Massachusetts Institute of Technology

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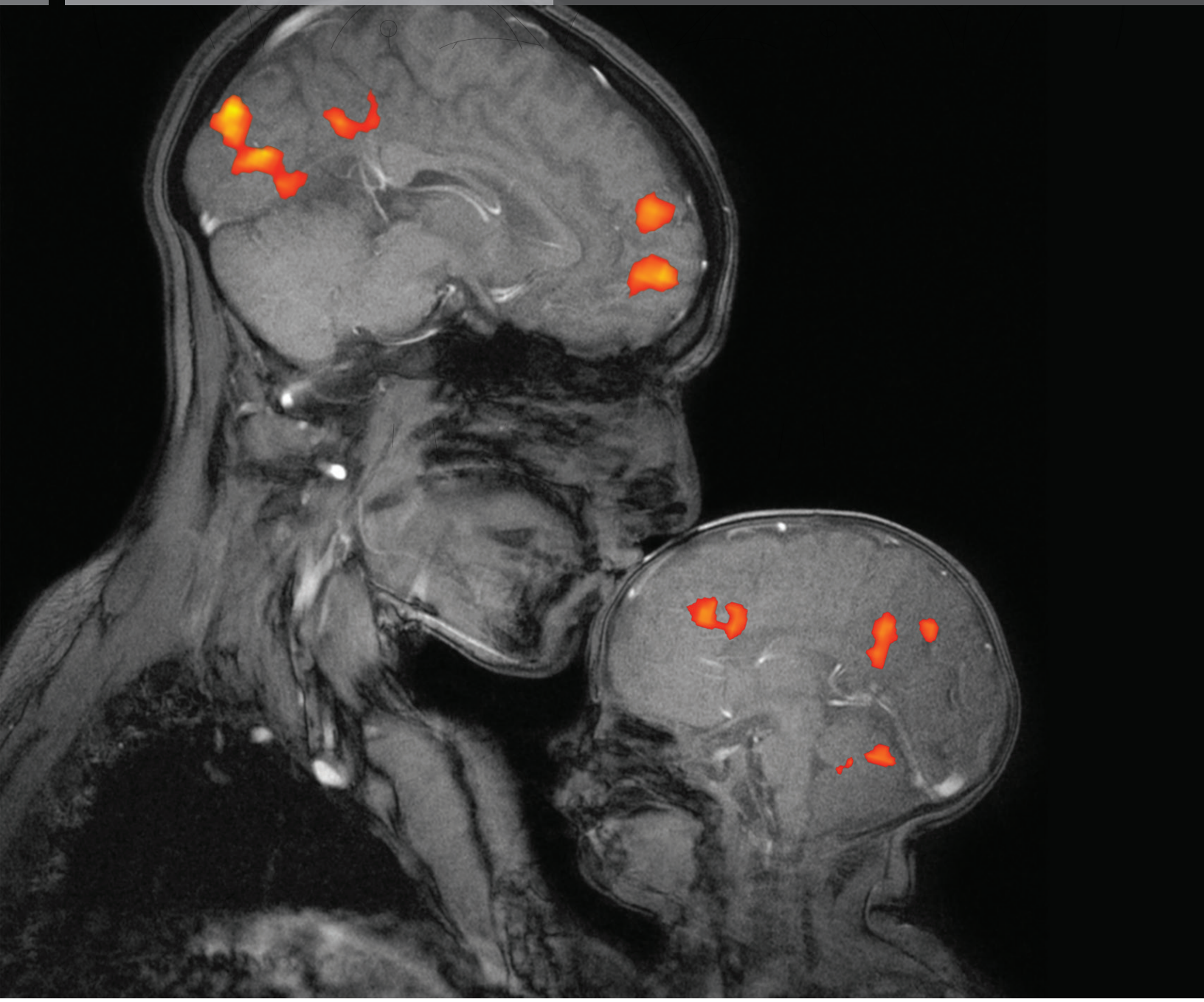
bcsnews



brain+cognitive sciences

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A Message from the Department Head
Jim DiCarlo

At the heart of the department's mission to reverse engineer the mind is a culture of interdisciplinary collaboration and innovation, thriving at the intersection of cognitive science, systems neuroscience, cellular and molecular neuroscience, and computation. We are stewards of an incredible legacy of academic excellence – one that understands the symbiotic relationship between brilliance in research and creating an environment that attracts talented individuals from a broad range of backgrounds.

