

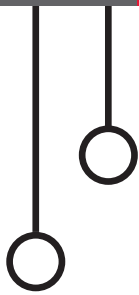
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RESEARCH

2016 – 2017

A new multi-disciplinary lab recently opened at LexisNexis' Centennial Campus facility. The 1,500-square-foot **LexisNexis Experience Innovation Studio** will be jointly operated by LexisNexis and NC State University. It will be available to LexisNexis employees building project engagement sessions, and it will be available to university students working on their own ideas and projects. The goal is to create new solutions to problems that haven't yet been explored. Leaders envision teams from multiple departments – from engineering to social sciences – collaborating with LexisNexis staff on new innovations.

NC State University Chancellor Randy Woodson and Mike Walsh, CEO of Lexis Nexis, are pictured here at the ribbon cutting for the lab last March.



Happy New Year from all of us in the NC State Computer Science Department! It is my pleasure to share this issue of our Research newsletter, our annual synopsis of research activities in the Computer Science (CSC) Department.

The year 2017 marked a milestone in the Department as we celebrated our 50th Anniversary. We had many events to celebrate this milestone, but a highlight was the induction of the inaugural class of the Computer Science Alumni Hall of Fame. The CSC Alumni Hall of Fame was established to celebrate and recognize the exemplary contributions our outstanding graduates have made to their profession, their community, and to the world at large. I encourage you to visit our website (csc.ncsu.edu/news/2069) to learn more about the 2017 class of inductees.

Another highlight of our 50th Anniversary celebration was the 50th Year Technical Symposium

and Reception held on October 13th in the James B. Hunt, Jr. Library. In addition to faculty and alumni panel discussions, our symposium featured talks by **Fran Sullivan**, General Manager of IBM/Wanda Cloud Company Partnership and IBM Senior Executive for North Carolina; **Patrick McDaniel**, a distinguished professor and renowned security expert from Penn State University; **Alvy Ray Smith**, a pioneer in the field of computer graphics and animation, and co-founder of Pixar Studios; and **Brian David Johnson**, renowned futurist, technologist and author, and currently the Futurist in Residence at Arizona State University.

Along with a wonderful 50th Anniversary celebration, we have experienced much success over the past year. Our students and faculty have received numerous awards and honors. However, there are a few highlights that deserve special notice:

(cont.)

INSIDE:

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Research Highlights

- **Dr. Min Chi**, assistant professor in the NC State Computer Science Department, has received a Faculty Early Career Development (CAREER) Award from the National Science Foundation (NSF). She becomes the 28th NSF CAREER Award winner for the department of computer science at NC State (22nd currently on faculty), one of the highest concentrations of any department in the nation. Chi's award, valued at \$547,810, supports her proposal titled "Improving Adaptive Decision Making in Interactive Learning Environments."
- **Dr. Donald Bitzer**, Distinguished University Research Professor of Computer Science, has been named a fellow of the National Academy of Inventors (NAI). Bitzer co-invented the flat plasma panel in 1964, and the technology was eventually applied to television screens. His work on the plasma display monitor earned him an Emmy Award in 2002. He also invented and co-developed Programmed Logic for Automated Teaching Operations, or PLATO, for the first computer system to combine graphics and touch-screen displays.
- It is only a year old, but already the **Visual Narrative Cluster** has come together as a team to find new ways of telling stories and to offer their resources to community members. Its members are physically spread across campus, hailing from four departments. The cluster includes **Todd Berreth**, assistant professor of design; **Frederico Freitas**, assistant professor of history; **Tianfu Wu**, assistant professor of electrical and computer engineering; and is coordinated by **Matthew Booker**, associate professor of history; **Helen Burgess**, associate professor of English; and **Amav Jhala**, associate professor of computer science.
- Researchers from Boston University, George Mason University, and **Dr. Alessandra Scafuro** from NC State have developed a Bitcoin-compatible system, called TumbleBit, a computer protocol that runs on top of Bitcoin, that could make it significantly more difficult for observers to identify or track the parties involved in any given Bitcoin transaction.
- **Dr. Timothy Menzies**, professor of computer science, has been recognized for his major contributions in the field of mining software repositories with the inaugural Mining Software Repositories Foundational Contribution Award. Menzies is the curator of the PROMISE repository, which is storage for Software Engineering project data.
- The NC State Department of Computer Science is pleased to announce the approval and launch of a **Masters Track in Security** in the Computer Science Graduate Program curriculum. Topics include both an overview of computer and network security, and a variety of more in-depth topics, including systems security, software security, privacy, and cryptography. The track can be customized to be more practice-oriented or theoretically-oriented based on the interests of the student.
- **Drs. Christopher Healey** and **Robert St. Amant**, along with PhD student **Zeyuan Chen**, have developed a user-friendly, inexpensive controller for manipulating virtual objects in a computer program in three dimensions. The device allows users to manipulate objects more quickly – with less lag time – than existing technologies. The device, called CAPTIVE, offers six degrees of freedom for users – with applications ranging from video gaming to medical diagnostics to design tools. And CAPTIVE makes use of only three components: a simple cube, the webcam already found on most smartphones and laptops, and custom software.
- **Dr. Robert Rodman** (1940-2017), professor of computer science and author, passed away in January 2017. He taught thousands of students throughout his 38 years as an NC State professor, making an impact on the lives of many. A professor, author, researcher, and friend: Rodman's legacy is one of incredible stature.



