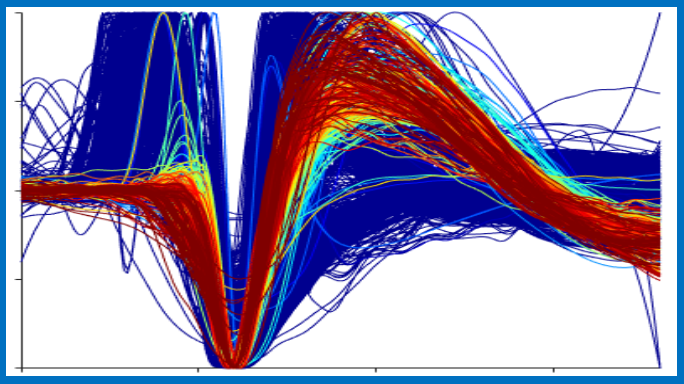
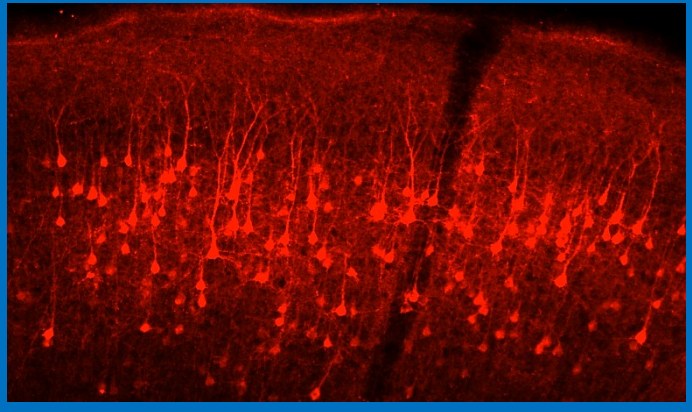
Duke Institute for Brain Sciences

Annual Report

FY 2024-2025





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A Message from our Director

This has been a year of transitions for the Duke Institute for Brain Sciences and our society. I was honored to take on the role of DIBS Director on January 1, 2025. Almost immediately the job changed from what I expected. The brain sciences community at Duke faced challenges to our research unparalleled in our lifetimes. Federal funding slowed to a trickle, Duke tightened its belt, and uncertainty enveloped us. Scientists and clinicians are used to uncertainty, especially those who make their life work the understanding of the brain, but as we entered the summer of 2025 we all had our doubts about the future of our careers, our field, and the prospects for US science. But passively accepting these circumstances was not an option, and we rallied.

If there were ever a time that justified the foresight to create and sustain DIBS since it started in 2008, this is it. When I arrived at Duke in 2010, DIBS was the catalyst for my first collaborations across campus. It played the same important role for many in our community. The key to DIBS's impact is its focus on *interdisciplinary* approaches. In times of stress on the research enterprise, investigators tend to react in one of two ways: hunker down or reach out. For some, tightening their focus and sticking with what they do best might be the right option. DIBS is here to facilitate the alternative approach: reaching out to explore the impact of new collaborations. We believe that expansion is better for scholars than retraction to our comfort zones. Reaching out is intellectually invigorating, it disseminates and amplifies the value of our expertise, and from a practical perspective it introduces us to more diverse funding opportunities.

As we closed fiscal year 2025, 6 months into my term as Director, I had a realization. While this was not the job I expected, it was an opportunity unlike any other I had encountered in my career. DIBS was needed more than ever. Everyone at DIBS rededicated themselves to serving the community. The strategic directions I laid out at the start of my term gained more urgency, and we have tried to be tireless in working on them. I began to meet one-on-one with all of the 200+ members of the DIBS Faculty Network to gain better insight into the state of the brain sciences at Duke and how DIBS could help most effectively. We reconvened our External Advisory Board after a year's hiatus and began expanding it, gaining four new members. A central initiative from prior years, the Flowers Drive MRI center, had to be cut for long-term budgetary reasons, but this freed us to accelerate planning for new, focused Research Groups to create new teams of investigators and to provide much-needed PhD student and faculty teaching support. We also re-launched our DIBS Seed Grant program after a four year absence. We are looking forward to stewarding these new initiatives as we proceed into FY26.

I am optimistic about the future of the brain sciences at Duke. We are facing challenges, but ultimately our research, education, and outreach efforts serve the public, yielding great societal benefits. The community of researchers and students at Duke, from our labs and clinics to our classrooms, are absolutely outstanding. The ties between the School of Medicine, the Trinity College of Arts & Sciences, the Pratt School of Engineering, and other Schools and units on campus remain close and mutually supportive. I have spent a lifetime in academia and, in my experience, no other institution enjoys the generous level of collegiality found at Duke. It is truly a special place.

When approached from an interdisciplinary perspective, as DIBS emphasizes, the brain sciences become more than just another scientific or biomedical enterprise. Integration of knowledge from molecular and cellular neuroscience through systems approaches and computation to cognitive studies, philosophy, and ethics provides our best chance at learning who we are and how to heal our minds and behavior when things go wrong. Our researchers make innumerable, unheralded sacrifices to achieve discoveries. DIBS will be there for them.

Marc Sommer, Ph.D.

Our mission, vision, and goals

The Duke Institute for Brain Sciences is a hub for neuroscience research, education and community engagement, drawing people to brain science, connecting them to each other, and sharing their work to help our world flourish.

Our mission

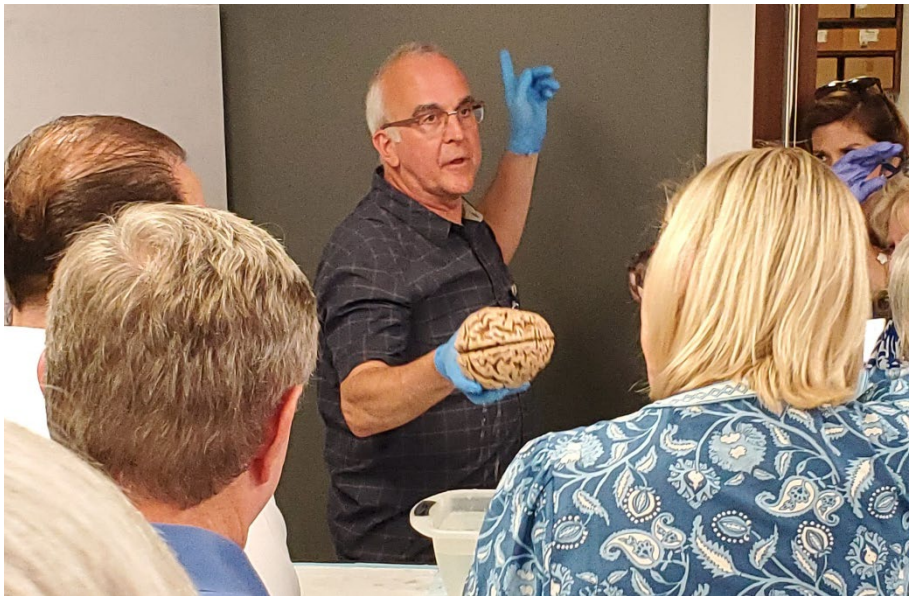
The mission of DIBS is to promote interdisciplinary brain science and translate discoveries into solutions for health and society.

