WU TSAI INSTITUTE

100 College Street, Suite 1184
https://wti.yale.edu/initiatives/graduate-certificate

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The Wu Tsai Institute (WTI) is a university-wide neuroscience initiative with the mission to understand human cognition and explore human potential by sparking interdisciplinary inquiry. WTI brings together biological, psychological, and computational perspectives through shared facilities, training and mentorship, joint faculty hiring, collaborative spaces, community-building events, and moonshot projects. It prioritizes mission-driven research that bridges disciplines and advances a more integrated understanding of the mind and brain across scales and species through the common language of data science.

GRADUATE CERTIFICATE IN BRAINS, MINDS, AND MACHINES

The human mind remains a mystery of science. It can be studied through psychological research on human behavior. However, this approach is limited because the mind's inner workings do not always lead to observable or interpretable behaviors. Indeed, behavioral measures are limited by the actions that the body is physically able to perform and reflect the end of a long chain of mental processes. Additional approaches are needed to provide a more complete and mechanistic understanding.

If the mind is like software, then the brain is the hardware. Genes, molecules, and cells in the brain self-organize into local circuits and broader systems. These structures have specialized functions for the mind and are connected to each other to generate complex behaviors. A better biological understanding of these intermediate stages of neural processing in humans and other animals will help reveal how the mind works.

Intelligent behavior arises not only from living organisms but increasingly from machines. Through rapid advances in deep neural networks, robotics, and brain-computer interfaces, AI models can achieve human-like performance in language, vision, and other digital tasks. These models provide a computational platform for exploring the algorithms of the mind while incorporating constraints from the brain.

Most Ph.D. programs specialize in one, or occasionally two, of these psychological, biological, and computational levels of analysis. The purpose of the Graduate Certificate in Brains, Minds, and Machines is to train students in all three, emphasizing levels they would otherwise be missing, in order to gain a broader and more integrative mindset and skillset for advanced research related to the mission of the Wu Tsai Institute. The interdisciplinary training provided by this three-year certificate includes courses, talks, workshops, and experiential learning opportunities.

First-year graduate students from any Ph.D. program in Yale's Graduate School of Arts and Sciences are eligible to apply. The student's dissertation adviser and an additional member of their thesis committee should be Wu Tsai Faculty Members (for a list of faculty, visit https://wti.yale.edu/humans/faculty). Certificate students are expected to fulfill their home department/program requirements in addition to those of the certificate below. Upon satisfactory completion, students receive the Graduate Certificate in Brains, Minds, and Machines to be reflected on their official transcript.

The certificate will begin accepting applications from first-year graduate students in the spring term, with the accepted cohort (rising second-year students) starting in the subsequent fall term. Outstanding applicants may be awarded a competitive Wu Tsai Graduate Fellowship.

Requirements

To receive the Graduate Certificate in Brains, Minds, and Machines, students must complete the following requirements:

COURSES

In addition to the courses required by their home department or program, certificate students must complete three courses:

- BM&M 5000, Brains, Minds, and Machines Core Course
- Methods course selected from an approved list (may also count toward home department/program requirements)
- Elective course selected from an approved list (may also count toward home department/program requirements)

ACTIVITIES

As members of the Wu Tsai Institute community, certificate students are expected to participate in the following events:

- WTI Inspiring Speaker Series
- A student-focused science communication series
- Professional development workshops
- Brains, Minds, and Machines annual poster session

EXPERIENTIAL LEARNING OPPORTUNITIES

Certificate students complete a set of pre-approved, hands-on learning experiences meant to enhance their interdisciplinary training. These opportunities are designed to extend learning beyond the classroom, thereby encouraging students to apply integrative approaches while expanding their skills and networks. Students identify and plan their experiences in advance through consultation with certificate leadership and activity supervisors to ensure alignment with their goals and the certificate's interdisciplinary objectives. Examples of opportunities include:

- Participating in lab meetings of a faculty member other than your adviser(s)
- Joining an industry project or visit a company regularly

- Gaining skills in one of WTI's shared research facilities
- Organizing a workshop, tutorial, poster session, or bootcamp for the WTI community
- Contributing to a science communication team by creating a media campaign
- Organizing a community outreach program or event
- Hosting a journal club or special interest group
- Creating an original opportunity (subject to approval)