

**THE
DEPARTMENT
OF COMPUTER
SCIENCE**

**DEPARTMENTAL REPORT
JULY 2019**



DEPARTMENT OF COMPUTER SCIENCE

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MESSAGE FROM THE CHAIR

SANJEEV SETIA

This is an exciting time for the CS department at Mason. Recognizing the importance of the field of computing to the economic vitality of the region, the state of Virginia has made an unprecedented commitment to invest in CS education in state universities over the next decade. Indeed, this investment by the state was a key factor in Amazon's decision to select Northern Virginia for its HQ2.

Partly in response to Amazon's HQ2 decision and the forthcoming investment from the state, Mason has announced the creation of a School of Computing (SoC) as well as the Institute for Digital Innovation (IDIA). This report contains an article on these initiatives, which promise to significantly elevate the profile of computing at Mason. The faculty of the CS department are looking forward to playing a key role in both the SoC as well as IDIA.

Nationwide, the last decade has seen an explosion of interest in computing. At Mason, the number of undergraduate students enrolled in computer science has quadrupled since 2011. Notably the increase in our student numbers has not come at the expense of academic quality; our incoming freshmen class continues to increase both in size and quality (as reflected in the high school GPAs and SAT scores of the incoming students).

In response, we have added several new faculty members. Since the last edition of this departmental report, we have six new tenure-track faculty members – Foteini Baldimtsi, Jonathan Bell, Yue Cheng, Eric Osterweil, Parth Pathak, and Craig Yu and six teaching track faculty members – Kevin Andrea, Ivan Avramovic, Ping Deng, Socrates Dimitriadis, Michael Neary, and Shvetha Soundararajan. You can learn about these outstanding faculty members in the report's Faculty Profiles section.

Over the last three years, several faculty received national and university awards for excellence in teaching and research. Jonathan Bell and Thomas LaToza received

NSF CAREER awards, bringing to fourteen the number of Career and Young Investigator awards by our faculty. Danny Menasce (2017) and Jeff Offutt (2019) received the statewide Outstanding Faculty award for excellence in research, teaching, knowledge integration, and public service from the State Council of Higher Education of Virginia (SCHEV).

The Department has also maintained its recent tradition of having at least one of its faculty win a Mason Teaching Excellence award every year. Recent awardees include Yotam Gingold (2017), Amarda Shehu (2018), and Paul Ammann (2019). Ten CS faculty have won this award over the last eight years demonstrating the department's good fortune in being able to recruit outstanding faculty as well as a department-wide commitment to teaching excellence.

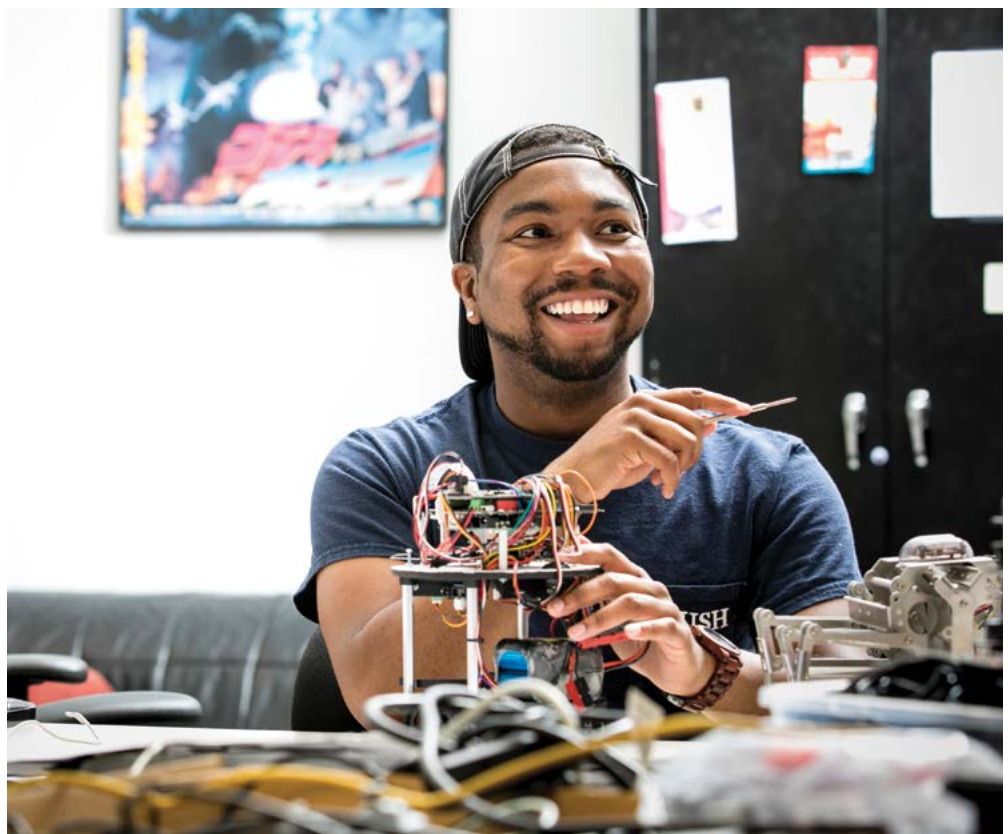
The department is equally committed to excellence in research. The department's research expenditures have more than doubled over the last five years, exceeding \$14M for FY2019. This report contains articles on Duminda Wijesekera's research on autonomous vehicles and a new NSF REU (Research Experience for Undergraduates) site on big data research established by Huzefa Rangwala and Mark Snyder. Last, but not least, the report includes profiles of three of our outstanding alumni – Zachary Ferguson (BS, 2017), Laurel Fielding (MS, 2007), and An Wang (PhD, 2018).

I invite you to read this departmental report for more information about our faculty, our academic programs, and the exciting ongoing research in the Computer science department at George Mason University.



