Join us in shaping the future of science! The Computer Science and Informatics graduate program at Emory University focuses on emerging, interdisciplinary areas of computing research. Our main concentrations are Data Science and Biomedical Informatics with a curriculum grounded in foundations, data and information management, security and privacy, and computing systems.

The Computer Science and Informatics (CSI) PhD and MS program specializes in large-scale data systems and analytics, information retrieval, natural language processing, and privacy and security, and integrates collaborative opportunities with the Emory School of Medicine, Rollins School of Public Health, the Nell Hodgson Woodruff School of Nursing, Woodruff Library, and the Centers for Disease Control and Prevention.

The Biomedical Informatics concentration (BMI) within CSI focuses on effective use of biomedical data, information, and knowledge in medical research as well as decision support driven by efforts to improve human health. Graduate student research involves developing advanced computational techniques and strategies, which can directly impact patient care, and influence both clinical and biomedical research.

CSI is jointly administered by the Departments of Mathematics and Computer Science, Biostatistics and Bioinformatics, and Biomedical Informatics. Faculty members from all three departments teach courses, conduct research rotations and advise graduate dissertations.

PROFESSIONAL DEVELOPMENT
The Laney Graduate School offers a range of programs that encourages students to develop their professional skills, engage with broader professional communities, and prepare for their careers.

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ACADEMIC PROGRAMS
The PhD and MS program in Computer Science build on Emory’s traditional strengths in medicine, life sciences, and social and behavioral sciences. Both programs offer challenging academics, a diverse student body and access to cutting-edge research and faculty within the program and across the Emory University. The PhD degree is suitable for those wishing to pursue careers in academics, industry, government, or healthcare. Possible areas of specialization include:

DATA SCIENCE
The Data Science track focuses on data security, privacy, information retrieval, statistical analysis, and data integration in the context of social, spatiotemporal, medical, public health, clinical, and biological data management. Research projects and course offerings span multiple departments including research groups in Biology, the School of Medicine, the Winship Cancer Institute, and the Rollins School of Public Health.

BIOMEDICAL INFORMATICS
The Biomedical Informatics (BMI) track focuses on the effective use of biomedical data and information, in conjunction with clinical research, to improve human health. Graduates find careers in teaching and research facilities of educational and medical institutions, industry and hospitals, law and government regulatory agencies. Graduate study comprises of developing advanced computational techniques and strategies that directly impact patient care and clinical and biomedical research. This is an interdisciplinary concentration, jointly administered by departments of Biomedical Informatics, Mathematics and Computer Science, Biostatistics and Bioinformatics.

DISCRETE MATHEMATICS AND THEORETICAL COMPUTER SCIENCE
This track focuses on graph theory, theory of computation, approximation and geometrical algorithms, combinatorial optimization, and mathematical programming. Research in traditional Computer Science as well as Bioinformatics and Computational Biology is pursued under this track.

SYSTEMS AND DISTRIBUTED COMPUTING
Conducts research in storage, cache memories, network science, distributed systems, collaboration technologies, and high-performance computing. Students can work on research projects in Grid and Cloud computing, particularly for eScience, health care, and major technology companies.

SCIENTIFIC COMPUTING
With strong connections to Radiology, Medicine, and Pediatrics to characterize research in this sub-area, this track emphasizes numerical linear algebra, image processing, iterative methods, optimization, partial differential equations, and computational fluid dynamics.

ALUMNI
Since the official start of the CSI PhD and MS program in 2007, 26 PhD students and many more MS students have graduated and obtained successful careers in industry or academia.

RECENT PHD GRADUATES
- JULIANNE CHUNG (PhD, 2011) Assistant Professor at Virginia Tech. “Numerical Approaches for Large-Scale Ill-Posed Inverse Problems.” Advisor: James Nagy.
- LIYUE FAN (PhD, 2014) Assistant Professor at SUNY Albany. “Preserving Individual Privacy for Spatio-Temporal Data Analytics.” Advisor: Li Xiong.
- PAWEL JURCZYK (PhD, 2009) Software Engineer at Google. “Scalable and Privacy-Preserving Integration of Distributed Heterogeneous Data.” Advisor: Li Xiong.
- MICHAEL NALISNIK (PhD, 2016) Data Scientist at Digital Envoy. “Scalable Computational Pathology: From Interactive to Deep Learning.” Advisor: Lee Cooper
- SEBASTIEN SIVA (PhD, 2011) Assistant Professor at Georgia Gwinnet College. “Solving Constraint Satisfaction Problems in Relational Algebra.” Advisor: James Lu.
- XIAOFENG XU (PhD, 2016) Research Staff at Facebook. “Indexing Moving Objects for Spatiotemporal Queries.” Advisor: Li Xiong.