Our vision

Our vision is a scientific and scholarly community that makes neuroscience greater than the sum of its parts by integrating schools, disciplines, and levels of analysis and education to accelerate breakthroughs and benefit society.

Our goals

- **Building bridges.** Unify dispersed scholars at Duke by manifesting their work and integrating their needs. Harmonize infrastructure and create communities of practice across Departments and Schools.
- **Exceptional interdisciplinary neuroscience education.** Attract, inspire, and educate the next generation of scholars and leaders. Equip our students to navigate uncertainty with curiosity, innovation, and joy via transformative research experiences.
- **Catalyze interdisciplinary research.** Connect and collide faculty and students for collaboration. Position them for innovation and translation of knowledge about the brain for discoveries and solutions.
- **Impact beyond Duke.** Synergize engagement and outreach to increase funding, advocacy, and partnerships. Share knowledge to promote brain literacy in support of enlightened policy and human flourishing.



Accomplishments 2024-2025

Understanding our constituents: Research areas and needs of the DIBS faculty

One-on-one Interviews

A main goal of Director Sommer after starting in January was to talk to every member of the DIBS Faculty Network, which consists of 200+ Duke faculty at all stages from new Assistant Professors to Emeriti. Interviews began in late January and have continued through August, 2025. Director Sommer conducted all the interviews. To schedule the interviews, the list of all DIBS Faculty was randomized and then sorted into three categories: Assistant, Associate, and Full Professors (Emeriti will be interviewed last). Director Sommer emailed them in batches of 10, consisting of 5 Assistant Professors, 3 Associate Professors, and 2 Full Professors. This process was intentionally biased to favor the Assistant Professors under the premise that they had the most urgent needs.

So far we have contacted 50 faculty, and ~2/3 replied, resulting in **one-on-one interviews of 34 (16 Assistant Professors, 9 Associate Professors, and 9 Full Professors)**. We will contact the non-responders later for a second chance at interviewing them. This is a work in process and we expect it to conclude by the end of FY26.

Each interview began with four questions:

1. What is the hottest new research from your lab that makes you the most excited?
2. What are the biggest challenges in conducting your research?
3. What can DIBS do to help?
4. What would you think of a new, centralized building dedicated to brain science research?

All of the interviews were recorded and transcribed, which allowed us to generate word clouds and qualitative summaries of themes in the responses.

Emerging areas of research in the brain science community

The first question in each interview asked about the hottest new research in each PI's lab. As might be expected given the diversity of our DIBS Faculty, there was a lot of variety. The responses from individual PIs will be used by DIBS to help promote collaborations between labs with overlapping emerging interests. An illuminating aspect of the responses was the prevalence of molecular/cellular neuroscience in our community (Fig. 1), with the terms "cell", "channel", and "mouse" dominating. Qualitatively, the major theme was that investigators are making a strong push to leverage new tools (e.g. AI/ML, organoids, high-density recordings, imaging, and computational modeling) to tackle fundamental and translational brain science questions.

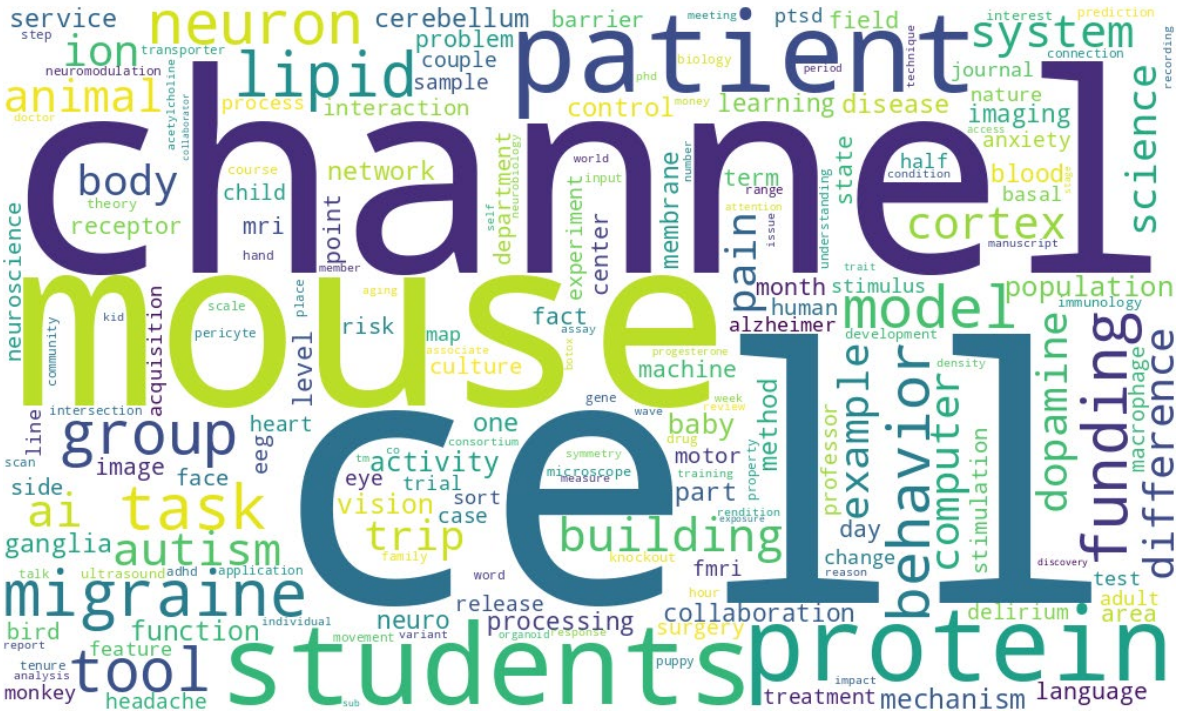


Figure. 1. Word cloud for Q1, "Hottest new research from your lab". All faculty combined (n=34).

Biggest challenges faced by the community

Responses about the challenges faced by faculty in running their labs were more varied (Fig. 2). While a lot of topics were brought up, the key difficulties were "students" and "funding." A priori, we expected funding to dominate the concerns, so we were surprised to see students rating so high. Qualitatively, the main problem is finding PhD students and mentoring them. Several faculty did not feel like they had any significant access to PhD recruitment. When they were successful in landing students, they had to learn "on the job" how to mentor them effectively. Funding is a major source of stress, both in general and as a result of federal funding slowdowns and terminations. Qualitatively, funding interacted with the topic of students, in that many faculty are concerned how to maintain financial support for them. To see if the challenges faced by faculty depend on their career stage, we made a separate word cloud for Assistant Professors only (Fig. 3), who tended to emphasize "time" as a concern as much as "funding".