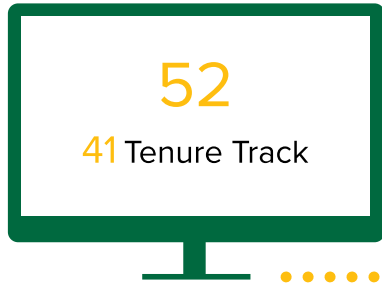
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FAST FACTS ABOUT CS@GMU

FACULTY



FY18 Research EXPENDITURES

\$8.3M



Grants with PI
in CS Department

\$7.8M



Grants with PI
in other Mason units

BS in Computer Science, BS in Applied Computer Science with concentrations in Bioinformatics, Computer Game Design, Geography, & Software Engineering

MS in Computer Science, MS in Information Systems, MS in Information Security, MS in Software Engineering

PhD in Computer Science



PROGRAMS

Faculty AWARDS



- 14 NSF Career Awards
- 1 AFOSR Young Investigator Award
- 2 ACM Fellows
- 4 IEEE Fellows
- 1 IAPR fellow
- 11 Mason Teaching Excellence Award Winners
- 2 SCHEV Outstanding Faculty Award Winners

Students



1782
Undergraduates



348
Masters



145
PhD



DEGREES Conferred

2017-18: 250 Undergrad, MS 123, PhD 16



10 WEEKS TRANSFORMS 10 STUDENTS

It's not long after the last of George Mason University's undergrads clear out of their dorms before the summer campus activities begin. This includes a special cohort of ten undergraduate students who have been accepted into a competitive Research Experience for Undergraduate (REU) program on Data Mining.

The REU program is sponsored by the National Science Foundation. NSF says, "The projects involve students in meaningful ways in ongoing research programs or in research projects specifically designed for the REU program." Students receive a stipend, as well as room and board.

The George Mason University Educational Data Mining program is run by professors Huzefa Rangwala and Mark Snyder, with support from various graduate students and faculty in the department and across the university and the Office of Student Scholarship (OSCAR).

"There are dozens of REU programs around the country, but Mason didn't have one," says Rangwala. "We felt the Department of Computer Science would be an ideal place to host one." George Mason University's location outside of Washington, DC, its campus facilities, and reputation of its CS Department, were ideal for the program.

"This summer will be our second of three years," says Snyder. "Students are working with educational data mining sets and looking at MOOCs, demographics, the use of videos, assessments, and chat functions."

Students apply from all over the country. Last year students came from Texas, Colorado, and Arizona. "It's competitive," says Snyder. "We receive between 150-175 applications and can only accept ten students. We work to have a gender and diversity balance."

In addition to doing original research, students learn how to research. The program goes fast, and starts with two weeks of training tutorials. Students read and evaluate papers, work with mentors, and learn "that even failing in a research project is progress," says Rangwala.

Snyder explains that the research findings are exciting and advance the educational and computing disciplines. The knowledge students gain is where the program shows its value. In the past year, two academic papers related to the research have been published.

A student from last summer says, "I've learned some things about myself, like what strategies work best for me to manage my time, the importance of setting smaller goals for myself to accomplish, and what motivates me to pursue my academic/career goals when grades are not relevant. I've learned that it's not always clear which direction you should take a research project next, and that there are more subjective decisions that must be made than one may expect."

Rangwala and Snyder are also learning. Both professors teach full CS course loads during the year, and are dedicated to students and teaching. They feel students need more interactive opportunities and skills to find mentors and learn to apply their classroom studies to real research. This isn't easy in an undergrad culture that focuses on grades and output. They are quick to say, "This is not a class." However, they will be making course-like adjustments this year with evaluations and how they structure the schedule. While students will not be graded, they will be working in a more familiar environment. The change will become part of their internal learning data, and may result in more changes next year.

"It's gratifying to see how students' mentality change from the start to the finish of the program," says Snyder. "Their idea of research changes, and they learn how to collaborate and present their findings in a real environment." ■

DISTINGUISHED LECTURE SERIES

Each year the Department of Computer Science hosts its Distinguished Lecture Series to feature notable and engaging computer scientists to come and share their research with the Mason community.

2015-2016

Henrik Christensen, 10/30/15
Georgia Institute of Technology
2D and 3D Model Based Visual Tracking

Carla Brodley, 11/11/15
Northeastern University
Challenges and Opportunities of Applied Machine Learning

Bruce Maggs, 2/24/16
Duke University
The Internet at the Speed of Light

Christos Faloutsos, 3/25/16
Carnegie Mellon University
Mining Large Graphs: Patterns, Anomalies and Fraud Detection

Maneesh Agrawala, 4/29/16
University of California, Berkeley
Storytelling Tools

2016-2017

Scott Klemmer, 10/3/16
University of California, San Diego
Design at Large

Adam Porter, 10/28/16
University of Maryland
Model Testing of Complex Systems- Some Challenges and Future Directions

Hugo Krawczyk, 12/5/16
IBM Research
Password (In)Security-You and Zuckerberg on the Same Sinking Ship

Phil Levis, 2/13/17
Stanford University
Securing the Internet of Things

Prem Devanbu, 4/24/17
University of California, Davis
On the Exploitation of Nature Software

2017-2018

Aidong Zhang, 9/25/17
SUNY Buffalo & NSF
Data Driven Self-Learning for Knowledge Discovery

James Kurose, 10/23/17
National Science Foundation
An Expanding and Expansive View of Computing

Hadas Kress-Gazit, 11/10/17
Cornell University
Synthesis for Robots: Guarantees and Feedback for Complex Behaviors

Xiaodang Zhang, 12/1/17
Ohio State University
Fast Data Accesses in Both Memory and Disks in Large Clusters

Nancy Amato, 2/26/18
Texas A&M University
Sampling-Based Motion Planning: From Intelligent CAD to Crowd Simulation to Protein Folding

Ming Lin, 3/5/18
University of North Carolina, Chapel Hill
Reconstructing Reality: From Physical World to Virtual Environments

Ari Juels, 3/30/18
Cornell Tech
Smart Contracts and Bug Bounties

Klara Nahrstedt, 4/6/18
University of Illinois at Urbana-Champaign
Toward Multi-view Live 360 Video Broadcasting

Prem Devanbu, 4/23/18
University of California, Davis
Studying and Exploiting the "Naturalness" of Code

2018-2019

Tarek F. Abdelzaher, 9/7/18
University of Illinois at Urbana-Champaign
Deep Learning for IoT Systems

Adam Smith, 9/21/18
Boston University
Privacy, Stability and Generalization

Romit Roy Choudhury, 10/5/18
University of Illinois at Urbana-Champaign
The Internet of Acoustic Things (IoT)

Ling Liu, 10/22/18
Georgia Institute of Technology
Trust and Privacy of Deep Learning in Adversarial Settings

Ricardo Baeza-Yates, 11/9/18
CTO of NTENT & Northeastern
Explainable AI

Ming Lin, 11/26/18
University of Maryland
Reconstructing Reality: From Physical World to Virtual Environments

