

When citing an abstract from the 2021 annual meeting, please use the format below.

[Authors]. [Abstract Title]. Program No. XXX.XX. 2021 Neuroscience Meeting Planner.
Society for Neuroscience, 2021. Online.

2021 Copyright by the Society for Neuroscience all rights reserved. Permission to republish any abstract or part of any abstract in any form must be obtained in writing by SfN office prior to publication.

Theme J Poster

J001. History of Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 8:30 AM - 9:30 AM

Program #/Poster #: J001.01

Topic: J.01. History of Neuroscience

Title: Description of Rexed's laminae in various animal species: historical perspective

Authors: ***I. DEMIRCUBUK**¹, E. CANDAR², G. SENGUL³;

¹Dept. of Anat., ²Dept. of Neurosci., Ege Univ. Inst. of Hlth. Sci., Izmir, Turkey; ³Ege Univ. Sch. Med., Izmir, Turkey

Abstract: The organization of the spinal cord gray matter as Rexed's laminae has been first described by the Swedish neuroanatomist and histologist Bror Rexed (1914 - 2002). He published his well-known articles “The cytoarchitectonic organization of the spinal cord in the cat” in 1952 and “A cytoarchitectonic atlas of the spinal cord in the cat” -in 1954. In these articles, he divided the spinal cord gray matter into ten laminae based on neuronal size, shape, and cytological features in transverse sections of the cat spinal cord. The landmark description of these layers by Rexed has formed the basis of the majority of detailed anatomical and physiological studies of the spinal cord in recent times. Rexed divided the gray matter into nine laminae (lamina 1 - 9) from dorsal to ventral and lamina 10 that is located around the central canal. The Rexed's laminae have been shown in the mouse by Sidman et al. (1971), in the rat by Molander et al. (1984 and 1989), and human in 2004, and mapped in detail for the first time along with spinal cord nuclei for the postnatal day 4 (P4) mouse by Sengul et al. (2012), and the mouse, rat, marmoset and rhesus monkey and human in 2013 (Sengul et al., 2013; Watson et al., 2021). Thus, the laminae of Rexed have been shown to be present in many species starting from the works of Rexed in early fifties.

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

Theme J Poster

J001. History of Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 8:30 AM - 9:30 AM

Program #/Poster #: J001.02

Topic: J.01. History of Neuroscience

Title: Present at the creation: notes on the early years of the Society for Neuroscience

Authors: *L. IRWIN;

Biol. Sci., Univ. of Texas at El Paso, El Paso, TX

Abstract: This presentation augments the official history of the Society as it appears on the SfN website, by adding some colorful details and personal reflections concerning the formation and first three national meetings of the Society, held in Washington, Houston, and San Diego. Those present at the creation (with brief provided biographical vignettes) included Ralph Gerard, Neal Miller, Louise Marshall, Ed Perl, Vernon Mountcastle, Ted Bullock, Eliot Stellar, and Robert Doty. Associates of the Neurosciences Research Program — an unrelated but influential precursor organization established in 1962 by Frank Schmitt — who also figured prominently in the early days of the Society included Maxwell Cowan, Walle Nauta, and Floyd Bloom. A few who were or later would become accomplished neuroscientists are listed in view of their notable absence from the founding group. A couple of telling anecdotes are related that shed light on early issues faced by the Society. An adjustable list of presenters at the first meeting in 1971 who plan to be at this meeting 50 years later is provided. A quiz to test the memory and knowledge of current attendees will be made available.

Disclosures: L. Irwin: Other; LI receives royalty from book referenced in presentation.

Theme J Poster

J001. History of Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 8:30 AM - 9:30 AM

Program #/Poster #: J001.03

Topic: J.01. History of Neuroscience

Support: CONACYT fellowship 858975

Title: Ricardo Miledi and his contributions to neuroscience

Authors: *C. L. GARCÍA;

Inst. De Neurobiología, Querétaro, Mexico

Abstract: Ricardo Miledi y Dau was a brilliant neuroscientist born in Mexico in 1927. He had a prominent career and received many awards worldwide for his contributions to science. His work was crucial in understanding the role of calcium in vesicular neurotransmitter release. He was the first to use *Xenopus laevis* oocytes for heterologous expression of mammalian neurotransmitter receptors. Ricardo Miledi was recognized as a distinguished professor at the National Autonomous University of Mexico (UNAM), where he obtained his medical degree and where he would later receive the honorary doctorate. He led in parallel both, the molecular neurobiology laboratory at the Institute of Neurobiology (UNAM), and the laboratory of cellular and molecular neurobiology at the University of California, where he extended his work with

postmortem membrane transplantation to *Xenopus* oocytes. The society for neuroscience and Grass Foundation held the Ricardo Miledi Neuroscience Training Program (2003-2012), which served as the basis for the current Latin American Training Program. Ricardo Miledi died last December 2017. He is remembered for his contributions to science and his exceptional role as mentor, friend, and human. This poster aims to honor his memory by reviewing his scientific career and work in neuroscience.

Disclosures: C.L. García: None.

Theme J Poster

J001. History of Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 8:30 AM - 9:30 AM

Program #/Poster #: J001.04

Topic: J.01. History of Neuroscience

Support: Chair in Neuroscience UAM-Fundación Tatiana Pérez de Guzmán el Bueno (C.C and I.P.-S.)
Beatriz Galindo senior research position in the Faculty of Medicine at Universidad Autónoma de Madrid (BEAGAL18/00098) (M.A.G.-C.)
Grant for I+D Projects by the Madrid Government SI2/PBG/2020-00014 (M.A.G.-C.)

Title: The history of the term thalamus

Authors: M. A. GARCÍA-CABEZAS, I. PÉREZ-SANTOS, *C. CAVADA;
Univ. Autónoma de Madrid, Madrid, Spain

Abstract: The term *thalamus* has a long and complex history. It was first used in Greek language by Galen of Pergamon in the Second century A.D. Afterwards, *thalamus* had an epical journey over 1500 years until it was consecrated by Thomas Willis in 1664. The term *thalamus* was translated into Syriac, Arabic, Latin, and then European vernacular languages. Along this journey, manuscripts traveled through Europe, the Middle East, Asia, and Africa in parallel to complex cultural and scientific exchanges. In the early Renaissance, *thalamus* was directly translated into Latin from the original Greek manuscripts that were available to the humanists. In Pre-Vesalian and Vesalian anatomy books, the term *thalamus* was not used because it was linked to outdated anatomical and physiological concepts. Indeed, the *thalamus* in Galenic physiology referred to a hollow chamber connecting the brain ventricles to the eyes, a concept questioned by Renaissance anatomists. Interestingly, these anatomists illustrated the *thalamus* as the part of the brain from which the brainstem originates. After the Renaissance, Jean Riolan the Younger recovered the term *thalamus* to refer to the deep gray matter structure that nowadays we name with this term. Finally, Thomas Willis fixed *thalamus* to anatomical terminology in his

influential textbook of brain anatomy. The story of the term *thalamus* epitomizes how the names of brain structures originated from Greek and Latin words as metaphors. It also provides a unique view on the production, preservation, and transmission of medical and scientific knowledge through generations.

Disclosures: M.A. García-Cabezas: None. I. Pérez-Santos: None. C. Cavada: None.

Theme J Poster

J001. History of Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 8:30 AM - 9:30 AM

Program #/Poster #: J001.05

Topic: J.01. History of Neuroscience

Title: The history of visual neuroscience related to the phenomenon of seeing one's own blind spots

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

Abstract: Edme Mariotte's discovery of the blind spot (BS) in 1686 is a remarkable and significant discovery. Today, every textbook in neuroscience, ophthalmology, and psychology teaches Mariotte's manner of mapping one's BS. Is it possible for one to actually see one's own BS? This is the other side of the coin concerning BS; and the answer is yes. There are basically two methods to observe one's own BS: 1. After adapting to a low illumination (~20 Lux) homogenous field with both eyes closed, quickly opening one eye will allow one to see a fast decaying image of the eye's BS (and possibly also the eye's Purkinje tree or PT—namely, the pattern of the eye's retinal blood vessels); 2. After adapting to a bright (>300 Lux) homogeneous field with both eyes closed, making an energetic eye movement with both eyes still closed will allow one to see the two eyes' BSs as two holes in entoptic vision. In 1694, Philippe de La Hire was the first to report seeing BS (using the first method). For this reason, we should refer to the effect of seeing BS as the La Hire phenomenon. La Hire presented an illustration of an entoptic image in which the central scotoma and the right eye's BS and PT are clearly seen. More than a century later, Jan Evangelista Purkinje (1819) showed some very similar figures; besides that, Purkinje (1823) also described the second method of seeing BS. Subsequent to La Hire and Purkinje, many other scientists have observed and reported the phenomenon: Aubert (1865), Helmholtz (1867), LeConte (1890), Charpentier (1898), etc. In the current vision science literature, it appears that the phenomenon of BS visibility has largely been forgotten—for instance, statements concerning the BS made by Dennett (1991; *Consciousness Explained*, p.324), Crick (1994; *The Astonishing Hypothesis*, p.54), Koch (2004; *The Question for Consciousness*, p.54), and Spillmann (2011; Review of "Blindspots: The Many Ways We Cannot See", p.379) all seem to indicate the non-existence of such a phenomenon. Hopefully, tracing

and knowing the relevant history regarding the La Hire phenomenon would revive it. Having described the relevant history, I claim that the La Hire phenomenon is more informative than the paradigm of mapping BS as to understanding the neural substrate underlying visual consciousness. Specifically, we can directly map this phenomenon to the neuroanatomical representation of BS within the principal thalamic recipient layer of the primary visual cortex (V1-L4)—for example, the BS and PT representations in human visual cortex demonstrated by Adams and Horton (2002). Based on such a mapping, we can assert that the neural substrate for visual consciousness (which is essentially color sensation) is V1-L4.

Disclosures: C.Q. Wu: None.

Theme J Poster

J001. History of Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 8:30 AM - 9:30 AM

Program #/Poster #: J001.06

Topic: J.01. History of Neuroscience

Support: JSPS KAKENHI 18K03182

Title: William James's theory of emotion as a pioneer work of affective neuroscience: Analyzing the content changes in James's theory of emotion and the contributing background factors

Authors: *T. SATO;

Social Welfare, Nagano Univ., Ueda, Japan

Abstract: William James (1884), an American philosopher and psychologist, and Carl Lange (1885), a Danish physician, proposed their independent theories of emotion in the late 19th century. Their theories made prominent contributions in the fields of affective neuroscience and psychology of emotion and emphasized the role of afferent neural input, that is, information transmitted from various peripheral body responses to the brain, to produce subjective experiences of emotion. James described not only the afferent neural processes but also the bodily perception or perception of organic disturbance that produce such subjective experiences, using his accurate and detailed introspection. While both theories were considered to be similar and were placed in the same category, called the “James-Lange theory,” there were some obvious differences between them. In fact, James (1894) criticized some parts of Lange's theory. Additionally, few but significant parts of James's theory about the neural process that produces subjective experience of emotion, seemed to have been changed, elaborated, or developed during the 10 years after the original version of his theory was proposed. This study presents aspects of his theory that have changed in the due course of time and discusses the background factors that contributed to these changes.

Disclosures: T. Sato: None.

Theme J Poster

J001. History of Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 8:30 AM - 9:30 AM

Program #/Poster #: J001.07

Topic: J.01. History of Neuroscience

Title: Carl Weigert: the stain and so much more

Authors: *B. BAKKUM;

Illinois Col. of Optometry, Chicago, IL

Abstract: Carl Weigert (1845-1904) is best remembered for the development of several histologic staining techniques, although his impacts on science were so much wider. His first significant contribution was when he published a preliminary note in which he showed he was able to stain bacteria for the very first time. This was of great importance for the subsequent work of Robert Koch. In a paper based on this research, Weigert began to develop the theory of what would eventually be called “coagulation necrosis” and the reparative processes (“Bioplastik”) of supporting tissues associated with inflammation. According to his younger cousin, Paul Ehrlich this monograph contained “the points of view that guided his work for the rest of his life” (translated). Working under Julius Cohnheim, Weigert published about several pathologic anatomy topics including the specific arrangement of duplicate ureters that become known as the Weigert-Meyer Rule. Weigert moved with Cohnheim to Leipzig and in 1882 developed the first stain for myelin. His close friend, Ludwig Edinger, maintained that being able to stain myelin had been the “starting point of a new period in science” (translated). Indeed it was the basis for the understanding of the complexity of the human brain we have now. When Cohnheim died, Weigert was considered his logical successor. There is a consensus of opinion that this promotion was denied Weigert because he was Jewish. In fact, Weigert was never offered an academic position at any German university, even though there were vacancies that had opened up while he was still alive. Weigert moved to Frankfurt where he became known as one of the foremost pathologists of his time. He developed reliable stains for fibrin, elastic fibers, and neuroglia. He also wrote expansively about coagulation necrosis and inflammation, which led to the idea that was later known as Weigert Law. Weigert had a joyous nature although suffered from bouts of depression and self-doubt, especially after his not being offered the position at Leipzig. He was generally well-liked and enjoyed entertaining his friends by storytelling, ventriloquy, and being an amateur mind reader. He financially supported his parents for many years such that he had a very modest lifestyle. His work always had a high degree of craftsmanship and was the result of slow, deliberate effort. He never published until he felt that he had diligently studied the problem from every point of view. Weigert literally worked to the

very end when he suddenly died of a coronary thrombosis. His death left much work incomplete, including an effort to formulate the results of years of work into a great universal law applicable to both animal and plant pathology.

Disclosures: B. Bakkum: None.

Theme J Poster

J010. Public Awareness of Neuroscience

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:00 AM - 10:00 AM

Program #/Poster #: J010.01

Topic: J.03. Public Awareness of Neuroscience

Support: IBRO/DANA Brain Awareness Week Grant

Title: Public Awareness of Neuroscience in Mongolia

Authors: ***B. LKHAGVASUREN**^{1,2}, E. TUMURBAATAR³, E. BAT-ERDENE³, M. OCH³, G. TUMUR-OCHIR⁴, B. DAGVAJANTSAN⁵, M. DASHTSEREN⁶, O. BYAMBASUKH⁷, B. CHOIJAMTS⁸, G. GANBURGED⁹, O. JAMYANDORJ⁹, O. ZAMBAL¹⁰, T. OKA², D. BOLDBAATAR¹⁰, T. JADAMBA¹⁰, B. MAJIGSUREN¹¹, R. DUGER¹²;

¹Mongolian Neurosci. Society, Ulaanbaatar, Mongolia; ²Psychosomatic Med., Intl. Univ. of Hlth. and Welfare, Narita, Japan; ³Brain Sci. Institute, Grad. School, Mongolian Natl. Univ. of Med. Sci., Ulaanbaatar, Mongolia; ⁴Mental Hlth., ⁵Dept. of Neurol., ⁶Family Med., ⁷Endocrinol., ⁸Obstetrics and Gynecology, ⁹Sch. of Dent., ¹⁰Mongolian Natl. Univ. of Med. Sci., Ulaanbaatar, Mongolia; ¹¹Ministry of Hlth., Ulaanbaatar, Mongolia; ¹²Mongolian Acad. of Sci., Ulaanbaatar, Mongolia

Abstract: Public Awareness of Neuroscience in Mongolia**Abstract:** To raise the public understanding of brain health, the Mongolian Neuroscience Society aimed to deliver public lectures to the general population and a lobby meeting for brain science with policymakers in 2021 in Mongolia. Supported by IBRO/APRC and Dana Foundation, we successfully organized the events in April and May this year in collaboration with the Ministry of Health, the Ministry of Education and Science, and the Mongolian Academy of Sciences. We coordinated a series of lectures about the brain, neurological and mental disorders, and their preventive interventions, particularly concerning the current pandemic. In addition to the main events, we launched an international joint symposium for mental health and brain awareness and roundtable discussions with core decision-makers in the field of science. All the events were broadcasted nationwide and disseminated through televisions, radios, newspapers, and social media. To actively engage the attention of both the general public and the government, a social media contest in conjunction with the forum was launched prior to it. As a result, the events reached more than 33.4 thousand people and have been watched by 8.6 thousand people. Thanks to the lobby meeting, the

Mongolian Academy of Sciences announced that a Center for Excellence in Brain Science will be established at the organization in the near future. In conclusion, these remarkable events have been raised the awareness of neuroscience among the Mongolian population. **Keywords:** awareness, general population, neuroscience, Mongolia

Disclosures: **B. Lkhagvasuren:** None. **E. Tumurbaatar:** None. **E. Bat-Erdene:** None. **M. Och:** None. **G. Tumur-Ochir:** None. **B. Dagvajantsan:** None. **M. Dashtseren:** None. **O. Byambasukh:** None. **B. Choijamts:** None. **G. Ganburged:** None. **O. Jamyandorj:** None. **O. Zambal:** None. **T. Oka:** None. **D. Boldbaatar:** None. **T. Jadamba:** None. **B. Majigsuren:** None. **R. Duger:** None.

Theme J Poster

J010. Public Awareness of Neuroscience

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:00 AM - 10:00 AM

Program #/Poster #: J010.02

Topic: J.03. Public Awareness of Neuroscience

Title: Neuropathic Pain in COVID-19 Patients: A Current Perspective

Authors: **D. L. ORTEGA-PANIAGUA**, L. J. RODRÍGUEZ-HERNÁNDEZ, L. B. VÁZQUEZ-ELIZARRARAZ, J. HERNÁNDEZ-AGUILAR, J. G. RAMIREZ-JARAMILLO, S. A. GONZÁLEZ-MENDOZA, M. FERNÁNDEZ-MOYA, L. A. VERGARA-HERNÁNDEZ, M. E. BARRETO-ARIAS, *O. A. JARAMILLO-MORALES;
Dept. de Enfermería y Obstetricia., Dept. de Enfermería y Obstetricia. División de Ciencias de la Vida del Campus Irapuato Salamanca. Univ. de Guanajuato, Irapuato, Guanajuato, Mexico

Abstract: The COVID-19 disease has proven to be a challenge for the scientific community and health personnel, since the SARS-CoV-2 infection not only affects the respiratory system, but has also shown a great impact on other systems and their organs. , including the nervous system within its divisions; central nervous system (CNS) and peripheral nervous system (PNS). In this context, clinical studies have reported the prevalence of neuropathic pain in COVID-19 patients, who usually do not have a good response to drug treatment. However, it is not well established in what sense COVID-19 disease modifies the perception of pain or the chemical mediators that are involved, as well as its mechanism of action. The present topic aims to provide an updated review of these topics, given that the course of the disease has taken a different course than was anticipated and has had different complications during its diagnosis and treatment.

Disclosures: **D.L. Ortega-Paniagua:** None. **L.J. Rodríguez-Hernández:** None. **L.B. Vázquez-Elizarraraz:** None. **J. Hernández-Aguilar:** None. **J.G. Ramirez-Jaramillo:** None. **S.A. González-Mendoza:** None. **M. Fernández-Moya:** None. **L.A. Vergara-Hernández:** None. **M.E. Barreto-Arias:** None. **O.A. Jaramillo-Morales:** None.

Theme J Poster

J010. Public Awareness of Neuroscience

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:00 AM - 10:00 AM

Program #/Poster #: J010.03

Topic: J.03. Public Awareness of Neuroscience

Support: Dana Foundation BAW-0000000077

Title: Engaging the public with science through community-based art collaborations

Authors: *A. MAYERS¹, L. DINH¹, P. L. CROXSON²;

²Mortimer B. Zuckerman Mind Brain Behavior Inst., ¹Columbia Univ., New York, NY

Abstract: Public engagement with science can involve one-way flow of information from a science institution to the public ('communication'), from the public to the institution ('consultation') or genuine dialogue and flow of communication ('participation') (Rowe & Frewer, *Science Technology, & Human Values* 2005). Beyond participation, however, lies collaboration, in which a science institution and a partner, such as a group of individuals or a community-based organization, engage in consultation, testing and development of new programs that allow participants to feel like co-owners of the content (Simon, *The Participatory Museum* 2010). In 2019, Columbia University's Zuckerman Institute, a neuroscience institute located in the heart of Harlem, New York, launched the program Breakout Science. Breakout Science is a series of events, each produced in collaboration with an arts focused community-based organization and featuring neuroscientists or mental health professionals. We had the following objectives: 1) create collaborative partnerships with community-based organizations located in Upper Manhattan or the South Bronx; 2) host events in community spaces; 3) generate curiosity and wonder around science through the arts; 4) attract audiences that a science institute would not normally attract. After an initial pilot phase with three in-person events, we pivoted to a virtual format in response to the COVID-19 pandemic and hosted over 33 virtual events in 2020-2021. Events ranged from small workshops with 16-108 participants to widely available public events with up to 2900 views. Up to 85% of surveyed participants heard about the events from our community-based organization partners and were not scientists. They sought out the events to learn more about the subject, and were evenly distributed between those who live in New York City (50%) and other locations (50%). Most surveyed participants (93.7%) rated the programs as excellent or above average and most (88.6%) indicated that they would attend if the events were held again next year. This suggests that our approach of collaborative partnerships to engage the public with science through art is helping us reach new audiences who may not otherwise seek out science content, both in our neighborhood and beyond.

Disclosures: A. Mayers: None. L. Dinh: None. P.L. Croxson: None.

Theme J Poster

J010. Public Awareness of Neuroscience

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:00 AM - 10:00 AM

Program #/Poster #: J010.04

Topic: J.03. Public Awareness of Neuroscience

Support: Dana/FENS BAW2021 Grant

Title: Edge: an association for neuroscience-art, establishing artist-scientist collaborations for communication and outreach

Authors: *I. E. STEWART^{1,2}, A. YOUNG^{1,3}, C. KÜHNAPFEL^{1,4}, F. SCHWALLER¹, T. LUPASHINA^{1,5};

¹EDGE: Neurosci. and Art e.V., Berlin, Germany; ²Max-Delbrück Ctr. for Mol. Med. (MDC), Berlin, Germany; ³NIRx GmbH, Berlin, Germany; ⁴Dept. of Cognition, Emotion, and Methods in Psychology, Fac. of Psychology, Univ. Wien, Vienna, Austria; ⁵Neurosci. Res. Center, Charité - Universitätsmedizin, Berlin, Germany

Abstract: Neuroscience-art begins with the premise of art as a direct communication medium between artists and spectators (Donald, 2006). Non-technical representations of scientific knowledge in art may allow for egalitarian and inclusive discourse on scientific advances and their impacts. Utilising art as a medium for outreach, we address a critical need for accessible sharing of scientific knowledge with the public (Parikh, 2021). Over the past years, the non-profit association EDGE e.V. has been developing a practice of neuroscience-art for public audiences and a collaborative platform for artists and scientists. We present a retrospective of art exhibitions with Berlin partners Charité Universitätsmedizin, the Bernstein Centre for Computational Neuroscience, the MIND Foundation, and the Einstein Centre for Neuroscience. We also preview a forthcoming neuroscience-art exhibition funded by the Brain Awareness Week initiative of FENS and DANA. Exhibition visitor attendance and testimony make the value of interdisciplinary work in the public domain evident, agreeing with Muller et al. (2015). To further develop neuroscience-art and establish concrete perspectives on its benefits, we participated in discussions and collaborations with other institutions. Critical reflection on science outreach and art-science forms an objective to establish spaces and opportunities for interaction and collaboration between artists and scientists. We have developed a collaboration program, and present proposed methods of neuroscience-art and study design for measuring its outcomes. Our experiences and goals address needs for both scientific and public communities, with a novel attempt at a concrete method for art-science collaboration, for new avenues of science communication and public outreach.

References

Donald, M. (2006). Art and cognitive evolution. In M. Turner (Ed.), *The Artful Mind: Cognitive*

Science and the Riddle of Human Creativity (pp. 3-200). Oxford, England: Oxford University Press.

Muller, L., Bennet, J., Froggett, L. & Bartlett, V. (2015). Understanding Third Space: Evaluating Art-Science Collaboration. ISEA. Proceedings of the 21st International Symposium on Electronic Art.

Parikh, S. (2021). Why We Must Rebuild Trust in Science. Retrieved July 15, 2021, from <https://www.pewtrusts.org/en/trend/archive/winter-2021/why-we-must-rebuild-trust-in-science>

Disclosures: **I.E. Stewart:** Other; Honorary executive of non-profit EDGE e.V. **A. Young:** Other; Honorary executive of non-profit EDGE e.V.. **C. Kühnapfel:** None. **F. Schwaller:** None. **T. Lupashina:** Other; Honorary executive of non-profit EDGE e.V..

Theme J Poster

J010. Public Awareness of Neuroscience

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:00 AM - 10:00 AM

Program #/Poster #: J010.05

Topic: J.03. Public Awareness of Neuroscience

Support: Healthy Brains, Healthy Lives Knowledge Mobilization
CIHR
Mitacs

Title: Piece of Mind: connecting neurodegenerative disease research and lived experience through the performing arts.

Authors: ***N. KUHLMANN**¹, **A. THOMAS**², **S. BLAIN-MORAES**²;

¹McGill Univ., Montreal, QC, Canada; ²McGill, Montreal, QC, Canada

Abstract: Introduction: Piece of Mind uses the performing arts to synthesize and translate knowledge about Parkinson's disease (PD) and dementia. Despite a growing number of interdisciplinary initiatives to meet the challenges of neurodegenerative diseases, language barriers continue to limit crosstalk between the bench, bedside and beyond. Traditional means of knowledge dissemination are rarely adapted to audiences outside academia, thus limiting research uptake. Objectives: We employ an arts-based approach to 1) provide common ground to facilitate knowledge exchange between participants involved in the creative process and 2) create multi-disciplinary performances that can spark meaningful dialogue around PD and dementia. Methods: Our intersectoral research-creation project connected artists, researchers, individuals living with PD / dementia, and caregivers to co-create 2 performances based on scientific research and lived experience. Art-science pieces were created to share scientific concepts with participants from the PD / dementia community. Virtual group sessions were used to explore these concepts through creativity and embodiment, and to facilitate discussion regarding the

lived experience of these conditions. The emergent themes were built on through improvisation, focused discussions, virtual / in-studio collaboration and work-in-progress presentations to create performances that remain true to the information on which they are based. The resulting bilingual, 45-min performances were filmed and made available online in mid-July. Written reflections from and interviews with project participants were analysed (thematic coding) to determine whether the collaborative process facilitated knowledge exchange and understanding, and the impact on audience members was analyzed based on talk-back sessions, questionnaires, and engagement with supplementary online materials. Results: Our participatory approach enables disparate communities to connect through joint experimentation, using movement and music as tools for knowledge creation and exchange. Both the creative process and the performances have sparked conversation regarding the intersections between research and lived experience of neurodegenerative conditions, and have engaged a wide audience on both an intellectual and emotional level. Conclusion: The performing arts provide a unique opportunity to unite scientific data with the lived experiences of PD / dementia. Piece of Mind hopes to paint a more holistic, person-centred image of these conditions in doing so.

Disclosures: N. Kuhlmann: None. A. Thomas: None. S. Blain-Moraes: None.

Theme J Poster

J010. Public Awareness of Neuroscience

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:00 AM - 10:00 AM

Program #/Poster #: J010.06

Topic: J.03. Public Awareness of Neuroscience

Title: Grey Matters Journal: Accessibility and inclusivity

Authors: V. S. C. TSAI¹, *J. N. BHATEJA¹, C. DAHLEEN¹, S. E. MAR¹, H. L. HAN¹, V. Y. WANG¹, S. A. GOLDEN²;

²Dept. of Biol. Structure, ¹Univ. of Washington, Seattle, WA

Abstract: Neuroscience is evolving at a remarkable pace, with each year bringing new discoveries and technological innovations. However, the dissemination of this knowledge is often limited by its technical intricacy and intended niche audience, resulting in a disconnect between researchers and their greater communities, including prospective students and trainees. This communication gap limits the progression, publicization, and impact of novel discoveries, and represents a challenging barrier to entry for students interested in pursuing careers in neuroscience.

Grey Matters Journal was established at the University of Washington to break down this barrier to the dissemination of current neuroscience research through writing and visual arts - with content created by undergraduates, for undergraduates and the greater non-scientific community. From our founding chapter, Grey Matters Journal has developed a framework for science

outreach that has been adopted at other undergraduate institutions across the nation. We aim to share this framework, support efforts in establishing new chapters, and ultimately develop a nationwide platform for dialogues between undergraduate neuroscientists and their greater communities that promote scientific advances through the accessibility and inclusion of the arts. Since its founding in 2012, with the mission of open-access scientific communication and outreach, Grey Matters Journal has produced 20 quarterly issues of high-quality neuroscience education that are freely available online for anyone to read, learn from, and get excited about. This is accomplished by teams of undergraduate students turning primary scientific literature into a more digestible and relatable format without the use of heavy jargon and through the incorporation of artistic representations to creatively express complex ideas. Going forward, we strive to bridge the gap between neuroscience and public understanding using diverse multimedia formats and the establishment of initiatives to work with and uplift underrepresented voices in neuroscience.

Disclosures: V.S.C. Tsai: None. J.N. Bhateja: None. C. Dahleen: None. S.E. Mar: None. H.L. Han: None. V.Y. Wang: None. S.A. Golden: None.

Theme J Poster

J011. Outreach Activities

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:15 AM - 10:15 AM

Program #/Poster #: J011.01

Topic: J.03. Public Awareness of Neuroscience

Support: Personal funds for first author, the proponent and main developer of the project

Title: A general algorithm for optimizing the path of Alzheimer disease with individualized citizen neuroscience: computational, neuropsychological and EEG tools to give existential meaning

Authors: *J. GOMEZ-MOLINA, A. L. GOMEZ-MOLINA;
Intl. Group of Neuroscience, IGN:N(S,E,P), Medellin, Colombia

Abstract: INTRODUCTION. Classification criteria for Alzheimer's disease (AD) are based on genetic (% of APOE or presenilin genes), anatomical (affected brain regions), temporal (e.g. age of onset), and functional parameters (EEG, fMRI, PET, MMSE, CDR, neuropsychological examinations, years of education). In our scientific abstract we proposed new arrays with dimensional axes in order to have an unbiased framework. Actually, some of the current paradigms to treat Alzheimer's disease (AD) have reached that status because few but prestigious labs in expensive projects have replicated the main findings. However, these paradigms can look like dogma to other researchers and patients. We need participation and replication of more small labs to verify some of the claims and capture the whole spectrum of

AD in real time. One way to do this is by using citizen science and accessible research tools, like behavioral tests or a portable EEG/neurofeedback system of 5 electrodes. **METHODS.** We sketch a method and a general algorithm for a spreadsheet or a database management system (DBMS) assuming an “ideal future situation”. **ASSUMPTIONS:** Probabilities, cost and benefits are subjectively estimated. **CONCLUSION.** A citizen neuroscience project can be implemented to verify by the general public the categories and claims of big labs, regarding treatments and classification of diseases. With new forms of EEG/neurofeedback patients can try to self-regulate their own behavioral and cognitive habits and design in this way their own trajectories as their disease develop instead of being rigidly classified in few subtypes. Gomez-Molina JF 2021 "A spreadsheet structure for an EEG/neurofeedback-based re-classification of Alzheimer's disease trajectories with a novel philosophical approach". SfN meeting

Disclosures: J. Gomez-Molina: None. A.L. Gomez-Molina: None.

Theme J Poster

J011. Outreach Activities

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:15 AM - 10:15 AM

Program #/Poster #: J011.02

Topic: J.03. Public Awareness of Neuroscience

Support: Faculty Development Grant, Gordon State College, Project 14372

Title: Learning while healing: Best practices based on neuroscience for teaching veteran students impacted by post-traumatic stress disorder

Authors: *I. S. JONES, E. G. MIXON;
Biol., Gordon State Col., Barnesville, GA

Abstract: From the beginning of warfare, veterans have returned home experiencing symptoms of psychiatric and emotional distress. Some had flashbacks of battles, during which they would experience all the same sensory effects of being on the battlefield. Some would simply be “different.” Their loved ones could not explain it, but the individual’s personality would be altered. Some had recollection events, in which a sound or visual cue would mentally transport them back to war. These episodes can elicit feelings of extreme fear and panic, but usually only last a few moments. However, the emotions awakened by such events can last much longer. We now know that these are manifestations of post-traumatic stress disorder (PTSD) and that this condition can have overarching effects on a person’s entire life. PTSD can have a tremendous effect on learning and memory. Taking on any task that requires concentration or attention can be a special challenge for a veteran experiencing such symptoms. Many veterans come back from assignment and want to continue, or begin, their college career, a noble aspiration that can sometimes be more difficult than the veteran first realizes. There are the obstacles of being a

nontraditional student which must be overcome, such as age differences between the veteran and his or her classmates. This can lead to feelings of isolation and an inability to relate to other students. But for the veteran experiencing PTSD, the challenges of navigating the college experience can be much more difficult. With an evidence-based, neuroscience-centered foundation, the end goal of this review is to develop a toolkit from which an instructor with veteran students can pull teaching techniques. We want to empower instructors and other college and university personnel with skills that are specific to working with veterans. We have made suggestions with regard to the entire learning process, especially considering leniency toward, and encouragement of animal-assisted therapy. Current research suggests that there are strategies that those around the veteran can use to offer support. However much more research needs to be conducted on teaching veteran students suffering from PTSD in a nurturing and supportive environment to encourage their success in a college or university setting. The aim of this review is to augment this area of research.

