that negatively influence their self-efficacy. A key structural issue in training was the lack of support from mentors, especially in preparing for careers outside of academia. Respondents frequently shared their experiences with a self-eliminating qualifier describing why a career in academia was not attainable or desirable because of what they had heard or seen their mentors or peers experience (e.g., competition for grants, job opportunities/security). While men and women both shared a need for better institutional support for childcare and families, women specifically discussed child-bearing roles and pressures. Examples of mentors exerting these pressures included telling new mothers to return to the lab quickly after giving birth. Women also noted more harassment, inappropriate behavior, and sexism in their responses than men. Respondents from underrepresented racial and ethnic groups noted pressures of being tokenized and a lack of respect due to their race or ethnicity. To address these issues, respondents expressed a need for their mentors to receive formal mentorship training, including training in normalizing and

supporting careers outside academia. Additionally, mentors should be aware of the outsized influence of their actions and words in shaping career self-efficacy. These findings have elucidated areas in which equitable support, including policy and programmatic interventions, can improve the structural dynamics of academic training for women and underrepresented minorities. Addressing these issues in the training environment will prevent talented individuals from feeling forced out of academic careers in neuroscience and enable them to contribute diverse perspectives and innovation for difficult research problems in their careers.

Disclosures: A. Ebrahimi: None. **L.E. Ullrich:** None. **J.R. Ogawa:** None. **M. Matthews:** None. **M.D. Jones-London:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.08

Topic: J.02. Teaching of Neuroscience

Title: Bridging the cultural divide between basic science and clinical medicine: a flexible scheme for teaching neurological disorders to graduate students

Authors: *L. L. RESTIFO;
Neurol., Univ. of Arizona Hlth. Sci., Tucson, AZ

Abstract: Students in neuroscience doctoral programs seek coursework focused on neurological disorders for varied reasons, including direct connections to their projects, scientific and personal curiosity, and a desire to explore the medical relevance of research. Such courses, especially if they present clinical diagnostic logic as well as research discoveries, can help bridge the cultural divide between science and medicine. For graduate programs and faculty, the number and range of topics under the umbrella of neurological disease is daunting even for a full-semester course. I developed an approach based on a rotating menu of exemplar diseases from which four are chosen for in-depth analysis. With the caveat that no disease is truly "simple", the course is organized into four modules representing ever-increasing complexity. The first module covers a monogenic disease with Mendelian inheritance (e.g., Duchenne muscular dystrophy, spinal muscular atrophy). The second addresses disorders that can be either hereditary with many possible genetic causes or sporadic with uncertain etiology (e.g., peripheral neuropathies, Alzheimer's disease). During the second half of the course, the emphasis shifts to diseases with strong gene-by-environment interactions. For diseases in the third module, there is strong evidence to support a pathogenic mechanism (e.g., multiple sclerosis), whereas in the fourth module, disease pathogenesis is much less clear (e.g., autism spectrum disorder). Within each module, the starting point is the clinical picture, including epidemiology, diagnostic criteria, differential diagnosis, natural history, and data from imaging and histopathology. The relevant neuroanatomy can be addressed. This is followed by the genetic basis of or contribution to the disease, along with environmental risk factors and triggers. Laboratory evaluation of tissues or

cells from patients or animal models is the next focus, with the goal of exploring disease pathogenesis and progression. The module ends by considering the current status of therapeutics and efforts to develop the first or better treatments. Readings come from the clinical, basic science, and translational science literature, providing opportunities to assess a wide range of established and emerging methodologies. Cross-cutting themes addressed in all modules include disease classification, the evolution of diagnostic criteria, the role of genetic testing, the quest for preclinical diagnosis and predictive biomarkers, validation criteria for animal models, the assumptions on which drug-discovery programs are based, and the special challenges of clinical trials.

Disclosures: L.L. Restifo: None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.09

Title: WITHDRAWN

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.10

Topic: J.02. Teaching of Neuroscience

Support: Bio-Design & Bio-Engineering Initiative Phase 2, Department of Bio-Technology (DBT), Government of India.

Title: Teaching Cognitive Neuroscience: Neuro-Instrumentation, an Indian perspective

Authors: R. K. JOSHI[1], H. HARIHARAN[3], K. SOODA[4], B. MADAN[5], R. RUSTAGI[5], K. SRINIVASAN[3], A. TAK[6], S. KUBAKADDI[7], M. INDIRAMMA[4], H. J. PANDYA[1], ***M. JAYACHANDRA**[2,3];
[1]Dept. of Electronic Systems Engin., [2]Ctr. For BioSystems Sci. And Engin. BSSE, Indian Inst. of Sci., Bangalore, India; [3]Divison of Mental Hlth. and Neurosciences, St. John's Res. Inst., Bangalore, India; [4]Computer Sci. and Engin., BMS Col. of Engin., Bangalore, India; [5]PankhTech Pvt Ltd, Delhi, India; [6]Physiol., Rajmata Vijaya Raje Scindia Med. Col., Bhilwara, India; [7]itie Knowledge Solutions, Bangalore, India

Abstract: Teaching Cognitive Event-Related Potentials (ERPs) can be greatly enhanced with demonstrations and hands-on experience, complementing both off-line and on-line courses[1]. However, the prohibitive cost of proprietary ERP systems make them impractical in a resource-constrained environment. Following earlier efforts to design such systems (M. Jayachandra et al., 2016[2]), we have developed a reliable, cost-effective system to demonstrate and teach ERPs, e.g., P300.
We integrated dry-electrodes with an Open-BCI system with a head-mounted display to present and record the visual P300. The stimuli first were tested on a reference system *(NEUROSCAN, Natus)*. The recordings were validated with a dry-electrode EEG cap *(ENOBIO, Neuroelectrics)*. This system could be easily modified to record other Cognitive ERPs, e.g, MMN. Such systems were helpful in teaching students and in allowing researchers to collect ERP data. Variations of this approach were successfully implemented, and are being used at DESE, IISc (Neonatal Hearing Screening project) and Computer Science & Engineering Dept., BMS College of Engineering (Dyslexia project).
With the Government's recent encouragement of indigenous manufacturing (advantages being, cost-effective (1/5 cost of *ENOBIO* and 1/75th cost of *NEUROSCAN*), and no import duties or paperwork), there has been an advent of Brain Wellness start-ups in India. We have shared our domain knowledge, protocols (stimulation, recording and analytical) with such entities, over the last 9 months. The aim is to modify their existing smart-phone compatible, brain EEG wearable hardware and software stack (e.g., *NEUPHONY, PankhTech*), to reliably record ERPs. Our primary focus is on Auditory and Visual Cognitive ERPs (P300, MMN) teaching systems. Such systems are expected to be useful in Physiology, Neurology, Neuroscience and Medical Electronics training.
We propose to test these devices in a formal, clinical pilot study, in the near future.
Rugged versions of such systems, with vanishingly simple interfaces in local languages, are being designed for training rural nurses (300,000) and ASHA (Accredited Social Health Activists: 700,000 community health workers, India's National Rural Health Mission), to complement health services with ancillary screening for Memory Disorders, Epilepsy, etc.
1. M. Jayachandra (2022-2020) NPTL-SWAYAM: Introductory Neuroscience and Neuro-Instrumentation. https://onlinecourses.nptel.ac.in/noc20_ee95/preview
2. M. Jayachandra et al., (2016) Using Micro-Controller Instrumentation to teach Cognitive Neurophysiology. 24.08A, 46th Annual meeting, SfN, San Diego.

Disclosures: R.K. Joshi: None. **H. Hariharan:** None. **K. Sooda:** None. **B. Madan:** A. Employment/Salary (full or part-time):; PankhTech Pvt Ltd. **R. Rustagi:** A. Employment/Salary (full or part-time):; PankhTech Pvt Ltd. **K. Srinivasan:** None. **A. Tak:** None. **S. Kubakaddi:** None. **M. Indiramma:** None. **H.J. Pandya:** None. **M. Jayachandra:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.11

Topic: J.02. Teaching of Neuroscience

Title: Integrating neuroscience into social work graduate curriculum, education and training

Authors: *J. BLACK[1], A. M. MAST[2], E. JOHNSON[2], S. LAWLER[4], I. KIM[5], Z. PIERCE[2], M. VALENCIA[2], J. SAY[3], E. LOZORAITIS[1];
[2]Social Work, [3]Sch. of Social Work, [1]Boston Col., Chestnut Hill, MA; [4]Sch. of Social Work, Arizona State Univ., Chevy Chase, MD; [5]Boston Children's Hosp., Boston, MA

Abstract: Title: Integrating neuroscience into social work graduate curriculum, education, and training
Presentation Format: No preference
J.02.c. Graduate and professional
Abstract Text:
Social work MSW graduate education is based on the bio-psycho-social model of human development, yet until recently the biological domain has been much less explored and not as systematically integrated into graduate level curriculum and professional development/continued education programs. If interested in neuroscience, social work graduate students often need to seek out neuroscience electives from other departments because few MSW programs offer neuroscience courses tailored to social workers. This presentation emphasizes the importance and feasibility of integrating cutting-edge neuroscience research and applications into graduate level social work curriculum (from foundation to advanced practice courses) and professional development.
Advancements in neuroimaging modalities provide a complimentary vantage point to understand, define and intervene with human conditions, such as psychopathology, that were once examined through behavioral methods alone (e.g. interview, neuropsychological testing, observer checklists). Given the tremendous growth of neuroscience research with clinical implications *and* the emerging necessity of "bio" literate social workers (as researchers, administrators, educators and clinicians), now is the time to increase focus on this bridging of fields within curriculum. Material presented will include: (1) a history of the integration of biological sciences research within social work coursework and training, (2) background of select neuroscience research (sMRI, fMRI, NIRS, EEG) focused on research questions and applications of interest to social work (such as racism, oppression, child maltreatment, aging, poverty, stress, attachment, cognition, emotional development), (3) specific courses within social work education where neuroscience could be integrated (such as Psychosocial Pathology, Child Welfare and Human Behavior in the Social Environment), (4) examples of currently existing neuroscience electives specific to social work (three of which developed by the presenter, an educational neuroscientist in social work), (5) the future of neuroscience within social work including field placement education and ongoing professional development and continued education programs, and (6) opportunities for those within the neuroscientific community to become involved with social work curriculum and professional training opportunities.

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Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.12

Topic: J.02. Teaching of Neuroscience

Support: This work was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (2021R1A6A3A01087089).
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Title: Customized Patient Education Focusing on the Symmetry Concept for Parkinson's Disease: A Brief Scoping Review

Authors: *M. S. PARK[1,2], W. HUR[1,2], S. PARK[2], H. YOO[1,2];
[1]Dept. of Cardiol. and Neurol. of Korean Medicine, Col. of Korean Med., Daejeon Univ., Daejeon, Korea, Republic of; [2]Clin. Trial Ctr., Daejeon Korean Med. Hosp. of Daejeon Univ., Daejeon, Korea, Republic of

Abstract: Parkinson's disease (PD) is a progressive neurodegenerative disorder with a heterogeneous disease presentation. Tailored patient education is required to explain the various aspect of disease and differential prognosis, as well as to increase treatment adherence in PD patients. In this brief scoping review, the authors aimed to identify the possible subtypes of PD for customized patient education by utilizing the concept of symmetry. We searched the PubMed database using the keywords "Parkinson" and ("symmetry" or "asymmetry"). The title and abstract of the articles were screened. Peer-reviewed, English-written articles published from 2013 to the present involving idiopathic PD patients and a clear concept of symmetry were included. This resulted in a total of 170 articles. The keywords and the concepts of symmetry were extracted from the articles and then charted using Microsoft Excel (Microsoft, Redmond, WA, USA). There were the most studies on asymmetry related to motor symptoms (n=88), followed by the nervous system (n=68), general disease presentation (n=10), and structural factors (n=4). Asymmetry in motor symptoms is more common in early-stage PD patients, especially when the onset age is relatively young. Early in the course of PD, arm swing and step length asymmetries are frequently proposed as biomarkers for differential diagnosis. In addition, patients with mutations in specific genes, such as LRRK2 and GBA, had a higher incidence of motor symptom asymmetry. On the other hand, symmetry in motor symptoms in PD patients usually indicates progression to a later stage. Meanwhile, asymmetry in the nervous system in PD patients has been reported in a variety of aspects, including the brain structure and metabolic network, cerebral blood flow, cognition, emotion, and neural activity. Brain imaging techniques have discovered that the contralateral side of the brain areas such as substantia nigra, striatum, caudate, putamen, and subthalamic nucleus was more affected from the early stage. The onset side of the disease, either right or left, was important in distinguishing the patients' symptoms related to emotion and cognition due to the lateralization of brain functions. There was also an interaction between the patient's handedness and the onset side of the disease. Since physical activity is usually increased, there is a general neuroprotective effect on the dominant side. The

disease stage and clinical characteristics of the PD patients can vary depending on different aspects of asymmetry. The authors believe that categorizing PD patients based on these concepts and guiding them through tailored coping strategies will be useful in future medicine.

Disclosures: **M.S. Park:** None. **W. Hur:** None. **S. Park:** None. **H. Yoo:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.13

Topic: J.02. Teaching of Neuroscience

Support: Simons Foundation
NINDS R25NS117365
HMS Dean's Innovation Award in Diversity & Inclusion

Title: MAHPING connections across institutions to enhance diversity and inclusion in neuroscience: the Morehouse And Harvard Partnership In Neuroscience Growth

Authors: *T. TAN[1], M. LEE[2], E. BATTY[1], P. MACLEISH[3], R. SEGAL[4,1], M. BENVENISTE[3]; [1]Neurobio., Harvard Med. Sch., Boston, MA; [2]Spelman Col., Atlanta, GA; [3]Neurosci. Inst., Morehouse Sch. of Med., Atlanta, GA; [4]Dana Farber Cancer Inst., Boston, MA

Abstract: Partnerships between academic institutions, especially between predominantly white institutions and minority-serving institutions (MSI), can enhance efforts to recruit and retain students for a diverse STEM workforce and can mutually strengthen research and educational efforts at both institutions. The Morehouse And Harvard Partnership In Neuroscience Growth (MAHPING) initiative is an innovative program that is fostering robust, cross-institutional research and educational collaborations in neuroscience among the Atlanta University Center Consortium (AUCC: composed of Morehouse School of Medicine, Spelman College, Morehouse College, and Clark Atlanta University) and Harvard Medical School (HMS). Formally launched in 2019, MAHPING builds upon a rich history of neuroscience collaboration between MSM and HMS, including between the BS/MS Program in Neuroscience at MSM - a fully-funded, accelerated Master's degree in Neuroscience to undergraduates within the AUCC - and the Harvard PhD Program in Neuroscience (PiN). Since its inception, MAHPING activities have included the development of new, team-taught courses such as an advanced Quantitative Neuroscience Bootcamp course for MSM BS/MS students, an undergraduate seminar course at the AUCC to provide early exposure to - and inspiration for - neuroscience, and a short course on light sheet microscopy offered to trainees and faculty at both institutions. Student course survey responses reflect learning gains and overall enthusiasm for these new educational offerings. The MAHPING initiative has also hosted a cross-institutional symposium on sleep and circadian biology, organized a student peer mentoring program for PiN and MSM BS/MS students, and recently launched the Pedagogy Fellows Program, a new professional development opportunity

for graduate and postdoctoral trainees at MSM and HMS to gain theoretical and applied knowledge in evidence-based, inclusive teaching practices. The MAHPING initiative continues to develop innovative programs that enhance neuroscience research and education across our institutions and to catalyze inter-institutional collaborations. These inter-institutional efforts will further enrich our individual communities and will promote diversity and strength in the neuroscience workforce more broadly.

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Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.14

Topic: J.02. Teaching of Neuroscience

Title: Centralized Morphology Toolkit for Students and Professionals

Authors: *L. ALFILER, C. GAMLIN, A. MUKORA, P. BOHN, M. MALLORY, G. WILLIAMS, J. A. WILSON, R. DALLEY, K. CASIMO, S. A. SORENSEN;
Allen Inst., Seattle, WA

Abstract: The Allen Institute is a biological sciences nonprofit research institute focused on neuroscience, cell biology, and immunology. Using a big science approach, we aim to generate useful public resources, drive technological and analytical advances, and discover fundamental brain properties through integration of experiments, modeling, and theory. A major goal of the Institute is to ensure that the datasets and resources are available and accessible to a broad audience. Some of the tools that are already available on our Toolkit webpage (https://portal.brain-map.org/explore/toolkit) include: tutorials describing how to use and access our data, transgenic mice, cell lines, hardware designs, and software applications. Recently, the Allen Institute for Brain Science Morphology team has developed, and made available on our website, a new in-depth Toolkit detailing how to reconstruct neurons, for both professional and educational audiences.
Our team uses the open-source neuron reconstruction software, Vaa3D, for our morphology work and we have created an end-to-end guide for labs who may be interested in replicating our neuron morphology pipeline. The new toolkit was developed to make our approach to quantitative neuron morphology accessible to a wide audience. The professional Toolkit details how scientists at the Allen Institute for Brain Science reconstruct single cells using Vaa3D-Terafly-Mozak software, analyze the morphologies using custom scripts, and use these data to establish quantitative cell types. All of these tools are made publicly available for other researchers to use. The student lesson explains how scientists study, digitally reconstruct, and quantify neuron morphology, in an interactive manner by asking students to engage with our datasets and hand draw cells from said datasets. Specifically, we generated a lesson plan and

accompanying webinar targeted towards advanced high school to advanced college students. The lesson plan gives a more realistic view of what neurons look like, as most neuroscience students are taught only using a simple neuron model. The lesson plan also introduces select Allen Institute online datasets to show students how to navigate these resources, as often the datasets can be overwhelming to inexperienced audiences (https://alleninstitute.org/about/education-outreach/neurons-beyond-textbook/). This highlights the continuing need to generate broadly reaching datasets that are user-friendly.