Mihai Pop, 11/30/18
University of Maryland
From Clustering to Variant Discovery: Algorithmic Opportunities in Microbiome Research

Tao Xie, 2/8/19
University of Illinois at Urbana-Champaign
Intelligent Software Engineering: Synergy between AI and Software Engineering

Pierre Baldi, 4/5/19
University of California Irvine
Deep Learning in the Biomedical Sciences

Mona Singh, 4/29/19
Princeton University
Deciphering cellular networks: From normal functioning to disease

PhD RECIPIENTS 2016-2019

2016

COMPUTER SCIENCE

Irina Hashmi

Probabilistic Approaches to Protein-protein Docking

Amarda Shehu, PhD, Department of Computer Science

Anveshi Charuvaka

Regularized Learning in Multiple Tasks with Relationships

Huzefa Rangwala, PhD, Department of Computer Science

Changwei Liu

A Probabilistic Logic Programming Based Model For Network Forensics

Duminda Wijesekera, PhD, Department of Computer Science

Ehsan Kourosfar

An Empirical Study of the Interplay Between Architecture and Software Quality Using Evolutionary History of the Software

Paul Ammann, PhD, Department of Computer Science

Eric Donghui Yuan

Architecture-Based Self-Protecting Software Systems

Hassan Gomaa, PhD, Department of Computer Science

Mohammad Atiqul Haque

Reliability Management Techniques For Energy-Aware Multiprocessor Real-Time Systems

Hakan Aydin, PhD, Department of Computer Science

Sharath Hiremagalore

Zero-Day Web Attack Detection Using Collaborative and Transduction-Based Anomaly Detection

Angelos Stavrou, PhD, Department of Computer Science

Suhas Singapogu

Command and Control Knowledge Discovery and Ontology Matching Using XML Schema

J Pullen, DSc, Department of Computer Science

Wentao Chang

Mitigating Information Leakage Threats from Browser Extensions

Songqing Chen, PhD, Department of Computer Science

INFORMATION TECHNOLOGY

Alaa Aref El Masri

Active Authentication Using Behavioral Biometrics and Machine Learning

Harry Wechsler, PhD, Department of Computer Science

Hanan Abdullah S Mengash

Decision Guided Group Package Recommender Based On Multi-Criteria Optimization and Voting

Alexander Brodsky, PhD, Department of Computer Science

Hesham Altaieb

Market-Based Decision Guidance Framework for Power and Alternative Energy Collaboration

Alexander Brodsky, PhD, Department of Computer Science

Jing Guan

A Model-Based Testing Technique for Component-Based Real-Time Embedded Systems

Jeff Offutt, PhD, Department of Computer Science

Riyadh Mahmood

An Evolutionary Approach for System Testing of Android Applications

Sam Malek, PhD, Department of Computer Science

Sean Palka

Automated Test Case Generator for Phishing Prevention Using Generative Grammars and Discriminative Methods

Damon McCoy, PhD, Department of Computer Science

Thabet Kacem

Secure ADS-B

Duminda Wijesekera, PhD, Department of Computer Science

2017

COMPUTER SCIENCE

Ajay Nagarajan

Realizing Cyber Resilience with Hybrid Intrusion Tolerance Architectures

Arun Sood, PhD, Department of Computer Science

Azad Naik

Hierarchical Classification with Rare Categories and Inconsistencies

Huzefa Rangwala, PhD, Department of Computer Science

Evan Behar

Dynamic Minkowski Sum Operations

Jyh-Ming Lien, PhD, Department of Computer Science

Gene Shuman

Using Myoelectric Signals to Classify Prehensile Patterns

Zoran Duric, PhD, Department of Computer Science

Huangxin Wang

Effective and Economical Moving Target Defense for Secure Cloud Computing

Fei Li, PhD, Department of Computer Science

Mansour Mustafa Abdulaziz

Data Collection Techniques Using Multi-Channel Network Coding in Low-Power and Lossy Networks

Robert Simon, PhD, Department of Computer Science

Maryam Bandari

Energy Management in Performance-Sensitive Wireless Sensor Networks

Robert Simon, PhD, Department of Computer Science

Nariman Mirzaei Alvari

Automated Input Generation Techniques for Testing Android Applications

Paul Ammann, PhD, Department of Computer Science

Zhonghua Xi

Making Shapes Foldable

Jyh-Ming Lien, PhD, Department of Computer Science

Anthony Melaragno

Secure Broadcast for Vehicular Communications

Duminda Wijesekera, PhD, Department of Computer Science

Charles Smutz

Countering Malicious Documents and Adversarial Learning

Angelos Stavrou, PhD, Department of Computer Science

Emad Yousif Albassam

A Model-Based Approach for Self-Configuration and Self-Healing in Component-Based Software Systems

Hassan Gomaa, PhD, Department of Computer Science

James Pope

A Control Plane for Low Power, Lossy Networks

Robert Simon, PhD, Department of Computer Science

K.R Damindra Savithri Bandara

Secure Intelligent Radio for Trains

Duminda Wijesekera, PhD, Department of Computer Science

Kamaleldin Mustafa Mohamed

A Secure Lightweight Framework for Hosting and Consuming Web Services in Smart Mobile

Duminda Wijesekera, PhD, Department of Computer Science

Mahmoud Awad

Dynamic Derivation of Analytical Performance Models in Automatic Systems
Daniel Menasce, PhD, Department of Computer Science

Mohammad Karami

Understanding and Undermining the Business of DDOS Booter Services
Jim Chen, PhD, Department of Computer Science & Damon McCoy, PhD

INFORMATION TECHNOLOGY**Noha M. A. Hazzazi**

Automating the Verification of Blood Safety Workflow
Duminda Wijesekera, PhD, Department of Computer Science

Upsorn Praphamontriphong

Testing Web Applications with Mutation Analysis
Jeff Offutt, PhD, Department of Computer Science

Vasilios Tzeremes

End User Software Product Line Support for Smart Spaces
Hassan Gomaa, PhD, Department of Computer Science

2018**COMPUTER SCIENCE****Wentao Chang**

Protecting Data Security and User Privacy in Browser Extension Environments
Songqing Chen, PhD

Hachim El Khiyari

Biometric Interoperability and Face Authentication Across Time Lapse
Harry Wechsler, PhD