What DIBS can do to help

When asked, "how can DIBS help your research?", the responses mirrored the challenges faced by the labs: "students" and "funding" were discussed about equally (Fig. 4). All faculty except the newer Assistant Professors were aware of the seed grants offered by DIBS in prior years (ending in 2021), and many lamented their absence. They would also like DIBS to get more involved with PhD student placement. Many said they would like to do more interdisciplinary brain science research, but that this requires easier movement of students across disciplines and willingness of departments to let the students they admit join labs outside of their core faculty. It is not clear what DIBS can do to help with that, but it has prompted us to think about how we might help to establish new incentives and initiatives to facilitate interdisciplinary PhD training. Responses isolated to the Assistant Professor cohort did not differ much (not shown).

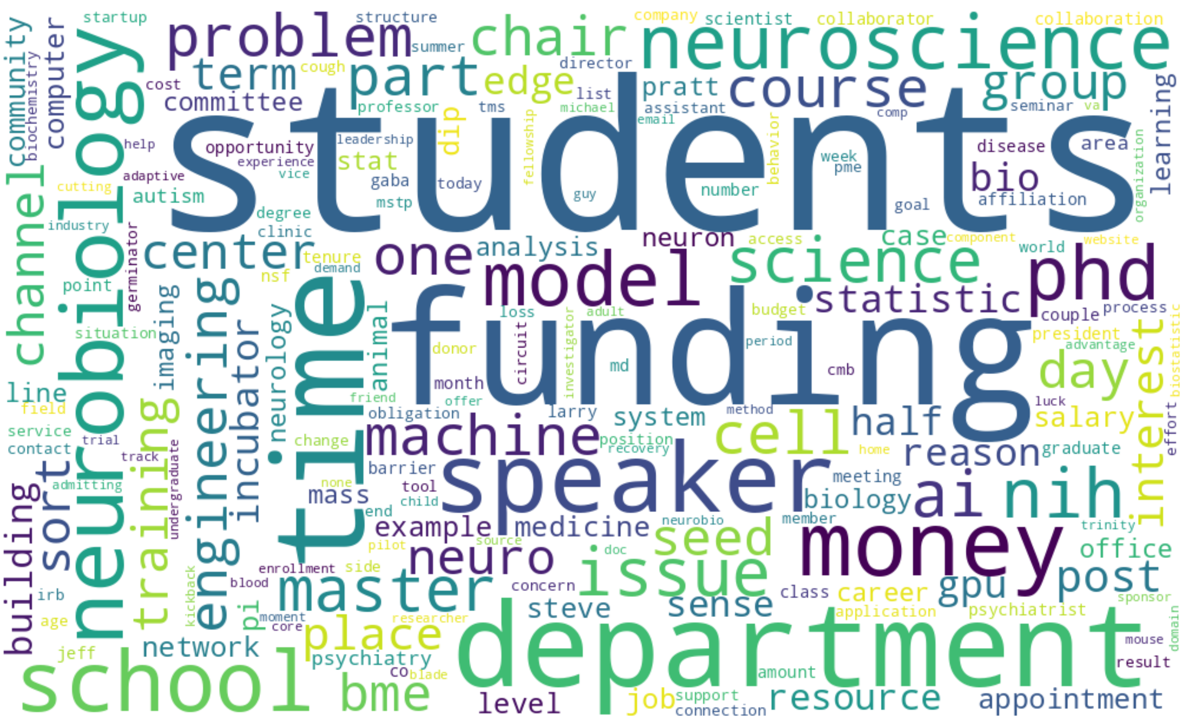


Figure 2. Word cloud for Q2, "Biggest challenges". All faculty combined (n=34).

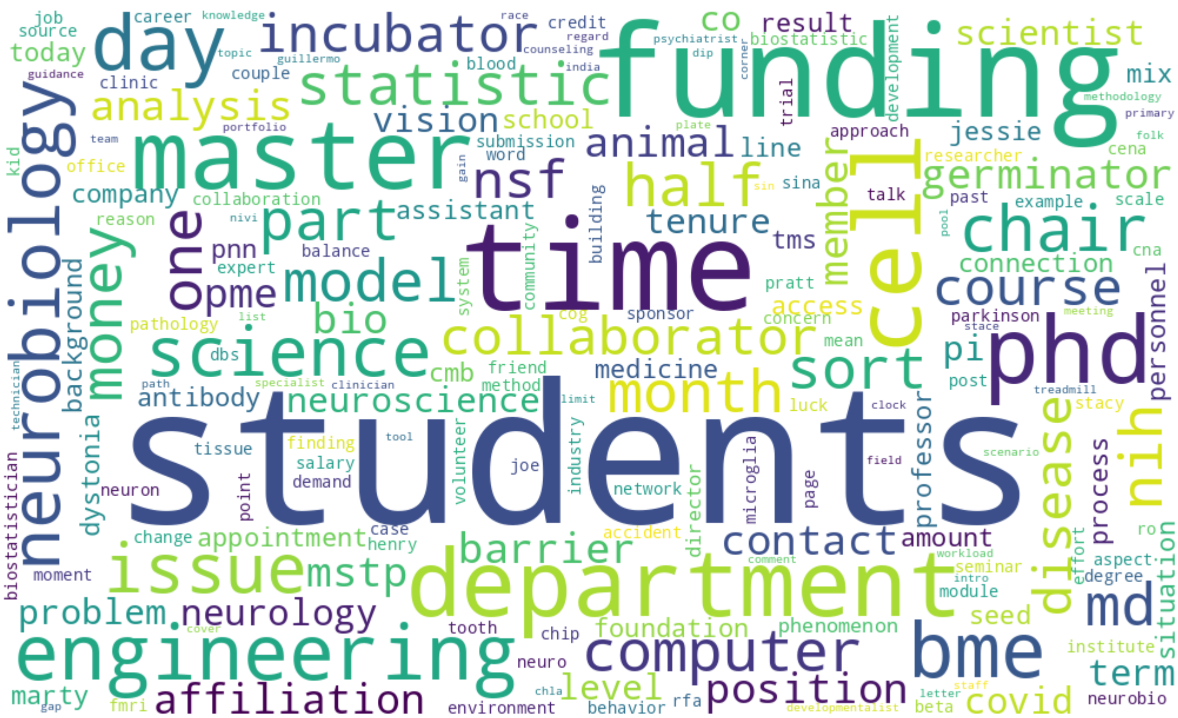


Figure 3. Word cloud subset for Q2, "Biggest challenges". Assistant Professors only (n=16).