(continued from page 1)

- According to the latest data from the American Society for Engineering Education (ASEE), NC State continues to rank #1 in the nation in number of tenure-track/tenured faculty in Departments of Computer Science in Colleges of Engineering. The department currently has 20 female faculty and several other female adjuncts;
- **Dr. Min Chi** is the department's most recent recipient of an NSF CAREER Award. She becomes the 28th NSF CAREER Award winner in the NC State Computer Science Department (22nd currently on faculty), one of the highest concentrations of any department in the nation;
- The Game Design Program at NC State has been recognized as one of the "Top 50 Undergraduate Schools to Study Game Design for 2017" on the Princeton Review's annual list which salutes the best schools in the US and Canada. NC State ranked 7th on the list of public universities, and 38th overall.

NC State is a Tier 1 research institution, and with over 30 centers, labs and groups, research is key to our mission. Our research productivity stands at more than \$62M in active research grants, and annual expenditures in the \$10M range. This ranks us in the top ten departments for sponsored research funding among computer science departments in colleges of engineering in the United States. On page two you will see a list of some of our research highlights, and a list of representative projects appears on page four of this newsletter. We invite you to visit our website at csc.ncsu.edu to learn more about the department, our faculty and staff, and our game-changing research.

In addition, our faculty and students benefited from a record level of corporate collaboration and research support over the year. Industry research partners including Cisco, Google, IBM, Northrop Grumman, LexisNexis, Microsoft and SAS provided research support of approximately \$1M to our faculty in 2016-17.

Also key to the CSC department's mission is providing the best education possible to our students. Enrollments continue to increase – in fall 2016 we enrolled 1,628 students in our department (918 undergraduates and 710 graduate students), and in fall 2017 that number increased to 1,753 students (1,049 undergraduates and 704 graduate students (197 PhD students)). In 2016-2017 we awarded 195 undergraduate degrees and 276 graduate degrees.

Demand for our graduates continues to be extremely high with starting salaries for those graduating with a BS degree averaging over \$70,000, while starting salaries for our master's degree students is more than \$108,000, and for PhD graduates, it's even higher. The top employers of our most recent graduates include Amazon, VMware, EMC Dell, NetApp, SAS, Fidelity Investments, and LexisNexis.

We are very proud of the accomplishments of our faculty who have received numerous prestigious awards and professional recognitions: **Dr. Donald Bitzer** has been named a fellow by the National Academy of Inventors (NAI). Bitzer co-invented the flat plasma display panel in 1964; **Dr. Munindar Singh** was elected a Fellow of the Association for the Advancement of Artificial Intelligence (AAAI); the International Foundation for Autonomous Agents and Multiagent Systems (IFAAMAS) has selected a paper co-authored by **Dr. James Lester** as a recipient of the 2017 Influential Paper Award. The article, "Animated pedagogical agents: Face-to-face interaction in interactive learning environments," laid the groundwork for a wide range of educational products incorporating animated agent technology; **Dr. Timothy Menzies** has been recognized for his major contributions in the field of mining software repositories with the inaugural Mining Software Repositories Foundational Contribution Award. Menzies is the curator of the PROMISE repository, storage for Software Engineering project data.