Yun Guo

Automatically Localizing and Repairing SQL Faults
Ami Motro, PhD

Rohan Khade

A Framework for Finding Patterns in Mixed and Streaming Data
Jessica Lin, PhD

Songrun Liu

Open Up New Possibilities of Linear Blend Skinning
Yotam Gingold, PhD

Arsalan Mousavian

Semantic and 3D Understanding of a Scene for Robot Perception
Jana Košecká, PhD

Md. Alimoor Reza

Parsing Indoor Scenes with RGB-D Images and Videos
Jana Košecká, PhD

Andeep Singh Toor

Collaborative Context-Aware Visual Question Answering
Harry Wechsler, PhD

An Wang

Elastic and Adaptive SDN-based Defense in Cloud Computing with Programmable Measurement
Songqing Chen, PhD

Ermo Wei

Learning to Cooperate via Reinforcement Learning
Sean Luke, PhD

Drew Wicke

Bounty Hunting: A Dynamic Multiagent Task Allocation Mechanism
Sean Luke, PhD

Mengbai Xiao

Improving Resource Utilization for Internet Mobile Streaming Services
Songqing Chen, PhD

INFORMATION TECHNOLOGY**Jason Porter**

Decentralized Runtime Architecture Discovery and Testbed for Adaptation and Failure Recovery of Large Dynamic Distributed Systems
Daniel Menasce, PhD and Hassan Gomaa, PhD, Information Technology

Michael Reep

Legal Ontologies for Protecting Genetic Privacy in EHR Systems and their Enforcements Mechanisms
Duminda Wijesekera, PhD, Information Technology

Eniye Tebekaemi

An Integrated Cyber-Physical Security Model For A Decentralized and Autonomous Smart Power Grid
Duminda Wijesekera, PhD, Information Technology

2019**COMPUTER SCIENCE****Indranil Banerjee**

Problems on Sorting, Sets and Graphs
Dana Richards, PhD

Arda Gumusalan

Dynamic Modulation Scaling Enabled Real Time Transmission Scheduling For Wireless Sensor Networks
Robert Simon, PhD

Yun Guo

Towards Automatically Localizing and Repairing SQL Faults
Jeff Offut, PhD & Amihai Motro, PhD

Mohan Krishnamoorthy

Stochastic Optimization based on White-box Deterministic Approximations: Models, Algorithms and Application to Service Networks
Alexander Brodsky, PhD & Daniel Menascé, PhD

Arsalan Mousavian

Semantic and 3D Understanding of a Scene for Robot Perception
Jana Kosecka, PhD

Zhiyun Ren

Academic Performance Prediction with Machine Learning Techniques
Huzefa Rangwala, PhD

Md A. Reza

Scene Understanding for Robotic Applications
Jana Kosecka, PhD

Venkateshwar Tadakamalla

Analysis and Autonomic Elasticity Control for Multi-Server/Queues Under Traffic Surges in Cloud Environments
Daniel A. Menascé, PhD

Jianchao Tan

Image and Video Decomposition and Editing
Yotam Gingold, PhD

Haoliang Wang

Analysis of All-to-One and All-to-All Communications in Massively Scaled Wireless Sensor Networks
Robert Simon, PhD

Ermo Wei

Learning to Play Cooperative Games via Reinforcement Learning
Sean Luke, PhD

Qi Xing

Data-Driven Biomedical Analysis, Modeling and Validation
Qi Wei, PhD, Department of Bioengineering

Chaitanya Yavvari

Using Vehicular Dynamics to Enhance Safety and Security in Connected Autonomous Vehicles
Duminda Wijesekera, PhD & Zoran Duric PhDScience

INFORMATION TECHNOLOGY**Noor Bajunaid**

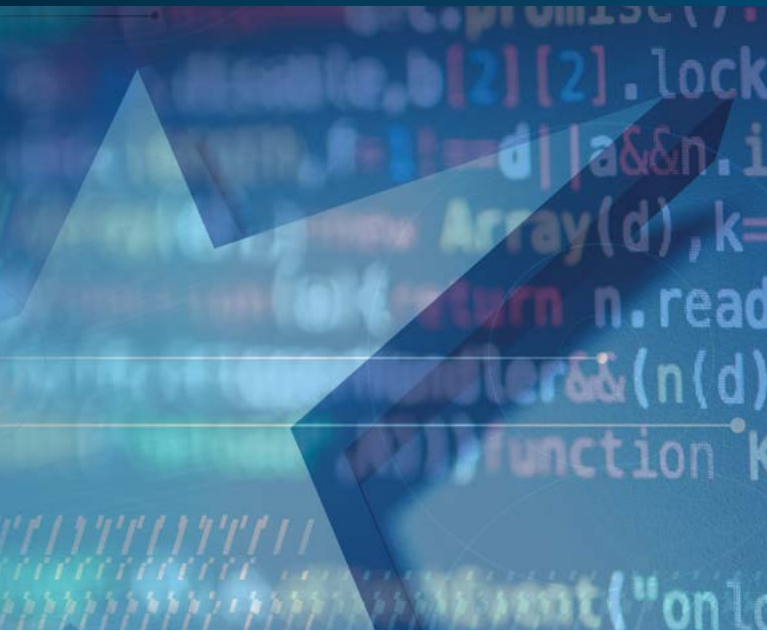
Modeling and Optimization of Performance and Reliability of Distributed Autonomic Systems
Daniel Menasce, PhD

Robert Kurtz

Improving Mutation Testing with Dominator Mutants
Paul Ammann, PhD

Mohammad Rezaeirad

Methods for reducing threat intelligence pollution: An Empirical Study on Remote Access Trojan Ecosystem
Damon McCoy, PhD



EIGHT YEARS OF AWARD-WINNING CS FACULTY

The Department of Computer Science is serious about CS education. With an enrollment boom that shows no sign of slowing, our department's commitment to teaching excellence continues to be our number one priority.

Our approach to teaching has changed as well. Gone are the days of traditional classroom lectures. Our faculty recognize our students have different learning styles and expectations.

Our department recently finished a three-year \$900K Google Computer Science Capacity Award Grant to develop new CS teaching methods. The program, SPARC, tested self-paced learning styles in introductory CS classes.

We have also completed our second year of a National Science Foundation (NSF) Research Experience for Undergraduates program (REU.) The program's goal is to teach research methodology in a non-competitive learning environment.

These programs, along with dozens of student-centered faculty-sponsored research initiatives, build a sense of community from the first CS class a student takes to the moment of graduation.