As our department's statement on diversity says well:

"It is through the experience of diverse interests, strengths, viewpoints and concerns of fellow students, staff and faculty, that our community members become open-minded intellectuals, leaders and innovators, primed to pursue the MIT mission of advancing and sharing knowledge to meet the great challenges of our time."

In this newsletter, we share with you stories about members of our community that exemplify this philosophy. You will learn about Lorraine K. Wong, a BCS undergraduate student whose efforts to help those around them was recently honored by the Institute with the 2017 Collier Medal. Lorraine's humble and quiet dedication to service provides a wonderful example for us all. You will also learn about the department's new post-baccalaureate program, which brings talented students from underrepresented minority communities to campus and introduces them to our science. It is our hope that these students will join the scientific community, enriching us with their ideas and talent in the years to come.

We also honor those whose legacy built the foundation that the department stands upon. I am saddened to share with you the obituary of professor and department head emeritus Richard Held. His service to the department was not limited to the laboratory – he was also a mentor, and gave selflessly of his time after retirement to working closely with members of BCS Professor Pawan Sinha's research group.

Creating this unique community and environment would not have been possible without the strong support of our donors over the years. They provide us with the financial resources to execute our mission, and we are incredibly thankful for their generosity. If you are compelled by the stories you read today, I hope that you might consider joining them. We have made great progress and are deeply excited about the future of our science – a future you can help us achieve through your support.

James J. DiCarlo MD, PhD
Peter de Florez Professor of Neuroscience
Head, Department of Brain and Cognitive Sciences

On the Cover

Mother and Child
Magnetic resonance image of BCS Professor Rebecca Saxe holding her 2-month-old infant, Percy. Brain regions that are active when looking at faces are shown in color, in both mother and child.

Image credit: Rebecca Saxe, Ben Deen, Atsushi Takahashi. MRIs taken at the Athinoula A Martinos Imaging Center, at the McGovern Institute for Brain Research, MIT.

Please keep in touch:
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Brain and Cognitive Sciences undergraduate honored with 2017 MIT Collier Medal

Lorraine K. Wong is the first School of Science honoree to receive the award

By Rachel Traughber | BCS Communications

In 2014, MIT created the Collier Medal to honor Police Officer Sean Collier's commitment to engaging with the community around him during his time at the Institute. The Medal is a living memorial to Officer Collier, who gave his life in service to MIT on April 18, 2013.

"How do you pay homage to a person who made the ultimate sacrifice, and also remember the person that he was?" asks MIT Chief of Police John DiFava. "We've memorialized him in two ways. We've built this beautiful structure in front of Stata and the Koch Institute, and we created the [Collier] Medal, which keeps [Sean] alive, in terms of what he stood for, what he was, and what he represented on this campus."

This year's recipient, MIT undergraduate Lorraine Wong, embodies the spirit of service the Medal commemorates. Jared Berezin, a lecturer in the Department of Comparative Media Studies/Writing, met Wong through the Increase Help Seeking working group on campus, part of MIT's MindHandHeart Initiative. The group was created to develop ways to connect those who are struggling with mental health to resources, and to reduce the societal stigma seeking help can bring.

"As the student co-chair of the working group, Lorraine holds a leadership position, yet rather than take a commanding role over meetings, they often prefer to listen intently to the members of the group," says Berezin. "Lorraine is typically the first to volunteer to do critical work on our group's behalf—ranging from setting up our infrastructure needs to preparing key questions for the group to consider—yet they show little interest in receiving recognition. They want to learn as much as they can, and do as much as possible to bring about meaningful, potentially life-saving changes on campus."

