

# Computer Science Ph.D. Program College of Computing Sciences

2015-2016 Edition



UNIVERSITY HEIGHTS  
NEWARK, NEW JERSEY 07102-1982

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FIRST CLASS  
U.S. POSTAGE  
**PAID**  
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NEWARK, NJ

## CONNECT WITH US



## WELCOME TO NJIT!

We are one of the nation's leading public polytechnic universities and a top-tier research institution. With an enrollment of more than 11,000 undergraduate and graduate students, we offer small-campus intimacy with the resources of a major public research university. NJIT

is a global leader in such fields as solar research, multimedia databases, big data, vehicular networking, medical informatics, bioinformatics, information systems and cybersecurity, among others. We rank fifth among U.S. polytechnic universities in research expenditures, topping \$100 million, and are among the top one percent of public colleges and universities for return on educational investment, according to *PayScale.com*.

NJIT occupies a 45-acre campus in the University Heights section of downtown Newark along with Rutgers – The State University Newark Campus, Rutgers Medical School and Essex County College. NJIT is located 20 minutes from New York City.

## Academic Environment

Our student organizations are active in our Computer Science department, making your student experience richer and more rewarding. These organizations include a student chapter of the Association for Computing Machinery (ACM), a women's student chapter of ACM, an NJIT chapter of the Women in Computing Society (WICS), as well as an association of Computer Science graduate students (DeepCS) and an institute-wide association of graduate students. Together, these organizations are responsible for funding student travel to conferences, organizing on-campus professional events (such as seminars, workshops, contests) as well as off-campus corporate visits and networking events.

## Professional Environment

Located in Northern New Jersey, within the greater New York Metropolitan area, NJIT is part of a vibrant ecosystem of high technology players including major pharmaceutical companies (e.g., Pfizer), telecommunication companies (e.g., Avaya Labs), Wall Street companies (e.g., Deutsche Bank, Bloomberg, Goldman Sachs), corporate research centers (e.g., Panasonic, Siemens, NEC) and federal agencies (e.g., the Federal Aviation Administration in Atlantic City). This offers our graduates and students excellent opportunities for internships, entrepreneurship, and employment.





## COMPUTER SCIENCE PH.D. ALUMNI

Our Ph.D. graduates are among the best and the brightest:

- Faculty members in academic institutions in the United States and abroad
- Researchers in research centers across the globe
- Data scientists and research engineers in top information technology companies, such as Google, Microsoft and Facebook.
- Research staff in financial companies, such as UBS and Bank of America

## LIVING IN THE GARDEN STATE

Officially referred to as the Garden State, New Jersey is also known as the *Garden of Innovations State*, in reference to its ongoing role as a leader in high technology. As one of the wealthiest states in the nation (by median income) and one of the most densely populated, New Jersey offers a superior quality of life and a wide variety of entertainment options, ranging from Broadway in Manhattan, to the Jersey Shore, to the Atlantic City Boardwalk.

Newark is a major rail station along the Northeast Corridor line and Amtrak's high speed train line (ACELA) that links the northeastern metropolitan areas from Washington DC to Boston, MA. In addition, the City of Newark is home to the New Jersey Performing Arts Center and the Prudential Center. In addition to both venues, there is access to all types of entertainment including concerts, sporting events and shows.

## RESEARCH AREAS

### Algorithms and Applications

- Simulation and Modeling
  - *J.M. Calvin, M.K. Nakayama*
- Parallel and Multicore Computing
  - *A. Gerbessiotis, D. Nassimi, A. Sohn*
- Experimental Algorithms and Algorithm Design
  - *A. Gerbessiotis*
- Scheduling
  - *J. Leung*
- Strong Algorithms
  - *J. McHugh*

### Artificial Intelligence

- Pattern Recognition and Machine Learning
  - *C.J. Liu, U. Roshan, F.Y. Shih, Z. Wei*
- Computer Vision and Multimedia Analysis
  - *C.J. Liu, F.Y. Shih, C.Q. Wu*

### Big Data Analysis

- Big Data Analytics and Data Mining
  - *U. Roshan, D. Theodoratos, V. Oria, J. Wang, Z. Wei, C.Q. Wu*
- Data Science
  - *C.J. Liu, U. Roshan, F.Y. Shih, Z. Wei*

### Cybersecurity

- Applied Cryptography
  - *R. Curtmola, K. Rohloff*
- Mobile and Wireless Security
  - *R. Curtmola, K. Rohloff, I. Neamtiiu, C. Borcea, G. Wang*

- Software Security and Safety
  - *A. Mili, I. Neamtiiu*
- Data Security
  - *R. Curtmola, V. Oria, F. Shih*
- Biometrics
  - *C. Liu*