It starts and grows with our faculty who for the past eight years have earned the highest awards from the University and the State of Virginia.

"The department of Computer Science is one of those departments in which faculty excel at both missions of teaching/mentoring and research/scholarship," says Kimberly Eby, George Mason University Associate Provost of Faculty Affairs and Development.

"Their faculty have won at least one of the university Teaching Excellence Awards every single year since 2012. They are also well represented in the list of recipients of our Office of Student Scholarship, Creative Activities, and Research (OSCAR) Mentoring Excellence Awards. With

respect to their research and scholarship, their faculty continue to engage in cutting-edge research, breaking new ground within the discipline and in collaboration with faculty from other disciplines. The innovation, creative approaches, and commitment to excellence that these faculty bring to all aspects of their work is truly remarkable. I have been grateful to the leadership of the department for fostering a culture where faculty clearly thrive."

This year, Paul Ammann received one of the university's awards for **Teaching Excellence**.

The Teaching Excellence Awards are both institutional recognition and monetary acknowledgment of the significant work that faculty members devote to course planning and preparation; curriculum development; and innovative teaching, advising, and undergraduate and graduate mentoring.

Paul Amman works with students to produce ShowMe videos, where he and the students work in an online conversation to solve a problem. He said, "I want the ShowMe videos to serve as online versions of class lectures that students can look at outside of the class meeting, thereby letting me 'flip' the classroom time for focus on exercises."

The 2019 Commonwealth of Virginia, State Council of Higher Education **Outstanding Faculty Award** was given to Jeff Offutt.

The Award recognizes and rewards excellence in teaching, research and scholarship, and public service among Virginia institutions, and is the highest honor presented to college and university faculty in the state of Virginia.

PAST OUTSTANDING TEACHER AWARD WINNERS

Amarda Shehu 2018

Yotam Gingold, Chris Kaufmann 2017

Kinga Dobolyi, Mark Snyder 2016

Sean Luke 2015

Huzefa Rangwala 2014

Jeff Offutt 2013

Tamara Maddox 2012

Peter Blake, director of SCHEV said, "We are fortunate that Virginia is home to one of the world's great systems of higher education, The Outstanding Faculty Awards recognize faculty members who have dedicated their lives to research, teaching and mentorship. Their work improves the lives of everyone in the Commonwealth."

In 2017, Daniel A. Menascé received this honor. He said, "Most importantly, what I try to do with my students is tell them they need to learn how to learn," he said. "You need to keep learning after you graduate. That is what is going to allow you to be a successful professional." ■



WHEN AN AWARD-WINNING PROFESSOR WINS AN AWARD

Commonwealth of Virginia, State Council of Higher Education Outstanding Faculty Award

Jeff Offutt is no stranger to accolades. He is a past recipient of the University Outstanding Teacher Award and this year received a department faculty award. But for this dedicated researcher and instructor, the SCHEV award, in his own words, was a "thrill and an honor."

When asked about the importance of teaching he said, "I love I can make a meaningful, long-term, positive impact. College is hard, and when I can help students succeed, and plant seeds that become time bombs that go off years or decades in the future, I am inspired to work harder because my work matters. Research is rarely big or loud, but creates ripples and currents that have effects over many years. I've had

students from years past tell me they used something I taught, or something I invented, to make better software with less effort. These things are incredibly fulfilling to me."

Offutt is quick to point out that he's not the first to win this award, and the entire CS faculty is worthy of praise. He said, "Computer science is in great demand right now, and George Mason is ideally positioned to help our region grow. This award emphasizes that the entire department is ready and excited to contribute."

The Outstanding Teaching Award recognizes his years of teaching at George Mason University, contributions to his field, and the example and mentoring he provides to junior faculty and the next generation of CS graduates - both undergraduate and graduate alike.



Jan M. Allbeck
Associate Professor
*PhD Computer and Information
Science, University of
Pennsylvania, 2009*

Jan Allbeck is currently the Associate Dean of the Honors College. She has taught at George Mason University since 2009. She has explored many aspects of computer graphics, but is most drawn to research at the crossroads of animation, artificial intelligence, and psychology in the simulation of virtual humans.

Selected Publications

1. Pelechano, Nuria, Jan Allbeck, Mubbasir Kapadia, and Norman I. Badler. *Simulating Heterogeneous Crowds with Interactive Behaviors*. CRC Press. Taylor and Francis Group. Sept. 2016.
2. Balint, Timothy J. and Jan M. Allbeck. "ALET: Agents Learning their Environment through Text." *Computer Animation and Virtual Worlds*. 28 (3-4), 2017.
3. Balint, Timothy J., Jan M. Allbeck, and Rafael Bidarra. "Understanding Everything NPCs Can Do." in *Proceedings of FDG, Malmo*, Sweden, Aug. 7-10, 2018.
4. Kapadia, Mubbasir, Nuria Pelechano, Jan Allbeck and Norman I. Badler. "Virtual Crowds: Steps Toward Behavioral Realism." *Synthesis Lectures on Visual Computing*. Morgan and Claypool Publishers. Nov. 2015.



Paul Ammann
Associate Professor
*PhD Computer Science,
University of Virginia, 1988*

Paul Ammann has taught at George Mason University since 1989. His areas of interest and expertise are software testing and secure information systems. He received the Volgenau School Outstanding Teaching Award in 2007.

Selected Publications

1. Ammann, Paul, and Jeff Offutt. *Introduction to Software Testing*, 2nd edition. Cambridge, UK. Cambridge University Press 2017
2. Just, René, Bob Kurtz, Paul Ammann. "Inferring Mutant Utility from Program Context." *ACM SIGSOFT International Symposium on Software Testing and Analysis*, 2017.
3. Kurtz, Bob et al. "Analyzing the Validity of Selective Mutation with Dominator Mutants." *ACM SIGSOFT International Symposium on Foundations of Software Engineering*, 2016.
4. Ammann, Paul, Marcio Eduardo Delamaro, Jeff Offutt. "Establishing Theoretical Minimal Sets of Mutants." *IEEE International Conference on Software Testing, Verification and Validation*, 2014.



Kevin Andrea
Instructor
*MS Computer Science, George
Mason University, 2014*

Kevin Andrea began teaching at George Mason University in 2017 before joining the faculty as a full-time instructor in 2018. He most recently completed a two-year position as a term research associate in support of the Center for Excellence in C4I and Cyber. Prior to joining the faculty, he served 11 years in the military, where he developed and conducted lectures and evaluation materials for training. As a PhD candidate, his research involves routing optimization and network security for Internet of Things devices. He is currently teaching low-level programming and systems programming courses.

