

PENN BRAIN SCIENCE,  
TRANSLATION, INNOVATION,  
AND MODULATION CENTER



**brainSTIM**  
Center

**Year in  
Review  
2023**

*Perelman School of Medicine  
University of Pennsylvania*



Penn Brain Science, Translation, Innovation, and Modulation Center

<b>1</b>	<b><u>From the Director</u></b>
<b>2</b>	<b><u>Center Initiatives</u></b>
<b>3</b>	<b><u>TMS Workshop</u></b>
<b>5</b>	<b><u>Faculty Spotlights</u></b>
<b>7</b>	<b><u>Faculty Highlights</u></b>
<b>9</b>	<b><u>Publications</u></b>
<b>13</b>	<b><u>Media &amp; Awards</u></b>
<b>17</b>	<b><u>Looking to 2024 &amp; Beyond</u></b>
<b>18</b>	<b><u>Giving Opportunities</u></b>

The brainSTIM Center would like to thank David Alvarez-Sanchez for his assistance with this Year in Review.

# FROM THE DIRECTOR



Dear brainSTIM Family,

I want to thank all the faculty, staff, and supporters who have contributed to brainSTIM's ongoing success, and I'm delighted to share our progress with you. 2023 was another great year for brainSTIM! We were delighted to welcome two new faculty members, Iahn Cajigas, MD, PhD and Golkoo Hosseini, MD. Dr. Cajigas, the newest member of our core faculty, is a renowned expert in the areas of deep brain stimulation, focused ultrasound, and stereotactic radiosurgery for both movement and psychiatric disorders. Additionally, he specializes in surgical interventions for epilepsy, as well as the utilization of neuromodulation techniques for refractory back pain. Dr. Hosseini, our newest center scientist, serves as Faculty Champion for Penn Psychiatry's emerging Neuromodulation Certificate Program for resident physicians, an effort that brainSTIM proudly supports. Many other brainSTIM faculty have enjoyed remarkable scientific successes, often in collaboration with each other and with other members of the Penn community, which are described here.

A major initiative for brainSTIM in 2023 was the launching of an intensive course on the use of transcranial magnetic stimulation (TMS). This 3-day workshop included both lectures and hands-on training, focused on the needs and interests of neuromodulation researchers. This effort was spearheaded by Nicholas Balderston, PhD, and we are delighted to recognize his successes by welcoming him into brainSTIM's core faculty.

Through its ongoing commitment of its faculty, staff, and many supporters, brainSTIM has continued to thrive and deliver on its goal of fostering trailblazing, multidisciplinary neuromodulation research at the University of Pennsylvania.

Thank you to everyone who committed their ideas, energy, time, and support to ensuring the success of brainSTIM. Please enjoy this annual review, and here's to a happy, healthy, and productive 2024!

A handwritten signature in black ink, appearing to read 'RH'.

Roy Hamilton, MD, MS

# CENTER INITIATIVES

## EDUCATION

**Workshop:** In 2023, the brainSTIM Center successfully launched its **first annual BrainSTIM Intensive 3-Day TMS Workshop**. The workshop covered didactic lectures from our brainSTIM Center faculty and hands-on training sessions and demonstrations. See more information on p. 3.

**Seminars:** Throughout 2023, brainSTIM also continued its collaboration with the Center for Neuromodulation in Depression and Stress (CNDS) and the new Center for Brain Imaging and Simulation (CBIS) to present a weekly, virtual speaker series related to Neuromodulation and Neuroimaging Relevant to Affective Disorders. We also continue our collaborations with Penn MindCORE.

**Training:** The brainSTIM Center had both a summer intern and a fellow in 2023. The intern this year was Dezhane Sealy, a junior at Cheyney University, that did an internship in Dr. Roy Hamilton's lab working on improving outreach efforts for underrepresented populations, encouraging their participation in clinical trials related to aphasia. The brainSTIM fellow is Dr. Catherine Norise, who completed medical school and a master's degree in translational research at Penn and then completed her neurology residency at the University of Massachusetts where she was Chief resident in her 4th year. Her current projects look at predictors of response to tDCS (transcranial direct current stimulation) and characterization of the expected disease progression in persons with neurodegenerative aphasia.

## CLINICAL AND INDUSTRY PARTNERSHIPS

brainSTIM continued to foster our relationships with industry partners. ANT Neuro, a technology company specializing in neurodiagnostics, participated in our TMS workshop by giving a hands-on demonstration of TMS paired with EEG and we are continuing our partnership with them. We also continue to expand the services we can provide to clinical trials, and were key TMS partners in an epilepsy trial this year. We will be expanding these services in 2024.