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Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.15

Topic: J.02. Teaching of Neuroscience

Title: Changing anatomy of fear perception

Authors: *C. KUMARI[1], A. KUMAR[2];
[1]Post graduate institute of medical education and research, Chandigarh, India; [2]Dept. of Anat., All India Inst. of Med. Sciences-Patna, Patna, India

Abstract: Background: For centuries there is a persistent belief that fear perception is primarily led by the amygdala. In recent years multiple studies have been published, including in humans, which have challenged this notion. **Methods:**We conducted a systematic review of the existing literature with the keywords, ‘fear perception’, ‘brain’, ‘amygdala’, ‘periaqueductal gray’, etc. The abstracts were screened followed by a full-text evaluation of the original articles which described the anatomy of fear perception in animal or human brains.**Results:**The early studies established the prime role of the amygdala in fear perception. The evidence from these studies was chiefly based on the crude methods, such as loss of function effects of the brain lesions in the animal models or patients undergoing psycho/neuro surgery or with traumatic lesions involving the temporal lobe of the brain. In contrast, the recent studies, which applied advanced genetic and imaging methods in behaving animals that manipulated the neuronal circuitry to decode the change in behavior, indicated that the amygdala is only secondary to the ‘periaqueductal gray’ in mediating fear perception.**Conclusion:**The fear perception is primarily led by ‘periaqueductal gray and the amygdala has a secondary role.

Disclosures: C. Kumari: A. Employment/Salary (full or part-time):; Full, PGIMER. **A. Kumar:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.16

Topic: J.02. Teaching of Neuroscience

Title: A review of the interactions between the gut-brain axis, probiotics, and Alzheimer's Disease

Authors: *R. TABAZA, S. KAUR, E. REZNIK, R. E. HARTMAN;
Psychology, Loma Linda Univ., Loma Linda, CA

Abstract: A growing body of experimental and clinical data confirms a key connection between aging and poor diet in the elderly that may contribute to the pathogenesis of Alzheimer's disease (AD). We reviewed the published studies on dietary interventions with probiotics to potentially modulate cognitive decline and symptoms in AD via the gut-brain axis. The consolidated evidence on the role of this bidirectional relationship suggests that dietary interventions may be safer and more financially accessible to those at risk of developing AD. Improving the scientific knowledge around the gut-brain axis and the use of dietary interventions as a means of preventing or slowing the progression of AD will have clinical implications by helping physicians, clinical psychologists, neuropsychologists, clinicians, and other healthcare professionals create evidence-based treatment protocols to help patients at risk of developing AD incorporate a diet beneficial to targeting their gut-brain axis. Doing so would allow healthcare workers to use dietary interventions with patients well before they develop the disease. This review will serve as an initial step in a general educational plan, targeting healthcare workers and individuals most susceptible to AD. Overall, findings across the studies suggest that a probiotic intervention at early stages of AD, such as MCI, could improve cognitive function and even delay disease progression. The number of probiotic strains administered, their dosage, and the length of treatment played a role in the extent of cognitive improvement. Studies revealed that probiotic supplementation altered fecal microbial diversity in patients with AD. Probiotics, when supplemented at adequate amounts for 12 weeks or longer, may improve cognitive function in individuals with MCI or AD. Although there are no current treatments for reversing AD pathology, diet and exercise are currently the most effective approaches for managing neurodegenerative disease progression. Ultimately, the data suggest that this approach may ameliorate symptoms of AD, while providing a useful framework to explore the microbiota-gut-brain axis. Considering that the field is still in its early stages, this literature review will be a useful resource for both researchers and clinicians.

Disclosures: R. Tabaza: None. **S. Kaur:** None. **E. Reznik:** None. **R.E. Hartman:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.17

Topic: J.02. Teaching of Neuroscience

Support: Province of Ontario Micro-Credentials Challenge Fund
Province of Ontario Community Impact Award

Title: Development of a microcredential program in neurotechnology

Authors: B. W. JENKINS[1,2], S. ARBUCKLE[3], G. O'LEARY[5], S. SHAW[1,8], M. K. MCINTOSH[3,9], P. GAPRIELIAN[3], A. PATEL[1,2], F. ARSHAD[1,10], J. COUTINHO[3], R. A. MARINO[3], J. HAMILTON[3], A. SEFLER[11,1], G. MOFFAT[12,6], J. D. GRIFFITHS[7,13], G. BLOHM[3], *S. E. BOEHNKE[3,4];
[1]NeuroTechX, Montreal, QC, Canada; [2]Univ. of Guelph, Guelph, ON, Canada; [3]Ctr. for Neurosci. Studies, [4]Biomed. and Mol. Sci., Queen's Univ., Kingston, ON, Canada; [5]Surgery, [6]Munk Sch. of Global Affairs & Publ. Policy, [7]Psychiatry, Univ. of Toronto, Toronto, ON, Canada; [8]Cognixion, Inc., Toronto, ON, Canada; [9]Med., Dalhousie Univ., Halifax, NS, Canada; [10]Univ. of British Columbia, Vancouver, BC, Canada; [11]NTX Services, Montreal, QC, Canada; [12]System2 Neurotechnology, Toronto, ON, Canada; [13]Krembil Ctr. for Neuroinformatics, CAMH, Toronto, ON, Canada

Abstract: Neurotechnologies (all technologies used for measuring-or influencing-the brain) have moved beyond the academic lab and into the consumer market, with further development fueled by both start-up companies and major corporations. Learners from many backgrounds (engineering, computer sciences, life sciences, business) are interested in innovating in this growing field, yet have knowledge gaps that are challenging to fill through already existing credentialed programs due to content constraints or geographic accessibility issues. To address this, Queen's University has collaborated with NeuroTechX (the leading global non-profit supporting neurotechnology enthusiasts) to create a suite of online microcredential courses that target a broad range of topics relevant to the neurotechnology industry, including: Neuroscience and Neurotechnology Primer; Neuroelectronic Recording and Processing; Neuroimaging; Neuromodulation; Behavioural Measurement; and Neuroethical Issues in Neurotech. To ensure content is industry-oriented, we developed an Industry Advisory Board and consulted with leaders from start-ups and established neurotechnology companies. Beyond technical content, our program also acknowledges that the adaptation of available neurotechnologies is fast outpacing conversations about the ethical, legal, and policy issues that accompany them; and ultimately how these technologies will shape society. Our program offers learners access to education that addresses these issues. The courses will be offered in an online format with TA support, and include hands-on tutorials using Python and open access datasets, interactive demos, and video interviews with neurotech companies about their products and entrepreneurial journey. By offering a broad range of courses, learners can take specific microcredential courses that target their knowledge gaps. Importantly, learners can also qualify to participate in a Capstone project course where they will get hands-on experience with neurotechnologies by working in small groups to complete design-challenge projects. The Capstone project will foster the development of industry-relevant skills and serve as a conduit to internships with partnering organizations. We will increase geographic accessibility to the Capstone project course through

partnerships with other Ontario universities. Development of this program was supported by the Province of Ontario Microcredential Challenge Fund and a Community Impact Award, with the goal of supporting the development of an educated and skilled neurotechnology workforce in Canada through short, credentialed educational programs.

Disclosures: B.W. Jenkins: None. **S. Arbuckle:** None. **G. O'Leary:** None. **S. Shaw:** None. **M.K. McIntosh:** None. **P. Gaprielian:** None. **A. Patel:** None. **F. Arshad:** None. **J. Coutinho:** None. **R.A. Marino:** None. **J. Hamilton:** None. **A. Sefler:** None. **G. Moffat:** None. **J.D. Griffiths:** None. **G. Blohm:** None. **S.E. Boehnke:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.18

Topic: J.02. Teaching of Neuroscience

Support: NIH R25 HD105583

Title: Reproducible Rehabilitation Research Training Program (ReproRehab): Building Data Science Capacity in Rehabilitation Research

Authors: *C. S. PHANORD[1], D. N. KENNEDY[3], J. M. FINLEY[2], J.-B. POLINE[4], K. R. LOHSE[5], S.-L. LIEW[1];
[1]Div. of Occup. Sci. and Occup. Therapy, [2]Div. of Biokinesiology and Physical Therapy, Univ. of Southern California, Los Angeles, CA; [3]Dep. of Psychiatry, Univ. of Massachusetts Chan Med. Sch., Worcester, MA; [4]Dep. of Neurol. and Neurosurg., McGill Univ., Montreal, QC, Canada; [5]Prog. in Physical Therapy, Washington Univ. Sch. of Med., St. Louis, WA

Abstract: There have been increasing concerns within the scientific community about producing research with adequate rigor and reproducibility. Data science methods allow for accurate and extensive data acquisition, management, storage, and analyses. The application of these methods can increase the reproducibility and replicability of research. However, many clinical and rehabilitation scientists lack the programming skills necessary to easily implement data science into their research. Here, we present our efforts to address this need with the Reproducible Rehabilitation Research Training Program (ReproRehab), a new NIH/NCMRR-funded R25 research education program that aims to equip rehabilitation researchers with programming and data science skills that can be applied directly to their own research. ReproRehab has three primary goals. First, we aim to build a national workforce of rehabilitation researchers knowledgeable in data science. To this end, we plan to train learners from across the training continuum of rehabilitation research (from students to faculty) to complete a 6-month program beginning in fall 2022. This will consist of a 2-month TA-guided, hands-on bootcamp followed by a 4-month self-guided learning portion to integrate newfound skills into their own research. Second, we will provide rehabilitation researchers who have data science skills with leadership

opportunities to effectively teach and mentor our learners as paid TAs. Third, we aim to further disseminate data science knowledge among the rehabilitation research community by creating an open-source, rehabilitation-focused online repository of data science resources. These will include training materials, public data archives, as well as our program course materials, all organized by specific research areas. Additionally, to better tailor our training program and online resource repository content, we disseminated a needs assessment to evaluate the rehabilitation community's research goals, which will allow us to better curate our ReproRehab curriculum. Upon successful completion of our program, we expect to improve the data science capacity across the rehabilitation research community, and thereby increase the reproducibility and replicability of research needed to move the rehabilitation field forward.

Disclosures: C.S. Phanord: None. **D.N. Kennedy:** None. **J.M. Finley:** None. **J. Poline:** None. **K.R. Lohse:** None. **S. Liew:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.19

Topic: J.02. Teaching of Neuroscience

Support: P30DA048742-01A1
5T32DA007234-29

Title: Functional neuroimaging of the effects of drug exposure or self-administration in rodents: A systematic review

Authors: *G. DROSSEL[1,2], J. ZIMMERMANN[3], A. ZILVERSTAND[1,4];
[1]Dept. of Psychiatry and Behavioral Sci., [2]Grad. Program in Neurosci., [3]Dept. of Neurosci., [4]Med. Discovery Team on Addiction, Univ. of Minnesota, Minneapolis, MN

Abstract: INTRODUCTION: Studying direct effects of drugs of abuse on brain function in humans is challenging due to the ethical constraints. Applying a drug acutely is sometimes possible, but chronic administration to induce addiction is unacceptable. However, both of these are doable within animal models. Rodents are a commonly used preclinical animal model for assessing neural correlates of drugs of abuse, as they are inexpensive and as resting-state whole-brain functional neuroimaging is translatable to humans. The literature on functional neuroimaging of acute and/or chronic drug effects on brain function in rodents has yet to be systematically reviewed. The goal of this project was to review this literature and summarize the brain effects from different drug categories with either acute or chronic administration. METHODS: We performed a systematic literature search according to the PRISMA guidelines. We identified 54 studies on rodent functional neuroimaging (eg, fMRI, phMRI, etc., n = 39) or positron emission tomography (PET, n = 17) with depressants (n = 12), opioids (n = 8), stimulants (32), hallucinogens (n = 1), and antipsychotics (n = 1). Comparing results from across

these studies allowed us to determine how brain function is altered by drug exposure or self-administration.
RESULTS: Results showed that the most common analysis conducted across studies compared animals administered a drug versus control animals that received no drug. Across drug classes, animals that received drug showed altered functionality most commonly in the striatum, followed by the hippocampus. Results in cortical regions were less consistent across drug classes. However for stimulants, the salience network consistently demonstrated altered function. Generally, results were consistent across animals of varying ages (eg, adolescents, adults), imaging modalities (eg, fMRI, phMRI, PET), length of administration (eg, acute vs chronic), and withdrawal phase (eg, none, acute, or prolonged withdrawal).
CONCLUSION: The reviewed studies provide evidence for both drug-general and drug-specific results of altered resting-state function in rodents at both the cortical and subcortical level, with results that correspond to effects seen in human substance use disorder. Due to the majority of studies being on stimulants, future work pertaining to depressants and opioids should be considered. Overall, these results highlight the utility of preclinical animal models for brain neuroimaging for substance use research.

Disclosures: **G. Drossel:** None. **J. Zimmermann:** None. **A. Zilverstand:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.20

Topic: J.02. Teaching of Neuroscience

Title: Perception check: lucid dreaming and memory encoding as elements of dungeons and dragons

Authors: P. EPSTEIN, ***J. LOU**, R. E. HARTMAN;
Loma Linda Univ., Loma Linda, CA

Abstract: Lucid dreaming is a dissociated state in which the dreamer becomes aware that they are dreaming, allowing lucid control of their behavior and interaction within the dream environment. Therefore, while the body is “asleep”, the mind seems to be “awake”. Anecdotal accounts from players of tabletop role-playing games (TTRPGs) such as Dungeons & Dragons indicate the potential elicitation of a similar “dreaming while awake” state, in which episodic memory and areas associated with dreams that can be recalled merge in the encoding process: players will recall the fantastical events of games as if they personally experienced the content of a play session. Although training to induce lucid dreaming has been used in psychotherapy, the use of the gaming experience as an intervention is yet to be established as a therapeutic approach, despite the potential for similar beneficial effects on memory formation and encoding. This review of the literature surrounding the gameplay dynamics of TTRPGs, the associated neuropsychological reactivity, and the various affected neural structures examines how these

factors overlap with the associated elements of lucid dreaming. Furthermore, Dungeons & Dragons, a prime example of TTRPGs that activate the encoding and formation of emotionally-burdened memories, is presented as a case study to demonstrate the feasibility of using the gaming experience for psychotherapeutic interventions and/or sleep rehabilitation.

Disclosures: P. Epstein: None. **J. Lou:** None. **R.E. Hartman:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.21

Topic: J.02. Teaching of Neuroscience

Support: PAPIIT Grant IA202120

Title: Changes in structural development trajectories induced by high alcohol intake in rats: a novel latent classes analysis

Authors: *D. ANGELES-VALDEZ[1], A. LOPEZ-CASTRO[1], L. NARANJO[2], S. ALCAUTER SOLORZANO[1], E. GARZA VILLARREAL[1];
[1]Inst. de Neurobiología. Univ. Nacional Autónoma de México (UNAM), Juriquilla, Mexico; [2]Dept. de Matemáticas,, Facultad de Ciencias, Univ. Nacional Autónoma de México, Mexico City, Mexico

Abstract: Alcohol use disorder (AUD) is a complex neuropsychiatric disorder that usually includes structural brain changes, however, divergence in structural developmental trajectories have not been broadly studied. Using an AUD rat model and in vivo longitudinal structural magnetic resonance imaging (MRI), we wanted to further understand neuroadaptive changes in AUD in young rats.In this study, we used the Intermittent-Access Ethanol 2-Bottle-Choice (IA2BC) drinking protocol in young Wistar rats (P45) (n = 48; 24 female). Animals with continuous access to ethanol (20%; 20 sessions or 45 days) were evaluated using MRI at 3 timepoints (baseline, P63 and P90) and compared to a control group. To classify rats into high and low alcohol intake groups, we development a classd package to compare four methods: (i) percentiles, (ii) k-means clustering, hierarchical clustering, (iv) and latent class linear mixed model (LCLMM). To compare structural longitudinal trajectories, we used whole-brain deformation-based morphometry with a linear mixed-effects model (group x age) using an exploratory FDR threshold (10%). Our results showed that, according to alcohol intake, the multivariate LCMM identified two latent classes of the IA2BC cohort based on longitudinal trends: high intake class (n=9; class probability = 0.97) and low intake class (n=22, class probability = 0.893). Furthermore, we found a significant interaction in local volume between control and high alcohol intake ($p<0.1$) at primary motor cortex (M1), thalamus, caudate-putamen and dentate gyrus. Overall, we found a data driven method of classifying alcohol intake rat groups, and divergence in developmental structural trajectories in AUD rats. These structural

changes may be related to neuroadaptive structural changes associated with AUD that will be further studied using immunofluorescence.

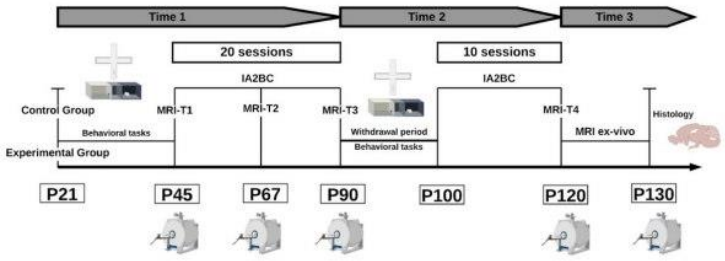


Figure 1 . Experimental Protocol

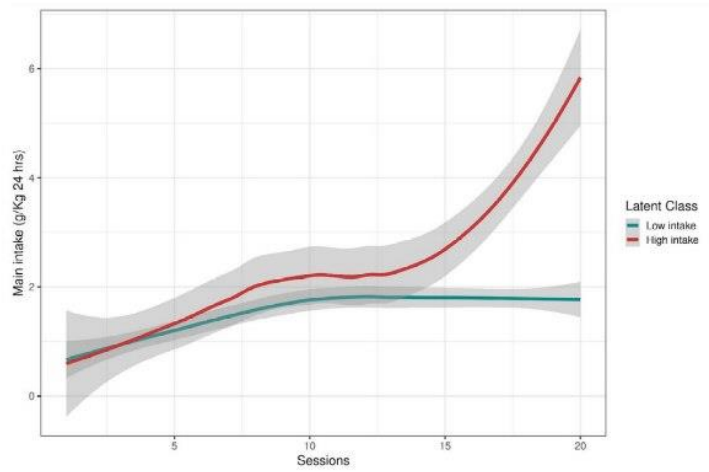


Figure 2 . Classification model between high and low ethanol intake.

