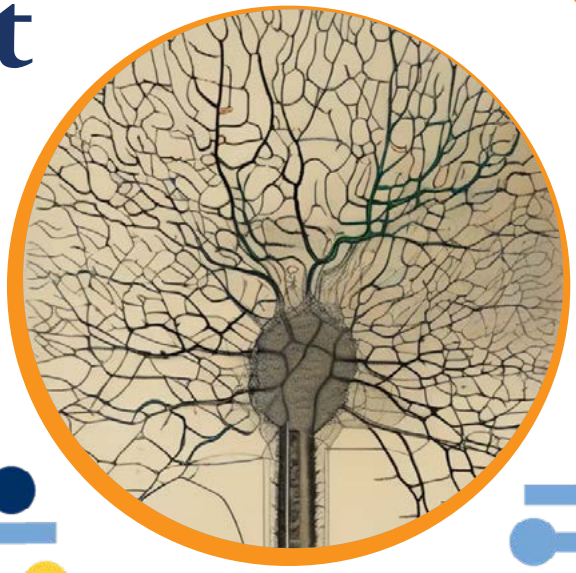
Yale
Center for Brain & Mind Health

Annual Report
2023



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Mission Statement

The Yale Center for Brain and Mind Health strives to be a beacon of innovation, championing transformative clinical and translational neuroscience research for the betterment of society. We cultivate inclusivity and collaboration, uniting faculty and trainees across disciplines to passionately pursue scientific discovery. Rooted in community, we actively forge connections with the health system, academia, and the public to identify pressing needs and catalyze real-world change. We address today's urgent challenges and envision and shape a healthier tomorrow for all.

Message from the Directors

Dear Colleagues,

At this time last year, the five of us were newly commissioned by Dean Brown to lead the Yale Center for Brain and Mind Health (CBMH). Bringing this team together was not without risk – distributed leadership amongst individuals largely unknown to each other, from different departments, with varied backgrounds and scientific interests. But the symbolism of having five directors for this new Center aligned with our ambition to do something different – to bridge disciplines and find unexpected synergy. The Center's inception brought us together around an aspirational goal: to cultivate and buttress clinical and translational neuroscience research, rooted in collaboration and with direct impact on clinical care.

Together, as we mark our first anniversary, we are humbled by your desire to join us in creating a highly collaborative neuroscience research community at Yale. CBMH consists of 165 members across 33 departments and 4 schools. The breadth and diversity of CBMH's faculty membership attests to our growing capacity to spark interdisciplinary research. The enthusiastic reception we have received from the Wu Tsai Institute, the clinical and research departments across Yale School of Medicine, and the broader Yale community reinforces our belief in the power of diverse perspectives to develop a deeper understanding of the human brain and mind. In these pages, you will see who we are, what we do, and how, together, we are closer to unlocking the secrets of the brain and mind while sidestepping the structural barriers that hinder collaborative research.

Our first CBMH symposium, held in May, was a resounding success. Backed by the School of Medicine and the Provost's Office, this event celebrated the Center's science and distributed pilot awards to four interdisciplinary teams focused on improving our understanding of brain function in multiple neurological and psychiatric conditions to advance treatment. We eagerly anticipate research updates from these teams in the coming year.

We are sprinting into our second year. You can look forward to hearing about our first cohort of post-doctoral fellows and the creation of a post-doctoral CBMH community. We will launch new symposia dedicated to first-in-person advances in clinical care and showcase your scientific achievements to Yale's development teams. We will also create a formal advisory board so that we can provide long-term stewardship and ensure that our mission aligns with other scientific initiatives at Yale and our local New Haven community.

Finally, after learning from you about areas of need, we recently launched two CBMH faculty searches: one in the area of network therapeutics and the other in population-level mental health of teenagers and young adults. These new recruits will strengthen Yale's impact on brain and mind health, addressing pressing public health needs. We are indebted to the many staff and faculty participating in these important searches.