EDUCATIONAL

# TMS WORKSHOP

EVENT

From September 27th to September 29th, 2023, BrainSTIM and the University of Pennsylvania successfully presented the **first annual BrainSTIM Intensive 3-Day TMS Workshop**.

The workshop covered didactic lectures and hands-on training around different neuromodulation topics with attendees from multiple institutions. Topic covered included:

Principles and Mechanisms of TMS  
Potential Safety Concerns  
Clinical and Cognitive Neuroscience Applications of TMS  
TMS Targeting and Experimental Design  
TMS/fMRI and TMS/EEG

brainSTIM Center Director Dr. Roy Hamilton and Dr. Branch Coslett, both Professors in Penn Neurology, opened up the workshop with introductory talks on the principles and mechanisms of TMS. Dr. Sudha Kessler, Assistant Professor of Neurology at CHOP & Penn, gave a lecture on potential safety concerns around TMS and how to mitigate those. The group then did some hands-on motor threshold in the Hamilton lab (run by Olu Faseyitan) and Balderston lab (run by Dr. Balderston).



Dr. Roy Hamilton listening to a lecture during the workshop.



Workshop attendees listening to a lecture by Dr. Nick Balderston.

# TMS WORKSHOP

The second day of the workshop focused on clinical applications in psychiatry with a lecture by Dr. Yvette Sheline, CNDS Director and Professor of Psychiatry, and applications in cognitive neuroscience with a lecture by Dr. John Medaglia, Assistant Professor at Drexel University in the Dept. of Psychological and Brain Sciences. Dr. Nick Balderston, Assistant Professor in Psychiatry, gave lectures on TMS Targeting and e-field modeling. ANT Neuro also did a hands-on demonstration of their simultaneous TMS/EEG equipment for the attendees.

On the final day, Dr. Desmond Oathes, Assistant Professor of Psychiatry, Co-Director of BrainSTIM, Associate Director of CNDS, and Director of CBIS, Dr. Brian Erickson, Research Assistant Professor, and Dr. Mario Cristancho, Associate Professor of Clinical Psychiatry presented. We also had two hands-on sessions related to experimental design and interleaved TMS/fMRI (by Dr. Romain Duprat). Finally, the TMS Workshop attendees were able to enjoy time at our social event held at a local establishment which concluded our first annual TMS workshop.

The Center would like to thank Dr. Nick Balderston for his contributions as the TMS Workshop Coordinator to make this programming possible.

BrainSTIM is excited to be able to offer this workshop yearly going forward!



TMS Targeting Presentation



ANT Neuro Demo



Interleaved TMS/fMRI Demo



## DR. NICHOLAS BALDERSTON

*Nick Balderston, PhD, is an Assistant Professor of Psychiatry and an experimental psychologist focusing on anxiety. His research uses psychophysiology, neuroimaging, and neuromodulation to develop and test brain-behavior hypotheses aimed at understanding the mechanisms that mediate clinical anxiety. Dr. Balderston spearheaded the brainSTIM Center's inaugural TMS Workshop and is a member of brainSTIM's Core Faculty.*

### **What do you like about your neuromodulation work and why is it important?**

I like that I can use neuromodulation as an approach to causally test hypotheses about how the brain works, and how our thoughts and feelings arise from these brain processes.

### **Can you share some projects you are currently working on?**

My primary project is aimed at understanding how brain connectivity changes following brain stimulation. People come in for 3 consecutive “doses” of TMS and then we measure their brain connectivity after each dose. The goal is to develop a computational model that explains these changes. Such a model would help us to find new ways to target the brain networks that make people anxious or depressed.

### **What is one of your future research endeavors?**

I am developing a project now that would use brain stimulation as a model system for memory consolidation. We would then test the effects of sleep deprivation on memory consolidation. This work is exciting, because it could help us to make better brain stimulation therapies by considering the role of sleep on their outcomes.

### **What has been your favorite part of collaborating with the brainSTIM Center and brainSTIM researchers?**

Our 3-day TMS workshop that we organized this past fall was incredibly rewarding. I believe that folks got a lot out of the workshop, and I look forward to expanding the scope of the workshop in the coming years.

### **What do you see as the future for the field of neuromodulation and for yourself in the long-term?**

I believe that the future of neuromodulation will be aimed at developing personalized interventions tailored to the needs of the individual patients. One important aspect of this personalization is to develop targeting approaches that allow for individualization, and I hope to be a part of this development.