Wong and MIT President L. Rafael Rief at the 2017 MIT Excellence Awards ceremony.

The suicide of a close high school friend spurred Wong's interest in mental health and mental illness.

"We didn't talk about mental health or mental illness in my high school. It felt like people just went on. Statistically, there are so many people dealing with the same things, and they just keep it inside and don't feel like they can talk about it," explains Wong.

As an MIT freshman, Wong joined the campus group Active Minds, a peer outreach group whose mission echoes that of Increase Help Seeking. The group's mandate is to utilize peer outreach to increase students' awareness of issues of mental health, symptoms of mental illness, and available resources for seeking help, while serving as a liaison between students, the MIT administration, and mental health community.

"There's nothing wrong with you if you have a mental illness or mental health issues. At MIT, many people were somewhere near the top of their high school class, they've been pretty successful, and often times they had people right there to support them. When you're here, and you're in your freshman fall, and you're taking classes that you've never taken before with so many talented students, it's not going to be as easy to succeed. And if you're struggling but you don't feel like you can reach out for help, that can hurt academically as well as personally and emotionally," says Wong.

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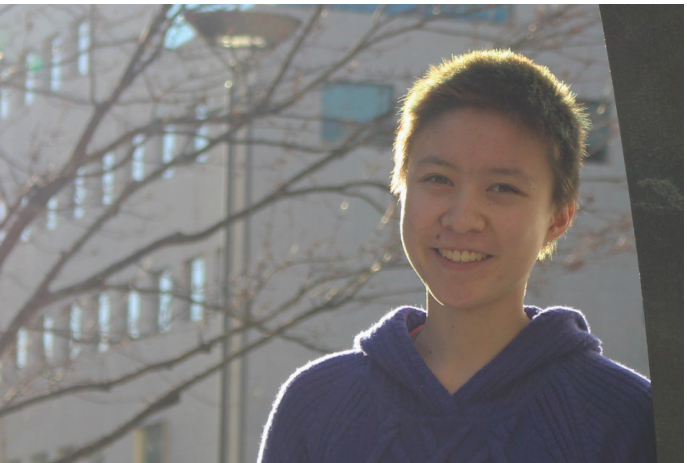
Wong in front of the Collier Memorial and the Brain and Cognitive Sciences Complex



Richard Held, professor emeritus of brain and cognitive sciences, dies at 94

Longtime professor and former department head spent a lifetime investigating the mechanisms of visual perception

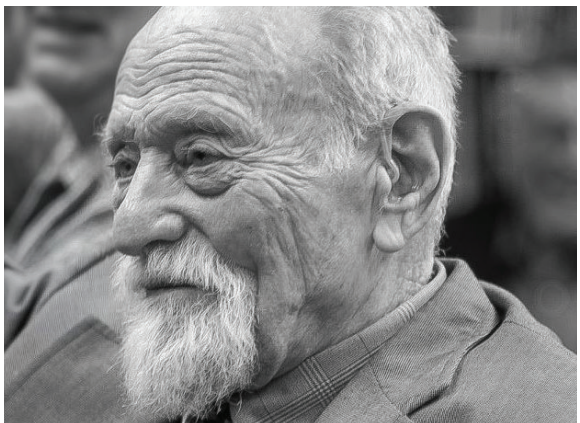
Richard M. Held, a professor emeritus and former head of MIT's Department of Brain and Cognitive Sciences who spent a lifetime investigating the mechanisms of visual perception, died at home of congestive heart failure on Nov. 21, 2016. He was 94.

As a faculty member and researcher at three institutions of higher education — Brandeis University, MIT, and the New England College of Optometry — Held pursued a lifelong interest in research on how the visual system develops and adapts, following the advice of Gestalt psychology founder and personal mentor Wolfgang Köhler to "make discoveries."