As we wrap up the celebrations of our first 50 years, it's easy to see the tremendous impact the Computer Science Department has had. The Research Triangle Park was built on the talent produced by this department. About 70% of our 9,000 alumni have remained in the area. However, over 10% of our alumni base is in the Silicon Valley and Seattle areas, with mission critical software engineering jobs on products and services we use every day. From your iPhone to Google Maps, from an Amazon order to your Pinterest page, NC State computer science alumni are helping shape the experience. We look toward an exciting future!

Laurie Williams
Professor and Interim Department Head

Selected Research Projects

Consortium for Nonproliferation Enabling Capabilities, **Nagiza Samatova** (pictured below), **Robin Gardner**. **\$9,744,249** by **US Department of Energy**.

ENGAGE: A Game-based Curricular Strategy for Infusing Computational Thinking into Middle School Science, **James Lester** (pictured bottom right), **Brad Mott**, **Eric Wiebe** (Friday Institute). **\$2,498,862** by **National Science Foundation**.

DIP: Integrated Data-driven Technologies for Individualized Instruction in STEM Learning Environments, **Min Chi**, **Tiffany Barnes**. **\$1,999,438** by **National Science Foundation**.

Moore Foundation Data-Driven Discovery Investigator, **Blair Sullivan**. **\$1,500,000** by **Gordon and Betty Moore Foundation**.

Collaborative Research: PRIME: Engaging STEM Undergraduate Students in Computer Science with Intelligent Tutoring Systems, **James Lester**, **Bradford Mott**, **Eric Wiebe** (Friday Institute). **\$1,499,828** by **National Science Foundation**.

Collaborative Research: Fostering Collaborative Computer Science Learning with Intelligent Virtual Companions for Upper Elementary Students, **Collin Lynch**, **Eric Wiebe**. **\$1,399,088** by **National Science Foundation**.

Health Quest: Engaging Adolescents in Health Careers with Technology-Rich Personalized Learning, **James Lester**. **\$1,301,820** by **National Institute of Health**.

Guiding Understanding via Information from Digital Environments (GUIDE), **James Lester**, **Eric Wiebe**. **\$1,238,549** by **Concord Consortium** via **National Science Foundation**.

Collaborative Research: Research in Student Peer Review: A Cooperative Web-Services Approach, **Edward Gehringer**. **\$1,034,166** by **National Science Foundation**.

CPS: Synergy: Integrated Sensing and Control Algorithms for Computer-Assisted Training (Computer-Assisted Training Systems (CATS) for Dogs, **David Roberts**, **Alper Bozkurt (ECE)**, **Barbara Sherman (CVM)**. **\$1,029,403** by **National Science Foundation**.

Using Real-Time Multichannel Self-Regulated Learning Data to Enhance Student Learning and Teachers' Decision-Making with MetaDash, **Min Chi**, **Roger Azevedo (Psychology)**, **Soonhye Pakr (Education)**. **\$914,585** by **National Science Foundation**.

Scalable Holistic Autotuning for Software Analytics, **Timothy Menzies**, **Xipeng Shen**. **\$898,349** by **National Science Foundation**.

Identification of Translational Hormone-Response Gene Networks and Cis-Regulatory Elements, **Steffen Heber**, **Jose Alonso**, **Anna Stepanova**, **Cranos Williams**. **\$897,637** by **National Science Foundation**.

Integrating Computing in STEM: Designing, Developing and Investigating a Team-based Professional Development Model for Middle and High School Teachers, **Tiffany Barnes**. **\$861,773** by **National Science Foundation**.

CAREER: Improving Adaptive Decision Making in Interactive Learning Environments, **Min Chi**. **\$547,810** by **National Science Foundation**.

Algorithms for Exploiting Approximate Network Structure Research Area 10: Network Science, **Blair Sullivan**. **\$538,199** by **US Army-Army Research Office**.

Holistic, Cross-Site, Hybrid System Anomaly Debugging for Large Scale Hosting Infrastructures, **Xiaohui (Helen) Gu**. **\$518,000** by **National Science Foundation**.