Disclosures: I.S. Jones: None. E.G. Mixon: None.

Theme J Poster

J011. Outreach Activities

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:15 AM - 10:15 AM

Program #/Poster #: J011.03

Topic: J.03. Public Awareness of Neuroscience

Support: Union of Concerned Scientists Seed Fund

Title: The University of Cincinnati Science Policy Ambassadors: Engaging Early-Career Researchers in Science Advocacy

Authors: *C. M. GODALE, J. PATRITTI-CRAM, K. SEROOGY;
Univ. of Cincinnati, Cincinnati, OH

Abstract: The COVID-19 pandemic caused misinformation, pseudoscience, and science skepticism to emerge in the public sphere. As a result, there has been a misalignment of scientific communication between the scientific community, the views of constituents, and elected representatives. Many scientists are aware of the need to publicly champion the value of research and encourage lawmakers to use evidence in policy decisions; however, early-career researchers (ECRs) have limited opportunities to engage in advocacy. The University of Cincinnati Science Policy Ambassadors (UCSPA) is a graduate and undergraduate student-run organization founded at the beginning of 2020 with a mission to provide undergraduate and graduate students with opportunities to engage in advocacy, engage elected officials, and create change in science policy. The goal of UCSPA is to educate students on how to be advocates for science. To date, UCSPA has accomplished this goal by providing hands-on training and skill development to its

members in many areas, including science communication, science diplomacy, and science policy. Here, we will showcase how UCSPA was founded in the midst of a global pandemic by taking part in the Union of Concerned Scientists -Team-Based Organizing Initiative, how UCSPA virtually coordinated advocacy initiatives of interest to students, how it started a monthly speaker series with policy professionals around the nation, how it coordinates lab tours for elected officials, and how it works to increase community engagement by offering science communication opportunities. UCSPA is led and co-founded by Society for Neuroscience (SfN) Early Career Policy Ambassadors C.M. Godale and J. Patritti-Cram, with SfN Advocacy Trainer and Key Contact Dr. K.B. Seroogy serving as faculty advisor.

Disclosures: C.M. Godale: None. J. Patritti-Cram: None. K. Seroogy: None.

Theme J Poster

J011. Outreach Activities

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:15 AM - 10:15 AM

Program #/Poster #: J011.04

Topic: J.03. Public Awareness of Neuroscience

Support: NIH / NIDA Grant DA005010
UCLA Brain Research Institute
UCLA Neuroscience Interdepartmental Program

Title: Effectiveness of a virtual undergraduate student-led drug outreach program

Authors: E. M. BURNETTE, L. C. BASS, J. J. MUNIER, C. J. EVANS, R. ROMERO-CALDERÓN;
UCLA, Los Angeles, CA

Abstract: Substance misuse and substance use disorder (SUD) represent a persistent societal burden amounting to over \$420 billion USD/year in lost productivity, healthcare and criminal justice costs [1]. Prevention can not only reduce this societal cost, but also improve the quality of life for those that would have become afflicted. Well-designed programs aimed at adolescent outreach may be particularly impactful, since drug use beginning in adolescence greatly increases risk for development of a SUD [2]. This is particularly relevant now, as changes in adolescent substance use have been seen over the course of the COVID-19 pandemic. Specifically, adolescents have shown increases in solitary substance use, increased frequency of alcohol and cannabis use [4], high levels of nicotine and cannabis vaping, and increases in stimulant use among younger adolescents [5]. To that end, we adapted the Drug Outreach, Promoting Awareness (DOPA) Program, a drug outreach course developed by the Interdepartmental Program in Neuroscience at UCLA, to reach adolescents virtually, via Zoom, during the shelter in place orders of spring 2020 and 2021. Not only were we able to measure

high schoolers' perception on the harmfulness and addictiveness of commonly used drugs before and after our intervention, but we were also in the unique position to compare the effectiveness of a virtual school visit to the traditional in-person model, which we recently evaluated [6]. Results from 93 matched responses across 7 high schools in the US and Canada revealed significant changes in perception for a few drugs, namely the harmfulness of cannabis and the addictiveness of stimulants and sedative club drugs. These results indicate that our virtual outreach initiative effectively targeted some of the drug use changes seen in adolescents during the COVID-19 pandemic [5]. We also determined that despite the advantages of virtual DOPA outreach (most notably the elimination of geographic boundaries), it was overall somewhat less effective than in-person outreach. However, it remains to be determined whether differences in efficacy between virtual and in-person interventions are due strictly to setting. These results suggests that in-person outreach should continue to be our main strategy, but also inform us on how to potentially incorporate some virtual element into our Program, particularly for cannabis, stimulants and party drugs.

Disclosures: E.M. Burnette: None. L.C. Bass: None. J.J. Munier: None. C.J. Evans: None. R. Romero-Calderón: None.

Theme J Poster

J011. Outreach Activities

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:15 AM - 10:15 AM

Program #/Poster #: J011.05

Topic: J.03. Public Awareness of Neuroscience

Support: NSF #1934288

Title: Multiphoton online: Maintaining the Nemonic network during a pandemic

Authors: *R. MCGREAL¹, C.-H. YU², R. HIRA², K. J. NIELSEN⁵, P. KARA⁶, M. GOARD³, G. D. STUBER⁷, J. L. CHEN⁸, J. SQUIER⁹, L. THEOGARAJAN⁴, J. BOWERS⁴, S. L. SMITH⁴;

¹Inst. for Collaborative Biotechnologies, ³Molecular, Cell. and Developmental Biol. / Psychological & Brain Sci., ⁴Electrical and Computer Engin., ²Univ. of California Santa Barbara, Santa Barbara, CA; ⁵Neurosci., Johns Hopkins Univ., Baltimore, MD; ⁶Univ. of Minnesota, Minneapolis, MN; ⁷Anesthesiol. and Pain Med., Univ. of Washington, Seattle, WA; ⁸Boston Univ., Boston, MA; ⁹Colorado Sch. of Mines, Golden, CO

Abstract: The overarching goal of our NSF-funded NeuroNex Neurotechnology Hub, the Nemonic (Next generation Multiphoton Neuroimaging Consortium) project, is to both create and disseminate state-of-the-art technology for multiphoton imaging and associated techniques to the neuroscience community. We develop next generation multiphoton imaging technology for new

experiments, advance fundamental technology to create new avenues for future imaging systems, and disseminate our technology and techniques to the broader community. Through our dissemination and outreach efforts we seek to impact both the neuroscience community, and a wide variety of disciplines and education levels. A common theme in our outreach is to educate engineers on neuroscience topics, educate neuroscientists on the optical engineering behind our imaging systems, and make our findings accessible to the general public. Since March 2020, we have temporarily shifted our network and outreach into a fully online format to accommodate public health during the pandemic. We host a YouTube channel (<https://www.youtube.com/c/NemonicNeuroNex>) which contains a repository of demonstration videos suitable for a wide range of experience levels from advanced high school students, to professors, to industry professionals, as well as the curious public. We host an annual workshop, which we have shifted to an online only format. Although key in-person interactions are lost, the virtual format accommodated more students, both in the US and internationally. A key emphasis of these workshops is to help engineers and neuroscientists learn a base set of references and terminology to better communicate and collaborate. Attendees learn about technology developed by the Nemonic project, as well the general principles of multiphoton imaging. We share workshop recordings on our YouTube channel and have additional resources on our website (<https://nemonic.ece.ucsb.edu/>). We have also developed the site BrainModules (<https://web.ece.ucsb.edu/~riichirohira/TopBM-2.06/>) to explore neural circuit connectivity, based in part on data from the Allen Institute for Brain Science. BrainModules provides a lightweight and easy web interface to visualize anatomical connections. Through our variety of online resources, the Nemonic project has ensured that our outreach, education, and dissemination efforts are of benefit to the neuroscience community and broader public in a time when in-person interactions are not possible.

Disclosures: R. McGreal: None. C. Yu: None. R. Hira: None. K.J. Nielsen: None. P. Kara: None. M. Goard: None. G.D. Stuber: None. J.L. Chen: None. J. Squier: None. L. Theogarajan: None. J. Bowers: None. S.L. Smith: None.

Theme J Poster

J011. Outreach Activities

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:15 AM - 10:15 AM

Program #/Poster #: J011.06

Topic: J.03. Public Awareness of Neuroscience

Support: AAAS/Lyda Hill Philanthropies
Dana Foundation

Title: Remote Neuroscience Engagement with the Books and Brains-New Orleans Initiative

Authors: *E. ENGLER-CHIURAZZI, M.-L. MALECKI, R. SOLCH, E. GALANG, E. CASARENO, E. DAMLE, S. SHRESTHA, Z. VIDELEFSKY, N. DELROOZ, B. ESNEAULT, Z. HOPEWELL, J. KLAR, A. IRYAMI, M. NARAHARI, C. VUONG, C. VUONG, Z. YOUNG;
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 and Brains-New Orleans program. The program's goal was to promote remote/virtual neuroscience engagement while supporting pandemic lockdown and social distancing procedures. We accomplished this in two ways, 1) by providing opportunities for synchronous and asynchronous neuroscience content interaction online, and 2) 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. Specifically, under the leadership of the faculty program director, Tulane University undergraduate volunteers were arranged into three 'krewes' to carryout various arms of the initiative. First, to provide neuroscience content asynchronously, a video krewe created a series of 'neuroscience-from-home' videos articulating key neuroscience topics. Second, to promote program awareness to the community and provide opportunities for synchronous direct engagement with a 'program mentor', a social media krewe designed a logo, launched a website, generated content, and managed regular postings on various social media platforms. Third, a data collection krewe quantified program participation by acquiring library book rental records, monitoring social media impressions, evaluating user responses from a satisfaction survey, and verifying the presence or absence of program books at various library sites. Additionally, 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. Our next steps include establishing community partnerships with local public and private school libraries, businesses, and literacy groups. 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. M. Malecki: None. R. Solch: None. E. Galang: None. E. Casareno: None. E. Damle: None. S. Shrestha: None. Z. Videlefsky: None. N. Delrooz: None. B. Esneault: None. Z. Hopewell: None. J. Klar: None. A. Iryami: None. M. Narahari: None. C. Vuong: None. C. Vuong: None. Z. Young: None.

Theme J Poster

J011. Outreach Activities

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:15 AM - 10:15 AM

Program #/Poster #: J011.07

Topic: J.03. Public Awareness of Neuroscience

Title: Brainstem: an educational podcast about the brain and brain disorders to combat stigma

Authors: *A. BHOGAL, M. BHOGAL, H. A. MARUSAK;
Wayne State Univ., Detroit, MI

Abstract: Individuals living with brain disorders are susceptible to the effects of stigma (i.e., low self-esteem, delaying seeking treatment). Stigma may be a result of the lack of awareness regarding these disorders. The BrainSTEM podcast was launched in March of 2021 with the goal of educating the public about the brain and brain disorders and in turn, destigmatizing various conditions. Each episode focuses on a brain disorder in which the host, neuroscientist Dr. Hilary Marusak, interviews an individual that has been affected by the disorder, followed by an interview with an expert that researches or treats that disorder. The podcast was developed by Dr. Marusak in conjunction with Amanpreet and Manmeet Bhogal, who have taken the lead on production, advertising, marketing, and content recommendations. This educational podcast has a target audience of individuals ranging from neuroscientists to the general public. The BrainSTEM podcast has published six episodes thus far on the following topics: *Tourette syndrome, Concussion & CTE, COVID-19 and the brain, Prosopagnosia, Human-Animal Interactions and Mental Health, and Schizophrenia*. All the BrainSTEM podcast episodes are available on Spotify, Apple Podcast, Google Podcast, Pocket Casts, and more. As of July 7, 2021, BrainSTEM has garnered over 420 listens, and the listenership continues to grow. Audience reactions have included appreciating the humanism of disorders via the interviews conducted in the first half of the episode, mentioning the ease of understanding the conditions with the language being used in the podcast, and realizing certain views that were held prior to listening to an episode were incorrect; for example, tics are not the same for everyone and can have various manifestations for people living with Tourette syndrome. Listening to interviewees and audience members has highlighted the need to reduce stigma surrounding brain disorders and the importance of science communication to the public. Moving forward, the BrainSTEM podcast team will work toward expanding audiences and increasing online engagement via social media platforms (e.g., Instagram, Twitter, TikTok). Additionally, future episodes may include topics like burnout and social anxiety disorder, both important and relevant topics with the COVID-19 pandemic. We hope that with our podcast, we will be able to communicate science information in a manner that is understood by the public, and in turn, meet our goal of destigmatizing various conditions.

Disclosures: A. Bhogal: None. M. Bhogal: None. H.A. Marusak: None.

Theme J Poster

J011. Outreach Activities

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:15 AM - 10:15 AM

Program #/Poster #: J011.08

Topic: J.03. Public Awareness of Neuroscience

Title: Reconnecting our brains one cell at a time in a pandemic

Authors: ***W. S. GRIESAR**^{1,2,4}, **J. J. LEAKE**³;

¹Northwest Noggin, Portland, OR; ²Psychology/Neuroscience, ³Univ. Studies, Portland State Univ., Portland, OR; ⁴Behavioral Neurosci., OHSU, Portland, OR

Abstract: Our brains are home to billions of cells that reach out and connect. These networks of linked neurons and glia make us who we are, and let us perceive, think and behave. When separated by trauma or injury they are remarkably plastic, capable of establishing new synapses, developing creative approaches to navigating a complex world. 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 brains and behavior into K-12 public schools, youth 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 almost 50,000 people since 2012! In 2020, with COVID-19 suspending in-person outreach, we developed a new found object brain cell project we could engage in online. We asked people to look around their own environment and find objects that reminded them of neurons or glia. We asked: "Can you construct a brain cell out of things that you find? What objects for you represent the function of a glial cell, or neuron, or the function of specific parts of a neuron? Do these objects have personal meaning, or say something about you?" We brought this project to K-12 classrooms in the Pacific Northwest and Hawaii, and presented it through two global webinars in collaboration with BrainFacts.org, a public information initiative of The Kavli Foundation, the Gatsby Charitable Foundation and the Society for Neuroscience. The brain cells created and posted online with the hashtag #showusyourbraincell are extraordinary - beautiful, compelling, informative - and offer windows into people's individual lives and circumstances. Many took the opportunity to explain the materials used and their significance, connecting essential aspects of other fields and cultures to basic structural components of our brains. A pandemic is traumatic, separates networks, and makes it hard to connect. Yet like our brain cells, we can adapt and find new approaches to our ever-changing world. Building excitement and awareness of discoveries, educational options and careers through arts-integrated neuroscience outreach also trains new scientists to collaborate, engages more people, and increases awareness and support for community investment in both brain research and the arts.

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

Theme J Poster

J011. Outreach Activities

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:15 AM - 10:15 AM

Program #/Poster #: J011.09

Topic: J.03. Public Awareness of Neuroscience

Title: Portland State University: Navigating neuroscience education and outreach during the covid-19 pandemic

Authors: *R. M. JARDINE^{1,2}, K. Y. HASHIMOTO^{1,2}, A. J. STEIGERWALD^{1,2}, L. J. MCGRATH^{1,2}, N. L. MACKENZIE^{1,2}, M. A. DEMOURA^{1,2}, W. B. LEVERETTE^{1,2}, K. A. AQAEI^{1,2}, J. L. PADUA^{1,2};

¹Portland State Univ., Portland, OR; ²All authors contributed equally, Portland, OR

Abstract: The Portland State University (PSU) Neuroscience Club is a community of service-minded students that focuses on providing quality education to those with limited access to neuroscience. During the COVID-19 pandemic, we were presented with challenges that made it difficult to continue connecting with our peers. To navigate these obstacles, we developed innovative ways to provide students with a neuroscience community. Whilst transitioning to a virtual setting, we adapted to online platforms. This has included reaching out to guest speakers from diverse backgrounds and collaborating with other Neuroscience Clubs from across the country. We hosted weekly meetings ranging from journal roundtables, to Q&A panels, to social events in order to provide a space for peer engagement. After years of student-led advocacy, our club has paved the way for PSU's first neuroscience curriculum via an Interdisciplinary Neuroscience Minor. Through the perseverance of club members and affinity students, PSU will now offer a formalized track of study. This pioneering minor will offer a diverse curriculum that teaches neuroscience through a multifaceted perspective. The University recognizes the importance of a systems-based approach to teaching neuroscience using methodology that accurately represents the diversity of the field. This coming year, as the state of COVID-19 changes, our club plans to continue adapting to the needs of our communities, while expanding our network. More than ever, we anticipate the need for connection and collaboration. As such, this coming year we plan to focus our attention on community service, specifically with Northwest Noggin - a non-profit organization specializing in neuroscience education and outreach through the STEM + Arts approach. Furthermore, we predict that the interdisciplinary nature of the new minor will strengthen ties across departments and programs of study at PSU, allowing for greater innovation. The PSU Neuroscience Club is proud to serve our community by providing meaningful exposure to neuroscience and a space to connect.

Disclosures: R.M. Jardine: None. K.Y. Hashimoto: None. A.J. Steigerwald: None. L.J. McGrah: None. N.L. MacKenzie: None. M.A. DeMoura: None. W.B. Leverette: None. K.A. Aqaei: None. J.L. Padua: None.

Theme J Poster

J011. Outreach Activities

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:15 AM - 10:15 AM

Program #/Poster #: J011.10

Topic: J.03. Public Awareness of Neuroscience

Title: Pivoting to a remote summer undergraduate program during COVID- 19 pandemic: Neurotrauma research at the Miami Project to Cure Paralysis.

Authors: M. CHAGOYEN¹, *N. DATTA¹, D. C. CILIEN¹, D. CILIEN¹, M. A. CORREA¹, A. PALERMO², L. BETANCOURT¹, D. W. MCMILLAN¹, K. L. GANT¹, M. S. NASH¹;

¹The Miami Project To Cure Paralysis, Univ. of Miami, Miami, FL; ²NeuRA, Randwick, Australia

Abstract: The 2020 COVID-19 pandemic threatened a much-anticipated tradition for undergraduate students; that of summer neuroscience internships - long considered a touchstone in preparation for careers in academic medicine and research. Having hosted an Undergraduate Summer Internship Program since 2013, The Miami Project to Cure Paralysis quickly pivoted to an online platform providing students from across the US an introduction to neurotrauma research through "The Remote Summer Undergraduate Program." The online format made it possible to promote engagement of four times the usual number of participants with our researchers and faculty from the sequestered safety of their homes. The program familiarized students with neurotrauma research through lectures and professional development workshops. This 8-week program presented a multidisciplinary curriculum three times weekly in zoom sessions introducing 48 participants to topics ranging from neuroinflammation and neuropathic pain in traumatic brain injury to secondary medical consequences of spinal cord injury. The program incorporated career development discussions emphasizing high-quality scientific communication, cv writing, entrepreneurship in research, and cultivating skills required to succeed academically and professionally. A journal club experience encouraged students to exchange ideas and share learning experiences from a wide range of assigned technical readings. Students from as far away as Washington State participated in this program without charge. The Miami Project targeted participation from students having of diverse racial and ethnic backgrounds by reaching out to more than 150 institutional departments of diversity and inclusivity to promote this program across the US. Students shared their thoughts and experiences at a post-course debriefing on how they connected with neurotrauma research and were inspired to pursue a future in academic research. Highlighting one of the responses,

"Looking back at these amazing eight weeks, I realize that a key part of this program is it was designed for us, the students. It portrayed different vital aspects of the job as a researcher, bad and good, and the extraordinarily captivating and essential work that the researchers do in the lab. Overall, I now know I want to keep studying "brain stuff" and maybe follow the steps of the fantastic scientists I was introduced to." Video lectures from the program were archived for students to review and reinforce their internship learning and experiences.

Disclosures: **M. Chagoyen:** None. **N. Datta:** None. **D.C. Cilien:** None. **D. Cilien:** None. **M.A. Correa:** None. **A. Palermo:** None. **L. Betancourt:** None. **D.W. McMillan:** None. **K.L. Gant:** None. **M.S. Nash:** None.

Theme J Poster

J002. History of Neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J002.01

Topic: J.01. History of Neuroscience

Title: Use of lamprey in spinal cord research: historical perspective

Authors: ***E. CANDAR**¹, I. DEMIRCUBUK², G. SENGUL³;

¹Dept. of Neurosci., ²Dept. of Anat., Ege Univ. Inst. of Hlth. Sci., Izmir, Turkey; ³Ege Univ. Sch. Med., Izmir, Turkey

Abstract: An ancient living fossil lamprey bears witness to an evolution that is existing for over 360 million years, whereas, a scientific research history dates back to the early 19th century. An ancestral chordate lamprey is placed in the superclass *Cyclostomata*. Today, lamprey is only one vertebrate on an ancient lineage of cyclostomes as living jawless fishes. These primitive anadromous fishes of the family *Petromyzontidae*, whose breeding stages are situated in freshwater, living in seas, rivers, or lakes as a larval or adult life form. Lamprey is considered one of the best animal models for studying embryonic development, organ differentiation, and regenerative capacity. History of the use of lampreys in spinal cord research started in the late 19th century, progressing in the 20th century, and is gaining momentum these days. The lamprey has a unique nervous system consisting of both invertebrate and vertebrate features which makes it remarkable. Furthermore, the organization of the lamprey spinal cord is similar to higher vertebrates. Cytoarchitecture and ultrastructural organization, some neurochemical contents, and physiological functions of the lamprey have been clarified over the course of many years by various methods. Thus, characteristic structures of the lamprey are defined such as dorsal cells, cerebrospinal fluid-contacting (CSFC) cells, large reticulospinal axons, edge cells, and Müller and Mauthner axons. Lamprey as an animal model is at the core of evolutionary, anatomical, physiological, histological, comparative, regenerative, and translational neuroscience spinal cord research. In the brief history of the lamprey, the first studies were carried out in the late 19th

century by Sagemehl, Shipley, Dohrn, and Kupffer. In 1935, Kappers, Huber, and Crosby described the unique structure of the lamprey spinal cord. In 1948, Whiting stained the spinal cord of the lamprey to reveal the nervous system of the Brook lamprey at the larval stage, and the neural crest of the lamprey was studied by Newth in 1950. In 1960s, anatomy and physiology of the lamprey spinal cord was investigated by Rovainen, and glucose metabolism by Rovainen, Lowry and Passoneau in collaboration. In 1980s, mechanosensitive neurons, edge cells in the spinal cord were investigated by Grillner, McClellan and Sigvardt. Yin and Selzer (1984) showed regeneration of the lamprey spinal cord using electrophysiology. The first lamprey spinal cord atlas has recently been prepared by Robertson et al. (2021) to be published in the book "The Mammalian Spinal Cord" (Watson et al., 2021).

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

Theme J Poster

J002. History of Neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J002.02

Topic: J.01. History of Neuroscience

Title: A systemic review of the progression of clinical management of acute spinal cord injury current recommendations and future directions

Authors: *J. R. MOSS, B. T. DAVID, R. G. FESSLER;
Neurosurg., Rush Univ. Med. Ctr., Chicago, IL

Abstract: Acute traumatic spinal cord injury (ASCI) is a pathology that is notoriously difficult to manage with poor, albeit variable, long term outcomes. Even in the advent of modern clinical management and neurosurgical techniques, treatment of ASCI has frequently bordered the experimental - an observation that has arguably resulted in a wide distribution of what is considered standard practice of care. This is an issue that is compounded by the fact that many clinical management techniques will eventually fall out of practice as studies identify them as ineffective, or even counterproductive, to improving long-term clinical outcomes. In this historical review, we discuss the progression of ASCI clinical management over the last twenty years. We dissect the rise and fall of various clinical management techniques while analyzing the merits behind such techniques, long term outcomes, and literature that either supports or refutes their continued use. In our discussion, we summarize the literature presented and assess current and future directions of ASCI research. We focus on the value of targeting the pathology of ASCI at different stages of progression and the benefit of novel computer models - such as machine learning and large publicly available SCI datasets - in both identifying reliable standards of care and directing future research in the field. It is possible that the morbidity

associated with ASCI may be sharply reduced if clinicians can confidently reference an established, evidence based, and reliable standard of care.

Disclosures: J.R. Moss: None. B.T. David: None. R.G. Fessler: None.

Theme J Poster

J002. History of Neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J002.03

Topic: J.01. History of Neuroscience

Title: Spinal Cord Injury-Induced Neuropathic Pain Mechanisms for detection and treatments

Authors: *B. L. AVONTS¹, R. G. FESSLER², B. T. DAVID²;

¹Integrated Biomed. Sci. PhD Program, ²Dept. of Neurosurg., Rush Univ. Med. Ctr., Chicago, IL

Abstract: Central neuropathic pain (CNP) is a common secondary condition following spinal cord injury (SCI), largely impacting quality of life and leading to poor outcomes across a number of modalities. SCI-induced CNP is defined as at- or below-level pain caused by a lesion to the spinal cord and produces sensory changes including hyperalgesia and allodynia, seen in both humans and rodents. Sensory changes occur after chemical and neuroplastic changes dysregulate nociceptive transmission through enhanced sensitivity to evoked stimuli and hyperexcitability of neurons, both in spinal and supraspinal regions. Importantly, the immune system is altered through glial activation and dysregulation of pro- and anti-inflammatory cytokines. The interaction between glial cells and neurons further disrupt sensory transmission leading to physiology and behavioral changes. The etiology of CNP following SCI is multidimensional and additional contributing factors need to be explored in order to improve detection and treatment. While lacking in efficacy, common CNP treatments include pharmacological, surgical, and psychological interventions. While most reviews cover the mechanism behind the hyperexcitability of central neuropathic pain in rodent spinal cord injury models, this review discusses additional inflammatory mediators leading to a novel approach for detection and therapies in humans.

Disclosures: B.L. Avonts: None. R.G. Fessler: None. B.T. David: None.

Theme J Poster

J002. History of Neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J002.04

Topic: J.01. History of Neuroscience

Title: The spinal cord-gut-immune axis and its implications on therapeutic development for spinal cord injury

Authors: *K. D. RAUE^{1,2}, B. T. DAVID², R. G. FESSLER²;

¹Rush Med. Col., Chicago, IL; ²Neurolog. Surgery, Rush Univ. Med. Ctr., Chicago, IL

Abstract: Spinal cord injury (SCI) affects approximately 1.3 million people living in the United States. Most research efforts have been focused on reversing paralysis, as this is arguably the most defining feature of SCI. The damage due to SCI, however, extends past paralysis and includes other debilitating outcomes including immune dysfunction and gut dysbiosis. Recent efforts are now investigating the pathophysiology of and developing therapies for these more distal manifestations of SCI. One exciting avenue is the spinal cord-gut-immune axis, which proposes that gut dysbiosis amplifies lesion inflammation and impairs SCI recovery. This review will highlight the most recent findings regarding immune and gut dysfunction following SCI, including mechanism and therapeutic targeting. Additionally, important considerations in how the spinal cord-gut-immune axis fits within the larger framework of therapeutic development (i.e. stem cell transplantation, scaffolds) will be discussed, emphasizing the lack of intersectional investigation and the missed opportunity to maximize therapeutic benefit in SCI.

Disclosures: K.D. Raue: None. B.T. David: None. R.G. Fessler: None.

Theme J Poster

J002. History of Neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J002.05

Topic: J.01. History of Neuroscience

Title: T Cells in Traumatic Spinal Cord Injury - Brief History and Current State of the Field

Authors: *N. J. WROBEL¹, R. G. FESSLER², B. T. DAVID²;

¹Integrated Biomed. Sci. PhD Program, ²Dept. of Neurosurg., Rush Univ. Med. Ctr., Chicago, IL

Abstract: Traumatic spinal cord injury (SCI) induces robust immune responses which persist indefinitely. While the exact influences of the various components of post-SCI immune responses on recovery remain a subject of debate, it is now commonly recognized that they can have both beneficial and detrimental effects. Further, this apparent duality extends to the influences of individual cell types, including T cells, which are the subject of this brief review. Early reports on T cells in SCI implicated them as mediators of pathological ‘trauma-induced

autoimmunity', whereby adaptive immune responses are directed against both central nervous system (CNS) antigens and non-CNS antigens. Particular attention was paid to the influences of myelin reactive T cells, which are known to be upregulated following SCI in humans and animals. Not long after these early reports, numerous works were published proposing a seemingly contradictory role of T cells as mediators of 'protective autoimmunity', which suggests that autoimmune responses against CNS antigens are a natural, protective response to CNS injury. One clear lesson that has arisen from our investigations into the roles of T cells in post-SCI immune responses is that the enormous complexity of these responses must be respected. When attempting to compare results and draw conclusions from various studies, it is critical to consider that the effects of T cell responses following SCI can be greatly influenced by genetics, level of injury, severity of injury, and time of intervention following injury. Additionally, each of these factors should be kept firmly in mind when designing studies to examine effects of T cell responses in SCI.

Disclosures: N.J. Wrobel: None. R.G. Fessler: None. B.T. David: None.

Theme J Poster

J002. History of Neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J002.06

Topic: J.01. History of Neuroscience

Title: Vascular dementia risk among Mongolian adults: An overview

Authors: *O. BYAMBASUKH¹, D. NAMJIL², M.-U. MUNKHSUKH³, P. BYAMBAJAV², O. ZORIGT⁴, O. GANBAT⁵, T. DASHJAMTS⁶, T. JADAMBA⁷, B. DAGVAJANTSAN²;

¹Dept. of Endocrinology, Sch. of Medicine, Mongolian Natl. Univ. of Med. Sci., Ulaanbaatar, Mongolia; ²Dept. of Neurology, Sch. of Medicine, Mongolian Natl. Univ. of Med. Sci., Ulaanbaatar, Mongolia; ³Endocrinol., ⁴Neurol., Mongolian Natl. Univ. of Med. Sci., Ulaanbaatar, Mongolia; ⁵Sch. of Nursing, Mongolian Natl. Univ. of Med. Sci., Ulaanbaatar, Mongolia; ⁶Dept. of Radiology, Sch. of Medicine, Mongolian Natl. Univ. of Med. Sci., Ulaanbaatar, Mongolia; ⁷Timeline Res. Ctr., Ulaanbaatar, Mongolia

Abstract: Background: Indeed, cognitive impairment is common in elderly people. However, cognitive impairment can also occur in middle-aged people due to non-communicable diseases. The prevalence of lifestyle related diseases which are considered as non-communicable diseases has been rapidly increasing in Mongolia. There is a lack of research on vascular cognitive impairment among Mongolians. Therefore, we aimed to overview these studies to identify whether the increasing prevalence of non-communicable disease is associated with the risks of cognitive impairment in Mongolians. Methods: The data was collected until June 20, 2021. We searched articles published in journals registered to PubMed and Doctoral and master's

dissertations registered in the Mongolian National Medical Library using keywords of “cognitive impairment”, “dementia”, “mild cognitive impairment”, “Alzheimer”, “vascular dementia”, “diabetes”, “Mongolia”, “obesity”, “stroke”, “hypertension”. Results: There were no internationally published articles in this field, 7 studies conducted and published in local research journal and as published by doctoral or master’s dissertations. A study found that the people with hypertension and stroke in strategic areas such as the anterior cerebral artery and left hemisphere were associated with CI in the study. A study showed that the mild cognitive impairment after cerebral artery microsurgery was 4.6 percent, 1.9 percent was severe CI. A further study compared people with and without type 2 diabetes using an age-gender matched case-control study design (case n=131; control n=131) aged the 40-80 years old. They used Mini Mental Status Examination (MMSE) to identify MCI and also evaluated the carotid artery carotid intima media thickness using Duplex/Doppler ultrasound. The MMSE scores were significantly different throughout study groups: 26.1 ± 3.7 and 27.5 ± 2.6 ($p < 0.001$) for people with and without diabetes, respectively. DM patients have 3 times more risks to have cognitive impairment when compared to people without DM. Conclusions: In Mongolia, people with non-communicable diseases might have a higher risk of cognitive impairment because of their poor control of chronic diseases. Further studies need to identify the risk of people with vascular diseases in order to improve the management of non-communicable diseases.