Held was born in Manhattan, New York City, on Oct. 10, 1922, the only child of Lawrence W. Held, a shipping export broker, and Tess (Klein) Held, an artist who worked for a time in fashion design. He spent his childhood taking things apart — clocks, locks, and batteries — and then making things, including electric motors and crystal radios, and reading about Tom Swift, the boy inventor.

He served in the Navy in World War II, where he was a tactical radar officer on the USS Kadashan Bay and USS Saratoga in the Pacific, earning the rank of second lieutenant. Held was stationed at Eniwetok Atoll, ready for a planned ground invasion, when the war ended after the dropping of the atomic bomb. After the war, he became a lab assistant to Wolfgang Köhler, co-authoring with him a 1949 Science paper demonstrating that moving a bright object in front of a stationary observer produced a corresponding electrical field in the brain.

Held earned a master's degree from Swarthmore College, a doctorate from Harvard University, and joined the faculty of Brandeis University in 1953, where he remained until 1962. There, he conducted with then-graduate student and future MIT Department of Brain and Cognitive Sciences faculty colleague Alan Hein what became his most famous experiment, demonstrating that, in the words of Held's late French colleague Marc Jeannerod, "perception is constructed by action." Their work showed the strong role of self-produced movement in visual development: In order to properly judge depth, and distinguish between objects, animals (including humans) need active interaction with the environment.



Richard Held, MIT professor emeritus and former head of the Department of Brain and Cognitive Sciences

In 1962, Held moved to MIT to join then department head Hans-Lukas Teuber in the Department of Experimental Psychology. As the chair of what is now MIT's Department of Brain and Cognitive Sciences (BCS) from 1977 to 1986, Held mentored several generations of graduate students, and oversaw the department's growth into one of the premiere neuroscience and cognitive science institutions. He was named professor emeritus in 1993.

In 2003, he joined the MIT laboratory of Pawan Sinha, a professor of vision and computational neuroscience, and became a collaborator in Project Prakash, a non-profit founded by Sinha that restores the sight of congenitally blind children in India and researches their subsequent development of vision. In a paper published in 2011 in Nature Neuroscience titled "The newly sighted fail to match seen with felt," Held and Sinha reported that newly-sighted subjects who sensed objects with their hands could not identify them by sight — at least at first. However, after a week with sight, their abilities rapidly improved. The findings, which answered a question first posed in 1688, forced a reconsideration of the conventional view that if children lack sight in early childhood, they will never be able to make visual sense of the world. The rapidity of improvement suggested that the visual system is, in some sense, pre-wired, but relies importantly on the feedback between sight and touch that is gained by experience.

"Dick made a remarkable set of contributions to vision science, all with a deep appreciation for the history of which he was part," says Steven Pinker, the Johnstone Family Professor of Psychology at Harvard University. "I had learned about Dick's work as an undergraduate in Montreal in 1972, and it was a privilege to have been his colleague. He will be missed, but remembered."

Scientific research was a source of pleasure to Held until the end of his life, and he maintained close contact with his colleagues, attending meetings of Sinha's laboratory until six months before his death. His final paper of more than 200, in which he was a senior author with Sinha as lead author, was published in the Proceedings of the National Academy of Sciences when he was 92 years old — a testament to his unending devotion to research. He died with an open copy of *Science News* next to his computer keyboard.

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BCS Community News

1, 2, 3. Members of the Saxe lab led the MIT Museum's Science on Saturdays event this spring. The event, "Your Developing Brain," was attended by ~1,000 parents and children. Image credit: Lori Rider

4. Rosa G. Liberman with MIT Provost Marty Schmidt and VP for Finance Israel Ruiz at the 2017 Excellence awards. Liberman one an ward for her exceptional customer service. From the nomination letter: "At MIT, Rosa is well known as a leader in emergency preparedness. She has diligently built a unified community where everyone has taken to heart the credo: emergency preparedness is everyone's responsibility. In fact, her efforts have strengthened the overall sense of community across Building 46 and beyond. She has a selfless commitment to MIT citizenship that far exceeds the norm.