Scaling CS Principles Through STARS Community and Leadership Development, **Tiffany Barnes**. **\$500,000** by **National Science Foundation**.

Supporting Regular Expression Testing, Search, Repair, Comprehension, and Maintenance, **Kathryn Stolee**. **\$499,996** by **National Science Foundation**.

Direct Physical Grasping, Manipulation, and Tooling of Simulated Objects, **Robert St. Amant**, **Christopher Healey**. **\$496,858** by **National Science Foundation**.

CAREER: Expanding Developers' Usage of Software Tools by Enabling Social Learning, **Emerson Murphy-Hill**. **\$495,721** by **National Science Foundation**.

SHF: Small: Improving Memory Performance on Fused Architectures Through Compiler and Runtime Innovations, **Xipeng Shen**, **Frank Mueller**. **\$470,000** by **National Science Foundation**.

SHF: Medium: Collaborative Transfer Learning in Software Engineering, **Tim Menzies**. **\$464,609** by **National Science Foundation**.

CAREER: Enable Robust Virtualized Hosting Infrastructures via Coordinated Learning, Recover, and Diagnosis, **Xiaohui (Helen) Gu**. **\$450,000** by **National Science Foundation**.

Fine-grained Measurement of Performance Metrics in the Internet of Things, **Muhammad Shahzad**. **\$449,999** by **National Science Foundation**.

Data Locality Enhancement of Dynamic Simulations for Exascale Computing, **Xipeng Shen**. **\$409,214** by **US Department of Energy**.

Taming Web Content Through Automated Reduction in Browser Functionality, **Alexandros Kapravelos**. **\$406,609** by **National Science Foundation**.

Transforming Computer Science Education Research Through Use of Appropriate Empirical Research Methods: Mentoring and Tutorials, **Sarah Heckman**. **\$406,557** by **National Science Foundation**.

CAREER: Secure OS Views for Modern Computing Platforms, **William Enck**. **\$400,000** by **National Science Foundation**.

Realizing Cyber Inception: Toward a Science of Personalized Deception for Cyber Defense, **Munindar Singh**. **\$375,360** by **University of Southern California** via **US Army Research Office**.

Collaborative Research: Semi and Fully Automated Program Repair and Synthesis via Semantic Code Search, **Kathryn Stolee**. **\$387,661** by **National Science Foundation**.



New Faculty Profiles



ARNAV JHALA

joined the department in fall 2016 as an associate professor in the Visual Narrative Cluster. He is co-director of the

Digital Games Research Initiative, and his specialty is artificial intelligence. He received his B.Eng in Computer Engineering from Gujarat University in India, and his MS and PhD in Computer Science from NC State University.



COLLIN LYNCH

joined the department in fall 2016 as an assistant professor. His research interests are in the area of graph-based

educational data mining, and the development of robust intelligent tutoring systems. He received his BA in Artificial Intelligence from Hampshire College, and his MS and PhD in intelligent systems from the University of Pittsburgh.



CHRIS MARTENS

joined the department in fall 2016 as an assistant professor. Her specialty is formal methods for creative media, game design,

believable virtual agents, collaborative digital storytelling, and simulation modeling. She received her BS and PhD in Computer Science from Carnegie Mellon University.



BRADLEY REAVES

joined the department in fall 2017 as an assistant professor. His research is dedicated to measuring and

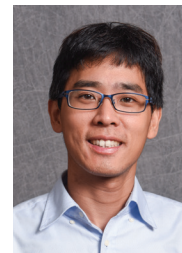
improving security and privacy of computer systems. He received his BS, and MS in computer engineering from Mississippi State, his MS in computer science from Georgia Tech, and his PhD from the University of Florida.



ALESSANDRA SCAFURO

joined the department in fall 2016 as an assistant professor. Her specialty is

cryptography, and her current interests are in the area of secure computation. She received her MS and PhD in computer science from the University of Salerno.



HUNG-WEI TSENG

joined the department in fall 2016 as an assistant professor. His specialty is systems, and

his current interests are in the area of heterogeneous computing. He received his BS and MS in computer science from National Taiwan University, and his PhD from the University of California, San Diego.