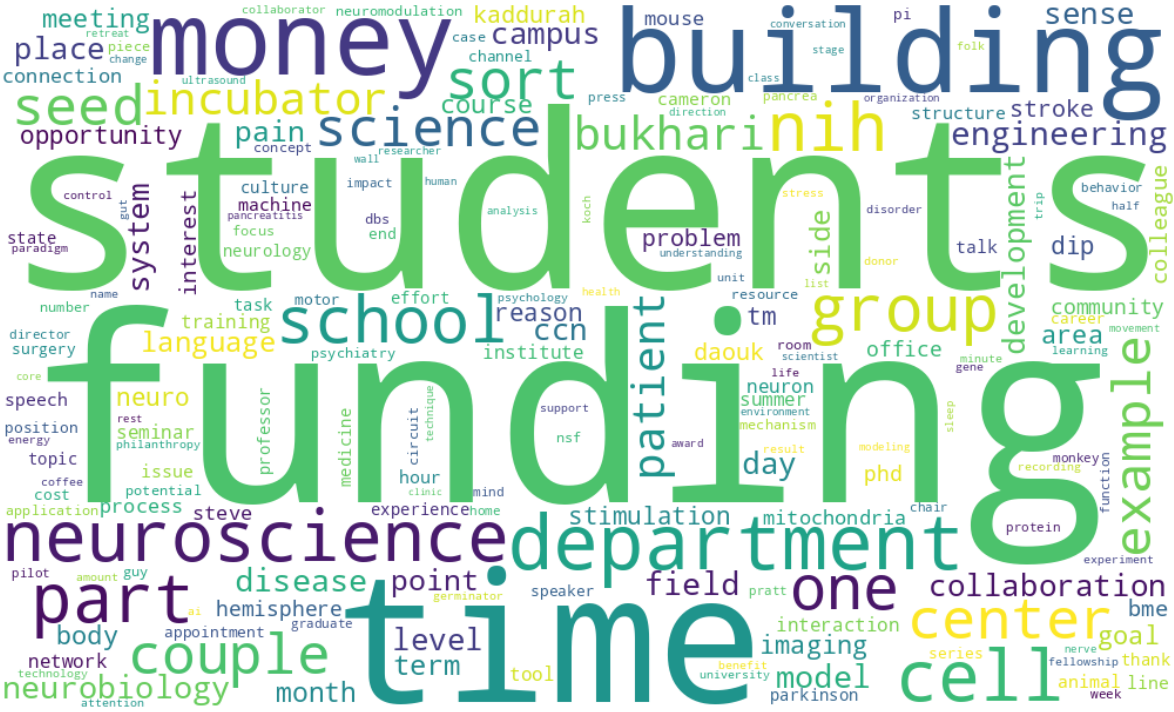
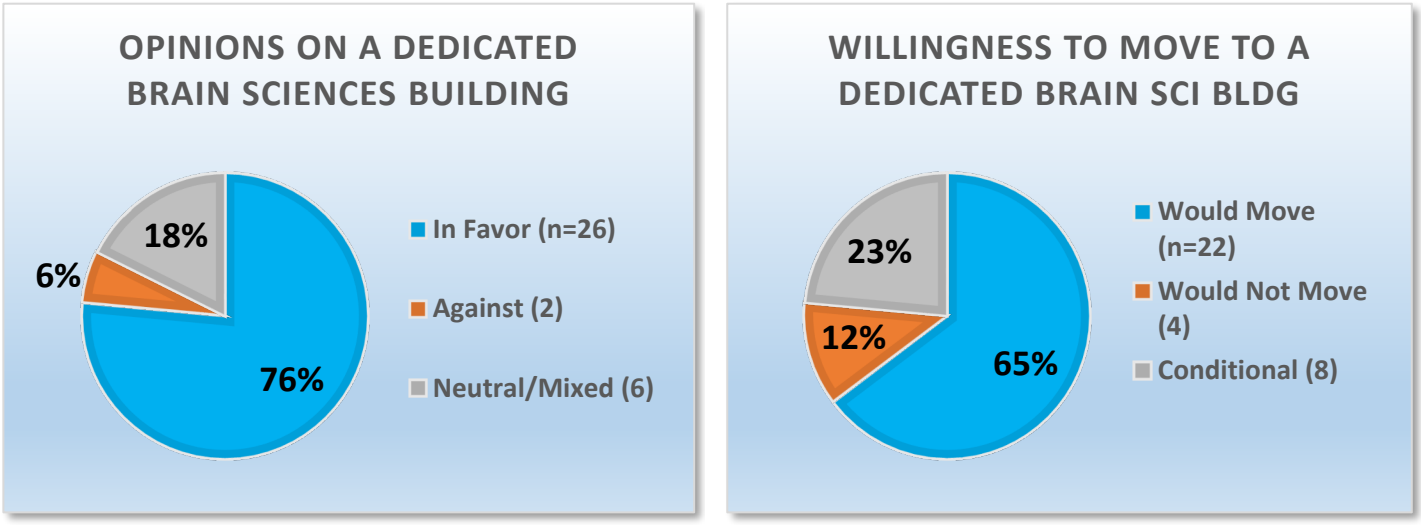


Figure 4. Word cloud subset for Q3, "What DIBS can do to help". All faculty combined (n=34).

Interest in a dedicated brain science building

Each interview concluded by asking the DIBS faculty whether they would be interested in a dedicated brain science building to co-locate labs from many departments and fields. Support for a dedicated building was very strong, with 3/4 of the faculty in favor (76%), a few with neutral or mixed opinions (18%), and a couple opposed (6%) (Fig. 6, left). Slightly lower enthusiasm was expressed for their own labs moving into such a building, with about 2/3 showing interest (Fig. 6, right). Qualitatively, arguments in favor of a building emphasized the importance of proximity and unplanned interactions for establishing collaborations and the benefits of shared space for interdisciplinary training. Potential downsides would include the high cost and the complexity of involving more clinical-oriented faculty. In the interviews, the question was posed as whether a new building would help, but the same benefits could be achieved at reduced cost by re-purposing an existing building.

Figure 6. Response distributions to Q4, about Duke having a dedicated brain science building



Summary: What we learned and how we are responding

First it should be emphasized that the interview results thus far are a sample of 35 faculty out of the more than 200 members of the Duke Faculty Network. The sample was also skewed, purposefully, toward Assistant Professors, and there may be some unknown biases in who agreed to be interviewed vs. who never replied to the invitation. That said, faculty selection was randomized and we think provide a good, preliminary snapshot of the state of brain sciences at Duke and how DIBS fits into that picture.

The striking result from Q1 was that brain sciences are heavily focused on molecular and cellular neuroscience. Historically and currently, DIBS has focused more on higher-level brain sciences as exemplified by the Center for Cognitive Neuroscience that it supports. That focus is a natural target for initiatives that promote interdisciplinarity, as cognitive neuroscience is by its nature at the interface between neural technology, systems neuroscience, psychology, philosophy, and translation. However, DIBS may be neglecting a large proportion of its constituency that has great potential, and possibly a great need, for interdisciplinary collaboration. These results have prompted us to examine ways to launch new Research Groups within DIBS, essentially nascent “mini-Centers” that could become additional Centers with interdisciplinary missions that branch out from genetics, neural-glial interactions, subcellular mechanisms of brain disorders, etc.