5. The department recently installed a new mural featuring the work of BCS community member Zeynep Saygin. This image shows pathways of nerve fibers through the brain in three dimensions: up/down (blue), front/back (green), and left/right (red). By comparing these maps of connectivity with maps of neural function, researchers can begin to predict how individual brains will respond to different stimuli. That will eventually help them to understand healthy brain development and will enable earlier diagnosis and interventions for conditions such as autism and dyslexia.

Department launches post-baccalaureate program

Research Scholars Program in Brain and Cognitive Sciences brings talented students to the department

By Rachel Traughber | BCS Communications

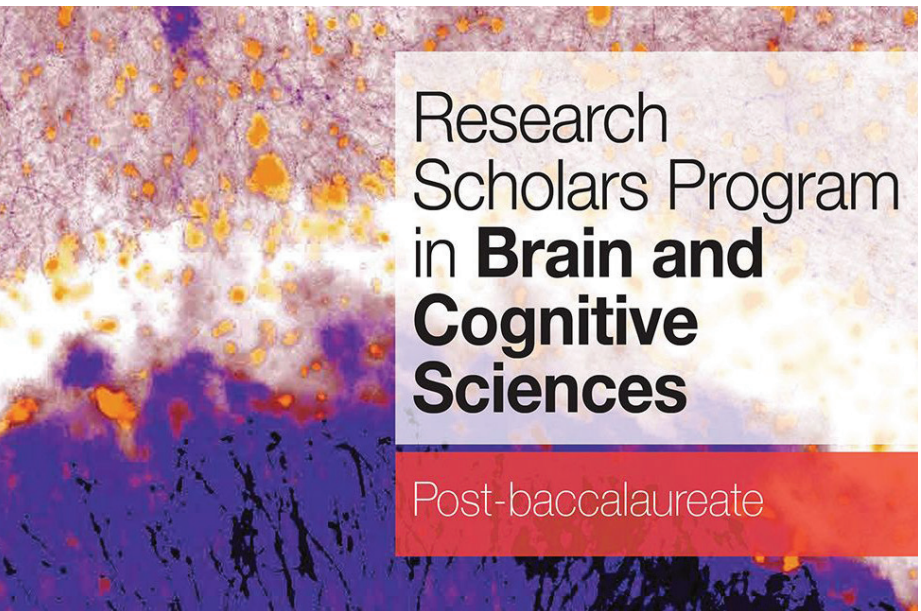
During spring 2017, the department launched a new post-baccalaureate program. Designed to help prepare outstanding college graduates from under-represented minority groups or economically disadvantaged backgrounds for graduate school in cognitive science, computational cognitive science, or neuroscience, each Research Scholar in Brain and Cognitive Sciences will be exposed to the full breadth of science and resources Building 46 has to offer.

The program is led by BCS professors Laura Schulz and Pawan Sinha.

“In our graduate admissions process, we often come across applicants who seem to be very motivated to undertake higher studies, but are just a little behind in terms of their formal preparation,” explains Sinha. “While they might not quite rise to the level of breaking threshold for admission during that cycle, we feel that they have the promise and the potential to be excellent students and scientists with a little more training.”

The program is small by design, with an emphasis on customizing each scholar’s experience at MIT to their research interests. The immersion in the research and culture at the department exposes the students to the rigors of graduate school, with current graduate students, labs, faculty, and fellow researchers, before they apply for graduate programs.

All graduate courses are open and available to matriculates. During the pilot phase, scholars participated in classes studying everything from the neuroscience of morality and functional MRI to neuroanatomy.
“Our department is unusual in that we have everything from cellular and molecular neuroscience to cognitive and computational neuroscience under the same roof,” explains Meredith Canode, BCS academic administrator. “This environment provides scholars with a singular opportunity to really explore everything brain- and mind-related, from cells to thought. They will have the opportunity to not only get practical laboratory experience, but to get that experience at one of the world’s greatest scientific institutions, in laboratories that are leading the way in the field.”