Disclosures: O. Byambasukh: None. D. Namjil: None. P. Byambajav: None. O. Ganbat: None. T. Dashjants: None. T. Jadamba: None. B. Dagvajantsan: None.

Theme J Poster

J002. History of Neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J002.07

Topic: J.01. History of Neuroscience

Title: The first nationwide research projects in neuroscience in Mongolia: The relationship between dental and temporomandibular abnormalities and QoL, anxiety, depression, cognitive impairment, and headaches.

Authors: *T. JADAMBA¹, Z. BODIKHUU², Z. GERELTEKH-OD², G. TUMUR-OCHIR², E. TUMURBAATAR², O. BAYARSAIKHAN², G. GANBURGED², E.-A. ANGARAG², P. BYAMBAJAV², M. OCH¹, O. BYAMBASUKH², B. DAGVAJANTSAN², U. GANBAATAR², O. GANTULGA², S. ZORIGT², T. GANDALAI², U. TUVSHINJARGAL²;

¹TimeLine Res. Ctr., Ulaanbaatar, Mongolia; ²Mongolian Natl. Univ. of Med. Sci., Ulaanbaatar, Mongolia

Abstract: Since the late 1980s, there have not been any nationwide population-based studies conducted in Mongolia. As such, from July to December, 2020, we started to conduct the first

nationwide research projects in neuroscience in Mongolia. Within this context, a part of our study included the assessment of the associations between: (1) malocclusion traits, quality of life (QoL), anxiety and depression; (2) tooth loss and cognitive impairment; and (3) temporomandibular disorders and headaches. Data was collected from the Mon-Timeline study, which is a multicenter, multidisciplinary, prospective, population-based cohort study in Mongolia; with the purpose of investigating various health problems among Mongolians, especially those concerning oral-, psychological-, mental- and neurocognitive health. The cohort consists of 64 sampling centers, including 30 primary health centers of 8 districts in Ulaanbaatar and 34 primary health centers of 4 rural regions in Mongolia. The primary health centers provide health care services to all individuals within certain geopolitical units, where the entire population is registered by name, age, gender, education, employment, and household income. All studies met the approval of the Institutional Review Board and Ethics Committee of the Mongolian National University of Medical Sciences. Our studies showed that not only was the prevalence of malocclusion high and increasing in Mongolia, but malocclusion is associated with depression and significantly impact the QoL of Mongolians. Significant negative correlations were found between psychological health, social relationships, and environmental domain and malocclusion in general, as well as with the individual malocclusion traits. Tooth loss was found to be associated with mild cognitive impairment independent of age, education and other socioeconomic factors. The prevalence and intensity of headaches were found to increase with the number of temporomandibular joint (TMJ) symptoms and was significantly higher than those who do not exhibit TMJ symptoms. In conclusion, in this study we will summarize the history of studies on common neurological diseases including neurodegenerative diseases in Mongolia; and the details of the nationwide study on neuroscience-related disorders will be demonstrated in our presentation.

Disclosures: T. Jadamba: None. Z. Bodikhuu: None. Z. Gereltekh-Od: None. G. Tumur-Ochir: None. E. Tumurbaatar: None. O. Bayarsaikhan: None. G. Ganburged: None. E. Angarag: None. P. Byambajav: None. M. Och: None. O. Byambasukh: None. B. Dagvajantsan: None. U. Ganbaatar: None. O. Gantulga: None. S. Zorigt: None. T. Gandalai: None. U. Tuvshinjargal: None.

Theme J Poster

J002. History of Neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J002.08

Topic: J.01. History of Neuroscience

Title: History of shockwave applications for neurological indications: Stimulation, modulation and regeneration of nerves, spinal cord and brain

Authors: *P. NOVAK;

Storz Med. AG, Taegerwilen, Switzerland

Abstract: First successful extracorporeal shockwaves application in medicine was the non-invasive kidney stone disintegration in 1980. It took about 10 years to recognize that low intensity shockwaves have the ability to stimulate healing process in the body. Shockwaves proved to be efficient for the treatment of non-unions, tendon and muscular pain, delayed wound healing, heart insufficiency, erectile dysfunction and of other indications. The working principle is the mechanical stimulation of biological processes called mechanotransduction resulting in increased cell metabolism, release of nitric oxide (Mariotti 2005) and of numerous growth factors (D'Agostino 2015, Wang 2017). There is also an anti-inflammatory effect, stimulation of stem cells (Aicher 2006) and of the innate immune system (Holfeld 2013). The key application in the neurology was the treatment of pain and spasm (Lohse-Busch 1996, Amelio 2010, Lin 2018 and others) after 1990. The pain treatment, starting with different tendinopathies followed by the treatment of the whole musculoskeletal system (trigger points) became very soon standard orthopedic procedure. Analgesic effect of the shockwaves is based mainly on reduction of substance P concentration (Hausdorf 2008) and of the unmyelinated nerve endings (Othori 2001). It took much longer before more complex neuronal structures received treatment. First patients with spinal cord injury have been treated (Lohse-Busch 2014) in 2004. The next step was the treatment of patients with unresponsive wakefulness (Lohse-Busch 2014). A new term, Transcranial Extracorporeal Shockwave Treatment (TESWT) was introduced. In parallel, the scientific investigations of the shockwaves on the nervous system in general continued. It was shown that shockwaves not only stimulate, but also regenerate the nerves after lesions (Mense 2013). Further milestone was the experimental treatment of the central nervous system of patients with Parkinson's and Alzheimer's disease (Lohse-Busch 2021) starting as early as in 2010. Later, also polyneuropathy has been successfully treated (Lohse-Busch 2014) too. Alzheimer's disease two-center study (Beisteiner 2019) resulted in regulatory clearance in Europe. At this time, the term TPS (Transcranial Pulse Stimulation) has been introduced for shockwave stimulation of the brain. Shockwaves, next to the stimulation, modulation and regeneration of brain can also open the Blood Brain Barrier, either directly (Kung 2018) or also indirectly by cavitation induced with microbubbles like with focused ultrasound. Shockwaves application is effective and safe. There have been no negative side effect observed.

Disclosures: P. Novak: A. Employment/Salary (full or part-time);; Storz Medical AG.

Theme J Poster

J002. History of Neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J002.09

Topic: J.01. History of Neuroscience

Title: Futures and risk factors of obstructive sleep apnea in the Mongolian population: a nation-wide analysis from the Mon-Timeline study

Authors: ***B. DAGVAJANTSAN**¹, M. MUNKHTSETSEG², P. BYAMBAJAV¹, G. GANTUMUR¹, M. OTGONBAYAR¹, O. CHIMEDREGZEN¹, E. GONCHIGSUREN¹, O. ZORIGT¹, B. BADRAL², T. JADAMBA³;

¹Dept. of Neurology, Sch. of Medicine, Mongolian Natl. Univ. of Med. Sci., Ulaanbaatar, Mongolia; ²Dept. of oral and maxillofacial surgery, Sch. of Dentistry, Mongolian Natl. Univ. of Med. Sci., Ulaanbaatar, Mongolia; ³Timeline Res. Ctr., Ulaanbaatar, Mongolia

Abstract: The prevalence of obesity is dramatically increasing in Mongolia. Obese people have a higher risk for non-communicable diseases and Obstructive Sleep Apnea (OSA) syndrome. There is no data on the prevalence of OSA in the Mongolian population; hence, we evaluated the risk of OSA using data from the population-based Mon-Timeline cohort (18 - 65 years of age). The risk of OSA syndrome was evaluated using the Berlin questionnaire, which consists of three categories (category 1: snoring and witnessed apneas; category 2: daytime sleepiness; and category 3: high blood pressure/obesity). Those who met any two of the three categories were considered at high risk for OSA syndrome. In this cross-sectional study, a total of 1405 people - with a mean age of 42 ± 14.3 , of which 42.5% were males - completed the questionnaire. Among them, 24.4% was classified as being at higher risk for OSA syndrome. Furthermore, 41.7% of the participants reported snoring, of which 39.3% responded that their snoring bothers other people. The prevalence of people with a higher risk for OSA syndrome was found to increase with age: notably 6.7%, 28.3% and 39.4% for age groups <30, 30 - 50, and >50 years, respectively. There were no differences between gender and education throughout the OSA risk categories. Based on a representative sample population, we conclude that OSA is prevalent and common among the Mongolian population.

Disclosures: **B. Dagvajantsan:** None. **M. Munkhtsetseg:** None. **P. Byambajav:** None. **G. Gantumur:** None. **M. Otgonbayar:** None. **O. Chimedregzen:** None. **E. Gonchigsuren:** None. **T. Jadamba:** None.

Theme J Poster

J002. History of Neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J002.10

Topic: J.01. History of Neuroscience

Title: Neuroboros fugue: brains, computers, neuromorphs, and the future of neuroscience

Authors: **A. D. ELLIOTT**¹, ***S. T. MANION**²;

¹NIH/NIMH, Bethesda, MD; ²ConsenSys Hlth., Pittsburgh, PA

Abstract: The goal of neuroscience is to understand the brain: what it does and how it works. Past decades have seen enormous growth in enabling technology and findings in neuronal function, circuits, and cognition. Today, knowledge about the brain is used to inspire technologies in robotics, neural networks, and neuromorphic computing. However, the intellectual frameworks underpinning modern neuroscience have changed little recently. Historically, the brain has been described using terms consistent with the dominant technology of the era (e.g. electricity, telegraphs, circuits, and computers), resulting in paradigms that evolve on a generational timescale. Due to the brain's complexity, the major approaches to studying it involve monitoring behavior, measuring activity from isolated component parts, and attempting to fit them back together in a coherent model. It is an underappreciated challenge in neuroscience to reach consensus on the definitions of these models. Like an ouroboros, the feedback loop through observation, hypothesis, experiment, and interpretation is often self-reinforcing within its own context.

We suggest that this architecture is limiting the potential for significant leaps in understanding and seek an open dialogue about new constructive models for thinking about the brain. We assert that new models will increase efficiency in both theoretical and applied neuroscience. New frameworks are increasingly critical for interpreting the vast amounts of data being generated at all levels of brain research. A greater diversity and intersection of these frameworks may ultimately be required to understand the brain. Prominent researchers are questioning the utility of the dependency on coding and computer metaphors. The time is ripe to revisit and innovate. Novel conceptual frameworks such as the brain as an internet and the musical "tuning" of neurons are emerging. The bidirectional framework of emerging technologies influencing novel ideas in brain research and vice versa is compelling, but there may be limits to what is discoverable or provable about the brain within such a closed framework. To develop these new models of the brain we recommend taking a variety sources, from science fiction's proven predictive power for future tech to forgotten and emerging philosophies across fields and incubating them in communities within neuroscience and beyond. This could be a rich source of models to inspire current research as we openly rethink what is possible. Here we present recently published suggested frameworks, identify common limitations, forecast future frameworks, and propose strategic goals and recommendations for this critical discussion.

Disclosures: **A.D. Elliott:** None. **S.T. Manion:** A. Employment/Salary (full or part-time);; ConsenSys Health.

Theme J Poster

J002. History of Neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J002.11

Topic: J.01. History of Neuroscience

Title: A Brief History of Saporin and its Contributions to Neuroscience

Authors: P. A. SHRAMM, L. R. ANCHETA, R. BOUAJRAM, *D. A. LAPPI;
CytoLogistics LLC, Carlsbad, CA

Abstract: When investigating the origins of targeted toxins (a drug, therapy, or scientific tool directed to a unique extracellular target), an appropriate place to begin is with the Nobel Prize-winning work of Paul Ehrlich and his concept of the "magic bullet." Over 100 years later, the use of targeted toxins to perform molecular neurosurgery has become a vital practice that allows researchers to observe changes in organisms after eliminating a neuronal population. A prime example of this practice is the specific targeting of cholinergic neurons in the basal forebrain to mimic Alzheimer's disease (AD). The research tool designed for this purpose is 192-IgG-Saporin, an antibody conjugated to the ribosome-inactivating protein (RIP) Saporin. Researchers have used this targeted toxin for over 30 years. A 2019 publication by Verkhratsky *et al.* reviews AD models and states this is the only lesion model that specifically targets cholinergic neurons. In 1983, during a quest to find the optimal payload for a targeted toxin, Fiorenzo Stirpe and colleagues discovered Saporin, a plant protein isolated from the common soapwort plant *Saponaria officinalis*. Unlike ricin and abrin, Saporin does not have a binding chain and cannot enter a cell on its own.

Scientists have devised new ways to use Saporin to advance their research and drug development activities. Just a few examples include:

1. A novel suicide gene therapy approach that uses a vector encoding a double-stranded DNA aptamer to deliver the gene encoding Saporin,
2. Delivery of Saporin encapsulated in a nanotechnology system for development of cancer treatments,
3. A deeper understanding of the difference between pain and itch and the relevant pathways, and
4. Development of a stable epilepsy animal model that is used for screening specific treatments that will lead to micro-methods to eliminate the disease.

This review will focus on Saporin as the payload delivered to cells. Targeted toxins (typically targeted by an antibody or peptide chemically linked or genetically fused) provide robust tools for neuroscience where ablation of specific neuronal populations is used to study behavior and function. Saporin is an ideal molecule because of its extreme resistance to high temperatures and denaturation, retention of catalytic activity after conjugation, and lack of a binding chain to allow entrance to the cytoplasm of cells on its own. As a result, it is one of the most studied RIPs used for its vigorosity, potency, safety, and ease of use in the laboratory. The information presented will shed light on the history of Saporin, current applications, and what the future holds for this protein in the neuroscience field.

Disclosures: P.A. Shramm: None. L.R. Ancheta: None. R. Bouajram: None. D.A. Lappi: None.

Theme J Poster

J002. History of Neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J002.12

Topic: J.01. History of Neuroscience

Title: History and Epidemiology of Neurological Manifestations of Coronavirus Pandemic: Recent Updates and Management

Authors: *M. F. KIRMANI¹, M. KIRMANI², S. KALBASI¹;

¹Sch. of Publ. Hlth., ²Inst. of Neurosci., Texas A&M Univ., College Station, TX

Abstract: Coronaviruses, such as severe acute respiratory syndrome coronavirus (SARS-CoV) is a pathogen that causes severe symptoms of the respiratory system. In December 2019, there was an outbreak in Wuhan, China December 2019 with a new coronavirus strain, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) named coronavirus disease 2019 (COVID-19) by the World Health Organization in February 2020. This novel new virus strain resulted in a global pandemic that has been reported to cause the severe respiratory syndrome. Coronavirus disease 2019 (COVID-19) has affected more than 8 million people and caused 440,000 deaths worldwide. COVID-19 is primarily a respiratory illness, but reports suggest that it may lead to hypercoagulable and thrombotic complications. Serious Neurological complications have been reported including anosmia, dizziness, confusion, ischemic stroke, encephalitis, encephalopathy, epilepsy, neurodegenerative diseases, and inflammatory-mediated neurological disorders. . More research is needed to fully determine the pathophysiology of neurological sequelae of COVID-19 which will give insights about the early recognition of atypical presentations of COVID-19 rather than the known initial presentation with the respiratory symptoms.

Disclosures: M.F. Kirmani: None. M. Kirmani: None. S. Kalbasi: None.

Theme J Poster

J012. Ethical and Policy Issues in Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J012.01

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

Title: Plan for Enhancing Diverse Perspectives: Scientific excellence, inclusivity, and The BRAIN Initiative®

Authors: R. RICHARDSON¹, A. BECKEL-MITCHENER², J. CHURCHILL², K. DAVID¹, *K. DUPRE¹, R. GARCIA², N. HSU¹, M. JONES-LONDON¹, L. KING³, C. LEY⁴, T. PASTERNAK¹;

¹NIH NINDS, Bethesda, MD; ²NIH NIMH, Bethesda, MD; ³NIH NIDCR, Bethesda, MD; ⁴NIH OD, Bethesda, MD

Abstract: To more effectively achieve its scientific goals, the NIH *Brain Research Through Advancing Innovative Neurotechnologies*® (BRAIN) Initiative is looking to engage more deeply in our country's vast talent pool to enhance global competitiveness and make discoveries to address the most challenging neurologic and neuropsychiatric disorders facing our society. The BRAIN Initiative upholds that there are many benefits that flow from a diverse scientific workforce, including: fostering scientific innovation, enhancing global competitiveness, contributing to robust learning environments, improving the quality of the research, advancing the likelihood that underserved populations participate in, and benefit from research, and enhancing public trust. The BRAIN Initiative is thus firmly committed to promoting inclusivity in the research community and recognizes that many investigators share these values and endeavor to change the culture in science. Where possible, BRAIN investigators should strive to assemble teams bringing diverse perspectives, career stages, backgrounds, and expertise, and provide full opportunity, participation, and development to individuals and groups traditionally underrepresented in neuroscience. Relatedly, the recruitment of research participants with diverse backgrounds and the inclusion of community perspectives ensures that research questions are informed by patient and family perspectives and that the benefits of research have wide applicability. In support of these values, beginning in Spring 2021, most funding opportunities from the NIH BRAIN Initiative will include a new component requiring that applications include a Plan for Enhancing Diverse Perspectives (PEDP), a summary of strategies that advance the scientific and technical merit of the proposed project through inclusivity. Evaluation of the PEDP will be made during the peer review process as part of the scorable criteria and will be used to inform funding decisions. With the PEDP, the BRAIN Initiative encourages the research community to broadly consider how diverse perspectives will advance the proposed aims. Through these collective efforts, the BRAIN Initiative actively supports the culture change necessary to address inequities and systemic biases in biomedical research, and advance scientific innovation and excellence. For more information see: <https://braininitiative.nih.gov/about/plan-enhancing-diverse-perspectives-pedp>

Disclosures: R. Richardson: None. A. Beckel-Mitchener: None. J. Churchill: None. K. David: None. K. Dupre: None. R. Garcia: None. N. Hsu: None. M. Jones-London: None. L. King: None. C. Ley: None. T. Pasternak: None.

Theme J Poster

J012. Ethical and Policy Issues in Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J012.02

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

Support: IEEE Technical Activities (TA) Committee on Standards (CoS) discretionary fund

Title: Reporting standards for improving rigor and translation in neuroscience and neurotechnology: aligning incentives via diverse stakeholder engagement

Authors: *Z. B. MCKINNEY¹, M. DE NEELING², A. ANTONIETTI³, D. PRODANOV^{4,5}, S. SUNDERAM⁶, S. SOMAN¹, C. D. EIBER⁷;

¹NeuroTechnology for Brain-Machine Interfacing, IEEE Standards Assn., Piscataway, NJ; ²Dept. of Neurol., Franciscus Gasthuis & Vlietland, Rotterdam, Netherlands; ³Dept. of Electronics, Information and Bioengineering, Politecnico Di Milano, Milano, Italy; ⁴NeuroElectronics Res. Flanders, IMEC, Leuven, Belgium; ⁵Ict, Bulgarian Acad. of Sci., Sofia, Bulgaria; ⁶Dept. of Biomed. Engin., Univ. of Kentucky, Lexington, KY; ⁷Univ. of Melbourne, Melbourne, Australia

Abstract: Despite the steady advance of neurotechnologies (NTs), neuroscience, and rehabilitation research, the lack of standards specific to the conduct and scientific reporting of research involving neural interfaces (NIs) poses an ongoing barrier to achieving systematic rigor and continued progress in these fields. Specifically, inconsistent and insufficiently detailed reporting of NI characteristics, experimental methodology (including data analysis and subject characterization), and study results severely limit the ability to interpret and meta-analyze findings from different studies through time and across institutions. As a result, neuroscience research is not efficiently translating into improved neurophysiological understanding, clinical therapies, or human-beneficial NT. To address this problem, IEEE Standards Working Group (WG) P2794 – part of IEEE Industry Connections Activity on NT for Brain-Machine Interfacing – is developing a Reporting Standard for *in vivo* NI Research (RSNIR) across a wide range of NI modalities. To promote rigorous and replicable research at greater scale, RSNIR aims to articulate the technical details that must be reported to make any NI study replicable, while remaining agnostic to the choice of methodology. Where possible, RSNIR references and builds upon existing standards and best practices for reporting animal and human clinical studies, while reinforcing the FAIR (findability, accessibility, interoperability, and reusability) principles of data management. Through applicability to multiple forms of scientific reporting – including peer-reviewed literature, regulatory submissions, and research grants – RSNIR aims to benefit all neuroscience and NT stakeholders by simplifying the translational research, validation, and commercialization of safe, effective, high-value NTs and therapies. To this end, RSNIR WG is open to participation by all stakeholders and is now conducting a community survey (<https://tinyurl.com/RSNIR>) to clarify key reporting gaps, shared interests, and use cases for RSNIR to address. This talk will summarize minimum reporting requirements proposed for implantable NI (DOI 10.1109/OJEMB.2021.3060919), the adaptation of these requirements to other types of NI, and preliminary survey findings, including the confirmed need for more technically detailed reporting of NI system performance and signal processing methods, as well as functional/clinical outcomes and numerous human factors. Moreover, the 82% majority of

initial responses from academic researchers affirms that RSNIR must engage and include a greater diversity of stakeholders in the standard creation process.

Disclosures: Z.B. McKinney: None. M. de Neeling: None. A. Antonietti: None. D. Prodanov: None. S. Sunderam: None. S. Soman: None. C.D. Eiber: None.

Theme J Poster

J012. Ethical and Policy Issues in Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J012.03

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

Support: NIH Grant R01AG054621

Title: Bias against historically excluded groups: the unintended consequence of neglecting hair preparation for EEG research

Authors: *L. RICHARDSON¹, N. WOODLEY⁴, L. NEUBERGER², J. SANDOVAL², H. J. HUANG³;

¹Biomed. Sci., ²Communication and Media, ³Mechanical and Aerospace Engin. Dept., Univ. of Central Florida, Orlando, FL; ⁴Pure Avidity Salon, Orlando, FL

Abstract: Neuroscience research explores the important neural correlates involved in behavioral and cognitive processes to provide a better understanding of brain function. The implications of this research broadly impact clinical and interventional practices, thus making diversity and inclusion in the research pertinent for the public. Recent social justice movements have brought to light several examples of systemic racism in the scientific community including those prevalent in neuroscience research. One prime example of racial bias exists in electroencephalography (EEG) research due to the nature of the hardware and subject preparation practices. EEG electrodes are placed on the surface of the scalp either directly using a dry electrode headset or placed on a fitted cap with conductive gel as the medium between the scalp and electrodes. However, curly or coily-haired participants who identify as Black or of African descent, for example, may not be well-represented in a sample solely due to the assumption that certain hair types prevent proper access to the scalp by EEG hardware. It is possible that exclusionary criteria based on hair type are not only based on ill-supported assumptions about hair but may also be inadvertent. This project aims to educate current EEG researchers on the importance of learning about different hair types and textures, along with hair preparation techniques that would alleviate the unproven concern that researchers have about recording quality signals from individuals with hair classified as curly, coily, dense, or coarse. We collaborated with a Black hair stylist who specializes in curly hair types to develop a set of working guidelines for subject hair preparation that emphasizes inclusivity of as many

participants as possible without unintentionally excluding marginalized individuals with curly/coily hair. These educational guidelines will become publicly available to the public on Wednesday, July 28th to coincide with the neuro-racism themed day of Black In Neuro Week in hopes of reaching a targeted audience. We plan to collect data from researchers in the EEG community who implement the guidelines in the form of feedback surveys. A version of the survey will be made available to participants in EEG research as well to determine the influence of the guidelines on participant decision-making and experience. The goal of this long-term, formative approach is threefold: to improve upon and enhance these guidelines as a community, help researchers collect good EEG data, and increase the inclusion of historically excluded groups in brain research.

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

Theme J Poster

J012. Ethical and Policy Issues in Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J012.04

Topic: J.03. Public Awareness of Neuroscience

Title: Neuroscientific explanations really do satisfy: meta-analysis confirms outsized influence of irrelevant information about the brain

Authors: E. M. BENNETT, *P. J. MCLAUGHLIN;
Psychology, Edinboro Univ. of Pennsylvania, Edinboro, PA

Abstract: More than ever, it is crucial that we consider how non-neuroscientists interpret and use brain research findings. This is because there seems to be an intense proliferation of public awareness about neuroscience, particularly in the evolving understanding of mental health, as well as so-called “brain-based” programs. The seductive allure of neuroscience explanations (SANE) effect is when people are unduly influenced by references to brain structure or function in popular media reports, advertisements, and even mock juries. The SANE effect is often studied in situations where the neuroscience information is irrelevant or adds no new insight to the matter at hand, and should therefore have no influence. Research on this effect is divided, with some studies finding a substantial SANE effect and others finding nothing, or failing to replicate certain effects. In order to better understand whether this effect truly exists, a meta-analysis was performed using the meta package in R. After combining all available relevant research, we found a significant, small-to-moderate standardized mean difference favoring the SANE effect. This suggests that neuroscience information added to advertisements, news articles, or court proceedings may have an impact on the public, even if it is irrelevant or lacks accuracy. We will discuss possible explanations and ramifications of this finding.

Disclosures: E.M. Bennett: None. P.J. McLaughlin: None.

Theme J Poster

J012. Ethical and Policy Issues in Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J012.05

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

Support: NIH Grant R01NS094211
NIH Grant R03NS103111
NIH Grant R01NS110012
NIH Grant 1T32NS09957801A1

Title: How can we trust machine learning in emerging neurotechnologies?

Authors: *A. I. BECK¹, T. E. BROWN²;

¹Grad. Program in Neurosci., ²Philosophy, Univ. of Washington, Seattle, WA

Abstract: Neurotechnology is a burgeoning field of research and development expected to grow exponentially over the coming decade. A large contributor to this growth is advancements in the field of artificial intelligence (AI), which has shown marked improvements in both sophistication and accuracy in recent years. However, greater AI sophistication may lead to lower interpretability of the underlying algorithms, concealing the relationship between input and output. As such, the union of AI and neurotechnology may occupy a unique ethical space due to the nature of the data that neurotechnological devices rely on. That is, because neurotechnological devices rely on information gathered from the brain – the part of our body that is central to our sense of self – preexisting ethical concerns regarding AI may acquire new dimensions in the context of neurotechnology. I argue that, when applied to neural signals, AIs with low interpretability present unique challenges to AI trustworthiness. This work focuses specifically on the dimension of trust in the context of closed-loop brain-computer interface (BCI) device. The general public trusts AI's capabilities more than they should – many hold tacit beliefs that algorithms are not only more competent decision-makers than humans, but also the decisions made by AI are 'objectively correct' or 'unbiased.' The relationship between an end-user and their BCI similarly relies on trust – trust on the part of the end-user that, for instance, decisions made by the AI of when to stimulate the end-user's cortex will improve their symptoms of epilepsy. If the AI in question is relatively difficult to interpret, however, then the central question becomes: how can the end-user trust the AI if not even the manufacturer of the AI can be confident that it is functioning as competently as possible? Information about inputs (neural data) and outputs (cortical stimulation) are not readily available, and the relationship between input and output cannot be easily accessed. The user only has access to their experiences of the clinical outcomes – whether the intervention changes their quality of life. Because of the nature

of the AI, there are no specialists who can say exactly how the AI makes its decisions with sufficient certainty. The end-user may have very few choices: unilaterally trust the AI, try to adjust the system's limited parameters, or perhaps forgo using the device entirely. This ethical concern could be partially ameliorated if the AI's algorithms and models were more interpretable, making the AI's decision-making processes more available to the end-user.

Disclosures: A.I. Beck: None. T.E. Brown: None.

Theme J Poster

J012. Ethical and Policy Issues in Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J012.06

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

Title: An assessment tool for the public opinion of the moral status of Artificial Intelligence

Authors: *M. HURLEY, G. E. HUE;
Neurosci. & Behavioral Biol., Emory Univ., Atlanta, GA

Abstract: The rapidly progressing ability of Artificial Intelligence (AI) to plan actions and integrate and process information in a manner similar to humans (Bostrom and Yudkowsky, 2014), alongside an increasingly anthropomorphic conceptualization of AI's underlying mechanisms has led experts in the fields of neuroscience, engineering, computer science, and philosophy to question whether or not AI has the ability to become conscious or sentient. Unclear criteria for defining consciousness and sentience as well as unclear criteria for determining moral status for humans, let alone non-human beings and entities, makes it even more difficult to predict how AI with human-like abilities may interact with and function alongside humanity, or to process how we will decide their moral and thus legal status in society. While much of the future decision-making regarding the moral, legal, and social status of AI will be conducted by academics and policymakers, it is equally imperative to understand the public's acceptance and overall opinion of this potential future; the public's attitude towards conscious AI may play a large role in deciding how AI are treated and interacted with, as well as whether or not they are respected as members of society. Because of this, it is crucial to understand the public's current opinion of the moral status of AI. This project aims to develop a robust assessment tool that can be used to neuroethically examine factors and themes crucial to the public's opinion of the moral status of AI. Five scenarios were created for the tool that assessed themes and subcategories preconceived as dimensions of moral status. The preliminary assessment tool was then evaluated by conducting qualitative interviews with participants with varying levels of understanding of AI. Participants offered insight into the clarity and effectiveness of the tool and four main themes relevant to AI and moral status were extracted from participant responses. A neuroethical analysis of the projected and emergent themes from

the interviews influenced the refinement of the scenarios on the administered tool and provides a solid foundation for an assessment tool for the public opinion of the moral status of AI that will be expanded upon after further interviews.

Disclosures: M. Hurley: None. G.E. Hue: None.

Theme J Poster

J012. Ethical and Policy Issues in Neuroscience I

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:30 AM - 10:30 AM

Program #/Poster #: J012.07

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

Title: Can GPT-3 convince a neuroscientist?: measuring the current efficacy of AI-generated scientific text

Authors: *C. LANDRY¹, C. LEWALLEN², C. R. FOREST²;

¹Wallace H. Coulter Dept. of Biomed. Engin., ²George W. Woodruff Sch. of Mechanical Engin., Georgia Inst. of Technol., Atlanta, GA

Abstract: In recent years, artificial intelligence (AI) language models such as GPT-3 have advanced substantially in their ability to complete natural language generation (NLG) tasks, prompting fresh concerns about fake news and popular debate about the nature of machine intelligence and creativity. GPT-3 and its contemporaries have already produced convincing, human-quality text in domains including poetry, college essays, online product reviews, and news articles. These types of experiments show, with some caveats, that a sufficiently advanced AI-text generator writing for a general audience can produce text that is indistinguishable from human-generated text. Building on these results, we asked, what happens when GPT-3 is used to generate scientific text and is evaluated by scientists? We will show results of a quantitative study that tested the ability of biomedical scientists to evaluate human-generated and AI-generated neuroscience abstracts. Briefly, we will **1)** test the ability of humans to detect AI-generated neuroscience abstracts in individual and comparative settings; **2)** determine the extent to which research experience, subject matter expertise, and familiarity with AI predict accuracy and confidence level of human detection of AI-generated text; and **3)** analyze common aspects of high-quality AI-generated neuroscience abstracts. In addition, we will discuss the broader implications of AI-generated text for the neuroscience community (e.g., peer review, grant proposals, and science communication) and propose a mixed methods approach for monitoring the continued progress of AI models in this domain.

Disclosures: C. Landry: None. C. Lewallen: None. C.R. Forest: None.

