DEPARTMENT OF COMPUTER AND INFORMATION SCIENCES

Telephone: (302) 831-2712
Website: http://www.cis.udel.edu/graduate/index.html
Faculty Listing: http://www.cis.udel.edu/people/index.html

Overview

The Department of Computer and Information Sciences offers programs leading to PhD and MS degrees, dual degree programs and accelerated 4+1 programs. In addition, the department offers interdisciplinary programs including the PhD in Bioinformatics and Data Science, MS in Bioinformatics and Computational Biology, PSM in Bioinformatics, Graduate Certificates in Bioinformatics, Applied Bioinformatics, and Biomedical Information and Data Science which are coordinated by the Center for Bioinformatics & Computational Biology.

Research

Computer Science is a vigorous and exciting field of research and study that continues to grow in importance. Computer science programs are broad in scope and deal with software and hardware technology, the theory of computation, scientific computing, and their applications. Departmental research strengths include artificial intelligence (machine learning, multiagent systems, planning, and problem solving), bioinformatics, computational theory (computational learning theory, design and analysis of algorithms, computability theory), compiler optimization and compilation for parallel machines, natural-language processing, (discourse and dialogue, generation, information extraction, summarization), systems (parallel and distributed computing, grid and volunteer computing, algorithm and architecture design for massive parallelism), networks, (distributed computing, transport layer protocols, mobile and wireless networks, algorithm and architecture design for massive parallelism, networks management, security performance modeling, simulation), graphics and computer vision, rehabilitation engineering (augmentative communication, speech recognition, and enhancement), software engineering (program analysis and testing), symbolic mathematical computation (algebraic algorithms, parallelization), and robotics.

Financial Aid

A number of fellowships, research assistantships, and teaching assistantships are awarded each year to full-time graduate students in the Department. Additionally, a few fellowships are awarded by the University to particularly outstanding students. Both entering and continuing graduate students are eligible to apply for financial aid.

If awarded financial aid and if satisfactory academic progress is maintained along with satisfactory performance of assistantship duties (when applicable), students entering with a bachelor's degree are normally supported up to two years for the MS degree, or up to five years for the PhD degree. Students entering with a master's degree are normally supported up to three years.

To maintain satisfactory academic progress beyond the second year, those students entering with a bachelor's degree are expected to take and fulfill the Preliminary Requirements after no more than three semesters of study. Students entering with an MS degree in Computer and Information Sciences (or a related area) are expected to take and fulfill the Preliminary Requirements after one semester of study.

Students who receive financial aid midway in their studies should speak to the CIS Graduate Committee Chair regarding their expected length of support. With regard to financial aid, PhD students are those who have fulfilled the Preliminary Requirements.

Admission to the graduate program does not automatically entitle an applicant to financial aid. Aid is awarded on a competitive basis from the pool of admitted applicants. Usually awards are made in March-May for the fall semester, and in December for the spring semester.

Computer and Information Sciences PhD, MS

The CIS graduate programs provide a solid foundation in the fundamental areas of computer science and, in addition, provides numerous advanced courses and seminars to acquaint the student with current computer science research. The main difference in objectives between the MS and PhD programs is that the PhD is designed to prepare students to conduct advanced research.

Requirements for Admission

1. The equivalent of a bachelor's degree at the University of Delaware. A minimum grade average of 3.2 in the major field of study and an overall cumulative index of 3.0 is required.
2. Scholarly competence in mathematics and computer programming. Applicants are expected to know the material covered by at least one undergraduate course in each of the following topics:

    - structured high-level language programming,
    - data structures,
    - computer architecture,
    - operating systems,
    - analysis of algorithms.

Additionally, applicants must have completed the equivalent of at least four undergraduate courses in the following list:

- calculus,
- discrete mathematics,
- probability and statistics,
- mathematical logic,
- comparable formal subjects, such as Theory of Computation.