RECENT MS GRADUATES
- LINLIN CHAI, Software Engineer at Amazon
- LIYUAN HAN, Software Engineer at Microsoft
- HAOJIAN JIN, Research Engineer at Yahoo Labs
- AMEEN KAZEROUNI, Data Scientist at Zappos
- YANDONG LIU, Software Engineer at Uber
- AKSHATHA PAI, Software Engineer at Varian
- JING SUN, Software Engineer at Google
- TUNAN WU, Lead Software Engineer, Fuhu Inc

AWARD-WINNING RESEARCH
- BEST STUDENT PAPER AWARDS: ACM SYSTOR, 2016; ACM SIGIR 2014; ACM WSDM 2014; IFIP DBSec 2013

RESEARCH AREAS
DATABASES AND INFORMATION MANAGEMENT
We work on storage, organization, management and retrieval of medical, public health, web and biological data.
Faculty: Eugene Agichtein, Shun Yan Cheung, James Lu, Ymir Vigfusson, Li Xiong

DATA MINING AND MACHINE LEARNING
We study algorithms and methods for finding patterns and insights in data to build more intelligent and effective systems.
Faculty: Eugene Agichtein, Jinho Choi, Gari Clifford, Lee Cooper, Joyce Ho, Shamim Nemati, Zhaohui “Steve” Qin, Ymir Vigfusson, Avani Wildani, Li Xiong
DATA AND NETWORKED SYSTEMS
We research how to build and improve scalable distributed systems, databases and networking to support the collection, analysis and understanding of large volumes of data.
Faculty: Dorian Arnold, Shun Yan Cheung, Davide Fossati, Ken Mandelberg, Vaidy Sunderam, Ymir Vigfusson, Avani Wildani

CENTER FOR LANGUAGE AND INFORMATION RESEARCH (CLIR)
We study computational linguistics and develop new techniques for natural language processing, information retrieval, web search, and text and social media mining.
Faculty: Eugene Agichtein, Jinho Choi, Phillip Wolff

BIOMEDICAL INFORMATICS (BMI)
Biomedical informatics leverages virtually all areas of biomedical, computational, physical and social science. Research groups include cancer, clinical phenotyping, mHealth, health care analytics, human genetics, high-throughput drug discovery, infectious diseases, neurosciences, pathology, radiology and real-time streaming health analytics, among others.
Faculty: Gari Clifford, Lee Cooper, Joyce Ho, Jun Kong, Qiao Li, Qi Long, Shamim Nemati, Andrew Post, Zhaohui (Steve) Qin, Ashish Sharma, Yan Sun, Li Xiong

SCIENTIFIC COMPUTING
Scientific computing research involves the development of fast, reliable numerical algorithms that are needed to solve difficult mathematical problems in a wide variety of applications.
Faculty: Michele Benzi, James Nagy, Lars Ruthotto, Vaidy Sunderam, Alessandro Veneziani

IMAGING INFORMATICS
Development of methods for labeling anatomic and micro-anatomic structures found in images, systems software and techniques for management and analysis of very large image data, and techniques and software tools for sharing this labeling information in a computational grid architecture.
Faculty: Lee Cooper, Jun Kong, James Nagy, Lars Ruthotto, Ashish Sharma

THEORY AND DISCRETE MATHEMATICS
At the heart of finding and exploiting patterns in data is the art of understanding what patterns are and computational methods for analyzing them. The theory and discrete mathematics group investigates fundamental questions in computer science and mathematics.
Faculty: Dwight Duffus, Michelangelo Grigni, Vojtech Rodl

HUMAN COMPUTER INTERACTION
We study how the true power of data analysis and computation can be unleashed through novel and improved interfaces to computers and other devices.
Faculty: Eugene Agichtein, Lee Cooper, Davide Fossati, Joyce Ho, Ashish Sharma

COMPUTATIONAL NEUROSCIENCE
Our research investigates how the brain organizes and analyzes information, as well as how we can use these observations to influence data computation in other domains.
Faculty: Gordon Berman, Babak Mahmoudi, Shamim Nemati, Ilya Nemenman, Avani Wildani