### Databases

- Database Management
  - *V. Oria, M. Rusinkiewicz, D. Theodoratos, J. Wang*
- Information Retrieval and Keyword Search over Structured and Semi-Structured Data, Search in High Dimension Spaces
  - *V. Oria, D. Theodoratos*
- Linked Data and the Semantic Web
  - *J. Geller, D. Theodoratos*
- Multimedia Databases and Multimedia Information Retrieval
  - *V. Oria*
- Spatio-Temporal Databases
  - *V. Oria*

### Health Computing

- Computational Biology
  - *J. Wang, Z. Wei*
- Bioinformatics
  - *B. Cohen, U. Roshan, J. Wang, Z. Wei*
- Medical Informatics
  - *J. Geller, Y. Perl*
- Biomedical Terminologies
  - *J. Geller, Y. Perl*

### Mobile Computing

- Smartphones
  - *I. Neamtiiu, G. Wang, C. Borcea*
- Mobile Computing and Sensing
  - *C. Borcea, G. Wang, R. Curtmola*
- Mobile Health
  - *G. Wang*

### Networking

- Vehicular, Ad Hoc, and Sensor Networks
  - *C. Borcea, G. Wang, C.Q. Wu*
- Green Computing and Networking
  - *C.Q. Wu*

### Systems and Software Engineering

- Software Engineering and Programming Languages
  - *A. Mili, I. Neamtiiu*
- Distributed Systems and Parallel Computing
  - *C. Borcea, X. Ding, A. Sohn, C.Q. Wu, G. Wang*
- Cloud Computing
  - *C. Borcea, A. Sohn, X. Ding, R. Curtmola*
- Linux Kernel
  - *A. Sohn*
- Web and Open Source Development
  - *J. McHugh*

## OUR RESEARCH PARTNERS

### Academia

- CalTech
- Clemson University
- CUNY College of Staten Island
- Georgia Tech
- MIT
- Montclair State University
- North Carolina A&T State University
- Rutgers University
- Stanford University
- UC-Riverside
- UC-San Diego
- University of North Carolina at Charlotte
- University of Pennsylvania
- University of Southern California
- University of South Florida
- **International**
  - Chinese Academy of Science Beijing, China
  - National Chiao Tung University, Taiwan
  - National Institute of Informatics Tokyo, Japan
  - Tianjin University, China
  - University of Bologna, Italy
  - University of Electronic Science and Technology of China
  - University of Paris Dauphine, France
  - University of Versailles, France
  - Zhejiang University, China
- **Industry**
  - Arcadia Optronics
  - Advanced Clustering
  - Applied Communication Sciences

- BBN Technologies
- Bell Labs
- Cybernetica
- Google
- LGS Innovation
- Raytheon

### Government

- Argonne National Laboratory
- Brookhaven National Laboratory
- Federal Aviation Administration (FAA)
- Lawrence Berkeley National Laboratory
- National Cancer Institute
- National Library of Medicine
- Oak Ridge National Lab
- SPAWAR Systems Center/Pacific
- Wistar Institute

## OUR RESEARCH CENTERS

- Big Data Research Center
- Center for Computational Heliophysics
- Cryptolab
- Data and Knowledge Engineering Laboratory
- Data Science Research Center
- New Jersey Center for Cybersecurity Research
- Structural Analysis of Biomedical Ontologies Center (SABOC)

## SOURCES OF FUNDING

- Army Research Lab
- Department of Defense - DARPA
- Department of Energy
- Department of Homeland Security
- National Aeronautics and Space Agency (NASA)
- National Institute of Health (NIH)
- National Science Foundation (NSF)

- Oak Ridge National Laboratory
- Office of Naval Research
- United Technologies Research Center (UTRC)

## FOR MORE INFORMATION

- College of Computing Sciences (CCS) - [ccs.njit.edu](http://ccs.njit.edu)
- Computer Science Department - [cs.njit.edu](http://cs.njit.edu)
- Computer Science Ph.D. Program [cs.njit.edu/academics/graduate/phdcs](http://cs.njit.edu/academics/graduate/phdcs)
- Office of Graduate Studies [www5.njit.edu/graduatestudies](http://www5.njit.edu/graduatestudies)
- To Apply - [njit.edu/admissions/apply-online](http://njit.edu/admissions/apply-online)