3. Strong applicants lacking prerequisites are occasionally admitted provisionally on the condition that they complete specified undergraduate courses with a B or better in addition to the normal degree requirements. Students without formal course work covering the prerequisites who have gained equivalent knowledge through work or other experience should submit appropriate evidence.
4. Minimum scores of 153, 155, and 4.0 are required for the verbal, quantitative, and analytical writing sections, respectively, of the Graduate Record Examination Aptitude Test. (if taken prior to 08/01/11, then minimum scores of 500, 700 and 4.0 are required for the verbal, quantitative, and analytical writing sections.) The GRE subject test is not required.
5. If the applicant has completed graduate courses in computer science beyond the bachelor's degree, the grades earned in these courses will be reviewed and considered in the admission decision. A minimum grade of 3.0 (B) in each of these courses is required.
6. For applicants whose first language is not English, and who have not received a degree at a U.S. college or university, a minimum score of 79 on the TOEFL (Test of English as a Foreign Language) or 6.5 on the IELTS (International English Language Testing System) is required for admission. A minimum score of 100 on the TOEFL or 7.5 on the IELTS is required to be considered for financial aid in the form of a teaching assistantship.
7. Three letters of recommendation from professors (preferably), employers, or others who are able to assess your potential for success in graduate studies. Use the University of Delaware recommendation form whenever possible. Any attached letter should be a signed original and, preferably, on colored letterhead from the author's institution.
8. It is suggested, but not required, that students provide official documentation of their relative ranking within their class.
9. A master's degree is not required for admission to the PhD program. Strong applicants with a Bachelor's degree are encouraged to apply directly for admission to the PhD program.

Admission to the graduate program is competitive. Those who meet stated minimum requirements are not guaranteed admission, nor are those who fail to meet all of those requirements necessarily precluded from admission if they offer other appropriate strengths. Required courses can be found at the bottom of the page. Apply using the central UD graduate application.

Interdisciplinary Degrees

The Department of Computer Science and Information participates in many interdisciplinary programs. Admission requirements follow, and course requirements are hyperlinked at the bottom of the page.

Bioinformatics and Data Science, PhD

Telephone: (302) 831-6173
Website: https://bioinformatics.udel.edu/education/binf-phd/
Faculty Listing: http://bioinformatics.udel.edu/Education/faculty

The Ph.D. in Bioinformatics and Systems Biology is offered as a University-wide interdisciplinary graduate program with scientific curriculum that builds upon the research and educational strength from departments across the Colleges of Engineering (CoE), Arts & Sciences (CAS), Agriculture & Natural Resources (CANR), and Earth, Ocean & Environment (CEOE). The Center for Bioinformatics and Computational Biology (CBCB) administers the Ph.D. program in Bioinformatics and Systems Biology and coordinates with the individual departments involved in the program.

Requirements for Admission

- A completed University of Delaware Graduate Studies application. Students may apply to the program prior to arranging a primary faculty advisor; however, all students in the program will need the agreement of a Program faculty member to serve as the primary faculty advisor before admission into the program.
- A bachelor's degree from an accredited four-year college or university, with a minimum grade average of 3.0 on a 4.0 system.
- Official, up-to-date transcripts of all undergraduate and graduate programs.
- Applicants may have undergraduate degrees from biological, computational, or other disciplines. However, applicants are expected to have scholarly competence in mathematics, computer science, and/or biology.
- The following GRE scores are competitive: Quantitative: 650, Verbal + Quantitative:1200 if taken prior to August 1, 2011 or Quantitative: 151, Verbal + Quantitative: 307 if taken after August 1, 2011. No GRE subject test is required.
- International student applicants must demonstrate a satisfactory level of proficiency in the English language if English is not their first language. International applicants must have an official TOEFL score of at least 250 on computer-based or 100 on Internet-based tests. TOEFL scores more than two years old cannot be considered official. Alternatively, IELTS can be accepted in place of the TOEFL. The minimum IELTS score is 7.5 overall with no individual sub-score below 6.0.
- Three letters of recommendation are required. At least one letter must be from a professor, other letters can be from employers or others who have had a supervisory relationship with the applicant and are able to assess the applicant's potential for success in graduate studies.

