Karla Kaun uses fruit flies to investigate the genes and pathways that underlie the mechanisms of addiction in the brain.
The brain makes us human. It governs our astounding capacity to learn, remember, see, act, and feel. It’s the most complex machine in the world—and more than 1,000 diseases and disorders cripple its function in nearly 1 billion people worldwide. Untangling the brain’s mysteries is one of the grandest challenges of our time. With a growing arsenal of new technologies, the stage is set for unparalleled discovery in brain science.

Brown University is a world leader in this effort. The Brown Institute for Brain Science (BiBS) epitomizes the extraordinarily bold and collaborative approach for which the University is known—and that is essential to brain research.
Brown is building the future of brain science. BIBS is focused on an ambitious but achievable tripartite goal: to uncover functions of the brain that distinguish us as humans, to discover new ways to treat brain diseases and disorders, and to create brain-like technologies to improve the human condition.

BIBS provides support for interdisciplinary, multi-investigator research and funding for early, high-risk projects, as well as undergraduate and graduate-level research training. Through these combined efforts, BIBS is uncovering the genes and proteins that govern the workings of brain cells, how brain cells wire together into circuits, and how these circuits give rise to complex behavior—and to translate these discoveries into devices that work like the brain and that could treat brain diseases and disorders.
Light-sensitive ganglion cells in the retina control circadian rhythm. Courtesy of David Berson.
Brain science at Brown is about collaboration. BIBS grew out of Brown University’s interdisciplinary culture, enabling scientists to attack complex and multifaceted brain science problems that require diverse skills and perspectives. This integrated, multidisciplinary approach unites more than 100 prominent engineers, physicians, neuroscientists, mathematicians, and cognitive psychologists, who—working alongside talented undergraduates, medical and graduate students, residents and postdoctoral fellows—connect bench research to clinical breakthroughs.

Scientific collaborations at BIBS are strengthened by Brown’s close relationships with its affiliated hospitals. BIBS partners closely with the Norman Prince Neuroscience Institute at Rhode Island Hospital as well as the Providence VA Medical Center, Butler Hospital, and Alpert Medical School’s other teaching hospitals. Shared resources within BIBS, including the MRI Research Facility and Behavioral Phenotyping Core Facility, also advance high-impact discovery. Enabled by these resources, BIBS is distinguished by the fluid boundaries that drive breakthroughs.
Leigh Hochberg and Arto Nurmikko are part of a large team of engineers, neuroscientists and physicians collaborating to develop brain computer interfaces.
BIBS is focused on game-changing discovery. From uncovering how cells respond to light to restoring lost function with devices that interface with the brain, BIBS has forged important fundamental discoveries that may revolutionize our understanding of brain science and, by elucidating common underlying causes, a wide range of diseases at once.

These groundbreaking fundamental findings underlie the institute's clinical brain innovations. BrainGate, a neural interface device that enables people with paralysis to control robotic limbs through their thoughts, is one standout example. The breakthrough was achieved through a herculean collaboration among neurologists, neuroscientists, computer scientists, and engineers working at the question from its mathematical and neuronal underpinnings all the way to its revolutionary application. The science underlying BrainGate has been extended to other innovations at Brown and may also enable researchers to develop devices for the treatment of neurological disorders and diseases like Parkinson's and epilepsy. This is how Brown is advancing brain science: by uncovering fundamental knowledge and translating that research into innovations and treatments.
Brain science is a top priority of Brown. President Christina Paxson’s *Building on Distinction: A New Plan for Brown* includes “understanding the human brain” as one of seven integrative themes critical to society’s development. The University and its affiliated hospitals are making major investments to advance knowledge of this last frontier.

Investments are directed toward three developing centers, each focused on an area of emerging excellence at Brown and of enormous potential in the field: computational neuroscience; neurobiology of cells, circuits, and disease; and neuroengineering. Modeled after BIBS’s successful Center for Vision Research, these nuclei of interdisciplinary research will create coherence and visibility, attract external funding, support undergraduate and graduate education, and catalyze breakthroughs.

Investment in this area will help us understand functions of the brain that distinguish us as humans, discover treatments for disorders that diminish our capacities, and create technologies to improve lives.

*Psychiatrist and developmental neurobiologist Eric Morrow uses human genetics, stem cells, and laboratory studies to investigate the basis of autism.*
Neurosurgeon and neuroscientist Wael Asaad treats brain disorders with implanted devices. His research lab investigates how groups of brain cells govern learning, work that could help physicians treat brain injury and disease more effectively.
Now more than ever, brain science has the potential to transform human health and existence. With its distinctive, collaborative culture, increasing preeminence in research and innovation, and growing momentum, the Brown Institute for Brain Science is poised to lead science and society into this new and promising era.

Support for this mission is needed. Brain research and training programs require substantial investment, particularly for the high-level faculty and technologies that will drive fundamental discovery, advance clinical treatments, and improve human lives.