Disclosures: D. Angeles-Valdez: None. **A. Lopez-Castro:** None. **L. Naranjo:** None. **S. Alcauter Solorzano:** None. **E. Garza Villarreal:** None.

Theme J Poster

024. Neuroscience Outreach and Education

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 024.22

Topic: J.02. Teaching of Neuroscience

Support: Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship, SB-1712051
DBT–Wellcome India Alliance Intermediate Fellowship, IA/I/11/2500290
IISER Pune

Title: Parallel scalable simulations of biological neural networks using TensorFlow: A beginner's guide

Authors: *R. MOHANTA, C. G. ASSISI;
Biol. Dept., IISER Pune, Pune, India

Abstract: Biological neural networks are often modeled as systems of coupled, nonlinear differential equations. The number of differential equations used to model a network increases with the size of the network and the level of detail used to model individual neurons and synapses. As one scales up the size of the simulation, it becomes essential to utilize powerful computing platforms. While there are several simulation packages that simulate brain dynamics at various scales ranging from the sub-cellular to cellular and inter-areal networks. Switching platforms or expanding the computational scope, when possible, often requires re-writing some components of the code and incorporating different libraries. The degree of difficulty in achieving this can vary as simulation packages often provide sophisticated user interfaces that hide the actual computations (numerical integrators and support functions). As the suite of features implemented in different simulation environments increases, it becomes difficult to grasp the details of the implementation comprehensively. Further, there is a high barrier of entry to developing flexible platform-independent general-purpose code that supports hardware acceleration on modern computing architectures such as GPUs/TPUs and Distributed Platforms. TensorFlow is a Python-based open-source package designed for machine learning algorithms. However, it is also a scalable environment for a variety of computations, including solving differential equations using iterative algorithms such as Runge-Kutta methods. We present a simple exposition of numerical methods to solve ordinary differential equations using Python and TensorFlow through a set of accompanying tutorials which consist of a series of Python notebooks that, over the course of five sessions, will lead novice programmers from writing programs to integrate simple one-dimensional ordinary differential equations using Python to solving a large system (1000's of differential equations) of coupled conductance-based neurons using a highly parallelized and scalable framework. Embedded with the tutorial is a physiologically realistic implementation of a network in the insect olfactory system. This system, consisting of multiple neuron and synapse types, can serve as a template to simulate other networks providing novice programmers the foundation upon which they can build their projects.

Disclosures: R. Mohanta: None. **C.G. Assisi:** None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.01

Topic: J.02. Teaching of Neuroscience

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

Physiology and Neurobiology, University of Connecticut
Psychology, University of Connecticut

Title: The 35th 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: *A. BETZ[1], R. A. ROTOLO[4], G. R. TANNER[5], T. H. AHERN[2], J. L. HAIGHT[3], V. P. FRANCONE[2], E. M. KLINE[6], J.-H. YANG[7], A. ECEVITOGLU[8], G. SANACORA[9]; [1]Quinnipiac Univ., Woodbridge, CT; [3]Psychology, [2]Quinnipiac Univ., Hamden, CT; [4]Psychological Sci., [5]Physiol. and Neurobio., [6]Univ. of Connecticut, Storrs, CT; [7]Psychiatry, Univ. of Connecticut, New Haven, CT; [8]Dept. of Psychological Sci., Univ. of Connecticut, Storrs, CT; [9]Dept Psychiatry, 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 35th NEURON conference was held on February 27th, 2022, at Quinnipiac University's Center for Medicine, Nursing and Health Sciences. The keynote address was given by Dr. Gerald Sanacora, Professor of Psychiatry at Yale University. In his talk, titled, "The Long and Winding Road; Ketamine's Journey from Proof-of-Concept Drug to FDA Approved Antidepressant Medication", Dr. Sanacora discussed his perspectives on clinical trials designed to test the efficacy of newly developed therapeutic agents in psychiatry. Following the keynote, students and faculty participated in workshop sessions including Careers in Science Panel, Detectives of Undiagnosed Disease, Effective Resume Writing, Resolving Conflicts in Labs, and Surgical Neurophysiology. In parallel, undergraduate, and graduate poster sessions, data blitz talks, and grad recruitment and networking took place. The Tieman Outstanding Poster Award was given to undergraduate and graduate students to honor the quality of their work, and an additional poster award was offered by Nu Rho Psi, the national undergraduate neuroscience honor society. 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). NEURON 2023 will be held Sunday, February 26th at Quinnipiac University's Center for Medicine, Nursing and Health Sciences. With continued local and regional support from faculty dedicated to student outreach and mentorship, and co-sponsorship from Quinnipiac University 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: **A. Betz:** None. **R.A. Rotolo:** None. **G.R. Tanner:** None. **T.H. Ahern:** None. **J.L. Haight:** None. **V.P. Francone:** None. **E.M. Kline:** None. **J. Yang:** None. **A. Ecevitoglu:** None. **G. Sanacora:** None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.02

Topic: J.02. Teaching of Neuroscience

Title: Psu neuroscience club - the quest for a neuroscience major: navigating neuroscience education via creation of an interdisciplinary neuroscience minor

Authors: *R. JARDINE, N. L. MACKENZIE, D. JANG, B. P. BOLEN, T. PHAM;
Portland State Univ., Portland, OR

Abstract: The Portland State University (PSU) Neuroscience Club is composed of service-minded students that focuses on improving access to neuroscience education. In order to meet the needs of PSU students, the club aspires to trailblaze the creation of an Interdisciplinary Neuroscience Major. Built upon years of student-led advocacy, the club has paved the way for PSU's burgeoning neuroscience curriculum. Through the perseverance of club members and affinity students, PSU will now offer a formalized, well-orchestrated track of study: the Interdisciplinary Neuroscience Minor. This minor offers a diverse curriculum that teaches neuroscience through a multifaceted perspective. The University recognizes the importance of a systems-based approach to teaching neuroscience using interdisciplinary pathways that more accurately represent the diversity of the field. The minor offers pathways for psychology, biology, and all other majors. We will be proposing an additional pathway for Computer Science majors for inclusion towards a computational neuroscience skill set. The Interdisciplinary Neuroscience Major will follow a similar outline akin to the new minor - however, it will provide additional pathways and practical experience, to promote and cultivate collaborative learning. Over the next year, the club will research how the new minor is being heard and received by the community, including local community colleges from which many students transfer. Furthermore, the club predicts that the interdisciplinary nature of the new minor will strengthen concordance across departments and programs of study at PSU, allowing for greater innovation.The PSU Neuroscience Club plans to continue focusing on community service and building new relationships, through outreach with local K-12 schools and nonprofits. This club aims to set a positive example of what a student-led group can accomplish when its students work in synergy, empowered by an encouraging, inclusive atmosphere - where all are welcome. As the state of COVID-19 changes, the organization plans to continue adapting to community needs, while expanding its network. More than ever, there is a need for connection, harmony, and collaboration. The PSU Neuroscience Club is proud to serve its community.

Disclosures: R. Jardine: None. **N.L. MacKenzie:** None. **D. Jang:** None. **B.P. Bolen:** None. **T. Pham:** None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.03

Topic: J.02. Teaching of Neuroscience

Support: NIH BP-ENDURE grant R25NS119707

Title: A program to prepare diverse transfer students for research careers in neuroscience

Authors: *A. ZUCKERMAN, A. JUAVINETT, B. BLOODGOOD, D. ARTIS, J. AVALOS MORFIN, E. MACAGNO, T. GAASTERLAND, S. LO;
Univ. of California San Diego, La Jolla, CA

Abstract: While community colleges have expanded access to higher education for a diversifying undergraduate population, transfer students are at a significant disadvantage in pursuing research opportunities in neuroscience because they have to acquire complex skills and build relationships within a compressed time frame. To address this issue and promote diversity in neuroscience, we developed a program called STARTneuro (BP-ENDURE), to support transfer students from under-represented backgrounds who are interested in pursuing Ph.D. programs in neuroscience. STARTneuro begins with a full-time, immersive summer research training program in which students are exposed to neuroscience techniques and provided with professional development workshops, mentorship, and networking opportunities. Because substantial research experience is necessary for continuation into Ph.D. training, we fund students to join research labs after the summer program while providing ongoing mentoring and professional support. Here we provide our first set of evaluation data, including surveys assessing outcomes of the summer training (two cohorts, 20 students) as well as data from students' first year in the program (one cohort, 10 students). In these surveys, we assess students' self-efficacy, understanding of how to navigate career and graduate school opportunities, sense of science identity, and perceptions of social and learning support. After our first summer, students reported significant increases in self-efficacy in 19 out of 21 research-related skills and significant increases in understanding how to navigate career and graduate school opportunities. They also reported a strong sense of learning and social support in the program. In the post-summer focus group, participants reported various benefits from the program, including learning about the diversity of neuroscience research and career opportunities, easing the transition to university, and being surrounded by supportive peers and mentors. Long-term evaluation efforts continue to track these students' participation in undergraduate research experiences and pursuit of Ph.D. programs in neuroscience. While currently descriptive in terms of evidence, the program can serve as an initial model to prepare transfer students for careers in neuroscience.

Disclosures: A. Zuckerman: None. **A. Juavinett:** None. **B. Bloodgood:** None. **D. Artis:** None. **J. Avalos Morfin:** None. **E. Macagno:** None. **T. Gaasterland:** None. **S. Lo:** None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.04

Topic: J.02. Teaching of Neuroscience

Support: Important: Up to now, in order to keep independent decision making, I have only used personal founds and resources.

Title: A teaching-lab/research-language and non-invasive unification program for engineering, physics and neuroscience based on chronobiosymmetry: from electrons to ant swarms

Authors: *J. F. GOMEZ-MOLINA;
Independent Activities of Neuro-Science/Engineering and Philosophy IAN(S,E,P), Medellin, Colombia

Abstract: INTRODUCTIÓN. Teaching engineering, biomedical, physical and social sciences to undergraduates has been usually implemented in separate courses. Although this favors specialisation, the ideal of a universal education is undermined. We propose here a teaching and research (computational and experimental) logic language to unify basic concepts of these sciences using the idea of symmetry (1) and the language of electrophysiology (2). METHODS. Programs in Excell, Phyton and Fuzzy Logic in MATLAB. Non-invasive experiments using electronic circuits, biomolecules in aqueous solutions; toy models of neurons and ion channels; video-recordings of ants (Atta cephalotes, Linnaeus, 1758). RESULTS. A circuit-model for social insects and industrial processes is proposed. Teaching tools were developed: see YouTube and websites; keywords: Gomez-Molina, neuroelectric minds, mentes neuroelectricas; see concepts of Group Theory, subgroups and activity conservation (2), Fig. 1(d). CONCLUSIÓNS. 1.We cannot understand fully what a single biomolecule is doing if we do not see it acting in the ecological escenario of chronobiology. 2. The language of chronobiosymmetry is useful for motivating students in the art/humanities to learn sciences and viceversa. 3. Left/right motor processes have a neural platform hardwired into us that can be used to learn about Groups and symmetries. 4. Subcellular calcium levels represent activation states that can be estimated with sleep spindles (2). 5. Ants are organisms that present collective activation states. By studying them, students can connect brain regions for social cognition with regions for abstract reasoning (eg symetry groups, state in high-dimensional space). 6. We are designing a textbook with laboratory practices to teach a unified course on this topic. Departments: Electrical, biomedical, chemical, mechanical, industrial and administrative engineering; biology and medical science. 7. By developing an appropriate language we can teach, in an interdisciplinary course, exciting topics from quantum mechanics (electron-level) to social science. REFERENCES. (1) Frenkel E 2013 Love & Math. Basic Books, Perseus Books Group. (2) Gomez-Molina JF, A Python/Excell comparison of exotic states between sleep and activation using chronobiosymmetry: spindles, alpha and Ca2+-cell compartments in aging and Alzheimer's disease, Scientific SfN-abstract 2022.

Disclosures: J.F. Gomez-Molina: None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.05

Topic: J.02. Teaching of Neuroscience

Support: 2021 Research Infrastructure Investment Grant: 509074

Title: The Impact of Community-Driven Solutions: How to Forge Authentic Institutional Partnerships.

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

Abstract: In 2020, Minneapolis became the epicenter of an extraordinarily diverse, historic, and globally-responsive racial movement that sparked a collective conversation that pulled people together to listen and embrace our differences, cultivating moments of inclusivity around the world. With this momentum, the University of Minnesota established the Community Engagement & Education Core (CEEd) at the Masonic Institute for the Developing Brain. CEEd promotes science, technology, engineering, agriculture, and mathematics (STEAM) development by fostering strong reciprocal community connections. CEEd places great importance on the feedback of our community peers and applies a listening, "community-first" model, investing time to recognize the voices of individual community members and leaders of community organizations in the design and implementation of our facilities, research questions, and clinical care. CEEd believes that early community input for services and research engagement identifies tangible opportunities for integration, collaboration, participation, and program evolution that improve people's lives, "owned" by the community, and inspire the next generation of underrepresented scientists.
CEEd has championed an "abundance mindset" by building partnerships and efficiencies with other community-serving groups within the university to expand our collective reach and effectiveness. CEEd forges university-wide connections to provide infrastructure that recognizes, supports, enhances, and strengthens the preexisting community-engaged research groups via collaboration, resource sharing, curriculum streamlining, and central administration. This silo-breaking approach promotes STEAM diversity with consistent and reinforced impact in the community. The proposed poster presentation will discuss 1) the establishment of the CEEd Core, 2) how it creates long-term, adaptive partnerships that sustain our way of co-creating successfully with the community and University partners, and 3) best practices to break silos, collaborate across disciplines, and share resources and relationships in the engagement field.

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

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.06

Topic: J.02. Teaching of Neuroscience

Title: Nu Rho Psi - The National Honor Society in Neuroscience

Authors: S. CASSELLA[1], M. BLACK[2], L. A. BECKER[3], ***M. T. KERCHNER**[4];
[1]Neurosci. Program, Loras Col., Debuque, IA; [2]Neurosci. Inst., Georgia State Univ., Atlanta, GA; [3]Psychology and Neurosci., Univ. of Evansville, Evansville, IN; [4]Psychology Dept., 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 9000 members, in over 102 chapters in 32 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 2022-23 theme is *COVID 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 (nurhopsi@washcoll.edu). Information regarding the charter application process may be found on our web page: https://nurhopsi.org/ .

Disclosures: S. Cassella: None. **M. Black:** None. **L.A. Becker:** None. **M.T. Kerchner:** None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.07

Topic: J.02. Teaching of Neuroscience

Support: NSF Grant 1458331
NSF Grant 2130078

Title: Reducing barriers for undergraduate STEM success at a primarily undergraduate institution: success stories and lessons learned.

Authors: *M. KREITZER, S. LEONARD, J. S. OSTRANDER, J. LEONARD;
Indiana Wesleyan Univ., Marion, IN

Abstract: Indiana Wesleyan University, a rural, primarily undergraduate institution, recently completed a STEM scholar program with 29 students funded by an NSF S-STEM award, which provided scholarships to reduce financial barriers for students and co-curricular experiences to increase their success as a STEM major. This program provided scholarships for two cohorts of STEM scholars who majored in biology, biochemistry, chemistry, or physics, and organized co-curricular opportunities including an end of the first-year professional development bootcamp, faculty-mentored research experiences, tutoring support, and faculty/peer mentors. At the programs conclusion 21 STEM scholars completed undergraduate degrees in STEM. Outcomes from this S-STEM Scholar program identified important interventions and challenges that we believed were predictive of student success. First, faculty-mentored **research experiences were predictive of student retention and graduation**. All STEM scholars who participated in undergraduate research completed a STEM degree, and conversely, no student who left the S-STEM program participated in research. Second, STEM scholars **valued STEM-specific professional development opportunities**, perceiving them to have a high impact on their development. Third, **first year experiences (FYE) were foundational for scholar retention and success**. As a group STEM scholars had higher first-year GPA's and institutional retention rate compared to traditional STEM majors. Last, **FYE challenges were correlated with STEM scholars who did not complete a STEM degree**, and particularly were challenged by the first-year General Chemistry sequence. Based on collective observations from this STEM scholar program we believe that a consistent, underlying challenge for IWU students who do not succeed in STEM majors (largely recruited from rural Indiana) is a lack of self-efficacy and science-identity. Moving forward IWU's STEM scholar program will implement an FYE course paralleling a year-long General Chemistry sequence aimed at addressing this barrier. In addition to directly providing academic support this FYE course seeks to develop excitement for science careers through mentorship, interactions with STEM professionals, industry field trips, and positive interactions with like-minded peers. We hypothesize that this effort will improve STEM scholar academic retention and success and lead to measurable gains in self-efficacy and science-identity. This S-STEM program will develop a scalable FYE model for institutions of higher education promoting STEM scholar transformation and academic success.

Disclosures: M. Kreitzer: None. **S. Leonard:** None. **J.S. Ostrander:** None. **J. Leonard:** None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.08

Topic: J.02. Teaching of Neuroscience

Title: Faculty for Undergraduate Neuroscience (FUN) promotes undergraduate neuroscience education and research via multiple mechanisms

Authors: *G. D. GRIFFIN[1], K. R. ILLIG[2], E. M. RHINEHART[3];
[1]Biol. & Psychology, Hope Col., Holland, MI; [2]Biol. Dept. and Neurosci. Program, Univ. of St. Thomas, Saint Paul, MN; [3]Biol., Susquehanna Univ., Selinsgrove, PA

Abstract: Since 1992, Faculty for Undergraduate Neuroscience (FUN) has been the premier international society devoted to neuroscience education and research at the undergraduate level (funfaculty.org). This poster details and connects the primary goals of FUN: 1) advance the interdisciplinary study of all facets of neuroscience at the undergraduate level, 2) promote research in neuroscience both as a model for and to encourage participation by undergraduates, 3) facilitate the development of novel undergraduate courses in neuroscience, 4) develop professional competency in emerging methods of neuroscience research, 5) enhance the communication of the latest methodologies in neuroscience research with undergraduates, and 6) contribute to the knowledge base of neuroscience through a variety of media. FUN accomplishes these goals by multiple mechanisms--working with a network of dedicated members (including members at the faculty and pre-faculty levels, institutional members, and sponsoring members). Annually, FUN works with sponsoring organizations to grant travel awards for undergraduates to attend the SfN meeting. Additionally, FUN hosts the Undergraduate Poster Session at the yearly SfN meeting. More recently, FUN has hosted the Neuroscience Undergraduate Research Virtual Symposium (NURVS) to provide an online venue for undergraduate students to present their research findings. The FUN Equipment Loan Program provides researchers with the opportunity to borrow state-of-the-art equipment from associated vendors. FUN publishes the online, peer-reviewed, PubMed-indexed Journal of Undergraduate Neuroscience Education, which is devoted to the dissemination of teaching and laboratory techniques for use in an undergraduate neuroscience curriculum (www.funjournal.org). FUN organizes faculty development workshops which bring educators together to develop and share researched-based instructional practices to enhance the learning experiences for multiple types of instructional modalities (in-person lecture/discussion, laboratory, and online teaching). Those interested in learning more about FUN are encouraged to visit us at our booth, online (funfaculty.org), or contact the authors.

