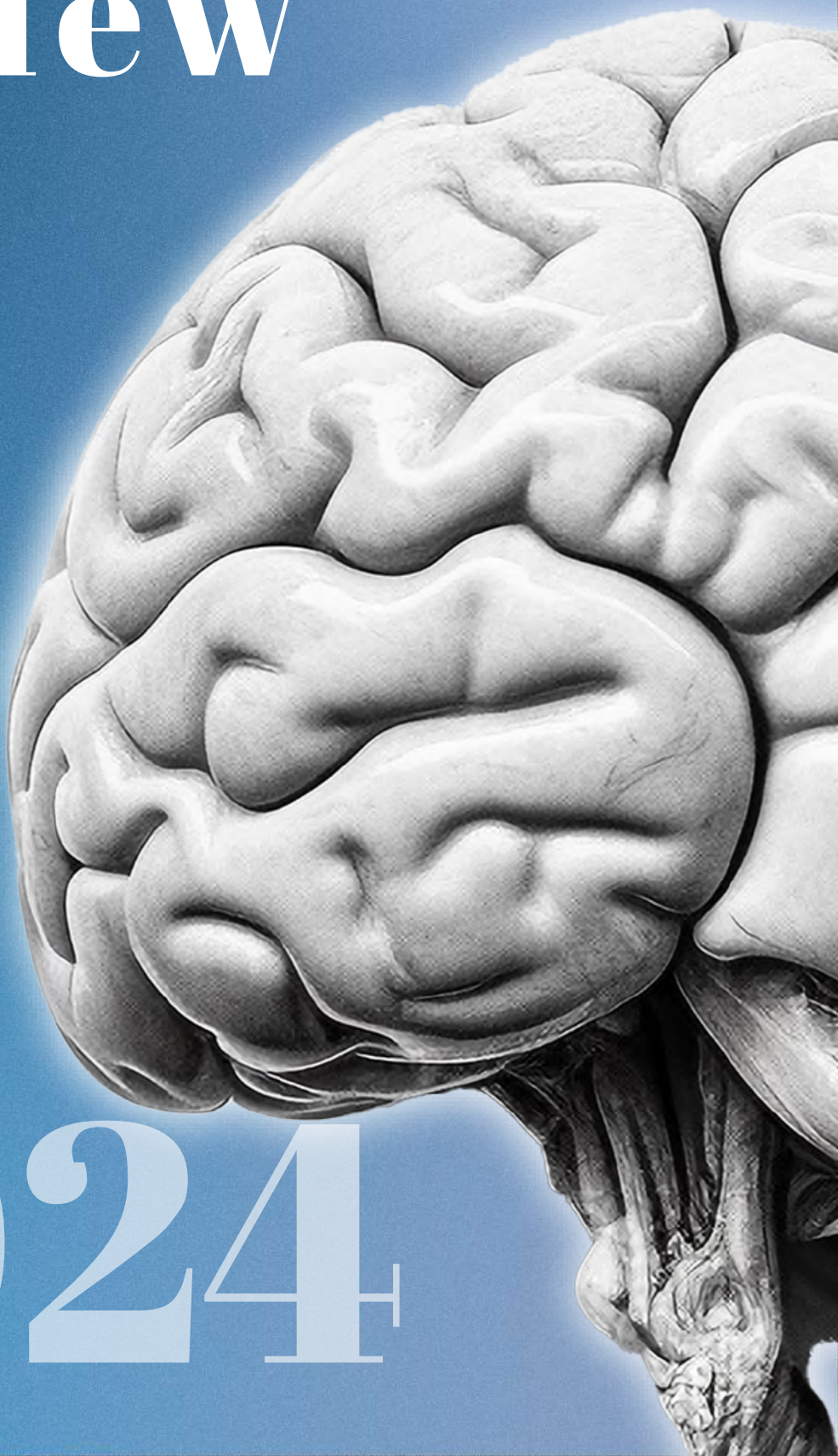
Year in Review

Penn brainSTIM Center



2024

brainSTIM Year in Review 2024

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Director's Words

Dear brainSTIM Community,

It's a pleasure to reflect on another remarkable year at the brainSTIM Center. Our continued momentum in 2024 attests to the excellence of our faculty and partners across the Penn community and beyond.

This year, we were thrilled to welcome Dr. Katherine Scangos and Dr. Catherine Norise to the Center. Dr. Scangos brings outstanding expertise in interventional psychiatry and circuit-based treatments for mood and anxiety disorders, while Dr. Norise, a long-standing contributor to our mission, now officially joins our faculty ranks, deepening our efforts in neuromodulation for language recovery. Their presence underscores our dedication to recruiting leaders who bridge scientific innovation and clinical care.

