PhD in Informatics with Emphasis in Bioinformatics

Degree Requirements

The following is a brief synopsis of the general degree requirements; please see the Informatics Institute web site (https://mui.missouri.edu) for complete details:

- Students must take required and area courses.
- Students must pass a qualifying examination.
- Students must present at least one institutional seminar annually.
- Students are required to complete a comprehensive exam, which includes written and oral elements, within a specified time frame.
- Students must pass a comprehensive examination at least 7 months before their scheduled defense.
- Students must submit and defend a dissertation describing the results of successful and original research in one of the branches of informatics.
- To show research progress, students are expected to be working toward presenting at conferences and publishing in peer-reviewed journals based on their informatics research.

Coursework Requirements

All students must have at least 72 credit hours at the graduate level, of which 15 credits must be at the 8000-level not including research, problems, lab rotations, or seminar. Transferring credits will be at the recommendation of the student's doctoral committee and the approval of the MUII Curriculum Committee.

REQUIRED CORE COURSES - BIOINFORMATICS EMPHASIS

AREA
INFOINST 7002  Introduction to Informatics  3
INFOINST 7010  Computational Methods in Bioinformatics  3

REQUIRED METHODS COURSES (9 Credit Minimum)
INFOINST 8810  Research Methods in Informatics  3
STAT 7510  Applied Statistical Models I  3

Student must choose one additional 3-credit methods course with doctoral committee approval.

LAB ROTATIONS AND SEMINAR
INFOINST 8087  Seminar in Informatics (Must be enrolled each semester)  0.5-1
INFOINST 8088  Lab Rotations in Informatics  2

RESEARCH
INFOINST 8090  Dissertation (pre-candidacy) Research in Informatics  1-99
INFOINST 9090  Dissertation (post-candidacy) Research in Informatics  1-99

AREA COURSE ELECTIVES (15 credits)
AN_SCI 7001  Topics in Animal Science (Molecular Evolution)  1-4
CMP_SC 7380  Database Management Systems I  3
CMP_SC 7740  Interdisciplinary Introduction to Natural Language Processing  3
CMP_SC 8370  Data Mining and Knowledge Discovery  3
CMP_SC 8630  Data Visualization  3

ECE 7270  Computer Organization  4
ECE 7590  Computational Neuroscience  4
ECE 8320  Nonlinear Systems  3
ECE 8570  Theoretical Neuroscience I  3
ECE 8580  Theoretical Neuroscience II  3
GEOG 7620  Biogeography: Global Patterns of Life  3
GEOG 7710  Spatial Analysis in Geography  3
GEOG 7810  Landscape Ecology and GIS Analysis I  3
GEOG 7840  Geographic Information Systems I  3
GEOG 7860  Advanced Remote Sensing  3
GEOG 7940  Advanced Geographic Information Systems (GIS II)  3
GEOG 8902  Topics in Geography-Biological/Physical/Mathematical  3

HMI 7410  Introduction to the US Health Care System  3
HMI 8435  Information Security, Evaluation and Policy  3
HMI 8437  Data Warehousing and Data/Text Mining for Health Care  3
HMI 8441  Biomedical and Health Vocabularies and Ontologies  3
HMI 8443  Enterprise Information and Solutions Architecture for Strategic Healthcare Operations  3
HMI 8460  Administration of Health Care Organizations  3
HMI 8461  Managing Human Resources in Health Care Organizations  3
HMI 8478  Knowledge Management in Health Care  3
HMI 8524  Health Economics  3
HMI 8565  Health Care Ethics  3
HMI 8571  Decision Support in Health Care Systems  3
HMI 8573  Decision Making for Health Care Organizations  3
HMI 8810  Consumer Health Informatics  3
IMSE 8810  Human Factors  3
INFOINST 8005  Applications of Bioinformatics Tools in Biological Research  3
INFOINST 8085  Problems in Informatics  1-6
INFOINST 8150  Integrative Methods in Bioinformatics  3
INFOINST 8190  Computational Systems Biology  3
INFOINST 8310  Computational Genomics  3
INFOINST 8870  Knowledge Representation in Biology and Medicine  3
IS_LT 9410  Seminar in Information Science and Learning Technology  1-3
NURSE 9460  Theories and Interventions in Health Behavior Science  3
PTH_AS 7450  Precision Medicine Informatics  3

Qualifying Exam Process

Students are expected to take the qualifying exam by the end of their third semester in the program. The exam will be based on their previous coursework, lab rotation experience, and one-page research statement. For more information on qualifying exam procedures, please see the
Comprehensive Exam Process

The comprehensive exam consists of two parts - the written portion, comprised of an R01 research proposal, and the oral exam. For more information on the comprehensive exam process, please see the MUII student handbook (https://muii-wh-prod.missouri.edu/wp-content/uploads/2017/05/MUII_Graduate_Student_Handbook_Fall2016.pdf).

