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Message from the Director

Welcome and welcome back! With the start of a new academic year, there is much to look forward to. I am thrilled to announce that the BMEII Symposium will be back as an in-person event in 2022 after a two-year hiatus due to the pandemic. We look forward to gathering experts across imaging modalities, nanotechnology, machine learning, data science, and digital

health to learn from one another and advance our collective understanding of how these tools can promote health and wellbeing. More information on our events can be found in this issue and will be distributed over the coming months. In the meantime, please enjoy the Fall issue of the BMEII newsletter.

BMEII News & Updates

Congratulations Corner

Yael Jacob, PhD, who started as a postdoctoral Fellow at BMEII in April 2018, joined the Depression and Anxiety Center for Discovery and Treatment in the Department of Psychiatry as Assistant Professor with a secondary appointment in BMEII this fall. Her research uses advanced neuroimaging to study structural and functional neural networks across different mood and anxiety disorders to understand how brain networks communicate and influence each other during different cognitive states.

Bradley Delman, MD has worked with Priti Balchandani, PhD since 2016 and has been formally BMEII-affiliated faculty since 2018. This fall, he has been promoted to Full Professor. He provides clinical and diagnostic expertise for many of the 7T neuroimaging protocols under Dr. Balchandani. This work complements his administrative, quality and clinical roles in the Department of Radiology. Dr. Delman is honored to contribute to such a well-organized and productive team.

BMEII is hiring!

We are looking for innovative, motivated faculty, postdocs, researchers, and support staff to join our team. Visit our [website](https://www.bmeiisina.org) for all open positions and instructions on how to apply.

Welcome, New BMEII Staff

Jamel A. Hicks recently joined BMEII as an Administrative Assistant. In his 5 years at Mount Sinai, Jamel has been a Patient Service Representative at Mount Sinai Union Square and a Senior Secretary in the Department of Orthopedics. Jamel completed his MBA in financial services at the Metropolitan College of New York. He is honored to join BMEII and looks forward to working with the diverse staff here.



Liliana Hopkins, a high school senior at Secaucus High School, joined BMEII in June 2021 as a volunteer. Her primary responsibilities included the redesigning and rewriting of the neuroimaging webpage. In addition to her work for BMEII, Liliana completed an internship at the Metropolitan Museum of Art and a mentorship for The Incandescent Review's Summer Studio. She plans to pursue a career in science communication and degrees in both the sciences and humanities.



Shams Rashid completed his undergraduate studies in Electrical Engineering at the City College of New York and received his PhD in Biomedical Engineering from Stony Brook University. He trained as a postdoctoral scholar at UCLA, specializing in Cardiac MRI. Prior to joining Mount Sinai, he was an Associate Scientist in St. Francis Hospital (Roslyn, NY). As an Instructor in BMEII, Shams plans to focus on Translational Neuroimaging with Ultrahigh Field MRI in the ANRP as well as contribute collaboratively to Cardiovascular and Body MRI.



Sera Saju is a research coordinator for multiple projects in ANRP looking at post-COVID symptoms. Before working at Mount Sinai, Sera was a research assistant for 2 years at NYU Langone for a study investigating predictive markers for bariatric surgery outcomes. She is currently working toward a Master's in Biomedical Science at Rutgers University while applying to medical schools.



Postdoc Spotlight

Bram Priem, MD

Bram Priem is a post-doctoral fellow in BMEII's Nanomedicine Laboratory. He received his medical degree at the University of Amsterdam in the Netherlands in 2016. After working in the medical field for a year, he started a PhD in nanotechnology with Dr. Willem Mulder as a supervisor and visited Mount Sinai several times for experiments. Dr. Priem's doctoral work focused on the development of a nanoparticle that induces trained immunity as a novel immunotherapy in cancer treatment. For this project he used BMEII's extensive facilities. Using imaging probes and the micro PET/CT, Dr. Priem and his team were able to image shifts of myeloid cell populations and increases in metabolism in the bone marrow and confirm the biodistribution of their novel particle in mice and non-human primates.

This project has resulted in a publication in Cell titled: 'Trained Immunity-Promoting Nanobiologic Therapy Suppresses Tumor Growth and Potentiates Checkpoint Inhibition'.

Currently Dr. Priem is performing a follow up project that has a deeper focus on the changes happening in the tumor microenvironment after treatment with their trained immunity inducing nanobiologic.

While his work primarily focuses on cancer treatment, Dr. Priem also aims to contribute to the fast and early detection of cancer and to identify the translational characteristics of nanoparticles in other diseases. To this end, he is currently investigating the results of treatment

on the immune system inside the tumor microenvironment. The Nanomedicine Lab, now run by Drs. Bram Teunissen and Mandy van Leent, combines both chemistry and translational research for the fast and efficient development of new treatments. This provides a creative and collaborative working environment. Outside of research, Dr. Priem enjoys running, snowboarding and cooking. In the future he hopes to start a residency in Internal Medicine and become an Oncologist.

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Meeting Spotlight

Save the Date!

BMEII Symposium & Radiology Retreat

THE TENTH ANNUAL
BMEII SYMPOSIUM
hosted by the BioMedical Engineering and Imaging Institute at the
Icahn School of Medicine at Mount Sinai in New York

Tessa Sundaram Cook, MD, PhD · Stephanie I. Fraley, PhD · James Dahlman, PhD · Penny Gowland, PhD · Tim Leiner, MD, PhD · Karla Miller, PhD · Nitish V. Thakor, PhD

ARTIFICIAL INTELLIGENCE · BIG DATA · NANOTECHNOLOGY ·
NEUROIMAGING · CANCER THERAPEUTICS · DIGITAL HEALTH

APRIL 27-28, 2022

Engineering & Medicine Seminar Series

For an updated schedule of lectures, check out our [webpage](#). The series will take place on Zoom for the remainder of the year. Interested in presenting? Contact Mallory Stellato at mallory.stellato@mssm.edu.