- Applications must also include a resume outlining work and academic experience, as well as an application essay consisting of the answers to the following questions:

    1. What educational background and scientific research or employment experience prepare you for this degree program?
    2. What are your long-term professional objectives?
    3. What specific attributes of the program make you feel that this degree is appropriate to help you achieve your professional objectives?

Applicants must, at the time of admission, have a Primary Faculty Advisor who has agreed to direct and advise a program of study. The Graduate Program Committee must approve all advisor selections. It is the expectation of the Committee that graduate advisors will have active research programs with funding at a level sufficient to support graduate student training. Applicants will typically have an M.S. degree in related field. Direct admission to the Ph.D. program immediately after a B.S. degree will only be considered for exceptionally qualified candidates, as determined by the Graduate Program Committee. However, these candidates will have to complete an additional nine credit hours to fulfill course requirements associated with the Bioinformatics and Computational Biology M.S. curriculum.

Admission to the graduate program is competitive. Those who meet stated requirements are not guaranteed admission, nor are those who fail to meet all of those requirements necessarily precluded from admission if they offer other appropriate strengths. Required courses can be found at the bottom of the page. Apply using the central UD graduate application.

Bioinformatics & Computational Biology, MS, PSM, and Bioinformatics Graduate Certificate

Telephone: (302) 831-6173
Website MS: https://bioinformatics.udel.edu/education/bicb-ms/
Website PSM: https://bioinformatics.udel.edu/education/binf-psm/
Website Graduate Certificate: https://bioinformatics.udel.edu/education/binf-cert/
Faculty Listing: http://bioinformatics.udel.edu/Education/faculty

The Master Degree, Professional Science Masters and the Graduate Certificate in Bioinformatics is administered through the Department of Computer & Information Sciences and coordinated by the Center for Bioinformatics & Computational Biology. Each degree offers a choice of concentration in Computational Sciences or Life Sciences.

Requirements for Admission

- A bachelor's degree from an accredited four-year college or university with a minimum grade average of 3.0 on a 4.0 system

- Applicants may have undergraduate degrees from biological, computational, or other disciplines. However, applicants are expected to have scholarly competence in mathematics, computer science and/or biology.
- The following GRE scores are competitive: Quantitative: 650, Verbal + Quantitative: 1200 if taken prior to August 1, 2011 or Quantitative: 151, Verbal + Quantitative: 307 if taken after August 1, 2011. No GRE subject test is required.
- International student applicants must demonstrate a satisfactory level of proficiency in the English language if English is not their first language. The University requires an official paper-based TOEFL score of at least 550, at least 213 on the computer-based TOEFL, or at least 79 on the Internet-based TOEFL. TOEFL scores more than two years old cannot be considered official.
- Three letters of recommendation are required. At least one letter must be from a professor; other letters can be from employers or others who have had a supervisory relationship with the applicant and are able to assess the applicant's potential for success in graduate studies.
- Applications must also include a resume outlining work and academic experience, as well as an application essay consisting of the answers to the following questions:
    - What educational background and scientific research or employment experience prepare you for this bioinformatics degree program?
    - What are your long-term professional objectives?
    - What specific attributes of the bioinformatics program make you feel that this degree is appropriate to help you achieve your professional objectives?

Admission to the graduate program is competitive. Those who meet stated requirements are not guaranteed admission, nor are those who fail to meet all of those requirements necessarily precluded from admission if they offer other appropriate strengths. Required courses can be found at the bottom of the page. Apply using the central UD graduate application.

Applied Bioinformatics, Graduate Certificate Online
Biomedical Informatics and Data Science, Graduate Certificate Online

Telephone: (302) 831-6173
Website: Applied Bioinformatics, Graduate Certificate Online (ABNF-CERT)
Website: Biomedical Informatics and Data Science, Graduate Certificate Online (BIDS-CERT)
Faculty Listing: http://bioinformatics.udel.edu/Education/faculty

The Online Graduate Certificates are administered through its academic home, the Department of Computer & Information Sciences, and coordinated by the Center for Bioinformatics & Computational Biology.