Senior Faculty Spotlight



DR. TIFFANY BARNES

Professor of Computer Science

Barnes is a professor of computer science at NC State University. She received her BS and MS in computer science and mathematics, and her PhD in computer science from NC State. A member of Phi Beta Kappa and the NC State Golden Chain Society, she has served as Chair (2008) and Program Chair (2009) of the Educational Data Mining

conference, Chair of the STARS Celebration conference (2011

and 2015), Program Chair (2014) for the Foundations of Digital Games conference, the ACM Special Interest Group on Computer Science Education Board (2010-2016), the Board of Directors for the International Educational Data Mining Society (2011-2016), Associate Editor for the *Journal of Educational Data Mining* (2008-2010), and Guest Editor for the *IEEE Computer Graphics and Applications* Special Issue on Serious Games (2009). Barnes received an NSF CAREER Award for her novel work in using data and educational data mining to add intelligence to STEM learning environments. Barnes is co-PI and current Executive Vice President for the STARS Computing, a consortium of universities that engage college students in outreach, research, and service to broaden participation in computing. Her research focuses on educational data mining, serious games for education, health, and energy, and broadening participation in computing education and research.

Researchers*

Dennis R. Bahler, Associate Professor

PhD, University of Virginia, 1987

Artificial intelligence: constraint processing, machine learning, hybrid neural-symbolic computing

Tiffany Barnes, Professor

PhD, North Carolina State University, 2003

Educational data mining, serious games for education, health and energy, broadening computing participation

Donald Bitzer, Distinguished University Research Professor

PhD, University of Illinois, 1960

Convolutional codes, signal processing for biological systems, computer-based education

Franz Brglez, Visiting Research Professor

PhD, University of Colorado, 1970

Distributed and collaborative workflows, databases, and groupware for the Internet

Min Chi, Assistant Professor

PhD, University of Pittsburgh, 2009

Machine learning, artificial intelligence, cognitive science and learning science

Rada Y. Chirkova, Associate Professor

PhD, Stanford University, 2002

Database performance, query-processing efficiency, data sciences

Jon Doyle, SAS Professor of Computer Science

PhD, Massachusetts Institute of Technology, 1980

Artificial Intelligence, mathematical and philosophical foundations, rational agents, decision making

Patrick Dreher, Research Professor

PhD, University of Illinois, 1991

Cloud computing, scientific and high performance computing

Rudra Dutta, Professor

PhD, NC State University, 2001

Network design: optical, wireless sensor and mesh networks; future Internet design

William Enck, Associate Professor

PhD, The Pennsylvania State University, 2011

Systems security, mobile operating systems security

Vincent Freeh, Associate Professor

PhD, University of Arizona, 1996

Operating systems, compilers, programming languages, storage

Edward Gehringer, Associate Professor

PhD, Purdue University, 1979

Memory management, object-oriented software systems, computer-aided education

Xiaohui (Helen) Gu, Associate Professor

PhD, University of Illinois, 2004

Distributed systems, operating systems, computer networks

Khaled Harfoush, Associate Professor

PhD, Boston University, 2002

Computer networking, Internet measurements, peer-to-peer systems, routing protocols

Christopher G. Healey, Goodnight Distinguished Professor

PhD, University of British Columbia, Canada, 1996

Visualization and computer graphics: methods for rapidly, accurately, effectively visualizing large complex datasets

Steffen Heber, Associate Professor

PhD, Universität Heidelberg, Germany, 2001

Algorithms to compare and analyze gene order permutations, animation development for bioinformatics education

Arnav Jhala, Associate Professor

PhD, NC State University, 2009

Artificial intelligence, storytelling in games, intelligent machinima generation, smart graphics, and intelligent user interfaces

Guoliang Jin, Assistant Professor

PhD, University of Wisconsin-Madison, 2014

Architecture and operating systems, parallel and distributed systems, software engineering and programming languages

Alexandros Kapravelos, Assistant Professor

PhD, University of California-Santa Barbara, 2015

Systems and software security

Michael Kowolenko, Managing Director of ITng

PhD, Northeastern University, 1985

Data science

James C. Lester, Distinguished Computer Science Professor

PhD, University of Texas, 1994

Artificial intelligence, intelligent user interfaces, intelligent tutoring systems, computational linguistics