Our education and outreach efforts grew in new and meaningful ways. We hosted our second annual transcranial magnetic stimulation (TMS) Workshop, where participants enjoyed an immersive introduction to research and clinical applications of this technology. We also co-sponsored dynamic seminars and national meetings, including the inaugural ANT Neuromeeting in North America and Neuromodec NYC 2024, where brainSTIM faculty and trainees presented their cutting-edge work. Meanwhile, our public engagement reached new audiences through events like WHYY's The Pulse and a new exhibit at The Franklin Institute, both highlighting the real-world potential of neuromodulation research.

Throughout the year, brainSTIM investigators received prestigious awards, launched innovative clinical trials, and published impactful research that is shaping the future of brain health. These achievements not only reflect individual excellence but also the power of our collaborative, cross-disciplinary community.

Thank you to everyone who helped make 2024 such a vibrant and productive year. We're energized by the progress we've made—and even more excited about what lies ahead. On behalf of the entire Center, I invite you to explore this year's report and to stay engaged as we continue advancing the science, education, and clinical application of neuromodulation in 2025 and beyond.

Sincerely,

Roy Hamilton, MD, MS

Director, Penn brainSTIM Center

Center Initiatives

Education

Workshop: The brainSTIM Center hosted its second annual TMS Workshop in 2024, offering several lectures by brainSTIM faculty with practical demonstrations and hands-on training sessions.

Seminars: Throughout 2024, brainSTIM held the following seminars:

- **CNDS:** brainSTIM 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 on Neuromodulation and Neuroimaging Relevant to Affective Disorders.
- **Penn MindCORE:** along with MindCORE, brainSTIM co-hosted two feature seminars: one from Dr. Robert Reinhart from the Department of Psychological & Brain Sciences at Boston University and another from Dr. Katherine Dunlop from the Neurosciences and Clinical Translation, Keenan Research Centre for Biomedical Science at St. Michael's Hospital in Toronto.
- **ANT Neuromeeting 2024:** Dr. Sudha Kessler and Dr. John Medaglia both gave presentations at the first ANT Neuro Meeting in North America.
- **NeuromodEC 2024:** Faculty members Dr. John Medaglia, Dr. Desmond Oathes, Dr. Robert Seilheimer, Shreya Parchure, and Dr. Roy Hamilton participated in the 2024 NYC Neuromodulation Conference.

Clinical and Industry Partnerships

Our partnerships with industry leaders continue to strengthen. ANT Neuro, specialists in neurodiagnostic technology, enhanced our TMS workshop with an interactive demonstration combining TMS and EEG technology. Building on this successful collaboration, we've expanded our clinical trial services, notably serving as primary TMS partners in a significant epilepsy study. Looking ahead to 2025, we plan to further broaden our service offerings

Dr. Balderston leading a session during TMS workshop.

TMS Workshop 2024

Leading experts gathered at the brainSTIM Center for an intensive deep-dive into the cutting-edge world of Transcranial Magnetic Stimulation (TMS). The three-day workshop, running from September 25-27, brought together clinicians and researchers for a unique blend of hands-on experience and theoretical exploration.

KC Chelette leading ANTneuro demo.

Camille Blaine, leading concurrent fMRI and TMS demo.

Attendee presenting their idea for TMS study, seeking feedback.

Olu Faseyitan providing hands on instruction.

Participants delved into the mechanics behind TMS technology, with special emphasis on safety protocols and the latest clinical breakthroughs. The comprehensive program featured state-of-the-art demonstrations of TMS integration with functional MRI and electroencephalography (EEG), alongside practical sessions on targeting techniques and experimental design.

The Center extends its gratitude to Dr. Nick Balderston for his ongoing leadership in organizing our second annual TMS Workshop and for ensuring the program's success.

The Center would also like to thank ANT Neuro for a demonstration of their simultaneous TMS/EEG equipment.

News

2024

MindCORE/brainSTIM Seminar

March 1, 2024

Dr. Robert Reinhart,

Department of Psychological & Brain Sciences, Boston University

Talk title: Noninvasive Neuromodulation for Impaired Cognition

New research offers hope for age-related cognitive decline through noninvasive electrical brain stimulation. Our lab's revolutionary approach aims to reverse memory decline in older adults.

Using precise, low-intensity electrical currents through specialized electrodes, we modify brain networks. Clinical trials on both healthy and cognitively impaired participants show promising results, with memory improvements lasting up to a month.

This work advances non-drug treatments for cognitive decline and Alzheimer's disease by targeting the underlying brain mechanisms.

November 1, 2024

Dr. Katharine Dunlop,

Neurosciences and Clinical Translation, Keenan Research Centre for Biomedical Science, St. Michael's Hospital, Toronto

Talk Title: Aging and the Depressed Brain

Normal aging involves cognitive decline and brain changes. Variations in decline rates may indicate accelerated aging and increased health risks. Depression can accelerate cognitive decline, though symptoms vary significantly among individuals.