Selected Publications

1. Andrea, K., A. Gumusalan, R. Simon, and H. Harney. "The Design and Implementation of a Multicast Address Moving Target Defensive System for Internet of Things Applications." *IEEE Military Communications Conference*, Oct. 23-25 2017, Baltimore, MD. *Best Paper
2. Andrea, K., R. Simon. "Design and Evaluation of an RPL-Based Multi-Sink Routing Protocol for Low-Power and Lossy Networks." *ACM Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems*, Nov. 2-6 2015, Cancun, Mexico.
3. Andrea, K., R. Simon, S. Luke. "Supporting Mobile Swarm Robotics in Low Power and Lossy Sensor Networks." *NATO Specialists Meeting on Swarm Centric Solution for Intelligent Sensor Networks (SET-222)*. June 7-8 2016, Rome, Italy.
4. Russell, K., M. Schader, K. Andrea, S. Luke. "Swarm Robot Foraging with Wireless Sensor Motes." *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*. May 4-8 2015, Istanbul, Turkey.



Ivan Avramovic
Instructor
*MS Computer Science, George
Mason University, 2012*

Ivan Avramovic has been a member of the Department of Computer Science as a full-time instructor since 2018, teaching programming and theory courses. He has also taught health informatics programming courses at George Mason University. Prior to academia, he worked professionally on programming and simulation projects at companies such as SAIC. His PhD research focuses on the analysis of randomized algorithms, combinatorics, and information dissemination algorithms

Selected Publications

1. Avramovic, I., D.S. Richards. "NP-Completeness of Shortest Leaf-to-Leaf Distance in a Tree." in *Proceedings of the 2019 International Conference on Computing, Networking and Communications*, Honolulu, HI, Feb. 2019.
2. Avramovic, I., D.S. Richards. "Existence of an Optimal Perpetual Gossiping Scheme for Arbitrary Networks." in *Proceedings of the 2019 Future of Information and Communication Conference (FICC)*, San Francisco, CA, Mar. 2019.
3. Avramovic, I. "Routing Sets and Hint-Based Routing." in *Proceedings of the 2019 Future of Information and Communication Conference*, San Francisco, CA, Mar. 2019.
4. Avramovic, I., D.S. Richards. "Analysis of Consensus Sorting via the Cycle Metric." in *Proceedings of the 2018 International Conference on Combinatorial Optimization and Application*, Atlanta, GA, Dec. 2018.

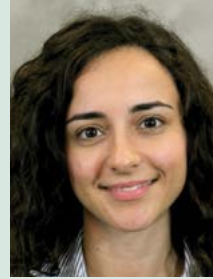


Hakan Aydin
Professor
*PhD Computer Science,
University of Pittsburgh, 2001*

Hakan Aydin has taught at George Mason University since 2001. His research interests include real-time embedded systems, low-power computing, and fault tolerance. He was a recipient of the National Science Foundation CAREER award in 2006. He has served on the program committee of various conferences. He was also the technical program committee chair of the IEEE RTAS 2011, and the general chair of the IEEE RTAS 2012 conferences. He received the Department of Computer Science Teaching Award in 2006 and 2009.

Selected Publications

1. Gumusalan, A., R. Simon, and H. Aydin. "Flexible Real-Time Transmission Scheduling for Wireless Networks with Non-Deterministic Workloads." *Ad Hoc Networks*, vol. 73, Issue C, May 2018, pp. 65-79.
2. Roy, A., H. Aydin, and D. Zhu. "Energy-Aware Standby-Sparing on Heterogeneous Multicore System." in *Proceedings of the 54th ACM/IEEE Design Automation Conference*, Austin, TX, June 2017.
3. Bandari, M., R. Simon, and H. Aydin. "DMS Based Energy Optimizations for Clustered WSNs." *ACM Transactions on Embedded Computing Systems*, vol. 16, no. 3, Article 86, Apr. 2017.
4. Haque, M.A., H. Aydin, and D. Zhu. "On Reliability Management of Energy-Aware Real-Time Systems through Task Replication." *IEEE Transactions on Parallel and Distributed Systems*, vol. 28, no. 3, Mar. 2017, pp. 813-825.



Foteini Baldimtsi
Assistant Professor
*PhD Computer Science, Brown
University, 2014*

Foteini Baldimtsi has taught at George Mason University since 2016. Her research interests are cryptography, privacy, and data security. She focuses on designing provably secure cryptographic schemes for a variety of applications such as privacy preserving identity management, secure electronic payments and private and scalable blockchain transactions. She is a recipient of an IBM faculty award and her research is supported by NSF, NSA and the Zcash Foundation.

Selected Publications

1. Baldimtsi, Foteini et al. "TumbleBit: An Untrusted Bitcoin-Compatible Anonymous Payment Hub." *24th Annual Network and Distributed System Security Symposium*, The Internet Society, 2017.
2. Baldimtsi, Foteini et al. "Efficient Accumulators with Applications to Anonymity-Preserving Revocation." *IEEE European Symposium on Security and Privacy*, 2017, pp. 301-315.
3. Baldimtsi, Foteini and Anna Lysyanskaya. "Anonymous Credentials Light." *ACM SIGSAC Conference on Computer and Communications Security, ACM-CCS*, ACM, 2013 pp. 1087-1098.
4. Hinterwalder, Gesine et al. "Efficient E-Cash in Practice: NFC-based Payments for Intelligent Transportation Systems." *Privacy Enhancing Technologies Symposium, PETS, Lecture Notes in Computer Science*, v. 7981, Springer, 2013, pp. 40-59.



Daniel Barbará
 Professor
*PhD Computer Science,
 Princeton University, 1985*

Daniel Barbará has taught at George Mason University since 1997. His areas of expertise are data mining and machine learning. He served as the program chair of the SIAM International Conference on Data Mining in 2003, and he has received numerous grants from the National Science Foundation, the Army, and other federal and state institutions.