## QUESTIONS?

[csPhdProgram@njit.edu](mailto:csPhdProgram@njit.edu) or 973-596-2866

## OUR RESEARCHERS

- Michael Baltrush - M.S. (Connecticut), Ph.D. (Connecticut)
- Cristian Borcea - M.S. (Rutgers), Ph.D. (Rutgers)
- James Calvin - M.S. (UC Berkeley), Ph.D. (Stanford)
- Reza Curtmola - M.S. (Johns Hopkins), Ph.D. (Johns Hopkins)
- Xiao Ning Ding – Ph.D. (Ohio State)
- Narain Gehani - M.S. (Cornell), Ph.D. (Cornell)
- James Geller - M.S. (SUNY Buffalo), Ph.D. (SUNY Buffalo)
- Alex Gerbessiotis - M.S. (Harvard), Ph.D. (Harvard)
- DaoChuan Hung - M.S. (TsingHua), Ph.D. (Purdue)
- ChengJun Liu - M.S. (Harbin Institute of Technology), Ph.D. (George Mason)
- Joseph Leung - B.A. (Southern Illinois U), Ph.D. (Penn State)
- James McHugh - A.B. (Fordham), Ph.D. (Courant Institute)
- Ali Mili – Ph.D. (Illinois), Doctorat d’Etat (Grenoble)
- Marvin Nakayama - M.S. (Stanford), Ph.D. (Stanford)
- David Nassimi - M.S. (Minnesota), Ph.D. (Minnesota)
- Iulian Neamtiiu - M.S. (Maryland), Ph.D. (Maryland)
- Vincent Oria - M.S. (Paris VI), Ph.D. (Telecom Paris Tech, Paris)
- Yehoshua Perl - M.S. (Weizmann), Ph.D. (Weizmann)
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- Jason Wang - M.S. (NYU), Ph.D. (NYU)
- Zhi Wei - M.S. (Rutgers), Ph.D. (U Penn)
- Chase Qishi Wu - M.S. (Purdue), Ph.D. (LSU)

## ACTIVE RESEARCH PROJECTS

- Multimedia Retrieval and Data Visualization - *C.J. Liu*
- Multimedia Indexing and Retrieval - *V. Oria*
- Dimensionality and Scalability with Application to Search in High Dimensional Spaces - *V. Oria*
- Moving Object Trajectory Management - *V. Oria*
- Facial Recognition - *C.J. Liu*
- Image Search - *C.J. Liu*
- Verified Software - *A. Mili*
- Image Watermarking - *F.Y. Shih*
- Image Forensics - *F.Y. Shih*
- Medical Image Analysis - *F.Y. Shih*
- Object Recognition - *F.Y. Shih*
- Avatar: Mobile Distributed Computing in the Cloud - *C. Borcea, R. Curtmola, X.N. Ding, N. Gehani*
- McSense: Scalable and Dependable Mobile Crowd Sensing - *R. Curtmola, C. Borcea*
- INVENT: Inter-Vehicular Network Technologies - *C. Borcea*
- 3DIA: Distributed Intelligence Architecture for the Internet of Things - *C. Borcea*
- Data Mining and Machine Learning Applied to Complex Network Analysis - *J. Wang*
- Cloud Storage Security - *R. Curtmola*
- Evaluation of Uncertainty and Risk - *M.K. Nakayama*
- Smart Bus System under Connected Vehicles Environment - *G. Wang*
- Self-Sustainable Networking of Survivability-Heterogeneous Sensors - *G. Wang*
- Building Personal Moving Trajectory Profile and Predicting Routes - *G. Wang*
- Intelligent and Distributed Intersection Management - *G. Wang*
- Terabits Networking for Big Data Science - *C.Q. Wu*
- Network Fusion for Radiation Source Detection and Localization - *C.Q. Wu*
- Scientific Workflow Management and Optimization - *C.Q. Wu*
- Securing Software Supply Chain Logistics - *R. Curtmola*
- Auditing Families of Medical Terminologies - *Y. Perl, J. Geller*
- iSECURE: Integrating Learning Resources for Information Security Research and Education - *R. Curtmola, J. Geller, V. Oria*
- Multicore Modeling - *A. Gerbessiotis*
- Parallel and Multicore Algorithm Design and Experimentation - *A. Gerbessiotis*
- Designing Hadoop MapReduce Algorithms for Big Data Analysis in the Cloud - *J. Wang*
- Sentiment Analysis for Social Media Data - *Z. Wei*
- Change-Point Models with Application to Online Advertising Data - *Z. Wei*
- Statistical Methods for Analysis of Biology Data - *Z. Wei*
- GPU and Machine Learning Solutions to Problems in Genomics and Data Science - *U. Roshan*
- Quality Assurance and Summarization of Biomedical Terminologies - *J. Geller, Y. Perl*
- Datacenter Technologies - *A. Sohn*
- Kernel-Level Virtual Machine Migration - *A. Sohn*