Using large clinical cohorts, my research examines this variation to develop targeted interventions. I will discuss how aging affects cognition and brain imaging in depression, particularly regarding executive function, suicide risk, and treatment outcomes. I will also present methods for identifying subtypes to better understand aging patterns in this diverse population.

MindCORE
Center for Outreach, Research, and Education

ANT Neuromeeting

The brainSTIM Center had a robust presence at the inaugural North America ANT Neuro Neuromeeting Conference held in Philadelphia, highlighting its significant contributions to advancing neuroscience research. Distinguished brainSTIM faculty members, Dr. John Medaglia, from Drexel University, and Dr. Sudha Kessler, from the Children's Hospital of Philadelphia, delivered engaging presentations on their pioneering work. Dr. Medaglia discussed innovative methods for enhancing cognition in real time, while Dr. Kessler presented her impactful research on clinical applications of EEG technology in pediatric populations. These presentations underscored the brainSTIM Center's dedication to translating cutting-edge neuroscientific findings into practical clinical interventions.

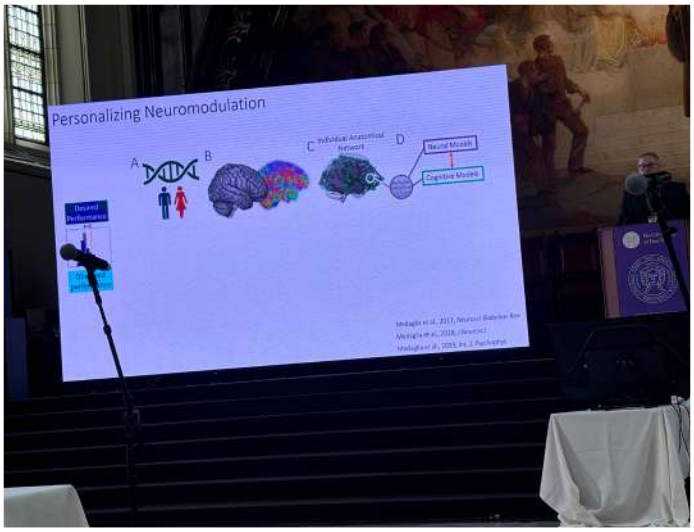
Dr. John Medaglia.

Dr. Sudha Kessler.

Dr. Roy Hamilton and members of the brainSTIM Center during panel discussion at Neuromodec 2024.

Neuromodec Meeting

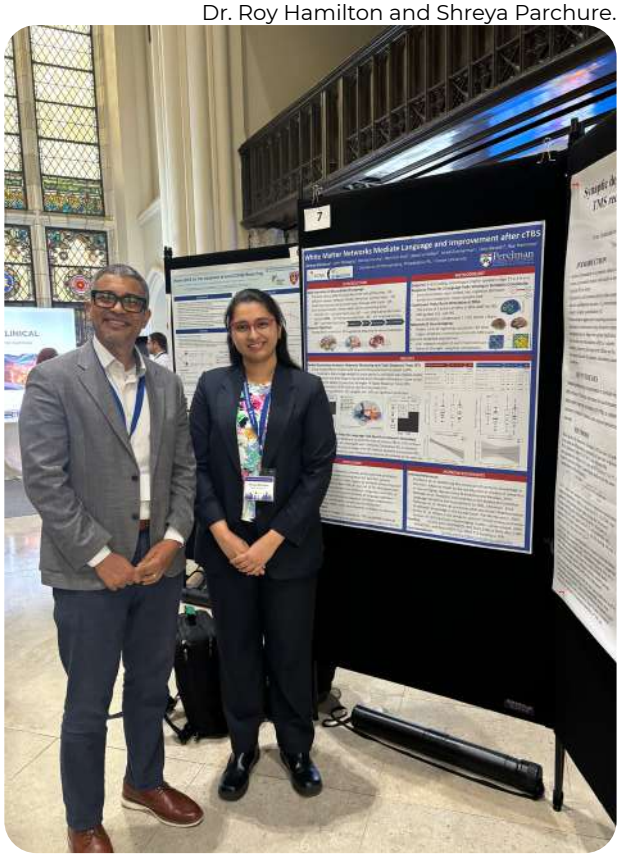
The University of Pennsylvania and the brainSTIM Center had a strong and dynamic presence at the Neuromodec NYC 2024 conference, showcasing the breadth and depth of their neuromodulation research. Dr. Roy Hamilton moderated the Imaging-Guided Neuromodulation panel, which featured center-affiliated researchers Dr. John Medaglia, Dr. Desmond Oathes, Dr. Robert Seilheimer, and graduate student Shreya Parchure. Additional invited talks were delivered by Dr. Yvette Sheline, who presented on innovative stimulation protocols for depression, and Dr. Nicholas Balderston,