Disclosures: G.D. Griffin: None. **K.R. Illig:** None. **E.M. Rhinehart:** None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.09

Topic: J.02. Teaching of Neuroscience

Support: NSF #2051105

Title: Assessment of Research Skills and Affective Factors Promoting Success and Retention in the Sciences in Underrepresented Minority and First-generation Undergraduates

Authors: *H. J. K. SABLE, D. B. LESTER;
Psychology, Univ. of Memphis, Memphis, TN

Abstract: The University of Memphis (UofM) houses the Neuroscience Techniques and Research Training (NeuroSTART) Program. Recruitment is open to rising undergraduate (UG) juniors and seniors from the Memphis area, but targets underrepresented racial/ethnic minorities (URM) and first-generation (1st gen) UGs. In the 2021 cohort, there were 86 applicants consisting of 54% URM and 40% 1st gen. The eight students accepted all identified as an URM and six were 1st gen. Participants received a stipend as they completed an empirical research project. With faculty mentorship, participants developed a testable hypothesis, collected and analyzed data, and disseminated oral/written results. Participants also received training in responsible conduct of research and engaged in other professional development activities. Key outcomes included faculty and participant ratings of research ability using a modified version of the Student Research Skills Comparison (SCRC), and participant ratings of affective factors promoting success and retention in the sciences. For the latter, we used a modified version of the self-efficacy subscale of the Motivational Strategies and Learning Questionnaire (SE), modified sense of belonging in neuroscience survey items (SB), and modified Science Identity Scale (SIS) items. The mean participant rating on the SCRC for all items was >3.25 (i.e., our benchmark). SCRC mentor ratings were similar except for item 3 (analyzing data) and 17 (writing articles for publication) which did not exceed the benchmark. Mentors and participants noted confidence related to ethics and technical training. For SE, SB, and SIS, our benchmark was also >3.25 on all items, except SB item 3 which was <1.25 (reverse scored). For SE, all items exceeded the benchmark. Participants were confident they learned basic neuroscience concepts, understood complex material, mastered technical skills, and did well in the program. For SB, although participants met the benchmark for items 1 (belonging), 2 (feeling accepted), and 4 (neuroscience in everyday life), it was not achieved for item 3 (feeling like "an outsider in neuroscience"). Lastly, for SIS, the benchmark was achieved for items 1 (neuroscience reflects "who I am"), 3 (identifying as neuroscientist), 4 (neuroscientist as important part of self-image), and 5 (having more in the field with my background makes me feel like a neuroscientist), but not achieved for item 2 (classifying self as neuroscientist). Overall, the affective assessments were extremely positive, but indicated a need for additional emphasis on creating a neuroscience-inclusive environment and promoting self-identification as a member of the field.

Disclosures: H.J.K. Sable: None. **D.B. Lester:** None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.10

Topic: J.02. Teaching of Neuroscience

Title: Undergraduate neuroscience with the arts, humanities and social sciences

Authors: *S. RAMAKRISHNAN;
Neuroscience, Biol., Univ. of Puget Sound, Tacoma, WA

Abstract: While neuroscience as a discipline has been interdisciplinarily taught across synergistic departments such as Biology and Psychology for a while, the applications of neuroscience has become manifold in a variety of settings - from behavioral economics to art therapy to neuroethics. However, this integration of neuroscience into the curriculum is not as common at the undergraduate level - and even if so only usually within a course targeted towards non-majors. More and more specialized fields of "neuro" studies are emerging at the level of graduate schools or within research settings.
At the University of Puget Sound, a small undergraduate liberal arts college, we have recently cultivated a neuroscience major - with pathways through economics, philosophy, arts, bioethics and religion. Students would be able to gain foundational concepts in neuroscience, while also exploring its application within their interest concentrations. With a required research component, and a combined capstone, it hopes to truly convey the breadth of neuroscience in the 21st century, while training a new generation of "neuro" professionals, grounded in scientific methodology but flavored with the arts, humanities or social sciences.

Disclosures: S. Ramakrishnan: None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.11

Topic: J.02. Teaching of Neuroscience

Title: On the Move! A Placement and Research Practicum Offering Exercise Programming to People with Parkinson's Disease

Authors: *L. BROWN;
Trent Univ., Peterborough, ON, Canada

Abstract: On the Move! is a student-led program that puts exercise-science research into action for people with Parkinson's (PwPD) in the Peterborough and Kawartha Lakes, Canada region. Research shows that regular exercise, especially high-intensity and rhythmic exercise like dancing and cycling, helps PwPD manage both the movement symptoms and mental-health challenges accompanying PD by providing temporary relief from PD signs in the hours immediately following a workout. Trent University Psychology, Biology, and Kinesiology students are selected and trained to lead exercise classes centred around dance and cycling. Students start with classroom work focused on understanding neural models of PD and research into the efficacy of different types of exercise programing for PD. They are also provided training led by personal-trainer consultants who regularly work with PwPD clients; students use

this information to tailor exercise programming to PwPD and to develop options for participants at different levels of progression. Finally, students are supervised as they conduct program evaluation studies focused on determining the effectiveness of the program. The program evaluation studies use survey and behavioural testing data to gather information on participants' pre- and post-program daily activity levels, general fitness and mobility, mental health and well being, and use qualitative data gathered through participant interviews to assess participants' experiences of the accessibility, suitability, and enjoyable nature of the classes. The program provides students with a structured research and placement experience with exposure to a welcoming clinical population.

Disclosures: L. Brown: None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.12

Topic: J.02. Teaching of Neuroscience

Support: NSF 1832338
NSF 1935749
NSF 1935771
NIH U24EB02900

Title: Expanding neuroscience education and research at Hispanic-serving institutions through faculty development workshops

Authors: A. DELORME[1], S. SIVAGNANAM[2], K. YOSHIMOTO[2], A. MAJUMDAR[2], ***E. E. SERRANO**[3];
[1]Swartz Ctr. for Computat. Neuroscience, Inst. for Neural Computing, UCSD, La Jolla, CA; [2]San Diego Supercomputer Ctr., Univ. of California San Diego, La Jolla, CA; [3]Biol. Dept., New Mexico State Univ., Las Cruces, NM

Abstract: Hispanic-serving institutions (HSIs) are defined in the Higher Education Opportunity Act (Title V) as institutions enrolling 25% or more Hispanic full-time equivalent (FTE) undergraduate students who are US citizens or residents. HSIs comprise ~ 18% of all higher education institutions and serve two-thirds of the nation's Hispanic students yet on average receive only 68 cents for every federal dollar distributed annually to other colleges and universities. HSIs also enroll high numbers of Black, Asian-American, and American Indian students, and serve many low-income students. This large diverse student constituency is a reservoir of talent for the nation's STEM workforce. Because of resource gaps, many HSIs struggle to offer curricula with the most contemporary content and this can place HSI students at a disadvantage as they continue their career pathways. Here we present a strategy for building neuroscience curricula with rigorous computational components at HSIs through development of

training activities for faculty who teach neuroscience. Virtual professional development workshops for faculty were developed as a collaborative partnership between the NSF HSI National STEM Resource Hub and the NSF and NIH funded Neuroscience Gateway. The free workshops provided an introduction to the Neuroscience Gateway (NSG) a cyberinfrastructure resource that facilitates neuroscience software for modeling and data processing on computing resources and is used for research and education by the neuroscience community. The workshop focused on electroencephalography (EEG) for neuroscientists by describing how EEG data can be collected and analyzed using EEGLAB, a popular data processing software. Workshop attendees joined from across the nation; admission priority was awarded to applicants from 2-year and 4-year HSIs who had limited prior NSF support, and to faculty within their first 10 years of academic appointment. External program evaluation demonstrated the workshop succeeded in motivating faculty to integrate the workshop content into courses and grant proposals. Participants provided improvement suggestions that are being being incorporated into the design of future offerings of the workshop that are planned for fall 2022.

Disclosures: **A. Delorme:** None. **S. Sivagnanam:** None. **K. Yoshimoto:** None. **A. Majumdar:** None. **E.E. Serrano:** None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.13

Topic: J.02. Teaching of Neuroscience

Title: Incf trainingspace: open access training resources on the principles of open science and fair neuroscience for neuroscience instructors

Authors: P. BERMUDEZ[1], ***M. ABRAMS**[2];
[1]Montreal Neurolog. Inst., Montréal, QC, Canada; [2]INCF, Stockholm, Sweden

Abstract: Advancements in technology for linking and distributing information have ushered in a new era for neuroscience scholarship. Neuroscience is moving towards open science and FAIR principles, which aim to make research outputs (data, code, and workflows) as open as possible and Findable, Accessible, Interoperable, and Reusable, characteristics required for making digital objects maximally useful for both humans and machines. Like any skill, the practices of open science must be learned, particularly since they are still taking hold in neuroscience, yet many traditional neuroscience training programs have not included courses on the principles and application of open science approaches in their curricula. Thus, the objective of the INCF TrainingSpace (https://training.incf.org/) was to create open- access training resources concerning open and FAIR neuroscience approaches that instructors at undergraduate institutions could incorporate into their practice. The resources are divided into study tracks that provide learners with an open science starter kit, introduction to FAIR neuroscience, subdiscipline specific FAIR approaches (neuroimaging, electrophysiology, and computational neuroscience),

and practical use cases of FAIR. In addition, the TrainingSpace also contains tutorials on tools and infrastructure that promote FAIR. All lectures within the study track provide learners with video recordings of lectures, learning objectives, and links to question and answer forums associated with the lectures. The resources are available to the community at large and include over 500 multimedia courses, lectures, and tool tutorials covering the subdisciplines of neuroscience and neuroinformatics, as well as computer science, data science, and ethics. The study tracks were developed in a collaboration between the INCF and a number of partners, including the Canadian Open Neuroscience Platform. All resources on TrainingSpace are licensed to allow instructors to reuse the materials.

Disclosures: P. Bermudez: None. **M. Abrams:** None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.14

Topic: J.02. Teaching of Neuroscience

Support: NIH P20 GM103429
NSF EEC-1801666
NSF DBI-1659831
NSF OAC-1730655
NIH MH122023

Title: Reducing barriers-to-entry for computational neuroscience using web-based tools in the classroom

Authors: *D. DONLEY[1], Z. CHEN[2], G. GLICKERT[3], D. BERGIN[4], D. SCHULTZ[4], S. S. NAIR[5];
[1]Harding Univ., Searcy, AR; [2]Electrical Engin. and Computer Sci., Univ. of Missouri, Columbia, Columbia, MO; [3]Neural Engin., Univ. of Missouri, Columbia, Wildwood, MO; [5]Electrical & Computer Engin., [4]Univ. of Missouri, Columbia, MO

Abstract: Computational tools and engineering principles are becoming increasingly important in the life sciences. Programs such as NEURON, Python, and Matlab have long been used in neuroscience. Each program has significant barriers-to-entry for undergraduate students and underrepresented groups in STEM. Additionally, those who have programming and computation expertise may not be broadly trained in basic biology. Therefore, more tools are needed to cross-foster ideas from neurobiology and programming/neural engineering. This is particularly true in the classroom where barriers-to-entry can impede learning and dampen enthusiasm. In a collaborative effort, we have adapted several NEURON programming tutorials and software laboratory activities to Python notebooks that can be run using freely available, web-based tools such as Google Colab. These tools have the ability to be differentiated for classroom use and

implemented at a variety of levels. In a pilot study to determine the effectiveness of these tools, we found that our notebooks are able to increase both knowledge of neurophysiology principles as well as promote a favorable attitude toward their incorporation in the classroom. Based on our initial rollout of the notebooks during short, online workshops we have developed recommendations for providing students "easy wins" to facilitate engagement and learning. Our long-term goal is to determine the effect of "plug-and-play" notebooks on major barriers-to-entry related to programming and computation. There are benefits and drawbacks to classroom implementation of computational tools that need careful thought and best practices for successful execution. Our goal is to facilitate an ongoing conversation about the best practices for implementing computation in the classroom and the recommendations for competencies related to programming/computation in neuroscience. Tools such as these are well-positioned promote collaborative working groups in the classroom that facilitate the cross-fostering of ideas and utilizes the combined skill set of the group.

Disclosures: D. Donley: None. **Z. Chen:** None. **G. Glickert:** None. **D. Bergin:** None. **D. Schultz:** None. **S.S. Nair:** None.

Theme J Poster

025. Undergraduate Neuroscience Programs

Location: SDCC Halls B-H

Time: Sunday, November 13, 2022, 8:00 AM - 12:00 PM

Program #/Poster #: 025.15

Topic: J.02. Teaching of Neuroscience

Title: A scientist spotlight assignment promotes inclusiveness in an undergraduate neurobiology course

Authors: *K. E. FRENZEL;
Neurosci. and Behavioral Biol., Emory Univ., Atlanta, GA

Abstract: A Scientist Spotlights assignment promotes inclusiveness in an undergraduate neurobiology course.
Creating a sense of belonging within the classroom is a key tenet of inclusive pedagogy. Undergraduate neuroscience classes attract students from historically excluded or marginalized communities, yet these students rarely see their identities represented in the classroom. The Scientist Spotlight assignment has shown promise for increasing introductory biology students' feelings of belonging in science and shifting science stereotypes and here I describe an adaptation of the assignment which was integrated into an upper-level Neurobiology course. The assignment presents counter-stereotypical examples of neuroscientists and integrates these scientists' research into the course, providing a broader view of who can be a neuroscientist. The integration of these scientists' research reinforced fundamental concepts and augmented classic experiments from the course textbook. The adapted Scientist Spotlight assignment responses from student pre- and post-course assessment demonstrate a significant change in feelings of relatability to neuroscientists and analysis of the language used in the reflection assignments

provides corroborating qualitative evidence. Going forward, student products from this assignment will serve as additional resources for other instructors and will synergize with other efforts like The Journal for Undergraduate Neuroscience Education's Project DiViNe (Diverse Voices in Neuroscience) for finding and creating pedagogical materials to integrate counter-stereotypical scientists into neuroscience curricula.

Disclosures: K.E. Frenzel: None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.01

Topic: J.03. Public Awareness of Neuroscience

Title: Analyzing Youtube and Spotify data from the #1 ranked science podcast in Brazil

Authors: *A. MAYER;
Federal Univ. Of Santa Catarina, Florianopolis, Brazil

Abstract: Many Brazilians are scientifically under-informed and skeptical or distrustful about science. However, curiously, most also are highly interested in science content (Gallup, 2019; CGEE, 2019). This apparent paradox could be explained by the lack of accessible information designed to enhance science literacy. To address this, I created a solo podcast (only one host) to teach the Brazilian public about neuroscience, with especial focus on themes related to mental health and performance. The main topics covered include attention, ADHD, memory, learning, sleep, circadian rhythm, dopamine and other neuromodulators, motivation, habitual behaviors, addiction, executive functions, and drugs and supplements. The first episode was produced in June of 2021, and in total, twenty one episodes has been published on both Spotify (Podcast: "Brain's Fault"; only audio content) and Youtube (channel "Andrei Mayer", audio/video content), with a median duration of 1h and 26 minutes. Data from these platforms were extracted on 06/12/22.

On Spotify, the podcast reached 1st place as the most listened-to science podcast in Brazil within 6 months of the first episode (in December of 2021). In total, the episodes were listened to 199,799 times by 106,142 different listeners, the majority of which were between 28-34 years old (31%). The podcast was also popular among individuals aged 23-27 (27%) and 35-44 years old (21%). The first episode posted on Spotify has received the most plays with a total of 25,072 streams, and discusses how to increase focus, energy and learning. The least listened-to episode (with a total of 868 streams) was the most recently posted episode on June 2022, discussing sleep drugs.

On Youtube, all the episodes were collectively viewed 5,248,572 times, by a similar demographic as Spotify (mainly young and older adults, aged 25-54 years old). The most popular one was the 9th episode, published in November 21, which discussed dopamine fasting and addiction (duration = 1h and 34minutes). It currently has 617,651 views, an average view

duration of 13 minutes, and more then 1,400 comments. Similar to Spotify, the least popular episode in Youtube was the most recently published one, about sleep drugs. It currently has 4,798 views, an view duration of 18 minutes and only 211 comments.
The striking difference in the total number of accesses on either platform suggests that the YouTube may be a more effective platform for reaching a larger audience. However, the podcast still performed strongly on Spotify, suggesting that a solo podcast is a great option to make neuroscientific knowledge accessible to the general public.

