COMPUTATIONAL MATHEMATICS

CAREER OVERVIEW FOR STUDENTS
The Computational Mathematics program combines the beauty and logic of mathematics with the application of today’s fastest and most powerful computers. Much emphasis is given on using the computer as a tool to solve mathematically modeled physical problems. The result is a program that integrates mathematical theory into solutions for real-world problems, offering the best of both worlds: mathematics and computer science.

Computational Mathematics includes the study of problems that have applications in engineering, operations research and other areas of the sciences. These include many problems that affect our everyday life, from Internet security and telecommunication networking, to routes for school buses and delivery companies. This program provides a solid foundation in both mathematics and computational methods, preparing its graduates to fill positions as mathematical analysts, scientific programmers, software engineers, systems analysts, and others.

Curriculum for Computational Mathematics
www.rit.edu/programs/computational-mathematics

Degree(s) Awarded
Bachelor of Science in Computational Mathematics

Bachelor of Science in Computational Mathematics & Master of Science in Computer Science (dual degree program)

Bachelor of Science in Computational Mathematics & Master of Science in Applied Mathematics (dual degree program)

Enrollment
Approximately 42 students are enrolled.

Cooperative Education Component
Students are eligible to participate in an optional co-op program upon completion of 2nd year courses. Participation is strongly encouraged.

Salary Information – Avg/Range
Co-op: $16.67 $15.00-$19.00
*BS: $62.932 $55,000-$70,000

*Statistics from the Nat’l Assn. of Colleges & Employers (NACE) for 2010-2011 graduates

Equipment & Facilities
- Students have access to programming and statistical and simulation languages, graphics software and design tools on a variety of platforms.
- Symbolic computation and statistical laboratories are also available.

Student Skills & Capabilities
- Mathematically formulating, modeling and solving problems; flexibility to quickly learn new computer concepts/methods; computer networking; communication and working in teams.

- Computer Skills:
  - Languages: C++, Java, Python
  - Software: LaTeX, Mathematica, MATLAB, Maple, Minitab
  - Operating Systems/Environments: UNIX, VMS, Mac OS, Windows
  - Other: Fundamentals of computer science

- Students focus in the discrete areas of mathematics including graph theory, as well as matrix, linear, and abstract algebra. They also have significant coursework in the principal areas of analysis including calculus, differential equations, real variables, and probability. In addition, students have many opportunities to pursue independent study or undergraduate research under the guidance of faculty members.
Nature of Work

Training/Qualifications
A Ph.D. degree in mathematics usually is the minimum education needed for prospective mathematicians, except in the Federal Government. In the Federal Government, entry-level job candidates usually must have a 4-year degree with a major in mathematics or a 4-year degree with the equivalent of a mathematics major. Outside the Federal Government, bachelor's degree holders in mathematics usually are not qualified for most jobs, and many seek advanced degrees in mathematics or a related discipline. However, bachelor's degree holders who meet State certification requirements may become primary or secondary school mathematics teachers. The majority of those with a master's degree in mathematics who work in private industry do so not as mathematicians but in related fields. For jobs in applied mathematics, training in the field in which mathematics will be used is very important. Mathematics is used extensively in physics, actuarial science, statistics, engineering, and operations research. Computer science, business and industrial management, economics, finance, chemistry, geology, life sciences, and behavioral sciences are likewise dependent on applied mathematics. Mathematicians also should have substantial knowledge of computer programming, because most complex mathematical computation and much mathematical modeling are done on a computer. (Source: U.S. Bureau of Labor Statistics O.O.H.)

Job Outlook
Employment of mathematicians is expected to grow about as fast as the average for all occupations. However, keen competition for jobs is expected. Employment of mathematicians is expected to increase by 16 percent during the 2010–20 decade. Advancements in technology usually lead to expanding applications of mathematics, and more workers with knowledge of mathematics will be required in the future. [Also see Career Overviews for Applied Mathematics, Software Engineering, and Computer Science] (Source: U.S. Bureau of Labor Statistics O.O.H.)

Job Titles
[Note: Most often the work involving computational mathematics is done by persons whose titles are other than mathematician”] Software Engineer, Computer Scientist, Analyst (e.g. Operations Research), Cryptanalyst (codes), Actuary, Market Researcher, Financial Advisor

Significant Points
- A Ph.D. degree in mathematics usually is the minimum education needed for prospective mathematicians, except in the Federal Government.
- Master’s and Ph.D. degree holders with a strong background in mathematics and a related discipline, such as computer science or engineering, should have better employment opportunities in related occupations. [Also see Overviews for Applied Mathematics, Software Engineering, and Computer Science.] (Source: O.O.H.)

Employment
Mathematicians held about 3,000 jobs in 2010 (many people with mathematical backgrounds worked in other occupations). Many mathematicians work for federal or state agencies. The Dept. of Defense accounts for about 81% of the mathematicians employed by the Federal Government. In the private sector mathematicians are employed by scientific R&D services, software publishers, insurance companies, pharmaceutical manufacturers, etc. (Data Source: U.S. Bureau of Labor Statistics O.O.H.)

Selected Employers of RIT Computational Mathematics Co-op and Graduating Students

Contact Us
We appreciate your interest in your career and we will make every effort to help you succeed. Feel free to contact Lisa Monette or Kate Caliel, the career service coordinators who work with the Computational Mathematics program. For your convenience, you can access information and services through our web site at www.rit.edu/co-op/careers.

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