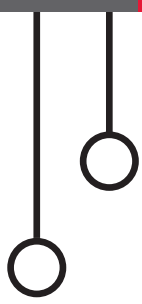


# RESEARCH

2018 – 2019

Emerging technologies could allow first responders to call up all sorts of information when responding to an emergency, but there is some uncertainty about what information is useful, how it should be displayed, and how emergency personnel could control which information to access and when. NC State is working with first responders to address these questions.

The work, led by **Dr. James Lester**, is made possible by a two-year, \$1.1 million grant from the National Institute of Standards and Technology (NIST). The project, called **IntelliVisor**, is focused on developing VR software that can help law enforcement, firefighters and emergency medical technicians respond to crises more rapidly and efficiently.



## INSIDE:

- Highlights
- Projects
- Faculty Profiles

Greetings, and welcome to the 2018-2019 issue of the NC State Computer Science (CSC) Department's Research newsletter! This newsletter provides a snapshot of the research activities in the department during the last fiscal year. We would love to share all of our research with you, but space simply will not allow.

Research is key to our mission, and the CSC Department is home to 13 research centers, and more than 35 research labs and groups. Current research productivity in the department stands at more than \$64M in active research grants, and annual expenditures are 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. Some of our 2018-2019 research highlights are listed on page two, and a sampling of some of our research projects appears on page four of this newsletter. I encourage you to visit our website ([csc.ncsu.edu](http://csc.ncsu.edu)) to learn more about the

department, our faculty and staff, and our state-of-the-art research.

Building on the NC State Computer Science Department's success as a global leader in the artificial intelligence space, we are pleased to announce the addition of an endowed **Goodnight Distinguished Professorship in Artificial Intelligence and Machine Learning**. This Professorship will allow us to recruit exceptional talent to help shape break-through discoveries and future research. This person will represent the department and university as a renowned scholar with expertise in the area of artificial intelligence, and will be a key leader in the vibrant and expanding artificial intelligence community at NC State and beyond. He or she will be expected to have a well-established record as a researcher, teacher, and thought leader in artificial intelligence with worldwide recognition and stature.

*(continued on page 3)*

# Research Highlights

- **Dr. Chris Martens**, assistant professor of computer science, has received a Faculty Early Career Development Award, also known as the **CAREER Award**, from the National Science Foundation (NSF). The NSF will provide \$500,000 in funding over five years to support Martens' project, "Explorable Formal Models of Privacy Policies and Regulations." The CAREER Award is one of the highest honors the NSF gives to young science and engineering faculty. **Martens is the Computer Science Department's 30th CAREER Award winner.**
- NC State was recently re-designated a **National Center of Academic Excellence in Cyber Defense Research**. In 2008, NC State was selected by the National Security Agency (NSA) and the Department of Homeland Security (DHS) as one of the first 23 National Centers of Academic Excellence in Information Assurance Research (CAE-R). NC State, one of only two universities from the state of North Carolina to receive the CAE-R distinction, recently had the designation renewed, and will hold this distinction until 2024.
- **Dr. James Lester** has been named Distinguished University Professor in the Department of Computer Science at NC State. A Fellow of the Association for the Advancement of Artificial Intelligence (AAAI), he is the founding director of the Center for Educational Informatics. He is internationally recognized for his research on artificial intelligence technologies for education.
- **Drs. William Enck, Bradley Reaves** and PhD student **T.J. O'Connor** have identified flaws in "smart home" Internet-of-Things (IoT) devices that allow third parties to prevent devices from sharing information. "We've found that there are widespread flaws in the design of these devices that can prevent them from notifying homeowners about problems or performing other security functions," says Enck. The devices are designed with the assumption that wireless connectivity is secure and won't be disrupted, which isn't always the case. The team has found potential solutions that address the device's vulnerabilities.
- A team of faculty and researchers at NC State were recently awarded a three-year \$1 million NSF grant in collaboration with the Wake County Public School System, UNC-Charlotte and Charlotte-Mecklenburg Schools to broaden participation in computer science (CS) and computational thinking (CT) in North Carolina. **Drs. Eric Wiebe, Dave Frye and Sherry Freeman** from the NC State College of Education's Friday Institute for Educational Innovation and **Dr. Tiffany Barnes** from the Department of Computer Science will lead this project, titled EcoCS: Developing a Systemic, Scalable Model to Broaden Participation in Middle School Computer Science Using an RPP Approach.
- Researchers from NC State have developed a technique for measuring speed and distance in indoor environments, which could be used to improve navigation technologies for robots, drones, or pedestrians trying to find their way around an airport. The technique uses a novel combination of Wi-Fi signals and accelerometer technology to track devices in near-real time. The technique, called "Wi-Fi-assisted Inertial Odometry (WIO)," uses Wi-Fi as a velocity sensor to accurately track how far something has moved. PhD student **Raghav Venkatnarayan** and assistant professor **Muhammad Shahzad** are the co-corresponding authors on the paper about the work.
- A paper co-authored by **Nachiappan Nagappan, Laurie Williams, Miriam Ferzli, Eric Wiebe, Kai Yang, Carol Miller** and **Suzanne Balik** has been recognized as the **#2** paper on the list of the **"Top Ten Symposium Papers of All Time."** The paper, "Improving the CS1 Experience with Pair Programming," which was written in 2003, was recognized at the 50th annual ACM Special Interest Group on Computer Science Education (SIGCSE) Technical Symposium held last March in Minneapolis, MN. The top ten papers were chosen from among the best papers that were presented over the last 49 years.