Requirements for Admission

- Bachelor's degree at an accredited four-year college or university with a minimum grade average of 3.0 on a 4.0 system.

- Applicants must be in the last semester of undergraduate study or hold an undergraduate degree in biological, computational, or other disciplines. However, applicants are expected to have scholarly competence in mathematics, computer science and/or biology.
- GRE scores are recommended but may be waived upon application review.
- International student applicants must demonstrate a satisfactory level of proficiency in the English language if English is not the first language. The University requires an official paper-based TOEFL score of at least 550, or at least 79 on the Internet-based TOEFL. TOEFL scores more than two years old cannot be considered official.
- Two letters of recommendation are required. Ideally at least one letter is from professors, the other letter can be from employers or others who have had a supervisory relationship with the applicant and are able to assess the applicant's potential for success in graduate studies.
- Applications must also include a resume outlining work and academic experience, as well as an application essay consisting of the answers to the following questions:
    - What educational background and scientific research or employment experience prepare you for this bioinformatics graduate certificate program?
    - What are your long-term professional objectives?
    - What specific attributes of the program make you feel this certificate is appropriate to help you achieve your professional objectives?

Admission to the graduate certificate program is competitive. Those who meet stated requirements are not guaranteed admission, nor are those who fail to meet all of those requirements necessarily precluded from admission if they offer other appropriate strengths. Required courses can be found at the bottom of the department page. Apply using the central UD graduate application.

Data Science, MS

Telephone: 302-831-0518
Website: https://www.msds.udel.edu/

The main requirements of the program comprise courses from three 17 departments (and colleges): the Department of Mathematical Sciences (DMS, in Arts and 18 Science), the Department of Applied Economics and Statistics (AES, in Agriculture and Natural 19 Resources) and the Department of Computer and Information Sciences (CIS, in Engineering).

Requirements for Admission

- A Bachelor's degree from an accredited program is required for admission. A major in any of mathematics, applied mathematics, statistics, computer science or engineering, or a field of engineering is a good background for this program. Undergraduate/graduate transcripts are required.
- A minimal background outside of the above STEM majors should include at least one semester of
    - multivariable calculus
    - linear algebra

    - statistics and/or probability
- at least two semesters of
    - computer programming
- Three letters of recommendation
- Written statement of professional goals and values
- International applicants must submit official proof of English proficiency such as TOEFL or IELTS scores. The recommended minimum TOEFL score is 100 and/or IELTS of 6.5.

Applications are evaluated based on a combination of record of academic achievement, recommendations, and the applicant's statement of professional goals and values. The Executive Committee will make admission decisions and assign accepted students to faculty advisors upon matriculation. Required courses can be found at the bottom of the department page. Apply using the central UD graduate application.

Dual degree and accelerated 4+1 programs

See details below.

Programs

Master's

- Bioinformatics & Computational Biology - Computational Sciences Concentration (BICB-MS)
- Bioinformatics & Computational Biology - Life Sciences Concentration (BICB-MS)
- Bioinformatics - Computational Science Concentration (PSM)
- Bioinformatics - Life Sciences Concentration (PSM)
- Computer and Information Sciences (MS)
- Data Science (MS)

Doctorate

- Bioinformatics Data Science (PhD)
- Computer and Information Sciences (PhD)

Certificate

- Applied Bioinformatics Certificate
- Bioinformatics - Computational Sciences Concentration Certificate
- Bioinformatics - Life Sciences Concentration Certificate
- Computational Science and Engineering Certificate

4+1

- Computer Science/Data Science 4+1 (BA/MS)
- Computer Science/Data Science 4+1 (BS/MS)
- Information Systems/Data Science 4+1 (BS/MS)