What exactly is the goal of the Center? CBMH is not a Center to eradicate stroke, to treat depression, or to better understand autism – though it may help do these things and more. CBMH is a community, to which you bring your individual passions and successes to create a multiplier effect. In this way, our collective efforts will shape our future. As a center founded on the principles of inclusivity and open dialogue, we welcome your ideas as we navigate this process.

With sincere thanks, and our best wishes for a healthy and productive academic year.

CBMH directors: Kevin Sheth, MD, Professor of Neurology and Neurosurgery ; James McPartland, PhD, Harris Professor in the Child Study Center and Psychology; Serena Spudich, MD, Gilbert H. Glaser Professor of Neurology; Christopher Pittenger, MD, PhD, Elizabeth Mears and House Jameson Professor of Psychiatry ; Eyiyemisi Damisah, MD, Assistant Professor of Neurosurgery and Neuroscience

Our Timeline

August 2022
CBMH Created
The Dean of Yale School of Medicine, Dr. Nancy Brown, announces the Yale Center for Brain & Mind Health

October 2022
Call for Members

January 2023
Pilot Grant Program
Applications to advance research in clinical and translational neuroscience

January & March 2023
CBMH Faculty Conversations
Discussion groups initiated for sharing ideas and opportunities within the community

April 2023
First CBMH Social Hour
Informal networking among members

May 2023
CBMH Inaugural Symposium
Presentations by eight pilot grant finalists

June 2023
~$1M in Pilot Grants Awarded
Support from the Medical School and Provost's Office

August 2023
Faculty Searches Launched
Network therapeutics and youth mental health

September 2023
CBMH Postdoctoral Fellowships Awarded

165 members

33 departments across Yale

Membership

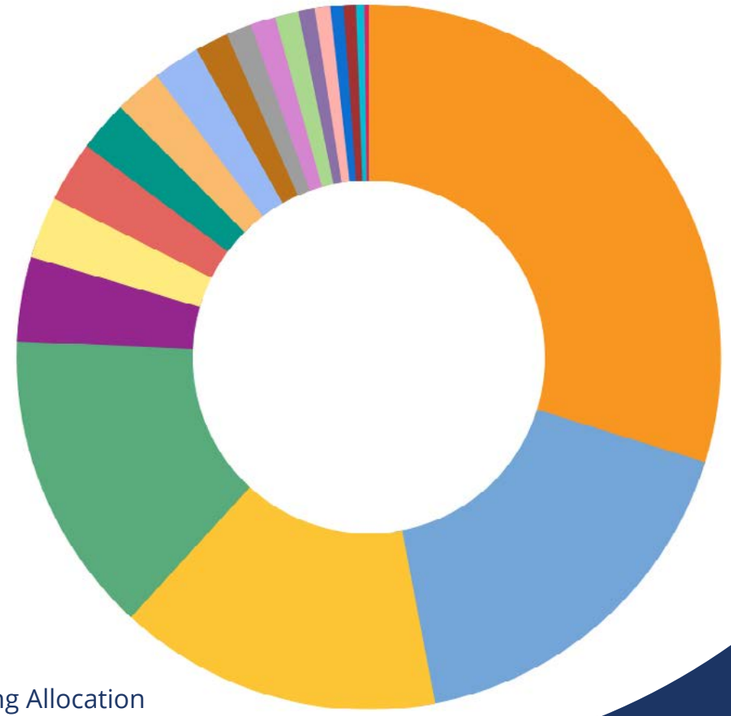
Building community for clinical & translational neuroscience

We are proud to announce that CBMH is currently 165 members strong. Our members come from 33 departments across four schools at Yale. We believe that our aim to advance novel and impactful research is best realized when scientific inquiry spans departments, disciplines, and levels of analysis.