(continued from page 1)

As you may remember, I took over the reins of the department last November (it's hard to believe it's been almost a year!). I am so grateful to the faculty and staff for welcoming me to NC State, and for making me feel part of the Pack! As new department head, I am happy to share some of the most recent successes of the department, our faculty, staff and students have experienced over the past year. Here are a few highlights that deserve special recognition:

- **Dr. Chris Martens**, assistant professor of computer science, has received a **Faculty Early Career Development Award**, also known as the **CAREER Award**, from the National Science Foundation. The award is one of the highest honors NSF gives to young science and engineering faculty members. NSF will provide \$500,000 in funding over five years to support Martens' project, "Explorable Formal Models of Privacy Policies and Regulations." Martens becomes the **department's 30th CAREER Award winner**.
- **Dr. Mladen Vouk**, professor, and former department head of the Computer Science Department, was recently named **Associate Vice Chancellor for Research Development and Administration** at NC State.
- **Dr. Patrick Dreher**, research professor in the Department of Computer Science, and associate faculty member in the Department of Physics, was recently named the **chief scientist of the IBM Quantum Computing Hub**.
- **NC State's Engineering Online** ranked **8th nationally** on the **2019 US News and World Report's Best Online Engineering Programs**; and ranked **6th** on the list of the **Best Online Computer Information Technology Programs**. The online graduate engineering program was also rated in the **top 10** on a list of **Best Online Graduate Engineering Programs for Veterans**.
- NC State's **Undergraduate Game Design Program** is ranked **23rd** on **The Princeton Review's** annual list of the **"Top 50 Undergraduate Schools to Study Game Design for 2019."**
- NC State ranks **#1 in tenure-track female faculty** among all computer science departments in colleges of engineering.
- The **Game Design Program** has also been ranked **#5** on **The Bachelor Degree Center's** list of the **25 Best Bachelor's in Game Design Degree Programs for 2019**.
- Over the past 10 years, NC State ranks **#2 in the world** in publishing at conferences and journals dedicated to games and interactive entertainment computing research.

Our faculty and staff have received numerous prestigious and professional recognitions:



- **Dr. Tim Menzies** has been selected as a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) for 2019;
- **Dr. Carla Savage** was named a Society for Industrial and Applied Mathematics (SIAM) Fellow, Class of 2019;
- **Dr. Frank Mueller** was named a 2018 Association for Computing Machinery (ACM) Fellow, the first faculty member in NC State's Computer Science Department to be recognized with this prestigious honor;
- **Dr. Xipeng Shen** was named a 2018 Distinguished Member of the Association for Computing Machinery (ACM);
- **Ken Tate**, Director of Engagement and External Relations, was recognized by the *Triangle Business Journal* as one of their 2018 Leaders in Diversity;
- **Dr. Donald Bitzer** received the Alexander Quarles Holladay Medal for Excellence, the highest honor bestowed by NC State and the University's Board of Trustees;
- **Dr. James Lester** has been named a Distinguished University Professor;
- **Tammy Coates**, Assistant Director of External Relations, was honored with a 2019 College of Engineering Award for Excellence;
- **Dr. Sarah Heckman**, Director of Undergraduate Programs and Teaching Associate Professor, received the 2018-2019 Computer Science Department's Person of Exceptional Performance (PEP) Award.

