How do we remember? How do we learn to make coordinated movements? How do drugs work to alleviate chronic pain? How does the human mind arise from the activity of the nervous system? These questions and many others are explored by neuroscience students at Macalester. Students may major in neuroscience studies or in biology with an emphasis in neurobiology.

Faculty

Eric Wiertelak, DeWitt Wallace Professor of Psychology and director of Neuroscience Studies, is a neuroscientist whose work includes physiological and behavioral investigations into (1) the neural mechanisms of motor and other systems involved in the production of coordinated motion, such as dance movements, and (2) the impact of environmental stressors, learning, natural medicines, and alternative therapies on a variety of neurophysiological response mechanisms, such as pain modulation. A fellow of both the American Psychological Association and the Association for Psychological Science, he is the recipient of the 2002 Wälder D. Mink Award for Outstanding Undergraduate Teaching from the Minnesota Psychological Association and the 2004 Macalester College Excellence in Teaching Award. His research has been funded by the National Center for Complementary and Alternative Medicine and the National Institute on Drug Abuse. His laboratory’s research has resulted in numerous student co-authored publications in academic journals and presentations at national and international conferences.

Darcy Burgund, associate professor of psychology, specializes in high-level visual cognition and memory, with a particular focus on object recognition and reading processes in adults and young children. Her current research uses behavioral and neuroimaging techniques to pursue two main lines of inquiry: (1) the effects of age and ability on perceptual tuning for letters, and (2) the extent to which visual form systems are dedicated to processing particular stimulus types. She teaches courses on cognitive neuroscience, neuroimaging techniques, and research methods.

Janet Folina, professor of philosophy, focuses primarily on the philosophy of mathematics and its historical basis. She also has done work on the history and philosophy of science and on the epistemological foundations of science. Her broader philosophical interests include Kant, Wittgenstein, realism-antirealism debates, the concept of objectivity, and the nature of the mind that emerges from both philosophical and scientific arguments.

Susan Fox, professor of mathematics and computer science, is interested in the impact of memory on reasoning and learning. She works with an approach from artificial intelligence called “case-based reasoning.” Case-based reasoning is frequently used for computerized help systems, for databases of events for businesses, and for design assistants. One research project uses a case-based system that can monitor and model its own behavior. Her main research project, however, is a system that uses case-based reasoning for robot control: both abstract route planning and behavior-level tasks.

Joy Laine, adjunct professor of philosophy, specializes in philosophy of mind and language. Her research and teaching combine interests in the Indian and Western analytical philosophical traditions. Currently she is working on a manuscript for a book about philosophical theories of persons. She regularly teaches Philosophy of Mind and Philosophy of Language, among other courses.

Brooke Lea, professor of psychology, specializes in human cognition, with an emphasis on higher mental processes such as language processing and deductive reasoning. His research interests include theories of discourse comprehension, models of human logical competence, and the interaction between literary devices and memory. Currently he is developing a model of comprehension that combines memory-based text processing with a schema-driven logical inference engine.

Julia Manor, visiting assistant professor, specializes in animal behavior and cognition. Her research interests include physiological measures of aggression in dogs, environmental enrichment in rats, and empathy behaviors in both rats and dogs. She likes exploring the intersections of behavior, emotions, and cognitions in non-human animals. She teaches courses in learning and behavior, sensation and perception, animal cognition, and brain and emotion.

Recent Courses

Artificial Intelligence
Behavioral Neuroscience
Brain and Emotion
Brain, Mind, and Behavior
Cognitive Neuroscience
Exploring Sensation and Perception
Hormones and Behavior
Inside the Animal Mind
Mathematical Modeling
Mind Reading: Understanding fMRI
Pain and Suffering
Philosophy of the Mind
Principles of Learning
Seminar in Neuropharmacology
Special Opportunities and Internships

Neuroscience Studies at Macalester features an active chapter of Nu Rho Psi, the national neuroscience honor society, and a neuroscience club that regularly schedules events and outings. The Twin Cities area provides a wide array of internships and other opportunities where students gain firsthand experience in clinical and scientific areas of particular interest to them. For example, Judith Syrkin-Nikolau ’15 (Ames, Iowa) was a neuroscience researcher with CogCubed in Minneapolis. In addition, a number of students pursue internships in other countries.