Theme J Poster

J013. Ethical and policy issues in neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:45 AM - 10:45 AM

Program #/Poster #: J013.01

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

Title: What women and minorities are afraid to speak up about

Authors: *D. M. TAYLOR^{1,2}, E. CASTAGNOLA³;

¹Neurosciences, Cleveland Clin., Cleveland, OH; ²Functional Electrical Stimulation Ctr., VA Northeast Ohio Healthcare Syst., Cleveland, OH; ³Bioengineering, Univ. of Pittsburgh, Pittsburgh, PA

Abstract: Before the pandemic, we were invited to host the ‘Power Hour™’ at a Gordon Conference on Neuroelectronic Interfaces in March 2020. The Power Hour™ is a discussion/workshop with the goal of promoting women and underrepresented minorities (URMs) in our field. Since many people don’t feel comfortable speaking up at these workshops, prior to the conference, we set up a website to collect anonymous anecdotes about the challenges women and URMs face as well as suggestions for improvement as a way to jumpstart the discussion (<https://www.inequalitystoriesinstem.org/>). The web link was shared with all the registered conference attendees by the organizers and forwarded to the greater Neural Engineering research community by an NIH program officer associated with the conference. Recipients were encouraged to forward the link to additional colleagues worldwide of any gender. To date, we have received ~140 anonymous anecdotes, and the results have been both enlightening and heartbreaking! As anticipated, we received numerous anecdotes about implicit bias as well as overt racism, sexism, and hate speech. We also received numerous stories about conflicting attitudes about family leave and women’s parental roles. What we didn’t anticipate, but probably should have, was the alarming number of anecdotes reporting sexual misconduct or sexual assaults in the workplace many ending in statements like— ‘*I never told anyone about this before*’. Reasons given typically included, ‘*I didn’t think I would be believed*’, ‘*speaking up would put my career in jeopardy*’, or ‘*the stress/embarrassment associated with speaking up was too much*’. Some of the most vulnerable to both sexual abuse and bullying/intentional harm are people with the most to lose by speaking up. The academic research system itself can facilitate this type of abuse as graduate students are reliant on their advisors for their degrees and pay checks, junior faculty are reliant on senior faculty for promotion and tenure, and most researchers are reliant on their peers who serve on grant review panels and editorial boards for funding and to get published. International scientists are even more vulnerable as they may risk deportation and many don’t have a local social support network and face language or cultural barriers to speaking up. People from lower socioeconomic groups are also more vulnerable especially if they have a family to support and no alternative support options. Unfortunately, due to the pandemic, the Gordon Conference is now rescheduled for 2022, but we are initiating these

important discussions via other venues like this one to create awareness, support those who feel alone, and get input on how to facilitate change.

Disclosures: D.M. Taylor: None. E. Castagnola: None.

Theme J Poster

J013. Ethical and policy issues in neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:45 AM - 10:45 AM

Program #/Poster #: J013.02

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

Support: Fred B. Snite Foundation

Title: Is there a signature of transgender identity in brain structure? A systematic review, partial meta-analysis, and critique

Authors: B. FLERES¹, C. HASZTO¹, *L. ELIOT²;

¹Chicago Med. Sch., ²Neurosci., Rosalind Franklin Univ. of Med. & Sci., North Chicago, IL

Abstract: Brain imaging of transgender participants has expanded dramatically in recent years. Such research is aimed at better understanding the biology of gender identity, independent of sex, as well as uncovering brain markers that might inform treatment decisions for patients with gender dysphoria. We conducted a systematic review of the structural neuroimaging literature focused on: 1) global brain measures, 2) regional cortical volumes, 3) regional subcortical volumes, 4) cortical thickness, 5) fractional anisotropy (FA) measures of white matter, and 6) post-mortem histology of hypothalamic and related structures. We limited our comparisons to transgender and cisgender participants of the same sex assigned at birth, along with 8 longitudinal studies of transgender participants before and after gender affirming hormone therapy. Between systematic PubMed plus hand-searches of prior reviews, we screened 299 articles, from which we collected 38 total studies meeting criteria. Seven of the studies utilized postmortem brains and reported various evidence of “feminization” in hypothalamic histology among transgender women (TW) compared to cisgender men (CM). But these 7 studies, all from the same lab, examined only 11 TW in total and none of the findings have been independently replicated. Among 8 cross-sectional studies reporting on global brain measures, meta-analyses revealed no significant differences in total intracranial volume, total gray matter volume, or total CSF volume for either TW or transgender men (TM). A significant difference was observed, however, for total white matter volume in TW, which was smaller than CM ($\kappa = 4$, $p = 0.029$, $d = -0.34$). Among 11 studies focused on subcortical volumes and a 10 focused on regional cortical volumes, few findings have replicated more than once, except for smaller cerebellar volume in TW compared to CM. Among cross-sectional DTI studies, 3 out of 4 found lower FA in the superior longitudinal fasciculus and corticospinal tract of TW compared to CM (ignoring

laterality discrepancies), but no differences were replicated more than once in TM compared to cisgender women. Across 5 studies of cortical thickness, most findings were not replicated; however 3 studies each reported thicker middle frontal gyri in TW and thicker superior frontal gyri in TM (ignoring laterality discrepancies) compared to cisgender participants. Overall, this disparate dataset has not revealed a clear marker for transgender identity in either TW or TM. A broader issue is whether this search for atypical brain features in transgender people unnecessarily stigmatizes a vulnerable community by pathologizing normal variations in human behavior.

Disclosures: B. Fleres: None. C. Haszto: None. L. Eliot: None.

Theme J Poster

J013. Ethical and policy issues in neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:45 AM - 10:45 AM

Program #/Poster #: J013.03

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

Support: Fred B. Snite Foundation

Title: Breaking the binary to better understand gender-brain relationships: A systematic review of neuroimaging studies using continuous measures of sex and gender

Authors: *J. RAUCH¹, L. S. ELIOT²;

¹Chicago Med. Sch., ²Dept. Neurosci., Rosalind Franklin Univ. of Med. & Sci., North Chicago, IL

Abstract: You can't have "dimorphism" without a binary variable. But by all accounts, gender is a non-binary phenotype. Recently, there has been an upward trend in brain research using continuous, as opposed to binary measures of sex/gender as a key demographic variable. This may help clarify decades of research that have largely failed to uncover reliable relationships between brain measures and gender-typical behavior or male/female disparities in mental health. One reason may be that binary sex is too "two-dimensional" a variable for understanding brain mechanisms of behavior. A better approach may lie in using continuous measures of the independent variable, gender, to relate features of brain structure, circuitry and function. We therefore systematically reviewed the brain imaging literature to identify studies that have used non-binary measures of sex/gender as a correlate. We began by surveying the psychological literature for well-validated and commonly used scales for quantifying gender role or behavior. This produced 11 inventories which we used to search PubMed in combination with brain imaging terms (e.g., "MRI", "brain"), identifying 221 studies that we screened to a final 8 studies that compared brain structures or function to these continuous gender measures. To validate our approach, we re-searched the neuroimaging literature using the 31 gender-related trait

inventories identified in Nielsen et al. (2021; doi.org/10.1186/s13293-021-00366-3) but found no additional studies. All 8 of these studies achieved more definitive results by testing brain/behavior hypotheses using continuous “gender” as opposed to binary sex as the independent variable. At the same time, we became aware of 3 recent discovery-based studies that probed large neuroimaging databases for correlates of gender-related behaviors measured on a continuous scale. All 3 studies used some version of an internalizing-externalizing dimension to map neural features across their sample, finding better correlation than when mapping such behaviors to binary sex. Together, both lines of research demonstrate the value of moving beyond a simple binary division of human participants in attempting to understand behaviors that differ between men and women. Using a continuous measure of gender as a sociological variable (GASV; Nielsen et al., 2021), as opposed to binary sex as the independent biological variable (SABV), may prove a more effective way of understanding gender diversity in behavior and the neural underpinnings of many neuropsychiatric disorders.

Disclosures: J. Rauch: None. L.S. Eliot: None.

Theme J Poster

J013. Ethical and policy issues in neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:45 AM - 10:45 AM

Program #/Poster #: J013.04

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

Support: NCATS UL1TR000427
NCATS UL1TR002373
PearlRx Network

Title: Assessment of Ethical Concerns in the Clinical Translation of Anti-Opioid Vaccines

Authors: V. WARTENWEILER¹, G. S. CHUNG¹, A. STEWART², *C. J. WENTHUR¹;
¹Sch. of Pharm., Univ. of Wisconsin-Madison, Madison, WI; ²Pharm., UW Hlth., Madison, WI

Abstract: As the prevalence of opioid use disorder (OUD) and opioid overdose continue to persist at alarming levels, anti-opioid vaccines have garnered much traction as a mechanistically innovative approach to treatment, and are now being tested in clinical trials. While experts have suggested several potential logistical and ethical issues surrounding their use, there have been no formal assessments of whether such concerns will manifest in real-world stakeholder populations. Therefore, student and practicing pharmacists in Wisconsin were contacted to share their knowledge, perceptions, and attitudes toward opioid vaccines and other OUD treatments. Participant contact followed a staged, multi-modal approach incorporating both focus group and survey measures. Focus group responses were analyzed using thematic content analysis, which revealed strong consensus among participants regarding anti-opioid vaccine opinions and a sense

of shared ownership regarding solutions to the opioid epidemic at large. Survey item responses were used to construct multi-dimensional opinion matrix profiles for both approved OUD therapeutics and anti-opioid vaccines. These matrices were then probed for unique features using an exhaustive combinatorial sum of differences calculation, revealing access inequality as the most concerning ethical consideration overall, with cost and patient refusal being the most distinct concerns for anti-opioid vaccines. Items assessing support for anti-opioid vaccine implementation across the clinical time course were also incorporated, revealing strongest support for voluntary use amongst individuals in recovery, and lowest support for mandatory use in at-risk individuals. Overall, the scope of ethical and logistical concerns regarding anti-opioid vaccine implementation were found to be similar to those for current OUD therapeutics, and anti-opioid vaccines were endorsed as potentially helpful additions to current OUD therapeutic approaches. While inclusion of additional stakeholder groups will be necessary to assess generalizability, our results indicate that most pharmacy practitioners will find it both pragmatically feasible and ethically acceptable to implement anti-opioid vaccines in the context of voluntary protection against overdose protection and prevention of relapse.

Disclosures: V. Wartenweiler: None. G.S. Chung: None. A. Stewart: None. C.J. Wenthur: None.

Theme J Poster

J013. Ethical and policy issues in neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:45 AM - 10:45 AM

Program #/Poster #: J013.05

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

Support: British Academy International Visiting Fellowship (BA #VF1-102524; TLW)
Clare Hall International Visiting Fellowship, University of Cambridge, England, U.K. (TLW)
Zimmerman Fund for Scientific Innovation Awards in Brain Science, Robert J. and Nancy D. Carney Institute for Brain Science (TLW)
Brown University Neuroscience Graduate Program (MAG)
Hanlon Foundation (TLW)

Title: Dignity Neuroscience: Universal Rights are Rooted in Human Brain Science

Authors: *T. L. WHITE¹, M. A. GONSALVES²;

¹Behavioral and Social Sci., ²Neurosci. Grad. Program, Brown Univ., Providence, RI

Abstract: Universal human rights are defined by international agreements, law, foreign policy, and the concept of inherent human dignity. However, rights defined on this basis can be readily subverted by overt and covert disagreements and can be treated as distant geopolitical events

rather than bearing on individuals' everyday lives. A robust case for universal human rights is urgently needed and must meet several disparate requirements: (a) a framework that resolves tautological definitions reached solely by mutual, revocable agreement; (b) a rationale that transcends differences in beliefs, creed and culture; and (c) a personalization that empowers both individuals and governments to further human rights protections. We propose that human rights in existing international agreements comprise five elemental types: (1) agency, autonomy and self-determination; (2) freedom from want; (3) freedom from fear; (4) uniqueness; and (5) unconditionality, including protections for vulnerable populations. We further propose these rights and protections are rooted in fundamental properties of the human brain. We provide a robust, empirical foundation for universal rights based on emerging work in human brain science that we term 'dignity neuroscience'. Dignity neuroscience provides an empirical foundation to support and foster human dignity, universal rights and their active furtherance by individuals, nations, and international law.

Disclosures: T.L. White: None. M.A. Gonsalves: None.

Theme J Poster

J013. Ethical and policy issues in neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:45 AM - 10:45 AM

Program #/Poster #: J013.06

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

Title: Bite-sized science policy: engaging early-career scientists in science communication with the SciPolBites blog

Authors: *M. N. SCHMEHL;
Neurobio., Duke Univ., Durham, NC

Abstract: Scientists and engineers have a unique role to play in policy, as they can use their expertise to contribute to the policymaking process and to public discourse. Early-career scientists and engineers are particularly suited to political engagement because they are directly affected by science-related policies in the academic workplace as well as in their broader communities. However, trainees have limited access to opportunities to build their skills in science policy and communication by discussing their fields with non-scientific audiences. In 2020, the Communications Committee of the National Science Policy Network founded the SciPolBites blog. The blog provides a platform for members to share their insights on current issues in science and policy that relate to their research or personal experiences. Groups of 2-4 reflections of 200-400 words each cover topics such as voting by mail, local advocacy, and racial justice from a variety of perspectives. Participants increase their confidence in communicating about science with the public and contribute to policy related to their research areas.

Disclosures: M.N. Schmehl: A. Employment/Salary (full or part-time); National Science Policy Network.

Theme J Poster

J013. Ethical and policy issues in neuroscience II

Location: Virtual Only

Time: Tuesday, November 9, 2021, 9:45 AM - 10:45 AM

Program #/Poster #: J013.07

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

Title: Cultivating a neuroethical ethos: reimagining neuroethics education in the lab

Authors: *J. FAROOQUI^{1,3}, S. DAWOD⁴, J.-M. BALAGUER^{5,3}, D. SARMA^{2,3};

¹Program in Neural Computation, ²Dept. of Mechanical Engin., Carnegie Mellon Univ., Pittsburgh, PA; ³Rehab Neural Engin. Labs, ⁴Ctr. for Bioethics and Hlth. Law, ⁵Dept. of Bioengineering, Univ. of Pittsburgh, Pittsburgh, PA

Abstract: The rapid advancement of neurotechnology demands that research efforts meaningfully engage ethical considerations. One barrier to engagement is that predominant frameworks are often regulatory and/or didactic, creating a perception of distance between ethics and day-to-day research. Our work aims to instead cultivate a neuroethical ethos - a research culture wherein ethics is an intrinsic part of research, from ideation to experimentation and beyond. We do so by establishing a discussion series designed to facilitate the internalization of neuroethical principles to develop this ethos among researchers, engineers, and clinicians in the Rehab Neural Engineering Labs (RNEL) at the University of Pittsburgh. RNEL is an interdisciplinary, collaborative hub for rehabilitation-focused neurotechnology development, consisting of 12 principal investigators and their respective research teams. However, integration of neuroethical principles in the life cycle of research has been largely offloaded to external regulatory bodies such as IRBs or the FDA. Ethics education is driven by coursework or online modules, which researchers report have little bearing on their research. Our approach relies on two main insights. First, people's genuine actions reflect their lived values and morals. Second, internalizing ethical principles through discourse can empower researchers to act ethically.

Our process for developing a neuroethical ethos involves 4 steps:

1. Topic identification, selecting neuroethical topics relating to RNEL research interests. In the last year, this has expanded to include topics that align with diversity and inclusion efforts undertaken by many lab members, making them easy to connect and internalize.
2. Open dialogue, via discussion sessions wherein topic area experts and lab members engage together with neuroethical principles through a set of deliberative questions.
3. Ownership, the process by which discussion participants internalize neuroethical principles by connecting them with their own lived values and expertise.

4. Application, where internalized principles manifest in researchers' choices and actions while planning and implementing research projects.

Our approach enables researchers to organically connect neuroethical principles with their own lived values and experiences, thereby encouraging active application of these principles in research. Feedback from our discussion participants indicates strong engagement and a deep curiosity about the topics. Particularly noteworthy are the connections drawn by participants between the newly synthesized topics and elements of their own research or outreach efforts.

Disclosures: J. Farooqui: None. S. Dawod: None. J. Balaguer: None. D. Sarma: None.

Theme J Poster

J006. Education: Innovations in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:15 PM - 3:15 PM

Program #/Poster #: J006.01

Topic: J.02. Teaching of Neuroscience

Support: Utah Valley University Undergraduate Research Scholarly and Creative Activities

Title: A cross-course supplementary learning model for undergraduate neuroscience education

Authors: D. MUNDS, A. CHEVRIER, M. DOHERTY, *J. O. TAYLOR;
Utah Valley Univ., Orem, UT

Abstract: The large-scale shift to online education in recent months has been accompanied by many challenges. Among these challenges are to create rigorous online courses that do not simply substitute personalized attention and hands-on labs with pre-recorded videos and written assignments. This is a particular challenge for neuroscience/biopsychology-related courses at an open-enrollment university like Utah Valley University because a significant minority of students come to classes with little practice in effective studying or awareness of options for academic support. As a partial solution to these challenges, we present an on-going, undergraduate, engaged learning project intended to facilitate student learning across multiple neuroscience courses in the Behavioral Science Department. Students developed a research-grounded pedagogical model for supplemental instruction that can be linked with the general learning objectives of a target course. Students then created the content for use in this cross-course platform. This content includes: (1) Short video instruction, (2) Interactive activities, (3) Video-based labs to demonstrate fundamental principles, (4) Consistent checks for understanding and remediation, and (5) Content that links material to student's daily lives or career goals. Proof-of-concept examples from a subset of learning objectives will be used to evaluate the resource's efficacy in an introductory neuroscience course during the 2021-22 school year.

Disclosures: D. Munds: None. A. Chevrier: None. M. Doherty: None. J.O. Taylor: None.

Theme J Poster

J006. Education: Innovations in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:15 PM - 3:15 PM

Program #/Poster #: J006.02

Topic: J.02. Teaching of Neuroscience

Title: The FUN Exchange: A community-driven repository for knowledge sharing to enrich neuroscience/biopsychology teaching

Authors: ***T. M. WRIGHT**¹, C. JORGENSEN²;

¹Biol. Sci., California State University, Sacramento, Sacramento, CA; ²Behavioral Sci., Utah Valley Univ., Orem, UT

Abstract: Online instruction has grown tremendously over the last decade. Furthermore, the pandemic forced many classes to be switched from face-to-face to an online modality and, in many cases, required sweeping changes to the way that faculty delivered content. As faculty redesigned their courses for the online space, two questions naturally arose:

1. Where can one find engaging teaching resources for neuroscience and/or biopsychology courses? 2. Can each resource be vetted for quality purposes, or is there ease of access to the author of each resource for support and/or attribution?

Although several attempts to accrue teaching resources for neuroscience and/or biopsychology courses have been made, high quality and engaging teaching resources are hard to find, limited in their scope (i.e., case studies only), and scattered widely across the internet. If these teaching resources could be made more readily available for faculty, the content of many courses could be made more interactive and engaging, leading to better outcomes for our students. Not surprisingly, during a recent Faculty for Undergraduate Neuroscience Workshop, we noted a need for a centralized repository of teaching resources for faculty teaching neuroscience or biopsychology courses.

To address this need, we have developed a repository (for face-to-face, hybrid, and online course delivery) tentatively named the FUN Exchange. The repository:

- 1) Is hosted on the online collaboration site Airtable, which is open to anyone willing to register and create an Airtable account—ensuring accessibility
- 2) Is set-up to allow searching by type of activity, topic, contributor, length of activity, etc.—ensuring searchability, and
- 3) Is designed to be community-driven—aimed to allow reviewing of resources, upkeeping the resources, and to allow contacting contributing members to inquire about potential questions as well as peer-review of submissions.

Taken together, the FUN Exchange is an opportunity to provide more opportunities for faculty to create engaging and interactive content for any course modality that will support student success.

Disclosures: T.M. Wright: None. C. Jorgensen: None.

Theme J Poster

J006. Education: Innovations in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:15 PM - 3:15 PM

Program #/Poster #: J006.03

Topic: J.02. Teaching of Neuroscience

Support: UHD Teaching Circle
 NSF RCN-UBE #1624104

Title: Teaching motor control disorders using a new case study in fully online neuroscience/psychology courses

Authors: *Y. KANG, S. BABB, *R. JOHNSON;
Univ. of Houston Downtown, Houston, TX

Abstract: The COVID pandemic transformed undergraduate teaching from more traditional to digital delivery methods, which presented challenges and opportunities in student engagement and learning. Active learning pedagogy such as case study teaching is a great way to engage students in face-to-face settings. We want to see whether it is also effective in fully online setting. To do this, we piloted a new case on motor control disorders in Intro to Neuroscience course in the Fall of 2020 and implemented the same case in Biological psychology in the Spring of 2021 at University of Houston Downtown. In the control session of Biological psychology, we assigned a literature review activity for the same topic. To evaluate learning, we used exam questions and collected student survey data, which showed no significant difference in learning but improved engagement and positive feedback in the case study group. Furthermore, we have learned valuable lessons over the strength and weakness of this new case and some pedagogical insights on how to teach case studies online.

Disclosures: Y. Kang: None. S. Babb: None. R. Johnson: None.

Theme J Poster

J006. Education: Innovations in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:15 PM - 3:15 PM

Program #/Poster #: J006.04

Topic: J.02. Teaching of Neuroscience

Title: A semester without exams: approaches in a small and large course

Authors: *R. BRANCO;

Univ. of Notre Dame, Notre Dame, IN

Abstract: Exams carry pedagogical downsides: they can create stress, decrease intrinsic motivation, and tend to reduce opportunities for creative problem-solving. Exams are also difficult to administer when flexibility is paramount, such as during remote learning, when students have special testing conditions, or during a pandemic when a subset of students are sick or in quarantine. To account for these shortcomings, I designed and instituted two completely exam-free undergraduate Neuroscience and Behavior courses in the Spring of 2021, one a large introductory-level course and the other a small upper-level elective course. This exam-free approach was evaluated in four areas: creative thinking, interest in the material, stress level, and academic performance. Evaluation of success in these areas was completed via student feedback and by comparing final projects to final projects from previous semesters. The exam-free approach produced favorable or neutral results in every measured outcome. The framework for an exam-free course described here could be a useful starting point for other instructors who want to eliminate exams.

Disclosures: R. Branco: None.

Theme J Poster

J006. Education: Innovations in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:15 PM - 3:15 PM

Program #/Poster #: J006.05

Topic: J.02. Teaching of Neuroscience

Title: Browser-based Axon Simulator and Visualizer for Education

Authors: *C. FIETKIEWICZ¹, A. DWARKA¹, J. MORTIMER²;

¹Hobart and William Smith Colleges, Geneva, NY; ²Case Western Reserve Univ., Cleveland, OH

Abstract: Computational modeling of axons serves as a tool for students to understand axonal dynamics, including action potential propagation, loss of axonal function, and the effects of electrical stimulation. However, the difficulty of using modeling software presents a barrier to many students and instructors. Additionally, modeling applications typically lack visualization tools that are appropriate for observing complex events in action potential propagation, such as collision and backpropagation. We developed a browser-based axon simulation of a myelinated axon that addresses these challenges and has been successfully used in undergraduate and graduate courses. The online simulator is available as an independent component of the Applied

Neural Control Toolkit website (<https://www.anctoolkit.com>), which also offers other neuron simulators and instructional videos on many topics in functional electrical stimulation. Simulating a myelinated axon is a complex task, given the need to model interconnected nodes of Ranvier and myelinated segments. Those who attempt the challenge typically use specialized software that requires significant training and, in some cases, experience in computer programming. Our online simulator requires no programming. Each node of Ranvier is based on the canonical Hodgkin-Huxley model (Hodgkin and Huxley 1952) with voltage-gated sodium and potassium channels. The interface allows the user to specify various physical axon properties, including axon diameter, internodal distance, and the number of nodes of Ranvier. Complex electrical stimulation experiments are performed by specifying the number of intracellular and extracellular stimulus pulses, as well as pulse start times, durations, and amplitudes.

Another challenge in axon modeling is the use of visualization tools for understanding the results of modeling experiments. In our simulator, a spike raster plot shows the times of each action potential for each node. This raster plot enables the user to visualize the direction and speed of multiple action potentials simultaneously. Additionally, the membrane voltage vs. time is shown for each node, including stimulus effects and graded potentials. A multiparameter plot for a selected node displays membrane voltage and Hodgkin-Huxley channel gate values.

The simulator has been successfully used in undergraduate and graduate courses on computational neuroscience and biomedical engineering at Case Western Reserve University, Cleveland, Ohio and Hobart and William Smith Colleges, Geneva, New York. Future work will include the ability to modify model settings for voltage-gated channels and myelin properties.

Disclosures: C. Fietkiewicz: None. A. Dwarka: None. J. Mortimer: None.

Theme J Poster

J006. Education: Innovations in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:15 PM - 3:15 PM

Program #/Poster #: J006.06

Topic: J.02. Teaching of Neuroscience

Support: T32EY007031
Washington Research Foundation Postdoctoral Fellowship

Title: Playful learning for large-scale systems neuroscience using brain-simulation experiments in the classroom

Authors: *D. BIRMAN, K. NYLUND, N. A. STEINMETZ;
Univ. of Washington, Seattle, WA

Abstract: In neuroscience classes we often teach our students by asking them to memorize brain regions, functions, and concepts. Active learning (i.e. learning by interactive experimentation) and in-person research experiences, however, are significantly more effective at helping students understand and internalize concepts [1]. While some in vivo experiments, such as cockroach and aplysia recordings, can be performed in the classroom, modern large-scale neural recording tools cannot. This unfortunately distinguishes neuroscience from the other physical sciences, where students are able to discover their fundamental principles by performing engaging experiments in laboratory courses. To encourage students in neuroscience classes to engage in a similar kind of playful learning we propose a brain simulation tool that can be run on a laptop browser capable of modeling sensory inputs, simple computations, and motor outputs. Using this tool, students are able to rediscover the fundamental concepts in neuroscience through their own curiosity and self-designed experiments. By making this tool accessible and exciting we aim to improve the quality of instruction in neuroscience with minimal investment from instructors. Over the last four years we have successfully introduced tutorials using brain simulations in large undergraduate lecture courses. Students who use the brain simulation environment have remarked on how it feels like they are “doing science” rather than memorizing facts. In our simulation, students are presented with a 3D mouse in an environment modeled on the visual psychophysics setup used by the International Brain Laboratory [2]. Students place electrodes into the mouse’s brain and observe LFP and spiking activity, while the mouse performs a simple 2-AFC task. In different recording modes students can observe raw data, rasters, and trial-averaged responses as well as explore mouse brain anatomy. Using this setup, students can repeat classic experiments mapping sensory neurons in visual and auditory cortex, exploring the neural activity that occurs during decision making, and observing how neural activity changes between passive and active behavior.

Moving systems neuroscience towards a process of experimenting and playful discovery will encourage students to engage deeply with the concepts and phenomena of our field and get them excited about learning more.

[1] Kober, N. (2015). Reaching students ... National Academies Press.

[2] Laboratory, T. I. B., Aguillon-Rodriguez, V., Angelaki, D., Bayer, H., Bonacchi, N., Carandini, M., ... & Zador, A. M. (2021). Standardized and ... eLife, 10.

Disclosures: D. Birman: None. K. Nylund: None. N.A. Steinmetz: None.

Theme J Poster

J006. Education: Innovations in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:15 PM - 3:15 PM

Program #/Poster #: J006.07

Topic: J.02. Teaching of Neuroscience

Support: Minnesota State University Mankato Psychology Department

Title: Discerning the effects of science literacy and science fiction media on undergraduate students' understanding of neuroscience and neurotechnologies

Authors: R. TESMER, A. P. MCCARTY, M. R. KURTZ, F. TASMIN, T. A. KROLAK, S. E. BRUCE, *A. P. STEINER;
Minnesota State Univ. Mankato, Mankato, MN

Abstract: Misinformation can significantly affect students' perception. Neurotechnology misinformation is a threat that erodes student trust in neuroscience. While accessibility and engagement with neurotechnologies continue to expand, students consume an increasing amount of media which contributes to misinformation and sways opinion. Therefore, we must understand where misinformation about neuroscience and neurotechnology originates. Engagement with the sciences, including neuroscience, encourages future support and acceptance.

We surveyed undergraduate psychology students (n = 182) to explore science literacy, measured by a modified survey used by the Pew Research Center, and knowledge accuracy about neurotechnology and neuroscience, such as electroencephalograms (EEG). We hypothesized that as science literacy increased, student knowledge would more accurately reflect the correct use of neurotechnologies even if misrepresented in the media. We measured misinformation using a scale that ranked neurotechnology accuracy as portrayed in popular media. Students rated their agreement with different statements; 'EEGs are used as a diagnostic tool; results can provide evidence of seizures'. Students with higher science literacy scores were less likely to select misinformation about certain neurotechnologies, such as EEGs. Higher science literacy positively correlated with knowledge of neuroscience. Data also suggested students had low knowledge of other neurotechnologies, such as deep brain stimulation; student knowledge was not correlated with science literacy.

Previous studies demonstrated inoculation against misinformation by using fictional stories. To investigate if science fiction media provided an inoculation effect, we devised a measure to rank media consumption. We used Google Trends search results from the past 12 months and compared each unique media entry against the most popular, searched-for media entry. This comparison established a common scale that we used to evaluate how much media each student consumed compared to popular Google searches. Results showed science fiction media may provide an inoculation-like effect; students who reported increased science fiction media consumption generally had more accurate representations of neurotechnology. Additional analysis must address whether science literacy increases science fiction media consumption or science fiction consumption alone prevents misinformation. These findings suggest that neuroscience education could be supplemented with science fiction media that shows accurate depictions of neurotechnology to reinforce previously learned knowledge.

Disclosures: R. Tesmer: None. A.P. McCarty: None. M.R. Kurtz: None. F. Tasmin: None. T.A. Krolak: None. S.E. Bruce: None. A.P. Steiner: None.

Theme J Poster

J006. Education: Innovations in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:15 PM - 3:15 PM

Program #/Poster #: J006.08

Topic: J.02. Teaching of Neuroscience

Title: Developmental Neuroscience and Community-Based Learning: An Effective Combination for Scientific Communication

Authors: *N. MICHAEL, A. STEVENS;
Univ. of Notre Dame, South Bend, IN

Abstract: Scientific research is meant to be shared with the public to enact positive change in a community, so literature translations skills and motivation to engage in the nonscientific community are additional measures that are useful to professors aiming to inspire effective future scientists. Teaching methods such as community-based learning (CBL) have been shown to be effective in promoting this ability, as students are able to synthesize class information with real-life community problem solving. 90 undergraduate students in the Developmental Neuroscience course at the University of Notre Dame from 2017-2019 were surveyed prior to and upon completion of the course. Questions and rating scales focused on four areas: content knowledge, scientific literature literacy, ability to convey scientific literature to a nonscientific population, and degree of civil engagement. During the course, students were exposed to CBL teaching along with regular coursework concerning the developmental basis for non-normative behavior in adulthood. 10 alumni from the course were surveyed using the same coding scheme to assess learning gains post-graduation. Scores were analyzed using two-tailed t-tests and ANOVA statistics. Results indicated significant differences in content knowledge, literature literacy, and translation ability between pre-course, post-course, and alumni conditions. Results comparing all students showed significant differences across all categories. These data indicate that students show learning gains in content knowledge, literature literacy, translation ability, and civil engagement during the course, and those gains persist in alumni for literature literacy and translation ability. The pandemic of 2020 and 2021 illustrated the dramatic gap that exists between scientific knowledge and scientific literacy. These data suggest that growth in such areas can occur when practicing CBL teaching, implying that it is an effective method for learning retention and translation ability over time. CBL is a teaching strategy that offers a nearly universal tool to neuroscience programs within institutions of higher education that offers sustained impact on student/trainee ability to translate basic science accessibly to the general population.

Disclosures: N. Michael: None. A. Stevens: None.

Theme J Poster

J009. Education: Professional Schools

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J009.01

Topic: J.02. Teaching of Neuroscience

Title: The Benefits of Podcasting as a Knowledge Dissemination Tool in Alzheimer's Disease Research: Case Study of the AMiNDR Podcast

Authors: *E. KOCH¹, S. LOUADI¹, E. ROWE¹, N. KUHLMANN², A. KAMESH³, J. FERREIRA⁴;

¹Univ. of British Columbia, Vancouver, BC, Canada; ²Neurosci., Univ. of British Columbia, Montreal, QC, Canada; ³Montreal Neurolog. Inst., McGill Univ., Montreal, QC, Canada;

⁴Unaffiliated, London, United Kingdom

Abstract: Podcasting has grown in popularity as a means to communicate science within and beyond the research community. The academic literature shows a consistent increase in podcast availability and listenership, and with the widespread access to the internet and mobile phones, podcasts are an accessible tool to remain informed, entertained and connected, all increasingly important during the pandemic when scientific meetings are scarce. AMiNDR Podcast (A Month in Neurodegenerative Disease Research) harnesses the geographical scholarship potential of the fast-growing podosphere for accessible science communication on Alzheimer's disease, specifically targeted to researchers. Every month, new primary papers in the field of Alzheimer's disease research are sorted into distinct categories, then presented in an audio format, along with a complete bibliography of papers covered. Since its launch in June 2020, AMiNDR published over 200 episodes with accompanying bibliographies, reaching over 2800 unique listeners worldwide. To assess whether AMiNDR is a useful and accessible service to neuroscientists, we have collected feedback through a formal survey of our listeners and internal interviews with members of our team. We also tracked our performance using Podcast analytics, and measured our reach, growth, and listener engagement on social media. In our presentation, we share the lessons we learned in our program evaluation and quality improvement initiative for the AMiNDR Podcast, with key recommendations for effective knowledge dissemination in Neuroscience.