## DR. IAHN CAJIGAS

*Iahn Cajigas, MD, PhD, is an Assistant Professor in Neurosurgery and a MD-PhD graduate of the joint Harvard-MIT program in health sciences and technology. Dr. Cajigas' clinical expertise includes deep brain stimulation, focused ultrasound, and stereotactic neurosurgery, the surgical management of epilepsy, the management of refractory pain with neuromodulation, and the surgical/radiosurgical treatment of trigeminal neuralgia.*

### **What do you like about your neuromodulation work and why is it important?**

Current clinical applications of neuromodulation allow us to reversibly alter brain circuits to achieve improvements in the quality of life in our patients who are suffering from challenging neurologic conditions. From a research perspective, neuromodulation allows us to understand the function of critical brain networks and to explore potential new interventions to help with challenging clinical syndromes.

### **Can you share some projects you are currently working on?**

In the operating room, we are currently recording from the motor cortex of patients undergoing Deep Brain Stimulation for the treatment of the movement disorder with the goal of ultimately developing brain computer interfaces to restore arm/hand movement after paralysis.

### **What is one of your future research endeavors?**

I am very interested in the combination of intracranial neuromodulation and spinal cord stimulation for the restoration of motor function after spinal cord injury. There are a number of new exciting research findings in this area which I would love to bring to Penn.

### **What is the importance of having a brainSTIM Center at Penn and being able to collaborate with brainSTIM faculty?**

The brainSTIM Center at Penn brings together an incredible group of investigators with deep expertise across the field of neuromodulation which allows us to work together to tackle extremely challenging clinical problems.

### **What do you see as the future for the field of neuromodulation and for yourself in the long-term?**

The field of neuromodulation will continue to grow in available clinical indications as we learn more about distinct brain networks. Neuromodulation will allow us to not only restore normal brain rhythms that causes a range of pathologies, but to also augment other clinical therapies by applying modulation in concert with them. I believe the combination of neuromodulation with peripheral or spinal cord stimulation will serve an important role in restoring motor function after neurological injuries in the upcoming decade.



# FACULTY

*highlights*

## NICK BALDERSTON, PHD



Dr. Nick Balderston is now a tenure-track Assistant Professor in the Department of Psychiatry. He was instrumental in coordinating the **first annual brainSTIM Center TMS Workshop** this year and has been named as Core Faculty within the brainSTIM Center. Dr. Balderston is an experimental psychologist focusing on anxiety. His research uses psychophysiology, neuroimaging, and neuromodulation to develop and test brain-behavior hypotheses aimed at understanding the mechanisms that mediate clinical anxiety. [Link here!](#)

## IAHN CAJIGAS, MD, PHD



Dr. Iahn Cajigas became a new Core Faculty member in the brainSTIM Center this year. He also received the **NIH NINDS K12 Neurosurgeon Research Career Development Award** and a two-year grant for his project entitled "Motor Cortical and Subcortical Encoding of Naturalistic Upper Extremity Behaviors for Functional Restoration via Brain Computer Interface Controlled Neuro-Prostheses". [Link here!](#)

## DENISE HARVEY, PHD



Dr. Denise Harvey received a **NIH K01 Career Development Award**, awarded by the National Institute on Deafness and Other Communication Disorders (NIDCD). The title of the grant is "Transcranial alternating current stimulation to enhance language abilities". She is a Research Assistant Professor of Neurology at Penn, an Adjunct Professor of Cognitive Psychology at Drexel University, and a Research Associate for Laboratory for Cognition and Neural Stimulation (LCNS) at Penn. [Link here!](#)

# FACULTY

*highlights*

## DESMOND OATHES, PHD



Dr. Desmond Oathes, **Co-Director of brainSTIM**, created his new center this year at Penn, the **Center for Brain Imaging and Stimulation (CBIS)**. The goal of the center is to leverage cutting edge neuroimaging to guide brain stimulation tools that interrogate and manipulate brain networks involved in neuropsychiatric conditions. The center also pursues TMS/fMRI methods development research with broad applications to cognitive and affective systems. The brainSTIM Center has already begun collaborating with CBIS. [Link here!](#)

## YVETTE SHELINE, MD, MS



Dr. Yvette Sheline is a McLure Professor of Psychiatry, Radiology and Neurology and the Director of the Center for Neuromodulation in Depression and Stress (CNDS). She was awarded a grant from NIMH entitled **HARMONY (HCP-2.0: Ascertainig Network Mechanisms and Analytics of Emotional Dysfunction)** which should advance the understanding of links between brain network dysfunction and specific psychopathology. Additionally, she has a new grant with a focus on bipolar disorder. [Link here!](#)

