Associate Professor, Dr. James Lester is pictured with Crystal Island, an adventure-style video game being developed at NC State. Crystal Island leverages artificial intelligence and commercial game technologies to create engaging interactive learning experiences. The game targets 8th graders studying microbiology and features a science mystery in which the student plays a detective tracking down the source of a disease.

Lester has been awarded more than $4M in National Science Foundation grants to study intelligent game-based learning environments for elementary and middle school students. Crystal Island is a collaborative project between NC State’s Department of Computer Science and the College of Education.

Research Highlights

The NC State University Department of Computer Science, which celebrated its 40th year in the fall of 2007, is proud to be one of the oldest and largest computer science departments in the nation. Fueled by an expansive growth of our graduate program and research efforts, as well as our recent move to NC State’s award-winning Centennial Campus, our department consistently ranks among the leading producers of the computer science talent and innovation that fuels an economic engine anchored in the Research Triangle Park and extending across the globe.

2007–08 was a truly historic year in the life of our department. During the fall of 2007, the department held a number of events in celebration of its 40th year, anchored by a Technical Symposium featuring Steve Wozniak, Al Aho, Dorothy Strickland and Larry Hodges. Work did not stop during this period of celebration, as our faculty and students excelled winning numerous prestigious awards and recognitions, our graduate program experienced continued growth, we added new academic concentrations and centers, and our research funding grew significantly.

Our research productivity reached a new level over the last year. Our research expenditures exceeded $8M and we now have more than $28M in active research grants. We also received over $7.5M in in-kind donations during the year. Our research interests range from theory and algorithms, bioinformatics, high-performance and power-aware systems, to artificial intelligence, graphics and visualization, networks, security, software engineering, and computer-based education. A list of select representative research projects is provided within this document.
I would like to thank all who have contributed to our success during the last year, and during our first 40 years.

Mladen Vouk
Professor and Department Head
Selected Research Projects

Complete list with abstracts is at
http://www.csc.ncsu.edu/research/


NOAA Interdisciplinary Scientific Environmental Technology (ISET) Cooperative Research and Education Center, Vince Freeh (Co-PI), Fredrick Semazzi (PI), Lian Xie, Jingpu Liu. NC A&T University via National Oceanic & Atmospheric Administration ($978,528, 9/1/2006–8/31/2011)


NeTS-NBD: Measurement-Based Mobility Modeling for MANETs, Mihail Sichitiu (ECE), Injong Rhee. NSF ($484,827, 8/15/2006–7/31/2009)

CAREER: Trust and Privacy Management for Online Social Networks, Ting Yu. NSF ($450,000, 8/1/2008–7/31/2013)


Research Faculty (cont.)

Thomas L. Honeycutt, Associate Professor
PhD, North Carolina State University, 1969
Management information systems, computer modeling and simulation, computer literacy

S. Purushothaman Iyer, Professor
PhD, University of Utah, 1986
Programming and specification languages; software model-checking, probabilistic models of concurrency

Xuxian Jiang, Assistant Professor
PhD, Purdue University, 2006
Virtual machines and security

James C. Lester, Associate Professor
PhD, University of Texas, 1994
Artificial intelligence, intelligent user interfaces, intelligent tutoring systems, computational linguistics

Xiaosong Ma, Assistant Professor (joint appointment with ORNL), PhD, University of Illinois, 2003
High performance computing, parallel I/O, storage systems, scientific data management

Frank Mueller, Associate Professor
PhD, Florida State University, 1994
Compilers and code optimization, concurrent and distributed, real-time and embedded systems

Peng Ning, Associate Professor
PhD, George Mason University, 2001
Computer and network security: new techniques for building trustworthy systems and wireless security

Harry Perros, Alumni Distinguished Graduate Professor, PhD, Trinity College, Ireland, 1975
Performance analysis of optical networks, performance monitoring of grids, queuing networks

Douglas S. Reeves, Professor
PhD, The Pennsylvania State University, 1987
Network security, peer-to-peer computing and overlay networks, real-time communication

Injong Rhee, Associate Professor
PhD, UNC Chapel Hill, 1994
Computer/wireless/sensor networks, multimedia networking, distributed systems, operating systems

Robert D. Rodman, Professor
PhD, University of California, Los Angeles, 1973
Spoken natural language dialogue and voice I/O systems, applying AI to error recovery in speech recognition

George N. Roukas, Professor
PhD, Georgia Institute of Technology, 1994
Network architectures and protocols, optical networks, grid computing, scheduling

Nagiza Samatova, Associate Professor (joint appointment with ORNL), PhD, Russian Acad. of Sci. (CCAS), 1993
Graph theory & algorithms, bioinformatics, systems biology, data management, data integration

Carla D. Savage, Professor
PhD, Georgia Institute of Technology, 1994
Computer/wireless sensor networks, multimedia networking, distributed systems, operating systems

Robert T. Amant, Associate Professor
PhD, University of Texas, 1993
Multiagent systems, intelligent agents, agent communication languages and protocols

Robert St. Amant, Associate Professor
PhD, University of Massachusetts, Amherst, 1996
Human-computer interaction, artificial intelligence, intelligent user interfaces, statistical expert systems
Research Faculty (cont.)