Disclosures: E. Koch: None. S. Louadi: None. E. Rowe: None. N. Kuhlmann: None. A. Kamesh: None. J. Ferreira: None.

Theme J Poster

J009. Education: Professional Schools

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J009.02

Topic: J.02. Teaching of Neuroscience

Title: Neurohistology - content, extent, timing, relevance, connections and ramifications in the current curricula for health care professions

Authors: *C. STEFAN¹, J.-P. SAINT-JEANNET¹, S. N. BIASUTTO², D. F. CURCIO³;

¹Mol. Pathobiology, New York Univ. Col. of Dent., New York, NY; ²Anatomy, Sch. of Med., Natl. Univ. of Cordoba, Cordoba, Argentina; ³Med. Educ., Icahn Sch. of Med. at Mount Sinai, New York, NY

Abstract: Histology has been one of the didactic disciplines most impacted by the waves of the vast curriculum remodeling process that has characterized the beginning of this century in the field of health care professions education. In most programs, histology underwent major changes or at least significant adjustments in terms of reorganization, allocation of hours, teaching methodology and technology. Moreover, it has increasingly amalgamated its traditional identity with other disciplines in the frame of newly created courses / units / blocks that are based on organ-system and/or structure-function paradigms. Neurohistology in particular has been at the forefront of these adaptive and transformative pathways, taking into consideration the various places it could be found in a curriculum or another. For instance, it could be part of Histology courses (either full extent or limited to basic tissues as a stepping stone to units that follow); Structure courses (combining gross anatomy, embryology and histology); or Neuroscience courses (which largely vary as they could incorporate not only neuroanatomy, neurohistology, development, neurophysiology, but also neuropathology, neuroimaging, neuropharmacology, behavior sciences, principles of clinical neurology and psychiatry). These parameters are important in designing, running, contributing to, and/or evaluating a program. Many common goals and dilemmas exist beyond the exact place where neurohistology may be pinned on curricular charts. This presentation analyzes, addresses and explores such goals and dilemmas, including: how much should be taught; what should be selected as relevant; finding the right balance between concepts and facts; providing adequate time, timing and sequence of topics; ensuring continuity and correlations with other curricular components; employing active learning methodologies; and switching the focus from a descriptive to a problem-solving approach in histology with direct applications in the clinical setting. By comparing, contrasting and illustrating different curricular formats and situations, the presentation highlights advantages, disadvantages, challenges, pitfalls, remedies, and the importance of both careful planning and ongoing fine tuning in achieving congruence between the neurohistology component and the other parts of the continuum. This multifaceted view of the instructional scaffolding process offers the premises to identify possible misalignments, gaps and weak links, as well as areas in which challenges could be creatively converted into valuable opportunities for further curricular development.

Disclosures: C. Stefan: None. J. Saint-Jeannet: None. S.N. Biasutto: None. D.F. Curcio: None.

Theme J Poster

J009. Education: Professional Schools

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J009.03

Topic: J.02. Teaching of Neuroscience

Title: www.learnmedicalneuroscience.nl. supporting students medical neuroscience in their learning

Authors: *E. VOS-WISSE¹, K. R. PARKS², V. V. MALAKHOV³, G. N. PETITTO DE GREGORIO⁴, L. E. WHITE⁵;

¹www.learnmedicalneuroscience.nl, mentor "Medical Neuroscience", Wageningen, Netherlands;

²mentor "Medical Neuroscience", Nanaimo, BC, Canada; ³mentor "Medical Neuroscience", Moscow, Russian Federation; ⁴mentor "Medical Neuroscience", Maracaibo, Venezuela, Bolivarian Republic of; ⁵Duke Inst. for Brain Sci., Duke Univ., Durham, NC

Abstract: In spring 2016 a volunteer mentor (EVW) created the site www.learnmedical-neuroscience.nl to support students Medical Neuroscience in their learning. It is a free website for anyone. The site is designed specifically to support learners of the MOOC (Massive Open Online Course) "Medical Neuroscience". This is a medical school-caliber course taught by LEW since 2013, through the Coursera platform. The course is also open to all and is frequently used for blended learning. The learning community is very diverse. Not all members (for example high school learners, learners that finished their formal education years ago) are ready for Medical Neuroscience. www.learnmedicalneuroscience.nl is designed specifically to support these learners with the course content and learning process with to-the point-resources and study tips. The structure of the website is designed to give learners overview of all the material present in the course. There is a menu at the top of the page and a menu in the right sidebar. The top menu gives access to pages with links to free websites supporting the learning content. The right sidebar menu gives access to Studytips, supporting the learning process with diverse sets of strategies and tips. In the top menu there is a page Learning Community: encouraging the learners of the Global Course Class to learn socially. There is a page called Virtual Lab: A curated set of links to relevant free websites. Organized to map course content in 7 subpages. A page Learning Materials to revise knowledge, content created strategically to support learning key concepts in Medical Neuroscience. There are subpages with learner-created visualizations and efficient guidance for identifying and searching peer-reviewed scientific literature. A page called Neurological Exam: Links to sites and videos on the neurological exam. The website is used enthusiastic by learners continuously. There are about 170 sessions a day. Users come from all over the world (United States, India, China, United Kingdom, Russia, Brazil, Canada, Mexico, Australia, Columbia to name a few). Most used are the pages Virtual lab Neuroanatomy, the Learning Materials and Study Tips. The page Visualize your knowledge is viewed a lot and seems to encourage student creativity, fun and learning. www.learnmedicalneuroscience.nl has supported student learning in the MOOC, Medical Neuroscience, and has become a valued resource for a global community of learners and users seeking a curated set of resources for learning human and medical neuroscience.

Disclosures: E. Vos-Wisse: None. **K.R. Parks:** None. **V.V. Malakhov:** None. **G.N. Petitto De Gregorio:** None. **L.E. White:** Other; Instructor for Coursera MOOC.

Theme J Poster

J009. Education: Professional Schools

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J009.04

Topic: J.02. Teaching of Neuroscience

Support: Center for Compulsive Behavior and Addiction, Rush University

Title: Integrating Addiction Neuroscience Throughout Health Profession Curricula

Authors: ***T. C. NAPIER**¹, N. K. SHETH¹, J. K. STRINGER³, N. CHIEN¹, R. FITZGERALD²;

¹Psychiatry and Behavioral Sci., ²Psychiatry and Behavioral Sciences; Dept. of Family Med., Rush Univ. Med. Ctr., Chicago, IL; ³Office of Integrated Med. Educ., Rush Univ., Chicago, IL

Abstract: Modern neuroscience is reframing our understanding of substance use disorders and behavioral addictions. Translating science-based care to training of future health professionals, wherein traditional modalities and entrenched biases may persist, can be challenging. The Rush University Center for Compulsive Behavior and Addiction (**CCBA**) has spearheaded a university-wide initiative named **Rush Integrated Substance-use-disorders Education (RISE)**. The core concept of RISE is that appreciating the neurobiology of addiction processes will engender compassion, reduce stigma, and provide a knowledge platform for updating therapy as new approaches arise. RISE has been introduced (in a largely virtual form due to the COVID-19 pandemic) in medical college, college of health sciences, and graduate college curricula. RISE Phase I has focused on three topics (i) Neuroscience of Addiction, (ii) Stigma, and (iii) Medications for opioid use disorder, including naloxone for opioid overdose. When appropriate, the curriculum also includes MAT waiver training. To empirically validate impact, we administered knowledge-based surveys. For example, an Addiction Medicine Elective was completed by 43 fourth year medical students. Of these, 22 provided consent to data use for research (18 pre-test results, 13 post-test). Due to the limited sample size, analysis of change at the individual level was not possible, but general comparisons between pre- and post-intervention results were made. Outcomes show a significant increase in learners' knowledge of (PRE, 84±4.2 SD; POST, 92±7.3; $t(28)=-5.1$, $p<0.0001$) and attitudes toward (PRE, 3±0.3; POST, 3±0.3; $t(29)=-5.3$, $p<0.0001$) addiction and opioid use disorder. RISE evidence-based templates are customized for residency and fellowship programs, and we have received grant support to disseminate RISE curricula to other medical colleges and residency courses in Illinois. Programmatic dissemination also is achieved by meeting participation (e.g., 2020 Family Medicine Midwest Conference; 2021 National Academy of Medicine Stigma Summit). RISE

residents are trained to work with community treatment centers. RISE faculty participate in CCBA-sponsored CME/CE-vetted meetings for Chicago metropolitan health care providers. Feedback from internal and CME/CE surveys and meeting presentations is informing RISE-Phase II, wherein curricula-specific sessions are being developed on vulnerable populations, prevention, drug-specific knowledge, behavioral addictions, and prevention and therapy for health professionals. We look forward to the potential impact of RISE-Phase II as we engage a larger community of learners.

Disclosures: T.C. Napier: None. N.K. Sheth: None. J.K. Stringer: None. N. Chien: None. R. Fitzgerald: None.

Theme J Poster

J009. Education: Professional Schools

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J009.05

Topic: J.02. Teaching of Neuroscience

Title: Reflections on pediatric pain education for occupational therapy students

Authors: *V. W. T. CHU;

Occup. Therapy, Virginia Commonwealth Univ., Richmond, VA

Abstract: Pain are common experiences for children of all ages. The prevalence of reported pain in children are high, 40% of children complain of pain that occurs at least once a week (Mathews, 2011). Research has also shown the negative long-term consequences for untreated pain for children and can lead to increased pain sensitivity later in life (Laekeman et al, 2021). There is a need for better education of our health professionals in pediatric pain.

Research has shown the effectiveness of using a multifaceted approach in pain management, based on a biopsychosocial model. Physical and occupational therapists play a key role in pain management as health professionals who work with individuals on areas of physical activity and occupational engagement. To address the need for pediatric pain education in our program, we implemented a 3-hour pain module in our pediatric occupational therapy curriculum. We covered a condensed version of the ISAP curriculum outline, focusing on the biopsychosocial model of pain, the neurophysiological basis of pain, distinction and classification of pain, pediatric pain and occupational-base assessments, non-pharmacological pain interventions, followed with a case study discussion.

Students gained knowledge about pediatric pain assessments and the use of self-report as a gold standard for pain assessments. Students were also familiar with non-pharmacological interventions to prepare them for their future practice as an occupational therapist. Aside from a knowledge check, students also completed a survey on perceptions about pain. The students decide whether they agree or disagree with a list of statements related to pain. The statements

were compiled from previous surveys to assess pain understanding (Turnquist & Engel, 1994, Unruh, 1995, Rochman 1998, McCaffery and Ferrell, 1997, Zanolin et al., 2007). It was surprising to note that, 72% of students agreed that children may complain of pain just to get attention, 61% of students thought that personal intuition about trustworthiness of the child is valuable in identifying whether the child is lying about pain, and 50% of students agreed that pain is largely an emotional or psychological problem.

Our educational module on pediatric pain focused on delivering knowledge on the neurophysiology of pain, pain assessments, and pain interventions for children. While students demonstrated understanding of the material, a large majority of them also showed misconception in values related to pain. As we seek to educate our health professional students on pain, we need to go beyond the theories and applications, and address values related to topics such as pain, as they impact how we practice.

Disclosures: V.W.T. Chu: None.

Theme J Poster

J009. Education: Professional Schools

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J009.06

Topic: J.02. Teaching of Neuroscience

Title: Teaching Science Medicine specialty as a clinical neuroscience integrative healthcare practice, delivery system and research professions.

Authors: *A. EKWERIKE, C. A. DIKEUKWU;
Col. Of Sci. Medicine, Claretian Univ. of Nigeria, Sci. Med. Res. Inst. / Inst. Of Neurosci. & Biomed. Res., Owerri, Nigeria

Abstract: Introduction. Science Medicine profession is an evidence based health care practice, delivery system & research. A derivative of Neuroendocrinology. It postulates the brain as the center of health and has its health care delivery system integrating all health care systems and medical disciplines into a synchronous mode for the safest health care service and the best consults in preventive, curative, rehabilitative, proactive health and research. Learning Method: By active learning classroom / field based S.T.E.M (Science, Technology, Engineering, Maths & Medicine) learning, & the SUPREP (Syndicated Universities Preparatory Research Educational Program) model academic credit earning exchange program. Specialties: Basic / Translational Research, Clinical Research, Clinical Neuroscience Medicine & Integrative Health Care Delivery System. General Course Contents: General Neuroscience, Cognitive Neurosquatometry- S.T.E.M Invention Technology Programs, Health Coach Career Business administration, Telemedicine & Computer Information Technology. Anatomy, Physiology, Pathology, Pathophysiology, Pharmacology, Pharmacognosy, Psychology, Social Medicine,

Gerontology, Forensic Science, Research Methodologies, Statistics, Clinical Medicine, Basic surgical techniques, Tropical Medicine, Alternative & Complementary Medicine, Professional laws & ethics, Health Care Management, Nursing bedside skills, Clinical clerking skills, Laboratory Investigative Med, Regenerative Med, Innovations, Research Development & Deliveries (IRD&D) studies, etc. Core Courses: Neuroanatomy, Neurophysiology, Neuropharmacology & Neuroendocrinology, Neurodiagnostics & Neuromedicine. Basic Admission Requirement: 12th grade education. Degrees and Durations: Translational Neuroscience Scholars Course:- 1. Bachelor of Science Medicine B.ScM 4 years, 2. Master of Science Medicine, M.ScM - 1 year, 3. Doctor of Philosophy Ph.D 3 years. 4. Post Doctoral in Science Medicine (D.ScM) 1 year. Clinical Neuroscience Scholars Course: 1. Bachelor of Science Medicine, B.ScM. 7 years. 2. Master Of Science Medicine, M.ScM 1 year. 3. Doctor of Science Medicine (ScM.D) 2 years with B.ScM (Clinical Neuroscience), 3 years with other degrees and 7 years direct for Candidates with 12th grade educational certificates. Science Medicine Integrative Health Care Delivery System : 1. Bachelor of Science Medicine (B.ScM Clinical Nutritional Medicine 5 years) 2. Masters 1 year & Ph.D 3 years or Doctor of Nutritional Medicine (DNM ScM 3 years). 3. Bachelor of Science Medicine (B.ScM Integrative Health Care Administration / Management 4 years), Master's 1 year & Ph.D 3 years.

Disclosures: A. Ekwerike: None. C.A. Dikeukwu: None.

Theme J Poster

J009. Education: Professional Schools

Location: Virtual Only

Time: Wednesday, November 10, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J009.07

Topic: J.02. Teaching of Neuroscience

Support: NIH P41EB018783-07 (J.R. Wolpaw) Stratton VA Medical Center

Title: Design and implementation of training and dissemination at national center for adaptive neurotechnologies (NCAN)

Authors: *D. HAHN¹, P. BRUNNER², A. K. THOMPSON^{1,3}, J. S. CARP^{1,4}, A. VATO¹, T. VAUGHAN¹, J. R. WOLPAW^{1,5,4};

¹Natl. Ctr. for Adaptive Neurotechnologies, Albany Stratton VA Med. Ctr., Albany, NY;

²Neurosurg., Washington Univ. in St. Louis, St. Louis, MO; ³Med. Univ. of South Carolina, Charleston, SC; ⁴Sch. of Publ. Hlth., ⁵Electrical and Computer Engin., Univ. at Albany - State Univ. of New York, Albany, NY

Abstract: Many novel and exciting neurotechnologies have been developed and validated in the laboratory, few have been translated to clinical practice, and fewer still are in wide-spread use. The National Center for Adaptive Neurotechnologies (NCAN) (www.neurotechcenter.org) seeks

to remedy this by: increasing understanding CNS function and dysfunction; using this new knowledge to create and validate novel therapies for neurological disorders; and enabling and encouraging other scientists, engineers, and clinicians to join in development, use and commercialization of adaptive neurotechnologies. To achieve these aims, NCAN: undertakes relevant basic research and develops new technology; establishes push-pull collaborative projects with others; disseminates NCAN technologies, including BCI2000 (www.bci2000.org), to academic, research, and clinical institutions; and provides training and dissemination (TD) activities to create a knowledgeable cohort of new investigators and users. NCAN Training and dissemination now includes a three-week Short Course (2016, 2017, 2019); a virtual Focus Course (Yr. 1, 2021); in-person workshops on specific topics (e.g., electrocorticography (ECoG), BCI2000, BCI Home System, spinal cord plasticity); summer programs for undergraduates and high-school students; a newly established monthly virtual lecture series; internship and mentoring opportunities for researchers. The 2021 virtual Focus Course, “Scientific & Engineering Principles of Adaptive Neurotechnologies,” has 15 faculty and an on-line student cohort of 46 early to mid-career scientists (14), engineers (18), and clinicians (15). It has four modules: Neuroscience; Engineering; Data Acquisition and Analysis; and Adaptive Neurotechnologies. Each module comprises live and pre-recorded lectures, live discussions, and relevant demonstrations. They occur in three sessions/week for four weeks. This focus course seeks to provide participants with a comprehensive grasp of the basic theory and practice of adaptive neurotechnologies, understanding of the scientific and clinical potential of these technologies, and exposure to the practical applications of adaptive neurotechnologies to real-world problems. This poster is intended to describe this new course and other NCAN training and dissemination activities.

Disclosures: D. Hahn: None. P. Brunner: None. A.K. Thompson: None. J.S. Carp: None. A. Vato: None. T. Vaughan: None. J.R. Wolpaw: None.

Theme J Poster

J007. Education: Promoting Diversity and Inclusion in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J007.01

Topic: J.02. Teaching of Neuroscience

Support: RCN-UBE #1624104

Title: A Scientist Spotlight assignment promotes inclusiveness in an undergraduate neurobiology course

Authors: *K. FRENZEL;
Emory Univ., Atlanta, GA

Abstract: 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 and reflection assignments suggest an increased identification as a scientist. 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. Frenzel: None.

Theme J Poster

J007. Education: Promoting Diversity and Inclusion in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J007.02

Topic: J.02. Teaching of Neuroscience

Support: Kentucky Spinal Cord and Head Injury Research Trust

Title: Aarts: african american research training scholars program: creating an undergraduate training fellowship program to increase the diversity of neurotrauma researchers

Authors: *J. C. GENSEL^{1,2,3}, Z. M. MADISON^{4,3}, M. A. PRENDERGAST^{7,4,3}, J. E. SPRINGER^{5,3,2,4}, N. B. ABDELSAYED^{6,3}, J. L. BURDETTE^{6,3}, U. G. GELETA^{6,3}, A. M. HALLIBURTON^{3,6}, B. J. NZERHUMANA^{6,3}, A. D. BACHSTETTER^{3,5,2}, P. G. SULLIVAN^{2,5,3}, W. J. ALILAIN^{3,2,4,5};

¹Dept. of Physiol., ²AARTS Mentor, ³Spinal Cord and Brain Injury Res. Ctr., ⁴AARTS Committee, ⁵Dept. of Neurosci., ⁶AARTS Scholar, Univ. of Kentucky, Lexington, KY; ⁷Dept Psychol, Univ. Kentucky, Lexington, KY

Abstract: In the Fall of 2020, the Spinal Cord and Brain Injury Research Center (SCoBIRC) at the University of Kentucky (UK) announced the inaugural African American Research Training Scholars (AARTS) program with the goal of increasing the interest of diverse undergraduates in

pursuing a career in the field of neurotrauma research. Supported by the Kentucky Spinal Cord and Head Injury Research Trust, SCoBIRC established five scholarships to provide 12-months of research support for undergraduate research training in neurotrauma including support for a summer stipend in the research laboratory of a UK faculty mentor and for travel to present findings at a national meeting, attend online workshops and courses, and purchase supplies for their summer research project. Qualified students have a declared major in a STEM field; 3.00 minimum G.P.A overall; a confirmed faculty mentor; 1 semester of independent neuroscience research experience; and past or concurrent enrollment in BIO 305: Introduction to Neuroscience Techniques. Applications were solicited University-wide and five scholarships were awarded based upon personal statements, references, and proposed research activities. In addition to performing full-time research during the summer, Scholars took part in a weekly AARTS summer program featuring discussions with UK Faculty that included journal clubs, lab presentations, and career development discussions. The culmination of the summer program will be the first 1st Annual Symposium of the SCoBIRC AARTS Program, a University-Wide research symposium featuring research presentations by each AARTS program Scholar. Here we highlight the individual research projects, present additional details about the program, and discuss and reflect upon efforts to increase diversity within the neuroscience and neurotrauma fields. We also report on solicited feedback about the inaugural program and plans for future refinement.

Disclosures: J.C. Gensel: None. Z.M. Madison: None. M.A. Prendergast: None. J.E. Springer: None. N.B. Abdelsayed: None. J.L. Burdette: None. U.G. Geleta: None. A.M. Halliburton: None. B.J. Nzerhumana: None. A.D. Bachstetter: None. P.G. Sullivan: None. W.J. Alilain: None.

Theme J Poster

J007. Education: Promoting Diversity and Inclusion in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J007.03

Topic: J.02. Teaching of Neuroscience

Support: NSF Grant 1832338

Title: Enhancing diversity, equity, and inclusion through multi-institutional partnerships between Hispanic-Serving Institutions and allies

Authors: *E. E. SERRANO;
New Mexico State Univ., Las Cruces, NM

Abstract: Heightened awareness of the barriers to full participation in research lend immediacy to the need to develop and disseminate strategic and novel solutions that elevate DEI in science.

Under-resourced institutions face the systemic challenge of receiving less financial support for research and education per student. This funding gap compromises their ability to offer a competitive research and educational experience to their students. Hispanic Serving Institutions (HSIs) are an enrollment-based minority institution category with student populations of at least 25%. In 2018, over 550 HSIs educated about two thirds of the 3.8 million Hispanic college students, over 40% (~470,000) of all Asian Americans, more Black students (~480,000) than all HBCUs, and more indigenous students (~25,000) than all Tribal Colleges. Few HSIs have achieved R1 status. Because there is no formula funding for HSIs, these institutions must compete for resources and they receive on average 68 cents for every federal dollar as compared with other institutions of higher education. The HSI Program is a new NSF initiative that aims to dismantle these barriers. The NSF HSI Program's National STEM Resource Hub has partnered with colleagues from the NSF Neuroscience Gateway, the West Big Data Innovation Hub, and faculty at various institutions to launch a series of workshops that unite HSI and non-HSI faculty and staff who seek collaborators with shared research interests. Workshops are community inspired and their content includes diverse themes including neuroscience, plant genetics, data science, grantsmanship, and research ethics. Preliminary outcomes show the networking aspects of the workshops foster team formation across institutions. SFN researchers are invited to learn about how to participate in Hub workshops that develop faculty disciplinary skills and aspire to forge cross institutional programs that support the success of persons from diverse backgrounds along their research pathways.

Disclosures: E.E. Serrano: None.

Theme J Poster

J007. Education: Promoting Diversity and Inclusion in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J007.04

Topic: J.02. Teaching of Neuroscience

Support: Howard Hughes Medical Institute (N. Simon and V. Ware, Program Directors)
PC Rossin College of Engineering
College of Arts and Sciences

Title: The STEM Summer Institute: Institutionalizing and Scaling Research Engagement and Training Opportunities for Underrepresented and First Generation Students

Authors: *N. SIMON¹, V. WARE¹, S. KISHORE², R. SAUSE³, C. KUSKO⁴;

¹Biol. Sci., ²Electrical and Computer Engin., ³Civil and Envrn. Engin., ⁴ATLSS Engin. Res. Ctr., Lehigh Univ., Bethlehem, PA

Abstract: Demand for a technologically advanced workforce and improving diversity among students pursuing the PhD in STEM fields can be met through evidence-based programs that incorporate research engagement, intensive mentoring, and targeted professional development activities. Here we describe the STEM Summer Institute (STEM-SI), a newly launched, larger scale program based on activities originally funded by the Howard Hughes Medical Institute (HHMI). Lehigh's HHMI program was designed to improve persistence, graduation rates, and the number of underrepresented students pursuing advanced degrees in neuroscience and other STEM fields through curricular reforms, research participation in teams, and enhanced mentoring. Two elements of the program were the: 1) Biosystems Dynamics Summer Institute (BDSI): a 10-week summer research experience for undergraduates as members of interdisciplinary teams comprised of faculty, grad students, and post-doctoral investigators. (64 teams 234 undergraduates, 110 grad students, and 100 faculty) participated since 2007 and >80% of undergraduate participants entered graduate programs in STEM, and 2) SEA-PHAGES: a research project between >170 institutions offering undergraduates opportunities to explore genomic diversity of novel bacteriophages. Of Lehigh's SEA graduates since 2009, 85% are in STEM post-graduation. STEM-SI was started in Summer, 2021 to scale the highly successful BDSI model at the university level and broaden the potential programmatic impact. Such institutionalization is expected as a follow-on to HHMI funding. The objectives are 1) building a large, STEM-wide community of scholars among participants, with a particular emphasis on engaging underrepresented students; 2) providing opportunities for students to learn about the breadth of activities in STEM at Lehigh and externally through a colloquium series and other events; 3) sponsoring professional development sessions to inform students about the scope of graduate and professional career choices and how to pursue these opportunities; 4) launching a vehicle for faculty that facilitates multidisciplinary collaboration to advance and expand research programs; and 5) building a platform to enhance and strengthen graduate student recruitment. In its inaugural year, STEM-SI has 90 undergraduate participants working with 40 faculty mentors. Student demographics show that participants are 48% women, 52% men, and 61% are underrepresented and/or first generation. The students range from rising sophomores to rising seniors. A comprehensive assessment effort has been implemented. The program is expected to expand in future years.

Disclosures: N. Simon: None. V. Ware: None. S. Kishore: None. R. Sause: None. C. Kusko: None.

Theme J Poster

J007. Education: Promoting Diversity and Inclusion in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J007.05

Topic: J.02. Teaching of Neuroscience

Support: NSF IOS1754986

Title: Promoting Enduring Learning by Connecting Course Content to Community Service

Authors: *M. L. LEMONS;
Assumption Univ., Worcester, MA

Abstract: Service-learning promotes student engagement, development of citizenship, and enduring learning. Here, we describe a service-learning module implemented in an undergraduate 400-level Developmental Biology course at a small liberal arts institution. While students learned about neural crest migration, they also investigated problems that can arise from inappropriate migration, including cleft lip/palate. As part of the community service learning designation of this course, students chose to raise awareness about cleft lip/palate and take steps to help those afflicted with this condition. The class partnered with SmileTrain, the world's largest cleft-focused charity, that offers a sustainable model of treatment. Working with SmileTrain, students designed and executed three primary projects. First, students planned a free, public viewing of a documentary about cleft lip/palate to increase awareness about this disorder. Secondly, students planned a campus event where members in our community made over 80 get-well cards for young patients recovering from free corrective surgery sponsored by SmileTrain. Lastly, students raised funds to donate to SmileTrain by hosting a "Chipotle day", where a local Chipotle restaurant agreed to donate a percentage of proceeds from one day to SmileTrain. Students heavily advertised all events on several forms of social media, fliers on campus, and by wearing T-shirts of their own design that advertised these events. In anonymous course evaluations, students shared that this service-learning course made: 1) course content feel more meaningful, 2) this course (and its concepts) to be memorable and "not soon to be forgotten" and 3) a positive impact on their willingness to engage in community service in the future.

Disclosures: M.L. Lemons: None.

Theme J Poster

J007. Education: Promoting Diversity and Inclusion in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J007.06

Topic: J.02. Teaching of Neuroscience

Title: Diversity and the foundations of neuroscience: introducing essentials of neuroscience in an undergraduate course through the contributions of Japanese neuroscientists and researchers

Authors: *E. P. WIERTELAK;
Psychology and Neurosci., Macalester Col., Saint Paul, MN

Abstract: Introductory neuroscience courses in the undergraduate curriculum are designed so that students will gain a basic understanding of the nervous system, the broad scope of the field of neuroscience and often, its intersections with society-- as may be observed in the arts, entertainment, language and more. A prerequisite-free course was designed to accomplish these goals, while also highlighting the diverse and global nature of progress in neuroscience research. Here, special focus was placed on a single country and culture: the examples that the history of Japan and the pioneering and/or continuing work of a selection of Japanese scientists provide in understanding how the nervous system does all that it does. The success of the approach in an introductory neuroscience class suggests that highlighting history and research of individual countries and regions can be an important component of a modern curriculum in neuroscience that is intentional in seeking to recognize the contributions of the diverse community that is neuroscience research and education. Examples, selected biographies and their relationships with core concepts will be discussed.

Disclosures: E.P. Wiertelak: None.

Theme J Poster

J007. Education: Promoting Diversity and Inclusion in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J007.07

Topic: J.02. Teaching of Neuroscience

Support: NIH Grant R24MH114785
NIH Grant R24MH114799
JHUAPL Internal Research Support

Title: Equitable recruiting of trailblazing early-career STEM leaders through holistic selection and scientific mentorship

Authors: M. CERVANTES, D. SYMONETTE, D. XENES, S. BAXLEY, M. VILLAFANE-DELGADO, E. C. JOHNSON, B. A. WESTER, *W. GRAY RONCAL;
Johns Hopkins Univ. Applied Physics Lab., Laurel, MD

Abstract: The Cohort-Based Integrated Research Community for Undergraduate Innovation and Trailblazing (CIRCUIT) Program recruits exceptional undergraduate students from diverse backgrounds to participate in a high-intensity research, leadership and mentoring program. Our strategy includes encouraging students to apply who are highly capable, but who have faced opportunity gaps or barriers in entering the STEM pipeline (e.g., first-generation college student; low-income, under-resourced, under-represented backgrounds; lack of mentors). By recruiting holistically and eliminating fixed requirements, we are able to reach students who might not have had the opportunity to demonstrate their skills through traditional pathways. Instead, students are

selected based on their need, potential, and commitment. Each student supports impactful research, including neuroimaging and machine-learning projects relevant to the BRAIN Initiative. In general, project placement for trailblazing students seeking their first research opportunity can be challenging, even for motivated mentor teams. To minimize bias and the impact of limited research experience, admitted students share standardized information about both their skills and interests in writing, which project mentors use to prioritize students. Students rank projects by assessing the goals and tasks of the project and related skills. We optimize project placement using the Gale-Shapley algorithm, and manually tune the results to ensure cohort diversity and representation of core skills across the cohort. As part of the program, we provide mentoring and training to facilitate a quality and substantive research outcome. We organically establish project teams that are diverse across many dimensions while recruiting outstanding and highly motivated talent, that otherwise could be overlooked. Our student fellows contribute across many different efforts, including computational neuroscience research within the Block and Object Storage Service Database (bossDB) petascale storage, processing, and analytics ecosystem. This holistic approach could provide a method for other BRAIN Initiative efforts to recruit a diverse cohort of trailblazing undergraduate researchers. Our student community this year includes 75 students from high school, undergraduate and graduate student populations and we are actively seeking new collaborations.

Disclosures: **M. Cervantes:** None. **D. Symonette:** None. **D. Xenos:** None. **S. Baxley:** None. **M. Villafane-Delgado:** None. **E.C. Johnson:** None. **B.A. Wester:** None. **W. Gray Roncal:** None.

Theme J Poster

J007. Education: Promoting Diversity and Inclusion in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J007.08

Topic: J.02. Teaching of Neuroscience

Support: NSF 1624104

Title: Neurocasenet - support for teaching neuroscience with cases

Authors: ***L. ROESCH**¹, P. MARSTELLER², K. FRENZEL¹;

¹Neurosci. & Behavioral Biol., ²Biol., Emory Univ., Atlanta, GA

Abstract: Calls for updating teaching methods in STEM classrooms are not new, and we now have overwhelming evidence that active learning in classrooms promotes student engagement, achievement, and retention in STEM. Case-based teaching methods like Problem Based Learning (PBL) have a long history of supporting learning in highly interdisciplinary settings and are an exciting tool in the neuroscience classroom. While the neuroscience community is large, and there is strong support for neuroscience education within the community, the creation

of case/PBL tools for neuroscience courses and peer-support for teaching with cases has been scattered. In 2016, we created The Neuroscience Case Network (NeuroCaseNet) to train faculty participants in the use, development, and publication of cases for teaching neuroscience. NeuroCaseNet provides collaboration opportunities for instructors with a strong interest in using these pedagogies in the classroom and has fostered publication of novel, peer-reviewed neuroscience case materials, supported new faculty collaborations, and trained novice instructors on case/PBL methods. Here, we summarize the work of NeuroCaseNet fellows, including shared curriculum, online forums, and future directions. With a focus on the use of cases, NeuroCaseNet continues to develop and support engaged educators committed to evidence-based pedagogy for teaching neuroscience.