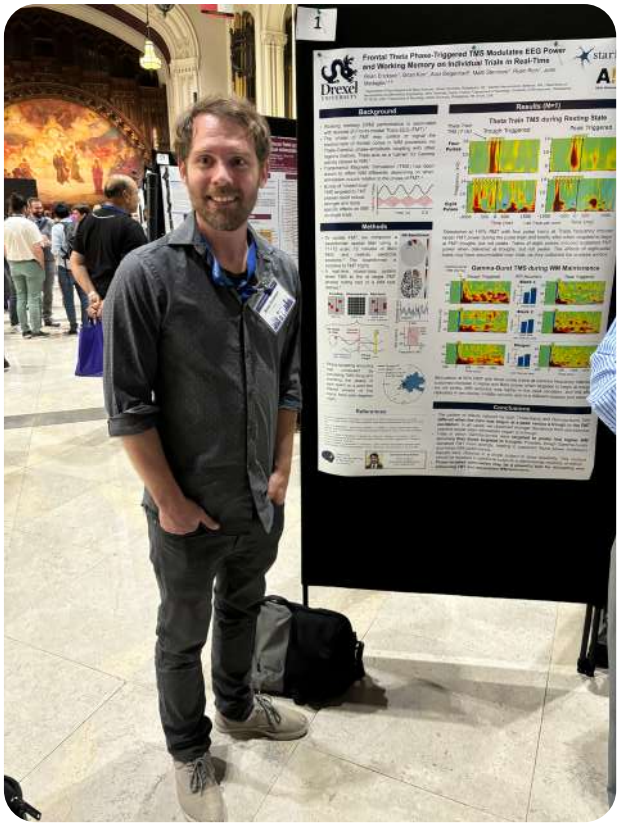
Dr. John Medaglia.

Dr. Desmond Oathes.

Dr. Roy Hamilton and Shreya Parchure.

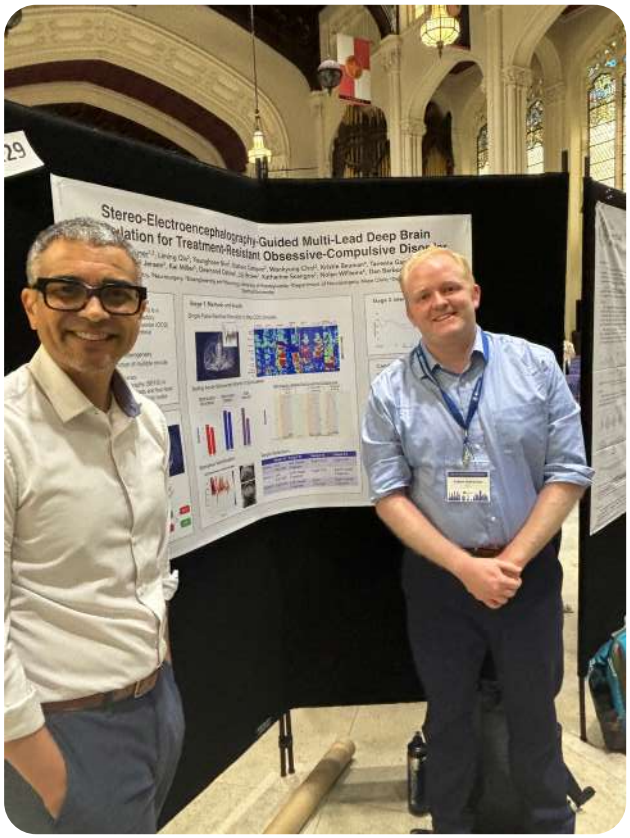


Dr. Brian Erickson.



who discussed the advantages of electric field (e-field) modeling in neuronavigation-guided transcranial magnetic stimulation studies. Poster presentations by Dr. Brian Erickson, Dr. Robert Seilheimer, and Shreya Parchure further highlighted the Center's leadership in advancing the science and application of invasive and noninvasive brain stimulation.

Title screen of Dr. Yvette Sheline's presentation.



Dr. Robert Seilheimer.

New Faculty

2024

Welcome to our new faculty!

Dr. Katherine Scangos

The brainSTIM Center is delighted to welcome Dr. Katherine Scangos, MD, PhD, as a new core faculty member. Dr. Scangos holds appointments as Associate Professor CE of Psychiatry and Neurosurgery at the University of Pennsylvania and serves as the Director of the Brain Circuit Therapeutics Clinic and Attending Physician in the Neuromodulation Service. Her clinical and research endeavors focus on interventional psychiatry, employing techniques such as transcranial magnetic stimulation (TMS) and deep brain stimulation (DBS) to treat conditions like treatment-resistant depression and obsessive-compulsive disorder. Dr. Scangos's work integrates advanced neuroimaging and neuromodulation methods to identify neural biomarkers and develop personalized, circuit-based interventions for psychiatric disorders. Her expertise enhances the BrainSTIM Center's mission to advance innovative neuromodulation therapies.