Departments

Anesthesiology	Lab Medicine
Biomedical Engineering (SEAS)	Mathematics (FAS)
Biostatistics (YSPH)	Neurology
Child Study Center	Neuroscience
Comparative Medicine	Neurosurgery
Computer Science (SEAS)	School of Nursing
Electrical Engineering (SEAS)	Obstetrics, Gynecology & Reproductive Sciences
Economics (FAS)	Pediatrics
Electrical Engineering (SEAS)	Political Science (FAS)
Economics (FAS)	Psychiatry
Emergency Medicine	Psychology (FAS)
Environmental Health Sciences (YSPH)	Radiology & Biomedical Imaging
Epidemiology (YSPH)	School of Law
Genetics	School of Management
Immunobiology	Surgery
Internal Medicine • General Internal Medicine • Cardiology • Digestive Diseases • Infectious Diseases	Urology
	Yale Ventures

- Schools within the School of Medicine
- Schools outside of School of Medicine



NIH Funding Allocation
by Institution

Research Support

The funding sources of CBMH members reflect an active and diverse portfolio of research support, currently totaling over $170M dollars in awards from the National Institutes of Health (NIH). In 2022, 20 different NIH funding institutes contributed to research programs led by CBMH faculty. Spanning a wide range of content areas, from Allergy and Infectious Diseases to Minority Health and Health Disparities, this profile of support reflects the diverse interests of CBMH faculty and the broad relevance of brain and mind health to clinical and translational neuroscience research.

NIH Funding

- National Institute of Mental Health (NIMH)
- National Institute on Aging (NIA)
- National Institute on Drug Abuse (NIDA)
- National Institute of Neurological Disorders and Stroke (NINDS)
- National Heart, Lung, and Blood Institute (NHLBI)
- National Institute of Child Health and Human Development
- National Institute on Alcohol Abuse and Alcoholism (NIAAA)
- National Center for Complementary and Integrative Health (NCCIH)
- National Institute of Allergy and Infectious Diseases (NIAID)
- National Institute of Biomedical Imaging and Bioengineering (NIBIB)
- NIH Office of the Director
- National Cancer Institute (NCI)
- National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)
- National Institute on Deafness and Other Communication Disorders (NIDCD)
- National Center for Advancing Translational Sciences (NCATS)
- National Institute on Minority Health and Health Disparities
- National Institute of Environmental Health Sciences (NIEHS)
- National Human Genome Research Institute (NHGRI)
- National Institute of Nursing Research (NINR)
- National Library of Medicine (NLM)

First Annual CBMH Pilot Award and Symposium

CBMH Pilot Grant Review Chairs
Sarah Yip, PhD; Psychiatry
Guido Falcone, MD, ScD, MPH; Neurology

The Center for Brain and Mind Health offered our first round of two-year CBMH Pilot Awards supporting impactful clinical and translational work in the spring of 2023. To encourage interdisciplinary work, applications were required to include at least two CBMH members from different departments or disciplines as co-principal investigators, to propose new work, and to have the potential to impact patient or community health in the near future. We received 24 applications, including from teams of investigators who first met and initiated collaborations at a CBMH event.

The initial review was led by Drs. Sarah Yip and Guido Falcone (pictured) and included a committee of 18 CBMH members. In keeping with our commitment to innovation and engaged scientific exchange, we included the broad CBMH community in the selection of pilot awardees, through the CBMH Inaugural Symposium held on May 16, 2023. The eight finalists for the 2023 CBMH Pilot Award program were invited to present their proposals in brief talks to an engaged audience of CBMH faculty members, trainees, and other community members. This allowed the community to see some of the exciting ideas percolating amongst our membership. Audience feedback was collected and was used as one factor in the final selection of the awarded grants, giving CBMH members direct input into the process. Over 100 attendees joined the symposium, mostly in person. It was followed by a social hour with refreshments for informal discussions and meetings.