Disclosures: **L. Roesch:** None. **P. Marsteller:** None. **K. Frenzel:** None.

Theme J Poster

J007. Education: Promoting Diversity and Inclusion in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J007.09

Topic: J.02. Teaching of Neuroscience

Support: SFN Grant 1624104

Title: Developing culturally relevant case studies for neuroscience courses and recruiting events.

Authors: ***K. M. WIENS;**

Bay Path Univ., Longmeadow, MA

Abstract: African American/Black, Hispanic/Latino(a) and Native American/Alaskan Native students interested in science change their major at a higher rate compared to white or Asian students. Two factors that contribute to this discrepancy are 1) a lack of sense of community and inclusion in the classroom and 2) a less developed science identity. Institutions that specifically serve these populations of students graduate significantly more of these students with science degrees because the students are able to develop their science identity within supportive and collaborative environments that help maintain their racial identity. The Joint Working Group on Improving URM Persistence in STEM outlined five recommendations for universities interested in increasing diversity in STEM disciplines. One recommendation is to “fire students’ creative juices” by designing course content that is relevant to student values and experiences; they also state that any changes need to be measured and reported in order to be useful to the scientific community as a whole. The Neuroscience program at Bay Path University (BPU) aims to develop culturally relevant course content that directly relates to African American/Black, Hispanic/Latino(a) and Native American/Alaskan Native student values and experiences, creating a more inclusive environment within the classroom that will help link science identity to

racial identity. We have incorporated culturally relevant case studies into most neuroscience courses. Verbal student feedback indicates that all students enjoy these modules and find it valuable to apply neuroscience content to issues related to diversity, equity, inclusion and social justice. We are a very small institution with an undergraduate population of ~600 students, so we are looking to partner with other institutions to measure the effectiveness of these course modules in increasing the recruitment and retention of African American/Black, Hispanic/Latino(a) and Native American/Alaskan Native students.

Disclosures: K.M. Wiens: None.

Theme J Poster

J007. Education: Promoting Diversity and Inclusion in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J007.10

Topic: J.02. Teaching of Neuroscience

Support: NSF 1624104

Title: Case studies as inclusive teaching tools

Authors: *J. C. WILHELM;
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 a 300-level neurobiology and behavior course, 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. In the role of the physician, 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 cases were designed to not have only one correct answer, but each had multiple approaches that could lead to successful solutions. This approach allowed students to evaluate the cases from diverse points of view and encouraged discussion among students about their differing opinions, leading to a deeper understanding of the content. Students completing the case studies reported an increased confidence in their understanding of the material and well as an increased understanding of the contributions of each of the identities that they played. Students also reported that they felt more confident in their abilities and desire to pursue a STEM related career.

Disclosures: J.C. Wilhelm: None.

Theme J Poster

J007. Education: Promoting Diversity and Inclusion in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J007.11

Topic: J.02. Teaching of Neuroscience

Support: RCN-UBE 1624104

Title: Teaching with cases increases student success when teaching neuronal structure and function in undergraduate Neuroscience and General Biology courses delivered online at Morehouse College

Authors: *V. HAFTEL;
Morehouse Col., Atlanta, GA

Abstract: Neuroscience content is taught in two Spring biology courses: General Biology 112 (GBIO), an introductory course for STEM majors, and Principles of Neuroscience (Neuro), a 300-level biology elective at Morehouse. These courses were modified to improve student engagement and success by teaching with cases developed through NeuroCaseNet at Emory University instead of traditional lecture. The case used has four parts with learning objectives that spanned the concepts of neuronal structure, function, and dysfunction in the face of neuroactive substances. In Neuro in 2020, the case was assigned for homework to supplement lecture, and answers to the case prompts were submitted. In 2021, the case replaced lecture for the portion of the course covering those objectives. Students were given: the case in an adaptive release format through the LMS, learning objectives, slide decks, links to relevant videos and online open access textbook chapters. Students submitted responses to prompts in each part of the case prior to discussing and problem-solving during class. In both semesters, students completed formative and summative assessments (multiple choice, short answer, problem solving, etc.). The first two exams mainly covered concepts in the case. In 2020, the exam average (score of 70% or greater) was 65.9%, with 9/24 (37.5%) passing exam 1, and 74.1%, with 13/23 (56.5%) passing exam 2. In 2021, scores and passing rates on exams covering the same objectives improved with the average score of 74.6%, with 16/21 (76.2%) passing exam 1, and 82.9%, with 20/21 (95.2%) passing exam 2. Assessment in GBIO showed modest improvement. Comparison was made deploying part 1 of the case in the 2019 (in person) and 2021 (online) classes. In 2021, instead of asking students to submit responses to the prompts of the case as in 2019, they were asked to submit a summary of the findings and a reflection on how the concepts in the case would apply to their lives. For equivalent exams, in 2019, the average score was 69.4% (34/67, or 50% passed), while in 2021 the average score improved to 71.9% (35/64, or 54% passed). Course modality may impact student engagement and success. The first half of the 2020 Neuro course

where the relevant material was delivered the class met in person, whereas the entire course was delivered online in 2021. Similar modalities were compared for GBIO (above). Still, many students expressed a preference for in-person courses, and the expectation was that the online environment would negatively affect learning outcomes. In these courses, positive outcomes occurred whether due to the use of cases and methods of student engagement with the material, or other factors yet to be examined.

Disclosures: V. Haftel: None.

Theme J Poster

J007. Education: Promoting Diversity and Inclusion in Undergraduate Neuroscience

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J007.12

Topic: J.02. Teaching of Neuroscience

Support: NSF Grant 2025257
CSUPERB Curriculum Development Grant 2020
CSUDH Office of Undergraduate Research Summer Research Award 2021
CSUDH Faculty Research Grant RSCA 2021

Title: Combining course-based research, high impact educational practices, design thinking and strengths-based coaching to support the next generation of neuroscience researchers

Authors: A. CAMARILLO¹, M. DE LA TORRE², P. A. VIEIRA³;

¹Clin. Sci., ²Biochem., ³Psychology, California State Univ. Dominguez Hills, Carson, CA

Abstract: Historically, there has been a challenge of retaining and graduating students as STEM majors. At CSU Dominguez Hills, a regional, urban, Hispanic-Serving and Minority-Serving Institution with a large number of first-generation college students that receive Pell grants, student persistence and retention is of particular concern. The purpose of this study is to study the efficacy of combining Course-based Undergraduate Research Experiences (CUREs), High-Impact Educational Practices (HIPs), Design Thinking (DT) training and Strengths-based coaching into a First Year Seminar (FYS) course. A diverse group of first-year students from both STEM and non-STEM majors enrolled in a Neuroscience of Hedonism course where they participated in a variety of activities to 1) promote learning of basic neuroscience concepts, 2) conduct a research study using low-cost electrophysiology tools, and 3) support personal and professional development. In addition to studying long-term effects like student retention and persistence rates, we also measure recruitment of non-STEM majors to STEM majors, science identity/literacy, self-efficacy and a variety of career-related attitudes. This pilot study will provide a framework by which STEM departments can create a survey course to recruit

incoming freshmen and encourage retention and persistence in STEM majors and subsequent careers.

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

Theme J Poster

J008. Education: Graduate School

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J008.01

Topic: J.02. Teaching of Neuroscience

Title: Use of UnEssay projects in a graduate neurobiology course

Authors: *S. AMICO-RUVIO;
D'Youville Col., Buffalo, NY

Abstract: Previously in my graduate-level neurobiology course, student learning objectives and outcomes were centered on the five lowest levels of Bloom's taxonomy: remembering, understanding, applying, analyzing, and evaluating. As a complement to this, in the Spring 2020 and 2021 semesters I wanted my students to tackle the highest, sixth level: creating. I aimed for my students to engage with neurobiology material in an imaginative way, and thus my students developed UnEssay projects. UnEssay projects allow students to demonstrate their learning beyond a traditional exam or paper with a medium of their choice, and have increasingly been assigned in various courses at several institutions over the last decade. In my neurobiology course, students were instructed to develop an UnEssay project that could either potentially connect with and educate the general public about neurobiology, or could help future students in the course. Students first chose a topic related to course content or neurobiology as a whole. Students then chose an enjoyable-to-them medium in which to present that material (e.g., podcast, game, song, art, pamphlet, website.) Projects were assessed using a rubric that examined their complexity, accuracy, audience, completeness, medium, and credibility. After project completion, students scored higher on traditional exam questions related to their topics in comparison to students in previous semesters. Additionally, students reported high satisfaction in developing these projects, including providing them with an enjoyable outlet during the stress of the COVID-19 pandemic.

Disclosures: S. Amico-Ruvio: None.

Theme J Poster

J008. Education: Graduate School

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J008.02

Topic:

Support: IBRO-LARC
PEDECIBA

Title: Innovation in virtual formation of Latin American human resources at the intersection of Neuroscience, Artificial Intelligence and Neuroethics, and at the emerging subfield of Neurodiplomacy

Authors: *M. E. CASTELLÓ¹, C. PEREIRA², G. ANLLÓ³, M. GUAL⁴;

¹Neurociencias Integrativas y Computacionales, Inst. Clemente Estable (MEC), Montevideo, Uruguay; ²Consejo de Formación en Educación, Administración Nacional de Educación Pública, Montevideo, Uruguay; ³UNESCO-Montevideo, Montevideo, Uruguay; ⁴SciDipGLOBAL, Mallorca, Spain

Abstract: Latin America recently started a process for its integration into the Brain Initiatives arena. Considering the regional unequal formation of human resources at the intersection of **Neuroscience, Artificial Intelligence -AI- and Ethics**, and global shortcomings in **Science Diplomacy** related to **Neuroscience** required for improving **Neuroscience Advocacy**, we co-organized two regional postgraduate innovative activities: The **IBRO-LARC/PEDECIBA Neuroscience and AI for All Virtual Associate School** and the **Regional PEDECIBA Postgraduate Virtual Course on Science Diplomacy applied to Neuroscience** with the participation of several outstanding international speakers. Almost 90 Latin American undergraduate, graduate, postgraduate, and professionals were selected from 500 applicants. The **Neuroscience and AI for All school involved:** **I)** Three weeks dedicated to **i)** theoretical and practical e-learning on Neuroscience, AI, and Neuroethics by virtual theoretical classes (usually followed by brief questionnaires discussed with Faculty online) and virtual seminars for the presentation of scientific articles in Neuroscience and Artificial Intelligence (presented by subgroups of students and followed by brief general discussions). **ii)** at home hands-on synchronous practical activities on Neuroscience and AI, remotely guided by faculty. Using low-cost Backyard Brains equipment provided by the school, students acquired and analyzed electrophysiological signals (electroencephalogram and electrocardiogram in humans, and action potentials in invertebrates). For Artificial Intelligence, students used a virtual space to work online in the analysis of neurobiological data. **II)** Five weeks dedicated to **i)** work on research projects proposed by students. **ii)** professional development-oriented talks (scientific and grant writing and collaboration in neuroscience). **III)** Presentation of students' projects results, orally -at a homonym **Symposium-**, and written in scientific report format.

The **virtual theoretical-practical Latin American course on Neurodiplomacy** consisted of virtual talks and round tables on Science Diplomacy, and Science Diplomacy applied to Neuroscience (in relation to regional and global Brain Initiatives, the role of Neuroethics in Neuroscience, Neurotechnology, Brain health, and Neurorights).

Students evaluation was both formative and summative promoting the publication of research project results.

We also contributed to the strengths of interdisciplinary human resources to improve Neuroscience education in Uruguay and Latin America because of the participation of teachers of the Uruguayan Education Training Council (ANEP).

Disclosures: M.E. Castelló: None. C. Pereira: None. G. Anlló: None. M. Gual: None.

Theme J Poster

J008. Education: Graduate School

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J008.03

Topic: J.02. Teaching of Neuroscience

Title: Improvement Instrument for the academic achievement of the student in the teaching-learning process in Neurosciences (Deep Electro Movement System for Electroencephalographic Record) multiple histological samples

Authors: *R. BELTRAN-RAMIREZ¹, M. MACIEL ARELLANO², V. LARIOS-ROSILLO², J. ORIZAGA TREJO², J. MARTINEZ-MENDOZA², J. ZEPEDA-GÓMEZ², C. ROMAN², X. BECERRA-GONZÁLEZ², J. DOMÍNGUEZ- RAMIREZ², C. GONZÁLEZ- SANDOVAL²;

¹Univ. de Guadalajara, Zapopan, Mexico; ²Univ. De Guadalajara, Zapopan, Mexico

Abstract: In the neuroscience area, physiological activity is easy to measure when there is a constant fixed point, however this measurement is difficult to obtain if what we are looking for is to map from the cortex to places such as the hippocampus, in which each of the Points on that path may contain important information for understanding the operation of the entire circuit. The use of mobile electrodes is well known, however, the movement is manual, which generates noise generated by the electrical activity of the conventional lines of the work facilities, which generates disturbances of 60Hz at the time of obtaining the signal in addition to the interaction Human behavior can generate situations in which experimentation can be compromised by presenting incidents such as location or depth errors, as well as the manipulation of the subject of experimentation itself can generate stress which can alter the results that are intended to be obtained, for this reason The generation of new technology that allows avoiding this type of errors is of utmost importance since it allows the interaction with the specimen to be minimal, achieving that the process is carried out remotely and without alterations by the experimentation personnel, through the use of of wireless technologies that allows the control of the process with minimal contact to the subject of pr You test. The present invention relates to the technical field of electronics, communication modules, neurological electrical activity, medicine, the conversion of electrophysiological measurements into graphic data and with continuous monitoring, since it provides a movement system for deep electrodes.

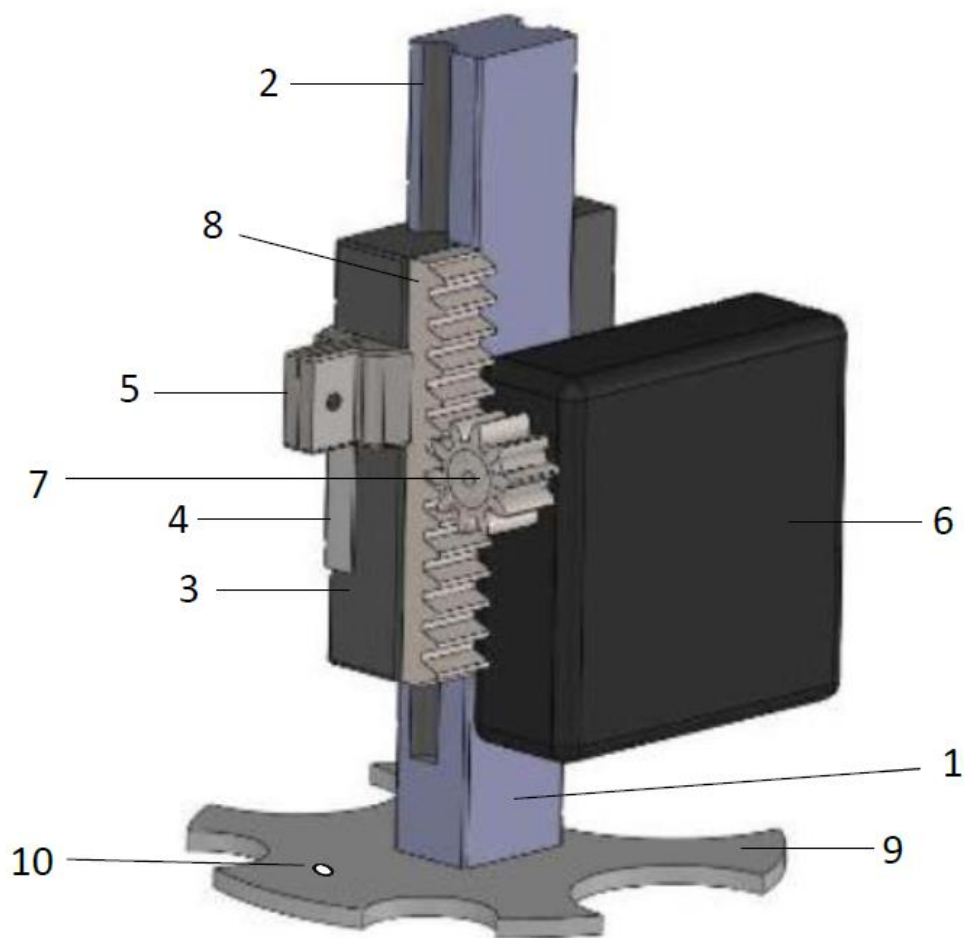


Figura 8

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

Theme J Poster

J008. Education: Graduate School

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J008.04

Topic: J.02. Teaching of Neuroscience

Title: Active learning and application of biostatistics in an R-based introductory course for graduate students in the biomedical sciences

Authors: R. J. REYNOLDS¹, M. DEFENDERFER², R. E. KENNEDY¹, *K. L. GAMBLE³;
¹Univ. of Alabama Birmingham, Birmingham, AL; ²Grad. Biomed. Sci., Univ. of Alabama At Birmingham, Calera, AL; ³Psychiatry and Behavioral Neurobio., Univ. of Alabama at Birmingham, Birmingham, AL

Abstract: Training in statistical analysis is widely recognized by graduate biomedical sciences (GBS) programs as crucial for well-rounded PhD candidates and future success in academics and industry. The SfN Core Competency recommends proficiency in analytical approaches, including experimental design, computer-based data management, data analysis and interpretation. Here, we have designed a fully hands-on approach in teaching introductory biostatistics for second year GBS students. The basic structure of the course consists of 1) in-class lectures on experimental design and statistical theory, 2) an R-based laboratory component, and 3) weekly active learning sessions. Each of these components are built into 13 modules (e.g., Regression, ANOVA, Analysis of Frequency Data, Survival Analysis). Lectures build knowledge of conceptual theory for particular statistical models connected to experimental design, but without mathematics prerequisites. The laboratory provides hands-on experience using the statistical programming language R using relevant data often encountered by PhD students in their program. Students then demonstrate proficiency of this knowledge in the preparation of take-home exams that require them to independently choose the correct statistical model for a real dataset, list assumptions, represent the data graphically, fit the model using R, and interpret the results. Emphasis is placed on reporting results in the format that would be required by a scientific journal. Weekly active learning sessions foster mastery in communicating statistical concepts orally and reinforce conceptual material covered during lecture through review of published articles and oral examinations. During the oral exam, a student presents a hypothetical research problem and hypothesis, identifies the appropriate statistical model for hypothesis testing, graphically demonstrates the predicted results and stated conclusions of the problem. In a chalk-talk format, students are asked questions that focus on alternative strategies for analysis given a different data structure, design and model assumptions. Students completing the course have reported that they have been well prepared for their qualifying exam and are often sought out by colleagues for statistical expertise. We are currently devising methods to test the statistical aptitude of students before and after completing the course. Overall, we believe this innovative course creates an environment conducive to learning a difficult and often ‘scary’ topic for students in a way that is productively applied to dissertation projects.

Disclosures: R.J. Reynolds: None. M. Defenderfer: None. R.E. Kennedy: None. K.L. Gamble: None.

Theme J Poster

J008. Education: Graduate School

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J008.05

Topic: J.02. Teaching of Neuroscience

Title: New Fellowship Improves Teaching Skills for Neuroscience Graduate Students and Postdoctoral Fellows at Northwestern University

Authors: *C. LIN, L. K. SHANAHAN, J. L. PITMAN, G. T. SWANSON;
Northwestern Univ., Chicago, IL

Abstract: The NUIN Teaching Fellowship program (NTF) is an initiative at Northwestern University for neuroscience graduate students and postdoctoral fellows to gain hands-on teaching experience. In spring of 2018, we collected survey data that indicated that graduate students (1) are interested in developing their teaching skills, and (2) would like more opportunities to do so. We developed NTF to provide such an opportunity, and launched the program in fall of 2018. NTF is led by trainees (i.e., students and postdocs), with support from program administration. Through NTF, faculty members with undergraduate teaching responsibilities serve as Faculty Mentors. Trainees can apply to work with Faculty Mentors on their undergraduate neuroscience course as their Teaching Fellow. Teaching Fellows attend the Faculty Mentor's course, and contribute to the course by giving lectures and/or leading discussion sections with guidance from the Faculty Mentor. Teaching Fellows also participate in other teaching-related activities, such as course design, making and grading assessments, and mentoring undergraduate students. So far, NTF has incorporated four Faculty Mentors and trained seven Teaching Fellows. In addition, three new Teaching Fellows have been recruited for the 2021-2022 academic year. All participants have reported overwhelmingly positive experiences with NTF, and Teaching Fellows have unanimously reported enhanced teaching skills. We encourage other graduate programs to incorporate initiatives like NTF to promote pedagogical professional development in STEM fields.* C. Lin and L. Shanahan contributed equally to this work.

Disclosures: C. Lin: None. L.K. Shanahan: None. J.L. Pitman: None. G.T. Swanson: None.

Theme J Poster

J008. Education: Graduate School

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J008.06

Topic: J.02. Teaching of Neuroscience

Title: Introduction of formal fellowship writing training increases the number of submissions and success rate.

Authors: *M. ALLEN, A. M. RAJADHYAKSHA;
Weill Cornell Grad. Sch. of Med. Sci., New York, NY

Abstract: Graduate students require training in multiple areas to successfully compete for faculty positions upon completion of terminal degrees and post-doctoral research positions. Our students reported a need for additional support in the area of fellowship and scientific writing. To address these concerns and provide our students with a well-rounded education that supports future endeavors, Weill Cornell Graduate School of Medical Sciences developed the Office of Fellowships and Scientific Writing. This office employs dedicated staff that create interactive, dynamic seminars to teach fellowship writing to our trainees. This office hosts 4 eight-week long seminars each year to train students how to write fellowships for the National Science Foundation Graduate Research Program and the NIH National Research Service Award (F31). The seminars source materials from the NIH, professional grant writing consultants, and the literature to ensure that trainees receive the most rigorous and up to date information. In addition, the dynamic lectures combine didactic sessions with peer review of participants' proposals. All student participants are offered one-on-one consultations with a PhD level scientist, not affiliated with the thesis lab, for individualized edits of their fellowships. Since the start of this new programming we have seen an increase in total number of submissions as well as overall success rate. Surprisingly, we have also experienced an increase in the variety of awards to which our students apply. In conclusion, programs implemented by the central graduate school that supplement scientific bench training positively influence the education of PhD students from neuroscience as well as other disciplines. These sessions also promote cross-disciplinary discussion that sharpens students' scientific communication skills and prepare them for future professional service. Here we discuss the format of the program, the content presented, as well as the outcomes used to analyze success.

Disclosures: M. Allen: None. A.M. Rajadhyaksha: None.

Theme J Poster

J008. Education: Graduate School

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J008.07

Topic: J.02. Teaching of Neuroscience

Title: Factors That Influence Career Choice among Different Populations of Neuroscience Trainee

Authors: L. E. ULLRICH¹, J. R. OGAWA¹, *M. MATTHEWS², M. D. JONES-LONDON¹;
¹Natl. Inst. of Neurolog. Disorders and Stroke, Rockville, MD; ²Office of Programs to Enhance Neurosci. Workforce Diversity, Natl. Inst. of Neurolog. Disorders and S, Rockville, MD

Abstract: Specific groups have historically been, and continue to be, underrepresented in the biomedical research workforce, especially academia. Career choice is a multifactorial process that evolves over time; among all trainees, expressed interest in faculty research careers decreases over time in graduate school, but that trend is amplified in women and members of historically underrepresented racial and ethnic groups (Golde and Dore, 2004; Fuhrmann et al., 2011; Sauermann and Roach, 2012; Gibbs et al., 2014; Roach and Sauermann, 2017). This work was designed to investigate how career interest changes over time among recent neuroscience PhD graduates, and whether differences in career interests are associated with social identity, experiences in graduate school and postdoctoral training, and personal characteristics. We report results from a survey of 1479 PhD neuroscientists (including 16% underrepresented scientists and 54% women scientists). We saw repeated evidence that individual preferences about careers in general, and academic careers specifically, predict current career interest. These findings were moderated by social identity and experiences in graduate school and postdoctoral training. Our findings highlight the important influence of the advisor in shaping a trainee's career path, and the ways in which academic culture is perceived as unwelcoming or incongruent with the values or priorities of certain groups. They suggest several areas for positive growth, ways to change how we think about the impact of mentorship, and policy and programmatic interventions that extend beyond trying to change or "fix" the individual and instead recognize the systemic structures that influence career choices. Golde C, Dore TM (2004) The survey of doctoral education and career preparation: the importance of disciplinary contexts. In: Paths to the professoriate: strategies for enriching the preparation of future faculty (Wulff DH, Austin AE, eds), Chap 2. San Francisco: Jossey-Bass. Fuhrmann CN, Halme DG, O'Sullivan PS, Lindstaedt B (2011) Improving graduate education to support a branching career pipeline: recommendations based on a survey of doctoral students in the basic biomedical sciences. CBE Life Sci Educ 10:239-249. Sauermann H, Roach M (2012) Science PhD career preferences: levels, changes, and advisor encouragement. PLoS One 7:e36307. Gibbs KD, McGready J, Bennett JC, Griffin K (2014) Biomedical science Ph.D. career interest patterns by race/ethnicity and gender. PLoS One 9:e114736. Roach M, Sauermann H (2017) The declining interest in an academic career. PLoS One 12:e0184130.

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

Theme J Poster

J008. Education: Graduate School

Location: Virtual Only

Time: Wednesday, November 10, 2021, 3:30 PM - 4:30 PM

Program #/Poster #: J008.08

Topic: J.02. Teaching of Neuroscience

Support: NSF Grant DGE-1922598

Title: Building transdisciplinary training capacities to create convergent research and develop translational innovations aimed at disability-related challenges

Authors: *D. V. SCARTON¹, R. LEUNG², J. K. MBUYA³, H. C. MATTO^{2,4}, H. S. RANGWALA^{3,4}, J. C. THOMPSON^{5,4}, N. PEIXOTO^{6,4}, P. SESHAIYER^{7,4}, S. CARMACK⁴, S. SIKDAR^{8,4};

¹Interdisciplinary Program in Neuroscience, Col. of Sci., ²Dept. of Social Work, Col. of Hlth. and Human Services, ³Dept. of Computer Science, Col. of Engin. and Computing, ⁴Ctr. for Adaptive Systems of Brain-Body Interactions, ⁵Dept. of Psychology, Col. of Engin. and Computing, ⁶Dept. of Electrical and Computer Engineering, Col. of Engin. and Computing, ⁷Dept. of Mathematical Sciences, Col. of Sci., ⁸Bioengineering, George Mason Univ., Fairfax, VA

Abstract: Chronic disability is one of the United States' most challenging health problems. Recent studies suggest that one in four adults live with a disability. The NSF Research Traineeship (NRT) program at George Mason University's Center for Adaptive Systems of Brain-Body Interactions (CASBBI) is cross-training graduate students to understand the fundamental causes of a given disability, address relevant environmental factors within their social-ecological context, and develop innovative transdisciplinary solutions with community stakeholders to improve the science and impact society. As part of the CASBBI NRT program, students work in teams to complete a one-year community-engaged design project. Here we describe the activities and experiences of one graduate student team composed of 3 students representing neuroscience, computer science, and social work disciplines. The students engaged in rapid team formation and project ideation through complementary interactive activities during an intensive 4-week boot camp that featured instruction in team science, team chartering, communication, design thinking techniques, and data science workshops. The team is currently engaged in structured activities to develop community partnerships and a research project focused on continuity of care within the opioid use epidemic. The CASBBI NRT program is an innovative, comprehensive graduate education approach that offers enhanced research and educational opportunities compared to traditional curricula in graduate neuroscience scholarship.

Disclosures: D.V. Scarton: None. R. Leung: None. J.K. Mbuya: None. H.C. Matto: None. H.S. Rangwala: None. J.C. Thompson: None. N. Peixoto: None. P. Seshaiyer: None. S. Carmack: None. S. Sikdar: None.

Theme J Poster

J003. Teaching of Neuroscience: K-12

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:30 PM - 2:30 PM

Program #/Poster #: J003.01

Topic: J.02. Teaching of Neuroscience

Support: Dana Foundation BAW Funding 2021

Title: A Virtual K-12 Neuroscience Education Outreach Program: Encouraging the Next Generation

Authors: *V. SARAVANAPANDIAN¹, T. WISHARD², J. E. MONDELLO³;

¹Psychiatry, ²Neurosci., ³Psychology, UCLA, Los Angeles, CA

Abstract: In order to build a scientifically literate society, scientists must be able to communicate science to the general public. Sponsored by UCLA's Brain Research Institute (BRI), Brain Awareness Week (BAW) is a student-run science education outreach program that aspires to impart neuroscience knowledge to K-12 students in low-income schools throughout the Los Angeles Unified School District. Each year, BAW brings together over 100 UCLA students, staff, and faculty and supports over 300 K-12 student participants. UCLA student volunteers design interactive and engaging lesson plans to teach a variety of neuroscience concepts. While our annual BAW, through in-person interactive activities, has shown to be successful, this year we wanted to evaluate if we could conduct a successful event in a virtual setting. We had a large number of K-12 student participants (N=205) from diverse backgrounds: Hispanic or Latino (43.5%), American Indian or Alaska Native (4.1%), Asian (15.9%), Black or African American (9.4%), and White (34.7%). We utilized digital classroom resources paired with pre-designed hands-on science experiment kits (delivered to students before the virtual event), that enabled students to participate in a series of interactive presentations including neurodiversity, sleep and dreams, and neurotechnology. We collected written feedback from K-12 students with neuroscience quizzes and surveys before and following our event. Preliminary analysis of pre/post-presentation surveys revealed that our virtual BAW has been effective in 1) teaching neuroscience to a young audience and 2) increasing interest in science education. Additionally, feedback surveys from student volunteers demonstrated that they had a better understanding of the topic they chose to present to K-12 students. These presentations will be made available online to be utilized from classrooms anywhere. As BAW is limited by the number of students we can typically accommodate at the on-campus event, our successful virtual event holds promise in reaching a much larger audience in future. With continued efforts, we hope to achieve a broad impact on society by raising scientific literacy and interest.

Disclosures: V. Saravanapandian: None. T. Wishard: None. J.E. Mondello: None.

Theme J Poster

J003. Teaching of Neuroscience: K-12

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:30 PM - 2:30 PM

Program #/Poster #: J003.02

Topic: J.02. Teaching of Neuroscience

Support: NIH SEPA Grant GM132961
NSF HRD 1826763
University of Kentucky Chellgren Endowment

Title: START program for underrepresented communities: adapting to the COVID-19 pandemic.

Authors: ***L. H. BRADLEY**¹, A. P. SINAI², F. WILLIAMS³, J. A. BRADLEY³, M. MOHR-SCHROEDER⁴;

¹Neurosci., ²Microbiology, Immunology, and Mol. Genet., Univ. of Kentucky Col. of Med., Lexington, KY; ³Univ. of Kentucky, Lexington, KY; ⁴STEM Educ., Univ. of Kentucky Col. of Educ., Lexington, KY

Abstract: The STEM Through Authentic Research and Training (START) Program is an university-community partnership integrating academic, social, and professional experiences to build a pipeline into college for first generation and traditionally underrepresented students, by providing year-round authentic research experiences, opportunities, and professional development for high school students and teachers. While the long-term effects are still to be determined, the disruption of in-person education due to the COVID-19 pandemic has adversely and disproportionately affected students from low income, first generation college, and traditionally underrepresented populations. This pandemic has also illustrated the importance and need for the recruitment of traditionally underrepresented populations in STEM to address health disparities, gaps in access to opportunity, and increase public STEM literacy. To reach students distantly, the START Program has worked with our Fayette County public school partners, as well as expanding to local after school programs and home school students to provide content to over 400 students through: engaging virtual laboratory tours from the University of Kentucky and community partners, “meet a scientist” discussions, and online near-peer student neuroscience demonstrations. In addition, to provide students with hands-on opportunities, the START Program has partnered with Higher Orbits to provide at home learning kits, for students to learn and develop teamwork, communication, and STEM principles while interacting and engaging in online content with teachers and professionals. Finally, the START Program has also moved its training platforms online, including receiving College Reading and Learning Association (CRLA) Peer Educator accreditation for our near-peer mentoring training. Collectively, the changes made to the START Program during the pandemic have resulted in the program reaching more students in the community than imagined and being better positioned to address this critical need in STEM and neuroscience education.