Collin Lynch, Assistant Professor

PhD, University of Pittsburgh, 2014

Graph-based educational data mining, development of robust intelligent tutoring systems, adaptive educational systems for ill-defined domains

Chris Martens, Assistant Professor

PhD, Carnegie Mellon University, 2015

Formal methods for creative media, game design, believable virtual agents, collaborative digital storytelling, simulation modeling

Tim Menzies, Professor

PhD, University of New South Wales, 1995

Artificial intelligence, data-mining and search-based software engineering

Brad Mott, Senior Research Scientist

PhD, NC State University, 2006

Artificial intelligence, game-based learning environments, computational models of interactive narrative

Frank Mueller, Professor

PhD, Florida State University, 1994

Compilers and code optimization, concurrent and distributed, real-time and embedded systems

Emerson Murphy-Hill, Associate Professor

PhD, Portland State University, 2009

Software engineering, especially the intersection of human-computer interaction and software engineering.

Kemafor Anyanwu Ogan, Associate Professor

PhD, University of Georgia, 2007

Semantic computing: semantic Web, databases, data mining, information retrieval, services computing

Chris Parnin, Assistant Professor

PhD, College of Computing, Georgia Tech, 2014

Graphics and computer interaction, software engineering, programming languages

Harry Perros, Alumni Distinguished Graduate Professor

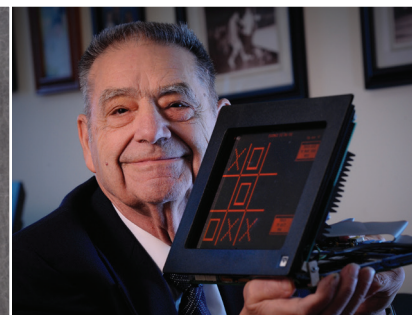
PhD, Trinity College, Ireland, 1975

Performance analysis of optical networks, performance monitoring of grids, queueing networks

Michael Rappa, Distinguished University Professor

PhD, University of Minnesota, 1987

Analytics, e-commerce, open courseware, open educational content, technology management



*list includes 2016-17 faculty as well as faculty promotions, and faculty joining the department in August 2017.

Bradley Reaves, Assistant Professor
PhD, University of Florida, 2017

Measuring and improving the security and privacy of computer systems, with emphasis on telephony networks and software for mobile platforms

Douglas S. Reeves, Professor
PhD, The Pennsylvania State University, 1987

Internet protocols, multimedia computing and networking, information security, computer org.

David Roberts, Associate Professor
PhD, College of Computing, Georgia Tech, 2010

Machine learning and artificial intelligence and their application to interactive technological experiences

Robert D. Rodman, Professor
PhD, University of California, Los Angeles, 1973

Computational forensic linguistics, applying artificial intelligence to error recovery in speech recognition

George N. Rouskas, Professor
PhD, Georgia Institute of Technology, 1994

Network architectures and protocols, optical networks, grid computing

Nagiza Samatova, Professor (joint apt. w/ORNL)
PhD, Russian Academy of Science (CCAS), 1993

Graph theory and algorithms, bioinformatics, systems biology, data management, data integration, data science

Carla D. Savage, Professor
PhD, University of Illinois, 1977

Combinatorics, combinatorial algorithms, network algorithms, graph theory, discrete mathematics

Alessandra Scafuro, Assistant Professor
PhD, University of Salerno, 2013

Cryptography, secure computation

Muhammad Shahzad, Assistant Professor
PhD, Michigan State, 2015

Embedded and real-time systems, networking and performance evaluation, cyber security

Xipeng Shen, Associate Professor
PhD, University of Rochester, 2006

Architecture and operating systems, extreme-scale data-intensive computing

Munindar Singh, Professor
PhD, University of Texas, 1993

Multiagent systems, intelligent agents, service-oriented computing, agent languages and protocols

Robert St. Amant, Professor
PhD, University of Massachusetts, Amherst, 1996

Human-computer interaction, artificial intelligence, intelligent user interfaces, statistical expert systems

