Computational Sciences (CMPS)

Chairperson: Rebecca L. Sanders, Ph.D.
Program Director: Stephen J. Merrill, Ph.D.
Computational Sciences website (http://www.marquette.edu/mscs/grad-computational.shtml)

Degrees Offered

Master of Science, students are admitted under Plan B (non-thesis option) but Plan A (thesis option) is also offered; Doctor of Philosophy

Program Description

Computational science is the discovery, implementation, simulation and application of models to solve scientific and engineering problems. The master's degree program accommodates students whose objectives are either the master's degree or preparation for doctoral study in some aspect of the computational sciences. The doctoral program is designed for individuals of outstanding ability who show promise as researchers in an interdisciplinary environment.

The diverse research opportunities in our naturally interdisciplinary department are enhanced by the research programs of associated faculty on the Marquette campus in the sciences and engineering and Milwaukee area research laboratories and clinics. Consult the department website for the most current information.

Prerequisites for Admission

Admission to the master's program in computational sciences requires an undergraduate degree in mathematics, statistics, computer science or a related field such as engineering or an area of science, with at least a minor (3 courses beyond a full calculus sequence) in mathematics and proficiency in a high-level computer language.

Admission to the doctoral program in computational sciences requires (in addition to the prerequisites for master's admission) demonstrated promise for original research.

Application Deadline

To be considered for fall admission, all application requirements must be completed and received in the Graduate School. The priority deadline for review of applications is Jan. 15 for both the master's and doctoral programs. After the priority admission deadline, applications will reviewed on a rolling basis.

Application Requirements

Applicants must submit, directly to the Graduate School:

1. A completed application form and fee online (http://marquette.edu/grad/future_apply.shtml).
2. Official transcripts from all current and previous colleges/universities except Marquette.
3. Three letters of recommendation addressing the applicant's academic qualifications for graduate study in the intended program.
4. (For doctoral and all international applicants) GRE scores (General Test only).
5. (For international applicants only) a TOEFL score or other acceptable proof of English proficiency.
6. (For doctoral applicants only) English-language publications authored by the applicant, including a master's thesis or essay, if applicable (optional, but strongly recommended).

Computational Sciences Master's Requirements

A master's student must complete a plan of study prepared in cooperation with an adviser and approved by the Graduate Committee of the Department of Mathematics, Statistics and Computer Science.

A master's student is admitted to the non-thesis program (Plan B) which requires at least 30 credit hours of course work and a non-credit essay that reflects the student's ability to synthesize source materials relating to a particular area of research or professional practice. An oral presentation of the essay is required.

A formal request to pursue a thesis (Plan A) must be approved by the department's Graduate Committee and the Graduate School. The Plan A student must complete a minimum of 30 credit hours, including six hours of thesis credits, and submit a thesis that must be an original contribution to the student's field of study. A public defense of the thesis is required.

All master's students in computational sciences must complete the 18-credit core:
### Computational Sciences Doctoral Requirements

A doctoral student in computational sciences must first complete a plan of study, designed to see the student through completion of the comprehensive examination. This plan of study should be prepared in cooperation with an adviser and approved by the Graduate Committee of the Department of Mathematics, Statistics and Computer Science.

Upon completion of the comprehensive examination, a doctoral student must then complete a program of study designed to see the student through completion of the program. This program of study should be defined, in cooperation with an adviser, on a Doctoral Program Planning Form and approved by the department's Graduate Committee.

The total program, exclusive of dissertation, will contain a minimum of 45 credit hours of approved course work beyond the bachelor's degree. Students must complete the 18-credit computational sciences core:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MSCS 6010</td>
<td>Probability</td>
<td>3</td>
</tr>
<tr>
<td>MSCS 6020</td>
<td>Simulation</td>
<td>3</td>
</tr>
<tr>
<td>MSCS 6030</td>
<td>Applied Mathematical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MSCS 6040</td>
<td>Applied Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MSCS 6050</td>
<td>Elements of Software Development</td>
<td>3</td>
</tr>
<tr>
<td>MSCS 6060</td>
<td>Parallel and Distributed Systems</td>
<td>3</td>
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**Total Credit Hours** 18

Students must also complete at least 2 credits of MSCS 6090 Research Methods/Professional Development and twelve credit hours of MSCS 8999 Doctoral Dissertation. Approved programs of study will normally include 6 credits of courses outside the department and no more than 12 credits in undergraduate courses.

Advancement to candidacy for the doctoral degree is considered after successful completion of the comprehensive examination, completion of all course work specified in the Doctoral Program Planning Form and successful completion of the qualifying examination, conducted by the student's doctoral committee. Typically, the doctoral committee also serves as the dissertation committee.

A doctoral student is expected to complete the core courses within the first two years of study, and to take the comprehensive examination at the first opportunity after their completion. A student who enters the program with the necessary core courses is expected to take the comprehensive exam at the first available time it is offered. No foreign language is required.