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

Theme J Poster

J003. Teaching of Neuroscience: K-12

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:30 PM - 2:30 PM

Program #/Poster #: J003.03

Topic: J.02. Teaching of Neuroscience

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

Title: Advancing high school research exposure through BRAINYAC: Brain Research Apprenticeships In New York At Columbia

Authors: *D. H. LI¹, B. M. SILVER^{1,2}, P. PATEL¹, K. E. REMOLE¹, J. IMBIMBO^{1,3}, A. M. MAYERS¹, D. SHOHAMY¹, P. L. CROXSON¹;

¹Zuckerman Inst., ²Dept. of Psychology, Columbia Univ., New York, NY; ³Evaluation Saavy, Brooklyn, NY

Abstract: Early exposure to authentic and meaningful experiences in scientific research can play a large role in future intent to pursue a career in science, technology, engineering, and math (STEM) fields. We present the BRAINYAC program, in which high school students from low-resourced backgrounds and traditionally underrepresented groups complete mentored summer research internships in neuroscience laboratories at Columbia University.

BRAINYAC is hosted by Columbia University's Zuckerman Institute, a neuroscience research institute located in a geographical area (upper Manhattan and the South Bronx), which contains neighborhoods with many challenges in terms of income, disability, and academic performance. These populations are also primarily composed of individuals who have been minoritized in STEM at every level of education.

Our aims are to: 1) recruit and retain high-potential students from low-resourced neighborhoods, with a focus on underrepresented minorities; 2) foster science skills and confidence in BRAINYAC students; 3) support students' career development and college applications. To achieve these aims, we recruit the majority of our students from low-income neighborhoods in the Bronx and upper Manhattan through an inclusive application process. Students complete preparatory coursework during the spring semester to strengthen their confidence, technical skills, and tools for navigating academia. They then complete summer mentored research internships.

Over the past years, at least 80% of our students have been from minoritized groups. Ongoing mixed-methods research including survey data and focus groups shows the impacts of BRAINYAC on students' identity and self-efficacy in STEM. We achieve successful recruitment and high retention rates through a combination of strategies creating an ecosystem of support for not only our students but also our mentors. We provide culturally responsive mentor training to enhance our mentors' ability to cultivate meaningful and positive relationships with their mentees. In addition to direct mentorship, our students benefit from BRAINYAC's partnerships with other programs that bolster college and career readiness, the offer of stipends on par with external employment opportunities, near peer mentoring from program alumni, and fellowships to support continued work in host laboratories.

Disclosures: D.H. Li: None. B.M. Silver: None. P. Patel: None. K.E. Remole: None. J. Imbimbo: None. A.M. Mayers: None. D. Shohamy: None. P.L. Croxson: None.

Theme J Poster

J003. Teaching of Neuroscience: K-12

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:30 PM - 2:30 PM

Program #/Poster #: J003.04

Topic: J.02. Teaching of Neuroscience

Title: Evaluating the educational effectiveness of a neuroscience outreach program for middle school students

Authors: A. SHEHADEH¹, A. WURSTER¹, K. VANRIPER¹, P. BECK¹, *K. PORTER-STRANSKY¹, P. J. VOLLBRECHT²;

¹Western Michigan Univ. Homer Stryker MD Sch. of Med., Kalamazoo, MI; ²Biomed. Sci., Western Michigan Univ. Sch. of Med., Kalamazoo, MI

Abstract: Scientific outreach events are assumed to benefit the community, but educational outreach events often fail to evaluate their own effectiveness. Indeed, a challenge for such events is assessing the educational impact these events have on the target audience. Brain Explorers is a neuroscience outreach program that focuses on creating accessible and assessable opportunities for middle schools to increase student interest in STEM and provides medical students an opportunity to practice scientific communication skills and teaching. The purpose of this study was to assess the educational effectiveness of a Brain Explorers lesson plan on middle school students' knowledge of neuroscience concepts. Learning objectives were derived from the Next Generation Science Standard MS-LS1-8, which states "students who demonstrate understanding can: gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories." Neuroscience topics related to this learning standard were presented through an introductory presentation followed by three hands-on application activities. To assess the level of learning, middle school participants were asked two free-response questions, both before and two weeks after the session. One question was covered in the content presented in the lesson and actively reinforced, while the control question was not a focus of the lesson. Investigators rated deidentified student responses using a rubric. Investigators were blind to whether the response was given before or after the session. To assess learning outcomes, ratings were averaged and analyzed using a t-test. Of the 71 students that took the pre-event quiz, 58 students completed the post-event quiz. Student scores for the question related to content discussed during the event significantly improved, whereas scores for the control question did not. The results of this study demonstrate that participating middle school students achieved learning advances from the session, even 2 weeks after the visit, demonstrating the educational effectiveness of this outreach program. This lesson

plan serves as an effective, assessable model for future outreach events and can be used by other scientists participating in neuroscience outreach.

Disclosures: A. Shehadeh: None. A. Wurster: None. K. VanRiper: None. P. Beck: None. K. Porter-Stransky: None. P.J. Vollbrecht: None.

Theme J Poster

J003. Teaching of Neuroscience: K-12

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:30 PM - 2:30 PM

Program #/Poster #: J003.05

Topic: J.02. Teaching of Neuroscience

Title: Brain Explorers: Developing a neuroscience outreach program focused on creating accessible and assessable neuroscience lessons while building science communication skills.

Authors: *P. J. VOLLBRECHT, K. A. PORTER-STRANSKY;
Biomed. Sci., Western Michigan Univ. Homer Stryker M.D. Sch. of Med., Kalamazoo, MI

Abstract: Increasing numbers of scientists are engaging in outreach through classroom visits and open-house style events held at their institution. Unfortunately, most outreach efforts fail to apply the same rigor to their outreach as they do to their primary research interests. The Brain Explorers Program is an educational outreach program with four primary goals. First, provide exciting and accessible science experiences for middle school students. Second, to assess the effectiveness of science outreach in reaching underrepresented groups and those with less enthusiasm for science. Third, provide an opportunity for medical students to improve their science communication skills. Fourth, to create easily replicated lessons for use with middle school students either by teachers or others involved in outreach activities.

The Brain Explorers Program teams undergraduate medical students with neuroscience faculty and middle school teachers to create lessons targeting 7th and 8th grade students. Lesson plans are required to include specific learning objectives, materials lists, and event timelines. Middle schoolers are asked to complete a survey prior to the initial Brain Explorers visit to determine attitudes towards science and neuroscience content knowledge. At least two weeks following the final visit to a classroom, students are asked to complete the same survey, providing pre/post data for program visits. Collection of demographic and science attitudes data provides insight into who is being reached by varying event types and location. Assessment of our outreach activities is critical for their continued success. Medical student instructors also provide reflections on their participation in the program. Qualitative analysis of these responses will allow us to evaluate whether instructors perceive improvements in their ability to communicate difficult topics to non-experts. Most news outlets target a reading/comprehension level of 8th grade, making an ability to communicate at this level particularly valuable for future physicians who will be on the front line of science communication. Finally, medical students are asked to

formalize their lesson plans using a lesson plan template so that the lesson can be utilized by teachers or others involved in science outreach in the future without input from the creating students. The Brain Explorers Program is an example of mutually beneficial community partnership with local school districts that creates engaging, accessible, and assessable neuroscience lessons while providing an opportunity for undergraduate medical students to reflect on and improve their science communication skills.

Disclosures: **P.J. Vollbrecht:** None. **K.A. Porter-Stransky:** None.

Theme J Poster

J003. Teaching of Neuroscience: K-12

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:30 PM - 2:30 PM

Program #/Poster #: J003.06

Topic: J.03. Public Awareness of Neuroscience

Title: Assessment of an online neuroscience educational outreach program for high school students

Authors: *B. PUDER¹, **M. DANIAL**², A. AILOJE², V. NGUYEN², K. SHELOPAL², A. WESTERLUND², C. SVID²;

¹Samuel Merritt Univ., Oakland, CA; ²Touro Univ., Vallejo, CA

Abstract: In-person neuroscience educational outreach programs have been successfully conducted for many years. The onset of the COVID-19 pandemic resulted in a transition to an online educational outreach format. The online format provided a platform that allowed continued educational connection and engagement with the community. Studying the effectiveness of an online neuroscience educational program can guide future educators to create effective programs and methods to support successful online community engagement and student learning. It was hypothesized that the creation of the online educational program would be effective and correlate with improvements in test performance regarding the neuroscience presented topics. To test this hypothesis, 4 neuroscience learning stations were created and presented in ZOOM breakout rooms to health academy high school students. Each neuroscience topic included a presentation and activity. The neuroscience presentations and activities were developed by students enrolled in a Masters in Medical Health Science program. Each ZOOM breakout room neuroscience station learning experience was 20 minutes in length and all high school students participated in all 4 neuroscience presentations. Tests were administered before and after each neuroscience topic presentation to the student participants. The pre and post tests contained questions relevant to the neuroscience topic. Each pretest was identical to its paired topic post test. The results of the paired t -tests revealed that two of the four neuroscience topic stations showed statistically significant differences between students' pre-test and post-test scores, and two stations showed no statistically significant findings. Additionally, none of the 54

high school students participated in the online qualitative survey designed to assess perceptions of the neuroscience topics and the overall program. Data from this study will assist in the design for future neuroscience online educational outreach programs.

Disclosures: **B. Puder:** None. **M. Danial:** None. **A. Ailoje:** None. **V. Nguyen:** None. **K. Shelopal:** None. **A. Westerlund:** None. **C. Svid:** None.

Theme J Poster

J003. Teaching of Neuroscience: K-12

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:30 PM - 2:30 PM

Program #/Poster #: J003.07

Topic: J.03. Public Awareness of Neuroscience

Title: Designing Lasting, Widely Available Digital Engagement Tools for STEM-Neuroscience Outreach

Authors: ***L. E. DIONISIO**, W. E. BABIEC;
UCLA, Los Angeles, CA

Abstract: UCLA's Project Brainstorm (<http://www.bri.ucla.edu/outreach/project-brainstorm>) is an undergraduate outreach class and major capstone aimed at raising STEM career awareness to underprivileged populations by teaching neuroscience-based topics in Los Angeles' K-12 schools. With the COVID-19 pandemic preventing in-person instruction, like many other outreach-based programs, Project Brainstorm designed lesson plans and activities for remote usage. Over several months, 8 students planned, built, and refined digital projects for distribution via computer and ideally cell phone to students in school and out-of-school learning environments using three information-sharing formats : 1) constructing a 'Bitmoji Laboratory' whereby a user follows a Bitmoji-app-customized avatar that leverages hyperlinked Google Slides integrated with music, video, and infographics, to self-navigate in an environment explaining a neuroscience-related topic, for example, Alzheimer's Disease, Neurodiversity, or Sleep; 2) utilizing the 'Kahoot!' online quiz platform to present information on several topics--such as the neuroscience of bilingualism and the neuroscience of history--followed by a question-and-answer game-style learning; and 3) creating several online infographics which provide facts and references across biological concepts ranging from the neuroscience of brain freezes to eating disorders. Therefore, these three types are easily accessible through the Project Brainstorm website for students to visit and return to on their own accord or to be freely used as a supplement to school curriculum and in-person instruction. When in-person outreach resumes, integration of these digital tools with in-person school visits will allow for students to expand their experience with a topic and share their outreach experience with family and friends alike.

Disclosures: **L.E. Dionisio:** None. **W.E. Babiec:** None.

Theme J Poster

J003. Teaching of Neuroscience: K-12

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:30 PM - 2:30 PM

Program #/Poster #: J003.08

Topic: J.03. Public Awareness of Neuroscience

Support: Stiles-Nicholson Foundation
Palm Health Foundation
South Florida Science Center and Aquarium
Heidenreich Foundation
Impact the Palm Beaches

Title: Advancing STEM-Community Engagement through Neuroscience Discovery (ASCEND): Developing youth interest in neuroscience and its careers

Authors: *N. L. BAGANZ^{1,2}, C. O. BENNICÉ¹, D. A. CINALLI, JR¹, R. D. BLAKELY^{1,2};
¹Stiles-Nicholson Brain Inst., ²Charles E. Schmidt Col. of Med., Florida Atlantic Univ., Jupiter, FL

Abstract: According to the U.S. National Report Card, only one out of three middle schoolers scores at or above proficiency in STEM (Science, Technology, Engineering, and Math), and the statistics are even worse for low-income children who attend Title I schools. Furthermore, student interest in pursuing STEM-related education falls sharply during middle school. The Florida Atlantic University Stiles-Nicholson Brain Institute (SNBI) is addressing the national shortage in STEM career-oriented students with ASCEND (Advancing STEM-Community Engagement through Neuroscience Discovery), a novel and innovative program targeting middle school students in south Florida. Established in 2017, the ASCEND program is designed and led by trained scientists with a passion for science communication and aims to bring neuroscience education to young minds in Palm Beach County, specifically in the city of Jupiter. ASCEND is a broad, umbrella program that features multiple branches, including a neuroscience mini-camp, *BrainSparks*, and a semester-long, after-school program, *NeuroExplorers*. During lessons with their neuroscientist leaders, students have the opportunity to dissect a brain and become familiar with basic science concepts, for example how electricity and chemicals work together as the brain's language of communication. The ASCEND teaching team comprises graduate and postdoctoral neuroscience trainees who develop and deliver curriculum in the form of fun and engaging activities and lessons using a combination of in-person lectures, online media, and virtual reality applications. The team also works in partnership with the South Florida Science Center and Aquarium, taking advantage of the *Journey through the Human Brain* permanent exhibit developed in collaboration with the SNBI. The ASCEND program was launched in Jupiter, Florida, and recently expanded to include another branch, *MobileMinds*, designed to take

ASCEND lessons on the road to deliver directly to schools more broadly in Palm Beach County. *MobileMinds* allows the SNBI to reach students whose participation in Jupiter-based ASCEND programs may be limited by means and/or distance to travel to Jupiter.

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

Theme J Poster

J003. Teaching of Neuroscience: K-12

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:30 PM - 2:30 PM

Program #/Poster #: J003.09

Topic: J.03. Public Awareness of Neuroscience

Support: Kentucky Academy of Science Grant

Title: Neuroscience educational outreach in eastern Kentucky, 2020-2021

Authors: *I. M. WHITE, G. C. CLARK, H. DANIELS, J. JACOBS, W. BEUCK, W. WHITE; Morehead State Univ., Morehead, KY

Abstract: The primary goal of our Neuroscience educational outreach program is to disseminate neuroscience information and promote brain health in eastern Kentucky through lectures and presentations of research outcomes. From fall 2019-spring 2021, we exceeded our goal to reach 3000 people through visits to schools (9th-12th grades) and virtual lectures, a brain drawing contest (K-12th grades), and the Kentucky Brain Bee (9th-12th grades). Unlike previous years when our visits were extended to elementary through high school (4th-12th), from fall 2019 our school visits and lectures were limited to high schools. Lectures focused on the effects of alcohol, opiates, and psychostimulants on brain function and behavior, as well as on research outcomes from neuroscience labs. The Brain Drawing Contest is designed to enhance brain awareness among students (K-12th), through collaborative efforts in the community—among teachers, parents, and administrators in four counties. We have received over 500 entries with themes specific to each grade. Judging was based on originality, scientific accuracy, and overall design. A group of judges included twelve student judges and seven faculty members from different disciplines, and a community representative participated in preliminary and final award judging. The Kentucky Brain Bee was held successfully in early February 2020, and the winner participated in the National Brain Bee held in April 2021. Eastern Kentucky is the primary service region of Morehead State University. Continuing participation and support from the community reflects an important impact of the Neuroscience outreach and education program on eastern Kentucky.

Disclosures: I.M. White: None. G.C. Clark: None. H. Daniels: None. J. Jacobs: None. W. Beuck: None. W. White: None.

Theme J Poster

J004. Education: College I

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:45 PM - 2:45 PM

Program #/Poster #: J004.01

Topic: J.02. Teaching of Neuroscience

Title: Exploring Gustation: Supertaster Activity and Results for Introductory Undergraduate Neuroscience Courses

Authors: *A. HAWTHORNE;

Burnett Sch. of Biomed. Sci., Univ. of Central Florida, Orlando, FL

Abstract: Neurobiology ZOO 3744 is our introductory undergraduate neuroscience course in the Burnett School of Biomedical Sciences at the University of Central Florida. The honors section typically is about 20 students, while the regular fall or spring section is about 200-300 students, from first year in college to seniors in a variety of majors. Biology is the pre-requisite. Topics the class covers include cell types, anatomy, action potential, neurotransmitters, and the senses. To engage students and increase their understanding of taste during our chapter on gustation, I used an activity for students to discover what type of taster they are: hypotaster, normal taster or supertaster. The activity is based on the research from Dr. Linda Bartoshuk (Bartoshuk et al., 1998) and taste testing procedures found online (such as Science Buddies, 2012). We first discuss general anatomy of the tongue, papillae and taste buds. The type of tasters are described, and students are asked to hypothesize what type of taster they are based on their eating preferences. Then, students use blue food coloring to paint the tip of their tongues. They apply a binder ring reinforcer as an area guide. Students take a photograph and count their fungiform papillae and not the filiform papillae. This activity helps students to differentiate the different papillae on the tongue. The number of fungiform papillae determines what type of taster they are. Students report their answers, and the graph with aggregate results is shared with the class. There is an option to opt out if for any reason they do not wish to do the activity. Pre-COVID-19 this activity was done in class. Since COVID-19, we discuss the activity in class, and I made a video of myself doing the activity. Students can complete the activity at home and report their results on our webcourse. There is also an exam question on the activity. Class survey results, exam question results and student feedback over multiple semesters will be shared. In the large class, results usually approximate the expected 25% hypotaster, 50% normal taster, 25% supertaster. Student feedback is generally positive and enthusiastic. This is often one of the favorite things we do in the class. This activity can enhance student engagement and can be used

in a variety of classroom settings, including larger classrooms (with teaching assistants or volunteers to help) or online.

Disclosures: A. Hawthorne: None.

Theme J Poster

J004. Education: College I

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:45 PM - 2:45 PM

Program #/Poster #: J004.02

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 class.

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 resulting from bilateral parietal lobe damage. In this interrupted case study designed for use in an upper-level undergraduate neuroscience class, students assess the symptomology of this condition and build on prior knowledge of classically described 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 in the creation of visual perception. This case study was assessed for achievement of learning outcomes and quality of student experience 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. The Neuroscience Case Network is supported by an NSF RCN-UBE grant, award # 1624104

Disclosures: D.G. Ehlinger: None.

Theme J Poster

J004. Education: College I

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:45 PM - 2:45 PM

Program #/Poster #: J004.03

Topic: J.02. Teaching of Neuroscience

Support: Cornell University, Center for Teaching Innovation
Cornell University, Neurobiology and Behavior
Hobart William Smith Colleges, Biology

Title: Student construction and use of an inexpensive fluorescence microscope for dynamic calcium imaging

Authors: J. RYAN¹, *B. JOHNSON², D. DEITCHER²;

¹Biol., Hobart and William Smith Colleges, Geneva, NY; ²Neurobio. and Behavior, Cornell Univ., Ithaca, NY

Abstract: We are designing low cost, Do-It-Yourself (DIY) student laboratory equipment to expand the teaching, learning and research toolbox for students and faculty. Here we describe student construction, use and assessment of our DIY fluorescence imaging microscope. Lecture material, readings and online resources introduced principles of fluorescence microscopy and *Drosophila* neurogenetics. This was followed by laboratory class sessions with teams of 2-3 students building their own imaging microscope, guided by pre-recorded build videos and assistance from course instructors. Student teams assembled their microscopes with the following parts: 20X objective lens, appropriate excitation and emission filters and dichroic mirror, CMOS camera, 3-D printed holders and housings for these parts, and a student-built LED light source. Teams tested their microscope function by collecting images from prepared slides showing GFP fluorescence in fly synaptic boutons. They analyzed images for fluorescence intensity and adjusted and colorized images with ImageJ. In another lab session, teams acquired images from living fly larval preparations in two simple experiments. These experiments compared fluorescence intensity before and during application of a high potassium saline that: 1) released GFP labelled neuropeptide in fly synaptic boutons, and 2) activated glutamate neurons labelled with GCaMP. Student assessment of the microscope build and use was conducted for two Spring 2021 laboratory courses (28 students total) at Cornell University (BioNB/BME/ECE, Principles of Neurophysiology and BioNB 4300, Experimental Molecular Biology). Students rated statements that addressed the following topics: knowledge of fluorescence imaging principles, affective experience of building and understanding the instrumentation, working in teams and clarity of guidance during the imaging sessions. All statements were rated highly positive by students. We continue our efforts to create interdisciplinary classrooms where students gain confidence to build and understand their tools to solve biological questions as future neuroscientists.

Disclosures: J. Ryan: None. B. Johnson: None. D. Deitcher: None.

Theme J Poster

J004. Education: College I

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:45 PM - 2:45 PM

Program #/Poster #: J004.04

Topic: J.02. Teaching of Neuroscience

Support: URSCA Student Grant

Title: Spatial memory and learning in crickets as a tool for engaged learning

Authors: *A. CHEVRIER, D. C. DAY, K. KNIGHTON, J. O. TAYLOR;
Dept. of Behavioral Sci., Utah Valley Univ., Orem, UT

Abstract: Conducting research is a vital skill to develop in future generations of scientists—one that is best learned through practice. The Behavioral Science Department at Utah Valley University has limited opportunity for student research experience as there are no formal research labs. Students with a future in science can greatly benefit from learning the necessary skills associated with designing and running a research project. This project focused on teaching students to apply research methods and techniques that they would otherwise not have the opportunity to become familiar with through practice. This was achieved by creating a project that created an opportunity for engaged learning for the students involved in the study and additionally creating a framework for future students to run research. The research in this project focused on the conditioning of cricket behavior to gain a better understanding of spatial memory and learning in crickets. Students first developed a basic protocol which was based on existing literature regarding cricket behavior. Throughout the course of the study, students met with their mentor to discuss and analyze the data, as well as develop ideas for alterations to the study. Due to various challenges, it was necessary to change the protocol many times including changes to the apparatus, animal husbandry practices, operationalization of learning and measurement of behavior, and considerations of motivations. However, after many different adaptations, a successful protocol was finally created. This project focused on the development of this protocol because of its importance not only in its role of teaching the students who developed it about research techniques, but also because of its potential as a teaching tool for future students who can use adaptations of this protocol to research behavioral, pharmacological, and biological manipulations in crickets.

Disclosures: A. Chevrier: None. D.C. Day: None. K. Knighton: None. J.O. Taylor: None.

Theme J Poster

J004. Education: College I

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:45 PM - 2:45 PM

Program #/Poster #: J004.05

Topic: J.02. Teaching of Neuroscience

Support: NIH Grant 1RF1MH120679-01

Title: Connectomics in the classroom: Introducing students to neuroscientific principles using the *Drosophila* Female Adult Fly Brain electron microscopy data set.

Authors: A. BELLEMER¹, B. BARRAGAN², K. WHITTENBURG³, M. WILTON⁴, E. GONZALEZ-NINO⁴, T. KAZIMIERS⁵, J. H. SIMPSON⁴, J. E. OSBORNE³, D. D. BOCK⁶, A. M. DACKS⁷, *K. J. COLODNER⁸;

¹Dept. of Biol., Appalachian State Univ., Boone, NC; ²George W. Bush New Tech. Odessa High Sch., Odessa, TX; ³Innovation Dept., Ector County Independent Sch. District, Odessa, TX;

⁴Dept. of Molecular, Cell. and Developmental Biol., Univ. of California, Santa Barbara, Santa Barbara, CA; ⁵Kazmos GmbH, Dresden, Germany; ⁶Dept. of Neurolog. Sci., Univ. of Vermont, Burlington, VT; ⁷Dept. of Biol., West Virginia Univ., Morgantown, WV; ⁸Program in Neurosci. and Behavior, Mount Holyoke Col., South Hadley, MA

Abstract: Neuroscience students at undergraduate institutions and high schools benefit from access to a diverse array of laboratory experiences that highlight key neuroscientific principles while also providing practical insights into the research process and career paths in neuroscience. Unfortunately, the ability to provide these laboratory opportunities often requires significant investment in hardware and instrumentation, which can preclude adoption of these experiences in classrooms or institutions where resources are limited. Moreover, the COVID-19 pandemic laid bare the need for laboratory exercises that can be implemented in a remote setting. We set out to design *in silico* active-learning laboratory modules that introduce students to key neuroscience concepts, situated within the context of connectomics. Connectomics is a burgeoning subfield of neuroscience where researchers are endeavoring to create comprehensive maps of synaptic connectivity within the nervous system to provide the anatomical framework in which to understand brain circuitry and function. Using a complete serial section electron microscopy volume of a Female Adult Fly Brain (FAFB) and the Collaborative Annotation Toolkit for Massive Amounts of Image Data (CATMAID) software platform, we have designed active-learning modules that teach students how to navigate within a connectomics dataset while teaching fundamental neuroscience concepts. We have designed both content-driven modules that focus on: neuroanatomy, neuronal cell biology, and synaptic connectivity, along with a module that provides student agency through an authentic research experience where students learn how to reconstruct previously untraced neurons within the *Drosophila* olfactory system and become citizen scientists by contributing to neuroscience research. These modules have been implemented in undergraduate and high school lab courses at four diverse institutions. Assessment of initial piloting of these modules indicates that student acquisition of fundamental neurobiological concepts was enhanced and that students experienced a deepened connection to

the research process. Future efforts will be dedicated towards developing new active-learning modules that highlight other neuroscientific concepts, creating scalable opportunities for authentic research experiences for undergraduates, and improving infrastructure to facilitate widespread dissemination of these materials to classrooms around the world.

Disclosures: **A. Bellemer:** None. **B. Barragan:** None. **K. Whittenburg:** None. **M. Wilton:** None. **E. Gonzalez-Nino:** None. **T. Kazimiers:** None. **J.H. Simpson:** None. **J.E. Osborne:** None. **D.D. Bock:** None. **A.M. Dacks:** None. **K.J. Colodner:** None.

Theme J Poster

J004. Education: College I

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:45 PM - 2:45 PM

Program #/Poster #: J004.06

Topic: J.02. Teaching of Neuroscience

Support: Center for Academic Excellence, Alverno College

Title: Enhancing undergraduate interest in pursuing careers in neuroscience by engaging in student driven research at a women's college.

Authors: A. R. PEARSALL, *M. H. RAY;
Alverno Col., Milwaukee, WI

Abstract: To increase engagement, retention, and graduation of women in STEM related fields (e.g., neuroscience), Alverno College, a designated HSI women's college, has invested and expanded co-curricular research for undergraduate students. Although the college does not offer a major in neuroscience, opportunities to engage in scholarship with faculty mentors are available. Estrada *et al.* (2016) found that showing students how to creatively link their STEM training to the needs of communities and individuals is an effective strategy for increasing students' success. During this session, we will discuss a model for student driven scholarship in the field of neuroscience with faculty mentoring and how the experience directly impacted the student's sense of being a scholar and belonging in the community of scholars, as well as the nature of the scholarship exploring gender dysphoria and neurodiversity. The focus of the student research was to conduct a literature review exploring the intersection between neurodivergence, specifically autism, and transgender identities. Existing theories relating transgender identities to neurodivergence, such as the theory of the "Extreme Male Brain" and the theory relating testosterone to gender expression were critically evaluated. The specific criteria and learning outcomes for the scholarship were articulated at the graduate level. Feedback was provided by the faculty mentor at a professional level, beyond what was expected in the classroom. This gave the student an experiential experience associated with the work of graduate school in the field of

neuroscience. Our approach involved direct instruction to strengthen professional development, critically evaluate research in the field of neuroscience, and communicate about research.

Disclosures: A.R. Pearsall: None. M.H. Ray: None.

Theme J Poster

J004. Education: College I

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:45 PM - 2:45 PM

Program #/Poster #: J004.07

Topic: J.02. Teaching of Neuroscience

Title: Survey study: do employers of psychology majors value neuroscience knowledge?

Authors: *S. BELL;

Dixie State Univ., St. George, UT

Abstract: Recent surveys of business leaders have revealed that a vast majority place a higher importance on a candidate's skills, such as critical thinking and effective communication, rather than his or her major when hiring. I conducted an online survey study to assess the relative value placed by employers of psychology graduates on skills versus content knowledge in neuroscience. The anonymous survey was sent to employers in the recruitment region for a teaching-mission, open-enrollment state university in southern Utah. Enhancing the career-relevance of neuroscience coursework at this university is of interest since most students plan to enter the work force upon graduation without pursuing a graduate degree. Respondents ($N = 38$) were asked to rate the relative importance of 25 various skills (e.g., "Handles conflict successfully") and 5 areas of neuroscience content knowledge (e.g., "Development and plasticity of the nervous system") on a scale from 1 (not important) to 5 (extremely important). As predicted, skills were rated significantly higher ($p < 0.0001$) on average ($M = 4.40$, $SD = 0.40$) than neuroscience content areas ($M = 1.94$, $SD = 1.12$). The top three rated skills were "Works productively as a member of a team," "Displays appropriate interpersonal skills," and "Displays good listening skills". When asked whether respondents valued "a candidate's skills to a greater extent than his/her conceptual and factual knowledge," 79% either strongly agreed or agreed while 0% disagreed or strongly disagreed. These results suggest that the potential employers of students from this institution place a relatively high value on employable skills and relatively low value on neuroscience content knowledge. Undergraduate neuroscience courses are taught in several different curricular contexts, many of which may require a high emphasis on neuroscience content knowledge (e.g. for pre-medical biology majors at a research-based university). In the context of the department and institution studied herein, however, students may benefit from a shift toward assignments and course structures that emphasize the development of marketable skills, particularly team-based learning activities.

Disclosures: S. Bell: None.

Theme J Poster

J004. Education: College I

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:45 PM - 2:45 PM

Program #/Poster #: J004.08

Topic: J.02. Teaching of Neuroscience

Title: Small group writing discussion groups did not specifically increase use of primary sources in an occupational therapy cohort

Authors: *A. PACK;
Utica Col., 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. In Spring 2020, a sudden and unplanned move to online learning disrupted plans for established methods of increasing familiarity with, and use of, primary sources. In an attempt to maintain contact between students to keep spirits up, and to maximize learning, small, voluntary discussion groups were formed. Students were instructed to read each others’ work and comment/discuss in a virtual meeting space (Zoom or Google Meet) without faculty present. Although the students who made use of the meetings had generally clearer writing and higher grades (all grading was blinded to student name and group status), the number of correct primary citations was not statistically different from the non-meeting group. Further, both groups’ use of primary literature was similar to previous cohorts who received no intervention at all.

Disclosures: A. Pack: None.

Theme J Poster

J004. Education: College I

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:45 PM - 2:45 PM

Program #/Poster #: J004.09

Topic: J.02. Teaching of Neuroscience

Title: Study material presented in preferred learning style does not enhance learning.

Authors: *C. ERICKSON¹, M. SLASKI², S. HOBBS¹;

²Psychological Sci., ¹Metropolitan State Univ. of Denver, Denver, CO

Abstract: One conception in education is that students learn better when taught in their preferred learning style, either a “visual” or “verbal” learner in spite of a lack of research in support of this claim. For example, Höffler et al., (2017) found that people who claim to be visual learners spend more time looking at pictures and people who claim to be verbal learners spend more time looking at words; however, there was no learning benefit from studying in one style. The goal of our research was to assess the effectiveness of teaching materials targeted at students’ preferred learning styles. Do visual learners indeed learn better when taught in a visual format and verbal learners in a verbal format? To answer this question, we developed an online survey that explored how well participants learned when presented with two different learning-style tailored instructional methods. Each participant was randomly assigned a learning block containing two verbal, text-based lessons and two visual, graphic-based lessons from four possible topics. Each lesson block contained either a visual or verbal version of all four topics. Participants first answered questions about their perceived learning style preference. There was then a buffer task of 25 visual reasoning problems modified from the Raven’s matrix task between learning and testing. This design allows us to compare retention of material when the participants’ preferred learning style matched the study material vs when there was a mismatch between preferred learning style and study material. More participants identified as visual learners than as verbal learners. Almost 70% reported being visual learners with only 30% reporting themselves as verbal learners. There was no difference in percent correct in participants’ preferred learning style vs. their non-preferred learning style for each of the four lessons (classical conditioning, $t(56) = -0.71$, $p = .48$, $d = 0.19$; conservation, $t(56) = -1.24$, $p = .22$, $d = 0.33$; photosynthesis, $t(54) = 0.66$, $p = .51$, $d = 0.18$; toilet function, $t(55) = -0.78$, $p = .44$, $d = 0.21$). Consistent with previous reports, these results indicate no benefit to tailoring teaching to student learning preferences. A power analysis revealed that 1600 participants would be required to have a significant effect. This research has multiple implications for educators and learners alike. Understanding how students respond to teaching materials tailored to preferred learning styles will help assess the effectiveness of learning-style based teaching. This can help educators to better direct their efforts and serve students more effectively, while avoiding unnecessary time spent on ineffective teaching methods.