Faculty-Student Collaboration

Student-faculty collaborative summer research is supported by individual faculty grants and institutional grants. The following are a few of the current and past student/faculty research projects conducted at Macalester:

Eshaan Iyer ’18 (Fremont, Calif.) conducted extractions from the Asiatic dogwood plant and executed studies examining the anti-inflammatory and anti-nociceptive effects of these substances in rodents.

Hannah Harder ’17 (Jacksonville, Ill.) completed studies examining the role of microbiota in the modulation of neural activity related to anxiety and stress.

Nicole Mathews ’16 (Chicago, Ill.) completed studies examining the empathic capabilities of rodents and underlying neurochemical modulation.

Wojciech Michno ’15 (Domsjö, Sweden) conducted studies that examined the anti-nociceptive activity of substances extracted from the peppermint plant.

Erin Gaidis ’14 (Wappingers Falls, N.Y.) completed studies examining the bioactivity of traditional Chinese medicines in the rat nervous system.

Resources

Neuroscience Studies is primarily housed in the Olin–Rice Science Center. The building contains more than $2 million in state-of-the-art scientific equipment. The college is close to the University of Minnesota, which provides students with additional opportunities to perform research. The university also houses one of the largest collections of biomedical journals in the United States and has extensive holdings in other areas of neuroscience as well, all of which are available for use by Macalester students. Numerous internships and seminars are available at the University of Minnesota and the many research facilities in the Twin Cities area.

Internships

Saksh Dasiwani ’18 (Mumbai, India) worked as a developmental trainee at Fraser Child and Family Center in Richfield, Minn.

Lianna Novitz ’18 (Canoga Park, Calif.) served as a neurophysiology data management intern at the University of Minnesota’s neurology department in Minneapolis.

Ly Bunchung ’16 (Ta Khmau, Cambodia) worked as a developmental trainee at Fraser Child and Family Center in Richfield, Minn.

After Macalester

Brooke Collins ’16 (Belton, Mo.) is pursuing a master’s degree in nursing at Vanderbilt University.

Alexis Cruz ’16 (Baltimore) will be conducting research through the IRTA program of the National Institutes of Health.

Akanksha Dua ’16 (Kolkata, India) is an analyst with the Analysis Group of Boston.

Harper Fauni ’16 (Lakewood, Calif.) will be conducting bioinformatics research at the National Human Genome Research Institute in Bethesda, Md., through a program of the National Institutes of Health.

Sinta Fergus ’16 (Auburn, Ala.) is a research assistant at the University of Minnesota.

Nicole Mathews ’16 (Chicago) is working in the neuroscience lab at the Cleveland Clinic doing stroke research.

Hannah Rose Brown ’15 (Ladoga, Wis.) is a research consultant at CogCubed.

Brett Campbell ’15 (Minneapolis) is a research technologist at the Cleveland Clinic.

Kathryn Hathaway ’15 (Plymouth, Minn.) is a brain image analyst at Institute of Child Development, University of Minnesota.

Wojciech Michno ’15 (Domsjö, Sweden) is a research assistant at Göteborgs Universitet in Sweden.

Erin Gaidis ’14 (Wappingers Falls, N.Y.) is a neuroscience laboratory manager at Duke University.

Dianna Amasino ’13 (Madison, Wis.) is the recipient of a prestigious National Science Foundation Predoctoral Fellowship and is pursuing a PhD in neuroscience at Duke University.

Frederik Kamps ’13 (Chanhassen, Minn.) is pursuing a PhD in neuroscience at Emory University.

Logan Sand ’12 (Stillwater, Minn.) is an electrophysiology technician with the Minnesota Epilepsy Group.

David Harris ’11 (Newton, Mass.) is in the PhD program in neuroscience at the University of Vermont.

Sara Berger ’10 (Mandan, N.D.) is pursuing a PhD in neuroscience at Northwestern University in Chicago.

Visitors

His Holiness the 14th Dalai Lama of Tibet spoke about the role of neuroscience in understanding the nature of happiness, fulfillment, and embodiment.

Prime behaviorist Frans de Waal spoke about his research exploring humanism across primate species.

Neuroscientist Michael Gazzaniga spoke about his research on how the brain enables the mind.

Neuroscientist Apostolos Georgopoulos spoke about his research on the brain mechanisms of cognitive processes.

Neuroscientist Jeffrey French spoke as part of the Neuroscience Seminar Series about his research on the neuroendocrine substrates of family life in marmoset monkeys.

Neuroscientist Chad Marsolek spoke about his research into the nature of priming effects and implicit memory.