The CBMH Pilot Award program is made possible by support from the Dean of the School of Medicine and the Provost's office. The CBMH leadership is grateful to both Dean Brown and Provost Strobel for committing a total of $925,000 to support four transformative early-stage clinical and translational studies of brain and mind health. Brief descriptions of the projects selected for funding for the 2023 CBMH Pilot Award project are included on the following page:

Pilot Grant Awardees




Maintaining the Antidepressant Effects of Ketamine in Parkinson's Disease with Cognitive Behavior Therapy.

Team : Drs. Sanacora, Santini, Holmes & Tinaz. $100,000

Many individuals with Parkinson's disease (PD) suffer from profound depression; this is not well treated by current approaches. We are conducting the first clinical trial of ketamine as a treatment for depression in PD. The CBMH Seed Grant is allowing us to determine whether the addition of specialized Cognitive Behavior Therapy (CBT) can sustain, or even enhance, ketamine's antidepressant effects in these patients. Success could have immediate impact on the lives of people with Parkinson's. This award advances our newly established cross-disciplinary research program, focused on better understanding and treating psychiatric symptoms in PD.


The Neural Architecture of Visual Hallucinations in Lewy Body Disease and Psychosis.

Team : Drs. Fredericks & Powers. $275,000

Current theories suggest that hallucinations arise from inappropriate over-weighting of prior knowledge in perception – effectively leading sufferers to perceive what they expect. This Seed Grant will extend this line of work to psychiatric symptoms in neurological patients, evaluating visual hallucinations in individuals with alpha-synucleinopathy and psychosis using a well-validated conditioned hallucinations task together with functional and structural neuroimaging. Parallel work in prodromal patients (REM behavior disorder) will assess the natural history of these symptoms.




Take Care & Control (TCC) - Achieving Equity and Effectiveness in Preventing Brain and Heart Disease

Team : Drs. Kernan, Sarpong, Forman & Sharma. $275,000

The Take Care and Control Project aims to develop an effective, generalizable strategy to improve brain and heart health in geo-politically defined communities (e.g., cities). Our methods blend advanced science in treatment implementation and behavior change with community engagement. We are partnering with a vanguard city, Derby, CT, as a first case study of this ambitious approach and are engaged with political leaders to coordinate goals for the first two years. If successful, this transformational initiative has the potential to rapidly scale up to generate transformational improvement in brain and heart health across communities.



Probing Avoidance and Trauma Memory Oscillations to Identify PTSD Circuit Targets

Team : Drs. Kaye, Sivaraju & Harpaz-Rotem. $275,000

The use of intracranial recordings to characterize the neural abnormalities underlying psychiatric symptoms has the potential to revolutionize our understanding of their causes and treatments. This Pilot Grant will study intracranial EEG from in patients with medically refractory epilepsy, who often suffer from the effects of trauma, to define brain oscillation patterns related to post-traumatic stress disorder (PTSD). By measuring these oscillations across emotional brain circuits as subjects engage in threat avoidance tasks and traumatic memory reactivation, we will identify inter-regional brain patterns which can, in the future, be targeted by novel circuit-level treatments for PTSD.

CBMH Postdoctoral Fellowship

About the Program

An important goal is to galvanize innovative neuroscience research that directly advances human health. We believe this is best accomplished by applying multidisciplinary perspectives in a collaborative style. We also believe an important way to nurture this culture is to embed a multidisciplinary, collaborative approach in research training. Towards this end, CBMH has created a postdoctoral fellowship program specifically designed to embody these goals, funding postdoctoral trainees engaged in new cross-disciplinary projects with the hope of inspiring young researchers to pursue careers that directly benefit brain and mind health.

Drs. Carolyn Fredericks and Albert Powers led a review process engaging multiple CBMH faculty members as reviewers, and four collaborative research teams were selected to receive funding for a postdoctoral fellow.

Selected Projects and Teams

Funded postdoctoral fellows will share the process and outcomes of their scientific projects through annual progress reports to CBMH and will have the opportunity to present their work at one or more CBMH events during their tenure. We look forward to sharing the achievements of the next generation of clinical and translational neuroscientists with you.