Disclosures: A. Mayer: None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.02

Topic: J.03. Public Awareness of Neuroscience

Support: Mind Science Foundation: BrainStorm

Title: Leveraging Social Media for Public Engagement with Science: An Analysis of In-App Data

Authors: *B. REIN;
Stanford Univ., Palo Alto, CA

Abstract: Video-based social media apps such as TikTok and Instagram can be effective tools for science communication, allowing scientists to share timely, evidence-based content directly with the public. Many of these platforms are adopting sophisticated recommendation algorithms that track user habits, learn their preferences and interests, and recommend tailored content. As a result, these apps offer scientists the unprecedented ability to preferentially reach those who are naturally curious about science. Arguably, these algorithms have made it easier than ever before to communicate science to receptive, self-selected target populations. Furthermore, when new users join these platforms, they are exposed to a broad range of videos to generate their personalized recommendations. This process inherently creates opportunities for scientists to contact those who may not typically seek science-related content. Thus, recommendation-based video apps are powerful - and perhaps underappreciated - vehicles for public engagement with science.Over the last 2 years, I have uploaded more than 300 educational science-related videos on the TikTok platform, which have collectively accumulated over 7 million "likes." Here I present an analysis of in-app data from a large sampling of these videos, searching for factors that meaningfully influence viewer engagement (i.e., video topic, video length). I also explore video metrics to identify predictors of video "virality" (measured as the number of views). Variables studied include video length, viewer retention, use of hashtags, and viewer engagement (rates of likes, comments, and shares). Finally, survey data are presented which assess how these videos have influenced followers' self-reported sentiment towards science (i.e.,

trust in science, trust in scientists).This poster is intended to provide useful insights for both current and aspiring science communicators on social media. These findings may help scientists navigate these platforms and understand factors influencing user behavior. Any SfN attendees interested in discussing social media for science communication are encouraged to stop by to chat!

Disclosures: B. Rein: None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.03

Topic: J.03. Public Awareness of Neuroscience

Support: Dana Foundation Brain Awareness Grant 2022
Dana Foundation Brain Awareness Grant 2021

Title: Nogginfest: A free public celebration of music, art, brains and neuroscience research

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

Abstract: Science needs investment, and engaging the public communicates discoveries and builds support for education and research. Integrating the arts, including painting and music in STEM (STEAM) fosters interdisciplinary engagement, and draws in more people not currently overrepresented in the academic study of 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 to 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 50,000 people since 2012!
NW Noggin is volunteer and free. Many science organizations in the Northwest are paywalled, and require you to come to them, excluding many, and largely serving those with existing resources and privilege. Yet despite minimal budgets, we successfully raised funds to bring accomplished outreach participants to SfN conferences to present posters and visit K-12 students in Chicago, San Diego and Washington DC public schools.
In 2017, through the efforts of undergraduate members of the Portland State University Neuroscience Club, we presented our first NogginFest, a free public celebration of music, art, research and brains! We offered live bands, an art auction, brain specimens, art activities and research speakers at the Alberta Rose Theater in Portland Oregon, and raised money to transport, house and feed 15 undergraduates at the SfN conference in Washington DC. Our students

presented posters and met with 700 students in Turner Elementary School.
We presented NogginFest again in 2018 and 2019, with more live musicians, artists and neuroscience researchers, funding more student participation at SfN. In 2020 we paused as the coronavirus pandemic took hold, but pivoted to a well-attended virtual NogginFest, supported by a brain awareness grant from the Dana Foundation in 2021.
In 2022, with support from the Dana Foundation, we returned to an in person NogginFest. The venue (Honey Latte Café) was donated, and the event brought out over 500 Portland residents who enjoyed music, held brains, asked questions, made art, heard about research and connected with each other from 2pm until midnight! NogginFest is the largest student-run, free, all ages celebration of brains, art and music in the Pacific Northwest, enthusing and informing a diverse public about discoveries in neuroscience.

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

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.04

Topic: J.03. Public Awareness of Neuroscience

Support: NIH P60-AA011605

Title: Challenges, opportunities and strategies to promote enthusiasm for brain science in a virtual space

Authors: *S. P. FACCIDOMO[1], C. DANNENHOFFER[2], J. L. HOFFMAN[2], L. C. ORNELAS[2], J. BESHEER[1], D. L. ROBINSON[1];
[1]Psychiatry & Bowles Ctr. for Alcohol Studies, [2]Bowles Ctr. for Alcohol Studies, Univ. of North Carolina - Chapel Hill, Chapel Hill, NC

Abstract: Goals: Despite the easing of restrictions across the country, our community outreach activities continued to be impacted by COVID-19 during the 2021/2022 school year. Thus, we approached outreach with caution, scaling back our in-person activities while also offering virtual outreach to communities throughout the state in partnership with the local Morehead Planetarium and Science Center. A significant benefit of, and key reason why we continue to engage in, virtual outreach, is that it allows us to interact with schools and health education programs in more remote and diverse areas of North Carolina. In this way, we are hopeful that we can enhance our ability to make science outreach accessible for more communities in NC and beyond. **Events:** This year we participated in one weekend of in-person museum events, one in-person science fair, one virtual health education talk for high school students, and several in person and virtual K-12 and college classroom visits. **Approach:** We are now well-equipped to offer a variety of adapted outreach activities via zoom to diverse audiences. This hybrid approach to community outreach has allowed us to clearly assess the successes and failures of

our activities in both settings. Here, we offer an in-depth comparison of similar activities in both settings and detail the ways in which we adapted each activity for in-person vs. virtual science dissemination, with the goal to be as hands-on and as interactive as possible in both venues. **Observations:** One of our most popular in-person activities is "Touch a Brain". We teach visitors about the human brain and have a specimen they are allowed to gently touch. This is a highly interactive exhibit and we have struggled to make it engaging via zoom without feeling like a lecture. In contrast, we have found that activities involving sensation & perception and learning & memory are interactive and engaging both in person and in a virtual setting. We hope to expand and continue to develop these activities as we move forward to find new and creative ways to engage our audience. **Conclusions:** We will continue to explore new iterations of activities that can engage our visitors for both in-person and virtual outreach. We are excited to expand our network beyond our county to reach more communities that may have limited accessibility to science outreach. We continue to have an overarching goal to make science accessible to all, especially to current and future K-12 generations.

Disclosures: S.P. Faccidomo: None. **C. Dannenhoffer:** None. **J.L. Hoffman:** None. **L.C. Ornelas:** None. **J. Besheer:** None. **D.L. Robinson:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.05

Topic: J.03. Public Awareness of Neuroscience

Support: NIH Grant GM 146300
NIH Grant MH 119049
NSF Grant 2050194

Title: A multi-stage approach to building a diversified neuroscience workforce

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

Abstract: A wealth of evidence has demonstrated that scientific workforce diversity is essential for discovery and innovation. However, neuroscience workforce diversity continues to be an ongoing and difficult challenge. While the concept of a "leaky" pipeline is not novel by any means, new research suggests that STEM pipeline diversity issues begin very early. There is a growing need for comprehensive programs that marshal learners through stages of development to nurture and grow their interest in neuroscience careers.The Center for the Neurobiology of Learning and Memory (CNLM)'s Office of Outreach and Education has developed an innovative pipeline training model that stimulates curiosity and passion for brain science as early as elementary school and continues this engagement through doctoral training. Our programs are sequenced with partial overlap as follows: (1) K-8 Brain Explorer Academy, a weekend exposure

program focused on early experiences with demos, dissections, and lab tours, (2) Brain Camp for middle and high school students, a two week immersive summer program featuring seminars, workshops, hands-on activities and group experiments, (3) High School Brain Explorer Academy, a flagship three-year (sophomore through senior year) comprehensive neuroscience engagement program in partnership with Title 1 schools supported by the NIGMS Science Education Partnership Award (SEPA), (4) Summer Institute in Neuroscience, an eight week summer research experience in UCI labs, supported by the NSF Research Experience for Undergraduates (REU) program and the University of California's UC-HBCU partnership program, and (5) Training Program in Learning and Memory, a T32 predoctoral training grant supported by the NIMH and a private endowment. Collectively, these programs have significantly increased the diversity of our neuroscience trainees. Each program is envisioned as a "feeder" program into the next stage in training. By stacking these programs across stages and ensuring their long-term sustainability by leveraging partnerships with federal and private funders, we can engage and retain talent in the neuroscience pipeline and make progress on achieving biomedical workforce diversity goals.

Disclosures: M.O. Yassa: None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.06

Topic: J.03. Public Awareness of Neuroscience

Title: Broadening the Diversity of the Applicant Pool for the BRAIN Initiative Team Science and U19 Grants

Authors: M. H. EISENBERG COLMAN[1], M. ROGERS[1], N. WILLIAMS[1], V. JUNGHAHN[1], A. SEVER[1], B. MCMAKIN[2], R. CALABRESE[2], Y. KLOTH[2], J. GNADT[2], K. DAVID[2], H. GEBREHIWET[2], *K. DUPRE[2], A. BECKEL-MITCHENER[3];
[1]Fors Marsh Group, Arlington, VA; [2]NIH NINDS, Bethesda, MD; [3]NIH NIMH, Bethesda, MD

Abstract: It is critically important that neuroscientists who are women and from underrepresented minorities (URM) are represented on NIH grants and research teams. The NIH *Brain Research Through Advancing Innovative Neurotechnologies*® (BRAIN) Initiative is committed to increasing the diversity of applicants for its multidisciplinary team science funding mechanisms such as the U19. In collaboration with NINDS and the NIH BRAIN Initiative, Fors Marsh Group conducted two rounds of In-Depth Interviews (IDIs) with current PIs on U19 grants and potential U19 applicants. Sixteen investigators (64% female, 53% URM) participated in the IDIs between February 1 and March 18, 2022. We spoke with current U19 holders in Round 1 and potential U19 applicants in Round 2, updating the discussion guide between rounds to reflect new findings. We prioritized speaking with women and URM investigators. The purpose was to identify motivators and barriers to applying to team science funding, understand

challenges that women and URM investigators face applying to team science grants such as the U19, and identify ways that PIs and the NIH BRAIN Initiative can better support them. The biggest named benefit of the U19 was that the scope and multidisciplinary aspect allowed for innovations that could not be accomplished independently. Other benefits included cross-functional collaboration and inclusion in the U19 network of researchers. Current U19 holders said that there were very few women and URM investigators with the necessary expertise to bring on to their teams. Many participants, especially women, cited the perceived difficulty demonstrating independent funding and leadership with a U19 grant compared to individual grants like an R01. This was a barrier to applying and women said this compounded the challenges they already faced demonstrating their expertise for promotion and grant funding compared to their male colleagues. However, investigators appreciated the NIH BRAIN Initiative efforts to reach women and URM. Overall, potential applicants see the value of multidisciplinary work and the U19 specifically. However, some women and URM investigators may hesitate to apply to team science grants, preferring to spend their time on an individual grant like an R01. The BRAIN Initiative could improve applicant diversity with a multi-faceted approach that strengthens and expands the NIH BRAIN Initiative's network of women and URM scientists and identifies opportunities for all PIs, including women and URM, to demonstrate leadership and independence on team science grants like the U19.

Disclosures: M.H. Eisenberg Colman: None. **M. Rogers:** None. **N. Williams:** None. **V. Junghahn:** None. **A. Sever:** None. **B. McMakin:** None. **R. Calabrese:** None. **Y. Kloth:** None. **J. Gnadt:** None. **K. David:** None. **H. Gebrehiwet:** None. **K. Dupre:** None. **A. Beckel-Mitchener:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.07

Topic: J.03. Public Awareness of Neuroscience

Support: IBRO Grant 089

Title: Sign language in neuroscience

Authors: *L. BAQUEDANO SANTANA[1], M. UTRILLA[2], C. SANDOVAL[3], R. E. LOVATON[4], M. INFANTE[5], V. ROJAS[6], E. M. ZAVALA MALPARTIDA[7];
[1]Univ. Nacional Mayor de San Marcos, Lima, Peru; [2]P.B.J.M, Lima, Peru; [3]Biom 3D, Huancavelica, Peru; [4]Neurosurg., Clinica San Pablo, Lima, Peru; [5]Consutores OSSIDE, Lima, Peru; [6]ANDES INSTITUTO DE CAPACITACIONES, Huancayo, Peru; [7]Lima, Hosp. Nacional Edgardo Rebagliati Martins, Lima, Peru

Abstract: The sign language is a complete, natural language that has the same linguistic properties as spoken languages. Sign language is expressed by movements of the hands and face.

It is the primary language of many persons who are deaf and hard of hearing and is used by some hearing people as well. There is no universal sign language, different sign languages are used in different countries or regions. A problem that we found was the lack of knowledge of basic terms of the nervous system, health and neurosciences in the deaf and hard of hearing community and therefore it is necessary to carry out public outreach activities that educate on these issues. The objective of the conference in sign language was to educate deaf and hard of hearing people in basic terms of the nervous system and the importance of the study of the brain and neuroscience. However, our long-term goal is to educate the hearing community about the importance and benefits of learning sign language, including benefits for the brain. But the most important is to develop a strong appreciation for deaf culture, and promote understanding and acceptance of the language.

Disclosures: L. Baquedano Santana: None. **M. Utrilla:** None. **C. Sandoval:** None. **R.E. Lovaton:** None. **M. Infante:** None. **V. Rojas:** None. **E.M. Zavala Malpartida:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.08

Topic: J.03. Public Awareness of Neuroscience

Support: IBRO/Dana Brain Awareness Grant 2021

Title: Going back to the new normal: Development of new strategies to reach new audiences

Authors: *R. C. ZEPEDA[1], G. GUILLÉN-RUIZ[2], T. MOLINA JIMÉNEZ[3], C. J. JUÁREZ PORTILLA[1], A. CORTÉS SOL[4], J. A. SÁNCHEZ SALCEDO[5], J. CUETO ESCOBEDO[6], I. MARTINEZ SERRANO[4], D. HERNÁNDEZ BALTAZAR[2], M. ALVARADO OLIVAREZ[2], T. CIBRIAN LLANDERAL[2], B. BERNAL MORALES[2], J. F. RODRÍGUEZ LANDA[2];
[1]Ctr. de Investigaciones Biomédicas, [2]Inst. de Neuroetología, [3]Facultad de Química Farmacéutica Biológica, [4]Facultad de Biología-Xalapa, [5]Facultad de Ingeniería en Sistemas de Producción Agropecuaria, [6]Inst. de Ciencias de la Salud, Univ. Veracruzana, Xalapa, Mexico

Abstract: After two years of pandemic lockdown, the return to face-to-face activities was an important challenge to face. Therefore, neuroscience researchers, along with members of the scientific community at the University of Veracruz, organized the 2022 Brain Awareness Week. As previous years, the Biomedical Research Center, the Institute of Neuroethology, the faculties of biology and chemistry, worked together to reach our goals. This year, we turn to hybrid system including face-to-face and virtual activities, this strategy gave us the opportunity to organize a wide variety of actions and events to reach a broad of audiences. In face-to-face activities, for instance, kindergarten children enjoyed of a virtual ludic lecture about how to take care of the brain, and the importance of eat and rest well. At elementary schools, we presented face-to-face Brain Fairs, where the students got the opportunity to learn and play with brain

models, observed brain sections under the microscope, test their senses, assemble puzzles regarding to brain functions, etc. Moreover, high schools' students received lectures in their classrooms about the importance of drug prevention, sleep function, learning and memory, the effect of hormones on behavior, the relation between microbiota and the brain, clocks in the brain, brain ischemia, among others. In addition, we achieved a social media campaign, that included Facebook Live scientific lectures transmitted on @semanadelcerebroxalapa. Also, in this Facebook page, we posted video capsules and infographics about brain functioning and diseases, thinking about people who do not belong to academic areas. Another important action was the production of radio capsules, "Breves del Cerebro", along with the University's radio station, RadioUV (90.5 FM), that were transmitted daily over the month of March, and currently, are available on Spotify, as podcast episodes. Finally, as an effort to include non-specialized audience, we also offered talks in restaurants and coffee shops that were prepared to this kind of spectators. The informal atmosphere in restaurants allows that people who normally have not the opportunity to get in touch with science in general, enjoy these talks, and clarify the doubts they use to have and had never been able to express them before. Our total number of attendees was around 910 people; that were distributed as follows: informal talks 115, Facebook Life lectures 160, and schools' lectures and workshops 635. Importantly, in 2021, we received the IBRO/Dana Brain Awareness Grant to organize the project named: Semana Internacional del Cerebro Xalapa.

Disclosures: R.C. Zepeda: None. **G. Guillén-Ruiz:** None. **T. Molina Jiménez:** None. **C.J. Juárez Portilla:** None. **A. Cortés Sol:** None. **J.A. Sánchez Salcedo:** None. **J. Cueto Escobedo:** None. **I. Martinez Serrano:** None. **D. Hernández Baltazar:** None. **M. Alvarado Olivarez:** None. **T. Cibrian Llanderal:** None. **B. Bernal Morales:** None. **J.F. Rodríguez Landa:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.09

Topic: J.03. Public Awareness of Neuroscience

Title: Knowing Neurons Neuroscience Communication Platform: The Translation Project

Authors: *A. HOGAN[1], A. PERIS-YAGÜE[2], Z. DOBLER[3];
[1]Univ. of California Los Angeles, Los Angeles, CA; [2]CTB (CTB-UPM) Ctr. for Biomed. Technol., Madrid, Spain; [3]UCLA, Los Angeles, CA

Abstract: As our world is increasingly shaped by technological advancements and government politics formed around scientific problems such as pandemics and climate change, it has never been more important to develop resources to disseminate science to the public. Knowing Neurons is a creative neuroscience publication platform and outreach organization whose main mission is to educate the public on recent neuroscience research findings in a way that is both informative and engaging, and to provide a platform where training neuroscientists can practice

their science communications skills. The content produced at Knowing Neurons spans multiple media such as podcasts, articles, and science art and spans topics from neurotechnology to science policy to science fiction. Although efforts to improve science communications resources have increased in recent years, most of these resources are only produced in English and many outreach events are only conducted in English. Recently the Knowing Neurons team has established a collaboration called The Translation Project with the University of California, Los Angeles (UCLA) Brain Research Institute and the UCLA Spanish and Portuguese Department to translate Knowing Neurons content into Spanish so that our material is accessible to demographics that are often underrepresented in STEM fields. To support this collaboration, Knowing Neurons formed an Outreach and Translation team consisting of bilingual members from Spain, Chile and the U.S. Two courses of UCLA undergraduate students translate Knowing Neurons articles and then take their work to conduct neuroscience outreach activities in Spanish to local high schools with large populations of Hispanic students. The Translation Project has so far resulted in over 60 translations and 4 outreach events. The translations have received over 7,000 pageviews on the Knowing Neurons website and the outreach events have increased student interest in STEM fields and pursuit of higher-level education. This project will continue for the foreseeable future and will work to create equitable resources for all demographics with the intention to increase retention of underrepresented groups in STEM fields.