Disclosures: C. Erickson: None. M. Slaski: None. S. Hobbs: None.

Theme J Poster

J004. Education: College I

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:45 PM - 2:45 PM

Program #/Poster #: J004.10

Topic: J.02. Teaching of Neuroscience

Title: Impulse provides an avenue for undergraduates to experience manuscript submission and revision practices as authors and peer reviewers

Authors: C. H. GODFREY, K. M. GEISINGER, H. B. WOLFE, A. E. STODDARD, E. A. GIBSON, *M. C. ZRULL;
Appalachian State Univ., Boone, NC

Abstract: *IMPULSE- The Premier Undergraduate Neuroscience Journal* provides undergraduates with the opportunity to gain experience with the processes of manuscript submission, revision, and publication prior to graduate education. While it is not uncommon for students to gain experience in research, empirical writing, and presentation during their undergraduate education, it is more difficult for undergraduates to attain a publication. *IMPULSE* is designed to provide an avenue not just for publication, but also for motivated students to gain experience in the editing and revision process as peer-reviewers and associate editors. Particularly throughout the the COVID-19 pandemic, *IMPULSE* has provided a way for undergraduates to interact and engage with scientific writing and critical thought without needing to be in the classroom or the laboratory. *IMPULSE* has over 10 revision teams based at colleges/universities around the country, with satellite reviewers spread even more widely. Each review team is composed of undergraduates, with an undergraduate associate editor (AE), and a faculty advisor (FA). Groups of students at a particular institution discuss their reviews of submissions with guidance from an FA. These institutions are referred to as Review Training Sites (RTSs). Undergraduates who wish to review for *IMPULSE* but are not at an institution with a review site are assigned to an RTS and work electronically. Each RTS selects an AE who has the responsibility to compile individual reviews into a single review and submit it to the Executive Editor, who is an undergraduate, on the *IMPULSE* editorial board. The Executive Editor compiles RTS reviews into a single document of comments and necessary and suggested edits, which is sent back to the manuscript author(s). The opportunity to be involved in revision helps undergraduates to understand what journals look for in a manuscript. Not only does *IMPULSE* provide opportunity to undergraduates, but it also works to improve access to scientific knowledge and learning. *IMPULSE* is an open-access journal indexed within the Directory of Open Access Journals, and authors who submit to *IMPULSE* retain ownership of their manuscript after publication. This academic year alone, *IMPULSE* has published 14 manuscripts submitted by students across the globe. Including *IMPULSE* in the undergraduate experience provides opportunity to effectively prepare students for success in graduate and professional education by allowing practice and development of writing skills as well as an introduction to the process of submitting neuroscience literature to a scientific journal.

Disclosures: C.H. Godfrey: None. K.M. Geisinger: None. H.B. Wolfe: None. A.E. Stoddard: None. E.A. Gibson: None. M.C. Zrull: None.

Theme J Poster

J004. Education: College I

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:45 PM - 2:45 PM

Program #/Poster #: J004.11

Topic: J.02. Teaching of Neuroscience

Title: Exploring mechanisms leading to symptomatic effects of 4-AP pharmacological treatments in patients with MS: A teaching/learning module

Authors: *A. O'NEIL¹, R. KRALL^{2,3}, R. L. COOPER⁴;

¹WakeMed Hosp., Raleigh, NC; ³Dept. of STEM Education,, ²Univ. of Kentucky, Lexington, KY; ⁴Dept Biol, Univ. of Kentucky Dept. of Biol., Lexington, KY

Abstract: Some pharmacological treatments prescribed for physiological conditions are selected because of their observed benefits for alleviating the condition even when the underlying mechanism of action behind the treatment are not well understood or why the treatment works in some cases and not others. Studying the potential mechanisms of the pharmacological actions on physiological function can provide a clearer explanation to clients and develop a more precise mechanistic understanding that can lead to more precise treatments. Utilizing the primary research literature, fundamental physiological concepts, and observed client outcomes, a framework can be constructed for use in primary and clinical research and as a guide for caretakers and in the construction of a teaching and learning module. In this regard, the mystifying actions of how 4-aminopyridine (4-AP) helps to alleviate some of the rigidity and movement of limbs in clients with multiple sclerosis (MS) is explored. It is well established that 4-AP blocks a subset of voltage gated potassium (K^+) channels, but it is somewhat counterintuitive how this promoted better locomotive movements. High doses of 4-AP can produce seizures in intact animals as well as heightened synaptic activity in isolated neural tissue. The mechanisms of action observed from clinical doses may be more related to the physiological changes that occur due to the progression of MS or even by actions on other cells besides neurons, leading to the secondary action on neurons. The saga continues in understanding exactly how 4-AP is beneficial for some clients with MS and not others. In this module, multiple physiological models are used to construct mechanistic explanations of the phenomenon. The learning objectives of this module are to: (1) cover the basic neurophysiological principles of electrical signals, synaptic transmission, and pharmacological actions of ion channels; (2) demonstrate the disease process of MS, and (3) address scientific literacy developed from a review of research studies on the phenomenon.

Disclosures: A. O'Neil: None. R. Krall: None. R.L. Cooper: None.

Theme J Poster

J004. Education: College I

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:45 PM - 2:45 PM

Program #/Poster #: J004.12

Topic: J.02. Teaching of Neuroscience

Title: Neuroscientific Ethical Discussions in Undergraduate Education Improves Critical Thinking and Communication skills

Authors: ***B. DESAI BRADARIC**, M. GUGLIELMO;
Rush Univ., Chicago, IL

Abstract: To prepare undergraduates for health care careers or graduate studies, students must be exposed to critical thinking and active learning activities during their education. Ethical issues are inherent in science courses but are rarely discussed. Debate-based discussion of ethical topics is a unique tool that can be used in the classroom. These discussions allow students to develop critical thinking and communication skills, as well as learn to produce well-supported, empirically based opinions on ethical issues. Toward this goal, the neuroscience course in the Bachelor of Science in Health Sciences (BSHS) program at Rush University, incorporates debate-based discussions on ethical hot topics in the field of neuroscience that align with course material. Students were required to read the scientifically based argument for and against the ethical issue and write a pre- and post-discussion reflection opinion paper. Classroom time is devoted to in-depth discussion of the ethical issue and the neuroscientific evidence including some discussion on the influence of society, religion and up-bringing on opinion formulation. The student voice was emphasized in each discussion session. Based on the post-discussion reflection grade, 93% of students improved by at least one letter grade or maintained their letter grade from the beginning to the end of the course. Students improved on their communication and formulation of opinion regardless of the number of ethical topics that were introduced within the course in a given year. In the post-discussion reflection assignment, students reflected on the variability in the evidence used to formulate an opinion, and the strong influence of society, religion and up-bringing on their initial opinion. Many indicated that scientific evidence strengthened their opinion. Furthermore, during the classroom discussion, students saw how opinions can be more influential when paired with scientific evidence. Debated-based ethical discussion as a classroom tool can be easily implemented to encourage critical thinking and improve written and oral communication.

Disclosures: **B. Desai Bradaric:** None. **M. Guglielmo:** None.

Theme J Poster

J004. Education: College I

Location: Virtual Only

Time: Thursday, November 11, 2021, 1:45 PM - 2:45 PM

Program #/Poster #: J004.13

Topic: J.02. Teaching of Neuroscience

Support: NIH P60 AA011605
NIH U24 AA020024

Title: Teaching students at risk for problematic alcohol drinking about alcohol neurobiology

Authors: *D. L. ROBINSON¹, C. A. DANNENHOFFER²;

¹Univ. of North Carolina at Chapel Hill, Chapel Hill, NC; ²Bowles Ctr. for Alcohol Studies, UNC Chapel Hill, Chapel Hill, NC

Abstract: Adolescence is a developmental period characterized by risk-taking and sensation seeking, and this often leads to experimentation with addictive drugs. Alcohol drinking is often initiated in adolescence, corresponding to middle school, high school or early college periods. One goal of the Bowles Center for Alcohol Studies at the University of North Carolina is to provide information to students at risk for alcohol use problems that can prevent excessive alcohol use and promote healthier alcohol use. To achieve this goal, we deliver interactive presentations to targeted student groups with the following learning objectives:

- 1.) Understand the specific neurobiology of the adolescent/young adult brain to produce adolescent-typical behaviors, and discuss why the adolescent/young adult brain is uniquely suited to the challenges for this developmental period.
- 2.) Recognize how alcohol uniquely affects the adolescent/young adult brain. The adolescent brain is specifically sensitive to some aspects of alcohol and insensitive to others, which leads many adolescents to binge drink and makes them vulnerable to blackouts. One notable vulnerability is learning and memory, raising the possibility that alcohol-induced memory impairments can impact academic performance.
- 3.) Discuss how binge drinking is a particularly harmful pattern of alcohol use, especially when resulting in blackouts. While adolescents eventually “age out” of the unique sensitivities to alcohol and often “age out” of problem drinking, research suggests that the effects of adolescent binge drinking on the brain and decision-making behavior are long-lasting.

Disclosures: D.L. Robinson: None. C.A. Dannenhoffer: None.

Theme J Poster

J005. Education: College II

Location: Virtual Only

Time: Thursday, November 11, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J005.01

Topic: J.02. Teaching of Neuroscience

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

Title: The 34th northeast undergraduate and graduate research organization for neuroscience (NEURON) conference held virtually

Authors: R. A. ROTOLO¹, G. R. TANNER², W. P. LYNCH⁴, A. BATTISON³, V. FRANCONI⁵, R. PRESBY¹, J.-H. YANG¹, A. ECEVITOGLU³, J. HAIGHT⁵, T. AHERN⁵, *A. BETZ⁵;

¹Psychological Sci., Univ. of Connecticut, Storrs, CT; ²Univ. of Connecticut, New Haven, CT; ³Univ. of Connecticut, Storrs, CT; ⁴Northeast Ohio Med. Univ., Rootstown, OH; ⁵Quinnipiac Univ., Hamden, 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 34th NEURON conference was held virtually on February 28th, 2021. A virtual conference format allowed NEURON to expand beyond its typical geographical constraints, providing an opportunity for students and faculty across the country to learn about new developments and share ideas. The 2021 keynote address was given by Dr. William (Bill) Lynch, Professor in the Department of Integrative Medical Sciences at the Northeast Ohio Medical University (NEOMED), Biomedical Sciences Graduate Program Faculty at Kent State University, and Member of the KSU-Brain Health Research Institute. In his talk, titled, "A Ghost in the Machine: The Case for Cryptic CNS Virus Infection Driving Disease in COVID-19 and Beyond", Dr. Lynch discussed his perspectives on the COVID-19 pandemic, the SARS-CoV-2 virus, and its ability to induce neurological and psychiatric sequelae. He also introduced insights from historical and current studies on CoV neurovirulence. Following the keynote, students and faculty participated in workshop sessions in virtual event rooms, including: Allen Brain Atlas Workshop, Careers in Science Panel, Detectives of Undiagnosed Disease, Dynamic Teaching in the Virtual Age, Strategies for Effective Personnel Management in Research Laboratories, and Surgical Neurophysiology. In parallel, virtual 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 2022 will be held Sunday, February 27th 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: R.A. Rotolo: None. G.R. Tanner: None. W.P. Lynch: None. A. Battison: None. V. Francione: None. R. Presby: None. J. Yang: None. A. Ecevitoglu: None. J. Haight: None. T. Ahern: None. A. Betz: None.

Theme J Poster

J005. Education: College II

Location: Virtual Only

Time: Thursday, November 11, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J005.02

Topic: J.02. Teaching of Neuroscience

Title: Nu Rho Psi, the National Honor Society in Neuroscience

Authors: S. N. CASSELLA¹, M. P. BLACK², M. J. GILL³, L. A. BECKER⁴, *M. T. KERCHNER⁵;

¹Loras Col., Dubuque, IA; ²Neurosci Institute, Ctr. Behav Neurosci, Georgia State Univ., Atlanta, GA; ³Psychology Dept., North Central Col., Naperville, IL; ⁴Psychology, Univ. of Evansville, Evansville, IN; ⁵Psychology, Washington College., 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 100 chapters across the United States and over 8500 members, *Nu Rho Psi* is a dynamic organization that aims to support the professional growth of its members. Most of our 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 chartered *Nu Rho Psi* chapters at Colleges and Universities. *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. *Nu Rho Psi* members help educate their communities about the *Nu Rho Psi* Theme of the Year - 2021-22 *The Neuroscience of Identity and Bias*. 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 establish a local chapter of *Nu Rho Psi* may contact the National Office located at Baldwin Wallace University and apply for a charter. For more information, see our web page: <https://nurhopsi.org/>

Disclosures: S.N. Cassella: None. M.P. Black: None. M.J. Gill: None. L.A. Becker: None. M.T. Kerchner: None.

Theme J Poster

J005. Education: College II

Location: Virtual Only

Time: Thursday, November 11, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J005.03

Topic: J.02. Teaching of Neuroscience

Support: NIH Grant R25NS117365
Simons Foundation Educational Grant 675866

Title: The BS MS program in neuroscience at the Atlanta University Consortium Center

Authors: *M. BENVENISTE;
Neurosci. Inst., Morehouse Sch. of Med., Atlanta, GA

Abstract: There is clearly a lack of racial/ethnic diversity within Neuroscience Research and other STEM fields when compared to the general population of the United States. Increasing diversity can lead to a diversity of thought, opinions and creativity. Although lack of diversity in science is a complex problem, the objective of the BS/MS Program in Neuroscience at Morehouse School of Medicine (MSM) is to combat this phenomenon by exposing students early in their academic careers to Neuroscience Research. Our hypothesis is that exposing top-tier undergraduates to a rigorous curriculum for neuroscience research will have a two-fold benefit: 1) Students will become aware of career possibilities in scientific research, thus potentially enlarging the pool of qualified candidates from under-represented populations. 2) Students will gain needed background into the complexities of neuroscience research through coursework and benchwork. Candidates are recruited into the MSM program as Juniors from the neighboring HBCU undergraduate institutions of the Atlanta University Center (Morehouse College, Spelman College and Clark-Atlanta University). This close geographic proximity allows students to walk from their home campus to their laboratories or graduate-level classes at MSM on a daily basis, thus maximizing interaction. As undergraduate Juniors and Seniors, students engage in coursework towards a Master's degree in Neuroscience at MSM concurrently with the completion of requirements for their Bachelor of Science degree at their home institution. Mentored Master's thesis work in an MSM laboratory starts during the summer before the senior year and continues for an additional 10 months after the student graduates from their undergraduate institution and culminates with a thesis defense and M.S. degree in Neuroscience. Coursework includes four rigorous courses in Neuroscience covering basic neurophysiology and neuropharmacology, circuitry, modern techniques and molecular tools used in cutting edge neuroscience research and the Neurobiology of Disease. Each of these courses places an emphasis on preparing students for their research by reinforcing critical thinking, problem solving and experimental design skills. Students also participate in a Quantitative Biology Bootcamp taught jointly by MSM and Harvard Medical School faculty. Graduates of the program have gone on to M.D., Ph.D. and M.D./Ph.D. programs.

Disclosures: M. Benveniste: None.

Theme J Poster

J005. Education: College II

Location: Virtual Only

Time: Thursday, November 11, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J005.04

Topic: J.02. Teaching of Neuroscience

Support: NIH grant DC01919
Autifony Therapeutics Ltd.

Title: Voltage gated Kv3.4 channels interact with BAG family of proteins: Studying protein interactions

Authors: *M. CHATTERJEE¹, Y. ZHANG¹, J. WU¹, M. MARABITA², A. BIOSA², N. PILATI³, M. J. GUNTHORPE⁴, C. H. LARGE², L. K. KACZMAREK¹;

¹Yale Univ. Sch. Med., New Haven, CT; ²Autifony Therapeut. Limited, Stevenage, United Kingdom; ³Autifony Srl, Verona, Italy; ⁴Autifony Therapeut. Ltd, Stevenage, United Kingdom

Abstract: Voltage gated Kv3.4 channels interact with BAG family of proteins: Studying protein interactions

M. CHATTERJEE¹, Y. ZHANG¹, J. WU¹, M. MARABITA², A. BIOSA², N. PILATI², M. J. GUNTHORPE², C.H. LARGE², L. K. KACZMAREK¹;

Yale Univ. Sch. Med., New Haven, CT, 06510, USA and Autofony Therapeutics Limited, Stevenage Bioscience Catalyst, Stevenage SG1 2FX, UK

Voltage gated Kv3.4 channels are important regulators of neuronal excitability and function. The cytoplasmic terminus of Kv3.4 channels interacts with a variety of proteins to perform various cellular and signaling functions. To identify the various interactors of the channel we performed the mass spectrometry analysis and found BAG (Bcl-2 associated athanogene) family as one of them. BAG family of proteins are known modulators of chaperone activity and possess anti-apoptotic function. In this study, we demonstrate the approach followed by scientists to validate the interactions between protein molecules and further investigate its significance. We describe techniques of co-immunoprecipitation for confirmation of a novel interaction of Kv3.4 channels with different BAG proteins in HEK cells stably expressing inducible human Kv3.4 channel. We further employed confocal imaging to observe colocalization between Kv3.4 channels and BAG proteins. We observed that induction of Kv3.4 channel by tetracycline caused increased protein expression of both BAG2 and BAG5 proteins. Moreover, knocking down BAG2 caused reduction in protein levels of Kv3.4 channels but not the mRNA levels. Our results suggest that BAG2 interact specifically to the Kv3.4 channels and share a reciprocal relationship. We describe a guideline approaches to investigate protein interactions in biology by using gene-editing, imaging, and molecular biology techniques commonly used in scientific labs which can help students in introductory biology courses to visualize the mechanics of protein interactions in

neuroscience.

This work was supported by NIH grant DC01919 to LKK and in part by Autifony Therapeutics Ltd.

Disclosures: M. Chatterjee: None. Y. Zhang: None. J. Wu: None. M. Marabita: None. A. Bioss: None. N. Pilati: None. M.J. Gunthorpe: None. C.H. Large: None. L.K. Kaczmarek: None.

Theme J Poster

J005. Education: College II

Location: Virtual Only

Time: Thursday, November 11, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J005.05

Topic: J.02. Teaching of Neuroscience

Title: An immersive study of introductory STEM courses: Integrative opportunities for undergraduate neuroscience education

Authors: *A. C. BASU;
Col. of the Holy Cross, Worcester, MA

Abstract: As neuroscience is an integrative discipline, neuroscientists must achieve broad-based proficiency in the fundamental concepts and skills of multiple STEM disciplines. One of the major challenges for undergraduate neuroscience education is how to support this achievement while maintaining diversity, equity, and inclusion in access to the discipline which have been elusive to STEM disciplines overall. As an integrative discipline in particular, what new opportunities to achieve in STEM can undergraduate neuroscience programs and curricula bring to students? As a neuroscience faculty member, I conducted a year-long immersive study of introductory STEM courses, auditing introductory biology, chemistry, math (calculus), and physics courses. I sat in the lectures and completed the assignments and exams alongside the students in order to learn about the expectations, the culture, and the emotional experiences involved. The instructors of these courses and I mapped their content, including the main underlying concepts and skills required to engage with the course content in the first unit (up to and including the first exam), when student attrition is the greatest. The results of this mapping project showed overlapping concepts and skills required in multiple introductory STEM courses, many of which were related to quantitative reasoning and basic principles of chemistry. In addition to insights about course content and academic expectations, the immersive study yielded insights about factors related to performance, the enforcement of disciplinary conventions and identity, and the social environment of introductory STEM courses. In many of these areas, undergraduate neuroscience programs and courses present excellent opportunities to enhance institutional STEM curricula and promote equity, inclusion, and sense of belonging in STEM

culture by offering complementary integrative content and inclusive pedagogical approaches to existing STEM programs.

Disclosures: A.C. Basu: None.

Theme J Poster

J005. Education: College II

Location: Virtual Only

Time: Thursday, November 11, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J005.06

Topic: J.02. Teaching of Neuroscience

Title: Collaborative Online International Learning in Behavioral Neuroscience: studying rodent social isolation across two laboratories

Authors: *J. P. KELLY¹, S. M. HARDING²;

¹NUI Galway, Galway, Ireland; ²Psychology Dept, Fairfield Univ., Fairfield, CT

Abstract: Collaborative online international learning (COIL) is a pedagogical approach that allows students from different countries to work together on projects to promote global engagement (Rubin, J. 2017: *Internationalization of Higher Education 2*: 27-44). Over the past 7 years, neuroscientists at Fairfield University and the National University of Ireland Galway (NUIG) have collaborated in a short-term in-person undergraduate study abroad course. With the cancellation of the course amid the Covid-19 pandemic, a COIL was developed to keep the institutions connected. We were able to identify a point of intersection between students enrolled in Research Methods at Fairfield and in the M.Sc. Neuropharmacology at NUIG. The project involved the analysis of datasets derived from experiments conducted in the research laboratories of both institutions, which revolved around the impact of social isolation on anxiety-related behaviors in male and female rodents (both rats and mice). Using an online platform (Zoom), students from both programs attended a short introductory session, after which they were divided into small breakout groups to analyze statistically and share their findings with the whole class towards the end of the session. Undergraduate students at Fairfield University later constructed APA-formatted research reports and posters to summarize group findings. Student assessments of this exercise suggested that the experience was beneficial for students at both institutions, but highlighted the need for more structure and additional time together to fully develop the ideas that could only be touched upon in a single 2-hour session. Another key takeaway is that Zoom allows international teaching to be strengthened and enhanced, particularly in established partnerships between scientists working on similar research questions. To conclude, this activity allowed a number of educational objectives to be enveloped into a single learning opportunity that can be developed and enhanced further in the future.

Disclosures: J.P. Kelly: None. S.M. Harding: None.

Theme J Poster

J005. Education: College II

Location: Virtual Only

Time: Thursday, November 11, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J005.07

Topic: J.02. Teaching of Neuroscience

Title: Faculty for Undergraduate Neuroscience (FUN): Supporting Undergraduate Faculty and Students

Authors: *K. R. ILLIG¹, G. D. GRIFFIN², M. E. MORRISON³;

¹Biol. Dept. and Neurosci. Program, Univ. of St. Thomas, Saint Paul, MN; ²Departments of Biol. and Psychology, Hope Col., Holland, MI; ³Biol. Dept., Lycoming Col., Williamsport, PA

Abstract: Faculty for Undergraduate Neuroscience (FUN) is the premier international society devoted to neuroscience education at the undergraduate level (www.funfaculty.org). This poster provides details on several ways that FUN advances undergraduate neuroscience education, including: 1) Since 1992, FUN has worked with sponsoring organizations to grant travel awards for undergraduates to attend the annual SfN meeting. 2) FUN hosts the Undergraduate Poster Session where undergraduates can present their research and connect with graduate programs. 3) The FUN Equipment Loan Program provides researchers with the opportunity to borrow state-of-the-art equipment from associated vendors. 4) 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). 5) FUN holds faculty development workshops which bring educators together to develop and share best practices in classroom, laboratory, and online teaching. 6) FUN supports regional undergraduate neuroscience research symposia. 7) FUN annually recognizes exceptional accomplishments in neuroscience education, mentorship, and service. 8) FUN supports communication and networking among its members through our newsletter and listserv. 9) FUN has a peer mentorship program that pairs trained mentors with members to provide career and personal support. 10) FUN hosts the Neuroscience Undergraduate Research Virtual Symposium (NURVS) to provide a national online venue for undergraduate students to present their work. Those interested in learning more about FUN are encouraged to visit us at Booth #2135, online, or contact the authors.

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

Theme J Poster

J005. Education: College II

Location: Virtual Only

Time: Thursday, November 11, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J005.08

Topic: J.02. Teaching of Neuroscience

Support: European Union's Horizon 2020 Framework Programme for Research and Innovation under the Specific Grant Agreement No. 945539 (Human Brain Project SGA3)

Title: The INCF TrainingSuite: NeuroEducation without borders

Authors: W. E. GRISHAM¹, P. K. GEORGE², *V. MURALEEDHARAN², M. BIRDSALL ABAMS²;

¹Dept Psychol, UCLA, Los Angeles, CA; ²INCF, Stockholm, Sweden

Abstract: Advancements in the field of neuroinformatics have resulted in a massive explosion in the quantity and diversity of neuroscience data being produced, yet many traditional neuroscience training programs have not revised curricula to prepare trainees with the computational skills required to organize and interrogate this large, multimodal data. Thus, the objective of this project was to build an online hub of neuroscience educational resources to fill the gap between current neuroscience curricula and the computational skills required to organize and analyze big data. To achieve this aim, we invited representatives from the world's leading neuroscience societies and large-scale brain initiatives to form the INCF Training and Education Committee that would provide oversight over the content and capabilities of the online hub. As a result, we developed TrainingSpace (<https://training.incf.org/>), an open access hub of nearly 500 multimedia courses, lectures, and tool tutorials covering the sub-specialisms of neuroscience and neuroinformatics, as well as computer science, data science, and ethics. In addition to course content, TrainingSpace also provides users with access to publicly available datasets from the world's leading neuroscience data repositories through KnowledgeSpace, a discoverability portal and community encyclopedia for neuroscience, and a question and answer forum, Neurostars.org. Since its launch in 2019, TrainingSpace has steadily increased in popularity with both trainees and trainers alike. It has also become popular with content providers that want to make their training materials available to the neuroscience community-at-large, as well as integrate their content into the larger TrainingSpace ecosystem.

Disclosures: W.E. Grisham: None. P.K. George: None. V. Muraleedharan: None. M. Birdsall Abams: None.

Theme J Poster

J005. Education: College II

Location: Virtual Only

Time: Thursday, November 11, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J005.09

Topic: J.02. Teaching of Neuroscience

Title: Open educational resources - What's available for neuroscience?

Authors: *M. P. LEUSSIS¹, A. DRAKE²;

¹Psychology & Neurosci., ²Biol., Emmanuel Col., Boston, MA

Abstract: Open educational resources (OERs) promise to play an increasing role in making educational materials such as textbooks available to all and in helping to (slightly) mitigate exorbitant costs often associated with post-secondary education. True OERs provide the ability to use, distribute and even adapt available resources to fit with the needs of the user. Many other free resources often get lumped in with OERs but may have restrictions prohibiting specific forms of use, modification or distribution. In neuroscience, there is a growing collection of OERs and open-access materials for instructors to consider incorporating into their courses. These include resources such as textbooks and other books, entire courses, individual lectures, videos and animations, or laboratory resources. This presentation will briefly review three free online textbooks for neuroscience. Available platforms for organizing and distributing OERs are outlined and briefly discussed, with an emphasis on their usefulness at the present time for neuroscience education. Further, some available neuroscience OERs will be highlighted to provide examples of the range of available materials.

Disclosures: M.P. Leussis: None. A. Drake: None.

Theme J Poster

J005. Education: College II

Location: Virtual Only

Time: Thursday, November 11, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J005.10

Topic: J.02. Teaching of Neuroscience

Title: Curriculum for incorporation of literary works into neuroscience of memory instruction

Authors: *T. K. PATTERSON;

UCLA, Los Angeles, CA

Abstract: "I put down the cup and examine my own mind."

- Marcel Proust, *In Search of Lost Time*

The topic of how the brain stores our experiences as memories is an area of interest to many undergraduates, but the material can be dense and intimidating, particularly to non-science majors. One approach to teaching this complex topic is to pair neuroscientific concepts with works of literature that address the concept in some way. This interdisciplinary approach can

help develop students' understanding of how memory works in ways that complement the understanding they can obtain from a purely scientific perspective. The curriculum that I will discuss in this presentation was developed as a seminar for freshman college students who had previously taken an interdisciplinary course on the brain, but the readings can be incorporated into any course that covers one or more of the topics. Each of the following course topics was paired with a reading assignment from a literary source (e.g., a short story or a novel excerpt): habit memory, Alzheimer's disease, organic amnesia, psychogenic amnesia, semantic dementia, recollective experience, highly superior autobiographical memory, traumatic memory, and eyewitness memory. In addition to developing understanding of the topics, students also learn how science and literature differ as disciplines and can inform each other.

Disclosures: T.K. Patterson: None.

Theme J Poster

J005. Education: College II

Location: Virtual Only

Time: Thursday, November 11, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J005.11

Topic: J.02. Teaching of Neuroscience

Support: NSF RCN-UBE Incubator Award #2018270

Title: Teaching Critical Thinking Skills in Introductory Neuroscience Courses

Authors: *M. IMAD^{1,2}, B. M. LOM³, S. MCGOWAN⁴, K. MURPHY WILSON⁵, J. T. OLIMPO⁶;

¹Pima Community Col., Tucson, AZ; ²Connecticut Col., New London, CT; ³Davidson Col., Davidson, NC; ⁴Georgetown Univ., Washington, DC; ⁵Univ. of California-Irvine, Irvine, CA;

⁶The Univ. of Texas at El Paso, El Paso, TX

Abstract: Critical thinking skills are important for student success in college STEM courses and beyond. Poor critical thinking skills are positively correlated with poor performance in science coursework (Bird, 2010; Driver et. al., 2000). These findings underscore the importance of critical thinking skills to success in STEM. Explicit instruction in and assessment of critical and logical reasoning is generally not part of introductory STEM curricula, including neuroscience courses. In fact, the course learning outcomes of most courses do not include an explicit mention of developing students' critical and logical thinking skills.

The National Science Foundation's top 10 priorities include increasing the speed and efficiency with which we use data, working across disciplines to solve today's large-scale challenges, and understanding the human technology frontier. Making progress toward these STEM-oriented activities requires well-trained graduates of STEM degree programs. Training in critical thinking skills during the early undergraduate years, therefore, holds the potential to grow and broaden

participation in STEM and cultivate independent and creative thinkers trained to reason effectively and prepared to tackle complex problems in innovative ways. Yet, The development of a critical disposition takes time and requires purposeful investment—intentional, and persistent commitment to training in the effective integration of affective and logical thinking into the various critical thinking matrices.

Here, we report on NSF-funded project that assembled a team of neuroscientists and science educators who collaborated to develop and disseminate the critical thinking resources, instructional, and assessment materials. To that end, network members developed common definitions of critical thinking that are informed by existing frameworks from the American Philosophical Society and other sources. Drawing on the framework of inoculation theory, the network then designed curricular materials that train students to recognize logical reasoning errors (e.g., common logical fallacies) and distortions or manipulations of scientific thinking (e.g., unfalsifiable pseudoscience). Importantly, the materials we developed is especially pertinent to undergraduate neuroscience students; we incorporated neuroscience research about human cognition—quite a bit of our cognition is uninformed, over-generalized, and inclined towards logical fallacies (Scriven & Paul, 2004).

Disclosures: M. Imad: None. B.M. Lom: None. S. McGowan: None. K. Murphy Wilson: None. J.T. Olimpo: None.

Theme J Poster

J005. Education: College II

Location: Virtual Only

Time: Thursday, November 11, 2021, 2:30 PM - 3:30 PM

Program #/Poster #: J005.12

Topic: J.02. Teaching of Neuroscience

Title: Radical indoctrination: an immersion model for undergraduate neuroscience

Authors: J. L. 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 many different angles? The answer is of course all three, but undergraduate neuroscience education focuses almost exclusively on facts, occasionally on process, and rarely if ever on community. Yet the latter two most strongly embody the critical thinking and scholarly dialogue so important to our professional lives. I have begun teaching an experimental course that weaves all three aspects together in an immersion model of learning. Students read papers from the primary literature, converse directly with the first author in the classroom, and ultimately present and defend their own evaluation of the work. Initially, students are nervous and hesitant, worried they won't have enough background knowledge to understand, let alone

critique, advanced research. But with repeated practice and encouragement, they become comfortable with the format and the material, and the best students perform at the graduate level. All students develop skills in digesting complex material, questioning assumptions, and communicating their perspective, skills critical not only for neuroscience but many other career paths as well.

Disclosures: J.L. Gauthier: None.