The results from linked Q2 and Q3 (what are the problems and how can DIBS help) largely affirm what DIBS has assumed to be important in supporting the community. Funding and training are a perennial challenge in scientific academia. DIBS has not provided direct funding since 2021, however, and the results spurred us to accelerate the revival of one mechanism, Germinator awards to PhD students and postdoctoral fellows. We re-launched a request for proposals for these awards in Fall 2025 and received 53 letters of intent, more than double received in any previous year, confirming community enthusiasm for them. A major strategic aim for the coming year is fundraising to sustain these awards into future years and allow for renewed offerings of the larger, Incubator awards to PIs and their labs. The second major need was for student support, and DIBS will be evaluating options to help match students at all levels (undergraduates, Masters students, and doctoral students) to labs that can provide them with interdisciplinary training in the brain sciences.

Finally, the results of Q4 demonstrate there is a desire for closer proximity between labs that a dedicated building can provide. One reason that DIBS exists is the fragmented community it serves, with its Faculty Network members scattered across dozens of buildings on the Duke campus and in downtown Durham. While a dedicated building is a long-term issue, and past attempts have tried to make it happen, we think the survey results provide evidence that the issue remains highly relevant to the brain science community. DIBS will continue to focus attention on this need. Whether in the form of a new building or a re-purposed one, it is certainly not feasible at the moment, barring unexpected large-scale philanthropy. It may become more feasible in the future, however, and should not be forgotten.

Impact Neuroscience Program (PhD student training)

Funded by the National Institute of Mental Health for **graduate student training** in the neurosciences at Duke, the Impact Neuroscience Program completed its first year of support for PhD students in the brain sciences. The leaders of the program, Alison Adcock, Ph.D. and Greg Samanez-Larkin, Ph.D., draw on their expertise in motivated learning, resilience, and well-being to identify conditions that optimize learning and cognitive performance. During its first year of operations, the program was launched, the application process and advisory board was established, and the first cohort of 12 fellows was selected. The program was renewed by the NIMH in the summer of 2025, and the second cohort consists of 10 renewed fellows with 2 new ones to be selected. The Impact Neuroscience program supports its fellows to:

- Participate in regular gatherings designed to build community, promote mental wellness, explore career opportunities, develop skills in mentorship, and protect time for imagination.
- Mentor younger students in the brain sciences.
- Participate in data science or other computational skill building opportunities, and receive support to match training opportunities to the fellow's research needs.
- Receive support to engage with activities that promote mental wellness.
- Have access to funds to support travel and summer stipends.
- Develop and regularly update a detailed career plan to prepare them for a wide range of careers inside and outside academia.

Neuroscience Teaching Lab

[DIBS Cube at the LSRC, lower level]

The Undergraduate Studies in Neuroscience program within the Trinity College of Arts and Sciences was launched and incubated in DIBS. After 10 years of growth and achievement, this program was moved into the Department of Psychology and Neuroscience in AY2018-2019. Nevertheless, DIBS continues to provide significant support for undergraduate neuroscience through access to the DIBS Faculty Network for faculty-mentored research experiences, support for its Summer Neuroscience Program, and critical facility support through the DIBS Cube at the LSRC. Thus, while the program is administered by an Arts & Sciences department, the DIBS Cube is the recognizable and functional "home" of the undergraduate program. This home includes the demonstration laboratory space in the DIBS Cube, which we have been developing into a Neuroscience Teaching Lab.

Through the dedicated work of our partners in Duke Alumni Engagement and Development and the gracious and generous interest of several families willing to support undergraduate education, Trinity College has received pledges and donations totaling $2.5M for the development of this Neuroscience Teaching Lab facility. With this level of support, we have been enriching active learning and discovery in the undergraduate Neuroscience curriculum, with a particular focus on early-career students.

One important milestone for the Undergraduate Studies in Neuroscience program was the approval of significant curriculum reform that would leverage the resources provided by the Neuroscience Teaching Lab and optimize the alignment of the neuroscience curricula (BS, AB, and minor) with the roll-out of the new curriculum in Trinity College. For students exploring and discovering neuroscience for the first time, as well as those who came to Duke because of our outstanding program, the Neuroscience Teaching Lab has become a place where they encounter human brain specimens,

record action potentials from nerves in insect legs, record electroencephalographic and electromyographic activities on classmates, and conduct numerous physiological and psychophysical experiments as they explore the brain basis of perception, action, and cognition.

Moreover, the Neuroscience Teaching Lab has enabled the launch of a new foundational course in the reformed neuroscience curricula, NEUROSCI 206L Introduction to Systems Neuroscience. This is the first laboratory course that all neuroscience majors will take as they enter the program and learn how neural circuits and systems are organized for sensation and motor control (Figure 7). They also learn in the course the fundamental importance of neuroanatomy for understanding the physiology of the central nervous system, with unique opportunity to feature exploration of human brain specimens as one principal means for discovery and learning.