Dissertation Defense Process

The doctoral dissertation defense must be scheduled no sooner than seven months after successful completion of the comprehensive exam. The dissertation must be written on an informatics subject approved by the candidate's doctoral program committee, must embody the results of original and significant investigation, and must be the candidate's own work. Please refer to the MUII student handbook (https://muii-wh-prod.missouri.edu/wp-content/uploads/2017/05/MUII_Graduate_Student_Handbook_Fall2016.pdf) for additional information.

Admission Contact Information

MUII Staff (mailto: muiiadmissions@missouri.edu)
241 Engineering Building West
Columbia, MO 65211-2060
Phone: 573-882-9007
FAX: 573-884-8709
Informatics Institute (MUII) website: https://muii.missouri.edu

Admission Criteria

Fall deadline: The deadline for Fall admission is March 1. However, to be considered for departmental and Graduate School fellowships and assistantships, applications should be submitted by January 15.

- Preferred GPA: 3.3 out of 4.0
- Preferred GRE scores:

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<th>Verbal + Quantitative</th>
<th>Analytical</th>
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<td>Prior to August 1, 2011</td>
<td>1200</td>
<td>3.5-4.0</td>
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<tr>
<td>On or After August 1, 2011</td>
<td>309</td>
<td>3.5-4.0</td>
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<td>* or a preferred GMAT score of 570</td>
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<tr>
<td>* Preferred TOEFL OR IELTS scores**</td>
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Internet-based test (IBT)         Paper-based test (PBT)
90                                577

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<tr>
<th>Item</th>
<th>Score</th>
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<td>Minimum IELTS</td>
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All Required Documents

Students are required to send ALL required application materials through the Office of Graduate Studies on-line application system. To begin your application, please see the ApplyYourself website (http://gradschool.missouri.edu/admissions/apply).

1. Curriculum Vitae
2. Statement of Purpose, which should include a summary of why the applicant is interested in pursuing an advanced informatics degree, a brief description of your previous research experiences, the specific area of informatics you are interested in pursuing, and your future career goals and plans in the informatics field.
3. GRE/GMAT scores. Use institution code 6875. The departmental code is not required.
4. TOEFL/IELTS scores for international applicants, if required.
5. Three letters of recommendation from faculty or supervisors who can evaluate the applicant’s credentials and potential to become successful in the area of informatics.
6. Scanned copies of transcripts from each college and university attended. If accepted, applicants will be required to have official copies of their transcripts sent directly from the institution to the Office of Graduate Studies.

Optional Documents

Applicants are encouraged to submit representative publications in informatics, if available.

Exceptional Funding Opportunities - Biomedical Big Data Science Pre-doctoral Training

Funded by NIH T32 (2016-2021)

MU Informatics Institute (MUII) is recruiting SIX top-notch trainees to pursue PhD degree in Informatics through an interdisciplinary training team. Students from basic sciences, life sciences, medicine, and computing disciplines are welcome to apply. Our unique training includes:

1. personalized training modules from core courses of the MS degree in Data Science and Analytics program, Big Data courses from Computer Science, and biomedical informatics courses from MUII, which will expose trainees to the basic concepts, ethics, and working knowledge in Big Data Science; (2) a problem-based learning curriculum in pre-doctoral-level Big Data-related courses, such as Mining Massive Data Sets for Biomedical Applications, designed to foster a team science approach to problem-solving; (3) a student-driven journal club/seminar series, in which students are offered opportunities to present research, pose questions, and receive feedback from peers and mentors. Our interdisciplinary components include (1) required tri-lab rotations to introduce students to animal/veterinary medical research, human medical research, computing/statistical methodologies, and health communications; (2) development of rigorous and reproducible open-source Big Data analytics tools, which will be assessed by the One Health research community after arduous testing; and (3) creation of an Individual Development Plan based on each trainee's background and career goal prior to joining the program. These positions are open to permanent residents and US citizens only. Women and minority students are encouraged to apply.

Please contact the project director Dr. Chi-Ren Shyu at ShyuC@missouri.edu (shyuc@missouri.edu) for inquiries.