BIOINFORMATICS
CAREER OVERVIEW FOR STUDENTS

Students in the Bioinformatics program develop the skills necessary for analyzing the data being generated by Next Generation Sequencing, proteomics, metabolomics, and other cutting-edge technologies. Students develop their understanding of biology and molecular genetics, as well as statistics and computer science, giving them many career options. B.S., M.S., 4+1 B.S./M.S., and molecular lab focused option programs are available.

Curriculum for Bioinformatics:
www.rit.edu/programs/bioinformatics-0

Degree(s) Awarded
Bachelor of Science
Master of Science
4+1 B.S./M.S.

Enrollment
Approximately 23 undergraduate and 22 graduate students

Cooperative Education Component
Each student is required to complete at least one 10-12 week co-op. Students are eligible to pursue that experience at any time after their 2nd year although encouraged to do so during their 3rd – 4th/5th years of study. Graduate students are also eligible.

Salary Information – Avg/Range
Co-op: $12.67 $10.00 - $20.00
BS: $35,600 $28,700-$46,600
MS: Insufficient data

Student Skills & Capabilities
Beginning in their first year of study, students attain a combined skill set in the biotechnology laboratory and in computer programming fundamentals.

While taking upper level courses, students develop a range of laboratory skills that is nearly equivalent to that attained by students in our Biotechnology program. Additionally, Bioinformatics students gain considerable experience applying common bioinformatics software tools and have a deep understanding of the algorithms underlying those tools. Students strive to hone their quantitative and analytical abilities.

Equipment & Facilities
The Bioinformatics program maintains a server room with systems dedicated to and accessible by courses and students for research projects. The exact hardware frequently changes as we update our resources.

A combination of storage and database servers complement these systems. Additionally, we maintain local copies of common bioinformatics databases such as Genbank Nucleotide and NHANES III.

RIT also has a centralized Research Computing center. They offer access to a multi-core cluster, a large memory SMP (Symmetric Multi-Processor) server, and Condor pool.

Research Computing also maintains collaborations with large grids shared across institutions, and provides training seminars in high performance computing.
Nature of Work

Bioinformatics jobs come with several different areas of focus, which are less strictly hierarchical than bioscience discovery research jobs. The analyst/programmer job provides more focused computational analysis support. Analyst/programmers design and develop software, databases and interfaces used to analyze and manipulate genomic databases. They collaborate with production to develop high-throughput data processing and analysis capability and to design and implement data queries, novel algorithms, and/or visualization techniques. Analyst/programmers also maintain large-scale DNA databases, prepare data for other scientists, monitor new data from public databases, and clean loaded data to satisfy quality control criteria. Scientist/engineers develop gene discovery algorithms for integrating sequence-based/functional knowledge about genes to help scientists analyze and interpret gene-expression data. They also analyze DNA information and identify opportunities for innovative solutions to analyze and manage biological data. In addition, they often assist in developing software and custom scripts to automate data retrieval, manipulation, and analysis; application of statistics; and visualization tools. (Source: Vault Career Guide to Biotech; The Jobs in Lab Research)

Training/Qualifications

Within the bioinformatics field employers tend to look for the following skills/strengths: fundamental training/knowledge in molecular biology, biochemistry and biotechnology, particularly, genomics, relational database administration and programming skills, e.g. using SQL, PERL, C.C++, etc. on a UNIX operating system, strong analytical abilities using relevant mathematical/statistical tools, a strong interest in utilizing computational skills to leverage the data outcomes of those working in the laboratory. Meticulous, independent, patient to do the same task repetitively and multitask (Source: www.geocities.com/bioinformaticsweb/carrier.html)

Job Outlook

Some bioinformatics professionals believe this field will continue to be insulated from all but major economic shocks, for several reasons. It is still a relatively new field and there are not enough qualified people to fill the need. Also, companies and academic centers continue to realize additional needs for such persons and thus create more new positions, particularly for MS and PhD graduates. On the other hand, in the past few years, the number of related academic programs (and job-seeking graduates) has increased significantly, while the rate of increase in new jobs has somewhat declined. There has also been a recent shift towards increasing academic jobs and decreasing industry jobs. However, the bioinformatics market is still growing rapidly worldwide and expected to surpass the 50 billion $mark soon, especially in the pharmaceutical and personal care product industries. (Source: Biohealthmatics.com & Chemical & Engineering News)

Job Titles

Computational Biologist, Gene Analyst, Bioinformatics Software Developer, Research Assistant/Associate, Biologics Database Programmer/Administrator, Computer Analyst/Programmer, Molecular Modeling Assistant

Significant Points

- A Ph.D. degree usually is required for independent research, but a master’s degree is sufficient for some jobs in applied research or product development; a bachelor’s degree is adequate for some non-research jobs.
- Doctoral degree holders face considerable competition for independent research positions, particularly in universities; holders of bachelor’s or master’s degrees in biological science can expect better opportunities in non-research positions.
- Biotechnological research and development will continue to drive employment growth and bioinformatics will be a major part of that. (Source: U.S. Bureau of Labor Statistics O.O.H.)

Employment

Biological scientists (including those in bioinformatics roles) held about 100,600 jobs in 2013. About 40% of all biological scientists were employed by Federal, State, and local governments. Federal biological scientists worked mainly for the U.S. Departments of Agriculture, Interior, and Defense, and for the National Institutes of Health. Most of the rest worked in scientific research and testing laboratories, the pharmaceutical and medicine manufacturing industry, or hospitals. (Source: U.S. Bureau of Labor Statistics O.O.H.)

Selected Employers of RIT Bioinformatics Co-op and Graduating Students

Ortho Clinical Diagnostics, Pfizer, Harvard School of Dental Medicine, Anthony IT, Bristol-Myers Squibb, Life Technologies, Applied Biosystems, 5Linx Enterprises, Children’s Hospital (Cambridge MA), Baylor College of Medicine, Broad Institute (at MIT), 454 Life Science, McNeil Consumer Products, The Institute for Genomic Research, Knowledge Computing, Boyce Thompson Institute for Plant Research, FM Global, UCB, Inc., US Food & Drug Administration, University of Rochester Medical Center, US Dept. of Agriculture

Contact Us

We appreciate your interest in your career. We will make every effort to help you succeed. Call our office and ask to speak with Mindy Blake, the career services coordinator who works with the Bioinformatics 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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Unless otherwise noted, information is based upon data collected by RIT Office of Career Services and Cooperative Education.