Producing well educated students who are prepared for the workforce is also key to the mission of the department. Our graduates continue to be in high demand with annual salaries for our undergraduates averaging over \$76,000, and our MS graduates are averaging \$112,000. And for graduates with a PhD, it's even higher! Our top employers are IBM, Cisco, Amazon, VMWare, NetApp, SAS and other top financial and IT organizations, as well as other high-tech companies.

I am excited about and encouraged by all of the accomplishments of the department, faculty, staff and students! I look forward to many more successful years!

Dr. Gregg Rothermel  
*Professor and Department Head*

# Selected Research Projects

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

*Development of a Nearly Autonomous Management and Control System for Advanced Reactors*, **Nam Dinh, Maria Avramova, Abhinav Gupta, Min Chi**. **\$2,686,834** by **US Department of Energy (DOE) – Advanced Research Projects Agency – Energy (ARPA-E)**.

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



*Multimodal Visitor Analytics: Investigating Naturalistic Engagement with Interactive Tabletop Science Exhibits*, **James Lester, Jonathan Rowe, James Minogue**. **\$1,951,956** by **National Science Foundation**.

*Collaborative Research: FW-HTF: Augmented Cognition for Teaching: Transforming Teacher Work with Intelligent Cognitive Assistants*, **James Lester, Bradford Mott**. **\$1,499,736** by

**National Science Foundation**.

*Supporting Student Planning with Open Learner Models in Middle Grades Science*, **James Lester**. **\$1,499,183** by **National Science Foundation**.

*Developing an Online Environment for Learning Algebra by Teaching a Synthetic Peer*, **Noboru Matsuda**. **\$1,399,947** by **US Department of Education (DED)**.

*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**.

*DeepGen: Dynamic Generation of Training Simulation Scenarios with Deep Reinforcement Learning*, **James Lester, Bradford Mott, Jonathan Rowe**. **\$1,398,004** by **US Army – Army Research Laboratory**.

*Investigating Emergency Response Performance with VR-Based Intelligent User Interfaces*, **James Lester, Bradford Mott, Randall Spain**. **\$1,112,175** by **National Institute of Standards and Technology**.

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

*Cognitive Human Enhancements for Cyber Reasoning Systems*, **Alexandros Kapravelos**. **\$884,817** by **Arizona State University/DARPA**.



*Collaborative Research: 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**.

*IUCRC Pre-Proposal Phase I NC State University: Center for Accelerated Real Time Analytics (CARTA)*, **Rada Chirkova**. **\$747,647** by **National Science Foundation**.

*Developing Integrated teaching Platforms to Enhance Blended Learning in STEM*, **Collin Lynch, Tiffany Barnes, Sarah Heckman**. **\$599,992** by **National Science Foundation**.

*CAREER: Explorable Formal Models of Privacy Policies and Regulations*, **Christopher Martens**. **\$555,000** by **National Science Foundation**.

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

*Science of Security Lablet: Impact through Research, Scientific Methods, and Community Development - Additional Funding*, **Laurie Williams, Munindar Singh**. **\$537,539** by **US Department of Defense (DOD)**.

*SaTC: CORE: Small: Enhanced Security and Reliability for Embedded Control Systems*, **Frank Mueller**. **\$500,000** by **National Science Foundation**.



*CAREER: On the Foundations of Semantic Code Search*, **Kathryn Stolee**. **\$500,000** by **National Science Foundation**.

*Supporting Position Independence and Reusability of Data on Byte-Addressable Non-Volatile Memory*, **Xipeng Shen**. **\$499,998** by **National Science Foundation**.

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



*CSR: SmartChainDB – Enabling Smart Marketplaces with a Scalable Semantically-Enhanced Blockchain Platform*, **Kemafor Ogan, Alessandra Scafuro, Binil Starly**. **\$499,773** by **National Science Foundation**.