## KELLY SLOANE, MD



Dr. Kelly Sloane had another successful year and was asked to chair a session entitled "Communicating your Science" at the **American Neurological Association** Annual Meeting 2023. Her clinical and research interests focus on recovery of cognitive function after stroke as well as healthcare technology. She has led studies on motor-cognitive recovery after stroke and technology-based cognitive assessment tools, and she is the author of numerous peer-reviewed publications of her research. Dr. Sloane is also a Co-Primary Investigator at the University of Pennsylvania's Laboratory for Cognition and Neural Stimulation (LCNS). [Link here!](#)

# HIGHLIGHTED PUBLICATIONS

1. Tsou, A. Y., **Kessler, S. K.**, Wu, M., Abend, N. S., Massey, S. L., & Treadwell, J. R. (2023). Surgical treatments for epilepsies in children aged 1–36 months: a systematic review. *Neurology*, *100*(1), e1–e15.
2. Webler, R. D., **Oathes, D. J.**, van Rooij, S. J. H., Gewirtz, J. C., Nahas, Z., Lissek, S. M., & Widge, A. S. (2023). Causally mapping human threat extinction relevant circuits with depolarizing brain stimulation methods. *Neuroscience and Biobehavioral Reviews*, *144*, 105005. <https://doi.org/10.1016/j.neubiorev.2022.105005>
3. Deluisi, J. A., & **Oathes, D. J.** (2023). Using metabolic imaging to investigate neuromodulatory mechanisms of rTMS. *Neuropsychopharmacology*, *48*(1), 209–210. <https://doi.org/10.1038/s41386-022-01432-z>
4. Ojukwu, D. I., **Barbosa, D. A.**, Caplan, A. L., & **Halpern, C. H.** (2023). Neurosurgery and Neuroinnovation in the Surgical Suite: The Ethics of Neurostimulation for Severe Obesity. *Ethics and Clinical Neuroinnovation: Fundamentals, Stakeholders, Case Studies, and Emerging Issues* (pp. 117–136). Cham: Springer International Publishing.
5. **Cajigas, I.**, Morrison, M. A., San Luciano, M., & Starr, P. A. (2023). Cerebellar deep brain stimulation for the treatment of movement disorders in cerebral palsy. *Journal of Neurosurgery*, *139*(3), 605–614.
6. Parker, J. J., Rolle, C. E., Shivacharan, R. S., **Barbosa, D. A.**, Feng, A., Huang, Y., Kakusa, B. W., Prieto, T., Jaffe, R.A., Williams N. R., & **Halpern, C. H.** (2023). Appetitive mapping of the human nucleus accumbens. *Biological Psychiatry*, *93*(6), e15–e19.
7. Nissim, N. R., Pham, D. V. H., Poddar, T., Blutt, E., & **Hamilton, R. H.** (2023). The impact of gamma transcranial alternating current stimulation (tACS) on cognitive and memory processes in patients with mild cognitive impairment or Alzheimer's disease: A literature review. *Brain Stimulation*, *16*(3), 748–755. <https://doi.org/10.1016/j.brs.2023.04.001>

# HIGHLIGHTED PUBLICATIONS

- 8.** Li, H., Srinivasan, D., Zhuo, C., Cui, Z., Gur, R. E., Gur, R. C., **Oathes, D. J.**, Davatzikos, C., **Satterthwaite, T. D.**, & Fan, Y. (2023). Computing personalized brain functional networks from fMRI using self-supervised deep learning. *Medical Image Analysis*, *85*, 102756. <https://doi.org/10.1016/j.media.2023.102756>
- 9.** Qiu, L., Spindler, M., & **Halpern, C. H.** (2023). Strategic Utilization of Next-Generation Deep Brain Stimulation Pulse Generators. *Movement Disorders Clinical Practice*, *10*(4), 722.
- 10.** Qiu, L., **Halpern, C. H.**, & **Barbosa, D. A.** (2023). Are we getting closer to offering deep brain stimulation for treatment-resistant depression in clinical practice? *Molecular Psychiatry*, *Jul*;28(7):2627–2629.
- 11.** Peebles, I. S., Phillips, T. O., & **Hamilton, R. H.** (2023). Toward more diverse, inclusive, and equitable neuromodulation. *Brain Stimulation*, *16*(3), 737–741. <https://doi.org/10.1016/j.brs.2023.04.013>
- 12.** Zhao, K., Fonzo, G. A., Xie, H., **Oathes, D. J.**, Keller, C. J., Carlisle, N., Etkin, A., Garza-Villarreal, E. A., & Zhang, Y. (2023). A generalizable functional connectivity signature characterizes brain dysfunction and links to rTMS treatment response in cocaine use disorder. *medRxiv : the preprint server for health sciences*, 2023.04.21.23288948. <https://doi.org/10.1101/2023.04.21.23288948>
- 13.** Mentzelopoulos, G., Driscoll, N., Shankar, S., Kim, B., Rich, R., Fernandez-Nunez, G., Stoll, H., **Erickson, B.**, **Medaglia, J. D.**, & **Vitale, F.** (2023). Alerting attention is sufficient to induce a phase-dependent behavior that can be predicted by frontal EEG. *Frontiers in Behavioral Neuroscience*, *17*, 1176865.
- 14.** Nissim, N. R., McAfee, D. C., Edwards, S., Prato, A., Lin, J. X., Lu, Z., **Coslett, H. B.**, & **Hamilton, R. H.** (2023). Efficacy of Transcranial Alternating Current Stimulation in the Enhancement of Working Memory Performance in Healthy Adults: A Systematic Meta-Analysis. Neuromodulation. *Journal of the International Neuromodulation Society*, *26*(4), 728–737. <https://doi.org/10.1016/j.neurom.2022.12.014>