- *Interrogation of the Causal Genes and Disease Mechanisms for Major Depressive Disorder*
  Kristin Brennand, PhD, & Marina Piccioto, PhD
  Departments of Psychiatry, Neuroscience, Pharmacology, and the Child Study Center

- *Natural Language Processing and Opioid Use Disorder*
  Arman Cohan, PhD, Sarah Yip, PhD, & Rajita Sinha, PhD
  Departments of Computer Science, Psychiatry, Neuroscience, and the Child Study Center

- *Comprehensive Functional Analysis of Copy Number Variants in Major Depressive Disorder*
  Janitza Montalvo-Ortiz, PhD & Thomas Fernandez, MD
  Department of Psychiatry and the Child Study Center

- *Cellular and Molecular Mechanisms and Novel Therapy in Porcine Stroke*
  Jiangbing Zhou, PhD, & Nenad Sestan, MD, PhD
  Departments of Neurosurgery, Neuroscience, Comparative Medicine, Genetics, and Psychiatry

Looking Ahead

Recruitment of New Faculty to Yale and the CBMH

A key role of CBMH is to identify and recruit new faculty who will initiate novel research programs that address crucial problems in brain and mind health. These faculty will amplify and diversify existing areas of strength at Yale and bring needed expertise in areas that are not currently well developed. Recruited faculty will be highly talented investigators leading transformative work in their fields with a strong track record of successful collaboration across disciplines. The intent is to hire faculty who are enthusiastic about contributing to our dynamic, growing community and are eager to apply bold ideas to advance the CBMH mission.

CBMH has recently initiated the first two faculty searches in areas identified by members and directors as integrative and timely: brain network therapeutics and the mental health of young adults. These and future searches will bring new CBMH colleagues to Yale who will enhance the environment for clinical and translational neuroscience that will ultimately benefit patients and populations.

CBMH Winter Research Symposium

CBMH supports neuroscience research that successfully bridges basic investigation and clinical intervention. We will host a symposium, open to the entire Yale community, to celebrate transformative examples of such work. A keynote presentation will be delivered by Dr. Timothy Yu, an innovative physician scientist at Harvard School of Medicine, whose unique approach to complex clinical conditions has led to groundbreaking, personalized gene therapy. Formal presentations and informal discussion, as well as a post-symposium reception, will facilitate engagement with the presenters.

CBMH Conversations and Member Meetings

Initiated in Winter of 2023, CBMH Conversations are small, dynamic meetings with groups of 8-10 CBMH members and one or more of the CBMH directors to facilitate the exchange of research ideas in an unstructured format. These Conversations have been popular, with each session to date fully subscribed, and they have generated engaged and productive discussions. CBMH will commence a new series of Conversations this fall as more topically focused, curated meetings, to bring together clusters of diverse investigators interested in specific topic areas or applying related tools. These could be chalk-talks provided by a few Center members, followed by discussion; free-flowing discussions to incite activity and detect commonalities between investigators interested in a relevant topic; or groups seeking to discuss potential interdisciplinary projects in response to grant opportunity announcements in a specific field.

We are also planning biannual meetings for all CBMH members, in which CBMH directors report on the progress of activities and opportunities fostered by CBMH to date. In keeping with our principle of transparent and interactive leadership, we will use these meetings to solicit input from members regarding research support priorities and creative strategies to inspire novel science.

Scientific Development for Trainees and Social Events for CBMH

In our first year we focused on building a community of faculty working in clinical and translational neuroscience. This year we will begin to engage the postdoctoral trainees of CBMH members, through monthly informal postdoctoral research-in-progress meetings and social events, to help postdoctoral trainees build relationships and learn about one another's work. We will also continue informal CBMH social events for faculty members, to build scientific community in clinical and translational neuroscience and to stimulate novel scientific discussions and collaborations.