Matthias Stallmann, Professor
PhD, University of Colorado, 1982

Algorithm design and analysis of serial and parallel models of computation

William J. Stewart, Professor
PhD, Queen's University, Northern Ireland, 1974

Performance evaluation of computer sys., numerical linear algebra, computer operating systems

Kathryn Stolee, Assistant Professor
PhD, University of Nebraska-Lincoln, 2013

Program analysis, empirical software engineering and crowdsourcing

John Streck, Chief Technologist of ITng
MS, Rensselaer Polytechnic Institute, 1974

Networks, cloud computing

Blair Sullivan, Associate Professor (joint apt. w/ORNL)
PhD, Princeton University, 2008

Algorithms and theory of computation, scientific and high performance computing, and analytics

David Thuente, Professor
PhD, University of Kansas, 1974

Denial of service and security for wireless systems; media access control protocols

Hung-Wei Tseng, Assistant Professor
PhD, University of California-San Diego, 2014

Systems, heterogeneous computing

Ranga Vatsavai, Associate Professor (joint apt. w/ORNL)
PhD, University of Minnesota, 2008

Advanced data sciences, geospatial analytics

Mladen Vouk, Distinguished Computer Science Professor
PhD, King's College, England, U.K., 1976

Software engineering, scientific computing, computer-based education, cloud computing, data science

Benjamin Watson, Associate Professor
PhD, Georgia Institute of Technology, 1997

Relationships between computer graphics and design

Laurie Williams, Professor
PhD, University of Utah, 2000

Agile software processes, software security, open software systems, healthcare information technology

Teaching Professors

Suzanne Balik, Teaching Assistant Professor
PhD, NC State University, 2014

Graphics, human computer interaction

Lina Battestilli, Teaching Assistant Professor
PhD, NC State University, 2005

Computer science education, cloud computing and datacenter networks, networking architecture

Sarah Heckman, Teaching Associate Professor
PhD, NC State University, 2009

Computer science and software engineering education, open educational resources

Jason King, Teaching Assistant Professor
PhD, NC State University, 2016

Logging for user accountability, nonrepudiation and forensicability

Jessica Young Schmidt, Teaching Assistant Professor
PhD, NC State University, 2012

Scholarship of teaching and learning

David Sturgill, Teaching Associate Professor
PhD, Cornell University, 1996

Parallel computation and its application to computationally hard problems, parallelism, machine learning



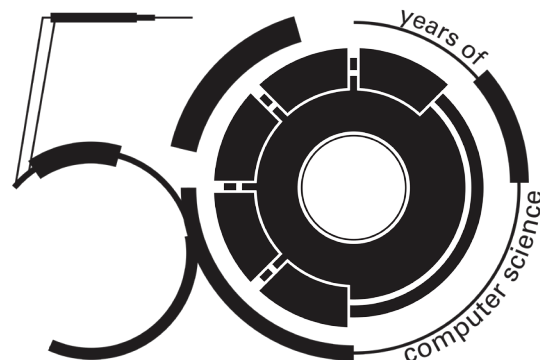
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Computer Science Research

Our key research areas are in:

- **Artificial Intelligence and Theory** (including Intelligent Agents, Machine Learning, Knowledge Representation, Planning, Natural Language Processing, Computational Economics and Management, Algorithms, Theory of Computation)
- **Computational Applications and Analytics** (including Data Intensive Computing, Scientific Computing, Bioinformatics, Data/Text Mining, Information Visualization, HealthCare Information Technology, Analytics Clouds, Data Science)
- **Games, Interaction, and Education Informatics** (including Games, Human-Computer Interaction, Graphics, Intelligent Tutoring, Undergraduate Education in Computing)
- **Security and Networks** (including Software and Network Systems Security, Information Assurance, Privacy, Policies, Regularity Compliance, Networking and Performance Evaluation, Web security, Mobile security, Crypto, Internet of Things)
- **Software Engineering and Systems** (including Requirements, Formal Methods, Policies, Reliability Engineering, Process and Methods, Programming Languages, Computer Architectures and Operating Systems, Databases, Embedded and Real-Time Systems, Parallel and Distributed Systems, High Performance Computing, Cloud Computing)

The department has a number of teaching and research laboratories, centers, institutes and other facilities that support its education, research and outreach missions.



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