# HIGHLIGHTED PUBLICATIONS

- 15.** Erani, F., Patel, D., Deck, B. L., **Hamilton, R. H.**, Schultheis, M. T., & **Medaglia, J. D.** (2023). Investigating the influence of an effort–reward interaction on cognitive fatigue in individuals with multiple sclerosis. *Journal of Neuropsychology*, *17*(2), 364–381.
- 16.** Chai, Y., Gehrman, P., Yu, M., Mao, T., Deng, Y., Rao, J., Shi, H., Quan, P., Xu, J., Zhang, X., Lei, H., Fang, Z., Xu, S., Boland, E., Goldschmied, J. R., Barilla, H., Goel, N., Basner, M., Thase, M. E., **Sheline, Y. I.**, Dinges, D. F., Detre, J. A., Zhang, X., & Rao, H. (2023). Enhanced amygdala–cingulate connectivity associates with better mood in both healthy and depressive individuals after sleep deprivation. *Proceedings of the National Academy of Sciences of the United States of America*, *120*(26), e2214505120. <https://doi.org/10.1073/pnas.2214505120>
- 17.** Zrenner, B., Zrenner, C., **Balderston, N.**, Blumberger, D. M., Kloiber, S., Laposa, J. M., Tadayonnejad, R., Trevizol, A. P., Zai, G., & Feusner, J. D. (2023). Toward personalized circuit-based closed-loop brain-interventions in psychiatry: using symptom provocation to extract EEG-markers of brain circuit activity. *Frontiers in Neural Circuits*, *17*, 1208930. <https://doi.org/10.3389/fncir.2023.1208930>
- 18.** Chai, Y., **Sheline, Y. I.**, **Oathes, D. J.**, **Balderston, N. L.**, Rao, H., & Yu, M. (2023). Functional connectomics in depression: insights into therapies. *Trends in Cognitive Sciences*, *27*(9), 814–832. <https://doi.org/10.1016/j.tics.2023.05.006>
- 19.** Zhang, Y., Rennig, J., Magnotti, J. F., & **Beauchamp, M. S.** (2023). Multivariate fMRI responses in superior temporal cortex predict visual contributions to, and individual differences in, the intelligibility of noisy speech. *NeuroImage*, *278*, 120271.
- 20.** Kim, B., **Erickson, B. A.**, Fernandez–Nunez, G., Rich, R., Mentzelopoulos, G., **Vitale, F.**, & **Medaglia, J. D.** (2023). EEG Phase Can Be Predicted with Similar Accuracy across Cognitive States after Accounting for Power and Signal-to-Noise Ratio. *eneuro*, *10*(9).
- 21.** **Barbosa, D. A.**, Gattas, S., Salgado, J. S., Kuijper, F. M., Wang, A. R., Huang, Y., Kakusa, B., Leuze, C., Luczak, A., Rapp, P., Malenka, R. C., Hermes, D., Miller, K. J., Heifets, B. D., Bohon, C. McNab, J. A. & **Halpern, C. H.** (2023). An orexigenic subnetwork within the human hippocampus. *Nature*, *621*(7978), 381–388.