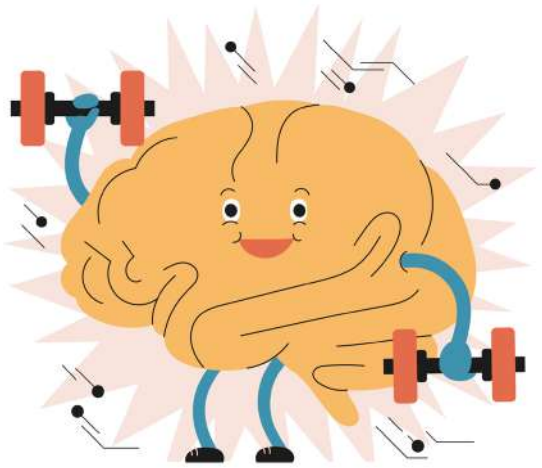
Dr. Catherine Norise

The Penn brainSTIM Center is pleased to welcome Dr. Catherine Norise, MD, as a Center Scientist. Dr. Norise, an Assistant Professor of Neurology at the Hospital of the University of Pennsylvania, specializes in cognitive neurology and neuromodulation. Her research focuses on utilizing noninvasive brain stimulation techniques, such as transcranial magnetic stimulation (TMS) and transcranial direct current stimulation (tDCS), to improve language function in patients with post-stroke aphasia and neurodegenerative conditions. Dr. Norise's work has been instrumental in advancing our understanding of the neural mechanisms underlying language recovery and cognitive rehabilitation. As the brainSTIM Center's first fellow, she has played a pivotal role in the Center's mission to develop talented neuromodulation researchers. We are excited to have her continue contributing to our interdisciplinary efforts to enhance brain health and cognitive function.

Media & Awards

2024

Media



Dr. Roy Hamilton Interviewed for Authority Magazine on Maintaining Brain Health

May 3, 2024

Dr. Roy Hamilton sat down with Authority Magazine to discuss how lifestyle habits support cognitive well-being. Dr. Hamilton serves as a Trustee of the McKnight Brain Research Foundation, the nation's only private foundation dedicated exclusively to discovering the mysteries of the aging brain. He discussed modifiable risk factors, nutrition, genetic predispositions, social connections, sleep and mindfulness as important parts of overall health.

Dr. Yvette Sheline's aiTBS therapy study for bipolar disorder featured in Penn Today

July 17, 2024

Dr. Yvette Sheline was featured in a Penn Today article titled "New form of repetitive magnetic brain stimulation reduces treatment time for bipolar disorder." Dr. Sheline discusses how accelerated intermittent theta burst stimulation (aiTBS) therapy can be used for depressed patients with bipolar disorder who may not respond well to drugs or cannot tolerate their side effects while also shortening the treatment window.

Awards & Accolades

Dr. Sudha Kessler

University of Pennsylvania Perelman School of Medicine Dean's Award for Excellence in Clinical Teaching.

Dr. Sudha Kessler, Associate Professor of Neurology at the Perelman School of Medicine and the Children's Hospital of Philadelphia (CHOP), and Penn BrainSTIM faculty has been honored with the 2024 Dean's Award for Excellence in Clinical Teaching at an Affiliated Hospital. As the Catherine D. Brown Endowed Chair in Pediatric Epilepsy, Dr. Kessler leads both the Child Neurology Residency and Pediatric Epilepsy Fellowship programs at CHOP. Her research focuses on pediatric epilepsy, including the use of neuromodulation techniques such as transcranial magnetic stimulation (TMS) to explore and treat epileptic mechanisms in children. Dr. Kessler's work contributes to advancing noninvasive brain stimulation methods. This award recognizes her exceptional commitment to clinical education and her impactful contributions to pediatric neurology and neuromodulation research.

Dr. Desmond Oathes

As the Director of the Center of Brain imaging and Stimulation (CBIS), and Associate Director of the Center for Neuromodulation in Depression and Stress (CNDS), Dr. Oathes investigates brain network communication and develops noninvasive brain stimulation tools. His notable 2024 achievements include:

- Recognition in **NIMH Strategic Plan Progress Report** for brain mechanism research
- Named to the **American College of Neuropsychopharmacology (ACNP)** program committee
- Selected as mentor for **ACNP's Underrepresented Near-Peer Mentorship Program**

Dr. John Medaglia

Outstanding Early Career Alumni Award from Pennsylvania State University Department of Psychology.

Dr. John D. Medaglia, an esteemed alumnus of Penn State's Department of Psychology, has been honored with the Outstanding Early Career Alumni Award in recognition of his significant contributions to the fields of cognition, connectomics, and neuromodulation. As a tenured Associate Professor at Drexel University and core faculty member at the University of Pennsylvania's brainSTIM Center, Dr. Medaglia's interdisciplinary research bridges cognitive neuroscience and neuroengineering. His work focuses on understanding and enhancing cognitive control through advanced brain network analysis and noninvasive brain stimulation techniques. This award highlights Dr. Medaglia's impactful research and his commitment to advancing our understanding of the human brain.