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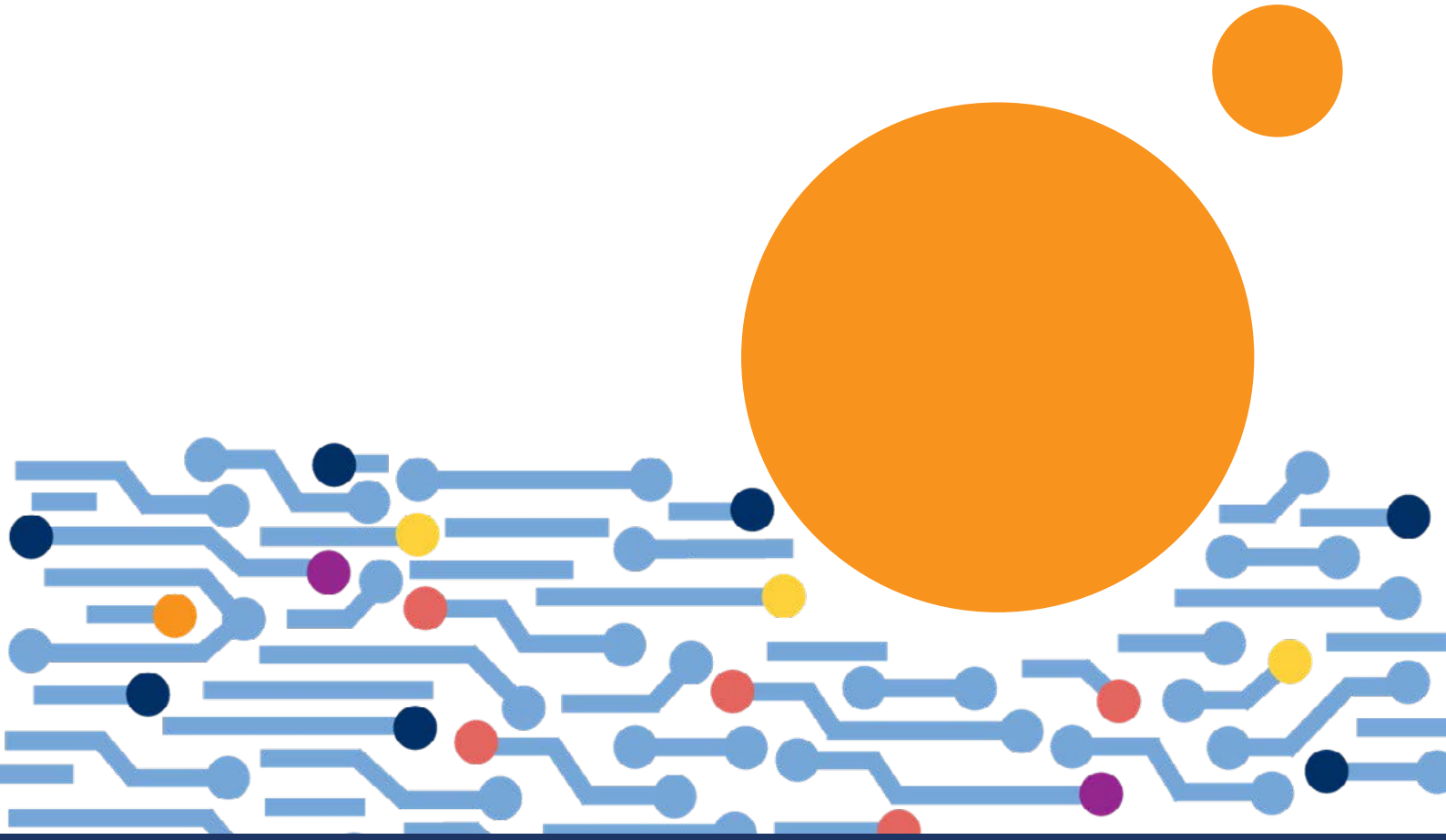

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