Matthias Stallmann, Professor
PhD, University of Colorado, 1982
Algorithm design and analysis of both serial and parallel models of computation

William J. Stewart, Professor
PhD, Queen's University, Northern Ireland, 1974
Performance evaluation of computer sys., approximate and numerical solution techniques for analysis

Alan L. Tharp, Professor
PhD, Northwestern University, 1969
File and data structures, man-machine interfaces, database management systems

David Thuente, Professor
PhD, University of Kansas, 1974
Communication system design, simulation, performance modeling, media access control protocol

Mladen Vouk, Professor
PhD, King’s College, England, U.K., 1976
Software engineering, scientific computing, computer-based education, high-perf. networks.

Benjamin Watson, Associate Professor
PhD, Georgia Institute of Technology, 1997
Relationships between computer graphics and design

Laurie Williams, Associate Professor
PhD, University of Utah, 2000
Agile software development methodologies and practices, collaborative/pair programming

Tao Xie, Assistant Professor
PhD, University of Washington, 2005
Automated software testing and verification, mining software engineering data

R. Michael Young, Associate Professor
PhD, University of Pittsburgh, 1997
AI: planning & plan recognition, natural language processing, development of computational models

Ting Yu, Assistant Professor
PhD, University of Illinois, 2003
Security, trust management and privacy protection in open systems, semi-structured databases

Emeritus Faculty

Wushow Chou, Professor Emeritus
PhD, University of California - Berkeley, 1968

Robert E. Funderlic, Professor Emeritus
PhD, University of Tennessee, 1970

David F. McAllister, Professor Emeritus
PhD, UNC Chapel Hill, 1972

Woodrow Robbins, Professor Emeritus
PhD, Syracuse University, 1971

Senior Faculty Profiles

Dr. Douglas S. Reeves received his BA in Biology from Indiana University; his MS in Computer Science/Engineering from the University of Louisville; and his PhD in Computer Science from The Pennsylvania State University in 1987. He joined the department in 1987 and currently serves as Professor of Computer Science and Electrical & Computer Engineering. Dr. Reeves is a contributing faculty member of several high-profile centers and labs on campus including the Center for Advanced Computing and Communication, the Center for Open Software Engineering, and the Cyber Defense Lab. His research interests include computer and network security, peer-to-peer computing and overlay networks, real-time communication and quality of service in networks, and network services including voice. During his academic and professional career, he has received many honors including the General Electric Doctoral Fellowship in 1985, an Undergraduate Teaching Award for the Department of Computer Science in 1988, and the Professional Engineer of the Year Award by the Department of Computer Engineering and Computer Science from the Speed Scientific School at the University of Louisville in 2003. Dr. Reeves has served as a consultant for a number of companies, and has been a member of the editorial boards of the International Journal of Information and Computer Security and the Telecommunications Systems Journal since 2005. He currently serves as the chair of the University Library Committee, which is actively involved in planning for the addition of The James B. Hunt Library, scheduled to open in 2013 on the Centennial Campus. To date, Dr. Reeves is the author/co-author of over 40 research papers, and has received over $4.7M in research funding. His most recent project, the "modus operandi project" is concerned with computing the similarity between two pieces of software. The major application is identification of metamorphic and polymorphic malware.

Dr. David J. Thuente received his PhD from the University of Kansas, and he currently serves as Director of Graduate Programs and Professor of Computer Science at NC State University. He is also Professor Emeritus, Purdue University and was a Director of Graduate Programs for the Purdue Graduate School. Dr. Thuente has extensive experience in both industrial and academic computing. He is the author/co-author of over 50 refereed journal and conference publications, another 20 workshop and professional publications (most refereed), over 30 industrial white papers and consulting reports, and has over 100 professional presentations at universities, industries and conferences nationally and internationally. Dr. Thuente has produced a seminal line-search algorithm that is the critical component of many optimization algorithms. He has also done benchmark research on protocols for low-bandwidth military communications and is currently working on protocol aware denial-of-service for wireless communications. He has held research positions at Argonne National Laboratory, Mitre Corporation, Magnavox Electronic Systems Company, Hughes Defense Communications Company, and Raytheon Systems Company. He has also been a consultant for Lockheed Corp., General Electric, OPNET and Northrop Grumman. Since 1985 Dr. Thuente has received over $2M in research and development grants and an additional $24M in other funding supporting teaching and research. Since Dr. Thuente became Director of Graduate Programs at NC State in 2003, the graduate program has grown by almost 60 percent to nearly 500 students. More impressive, the PhD enrollment has grown from 47 to 174 students, representing an astounding 270 percent growth. Under Dr. Thuente’s leadership, the NC State graduate program now ranks in the top ten public universities in the country in terms of graduating both Master’s and PhD students.

New Faculty Profiles

Dr. Xuxian Jiang joined the faculty in August, 2008. Dr. Jiang received his PhD from Purdue University in 2006, and was formerly an assistant professor at George Mason University in Fairfax, VA. His research interests are in virtual machines (VMs) and security.

Contributions from Fay Ward and Roger Winstead
Edited by Tammy Coates and Ken Tate
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