# HIGHLIGHTED PUBLICATIONS

- 22.** Brown, L., White, L. K., Makhoul, W., Teferi, M., **Sheline, Y. I., & Balderston, N. L.** (2023). Role of the intraparietal sulcus (IPS) in anxiety and cognition: Opportunities for intervention for anxiety-related disorders. *International Journal of Clinical and Health Psychology, 23*(4), 100385.
- 23.** Modi, P., Qiu, L., Fallah, T., Courtwright, A., & **Halpern, C. H.** (2023). Magnetic Resonance Guided Focused Ultrasound Thalamotomy for Treatment of Severe Essential Tremor in a Lung Transplant Recipient—A Case Report. *Transplantation Proceedings, 55*(8), 1988–1990.
- 24.** Ramanan, V. K., Armstrong, M. J., Choudhury, P., Coerver, K. A., **Hamilton, R. H.,** Klein, B. C., Wolk, D. A., Wessels, S. R., Jones, L. K., & AAN Quality Committee. (2023). Anti-amyloid monoclonal antibody therapy for Alzheimer disease: emerging issues in neurology. *Neurology, 101*(19), 842–852.
- 25.** Patel, M., Teferi, M., Casalvera, A., Lynch, K., Nitchie, F., Makhoul, W., **Oathes, D. J., Sheline, Y., & Balderston, N. L.** (2023). Interleaved TMS/fMRI shows that threat decreases dlPFC-mediated top-down regulation of emotion processing. *medRxiv : the preprint server for health sciences, 2023.11.11.23298414*. <https://doi.org/10.1101/2023.11.11.23298414>
- 26.** Jiang, B., Ozkara, B. B., Creeden, S., Zhu, G., Ding, V. Y., Chen, H., Lanzman, B., Wolman, D., Shams, S., Trinh, A., Li, Y., Khalaf, A., Parker, J. J., **Halpern, C. H.,** & Wintermark, M. (2023). Validation of a deep learning model for traumatic brain injury detection and NIRIS grading on non-contrast CT: a multi-reader study with promising results and opportunities for improvement. *Neuroradiology, 65*(11), 1605–1617.
- 27.** Deck, B. L., Kelkar, A., **Erickson, B.,** Erani, F., McConathey, E., Sacchetti, D., **Faseyitan, O., Hamilton, R., & Medaglia, J. D.** (2023). Individual-level functional connectivity predicts cognitive control efficiency. *NeuroImage, 283*, 120386.
- 28.** Tompary, A., Xia, A., **Coslett, B. H.,** & Thompson-Schill, S. L. (2023). Disruption of Anterior Temporal Lobe Reduces Distortions in Memory From Category Knowledge. *Journal of cognitive neuroscience, 35*(12), 1899–1918. [https://doi.org/10.1162/jocn\\_a\\_02053](https://doi.org/10.1162/jocn_a_02053)

# MEDIA



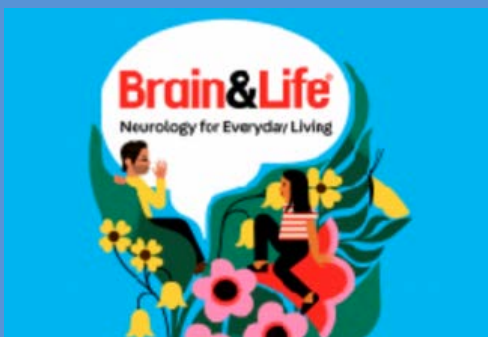
“How can AI and the Brain Work Together?”

In a podcast episode of Brain Friends, **Dr. Roy Hamilton**, Professor of Neurology, Psychiatry, and Physical Medicine and Rehabilitation and Director of both the brainSTIM Center and Penn’s Laboratory for Cognition and Neural Stimulation (LCNS), participated in a part 2 discussion on neuroplasticity. Click or tap on the image to listen!



“Neurotech and the Growing Battle for Our Brains”

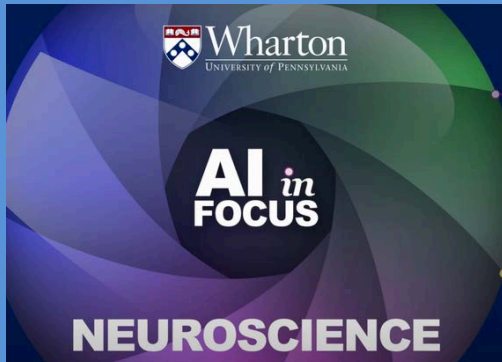
In an episode of PBS WHYY’s The Pulse, **Dr. Roy Hamilton** dives into neurotech-related questions with Nita Farahany, a leading scholar on the social, legal, and ethical implications of emerging technologies, and some of the conclusions she’s come to in her new book, “The Battle for Your Brain: Defending the Right to Think Freely in the Age of Neurotechnology.” Click or tap on the image for more!



“What is Agnosia and How Does it Affect the Brain’s Perception?”