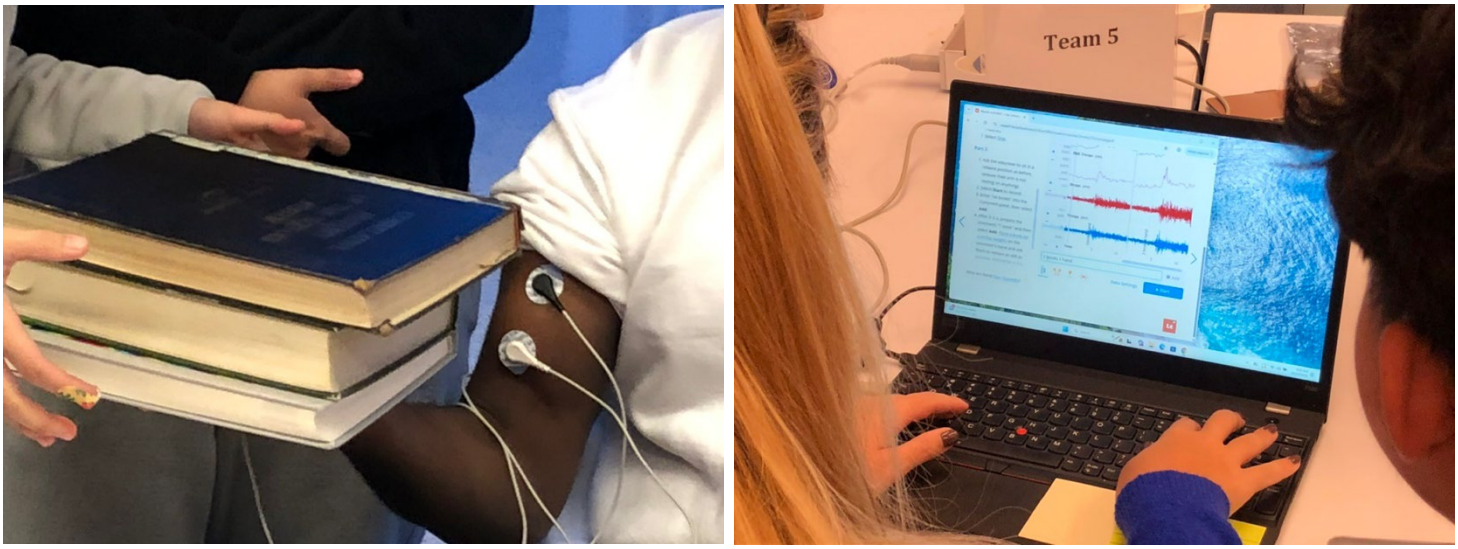


Figure 7. Hands-on lab experiences in the Neuroscience Teaching Lab. Students record electromyographic activity while the biceps is loaded (with neuroscience books!) in the new foundation course, NEUROSCI 206L Introduction to Systems Neuroscience. Undergraduate students learned through experimentation about the nervous system's control of skeletal muscle.

The Duke Institute for Brain Sciences would like to thank Mike and Jennifer Shannon, parents of Sara Rose Shannon T'23, for their generous gift of $1 million to Duke's Neuroscience program. Their gift, together with the substantial gifts of two other families who wish to remain anonymous, have made possible these advances in our Neuroscience Teaching Lab and the curricula it serves.

Cognitive Neuroscience Research Internship (CNRI)

The Cognitive Neuroscience Research Internship program was created by Duke Neuroscience PhD students to provide **Duke Undergraduates** who have not had the privilege of working in a research lab to gain their first invaluable research experience in the laboratories of faculty affiliated with DIBS's Center Cognitive Neuroscience.

During the Fall 2024 and Spring 2025 semesters, CNRI admitted 18 Undergraduate students (out of 81 applicants) having no previous (non-course-based) research experience as research interns. This transformational program for Duke Undergraduates has graduated 74 CNRI students since its inception in the fall of 2020.

In addition to an invaluable research experience, the Undergraduate interns gained:

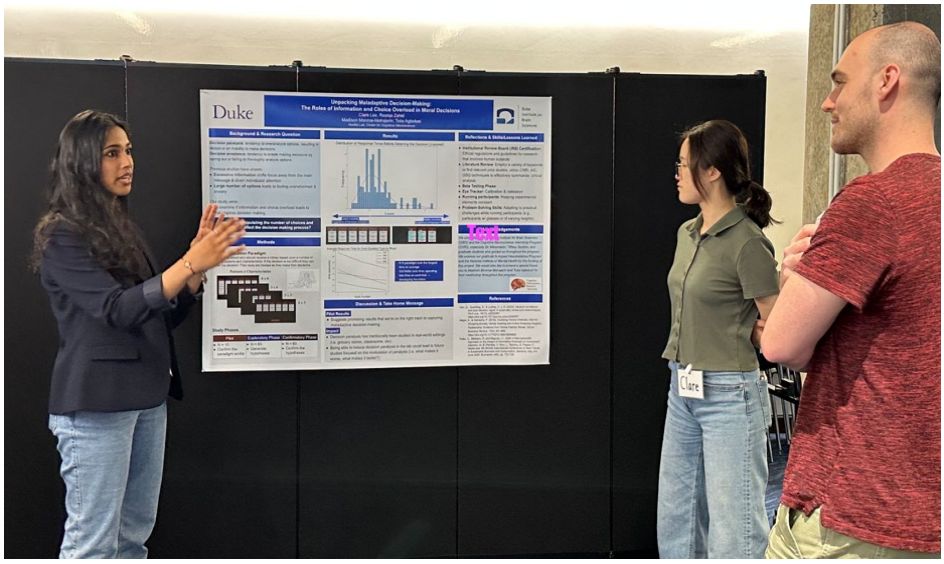
- Guided mentorship
- Professional skills development (e.g. Python programming)
- Camaraderie from their peer cohort

The interns' research spanned a variety of topics including:

- Decision paralysis, decision avoidance, and the role of information and choice overload in the brain
- Tracking neural activity as birds learn to sing
- Investigating functional activation in the spinal cord to predict pain sensitivity

Since its inception, the CNRI internship has helped undergraduates obtain future research positions in labs inside and outside of our neuroscience community. Many CNRI alumni graduate from Duke and successfully matriculate into graduate school or transition into research careers in industry.

The CNRI program, inspired, created and led by our graduate students and postdoctoral fellows, is not only designed to serve the undergraduates but also provides professional development opportunities for the graduate students. Participation in training experiences like CNRI and DUNE (described next) over their academic journey provides graduate students and other trainees with the valuable skills of mentorship, conflict resolution, communication, organization, time management, and leadership.



DIBS is committed to continuing programs like CNRI to provide graduate trainees in neuroscience with multiple didactic and experiential opportunities to develop their mentorship portfolio.

Duke University Neuroscience Experience (DUNE)

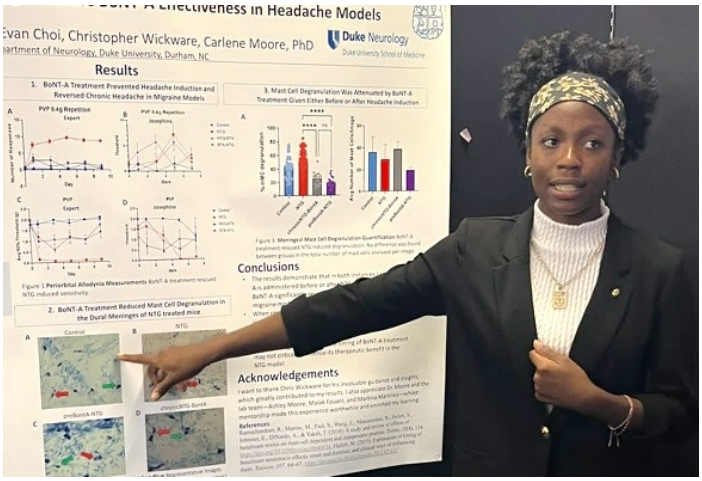
A cohort of eight local **high school students** were selected from a pool of 100 applicants to participate in the Summer 2025 DUNE program. This transformational program for local high school students has graduated 32 DUNE scholars since its inception in the summer of 2021.

In addition to professional development workshops for college readiness, a neuroscience fundamentals curriculum, and an overview of career pathways, scholars received paid research intern experience in Duke Neuroscience labs.

This year in the lab, scholars studied topics such as:

- How animals express emotions
- The effect of environmental stressors on brain development
- Tracing the genetic and molecular origins of brain cells

The students presented their research in a poster session where the Duke Neuroscience community and the students' families and friends were enlightened with their contributions to the field of neuroscience.