Selected Publications

1. Elsabagh, Mohamed, Daniel Barbará, Dan Fleck, Angelos Stavrou. "On Early Detection of Application-level Resource Exhaustion and Starvation." *Journal of Systems and Software* 137, 2018, pp. 430-447.
2. Murmura, Rahul, Angelos Stavrou, Daniel Barbará, Dan Fleck. "Continuous Authentication on Mobile Devices Using Power Consumption, Touch Gestures and Physical Movement of Users." RAID 2015 in Proceedings of the 18th International Symposium on Research in Attacks, Intrusions, and Defenses – vol. 9404, pp. 405-424
3. Molloy, Kevin, M. Jennifer Van, Daniel Barbará, Amarda Shehu. "Exploring Representations of Protein Structure for Automated Remote Homology Detection and Mapping of Protein Structure Space." *BMC Bioinformatics* 15(S-8): S4 (2014).
4. Loulwah, AlSumait, Daniel Barbará, James Gentle, and Carlotta Domeniconi. "Topic Significance Ranking of LDA Generative Models." in *Proceedings of the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases*, 2010.
5. Loulwah, AlSumait, Daniel Barbará, and Carlotta Domeniconi. "The Role of Semantic History on Online Generative Topic Modeling." in *Proceedings of the Workshop on Text Mining, SIAM International Conference on Data Mining*, 2009.



Jonathan Bell
 Assistant Professor
*PhD Computer Science,
 Columbia University, 2016*

Jonathan Bell joined George Mason University in 2015. He teaches and directs research in Software Engineering and Software Systems. His research makes it easier for developers to create reliable software by improving software testing. He has published 18 peer-reviewed papers on software testing and analysis, winning two Distinguished Paper awards (VMVM at ICSE 2014 and HitoshiIO at ICPC 2016). He is also the recipient of the NSF CAREER award. He teaches courses in distributed systems, web development, program analysis and software testing.

Selected Publications

1. Hilton, M., Jonathan Bell, D. Marinov. "A Large-Scale, Longitudinal Study of Test Coverage Evolution." in *33rd IEEE/ACM International Conference on Automated Software Engineering*, 2018.
2. Bell, Jonathan et al. "Automatically Detecting Flaky Tests." in *Proceedings of the 2018 International Conference on Software Engineering*, 2018.
3. Bell, Jonathan and L. Pina. "CROCHET: Checkpoint and Rollback via Lightweight Heap Traversal on Stock JVMs." in *Proceedings of the 2018 European Conference on Object-Oriented Programming*, 2018.
4. Spahn, R. et al. "Fine-Grained Data Management Abstractions for Modern Operating Systems." in *Proceedings of the 11th USENIX Symposium on Operating Systems Design and Implementation*, 2014.



Alexander Brodsky
Professor
*PhD Computer Science,
Hebrew University of
Jerusalem, Israel, 1991*

Alex Brodsky joined George Mason University in 1993. His current research interests include Decision Support, Guidance and Optimization (DSGO) systems; and DSGO applications, including energy, power, manufacturing, sustainability and supply chain. Alex has published over 120 refereed papers, including six Best Paper Awards. For his research work related to DSGO systems, Alex received a National Science Foundation (NSF) CAREER Award, NSF Research Initiation Award, and funding from the Office of Naval Research (ONR), National Aeronautics and Space Administration (NASA), National Institute of Standards and Technology (NIST), and Dominion Virginia Power.

Alex' roles include Conference Co-chair of the 21st International Conference on Enterprise Information Systems (ICEIS-2019); keynote speaker at ICEIS-2017; General Chair of the IEEE International Conference on Tools with Artificial Intelligence (ICTAI-2017); keynote speaker at ICTAI-2016; Program Chair of ICTAI-2013; Program Co-chair of the IEEE ICDE workshop on Data-Driven Decision Guidance and Support Systems (DGSS 2012, and DGSS 2013); a general vice co-chair of IEEE ICDE 2012; and Conference Chair of the International Conference on Principles and Practice of Constraint Programming (CP99).

Selected Publications

1. Brodsky, A. et al. "Factory Optima: A Web-Based System for Composition and Analysis of Manufacturing Service Networks Based on a Reusable Model Repository." *Intl. J. of Computer Integrated Manufacturing*, Taylor & Francis, 2019.
2. Krishnamoorthy, M., Brodsky, A., Menascé, D. "Stochastic Decision Optimization Based on Deterministic Approximation of Processes Described as Closed-form Arithmetic Simulation." *Journal of Decision Systems*, 2018.
3. Nachawati, M.O., Brodsky, A., Luo, J. "Unity Decision Guidance Management System: Analytics Engine and Reusable Model Repository." *Intl. Conf. on Enterprise Information Systems*, 2017.
4. Brodsky, A., Luo, J. "Decision Guidance Analytics Language (DGAL): Toward Reusable Knowledge Base Centric Modeling." *Intl. Conference on Enterprise Information Systems*, 2015.



Jim X. Chen
Professor
*PhD Computer Science,
University of Central Florida,
1995*

Jim Chen has taught at George Mason University since 1995. He is the editor-in-chief of *Computing in Science & Engineering*, a senior member of the Institute of Electrical and Electronics Engineers, and an associate member of the Association for Computing Machinery. He has authored four books, edited two conference proceedings, published over 100 research papers, and acquired three patents. His research interests include computer graphics, virtual reality, visualization, networking, and simulation.

Selected Publications

1. Chen, Jim X. "Understanding the Research Publication Process." *Computing in Science & Engineering*, vol. 20, no. 2, Apr. 2018, pp. 6-7.
2. Chen, Jim X. "VR Is Hot, but Why?" *Computing in Science & Engineering*, vol. 19, no. 4, Aug./Sept. 2017, pp. 4-5.
3. Quan, W., Y. Jiang, J. Zhang, and J.X. Chen. "Robust Object Tracking with Active Context Learning." *The Visual Computer*, vol. 31, no. 10, Oct. 2015, pp. 1307-1318.



Songqing Chen
Associate Professor
*PhD Computer Science, College
of William and Mary, 2004*

Songqing Chen has taught at George Mason University since 2004. His areas of interest and expertise are Internet content delivery systems, Internet measurements and modeling, system security, and distributed systems. In addition to the National Science Foundation CAREER and AFOSR Young Investigator Awards, he has received the George Mason University Emerging Researcher, Scholar, and Creator Award, the Volgenau Rising Star Faculty Award, and the Department of Computer Science Outstanding Research Award (three times).