Disclosures: **A. Hogan:** None. **A. Peris-Yagüe:** None. **Z. Dobler:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.10

Topic: J.03. Public Awareness of Neuroscience

Support: DFG SFB 1280 – Project-ID 316803389

Title: Podcasting with success: When neuroscience meets slam poetry

Authors: S. LINN, L. BISCHOFF, *O. GUNTURKUN;
Biopsychology, Ruhr-Universität Bochum, Bochum, Germany

Abstract: Podcasts have the power to carry you into unknown neuroscientific spheres - while mowing the gras or cycling to work. To us, it has proven to be the ideal medium to translate the breadth and depth of scientific research into an audible and easily digestible adventure. But how to find your niche in a dense landscape of science podcasts? How to produce a podcast, your listeners will recall and subscribe? And at the end: is it worth the effort?
We say Yes and explain Why: In our podcast, launched in 2021, poetry slammer and cabaret artist Rainer Holl guides an audience of 20-40-year-olds through the different areas of our transdisciplinary collaborative research council SFB 1280 "Extinction Learning" with its 19 heterogeneous neuroscientific projects. Our podcast is telling stories and makes the academics

explain their research in an intelligible way. It does not shy away from dealing with controversial issues and translating highly complex research results into our own words. We cover a variety of topics with it, ranging from learning processes to trauma research, from theoretical concepts to clinical trials, from one region of the brain to another. At the end of each episode, our host summarizes the conversation in witty lyrics.
As this abstract is handed in, "Can you forget? - The podcast about learning, forgetting, and remembering" counts 6,000 listeners and 2,000 subscribers. Although the series is exclusively in German (until now), 130 of our listeners are from the U.S. and 44 from other countries.
After ten episodes, we launched a second season at the beginning of 2022 with fresh ideas, a new structure, better recording facilities, more public engagement and accompanying social media activities. This way, we hope to turn it into a podcast to be MEMOrized:
"Whereby THE MEMORY is not the most ACCURATE term
It is not a black box in the brain with clear directions
It is much more a system, Modular complexly interconnected
Interspersed with feelings and streams of thoughts
In which memories trace neuronal courts
The so-called engrams - on whose search we set out"

Episode 9, findable on https://sfb1280.ruhr-uni-bochum.de/podcast

Disclosures: **S. Linn:** None. **L. Bischoff:** None. **O. Gunturkun:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.11

Topic: J.03. Public Awareness of Neuroscience

Title: Communicating neuroscience to foreign language teachers and advisors

Authors: *E. RUIZ ALANIS;
Natl. Sch. for Languages, Linguistics and Translation, Natl. Autonomous Univ. of Mexico, Mexico City, Mexico

Abstract: In recent times, the interest in linking neuroscience with diverse domains has increased, from the emergence of areas such as neuroeconomics, to applications such as neuromarketing or the practice of mindfulness in the work environment. In particular, brain research has the potential to support the teaching-learning process. However, there is a gap between research and teaching: on the one hand, in language courses, as well as in teacher training courses, teaching is still based on widely denied neuromyths; on the other hand, there is no certainty about how to transfer knowledge from the laboratory to the classroom.
Due to the above, in 2021 I received an invitation to collaborate with the Self-Directed Learning Center of my university. Throughout the first semester of the year, and in collaboration with two language advisors from the center, we prepared an introductory neuroscience workshop aimed at

language teachers and advisors, with an emphasis on the topics that have the greatest impact on learning.
The workshop served as both a goal and a starting point. A goal, since it offered an updated and concise overview of the neuroscience of learning for teachers. A starting point, since it allowed us to identify concerns regarding the link between research and education, as well as other areas of opportunity to give continuity to the workshop.
Since the workshop, I have continued to develop neuroscience communication activities for teachers, to give the widest possible scope to the findings that are relevant to their teaching practice. Some of these activities have included a talk on neuromyths and foreign language teaching, a presentation for students of the degree in applied linguistics, as well as different courses and workshops in congresses and academic contexts.

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

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.12

Topic: J.03. Public Awareness of Neuroscience

Support: IF/THEN Initiaitve
Dana Alliance

Title: Remote Neuroscience Engagement with the Books & Brains New Orleans Initiative: Year 2 Progress Update

Authors: *E. ENGLER-CHIURAZZI, R. SOLCH-OTTAIANO, J. KLAR, A. IRYAMI, Z. PLUMLEY, E. DAMLE, B. SWEETEN, **I. PURSELL**;
Tulane Univ., New Orleans, LA

Abstract: Though the importance of neuroscience education and community engagement activities is as relevant as ever, the 2020 SARS-CoV-2 pandemic revealed a critical need to develop remote STEM outreach approaches. To address this need, in 2020, we launched an innovative neuroscience engagement initiative, the Books & Brains-New Orleans program. The program's goal was to supplement in-oerson engagement with remote/virtual neuroscience engagement while supporting pandemic lockdown and social distancing procedures. We accomplished this in two ways by leveraging established brick-and-mortar content delivery infrastructure, the New Orleans Public Library system, to passively and remotely deliver neuroscience content in a way that did not require internet access. In our second year of operation, we purchased a series of neuroscience books targeted at a range of ages and donated these to the various branches of the New Orleans Public Libraries as well as to a subset of individually operated Free Lending Libraries in various communities and neighborhoods

throughout the greater New Orleans metropolitan area. We also established several community partnerships with local public and private school libraries, businesses, and literacy groups. Finally, as pandemic restrictions have eased, we have hosted a series of neuroscience engagement tables at local community events. Data on book distribution, survey results, and in-person outreach impacts will be presented. This program was conducted in collaboration with the Tulane University Neuroscience Association, the New Orleans Public Library system, and the Free Lending Libraries program, as well as with support of the American Association for the Advancement of Science/Lyda Hill Philanthropies IF/THEN initiative, the Dana Foundation, the Tulane Brain Institute, and the Society for Neuroscience Greater New Orleans Chapter.

Disclosures: E. Engler-Chiurazzi: None. **R. Solch-Ottaiano:** None. **J. Klar:** None. **A. Iryami:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.13

Topic: J.03. Public Awareness of Neuroscience

Title: Medical schools and the HBCU internship program of the Alzheimer's Association and Thurgood Marshall College Fund

Authors: A. PETERSON[1], K. MCDONOUGH[5], A. REED-LOFTON[5], M. DUNSTAN[2], M. GEMEDA[3], F. RUSSOM[1], J. LAGBO[1], L. MASON[1], K. HOWARD[1], P. F. ARAVICH[4]; [1]Student, [2]Geriatrics, [3]VP Diversity & Inclusion, [4]Pathology/Anatomy and *SFN member/submitter, Eastern Virginia Med. Sch., Norfolk, VA; [5]Southeastern Virginia Chapter, Alzheimer's Assn., Norfolk, VA

Abstract: Medical and health profession students working with the Eastern Virginia Medical School (EVMS) Chapter of the Student National Medical Association (SNMA) did a community intervention on the signs of health disorders disproportionally affecting minority populations. The intervention occurred at the commemoration of the 400th anniversary of the birth of slavery in English-speaking North America at what is now the Fort Monroe section of Hampton, Virginia. Likert-scale outcome data on what was learned best were collected from 36-38 respondents who were predominantly Black/Mixed Race (66%), well educated (94% at least with college), middle-aged (62%), women (61%). Compared to, e.g., learning more about the signs of a heart attack (71.1% agreed/strongly agreed they learned more), there was less knowledge gained about the signs of Alzheimer's disease (AD) (63.2% agreed/strongly agreed they learned more). These data show the need for more extensive AD education at minority community events. The national Alzheimer's Association is formally addressing minority awareness, research and treatment disparities in several ways. One is by a collaboration with the Thurgood Marshall College Fund (TMCF). This program is a year-long paid internship program for students at Historically Black Colleges and Universities (HBCUs) who are interested in

health careers. Regional HBCUs are paired with regional AD chapters to promote collaborations, engage diverse communities, and increase the number of under-represented minority medical and health profession students. We propose that the existing regional HBCU-AD-TMCF internship program could be enhanced greatly by formally partnering with regional medical schools, including SNMA and health profession students as near-peer paid mentors, and volunteer faculty with dementia and public health expertise. Partnerships and outreach efforts already existing in Southeastern (SE) Virginia to make this a reality include: The current Norfolk State University-SE Virginia Alzheimer's Association-TMCF Internship Program, which is one of only a few in the country; Norfolk State-EVMS affiliations for under-represented minority student training and research; EVMS SNMA community outreach efforts; EVMS research collaborations with the local AD chapter and regional HBCUs; the EVMS geriatric interest club and its award-winning Beyond Clinic Walls program; EVMS virtual Geriatric Sit-Down Rounds focused on unmet community needs for persons with complex behavioral and physical needs; the EVMS "community vision;" and the new public health consortium with Norfolk State, EVMS and Old Dominion University.

Disclosures: A. Peterson: None. **K. McDonough:** None. **A. Reed-Lofton:** None. **M. Dunstan:** None. **M. Gemeda:** None. **F. Russom:** None. **J. Lagbo:** None. **L. Mason:** None. **K. Howard:** None. **P.F. Aravich:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.14

Topic: J.03. Public Awareness of Neuroscience

Title: Grey Matters Journal: Facilitating community engagement and inclusion in neuroscience through accessible, accurate scientific communication

Authors: *J. N. BHATEJA, C. A. DAHLEEN, S. E. MAR, K. YADAV, S. A. GOLDEN; Univ. of Washington, Seattle, WA

Abstract: Dissemination of neuroscience research is often limited by technical language, a lack of diverse perspectives, and socioeconomic barriers. This can create a disconnect between scientists and the public, perhaps most prominently future scientists from underrepresented backgrounds. Such a disconnect perpetuates systemic inequalities and hinders the progression, publicization, and impact of scientific advancements. Grey Matters Journal was established at the University of Washington in 2012 to bridge this communication gap through writing and visual arts - with content created by undergraduates that is freely available to the greater non-scientific community. Teams of students are mentored in scientific communication to use language that is accessible to the public, yet still reflects the nuances of scientific interpretation. This writing is paired with artistic representations that both engage readers and expressively encapsulate scientific concepts. From our founding chapter, the Grey Matters Journal production model has

been adopted at 7 other undergraduate institutions across the nation. In addition to producing over 20 issues, our efforts have broadened to include a wider range of media, content, and events. We host interactive high school outreach events targeted at students from underrepresented backgrounds who might not otherwise engage with neuroscience. Online content is also produced to bring accessible and entertaining neuroscientific content worldwide. Additionally, we host community engagement events, including our annual event "An Evening with Neuroscience", which brings the general public into direct conversation with a panel of diverse neuroscience professionals. Going forward, we aim to improve and increase the reach of our production framework as well as more effectively integrate outreach efforts into our existing national organization. This will ultimately serve our goal of developing a nationwide platform for dialogues between undergraduate neuroscientists and their greater communities that promote accessibility and inclusion through creativity, critical thinking, and neuroscientific outreach.

Disclosures: J.N. Bhateja: None. **C.A. Dahleen:** None. **S.E. Mar:** None. **K. Yadav:** None. **S.A. Golden:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.15

Topic: J.03. Public Awareness of Neuroscience

Support: Bloomsburg University Internal Grant

Title: Undergraduate psychology majors provide school outreach program during Brain Awareness Week

Authors: *J. A. JOHNSON[1], J. STEVENS[2], K. RHINE[3], S. WARD[4];
[1]Bloomsburg Univ., [2]Psychology, Bloomsburg Univ., Bloomsburg, PA; [3]Psychology, Millersville Univ., Millersville, PA; [4]Penn State Hlth. Holy Spirit Med. Ctr., Camp Hill, PA

Abstract: The purpose of this poster is to present the results of a neuroscience educational outreach program designed, implemented, and assessed pre-COVID in Spring 2019. Three undergraduate Psychology majors (authors J.S., K.R., & S.W.), as part of an independent study course, created age-appropriate, interactive neuroscience activities for elementary and middle school audiences. The elementary school activities covered six neuroscience topics: brain plasticity, helmet safety, neuroanatomy, pain, taste, and smell. The middle school activities covered six neuroscience topics: neural transmission, sensory plasticity, memory processes, taste, smell, and pain. Each activity included a poster presentation and a hands-on task created by the three undergraduates designed to take 7-10 minutes. The three undergraduate majors trained other undergraduate Psychology volunteers to present the posters and activities to the school students. The undergraduate volunteers and authors then visited local elementary and middle schools to present the posters and activities as a high impact service-learning opportunity. At the

school, 1-2 undergraduate volunteers taught their activity to a group of 3-5 elementary or middle school students. The school students rotated through all six activities during the allotted time of about 1 hour. School students (79 fifth graders & 172 seventh graders) and undergraduate volunteers (26 total) completed written assessments of the program. School students reported a high level of enjoyment of the program, 9.5 on a scale of 1 (*low*) to 10 (*high*). Their favorite activities were about brain plasticity, taste, and sensory plasticity. The school students reported learning the most from the helmet safety, smell, and taste activities. Undergraduate volunteers also reported a high level of enjoyment of the program, 9.5 on a scale of 1 (*low*) to 10 (*high*). They rated the experience as valuable (9.5 out of 10) and something they would do again in the future (9.5 out of 10). Many undergraduate volunteers reported learning about their own public speaking skills by being part of the program. The most common suggestion from undergraduate volunteers for future programs was spending more time at the school so they could interact longer with the school students. Overall, this program allowed undergraduate students to share their scientific knowledge and understanding of neuroscience in a way that benefited them and their local community.

Disclosures: **J.A. Johnson:** None. **J. Stevens:** None. **K. Rhine:** None. **S. Ward:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.16

Topic: J.03. Public Awareness of Neuroscience

Title: Basic aspects of neuroscience in the Peruvian Quechua language

Authors: *M. UTRILLA[1], L. E. BAQUEDANO SANTANA[4], R. E. LOVATON[5], E. M. ZAVALA MALPARTIDA[6], C. SANDOVAL[2], M. INFANTE[3];
[1]Lima, Chapter Perú, Lima, Peru; [2]Chapter Perú, lima, Peru; [3]Chapter Perú, LIMA, Peru; [4]Laboratorios de Investigación y Desarrollo, Univ. Nacional Mayor de San Marcos, Lima, Peru; [5]Neurosurg., Clinica San Pablo, Lima, Peru; [6]Lima, Hosp. Nacional Edgardo Rebagliati Martins, Lima, Peru

Abstract: Quechua is a linguistic family, with several varieties distributed in South American countries. In Peru, the varieties of Quechua are grouped into two large branches, one is located in the central area of the country and the other in the northern and southern areas, this distribution corresponds to the historical phenomena of language expansion and geographical variants. Quechua is considered a vital language, although many of its varieties, in reality, are in danger or in serious danger since today it has been underestimated and has been undervalued. The objective of this scientific dissemination activity was to inform and make the population aware of the importance of Quechua and its application in basic aspects of neuroscience. This scientific dissemination activity was carried out within the framework of inclusion and society of the Congress of Neuroscience in Peru. The audience reached was 1,500 people and included people

from the government, university, business and general public spheres. Social organizations are the main managers of the struggle for the survival of the language to maintain the richness of cultural heritage, as well as its inclusion in issues related to science, technology and innovation.

Disclosures: M. Utrilla: None. **L.E. Baquedano Santana:** None. **R.E. Lovaton:** None. **E.M. Zavala Malpartida:** None. **C. Sandoval:** None. **M. Infante:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.17

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: *S. M. CLAYPOOL, Z. DEMKO, J. MENDOZA, D. PHAM, J. SANFILIPPO; IRP/NIDA/NIH, Baltimore, MD

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), with the initial goal of increasing diversity and representation at the NIDA IRP in-house seminar series. Since then, we at IDEA have broadened in scope to promote and celebrate diversity within the NIDA IRP. We believe that scientific research is strongly intertwined with principles of inclusion, diversity, and equity, and that, as former NIH Director Dr. Francis Collins emphasizes, equity is a public-health issue and is thus central to NIH's mission.
Our committee comprises 4 subgroups:
(1) The seminar subgroup invites speakers to participate in a Diversity & Inclusion (DiveIn) seminar series, within the NIDA IRP seminar series, to help increase its diversity and representation. Proposed speakers either are from historically underrepresented backgrounds or have a strong record of advocating for diversity, equity, and inclusion.
(2) The discussion subgroup organizes institute-wide discussion sessions on topics related to diversity, equity, and inclusion, sometimes coordinating with the seminars. Examples have included a discussion on a DiveIn seminar given by Dr. Hannah Valantine entitled "NIH's Scientific Approach to Inclusive Excellence" and a panel of women scientists entitled "The Hill We Climb: A Conversation with Women Scientists."
(3) The newsletter subgroup writes and designs informative newsletters emailed to all NIDA IRP staff. The newsletters celebrate national-heritage months and other nationally recognized observances, or acknowledge traumatic current events in a culturally informed and sensitive manner. Examples have included newsletters celebrating Black History Month, Women's History Month, and Asian American and Pacific Islander Heritage Month.
(4) The outreach subgroup organizes opportunities for IDEA committee members to volunteer with Baltimore City Schools, furthering NIDA's mission by bringing awareness to substance use

disorders and combatting stereotypes and misconceptions about them. Efforts have included visiting a local high school to discuss research and training opportunities offered at NIDA. One goal is to establish pipelines that may improve access to careers in science for people in underserved communities.
We believe that the efforts of our committee contribute to building a more equitable work environment and foster a supportive and inclusive community, which will ultimately contribute to better science and better human health.