Students are assigned a faculty advisor as soon as they are admitted, enrolling in up to four courses and participating in a graduate research rotation. By the end of their first semester, they are placed in a lab that will be their primary research home for the duration of the program. By the end of the first year, students will start work on a summer research project under the advice of their lab’s principal investigator and their faculty advisor. During their second year, scholars begin the process of applying for an National Science Foundation graduate research fellowship and attend at least one national or international conference in their chosen research field. Superior candidates for the graduate program at BCS will be moved to a fast-track admissions program.

Recruiting for the program has now begun.

“This is a wonderful vehicle for our department’s faculty to proactively do outreach to communities that may not always think of MIT as a viable option,” Schulz says. “It is my hope that the BCS faculty will actively engage in this process and promote the post-baccalaureate program in their talks across the country.”

All scholars will receive the equivalent of a graduate student stipend, health insurance, access to student housing, tuition remission, and all other benefits and privileges conferred upon MIT graduate students. At the completion of the program, scholars will receive an official transcript from MIT that documents the subjects and research completed in the department. Successful candidates will be fully prepared for a program of graduate studies in brain science.

To learn more about the program, please visit ***bcs.mit.edu/postbacc.*** *If you are interested in supporting one of our Research Scholars, please contact Rachel Donahue* ***rjd@mit.edu***

Noteworthy News

PhD Rebecca Canter, Danielle Feldman, Bryan Higashikubo, Shaiyan Keshvari, Tejas Kulkarni, Rajeev Rikhye, Sangyu Xu, **SM** Evan Murray

Faculty member **Ed Boyden** was named a Faculty Scholar by the Howard Hughes Medical Institute (HHMI), the Simons Foundation, and the Bill and Melinda Gates Foundation. He was also elected to the American Academy of Arts and Sciences.

Faculty member **Kwanghun Chung** received NIH's New Innovator Award.

Faculty member **Michale Fee** received the School of Science Prize for Undergraduate Education.

Faculty member **Mark Harnett** was named Frederick A. (1971) and Carole J. Middleton Career Development Assistant Professor of Neuroscience.

Faculty member **Myriam Heiman** was named Latham Family Career Development Assistant Professor.

Staff member **Rosa Liberman** received MIT's 2017 Serving the Client Recipient: Providing consistent and exceptional service excellence award.

Undergraduate **Anita Liu** was named a Schwarzman Scholar.

Faculty member **Troy Littleton** received the Menicon Professor in Neuroscience chair.

Faculty member **Earl Miller** received the Goldman-Rakic Prize for Outstanding Achievement in Cognitive Neuroscience from the Brain and Behavior Research Foundation. He was also elected to the American Academy of Arts and Sciences.

Faculty member **Elly Nedivi** was elected to AAAS.

Faculty member **Molly Potter** received the 2017 Norman Anderson Lifetime Achievement Award from the Society of Experimental Psychologists. She was also elected to the American Academy of Arts and Sciences.

Postdoc **Jinsoo Seo** (PILM) received a 2016 Infinite Kilometer Award.

Faculty member **Li-Huei Tsai** received the Society for Neuroscience Mika Salpeter Lifetime Achievement Award.

Faculty member **Kay Tye** received the Society for Neuroscience's Young Investigator Award, and the Freedman Prize for Exceptional Basic Research from the Brain and Behavior Research Foundation.

BCS undergraduate **Lorraine K. Wong** received the 2017 Collier Medal.

Faculty member **Feng Zhang** was named James and Patricia Poitras Professor in Neuroscience, was runner up for TIME's person of the year, was named a Faculty Scholar by Howard Hughes Medical Institute (HHMI), the Simons Foundation, and the Bill and Melinda Gates Foundation; and received tenure at MIT.