Dr. Flavia Vitale

National Science Foundation Career Award

Dr. Flavia Vitale, an Associate Professor in Penn Engineering and Neurology at Penn Medicine, was awarded a prestigious 2024 NSF CAREER Award for her groundbreaking work developing accessible, multimodal devices to diagnose and treat neurological disorders. A key collaborator with the Penn brainSTIM Center, Dr. Vitale's research leverages electrically conductive nanomaterials known as MXenes to create advanced brain-interface technologies that can interact with both the electrical and chemical signals in the brain—paving the way for more precise, minimally invasive, and affordable solutions for patients with epilepsy and other drug-resistant conditions. Her CAREER Award not only supports this research but also expands educational outreach, including high school internships and student training in neuroengineering at Penn.

WHYY's "The Pulse" 10th Anniversary

LCNS research coordinator Jeffry Alfaro prepares to stimulate Maiken Scott as she interviews Dr. Hamilton.

Dr. Roy Hamilton, Director of Penn's brainSTIM Center, was a featured guest on WHYY's The Pulse during its 10th anniversary live show, hosted by Maiken Scott. In this special episode, Dr. Hamilton discussed his work with noninvasive brain stimulation technologies, such as transcranial direct current stimulation (tDCS), to explore and enhance cognition in both clinical and healthy populations.

Maiken, Dr. Hamilton, other presenters & WHYY benefactors.

Jeffry applies tDCS electrodes to Maiken.

In a compelling demonstration, Scott volunteered to receive tDCS live on stage while Dr. Hamilton explained how these mild electrical currents are being used to study brain function and potentially improve focus, creativity, and recovery from neurological conditions like stroke. The event highlighted the intersection of cutting-edge neuroscience and public engagement, underscoring the brainSTIM Center's commitment to advancing cognitive health through innovative research.

Dr. Hamilton.

Maiken, Dr. Hamilton, and other presenters.

Eldith DC (tDCS) stimulator.

Mxene electrodes on loan from the Vitali Lab.

Franklin Institute Body Odyssey Exhibit

The brainSTIM Center has partnered with The Franklin Institute to contribute to the new "Tomorrow's Body Odyssey" exhibit, showcasing cutting-edge advancements in neuromodulation technology. On display is a transcranial direct current stimulation (tDCS) device from the Laboratory for Neural Stimulation, offering visitors a glimpse into noninvasive brain stimulation techniques. Additionally, the exhibit features an array of MXene electrodes developed by Dr. Flavia Vitale's lab, highlighting innovative materials designed for advanced neural interfacing. This collaboration underscores the brainSTIM Center's commitment to public engagement and education in neuroscience.

Example of transcranial electrical stimulation (tES).

Example of intercranial and extracephalic Mxene electrodes.

Body Odyssey exhibit at the Franklin Institute.

Sunday Breakfast Club

Dr. Roy Hamilton, was invited by Maiken Scott, host of WHYY's health and science podcast The Pulse, to reprise his presentation and discussion this time at a Sunday Breakfast Club event. The Sunday Breakfast Club Philadelphia, an organization where "Philadelphia's leaders gather to learn from one another and share ideas to make the city soar," hosted the event. During the event, Jeffry Alfaro, a clinical research coordinator within the Laboratory for Cognition and Neural Stimulation, administered transcranial direct current stimulation (tDCS) live on stage. Dr. Hamilton and Ms. Scott discussed electrical brain stimulation techniques and their applications. Two other area scientists also participated in the event, followed by a Q&A session for all of the scientists.

Maiken Scott.

Maiken, Jeffry, and Dr. Hamilton.

Jeffry prepping Maiken for tDCS.

Maiken getting tDCS stimulation while interview Dr. Hamilton.

Publications

2024

Higlighted Publications

- Nho, Y. H., Rolle, C. E., Topalovic, U., Shivacharan, R. S., Cunningham, T. N., Hiller, S., Batista, D., Feng, A., Espil, F. M., Kratter, I. H., Bhati, M. T., Kellogg, M., Raslan, A. M., Williams, N. R., Garnett, J., Pesaran, B., **Oathes, D. J.**, Suthana, N., Barbosa, D. A. N., & **Halpern, C. H.** (2024). Responsive deep brain stimulation guided by ventral striatal electrophysiology of obsession durably ameliorates compulsion. *Neuron, 112*(1), 73–83.e4. https://doi.org/10.1016/j.neuron.2023.09.034