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

*FEED: Flexible, Equitable, Efficient, and Effective Distribution*, **Min Chi, Julie Ivy**. **\$400,000** by **UNC-NC A&T University**.

*DockerizeME: Automatic Interference and Repair of Computing Environments*, **Christopher Pamin**. **\$345,875** by **National Science Foundation**.

# New Faculty Profiles



## **BITA AKRAM**

joined the department in fall 2019 as a teaching assistant professor. Her research focus is on designing advanced learning technologies for instructional support and improving access and quality of computer science education by developing innovative computer science curricula. Prior to

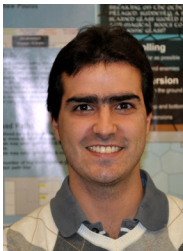
joining the faculty, she was a research assistant at the NC State Center for Educational Informatics and the Friday Institute for Educational Innovation. She received her PhD (2019) from NC State University.



## **DON SHEEHY**

joined the department in fall 2019 as an associate professor. His research is in the areas of computational geometry and topological data analysis. Prior to coming to NC State, he was on the faculty at the University of Connecticut. He received his BSE in computer science from Princeton University, and

his PhD (2011) from Carnegie Mellon University.



## **IGNACIO DOMÍNGUEZ**

joined the department in fall 2019 as a teaching assistant professor. His research studies human behavior in video games and virtual environments to create computational models of interaction that can be used to identify, predict, and influence behavior and decision-making. He received his

MS and PhD (2018) in computer science from NC State University.



## **RUOZHOU YU**

joined the department in fall 2019 as an assistant professor. His research interests are broadly in the areas of computer networks, distributed systems and cybersecurity. He received his BS from the Beijing University of Posts and Telecommunications, and his PhD

(2019) from Arizona State University.



## **JOHN-PAUL ORE**

joined the department in fall 2019 as an assistant professor. His research interests are in the areas of software engineering, robotics, program analysis, and system testing using high-resolution physical simulators. He received his PhD (2019) from the University of Nebraska - Lincoln.

## Senior Faculty Spotlight



## **DR. GREGG ROTHERMEL**

*Department Head and Professor of Computer Science*

Rothermel became the Head of the Department of Computer Science in November, 2018. He comes to NC State from the University of Nebraska-Lincoln where he was a professor and Jensen Chair of Software Engineering.

He received his PhD in

Computer Science from Clemson University, his MS in Computer Science from SUNY Albany, and a BA in Philosophy

from Reed College. Prior to returning to academia, he was a software engineer, and Vice President of Quality Assurance and Quality Control for Palette Systems, a manufacturer of CAD/CAM software.

Rothermel's research interests include software engineering and program analysis, with emphases on the application of program analysis techniques to problems in software maintenance and testing, end-user software engineering, and empirical studies.

Rothermel is an IEEE Fellow and an ACM Distinguished Scientist. He is currently General co-Chair for the 2020 ACM/IEEE International Conference on Software Engineering, serves as an Associate Editor for IEEE Transactions on Software Engineering and Methodology, and is a member of the Editorial Boards of the Empirical Software Engineering Journal and Software Quality Journal.

# 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, NC 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

**Franc Brglez, Visiting Research Professor**  
PhD, University of Colorado, 1970

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

**Min Chi, Associate Professor**  
PhD, University of Pittsburgh, 2009

Machine learning, artificial intelligence, cognitive science and learning science

**Rada Y. Chirkova, Professor**  
PhD, Stanford University, 2002

Database performance, query-processing efficiency, data sciences

**Anupam Das, Assistant Professor**  
PhD, University of Illinois, 2016

Data science

**Jon Doyle, SAS Distinguished Professor**  
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 and Interim Associate Department Head**  
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, Professor**  
PhD, Purdue University, 1979

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

**Xiaohui (Helen) Gu, 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

**James C. Lester, Distinguished University 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

**Noboru Matsuda, Associate Professor**  
PhD, University of Pittsburgh, 2005

Technology innovation and integration to advance the sciences of learning

**Tim Menzies, Professor**  
PhD, University of New South Wales, 1995

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

**Bradford 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

**John-Paul Ore, Assistant Professor**  
PhD, University of Nebraska-Lincoln, 2019

Software engineering, robotics, program analysis, and system testing using high-resolution physical simulators