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Held was elected to the National Academy of Sciences and was a fellow of the American Academy of Arts and Sciences. He was awarded three honorary doctorates, including one from the Free University of Brussels presented by King Baudouin, and received multiple professional awards including the Galileo Award of the American Foundation for Vision Awareness, the Kenneth Craik Award from Cambridge University, the Howard Crosby Warren Medal from the Society of Experimental Psychologists, and the Glenn A. Fry Award from the American Academy of Optometry.

Held led an active life, commuting by bicycle to MIT in the 1960s and 1970s at a time when that was rare, and was an avid tennis player into his 60s at the Cambridge Tennis Club. With his wife, he was an enthusiastic member of the Old Cambridge Shakespeare Association, which met monthly to read the works of the Bard aloud. Over the past decade-and-a-half, he was an active member of a memoir-writing group led by Clark C. Abt, the founder of a policy research firm, where his autobiographical sketches revealed a wry sense of humor in finely-crafted prose.

He is survived by his wife of 65 years, Doris Bernays Held, a retired psychotherapist; three children, Lucas Held of New Haven, Connecticut, Julia Held of Westhampton, Massachusetts, and Andrew Held of Northampton, Massachusetts; and two grandchildren. In June, he and Doris moved to Northampton to be close to their daughter Julia and her family.

In lieu of flowers, donations may be made to Project Prakash, 955 Massachusetts Avenue, Suite 351, Cambridge, MA 02139, or through projectprakash.org.

Text adapted from original. To read the obituary in full, please visit ***bcs.mit.edu/heldobit***

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Left to right: Seniors Lorraine Wong, Kathy Dieppa, and Zoë Redstone-Rothstein staff the Active Minds booth during Eating Disorder Awareness week in March.

Photo: Yanisa Techagumthorn

This quiet commitment to helping others and an interest in science and technology intertwined in Wong from an early age. In addition to their mental health advocacy, Wong also volunteers for programs that encourage girls to connect to STEM fields. Growing up in Los Altos, California, they attended a K-12 STEM focused school, actively participated in two Girl Scout troops, and helped to create a third.

"In high school, I did robotics. We had a Girl Scouts team called Space Cookies," shares Wong. Jointly sponsored by NASA and the Girl Scouts, the robotics team was a special troop that exposed young women to designing, fabricating, and programming robots in a group setting. "We were able to work at the NASA Ames Research Center. It was an amazing experience." During their senior year, Wong helped create the middle school version of the troop, ensuring that girls as young as 12 could participate.

Their interest in this advocacy continued at MIT, where they participated in the Women's Initiative, an outreach program that sends students majoring in STEM fields to schools around the country to talk to girls about engaging with STEM. Wong spent a week in the Lowell, MA school district, speaking to middle school girls about different kinds of science and engineering, and finishing with a hands-on project extracting DNA from strawberries.

"The girls were taken out of the class to meet with us. It was a special time for them to be able to be on their own, have engineering and science on their minds, while not having the stereotypes filtering in from other people also working on the same things," says Wong.

With these dual interests in mental health and gender, it should come as no surprise that Wong is a double major in Brain and Cognitive Sciences and the Program in Women and Gender Studies. After they graduate, Wong plans to work at nonprofits for a few years before going to grad school for degrees in social work and public policy. While many of the activities they are involved with on campus touch mental health and gender, they are also part of the greater Boston advocacy community, working with Planned Parenthood, the Samaritans crisis hotline, and GLAD, the GLBTQ Legal Advocates and Defenders where they volunteer at GLAD Answers, a legal infoline.

"I love MIT's mission," Wong says. "Our motto is 'mind and hand,' but I think our mission closes with something like 'we're trying to teach our students science, tech, and engineering for the betterment of humankind.' It's not that we're teaching these things to make money, or make cool discoveries, but we're doing it for or to help people. It's not just science — there's a human aspect to everything we do."