- Saluja, S., Qiu, L., Wang, A. R., Campos, G., **Seilheimer, R.,** McNab, J. A., Haber, S. N., Barbosa, D. A. N., & **Halpern, C. H.** (2024). Diffusion magnetic resonance imaging tractography guides investigation of the zona incerta: A novel target for deep brain stimulation. *Biological Psychiatry*. Advance online publication. https://doi.org/10.1016/j.biopsych.2024.02.1004

- Dengler, J., Deck, B. L., Stoll, H., Fernandez-Nunez, G., Kelkar, A. S., Rich, R. R., **Erickson, B. A.,** Erani, F., **Faseyitan, O., Hamilton, R. H.,** & **Medaglia, J. D.** (2024). Enhancing cognitive control with transcranial magnetic stimulation in subject-specific frontoparietal networks. *Cortex, 172*, 141–158. https://doi.org/10.1016/j.cortex.2023.11.020

- Webler, R. D., Morales Carrasco, C., Cooper, S. E., Chen, M., Hunt, C. O., Hennessy, S., Cao, L., Lam, C., Chiu, A., Differding, C., Todd, E., Hendrickson, T. J., **Oathes, D. J.,** Widge, A. S., Hermosillo, R. J. M., Nelson, S. M., Fair, D. A., Lissek, S. M., & Nahas, Z. (2024). Causally probing the role of the hippocampus in fear discrimination: A precision functional mapping-guided, transcranial magnetic stimulation study in participants with posttraumatic stress symptoms. *Biological Psychiatry: Global Open Science, 4*(3), 100309. https://doi.org/10.1016/j.bpsgos.2024.100309

- Qiu, L., Chang, A., Ma, R., Strong, T. V., Okun, M. S., Foote, K. D., Wexler, A., Gunduz, A., Miller, J. L., & **Halpern, C. H.** (2024). Neuromodulation for the treatment of Prader-Willi syndrome: A systematic review. *Neurotherapeutics, 21*(3), e00339. https://doi.org/10.1016/j.neurot.2024.e00339

- Das, R., Gliske, S. V., West, L. C., Summers, M. O., Tang, S., Hirt, L., Maroni, D., **Halpern, C. H.,** Thompson, J. A., Kushida, C. A., & Abosch, A. (2024). Sleep macro-architecture in patients with Parkinson's disease does not change during the first night of neurostimulation in a pilot study. *Journal of Clinical Sleep Medicine*. Advance online publication. https://doi.org/10.5664/jcsm.11180

- Teferi, M., Gura, H., Patel, M., Casalvera, A., Lynch, K. G., Makhoul, W., Deng, Z. D., **Oathes, D. J., Sheline, Y. I.,** & **Balderston, N. L.** (2024). Intermittent theta-burst stimulation to the right dorsolateral prefrontal cortex may increase potentiated startle in healthy individuals. *Neuropsychopharmacology*. Advance online publication. https://doi.org/10.1038/s41386-024-01871-w

- **Erickson, B.,** Kim, B., Sabes, P., Rich, R., Hatcher, A., Fernandez-Nuñez, G., Mentzelopoulos, G., **Vitale, F.,** & **Medaglia, J.** (2024). TMS-induced phase resets depend on TMS intensity and EEG phase. Journal of neural engineering, 21(5), 056035. https://doi.org/10.1088/1741-2552/ad7f87

- **Cristancho, M.,** Fava, M., Ingelfinger, J., Nikayin, S., & Sanacora, G. (2024). Depression - Advanced Treatments for Treatment-Resistant Depression. The New England journal of medicine, 390(20), e44. https://doi.org/10.1056/NEJMp2310181

- Duprat, R. J., Linn, K. A., **Satterthwaite, T. D., Sheline, Y. I.,** Liang, X., Bagdon, G., Flounders, M. W., Robinson, H., **Platt, M.,** Kable, J., Long, H., Scully, M., Deluisi, J. A., Thase, M., **Cristancho, M.,** Grier, J., Blaine, C., Figueroa-González, A., & **Oathes, D. J.** (2024). Resting fMRI-guided TMS evokes subgenual

anterior cingulate response in depression. *NeuroImage, 305, 1–9.* https://doi.org/10.1016/j.neuroimage.2024.120963

- **Sheline, Y. I.,** Makhoul, W., Batzdorf, A. S., Nitchie, F. J., Lynch, K. G., Cash, R., & **Balderston, N. L.** (2024). Accelerated intermittent theta-burst stimulation and treatment-refractory bipolar depression: A randomized clinical trial. *JAMA Psychiatry, 81*(9), 936–941. https://doi.org/10.1001/jamapsychiatry.2024.1787

- **Balderston, N. L.,** Duprat, R. J., Long, H., Scully, M., Deluisi, J. A., Figueroa-Gonzalez, A., Teferi, M., **Sheline, Y. I.,** & **Oathes, D. J.** (2024). Neuromodulatory transcranial magnetic stimulation (TMS) changes functional connectivity proportional to the electric-field induced by the TMS pulse. *Clinical Neurophysiology, 165*, 16–25. https://doi.org/10.1016/j.clinph.2024.06.007

