INDIANA UNIVERSITY

University Graduate School
2008-2009
Academic Bulletin

Informatics

School of Informatics
Bloomington

Dean
Robert Schnabel

Departmental E-mail
graduate@informatics.indiana.edu

Departmental URL
informatics.indiana.edu

Faculty
(An asterisk [*] denotes membership in the University Graduate School faculty with the endorsement to direct doctoral dissertations.)

Professors
William Aspray*, J. Michael Dunn* (Emeritus), Geoffrey Fox*, David James Hakken*, Michael McRobbie*, Javed Mostafa*, Christine Ogan*, Edward Robertson*, Martin Siegel*, Erik Stolterman*, Peter Todd*, Alessandro Vespignani*, Larry Steven Yaeger*

Associate Professors
L. Jean Camp*, Mehmet M. Dalkilic*, Markus Jakobsson*, Sun Kim*, Filippo Menczer*, John Paolillo*, Christopher S. Raphael*, Luis M. Rocha*

Assistant Professors
Mu-Hyun Baik*, Jeffrey Bardzell*, Eli B. Blevis*, Mehmet M. Dalkilic*, Alessandro Flammini*, Dennis Patrick Groth*, Esfandiar Haghverdi, Matthew Hahn*, Raquel Hill*, Sun Kim*, Younkyung Lim*, Eden Medina*, Steve Myers*, Predrag Radivojac*, Santiago David Schnell*, Kalpana Shankar*, Haixu Tang*, XiaoFeng Wang*, Yuqing (Melanie) Wu*, Catharine Wyss*, David Wild*, Yuzhen Ye

Degrees Offered
The Doctor of Philosophy (Ph.D.) degrees in Informatics, and Computer Science and, the Ph.D. Minor in Informatics, and the Ph.D. Minor in Bioinformatics are offered through the University Graduate School. In addition, the School Department of Informatics offers the Master of Science in Bioinformatics, the Master of Science in Chemical Informatics, the Master of Science in Computer Science, and the Master of Science in Human-Computer Interaction Design, and the proposed Master of Science in Security Informatics (see the School of Informatics graduate bulletin).

Ph.D. in Informatics

The Ph.D. in informatics provides a balance between technological, scientific, and social dimensions involved in the development and application of information technology.

Admission Requirements
Admission requirements in the areas of undergraduate grade point average and GRE score levels are those of the University Graduate School. The applicant must also have some skill in computer programming.

For students planning to focus on bioinformatics or chemical informatics, a high level of computer programming competence is required. Students focusing in health informatics are expected to have a background in one of the health care professions. Students planning to specialize in social informatics or human-computer interaction should have familiarity with design principles and have some grounding in the social sciences.

For those who enter the Ph.D. program directly from their bachelor's program, there will be a formal assessment after two years of coursework, an "up or out" evaluation. Assessment will look at successful progression in the Ph.D. program with regards to progress toward completion of course requirements, maintenance of course grades and overall GPA according to Graduate School guidelines, and research, as measured by presentations at disciplinary meetings and publications. For those who wish to enter the Ph.D. program from their master's program, there will be an application process. In this case, there is a natural evaluation of the student's record.

Annual Review
Each year, students will be required to file an annual review with their advisor and program or dissertation committee. The review covers the period of the previous academic year and is due June 1. Four areas will be covered: coursework, research, teaching, and service. Written feedback will be provided by the student's advisor.

Course Requirements
A total of 90 credit hours are required. There are 27 required credits, which include I501, 6 credits of seminar work, 9 credits in subdiscipline courses in a breadth area, 3 credits in professionalism and pedagogy (most likely taken as I600), and 6 credits of research rotation (I790). Students must take an additional 12 credits of theory and methodology courses applicable

to the student's specialty. These courses can be taken inside or outside the school. Students must also take an additional 21 to 30 credits in elective coursework. The required PhD minor is included in this category. The remaining 21 to 30 credits will be taken in dissertation credits.

No more than 30 hours may be counted from a master's degree taken at Indiana University or a graduate program at another university. (An additional 6 hours of master's thesis or capstone project may be counted toward the Ph.D. at the discretion of the student's program committee, assuming the thesis or capstone project is of sufficient research quality.)

Tracks of Study
Choices of fields offered for qualifying examinations must be approved by the Graduate Studies Committee. Tracks of study currently proposed within the department are bioinformatics, chemical informatics, human-computer interaction, social informatics, complex systems, music informatics, security informatics, logic and mathematical foundations, and data discovery.

Minor
All students are required to have an appropriate minor outside or partially inside the school. Since the school has many proposed "tracks," students will be allowed to choose another "track" within the school as a minor. Minors will be selected with the advisor's recommendation. Some of the courses included in the minor may also count towards the student's methodology or other requirements.

Grades
An overall B (3.0) average for all Ph.D. courses in Informatics is required.

Written Qualifying Examinations
All students will take a written qualifying examination that consists of a depth exam and a breadth exam. The qualifying examinations are described in a separate document. Examinations will be offered at the end of August and at the beginning of the second semester in January. Examinations must be completed by the beginning of the student's fourth year in the program but can be completed before that time when the core courses are completed. Students who do not successfully complete the examination can retake the exam a second time.

