Master's Program in Computational and Applied Mathematics



Mathematical language permeates essentially all scientific areas. Become fluent with the Master's Program in Computational and Applied Mathematics.

Solid Foundations

The University of Chicago's Master's Program in Computational and Applied Mathematics (MCAM) offers a comprehensive up-to-date education in the main areas of computational and applied mathematics, such as data analysis, dynamical systems, linear algebra, machine learning, numerical methods, optimization, partial differential equations, and applied probability.

- Master's students have two tracks to choose from:

  Computational Mathematics

  Applied Analysis and Modeling

- Full-time students may complete requirements in nine months or more.
- Full-time students who choose to complete a master's thesis may fulfill requirements in 15 months or more.
- Both options can extend up to two academic years.

Interdisciplinary and Integrative

The interdisciplinary nature of MCAM will prepare you to pursue a PhD in many areas of computational and applied mathematics or other math-intensive applied sciences, or a professional career in a field where mathematical expertise is paramount, such as data analysis, scientific computing, imaging, and many current engineering fields.

Program courses are offered through the **Committee on Computational and Applied Mathematics** (CCAM) in the Physical Sciences Division and taught by faculty from CCAM and:

- **The Department of Statistics**
- **The Department of Mathematics**
- **The Department of Computer Science**

Many faculty members are actively engaged in interdisciplinary research areas such as **geophysical and medical imaging**, **machine learning**, **scientific computation**, and more.

PROGRAM AT A GLANCE

9 – 24 MONTHS
to complete depending on student background and plan of study

IN PERSON
at UChicago's Hyde Park campus

MASTER'S THESIS
Students interested in pursuing a PhD program after the MCAM are encouraged to pursue the option of a master's degree with thesis under the guidance of a CAM adviser.

Prerequisites

Applications should demonstrate that the candidate will benefit from the program's curriculum. The minimal prerequisites for the program are a solid background in multivariate calculus, linear/matrix algebra, and elementary probability and statistics.

Recent course offerings include:

- Applied Approximation Theory
- Applied Dynamical Systems
- Applied Fourier Analysis
- Applied Functional Analysis
- Convex Optimization
- Foundations of Computational Dynamics
- Inverse Problems and Data Assimilation
- Machine Learning
- Mathematics of Generative Models
- Matrix Computation
- Measure Theoretic Probability (sequence)
- Modern Applied Optimization
- Monte Carlo Simulation
- Nonlinear Optimization
- Partial Differential Equations
- Scientific Computing with Python
- Stochastic Calculus
- Variational Methods in Image Processing

Curricular Pillars

Our coursework provides the pillars of computational and applied mathematics such as **physics-based modeling**, **data-based modeling**, and **scientific computing**. Through the interdisciplinary research interests of our Committee on CAM (CCAM) faculty, students will be exposed to a variety of applications for the theoretical skills they will acquire.

MCAM students choose among the many introductory graduate courses offered to the CCAM PhD students. Master's students are fully integrated in the academic activities of the department alongside the PhD students.

The program consists of at least 9 graduate-level courses, including:

- A choice of the **Computational Mathematics track** or the **Applied Analysis and Modeling track**, each a sequence of 3 courses
- 3 additional courses, selected from the track not chosen above or from other courses offered as part of the CAM graduate programs
- 3 additional courses, chosen from the lists above, or from graduate-level courses related to CAM offered through the **PSD**, the **Toyota Technological Institute at Chicago**, or the **Booth School of Business**

All course programs must be approved with the signatures of the student's academic advisers.

"The interdisciplinary nature of the CAM program allows me to explore my broad interests ranging from complex dynamical systems to quantitative finance. I've found a community of peers who share my drive for inquiry and are always ready to dive into collaborative 'side-quests'."

Yuelong Li, master's student in Computational & Applied Mathematics

Scan or click the QR code to apply!

To schedule a meeting or request more information, email mcam-admissions@lists.uchicago.edu