- Vaz, A., Wathen, C., Miranda, S., Thomas, R., Darlington, T., Jabarkheel, R., Tomlinson, S., Arena, J., Bond, K., Salwi, S., Ajmera, S., Bachschmid-Romano, L., Gugger, J., Sandsmark, D., Diaz-Arrastia, R., Schuster, J., Ramayya, A. G., **Cajigas, I.,** Pesaran, B., Chen, H. I., & Petrov, D. (2024). Return of intracranial beta oscillations and traveling waves with recovery from traumatic brain injury. *bioRxiv*. https://doi.org/10.1101/2024.07.19.604293

- Gallagher, R. S., Sinha, N., Pattnaik, A. R., Ojemann, W. K. S., Lucas, A., LaRocque, J. J., Bernabei, J. M., Greenblatt, A. S., Sweeney, E. M., **Cajigas, I.,** Chen, H. I., Davis, K. A., Conrad, E. C., & Litt, B. (2024). The sixth sense: How much does interictal intracranial EEG add to determining the focality of epileptic networks? *Brain Communications, 6*(5), fcae320. https://doi.org/10.1093/braincomms/fcae320

- Qiu, L., Pomeraniec, I. J., Howard, S. D., Ajmera, S., Bagley, L. J., **Cajigas, I.,** Kennedy, B. C., & **Halpern, C. H.** (2024). Intraprocedural three-dimensional imaging registration optimizes magnetic resonance imaging-guided focused ultrasound and facilitates novel applications. *Operative Neurosurgery*.

Advance online publication. https://doi.org/10.1227/ons.0000000000001457

- Dengler, J., Deck, B. L., Stoll, H., Fernandez-Nunez, G., Kelkar, A. S., Rich, R. R., **Erickson, B. A.,** Erani, F., **Faseyitan, O., Hamilton, R. H.**, & **Medaglia, J. D.** (2024). Enhancing cognitive control with transcranial magnetic stimulation in subject-specific frontoparietal networks. *Cortex, 172,* 141–158. https://doi.org/10.1016/j.cortex.2023.11.020

- **Sloane, K. L.,** & **Hamilton, R. H.** (2024). Transcranial direct current stimulation to ameliorate post-stroke cognitive impairment. *Brain Sciences, 14*(6), 614. https://doi.org/10.3390/brainsci14060614

- de Wit, M. M., **Faseyitan, O.,** & **Coslett, H. B.** (2024). Always expect the unexpected: Eye position modulates visual cortex excitability in a stimulus-free environment. *Journal of Neurophysiology, 131*(5), 937–944. https://doi.org/10.1152/jn.00169.2023

Looking to 2025 & beyond

As we look ahead to 2025, the brainSTIM Center remains committed to advancing cutting-edge neuromodulation research and strengthening our cross-disciplinary intellectual community at Penn and beyond.

Our research programs continue to expand across a broad range of neurologic and psychiatric conditions. Ongoing clinical trials target depression, OCD, binge eating, and language disorders associated with stroke and neurodegenerative disease. We are also engaged in federally funded and industry-supported studies focused on epilepsy, stroke, and neurodegenerative aphasia. These projects reflect our growing impact in translational neuroscience and our commitment to improving lives through innovative neuromodulation therapies.

This progress would not be possible without strong institutional support from the Perelman School of Medicine, competitive grant funding, and the generous philanthropic contributions of our supporters. In particular, the Hart Fund continues to catalyze novel, precision-focused research across our Center.

Education and training continue to be central to our mission. Our TMS course—which combines lectures and hands-on workshops led by our diverse faculty—remains a cornerstone of our educational offerings. In 2025, we are excited to deepen our partnerships with the Departments of Neurology and Psychiatry to build new educational pathways in neuromodulation for residents, fellows, and early-career investigators.

This year offers exciting opportunities to engage with the broader scientific community. In partnership with the Penn Translational Neuroscience Center, brainSTIM is co-hosting the PTNC Neuromodulation Symposium—a two-day gathering of national and international leaders in the field. We're also building momentum through events like the 2025 ANT NeuroMeeting, which strengthens our national presence and reflects our growing role in shaping the future of neuromodulation.

We will continue to foster collaborations with academic and industry partners, host prominent scientific speakers, and elevate the work of our investigators through media engagement and major scientific conferences. These efforts reflect our enduring goal: to create a truly integrated ecosystem for discovery, education, and innovation in brain stimulation.

With a growing network of scientists and clinicians, a strong foundation of support, and a shared vision for progress, the brainSTIM Center enters 2025 with momentum and optimism. We look forward to deepening our impact, supporting our community, and shaping the future of neuromodulation together

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.

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