DATA PRIVACY AND ASSURED INFORMATION MANAGEMENT
The AIMS research group conducts research at the intersection of data management and information privacy and security aimed at enhancing privacy, confidentiality, trust, interoperability, and scalability of healthcare and spatiotemporal information systems.
Faculty: Li Xiong

DISTINGUISHED FACULTY AWARDS
- NSF CAREER Award (Ymir Vigfusson, Systems Lab)
- NIH K01 Award (Jun Kong, BMI and Shamim Nemati, BMI)
- NSF/NIH and PCORI Awards (Li Xiong, AIMS Lab)
- A.P. Sloan Research Fellowship (Eugene Agichtein, IR Lab)
- British Computer Society, Karen Spärck Jones Award in Information Retrieval (Eugene Agichtein, IR Lab)
- IEEE Computer Society, Gordon Bell Prize for Parallel Processing Research (Vaidy Sunderam, Systems Lab)
- R&D 100 Awards 1999 & 2011 (Dorian Arnold)
- SIAM Fellow (Michele Benzi, James Nagy), ACM Distinguished Speaker (Dorian Arnold)

FACULTY

CORE FACULTY
- EUGENE AGICHTEIN, PhD, Columbia University, 2005. Information retrieval, Text and Data Mining.
- LEE COOPER, PhD, Ohio State University, 2009. Machine Learning, Medical Imaging, Genomics.
- DAVIDE FOSSATI, PhD, University of Illinois at Chicago, 2009. Technology Enhanced Learning, Educational Data Mining, Computer Science Education.
- JOYCE HO, PhD, University of Texas - Austin, 2015. Data Mining, Machine Learning.
- JUN KONG, PhD, Ohio State University, 2008. Biomedical Image Analysis, Imaging Informatics.
- QIAO LI, PhD, Shandong University, China, 2005. Biomedical Informatics.
- BABAK MAHMoudi, PhD, University of Florida, 2011. Machine Learning, Optimization and Computational Neuroscience
- JIM NETTLES, PhD, Emory University, 2005. Structural Biology, Cancer Research, Bioinformatics.
ANDREW POST, MD, PhD, University of Pennsylvania, 1999. Language and Information Research, Biomedical Informatics.

ZHAOHUI (STEVE) QIN, PhD, University of Michigan, 2000. Statistical Genetics, Genomics.


AVANI WILDANI, PhD, University of California, Santa Cruz, 2013. Systems Optimization, Data Mining, Archival Storage.


AFFILIATED FACULTY

GORDON BERMAN, PhD, Cornell University, 2009. Computational Ethology and Neuroscience.

SHERI CHERNETSKY TEJEDOR, PhD, The Johns Hopkins University, 2002. Biomedical Informatics.

CHRISTOPHER FLOWERS, MD, Stanford University School of Medicine, 1997; MS, Stanford University, 1997; MS, University of Washington-Seattle, 2002. Lymphoma Research, Oncology Informatics.

MARY GALINSKI, PhD, Sackler Institute of Biomedical Sciences, New York University School of Medicine, 1987. Malaria research and epidemiology.

YING GUO, PhD, Emory University, 2004. Imaging Statistics.


CARLOS MORENO, PhD, Emory University, 1998. Cancer Bioinformatics, DNA Microarray Analysis, Systems Biology.


GEORGEY SMITH, PhD, MD, Emory University School of Medicine, 2010. Informatics, Immunology.

YAN SUN, PhD, Wayne State University School of Medicine, 2001. Biomedical Informatics.

TOMMY THOMAS, MD, PhD, University of Alabama at Birmingham, 2005. Biomedical Informatics, Neurology.


TIANWEI YU, PhD, University of California, Los Angeles, 2005. Bioinformatics.

EMORY UNIVERSITY

Emory University is one of the major scientific research and medical research centers in the Southeast and is among the fastest growing Medical Centers in the United States. Emory is consistently ranked in the top 20 institutions nationally for NIH research support. Newsweek magazine, in a testament to our quality and dedication to education, recently named Emory University as one of the 25 “New Ivies.” Emory is recognized as a leader in higher education in sustainability and has won numerous awards. The Best Colleges has placed Emory in the top 10 in the nation in the categories of greenest universities and the most beautiful college campuses.