Next year, the DUNE team of neuroscience graduate students and postdocs will continue to build the program to welcome students into our scientific environment and make research opportunities more accessible to students in the sciences who have not yet had opportunity for scientific enrichment. They will grow recruitment efforts and develop ways to remain connected with DUNE Alumni, mentoring the interns after the summer experience. The program will be sustained and expanded carefully to retain the exemplary, enriching experience that DUNE has delivered since 2020.

DIBS and the DUNE team would like to acknowledge and thank our External Advisory Board member, George Lamb III (T'75, P'21), who has generously funded this transformational program. Additional contributions were received from Dr. Cynthia Payne and the Walder-Christensen Charitable Fund.

Growing awareness and engagement to expand our community

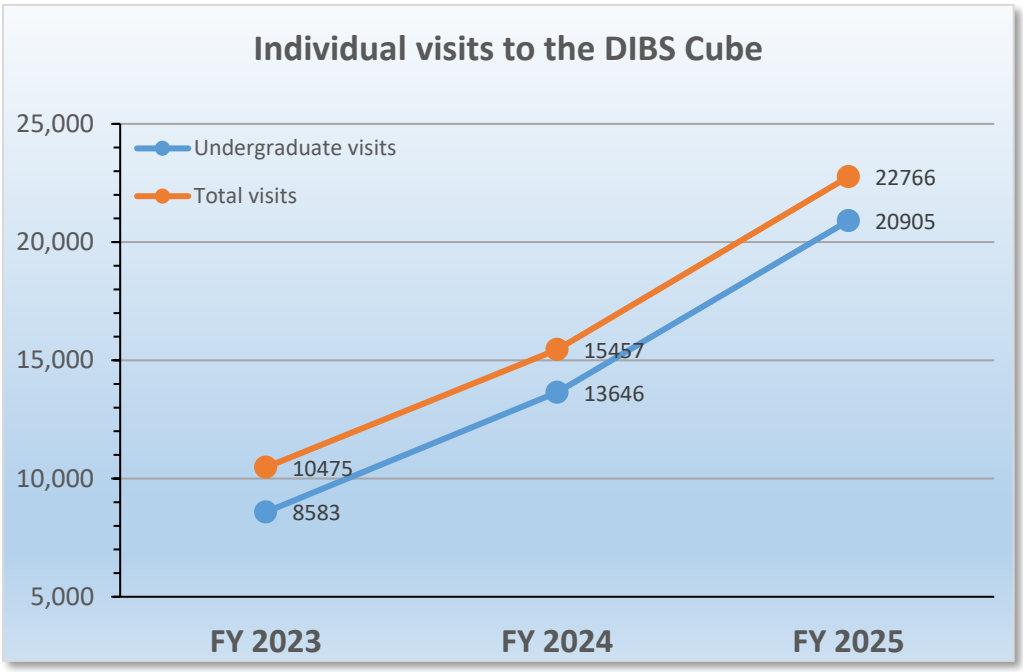
We worked to increase awareness of our work and mission in the ultimate goal of increasing engagement by the Duke community, on campus and alumni. To do this, we:

1) **Increased learner utilization of our space**, the DIBS Cube, including master's and doctoral students in the Graduate School, the School of Medicine, and the Pratt School of Engineering, in addition to the undergraduate students who are in the Cube daily.
2) **Partnered with Duke-based local outreach programs to educate and inspire local middle and high school students**, including featuring human brain encounters and neurophysiological demonstrations for BOOST (Building Opportunities and Overtures in Science and Technology), SALUD (Scholar Academic for LatinXs United for Diversity), and HPREP (Health Professions Recruitment and Exposure Program).

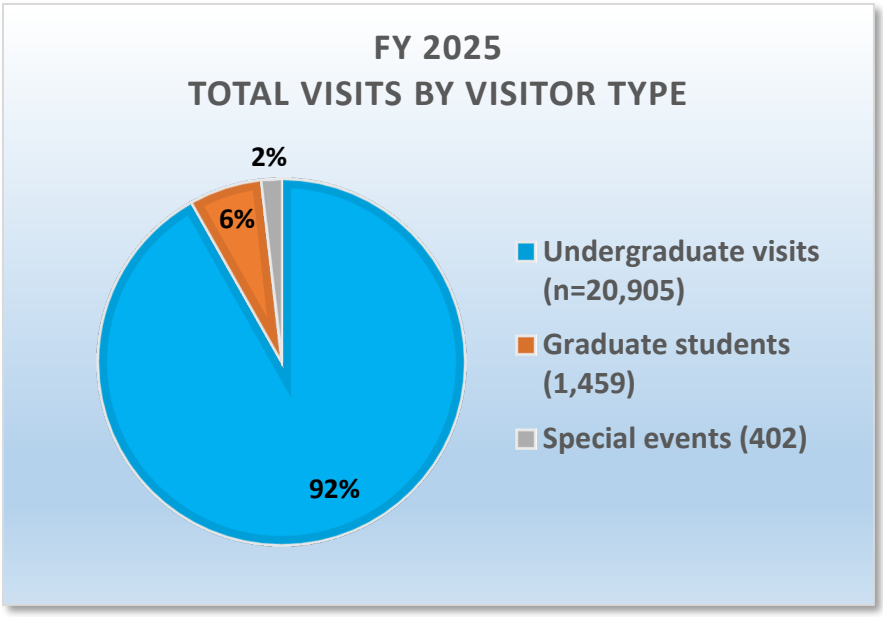
3) **Partnered with Duke Alumni Engagement and Development and the Duke Alumni Board of Directors** to facilitate brain-focused experiential learning events in the DIBS Cube for returning alumni and visiting friends of Duke.
4) **Created new ways to engage the Duke community** through the outputs of the Brain Portal Bass Connections project team, including large-format, multi-screen research highlights in The Link and a virtual brain in augmented reality for visualizing and learning about the human brain anywhere on campus.

Increased visits and utilization of the Cube

People came to the Cube for classes, neuroscience lab work, meetings, conferences, colloquiums, workshops and to study. Increased events scheduled in the space and more classes with their students brought a buzz of excitement and passion to our space.



The DIBS Cube hosted 20,905 undergraduate visits in FY 2025, **increasing 53% from the previous year.** All individual visits (including graduate students and participants of special events) totaled 22,766, **increasing 47%**. Overall we are experiencing about 50% growth year-by-year since FY 2023.



Undergraduates are the most prevalent users of the Cube, followed by Graduate students and individuals attending special events. In total, there were **over 22,000 visits** last year, demonstrating the high utilization of the space and its value to the brain science community, especially in regard to education.