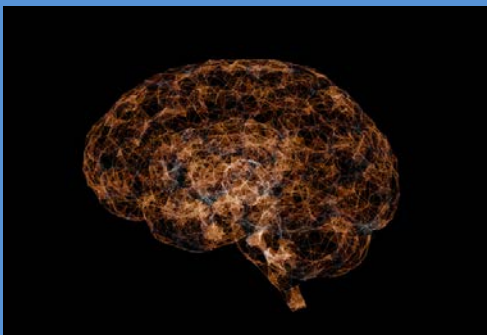
In a special episode, Dr. Sarah Song joins as a guest co-host to talk with **Dr. Roy Hamilton**, behavioral neurologist and professor of neurology at the University of Pennsylvania. Dr. Hamilton discusses agnosia—a rare neurologic disorder characterized by an inability to recognize and identify objects or persons. Dr. Hamilton explains the various types of agnosia, which parts of the brain are affected, and how it is treated. Click or tap on the image for more!

# MEDIA



“How can AI and the Brain Work Together?”

Wharton’s Elizabeth (Zab) Johnson and **Michael Platt** join Eric Bradlow, vice dean of Analytics at Wharton, to discuss how AI is being used in neuroscience to better understand the human brain. The conversation covers remarkable research developments in measuring brain activity, replicating speech and mobility, mental health, and more. This interview is part of a special 10-part series called “AI in Focus.”



“Understanding the brain via a molecular map”

This article discusses *Penn Integrates Knowledge* (PIK) Professor **Michael Platt** and collaborators have generated the first single-cell ‘atlas’ of the primate brain to help explore links between molecules, cells, brain function, and disease.



“Cognitive Gear with Professor Michael Platt”

In this episode, nnpHub explores **Michael Platt’s** expertise in the application of neuroplasticity for Leadership and discusses his book understanding his approach to facilitating leadership development. The host explores his product development and the tools that ensure accurate data can be gathered on the sports field the clinical environments as well as the boardroom.

Click or tap images to be taken to the respective media pages!



# MEDIA



“Battling a Binging Brain”

In this article, **Casey Halpern** recent research focuses on using deep brain stimulation (DBS) to treat conditions like binge eating disorder. In a pilot study, two obese women experienced weight loss and improved eating habits after receiving DBS implants. Halpern aims to expand this research to offer more treatment options for obesity and related disorders. Despite ethical considerations, Halpern is driven by a commitment to patient autonomy and improving quality of life for those with neurological conditions.



“Understanding OCD and Compulsive Behaviors”

This video covers **Dr. Casey Halpern’s** research and clinical practice focus on using deep brain stimulation to treat compulsive and movement disorders such as obsessive-compulsive disorder, eating disorders, as well as other neurologic conditions.



“Optimism and Stroke Outcomes”

**Dr. Kelly Sloane**, Assistant Professor of Neurology at Penn appeared on a SiriusXM podcast Doctor Radio on April 3, 2023 to discuss “Optimism and Stroke Outcomes”.

Click or tap images to be taken to the respective media pages!

# AWARDS



## **Dr. Mario Cristancho:**

### *Albert Stunkard Award*

University of Pennsylvania, June 2023

*Faculty Recognition Award for Outstanding Ability and Commitment to Teaching and Mentoring of Residents*

Dr. Cristancho's clinical focus is in the area of mood disorders particularly treatment resistant depression. He specializes in the use of psychopharmacology and neuromodulation interventions including Transcranial Magnetic Stimulation (TMS), Vagus Nerve Stimulation (VNS), Deep Brain Stimulation (DBS), and electroconvulsive Therapy (ECT).

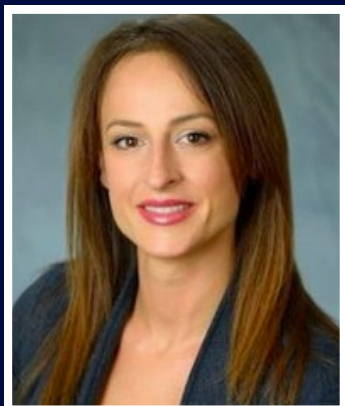


Picture courtesy of PMC

## **Dr. Roy Hamilton**

### *Winner of the Inaugural American Academy of Neurology (AAN) Changemaker Award*

Dr. Hamilton, Director of brainSTIM and the Laboratory of Cognition and Neural Stimulation, was awarded the IDEAS Changemaker Award which is given to an AAN member who has made a meaningful contribution within their academic institution by increasing diversity, equity, and inclusion efforts within the neurology department. It was awarded to him for his "tremendous dedication" to DEI efforts and he received his award at the AAN 2023 Annual Meeting in Boston.



