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Use-inspired basic research degree

Theoretical and practical aspects of Cyberinfrastructure (CI) as applied to specific problems across multiple domains

— *Double-helix paradigm*: hard-core computing technology & domain problems in business, engineering, science, and social science
Intra-disciplinary – the 3 I’s

- Infrastructure, Interaction, Informatics

- Active research areas:
  - Algorithm and theory
  - Artificial intelligence and machine learning
  - AR/VR
  - Communication and networking
  - Computer vision and pattern recognition
  - Data science
  - Education research
  - Graphics and visualization
  - Human-computer interaction
  - IoTs
  - Mobile and pervasive computing
  - Programming languages
  - Security and privacy
  - Software engineering
  - …
Inter-disciplinary

- Computing to *support, facilitate, enable, and inspire* domain research

- Active domain research areas:
  - Accessibility
  - Biomedical computing and Health IT
  - Computational science
  - Computational sustainability and Green IT
  - Education informatics/technology
  - Gaming
  - Geographic information system
  - Imaging and imaging informatics
  - Natural language processing
  - Services sciences
  - Social computing
  - ...
Infrastructure

- Integration with computing systems through application
- Hardware
  - System-level design and their building block components
- Software
  - All aspects of systems and applications s/w development
- Communications
  - Sensor networks and protocols, wireless, mobile, security
Interaction

- How people and technology interact and interface
- Foundations in cognitive, social and behavioral sciences
- Understand human, social, and organizational relationships
- Engineering approach
  — Solutions based on rules and principles
  — Measurable
Intra-disciplinary – 3 I’s

Informatics

• Study of computational and algorithmic techniques
• Data intensive systems
• Capture, storage, processing analysis and interpretation of data
Program of Study

- Core & Electives
- Research Potential Assessment
- Proposal Defense
- Dissertation Research
- Dissertation Defense
Program Requirements

Total: 60 Credits

Foundation Courses: 9 Credits
Core Electives: 9 Credits
Electives: 9-18 Credits
(distribution requirement: sixty percent of the courses must be PhD courses)

Research Colloquium (first two years): 0 Credit
Teaching Skills: 2 Credits
Research and Dissertation: 22-31 Credits
Other Program Requirements

Residency: 1 year full-time study

Assessments:
- Qualifying: Research Potential (at the end of 1\textsuperscript{st} year for FT)
- Candidacy: Proposal Defense
- Dissertation Defense
- (Publication Requirement)
Foundation Courses

- Research Foundations
- Quantitative Foundations
- Cyberinfrastructure Foundations
- Teaching Skills Workshop
Core I-Course Electives

To gain knowledge that represents the breadth of the computing and information sciences: one course each from the categories of Infrastructure, Interaction, and Informatics.

The candidate courses in each I-category are maintained and updated by the PhD program. They are typically more research-oriented graduate courses from the PhD program or related departments.
Other Electives

General electives may come from any graduate program, must be discussed with the PhD advisor(s) and be approved by the PhD director.

The specific number of electives will be determined by the needs for research.
Students & Graduates

- Current students: 103
  - First-year students: 20
- Graduates: 50
  - Academics: 20 (sixteen faculty, four postdocs)
  - Industry: 30

- Rankings:
  - 68th in US News doctoral program ranking (reputation)
  - 65th in CSRankings.org (top conference publications) (Oct 2nd, 2020)
    - 64th in AI
    - 25th in HCI
    - 65th in Security
    - 32nd in Software Engineering
    - 62nd in Theory
~220 fully reviewed

35 offers
   — all full-time
   — 9 declined
   — 20 enrolled (6 more deferred because of COVID)
Ph.D. Program Faculty

**GCCIS:**

**CS:** Anderson, Bailey, Bazakova, Bischoff, Fluet, Geigel, Hemaspaandra, Homan, Hu, Kwon, Kumar, Liu, Mior, Nwogu, Ororbia, Radziszowski, Rafique, Raj, Reznik, Rivero, Romanowski, Zanibbi

**CSEC:** Bhattacharya, Hoover, Mishra, Pan, Rahbari, Wright, Yuan

**IGM:** Castellanos, Papangelis, Peng, Simkins, Tomaszewski

**iSchool:** Fan, Hanson, Heunerfauth, Oh, Peiris, Shenoy, Shinohara, Tigwell, Yacci, Q. Yu

**PhD:** Haake, Kong, Li, Shi, Wang

**SE:** DeSell, Hawker, Krutz, Meneely, Mirakhorli, Mkaouer, Newman, Sharma, Z. Yu

**KGCOE:** Ganguly, Kwasinski, Linte, Lopez-Alaron, Loui, Lukowiak, Markopoulos, Ptucha, Savakis, Tsouri, Yang, Zhang

**COLA:** Ovesdotter Alm, Zampieri

**COS:** Cahill, Cui, Fokoue, Marchetti, Ross

**CET:** Kim, Li, Nygate

**NTID:** Hauser, Nordhaus
Admission

Priority review date: December 31, 2020, continuous review/offer

Basic Requirements:
• Baccalaureate degree in a broadly-defined computing-related discipline
• Transcripts (strong record of academic achievement)
• 1-yr programming and computing concepts (advanced computing courses desirable)
• Discrete mathematics, probability and statistics (strong math background desired)

Application Process:
• Phase One: Now-Feb
  — Admission Committee: evaluation of applicants
  — PhD Director: evaluation of faculty requests
• Phase Two: Nov-Mar
  — Match Making!
2 letters of recommendation
Personal statement
Past works (optional)
Other Application Materials

GRE (general exam, within last 5 years)
• No minimums
  — Averages of accepted students:
    – V: 150+
    – Q: 160+
    – W: 3.5+
• Maybe waived if overall application is exceptional

TOEFL (minimum)
• Paper-based test: 570
• Internet-based test: 88
• Computer-based test: 230

Interview
Assistantships

Research and teaching

Full tuition + stipend + medical insurance
— ~$72K
— Possible additional summer funding

Apply with application materials
How to Apply

https://www.rit.edu/admissions/graduate#applying-for-admission