DIBS Faculty Network members in the news

Brain scientists in the DIBS Faculty Network received extensive media coverage for their discoveries and inventions during FY2025. Here are some selected stories and their DIBS Faculty main contributors:

- New study reveals the surprising volume of mental health cases in primary care
  Avshalom Caspi
- AI-integrated imaging reveals retinal cellular structures with precision and speed
  Sina Farsiu
- Dopamine neurons' sensitivity to immune system gene offers clues to hyperactivity and behavioral disorders
  Anthony Filiano
- Scientists can tell how fast you're aging from single brain scan
  Ahmad Hariri
- Being ladies' man comes at price for alpha male baboons
  Susan Alberts
- Essentials: Improving health with stronger brain-body connection
  Diego Bohorquez
- Breakthrough Discovery: Brain Cell Astrocytes key to treating depression, schizophrenia
  Cagla Eroglu
- The Duke Mouse Brain Atlas promises to accelerate studies of neurological disorders
  Len White

The impact and reach of these Duke brain science stories were amplified several fold, as most of them were picked up by numerous media outlets around the world. For example, the last article listed was picked up by 9 media outlets, ranking it in the top 5% of all research outputs scored by Altmetric.

Our generous supporters

Our External Advisory Board

We are grateful for our External Advisory Board's generosity in expertise, time and financial support. They care deeply about the Institute's mission and programs, and their advocacy and dedication are vital to the Institute's success.

Chip Newton, Chair	
Jim Barrett	A.B.'81
Scott Barton *(ended in FY2025)*	A.B.'87, P'17
Alice Hunter Bender	A.B.'85, M.B.A.'89, P'18, P'21
Stacey Coulter	A.B.'83
Jack Dale	B.S.'07
Andrew Feinberg	B.S.E.'90, P'22
Alex Geier	A.B.'85, P'28
John Gilhuly *(started in FY2026)*	B.S.'17
Sharone Gilbert *(will start in FY2027)*	P'25
Bethann Brill Horey	B.S.'84, P'18
Kyra Hoskin	B.S.'23
Brendan Huang *(started in FY2026)*	B.S.'15
George Lamb	A.B.'75, P'21
Caroline Leventhal Martinez	B.S.'96
Bob Penn (emeritus)	A.B.'74, P'05, P'11, P'19
Sonya Wakil	B.S.'79, P'18

We would also like to give a special thank you to the following generous donors:

- **Ron and Beth Ostrow** who have made the Brain Portal Bass Connections team possible. The Ostrows have also provided support to enhance our CNRI undergraduate internship program.
- **Mike and Jennifer Shannon**, parents of Neuroscience major Sara Rose Shannon '23, whose generosity to the Undergraduate Studies in Neuroscience program has enabled us to develop the Neuroscience Teaching Lab in the DIBS Cube.
- **George Lamb** who has provided many years of support to make the DUNE program possible.
- **Our Anonymous donors**

Thank you to everyone who supports with gifts as well as their time and passion. We are grateful to have your support.

Resources

For more information on DIBS and its programs, please visit the following web pages:

- Duke Institute for Brain Sciences *News*
- Duke University Neuroscience Experience (DUNE)
- Cognitive Neuroscience Research Internship (CNRI)
- Cognitive Neuroscience Admitting Program (CNAP)
- Impact Neuroscience Program

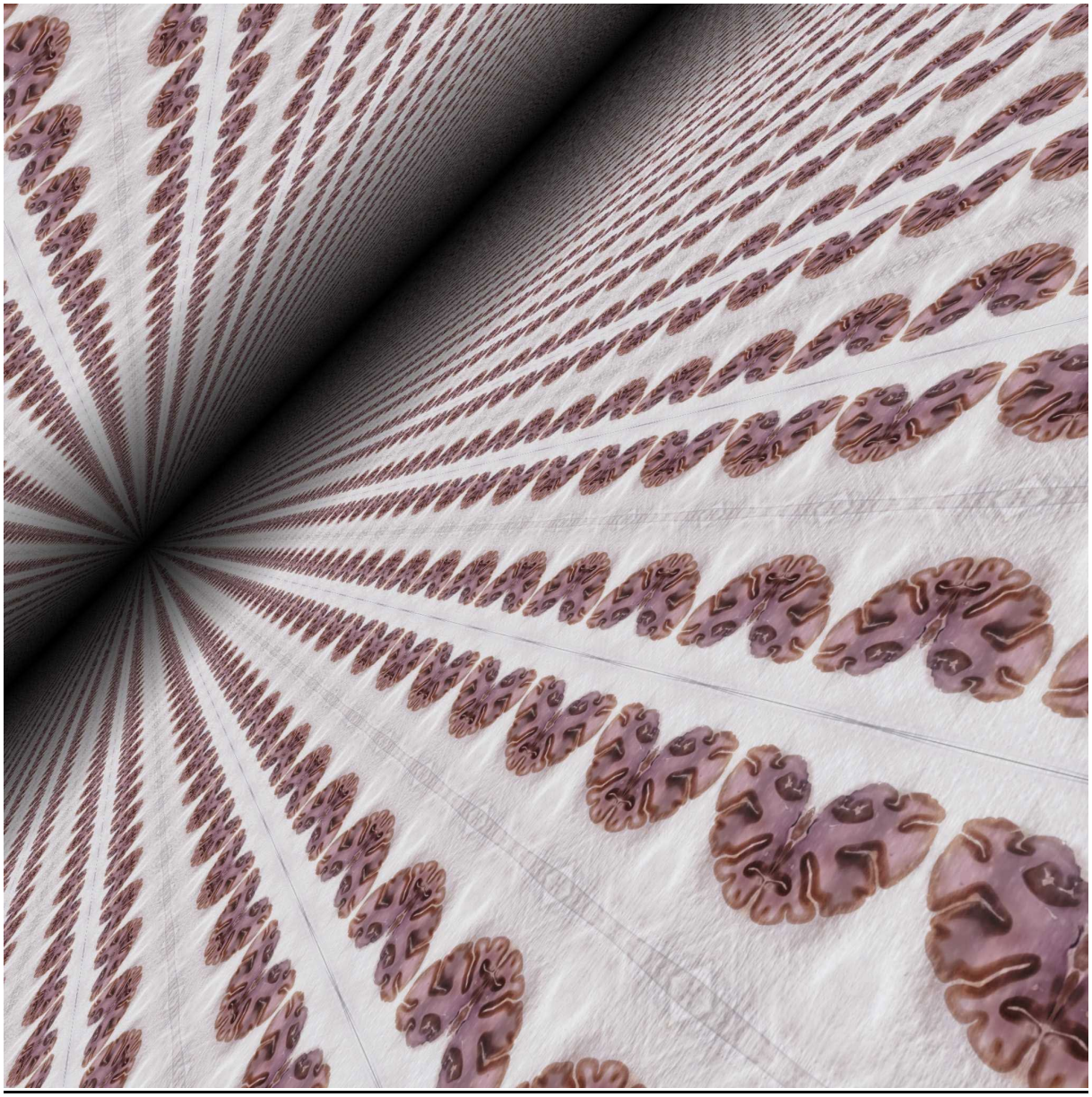


Photo credits: Neurons on cover page and brain sections on final page by Jessi Cruger and Dr. Martin Bohlen from Dr. Sommer's lab. The rest were taken by DIBS-associated staff, faculty, and trainees.