## **Dr. Flavia Vitale**

### *Materials Research Society Communications Early Career Distinguished Presenter*

Dr. Vitale is an Assistant Professor of Neurology, Bioengineering and Physical Medicine and Rehabilitation at the University of Pennsylvania. Her lab designs and develops of novel bioelectronic interfaces for studying, monitoring and treating disorders of the nervous and neuromuscular systems.

# LOOKING TO 2024 & beyond..

In 2024, we look forward to continued growth as an organization, greater innovation, and richer collaboration between brainSTIM investigators.

We are excited to continue our ongoing clinical trials for disorders like depression, attention deficit hyperactivity disorder (ADHD), obsessive compulsive disorder (OCD), binge eating, and language disorders due to stroke and degenerative diseases. Ongoing federally funded and industry sponsored studies that focus on diagnostic and therapeutic approaches in disorders such as acute stroke, epilepsy, and neurodegenerative aphasia (language loss) continue to advance the cutting edge of translational and clinical neuromodulation.

Our research continues to thrive through the initial support of the Perelman School of Medicine, numerous grants and awards, and generous philanthropic gifts to brainSTIM investigators. The Hart Fund, in particular, continues to help our center spearhead novel approaches in precision neuromodulation.

In 2024, the brainSTIM Center will continue to develop our educational initiatives including our robust training course in transcranial magnetic stimulation (TMS), which features lectures and hands-on workshops led by our multidisciplinary team of outstanding brainSTIM faculty. Building on our success in training and education, brainSTIM will collaborate with Penn's Department of Psychiatry in 2024 in developing a certificate program to advance a longitudinal curriculum of research, didactics and clinical activities in neuromodulation.

In the coming year, brainSTIM will continue to foster Penn's vibrant neuromodulation community by co-hosting national and international speakers and showcasing the innovative discoveries of brainSTIM's investigators at impactful national scientific meetings and in the media. We are continuing our collaborations with industry partners to foster long-term relationships and leverage those partnerships to advance the goals of the center.

In short, with its superb team of scientists and clinicians, impactful projects, and committed collaborators and intellectual stakeholders, the future of brainSTIM remains bright. We look forward to working with all of you in the new year and what we hope will be many years to come.

# GIVING OPPORTUNITIES

We all have a stake in preserving and optimizing our brains' remarkable abilities. Thanks to your generous support, brainSTIM makes great progress toward groundbreaking discoveries in neuroscience. These discoveries allow us to develop new treatments for a wide range of neurologic and psychiatric disorders, and to find new ways to revitalize the performance of the human brain throughout the lifespan.

Every day, our globally renowned experts and scientific pioneers make breakthrough discoveries involving neuromodulation into novel treatments for brain disorders. Scientists and clinicians at brainSTIM focus on understanding the complex organization of the brain and harnessing its ability to reorganize in the setting of disease. Armed with this knowledge, we aim to stimulate the brain to undo the symptoms of the most common, debilitating disorders, including depression, anxiety, stroke, and dementia. With faculty whose work spans the fields of neurology, psychiatry, neurosurgery, neurorehabilitation, biomedical engineering, psychology, cognitive neuroscience, and animal research, brainSTIM is a cross-cutting network ideally situated to foster research collaboration across Penn and other institutions around the globe.

Your support will make a positive impact, both in the field of neuroscience and in the lives of patients and their families. Donor support for the brainSTIM Center supports our core efforts in three ways. First, philanthropy is critical to recruiting and retaining the most qualified clinical and translational scientists at the brainSTIM Center. Second, generous giving also supports promising research projects, including seed funding for highly innovative, early-stage research. Finally, philanthropic giving allows the brainSTIM Center to nurture the next generation of translational scientists (PhDs and MDs), who will advance scientific discoveries and develop advanced treatments for brain disorders using neuromodulation. Donors like you help us make discoveries that will reverse the burden of degenerative disorders, and with your support today, we can keep that momentum going.

Your philanthropic dollars make a world of difference in neuromodulation, and we are extremely grateful for your partnership. For additional information, or to donate to the Center, please visit the [brainSTIM Giving Page](#), or the 'Donate' section of the brainSTIM website.

# STAY CONNECTED!



**@PennbrainSTIM**



**@PennbrainSTIM**



**Website**

**[med.upenn.edu/brainSTIMcenter](https://med.upenn.edu/brainSTIMcenter)**

**How can you help  
brainSTIM?**

**[Donate here](#)**

**Contact Email:**

**Penn brainSTIM Center  
[brainSTIM@penmedicine.upenn.edu](mailto:brainSTIM@penmedicine.upenn.edu)**

**Goddard Building, Room 518  
3710 Hamilton Walk  
University of Pennsylvania  
Philadelphia, PA 19104**