The Intersection of Neurosurgery, Psychiatry, and Imaging

Ki Sueng Choi, PhD

Ki Sueng Choi, PhD, is an Assistant Professor of Radiology and Neurosurgery at the Icahn School of Medicine at Mount Sinai and joined the BMEII Neuroimaging faculty in 2018. He heads a multimodal imaging core at the Nash Family Center for Advanced Circuit Therapeutics (CACT), specializing in advanced precision surgical treatments for neuropsychiatric disorders. Dr. Choi earned his PhD in bioengineering from the Georgia Institute of Technology, focusing on functional and structural neuroimaging in various psychiatric disorders. He completed a postdoctoral fellowship and served as an Assistant Professor in the Department of Psychiatry and Behavioral Science at Emory University.

Dr. Choi is the Imaging Core lead scientist at CACT. His research focuses on connectome-based deep brain stimulation (DBS) strategies for various neurological and psychiatric disorders. The Choi lab is developing a precision surgical targeting approach based on brain connectivity analyses, “Connectome DBS,” that integrates multimodal structural (diffusion tractography) and functional (resting-state fMRI and PET) imaging strategies. Over the past decades, DBS has demonstrated remarkable clinical benefits for people with neuropsychiatric conditions. Though current DBS targets are still predominantly based on the historical efficacy of stereotactic lesions, accumulating evidence suggests that DBS primarily works by rebalancing and remodeling diseased brain circuits. Therefore, the field of DBS

is currently experiencing a paradigm shift away from the focal effects of stimulation on the target anatomical structure toward impacting distributed brain networks. This development is paralleled by the maturation of the “connectome” in the field of neuroimaging. Significantly, the recent implementation of computational neural field models to DBS leads and diffusion tractography images allows us to estimate activation white matter pathways in an individual patient with given stimulation parameters (i.e. location, amplitude, pulse width). This novel connectome approach

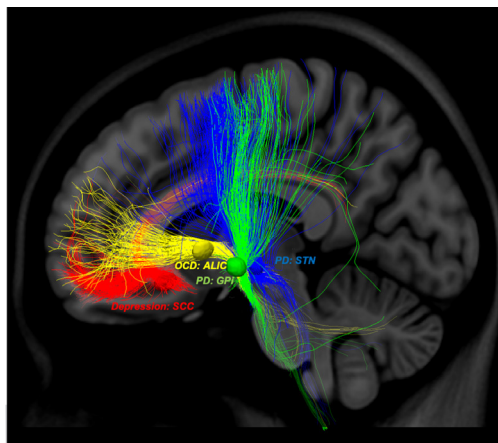


Figure 1. Connectome Deep Brain Stimulation and white matter activation pathway in Subcallosal Cingulate Cortex (SCC) for treatment-resistant depression (Red), Anterior Limb of Internal Capsule (ALIC) for OCD (Yellow), STN and GPI for Parkinson's Disease (GPI: Green and STN: Blue).

has been applied to subcallosal cingulate DBS for treatment-resistant depression, and it shows an 80% response rate compared to 41% anatomy-based targeting. Currently, this approach is being tested in OCD patients treated with DBS of the Anterior Limb of Internal Capsule (ALIC), a recently funded R01 project (Drs. Choi and Figeo, MPI). In addition, a newly developed toolbox that enables real-time visualization of activation white matter pathways with given stimulation settings, now allows for a patient-specific tractography-based determination of the optimal target location in the operating room and programming tractography-informed stimulation settings during follow-up.

In addition to DBS research, Dr. Choi and his team are studying brain mechanisms mediating depression pathogenesis and antidepressant treatment response using multimodal neuroimaging strategies, including resting-state fMRI, PET, and structural techniques. Current projects emphasize developing novel imaging biomarkers predictive of disease progression, treatment response, and optimal treatment selection for individual depressed patients at all stages of illness.

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Core Spotlight

Core Staff

While this feature has mostly focused on Core hardware, we all know that the hardware would be largely useless without the dedication and tireless efforts of our Core staff. This month we'd like to profile the MRI and Nuclear Medicine research technologists who work in the Human Imaging Center in BMEII. We'd also like to recognize all the clinical technologist (too numerous to mention) that assist with research on other systems around the medical center.



From left to right: Kamil Banibaker, Dewey Chu, Kimberly Jackson. Not pictured: Clayton Reid.

Kamil Banibaker, RT (R) (MR) (ARRT), has been working in radiologic technology for 40 years doing MRI, CT, interventions, and research. He has a Bachelor of Science from

Long Island University and has been with BMEII since 2013. Outside of work, he enjoys walking, soccer, swimming, and tennis.

Dewey Chu, RT (R) (MR) (ARRT), has been in MRI since 2009 and started working at BMEII in 2013. Dewey works with the Skyra 3T, Magnetom 7T, and the PET/MRI scanners. His hobby is traveling

to different countries for site seeing.

Kimberly Jackson, BS, LNMT, RT (N), (MR), started as a licensed nuclear medicine technologist in 2010 and went on to obtain her MRI license in 2015. Kim joined BMEII in 2019 but has been involved in PET/MR as a Lead Technologist since 2012 when the first ever simultaneous PET/MR study was performed in New York. She is skilled in PET/MRI, Clinical Research, Physics, Science, Fine Arts, and Public Speaking.

Clayton Reid, RT (R) (MR) (ARRT), has been scanning in MRI since 1993 and has been in the BMEII as a per diem technologist for the past 4 years. He enjoys spending time with his family and car customization.

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