Disclosures: **S.M. Claypool:** None. **Z. Demko:** None. **J. Mendoza:** None. **D. Pham:** None. **J. Sanfilippo:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.18

Topic: J.03. Public Awareness of Neuroscience

Support: NIH Grant GM146300
NIH Grant MH119049
NSF Grant 2050194

Title: Building a sustainable model of neuroscience education and community outreach

Authors: *N. D. DIPROSPERO, J. N. LINGAD, M. G. CHAPPEL-FARLEY, C. M. HENNINGFIELD, M. O. YASSA;
UC Irvine, Irvine, CA

Abstract: Student-led STEM outreach programs at institutions of higher education are a popular means for trainees to share their knowledge with the community. However, logistical and financial challenges can limit the long-term impact of such programs. Here, we present a new model to address these challenges. The UC Irvine Center for the Neurobiology of Learning and Memory's (CNLM) Ambassador Program, founded in 2017, is a student-led outreach organization aiming to share the passion for neuroscience with the local community and contribute to an informed citizenry.
Over the last five years, it has grown into a highly interdisciplinary training and outreach unit comprising over seventy graduate and undergraduate students, postdocs, and research staff from over a dozen departments at the UC Irvine. The program's members are organized into committees including (1) K-12 Education, (2) Adult Continuing Education, (3) Science Communication, (4) Professional Development, (5) Outcomes Assessment, and (6) Research Development. Committees, led by annually elected co-chairs, design, implement, and assess programs to meet their outreach and education goals. This sustainable structure provides important leadership and professional development opportunities. Preliminary evaluation has demonstrated the positive impact of these programs on audiences, including improving attitudes

towards science, as well as on the mental health and professional growth of the ambassadors themselves.
The program is administratively and financially supported by the Center's infrastructure and private philanthropy, as well as by grants from nonprofit partners such as the Dana Foundation and federal sponsors including NIH and NSF. This combination of institutional and external support enables activities and projects that can impact a broader audience, including underserved communities. It also ensures the program's long-term sustainability, independent of its constituent members, most of whom have a limited duration of participation due to their degree completion. Altogether, the CNLM Ambassador Program is an innovative model of sustainable neuroscience outreach that can be deployed at scale by creating partnerships to reproduce its success in other institutions and communities.

Disclosures: N.D. DiProspero: None. **J.N. Lingad:** None. **M.G. Chappel-Farley:** None. **C.M. Henningfield:** None. **M.O. Yassa:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.19

Topic: J.03. Public Awareness of Neuroscience

Support: Foundation for the Fight for Human Survival
SFN Chapter Grant

Title: Brain Camp in West Virginia and Online in Ukraine

Authors: *V. GRITSENKO[1], S. YAKOVENKO[2], O. MOLCHANOVSKYI[3], R. J. NELSON[4]; [2]Human Performance, [1]West Virginia Univ., Morgantown, WV; [3]Applied Sci., Ukrainian Catholic Univ., Lviv, Ukraine; [4]Neurosci., Sch. of Med., Morgantown, WV

Abstract: Learning about the brain is fascinating, and people are naturally inquisitive. However, economic and geopolitical obstacles can easily dampen this spark. Members of the Northern West Virginia Chapter of the Society for Neuroscience have teamed up with the faculty and graduate students of the Departments of Neuroscience and Human Performance at West Virginia University, as well as the WVU Center for Foundational Neuroscience Research and Education and Rockefeller Neuroscience Institute to continue a public outreach program. The program aims to provide educational experiences and nurture the spark of curiosity in undergraduate students and high school students in Morgantown, West Virginia and remotely in Ukraine. We have created a Neuroscience Undergraduate Research Opportunity (NURO) camp program for in-person and remote instruction to introduce the basic neuroscience topics and conduct hands-on and active-learning-based activities. The NURO program has two branches. In the first branch, we partnered with several HBUCs and the University of Puerto Rico to provide a 9-week in-person research experience at WVU Health Sciences Center that emphasized URM students. The

second branch of NURO was conducted online, during which undergraduates from two Ukrainian universities (Ukrainian Catholic University and National Technical University of Ukraine) conducted research in computational neuroscience. The undergraduates from Ukraine trained in engineering and data sciences are severely disadvantaged; as the war rages on, many are displaced and face an uncertain future. For many high school students in West Virginia, educational and research experience opportunities outside the state school system are limited, which disadvantages them when applying to universities. We also conducted a WVU Brain Camp that lasted a week and recruited rising third year high school students from Morgantown, West Virginia. The in-person Brain Camp comprised visiting WVU neuroscience labs, listening to lectures, and participating in educational activities. The importance of research experiences to undergraduates is extremely high, maintaining their interest in science and exposing them to the opportunities and potential mentors in academia. In conclusion, our outreach program has expanded and reached a broader audience; it continues to have a positive impact on people of all ages in our community and globally.

Disclosures: V. Gritsenko: None. **S. Yakovenko:** None. **O. Molchanovskyi:** None. **R.J. Nelson:** None.

Theme J Poster

026. Neuroscience Outreach Activities

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 026.20

Topic: J.03. Public Awareness of Neuroscience

Support: Dana Foundation
Instructional Innovation Grant from the Virginia Tech Center for Excellence in Teaching and Learning
VTCSOM Department of Basic Science Education

Title: Bodies and Bites: a healthy taste of anatomy, physiology, and nutrition

Authors: *K. K. RAU;
Basic Sci. Educ., Virginia Tech. Carilion Sch. of Med., Roanoke, VA

Abstract: “Bodies and Bites” is an educational program in which medical students from the Virginia Tech-Carilion School of Medicine (VTCSOM) and graduate students from the Fralin Biomedical Research Institute (FBRI) apply active learning strategies to teach anatomy, physiology, and nutrition to 2nd-5th grade kids in Roanoke, Virginia. This four-week program is held in the Fall and Spring at the West End Center for Youth (https://www.westendcenter.org/), which is an after school educational center that serves K-12 children who live in one of Roanoke’s most disadvantaged and under-served neighborhoods. Kids from the West End Center are broken into groups, and rotate through a different topic each week. In the Fall, these topics focus on how we sense our environment through hearing, vision, taste, smell, touch, and balance.

In the Spring, the kids learn about specific body systems, including the nervous system, cardiovascular system, digestive system, and musculoskeletal system. These sessions are a combination of small group discussion and hands-on activities and crafts, and are facilitated with the use of 3D anatomical models. Each session ends by making a healthy snack with the kids that relates to that particular system (e.g. making guacamole for the nervous system, since avocados are high in good fats).

Disclosures: K.K. Rau: None.

Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 027.01

Topic: J.04. Ethical and Policy Issues in Neuroscience

Support: ERA-NET Neuron "HybridMinds" - Swiss National Science Foundation 32NE30_199436

Title: To trust or not to trust: the ethics of using AI in clinical neuroscience

Authors: *M. IENCA, G. STARKE;
EPFL, Lausanne, Switzerland

Abstract: Artificial Intelligence (AI) plays an increasingly central role in clinical neuroscience. Most of these AI systems, especially Deep Learning-based applications using multi-layered Artificial Neural Nets, exhibit epistemic opacity in the sense that they preclude comprehensive human understanding and ex post inspection. These opacity challenges are exacerbated when self-learning algorithms are embedded into closed-loop systems (e.g. for neuroadaptive technology) as those algorithms may potentially override the user's voluntary control. To address these challenges, we provide an ethical impact assessment of three case studies involving the use of AI in clinical neuroscience: (A) diagnostic image evaluation for multiple sclerosis; (B) therapeutic recommender systems for stroke interventions; and (C) AI-based intelligent motor-neuroprostheses. This neuroethical analysis is aimed at assessing the conditions, if any, under which it is ethically and methodologically justifiable to deploy AI systems in clinical decision-making. Furthermore, it will provide evidence-based safety and efficacy requirements for ensuring the adequate validation of AI systems in clinical neuroscience.

Disclosures: M. Ienca: None. **G. Starke:** None.

Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 027.02

Topic: J.04. Ethical and Policy Issues in Neuroscience

Support: John Templeton Foundation #61283
Fetzer Institute, Fetzer Memorial Trust #4189

Title: Collaboration between neuroscientists and philosophers is critical in studies of higher-level brain function, particularly in the neuroscience of volition

Authors: *U. MAOZ[1], M. ROBINSON[2];
[1]Chapman Univ., [2]Chapman Univ., Orange, CA

Abstract: Do humans have free will? That is one of the longest-standing debates in the history of human thought. Importantly, answering this question requires answering the following two questions:
1. What is required in order to act freely?
2. Do humans ever fulfill those requirements?
Two things are noteworthy about these two questions: (a) the first is a philosophical question (so cannot be answered by empirical means) and the second is a scientific question; and (b) until we have an answer to the first question, we cannot begin to answer the second one. So, to make progress on such high-level questions, philosophers and neuroscientists must collaborate. Such collaborations tend to result in deeper discussions about the nontrivial concepts involved, which then leads to better neuroscience. The Libet experiment is an example of what happens when neuroscientists work alone. This foundational experiment in the neuroscience of volition purported to show that the onset of neural precursors of voluntary action precede participants' reports of their decision to move. Some have taken these results to mean that actions are generally decided unconsciously, even denying a role for consciousness in human decision-making. But these conclusions depend on the plausibility of Libet's philosophical assumptions about decisions. Libet, however, conflates decisions, intentions, urges, and wishes—which are radically different things. Philosophers have spent millennia working on clarifying these and similar concepts. Neuroscientists are relative newcomers to the field and have a lot to learn.
The issues above resonate in studies of other higher-level brain function—e.g., emotions, volition, consciousness. Philosophers' diverse point of view can help especially when choosing the research questions, when designing the paradigm, and later when interpreting the results. Results from these collaborative studies reverberate beyond just neuroscientists. And this generalizability of the results outside the discipline of neuroscience is arguably just as important as their reproducibility within neuroscience. Finally, philosophers also benefit from this collaboration, enriching philosophical debates with the latest neuroscientific findings.

Disclosures: U. Maoz: None. **M. Robinson:** None.

Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

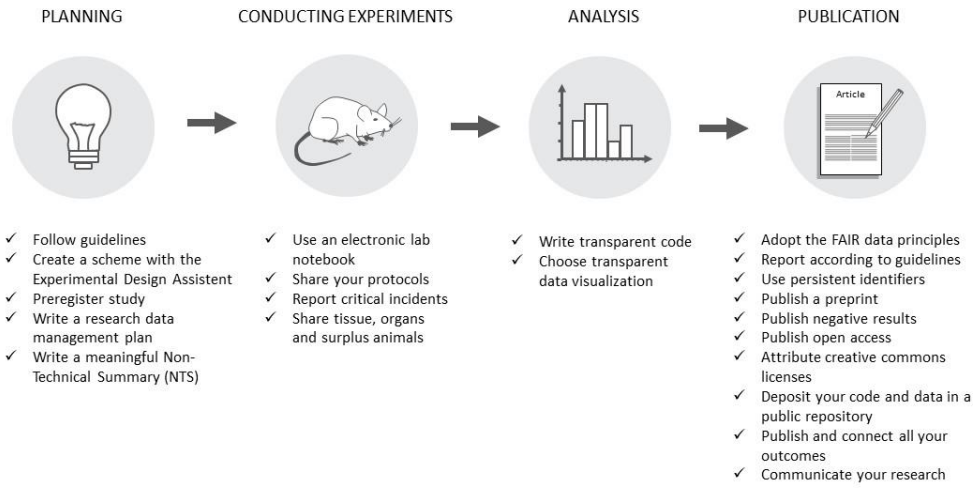
Program #/Poster #: 027.03

Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: Open science tools in translational animal research - fostering research transparency and quality

Authors: *K. DIEDERICH, K. SCHMITT, P. SCHWEDHELM, L. LEWEJOHANN, B. BERT, C. HEINL;
German Ctr. for the Protection of Lab. Animals (Bf3R), German Federal Inst. for Risk Assessment, Berlin, Germany

Abstract: Open science has become a slogan in the scientific community that that too often fails in its practical implementation. Here we provide an overview of practices that can be applied throughout the research process to help scientists improve the transparency and quality of their work. As open science practices continue to evolve, we also provide an online toolbox of resources that we will continually update. This toolbox can be accessed through Zenodo (DOI: 10.5281/zenodo.6497559).
Translational biomedical research has a special responsibility to be transparent and of high scientific quality, as it still relies on animal testing and is the basis for clinical trials that may potentially put patients at risk. However, translational biomedical research still lags behind other fields in implementing open science practices. In addition to deep-rooted problems in the scientific incentive system, this deficit may also be due to a lack of information. Animal researchers can already choose from a variety of tools to increase the transparency of their scientific work. We provide an overview on the tools that can be used throughout the research process, from planning to conducting and analyzing a study to publishing it.
Open science practices not only raise the profile of individual scientists, but can also initiate a change in the research culture towards greater transparency and quality. There are early indications that open science is increasingly being adopted in translational biomedical research as key players in the scientific incentive system, i.e., funders, publishers, and research institutions, support and, in some cases, already require the implementation of open science practices. However, scientists do not have to wait for the slowly evolving incentive framework to change their research habits; they can take initiative and start using open science tools for more collaboration, transparency and reproducibility today.



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Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 027.04

Topic: J.04. Ethical and Policy Issues in Neuroscience

Support: NIH Grant R01AG054621

Title: Hair type as an exclusionary criterion results in subject misrepresentation in EEG research

Authors: *L. JONES[1], N. WOODLEY[4], L. NEUBERGER[2], J. SANDOVAL[2], H. J. HUANG[3]; [1]Burnett Sch. of Biomed. Sci., [2]Nicholson Sch. of Communication and Media, [3]Mechanical and Aerospace Engin. Dept., Univ. of Central Florida, Orlando, FL; [4]Pure Avidity Salon, Orlando, FL

Abstract: Electrophysiological recordings are an essential component in human neuroscience research for understanding behavior, cognition, and brain function. These technologies are also widely used in clinic and health-related interventions, thus the tools and techniques implemented should be inclusive of the diverse public. Social justice movements led by scientists and ethicists

have illuminated electroencephalography (EEG) as an example of a neuroscience research tool that is incompatible with a range of hair types ultimately leading to racial bias. The Black and African American community has long been affected by historical racism in science and medicine, thus as the largest community with "EEG-incompatible" hair types, they are largely excluded from EEG research. It is unclear whether this issue arises due to hardware incompatibility, preparation techniques, assumptions about hair type rooted in racial bias, or a combination of all factors. This suggests the need for a multi-faceted and community-based approach to eliminating bias in neuroscience. To convince the community that solutions-based approaches are necessary, we collected researcher and participant perspectives on the topic of EEG and hair by hosting an online survey. We collected data from 230 respondents from August to December 2021. Results from the participant perspective highlight the need for better researcher-participant communication. When asked what they wish they knew prior to participating in an EEG study, 79% of participants responded that they wish they knew more about EEG electrode preparation, didn't know what they were getting into, experienced microaggressions, and regret being a participant. From the researcher perspective, we assessed the total number of subjects recruited, Black/African American subjects, and subjects excluded due to hair type. A one-way ANOVA revealed a statistically significant relationship between the total number of Black and African American subjects recruited and those who are excluded from participating due to hair type ($p=0.001$). A ranked correlation assessment showed a positive correlation between the total number of subjects recruited and exclusion of Black/African American subjects ($p=0.000549$). This demonstrates how hair type is a common exclusionary criterion that neglects individuals who are members of historically excluded communities. We hope these results will convince other researchers to join our efforts to create solutions that will improve recruitment and retention of more diverse subjects in human neuroscience.

Disclosures: L. Jones: None. **N. Woodley:** None. **L. Neuberger:** None. **J. Sandoval:** None. **H.J. Huang:** None.

Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 027.05

Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: Ethical Considerations for Neurotechnologies Targeting Autism

Authors: *J. JIN;
Emory Univ., Atlanta, GA

Abstract: The global prevalence of autism spectrum disorder (ASD) has increased in recent years, likely reflecting improvements in diagnostic and identifying tools for ASD (Burton 2021). Consequently, a parallel increase in demand has emerged for the development of new therapies for autism. Innovators have sought to address this demand by creating a new avenue for targeted

therapies through neurotechnology, particularly neuromodulation, neurofeedback, and transcranial magnetic stimulation. Though these technologies are being rapidly developed and are already available for user consumption, innovators have neglected to give sufficient consideration for the ethical concerns raised by offering neurotechnology for individuals with autism. While many concerns are not unique to autism, I argue that it represents a nuanced case requiring direct acknowledgement. For instance, even with decades of research, we still do not possess a full understanding of the neuropathology of autism. Thus, potential repercussions from modulating brain activity with neurotechnology are yet to be elucidated. Furthermore, individuals with autism are particularly vulnerable to exploitation and paternalism, which can circumscribe individual autonomy and pre-established human rights. The ethical dilemmas surrounding neurotechnology development for individuals with autism can be uniquely explored through the lens of the ongoing global neuro-rights movement. Despite the intense debate regarding the validity of neuro-rights (Bublitz 2022), stakeholders agree that rapid developments in neurotechnology and innovation have created an urgent need to protect and preserve the ethical principles underpinning neuro-rights. Given these concerns, I argue that it is imperative to examine the ethicality of offering neurotechnologies for individuals with autism and provide a nuanced, careful exploration of the relevant ethical principles. Excluding such individuals from the conversation and failing to address potential threats may deprive them of protections that we assign and promote for neurotypical individuals. Neurotechnologies for autism offer promising interventions that directly impact the brain rather than mitigating symptoms, like most currently available therapies. However, we must be sure to consider the impact on end users and urge innovators to develop neurotechnologies responsibly. Only then can we secure and protect the ethical principles purported by the neuro-rights movement as fundamental to human rights.

Disclosures: J. Jin: None.

Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 027.06

Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: Cultivating a neuroethical ethos among neural engineering researchers

Authors: *J. FAROOQUI[1,4,6], J. BALAGUER[1,2,6], S. DAWOD[3], E. M. GRIGSBY[1,2,6], A. J. HERRERA[1,2,6], M. K. JANTZ[1,2,6], G. NUTTER[3], D. SARMA[1,5,6], J. YE[1,4,6];
[1]Rehab Neural Engin. Labs, [2]Bioengineering, [3]Ctr. for Bioethics and Hlth. Law, Univ. of Pittsburgh, Pittsburgh, PA; [4]Neurosci. Inst., [5]Mechanical Engin., Carnegie Mellon Univ., Pittsburgh, PA; [6]Ctr. for the Neural Basis of Cognition, Pittsburgh, PA

Abstract: The rapid advancement of neurotechnology demands that research efforts meaningfully engage ethical considerations. Unfortunately, researchers often perceive ethics as removed from day-to-day research due to the didactic or regulatory nature of predominant

research ethics frameworks. While they are keenly aware of the importance of ethical research, researchers may rely on external regulatory bodies such as IRBs or the FDA to "handle ethics." Research ethics education is driven by online modules and generalized coursework that often have little relevance to researchers' day to day work.
Our work aims to instead cultivate a *neuroethical ethos* - a culture in which ethics is an intrinsic part of research, from ideation to experimentation and beyond. To this end, we established a discussion series designed to help lab members engage with neuroethical principles in the Rehab Neural Engineering Labs (RNEL) at the University of Pittsburgh. This approach rests on two main principles. First, relating ethics issues to people's research and lived values can drive both engagement with and internalization of ethical principles. Second, engagement is critical to creating a culture that prioritizes ethics. Therefore, we developed our approach with the goal of delivering engaging and relevant ethics content.
We began by selecting neuroethics topics based on current concerns and conversations in the field of neural engineering. Topics were broadly separated into categories: Rights and Experience of Participants, Equity and Structural Barriers, Translation and Dissemination, and Future Concerns of the Field. We organize a monthly seminar series in which topic area experts and lab members jointly engage in discussions to explore the topic. Seminars are driven by guiding questions that encourage attendees to connect ethical principles with their own values, lab experience and broader issues. We posit that this process can empower lab members to take ownership of ethical principles, and ultimately apply these principles in their research.
We have held around 20 discussion seminars since spring 2019, each attended by 20 or more lab members. In feedback surveys for these seminars, attendees report high satisfaction with the dialogue-based approach. Responses indicate strong engagement and interest in further ethics programming. Moreover, this approach has attracted interest and engagement from outside RNEL, including an invitation to deliver a large-scale discussion seminar at a local neuroscience trainee conference with over 100 attendees. This kind of ethics engagement among researchers promises to have positive impacts on the future of a rapidly changing field.

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Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 027.07

Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: Recommendations emerging from carbon emissions estimations of the 2018 Society for Neuroscience annual meeting

Authors: *C. KAY[1,2], R. KUPER[3], E. A. BECKER[4];
[1]Clin. Psychology, The Chicago Sch. of Professional Psychology at Washington DC,

Washington, DC; [2]St. Joseph's Univ., Philadelphia, PA; [3]Temple Univ., Philadelphia, PA; [4]Lawrence Univ., Appleton, WI

Abstract: The annual Society for Neuroscience meeting is the most widely attended international conference in the neuroscience field. An annual average attendance of approximately 30,000 yields significant, measurable environmental impacts that conflict with the environmental commitment of the society. We gathered 12,825 presenters' home institution, country and city of residence, for which we determined the likely mode of transportation associated with the 2018 meeting in San Diego. We then used two online calculators, benchmark estimations, and metrics from refereed literature to assess the annual impact of meeting-related domestic and international travel; operations, assembly, and disassembly of the event venue; and hotel accommodations. We found that presenters' conference travel resulted in between 17,311 and 16,437 t CO_2, with radiative forcing index factors (RFI), or between 9,159 and 8,690 t CO_2 without RFI factors. Emissions from aircraft accounted for 99.93% of total travel-related emissions. Comparatively, carbon dioxide emissions for hotel accommodations equaled about 110 t CO_2, whereas emissions from the San Diego Convention Center over 8 days of use equaled about 122 t CO_2. We also relate our data to September Arctic sea ice loss (~26,777 m^2), labor productivity loss in developing equatorial regions (~$5,980), estimate the number of 3" caliper *Acer saccharum* trees that would be needed to sequester an equivalent quantity of CO_2 over one year (i.e., if they live; ~371,280), and per capita emissions elsewhere. For instance, a presenter who traveled by air to Neuroscience may have emitted as much as a resident of Nigeria in 2018 (~0.80 t CO_2), without RFI, or a resident of Tanzania (~1.35 t CO_2) with RFI. Additionally, we estimated emissions from alternative modes of convening, which results in emissions reductions of between 77 and 22 percent for hybridized options and 99.40 percent for a virtual meeting. Bearing this in mind, by 2030 we strongly recommend adopting an alternative way to convene moving forward, such as fully virtual or creating 4 to 6 in-person hubs across the world connected virtually.

Disclosures: C. Kay: None. **R. Kuper:** None. **E.A. Becker:** None.

Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 027.08

Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: Family Support Policy for Pharmacy, Medical, and Graduate Students

Authors: *B. S. O'BRIEN[1], L. DASKALSKA[2], T. ARZUA[3], B. BAKKEN[1];
[1]Cell Biology, Neurobiology, and Anat., [2]Publ. Hlth., Med. Col. of Wisconsin, Milwaukee, WI; [3]Columbia Univ., Columbia Univ., New York, NY

Abstract: For many Science, Technology, Engineering, and Math (STEM) students at the graduate and professional levels, family support policies are inadequate or non-existent. This hinders students' family planning ability, increases the challenges of completing the degree, and disproportionately impacts women. Suitable and accessible family support policies are necessary to advance STEM institutions toward equity, while also supporting changes in student demographics. With that goal in mind, the Council for Women's Advocacy, a group of physicians, professors, administrators, and students at the Medical College of Wisconsin, developed and implemented policy recommendations addressing these critical needs. They include 1) Course and program accommodations, 2) Childcare financial aid, and 3) Lactation support. Considering the number of neuroscience trainees needing increased family support in the US, we hope that the language in these recommendations can serve as a framework to build on for other STEM institutions.The United States remains one of the few countries that does not guarantee a national paid parental leave, with employees needing to refer to the Family and Medical Leave Act, as well as state- and employer-specific guidelines, to determine the amount of support and any details. The recent Build Back Better Act aimed to address this issue by proposing universal paid leave and provisions for assistance with childcare. However, the Act did not put forward specific provisions for student parents and has not yet passed in the Senate. Because students in graduate and professional programs are not often considered employees, many are left without guidance on family leave and other family resources. This gap, paired with the rise in the age of enrollment, has led to an increased number of students wanting to start a family but without adequate support to complete their training while doing so. Further, professional students who felt supported by adequate policies reported higher productivity and better mental health overall Between neuroscience and psychology, it is estimated that 4 to 5 thousand students earn their doctorate every year. Alongside medical, and pharmacy students who will go on in neuroscience-related careers, we believe that implementing family support policies will foster an academic environment that promotes mental health and improved work-life balance for the next generation of neuroscientists.

Disclosures: B.S. O'Brien: None. **L. Daskalska:** None. **T. Arzua:** None. **B. Bakken:** None.

Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 027.09

Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: Psychedelics, MDMA and cannabis - ethical and policy considerations in neuroscience and medicine

Authors: *M. A. BOEHM[1,2];
[1]Intramural Res. Program, NIH, Natl. Inst. on Drug Abuse, Baltimore, MD; [2]Dept. of Neurosci., Brown Univ., Providence, RI

Abstract: Psychedelics (e.g., psilocybin, *N*,*N*-dimethyltryptamine (DMT), ibogaine), MDMA (i.e., 3,4-methylenedioxymethamphetamine) and cannabis have received growing attention from neuroscientists and clinicians interested in their neurobiological effects and potential therapeutic applications. The U.S. Food and Drug Administration (FDA) has granted Breakthrough Therapy designations to MDMA-assisted psychotherapy for treating post-traumatic stress disorder (PTSD) and to psilocybin therapy for treatment-resistant and major depression. In addition, there are currently over 50 active/recruiting human studies investigating classical psychedelics in healthy subjects or in the treatment of substance abuse, mood/anxiety disorders, anorexia/body dysmorphia, migraine/cluster headache or early Alzheimer's/cognitive impairment. With respect to cannabis, the FDA has approved a cannabidiol (CBD) drug (i.e., Epidiolex) for treating seizures as well as medications containing synthetic Δ-9-tetrahydrocannibinol (Δ-9-THC) (i.e., nabilone and dronabinol) for nausea/loss of appetite in chemotherapy and HIV patients. In addition, over 75% of states in the U.S. have legalized medical cannabis with reported uses for conditions such as traumatic brain injury, chronic pain, PTSD and multiple sclerosis. Despite their therapeutic indications, psychedelics, MDMA and marijuana (i.e., cannabis containing >0.3% Δ-9-THC) remain Schedule I drugs under the Controlled Substances Act (CSA), a Schedule intended for drugs with no accepted medical use and high potential for abuse/dependence. This presents major obstacles for scientists and clinicians interested in studying these compounds because strict laws and regulations limit production and access. In addition, federal funding for research using psychedelics, MDMA or cannabis has been historically absent. More clinical research with these substances is desperately needed given the increasing public access/therapeutic claims, and studies should focus on addressing knowledge gaps to minimize adverse effects/abuse and improve patient outcomes. Researchers and regulators should also respect and learn from cultural/spiritual perspectives related to the use of naturally occurring psychedelics (e.g., mushrooms with psilocybin/psilocin or ayahuasca (a plant brew containing DMT)) for self-development and healing practices. Input from a variety of backgrounds (e.g., psychedelic therapists, indigenous community leaders, biomedical researchers/clinicians, non-profit/private sectors, law experts) is necessary to form new drug policies that prevent appropriation and advance public health.

Disclosures: M.A. Boehm: None.

Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 027.10

Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: Engineering Diplomacy: Artificial Intelligence and Human Augmentation in International Policy

Authors: *A. M. BUCH[1], D. M. EAGLEMAN[2], L. GROSENICK[1];
[1]Dept. of Psychiatry and Brain and Mind Res. Inst., Weill Cornell Medicine, Cornell Univ., New York, NY; [2]Dept. of Psychiatry & Behavioral Sci., Stanford Univ., Palo Alto, CA

Abstract: Over the last two decades, the pace of innovation in technologies that alter the human experience has been rapidly accelerating while at the same time our world becomes increasingly interconnected. Smartphones, virtual conferencing, wearable technology, virtual and augmented reality, neurotechnology, and artificial intelligence are emerging as widely available technologies that—if used appropriately—could provide significant advantages for the practice of diplomacy. Through collaborations among diplomats, scientists, and engineers, along with organizational adaptation that incorporates training in, integration of, and distribution of resources for artificial intelligence (AI), we envision AI paired with emerging human augmentation technologies significantly improving the bandwidth, speed, and optimality of international policy and diplomacy. Here we outline a systematic exploration of how AI and human augmentation will impact foreign affairs and international policy. Our work explores how artificial intelligence (AI) combined with emerging sensory augmentation technologies could serve as a tool to aid in international policy and diplomacy, and the promising benefits and potential challenges this will bring. We outline how AI could improve the global coordination of advancing research objectives and product deployment as well as monitor, respond to, and aid in collaboration on world-crises with global partners. We include ethical considerations such as training AI algorithms on high-quality data to prevent racial and gender biasing and advancing the global coordination of data collection and AI standards and explore the question: How do we make ethical decisions about advancing technology that has dual potential to benefit and harm individuals in a global world? We provide case studies of forums in which human-augmented AI is already at play in domestic and international policy and discuss possible futures. We conclude by discussing recommendations and opportunities for real-world implementation and adoption. Overall, scientists and engineers should work together with policymakers and diplomats to integrate these technological tools into policymaking and modernize the art of diplomacy.

Disclosures: A.M. Buch: None. **D.M. Eagleman:** None. **L. Grosenick:** None.

Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 027.11

Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: Green Neuroscience in the time of pandemics: Atoms, molecules, neurons, systems, minds, societies and the environment

Authors: *E. OHAYON[1,2];
[1]The Green Neurosci. Laboratory, Neurolinx Res. Inst., La Jolla, CA; [2]The Inst. for Green & Open Sci., Toronto, ON, Canada

Abstract: Over the past decade there has been an increased awareness of the impact of factors such as diversity, identity, academic freedom, social and environmental justice in the neurosciences. These justice domains have often been undervalued, marginalized or altogether ignored in the neuroscience community with devastating impacts on neuroscience research and communities. Many of these issues are interconnected and will require a multifaceted, open and multiscale approach that can overcome systemic bias as well as reductionist tendencies in the neurosciences. Here we review some of the integrated principles, practices and aims that might be applied to create more just, cohesive and environmental neurosciences across scales (see also https://greenneuro.org/principles/). In particular, we assess progress over the past decade with a focus on how research practices and science might need to evolve in the context of pandemics and in light of profound societal changes. In addition, we outline a neuroscience educational curriculum that may help forward these aims and benefit science, affected individuals, communities and the environment.

Disclosures: E. Ohayon: None.

Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 027.12

Topic: J.04. Ethical and Policy Issues in Neuroscience

Support: CIHR Grant #433650-REB-39478

Title: Balancing scientific rigour and police practice: considerations for applied neuropsychological research

Authors: *P. M. DI NOTA[1], J. P. ANDERSEN[2];
[1]Psychology, Univ. of Toronto, Mississauga, Mississauga, ON, Canada; [2]Psychology, Univ. of Toronto Mississauga, Mississauga, ON, Canada

Abstract: Applied research on police and law enforcement has increasingly moved towards more stringent empirical practices, including the use of neuroscientific approaches to investigate learning and performance of cognitive and motor skills related to the use of force (UOF). Importantly, published research informs current policies and practices surrounding UOF training and operations, including poor quality studies that undermine the urgency of real-world issues like racial biases. However, knowledge dissemination is often dependent on peer reviewers' and journal editors' subjective biases towards policing and whether applied neuropsychological research is "scientific enough". Academics and professionals engaged in applied research are faced with numerous challenges at every stage of inquiry – from study design and execution to communicating findings to various audiences (e.g., public, police, government). Peer-reviewed findings from several original research studies, systematic literature reviews, and meta-analyses on international samples of frontline and tactical officers will exemplify the following practical

considerations: scheduling of research (i.e., testing, follow-up) in conjunction with daily operations; subjective (i.e., self-report) and objective (i.e., neurophysiological) measures of various (non)visible competencies and cognitive skills including situational awareness and resilience; limited availability of research funding and resources (e.g., qualified and available personnel). Theoretical considerations regarding the scientific merit of applied neuropsychological research include: predictive or external validity of experimental conditions (e.g., computer-based tasks, virtual reality) to real-world settings; ethical and learning-related implications of inducing performance errors for observational purposes; inclusion of outliers in neurophysiological and psychological data that reflect true variability in representative active duty participants. Taken together, the challenges identified in the current presentation speak to a unique neuroscientific research community. We invite any interested parties to join a discussion of how this research field can contribute meaningfully to both scientific knowledge generation and police reform.

Disclosures: P.M. Di Nota: None. **J.P. Andersen:** None.

Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 027.13

Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: Post-ssri sexual dysfunction: an overview

Authors: *P. E. L. MARINHO;
The Univ. of Western Ontario, London, ON, Canada

Abstract: Selective serotonin reuptake inhibitors (SSRI) are a class of drugs commonly used as first-line treatment for a wide range of psychiatric disorders, such as depression, anxiety, obsessive-compulsive disorder, and panic disorder. SSRIs are one of the most prescribed class of psychiatric drug, and 12% of people in the US are reported to use them continuously. Despite initially being considered as a class of antidepressant almost free from side effects, post-market data indicates a high prevalence of said side effects; sexual dysfunction is the most common, with a prevalence estimated at 75% of users. However, since 2006, there has been increasing reports of enduring sexual dysfunction after discontinuation of SSRI and, in 2019, Post-SSRI sexual dysfunction (PSSD) was recognized as a medical condition by the European Medicines Agency. In this review, we summarize the main features of this condition, possible pathophysiology mechanisms, proposed management strategies and future directions. PSSD is an iatrogenic condition in which patients continue to experience persistent sexual problems after the discontinuation of the SSRI. Symptoms include reduction or loss of libido, genital anesthesia, inability to orgasm or pleasure-less orgasm. In men it also includes erectile dysfunction and premature ejaculation and, in women, lack of vaginal lubrification. PSSD may occur at any age, in both sexes, and can start as soon as the first administered dose or become apparent only after

discontinuation of the SSRI. The prevalence of PSSD is unknown, with a lack of data regarding its pathophysiology and no consensus on treatment. Possible pathological mechanisms may include desensitization of serotonin receptors, changes in gene regulation, and serotonin toxicity. Some therapeutical strategies to reverse PSSD have been tried, including dopamine agonists, 5-HT1A agonists, and PDE5 inhibitors, with varying results. It is important that health professionals inform patients about possible long-term effects of drug use, as well as assess the impact of antidepressants on the patient's sex life.

Disclosures: P.E.L. Marinho: None.

Theme J Poster

027. Neuroscience Ethics

Location: SDCC Halls B-H

Time: Saturday, November 12, 2022, 1:00 PM - 5:00 PM

Program #/Poster #: 027.14

Topic: J.04. Ethical and Policy Issues in Neuroscience

Title: Alcohol, memory & trauma in the adolescent brain: Implications for Title IX offices

Authors: *S. DICKINSON, E. PATCHETT, T. WITCRAFT;
St Olaf Col., Northfield, MN

Abstract: Though estimates range widely, data suggest that approximately 20% of undergraduate women and 5-10% of undergraduate men experience sexual victimization, including sexual coercion, unwanted sexual contact, and rape. According to one source, 43% of sexual assault events involve alcohol use by the victim; 69% involve alcohol use by the perpetrator (American Addiction Centers, 2020), and the effects of alcohol complicate the investigation and adjudication of sexual assault in a variety of ways. The investigation, and adjudication, of sexual assault events at many institutes of higher education is coordinated by the campus Title IX office. Training of investigators and adjudicators is also often coordinated by the Title IX; recent work funded by the National Institute of Justice indicates that there is an acute need for well-trained investigators. To our knowledge, Title IX investigator training currently includes somewhat incomplete and outdated information about the neurobiological effects of stress and trauma on memory and potential interactions with alcohol. In addition, little to no attention is given to the ways alcohol and stress could affect memory processes in the still-developing young adult brain. We are integrating current scientific understanding to provide nuanced and comprehensive training materials for Title IX offices, starting with our small campus and hopefully providing a resource for other institutions.

Disclosures: S. Dickinson: None. **E. Patchett:** None. **T. Witcraft:** None.