Oral Qualifying Examination
The oral qualifying examination covers in-depth knowledge of the student's primary research area. This examination is administered by the student's program committee. The qualifying examinations will normally be completed at the end of course work, before the student embarks on the dissertation. The student must pass this examination before passing on to candidacy.

Dissertation Proposal
The proposed research for the dissertation must be approved by the research committee and presented at a public colloquium in the school.

Final Examination
Oral defense of the dissertation.

Ph.D. Minor in Informatics

A minor in informatics requires 9 credit hours. The required 9 credit hours refer to any 3 graduate courses suitable for the student's research, to be decided by the student's advisor (in his or her department) and the Informatics graduate program director. Typically, these 3 graduate courses are chosen from the set of core courses available in the Informatics Ph.D. program.

Ph.D. Minor in Bioinformatics

Bioinformatics draws on knowledge and information from various fields such as biology, computer science, medicine, chemistry and physics. Students in relevant Ph.D. programs such as biochemistry and molecular biology, medical and molecular genetics, medicine, chemistry, or biology are the target audience for the Ph.D. minor in bioinformatics.

Requirements
A minor in bioinformatics requires 12 credit hours. The core curriculum consists of graduate level courses in informatics. Electives may be chosen based on personal interests from a broad list of courses in biology, chemistry, computer science, information science, and medical and molecular genetics. The graduate bioinformatics courses in the School of Informatics assume a minimal knowledge of cell and molecular biology. That level of understanding could be gained with at least 6 undergraduate credit hours in molecular biology, genetics, or evolution.

Courses

Core Courses
I601 Introduction to Complex System (3 cr.)
I604 Human-Computer Interaction Design Theory (3 cr.)
I605 Social Foundations of Informatics (3 cr.)
I611 Mathematical and Logical Foundations of Informatics (3 cr.)
I617 Informatics In Life Sciences and Chemistry (3 cr.)
I651 The Ethnography of Informatics (3 cr.)

Other Courses
G901 Advanced Research (6 cr.)
I500 Fundamental Computer Concepts for Informatics (3 cr.)
I501 Introduction to Informatics (3 cr.)
I502 Information Management (3 cr.)
I504 Social Dimensions of Science Informatics (3 cr.)
I506 Globalization and Information (3 cr.)
I519 Introduction to Bioinformatics (3 cr.)
I525 Organizational Informatics and Economics of Security (3 cr.)
I529 Machine Learning in Bioinformatics (3 cr.)
I530 Legal and Social Informatics of Security (3 cr.)

I531 Seminar in Health Informatics (1-3 cr.)
I532 Seminar in Bioinformatics (1-3 cr.)
I533 Seminar in Chemical Informatics (1-3 cr.)
I534 Seminar in Human-Computer Interaction (1-3 cr.)
I536 Foundational Mathematics of Cybersecurity (3 cr.)
I538 Introduction to Cryptography (3 cr.)
I539 Cryptographic Protocols (3 cr.)
I541 Human-Computer Interaction Design I (3 cr.)
I543 HCI Design and Evaluation Methods (3 cr.)
I545 Music Information Representation, Search, and Retrieval
   (3 cr.)
I546 Music Information Processing: Symbolic (3 cr.)
I547 Music Information Processing: Audio (3 cr.)
I548 Introduction to Music Informatics (3 cr.)
I571 Chemical Information Technology (3 cr.)
I572 Computational Chemistry and Molecular Modeling
I573 Programming for Science Informatics (3 cr.)
I590 Topics in Informatics (1-3 cr.)
I590 Topics in Informatics (3 cr.)
I609 Advanced Seminar I in Informatics (3 cr.)
I619 Structural Bioinformatics (3 cr.)
I621 Computational Techniques in Comparative Genomics
   (3 cr.)
I624 Advanced Seminar I in Human-Computer Interaction
   (3 cr.)
I625 Advanced Seminar I in Social Informatics (3 cr.)
I627 Advanced Seminar I in Bioinformatics (3 cr.)
I628 Advanced Seminar I in Complex Systems (3 cr.)
I634 Advanced Seminar II in Human-Computer Interaction
   (3 cr.)
I635 Advanced Seminar II in Social Informatics (3 cr.)
I637 Advanced Seminar II in Bioinformatics (3 cr.)
I638 Advanced Seminar II in Complex Systems (3 cr.)
I647 Advanced Seminar I in Chemical Informatics (3 cr.)
I657 Advanced Seminar II in Chemical Informatics (3 cr.)
I667 Seminar in Health Informatics II
I690 Topics in Informatics (1-3 cr.)
I698 Research in Informatics (1-12 cr.)
I699 Independent Study in Informatics (1-3 cr.)
I709 Advanced Seminar II in Informatics (3 cr.)
I790 Informatics Research Rotation (3 cr.)
I798 Professional Practicum/Internship (non-credit)
I890 Thesis Readings and Research (1-12 cr.)