**Chris Parnin, Assistant Professor**  
PhD, Georgia Institute of Technology, 2014

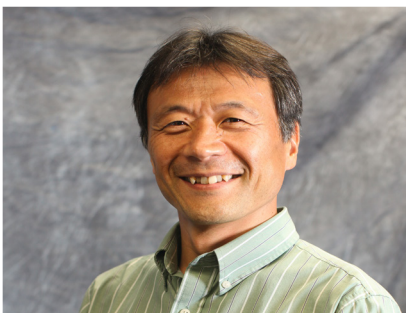
Graphics and computer interaction, software engineering, programming languages

**Harry Perros, Alumni Distinguished Graduate Professor**  
PhD, Trinity College, Ireland, 1975

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

**Thomas Price, Assistant Professor**  
PhD, NC State University, 2018

Computing education, intelligent tutoring systems, educational data mining, and novice programming environments



*\*list includes 2018-19 faculty as well as faculty promotions, and faculty joining the department in August 2019.*

**Michael Rappa, Distinguished University Professor**  
**PhD, University of Minnesota, 1987**

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

**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**

Architecture and operating systems, cyber security, networking and performance evaluation

**David Roberts, Associate Professor**  
**PhD, Georgia Institute of Technology, 2010**

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

**Gregg Rothermel, Professor and Department Head**  
**PhD, Clemson University, 1985**

Software engineering and program analysis with emphases on the application of techniques to problems in software maintenance and testing, end-user software engineering, and empirical studies.

**George N. Rouskas, Alumni Distinguished Graduate Professor**  
**PhD, Georgia Institute of Technology, 1994**

Network architectures and protocols, optical networks, grid computing

**Nagiza Samatova, Professor**  
**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 University, 2015**

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

**Don Sheehy, Associate Professor**  
**PhD, Carnegie Mellon University, 2011**

Computational geometry and topological data analysis

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

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

**Munindar Singh, Alumni Distinguished Graduate Professor**  
**PhD, University of Texas, 1993**

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

**Matthias Stallmann, Professor**  
**PhD, University of Colorado, 1982**

Algorithm design and analysis of serial and parallel models of computation

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

Program analysis, empirical software engineering and crowdsourcing

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

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

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

Advanced data sciences, geospatial analytics

**Mladen Vouk, Distinguished 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, Distinguished Professor**  
**PhD, University of Utah, 2000**

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

**Ruozhou Yu, Assistant Professor**  
**PhD, Arizona State University, 2019**

Computer networks, distributed systems, and cybersecurity

## Teaching Professors

**Bitu Akram, Teaching Assistant Professor**  
**PhD, NC State University, 2019**

Advanced learning technologies, and improving access and quality of computer science education

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

Graphics, human computer interaction

**Lina Battestilli, Teaching Associate Professor**  
**PhD, NC State University, 2005**

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

**Ignacio Domínguez, Teaching Assistant Professor**  
**PhD, NC State University, 2018**

Human behavior in video games and virtual environments that can be used to identify, predict, and influence behavior and decision-making

**Sarah Heckman, Alumni Distinguished Undergraduate Professor**  
**PhD, NC State University, 2009**

Computer science and software engineering education, open educational resources

**Jamie Jennings, Teaching Assistant Professor**  
**PhD, Cornell University, 1995**

Theory, programming languages, software engineering, robotics, and artificial intelligence

**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 intelligence





## 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
- **Cyber Security** including Information Assurance, Privacy, Policies, Regularity Compliance, Networking and Performance Evaluation, Web Security, Mobile Security, Crypto, Internet of Things
- **Networks** including Software and Network Systems Security, Performance Analysis, Wireless and Mobile Networking, Network Analytics, Internet of Things, Internet Architecture and Protocols
- **Software Engineering** including Requirements, Formal Methods, Policies, Reliability Engineering, Process and Methods, Programming Languages, Testing and Verification
- **Systems** including 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.*



**NC STATE** Engineering

**Department of Computer Science**  
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