Selected Publications

1. Mengbai, Xiao et al. "MiniView Layout for Bandwidth-Efficient 360-Degree Video." in *Proceedings of the 26th ACM International Conference on Multimedia*, Seoul, Korea, Oct. 22-26, 2018.
2. Mengbai, Xiao et al. "OpTile: Toward Optimal Tiling in 360-Degree Video Streaming." in *Proceedings of the ACM Multimedia Conference Mountain View, CA*, Oct. 23-27, 2017.
3. Wang, An et al. "vPROM: vSwitch Enhanced Programmable Measurement in SDN." in *Proceedings of the 25th annual edition of the IEEE International Conference on Network Protocols*, Toronto, Canada, Oct. 10-13, 2017.
4. Wang, An, Aziz Mohaisen, and Songqing Chen. "An Adversary-Centric Behavior Modeling of DDoS Attacks." in *Proceedings of the 37th IEEE International Conference on Distributed Computing Systems* Atlanta, GA, June 5-8, 2017.



Yue Cheng
Assistant Professor
*PhD Computer Science, Virginia
Tech, 2017*

Yue Cheng's research interests are in distributed systems, storage systems, serverless and cloud computing, and high-performance computing. He is currently working on redesigning the serverless computing infrastructure and systems support for federated learning.

Selected Publications

1. Zheng, Chai et al. "Towards Taming the Resource and Data Heterogeneity in Federated Learning." 2019 *USENIX Conference on Operational Machine Learning*.
2. Zhang, Jingyuan et al. "HyperFaaS: A Truly Elastic Serverless Computing Framework." *16th USENIX Symposium on Networked Systems Design and Implementation*.
3. Cheng, Yue et al. "Erasing Belady's Limitations: In Search of Flash Cache Offline Optimality." *2016 USENIX Annual Technical Conference*.
4. Cheng, Yue, Aayush Gupta, Ali R. Butt. "An In-Memory Object Caching Framework with Adaptive Load Balancing." in *Proceedings of the Tenth ACM European Conference on Computer System*, 2015.



Ping Deng
Assistant Professor (Teaching)
PhD Computer Science,
University of Texas at Dallas,
2007

Ping Deng began teaching at George Mason University in 2018. She teaches courses in C programming and data management and mining. Her research interests include database and data mining.

Selected Publications

1. Deng, Ping et al. "Efficient Non-Unique Probes Selection Algorithms for DNA Microarray." *BMC Genomics*, vol. 9, suppl. 1, 2008.
2. Deng, Ping, Qingkai Ma, and Weili W. "A Projected Clustering Algorithm and its Biological Application." DIMACS Book Series, *Clustering Challenges in Biological Network*, ch. 9, pp. 187-206, ed. W. Art Chaovaitwongse, 2008.



Socrates Dimitriadis
Assistant Professor (Teaching)
PhD, Cognitive Science, Brown
University, 2010

Socrates Dimitriadis enjoys teaching programming courses and likes to put an emphasis on the algorithmic thinking as well as the pragmatic aspects of software development. Before coming to George Mason University, he spent over ten years working as a full stack developer, and he has built a web portal that attracts more than 100,000 visitors per day. His interests include computational cognitive science, human and computer vision, and the multifaceted process of learning, from brain plasticity to neural networks to lifelong learning.



Carlotta Domeniconi
Associate Professor
PhD Computer Science,
University of California,
Riverside, 2002

Carlotta Domeniconi has taught at George Mason University since 2002. Her research interests include machine learning, data mining, classification, clustering, and big data, with applications in text mining, social network analysis, financial data mining, and learning analytics.

Selected Publications

1. Wang, Xing et al. "Multiple Independent Subspace Clusterings." in *Proceedings of the AAAI Conference on Artificial Intelligence*, Honolulu, HI, Jan. 27-Feb, 1, 2019.
2. Tu, Jinzheng et al. "Multi-Label Answer Aggregation Based on Joint Matrix Factorization." in *Proceedings of the IEEE International Conference on Data Mining (ICDM)*, Singapore, Nov. 17-20, 2018.
3. Gasparovic, Ellen and Carlotta Domeniconi (Eds.) "Research in Data Science." *Associations for Women in Mathematics Series*, vol. 17, Springer, 2019.
4. Kamath, U., C. Domeniconi, and K. De Jong. "Theoretical and Empirical Analysis of a Spatial EA Parallel Boosting Algorithm." *Evolutionary Computation*, 26(1) 2018, pp. 43-66.
5. Ren, Y., C. Domeniconi, G. Zhang, and G. Yu. "Weighted-object Ensemble Clustering: Methods and Analysis." *Knowledge and Information Systems*, vol. 51, issue 2, Springer, May 2017, pp. 661–689.



Zoran Duric
Associate Professor
PhD Computer Science,
University of Maryland, College
Park, 1995

Zoran Duric is the program coordinator for the Master of Computer Science Degree. He has taught at George Mason University since 1995. His main research interests are applying computer vision and video image processing to analyze movements of humans and vehicles. He is a deputy editor of *Pattern Recognition Journal* and a member of the editorial board of *IEEE Transactions on Intelligent Transportation Systems*.

Selected Publications

1. Shuman, G. et al. "Improving the Recognition of Grips and Movements of the Hand Using Myoelectric Signals." *BMC Medical Informatics and Decision Making*, 16(2):65, 2016.
2. Gerber, L.H. et al. "The Feasibility of Using Haptic Devices to Engage People with Chronic Traumatic Brain Injury in Virtual 3D Functional Tasks." *Journal of NeuroEngineering and Rehabilitation*, 11:117, Aug. 2014.
3. Vishnoi, N. et al. "Motion Based Markerless Gait Analysis Using Standard Events of Gait and Ensemble Kalman Filtering." in *IEEE Conf. EMBS*, Aug. 2014.
4. Yavvari, C., Z. Duric, and D. Wijesekera. "Cooperative Collision Avoidance by Sharing Vehicular Subsystem Data." in *29th IEEE Intelligent Vehicles Symposium*, 2018.



Yotam Gingold
Associate Professor
PhD Computer Science, New York University, 2009

Yotam Gingold directs the Creativity and Graphics Lab (CraGL). Its mission is to solve challenging visual, geometry, and design problems and pursue foundational research into human creativity. He has taught at George Mason University since 2012. His research interests include interactive geometric modeling, color, creativity support, and crowdsourcing. His research has been incorporated into Adobe Illustrator as the Puppet Warp tool.

Selected Publications

1. Tan, Jianchao, Jose Echevarria, Yotam Gingold. 2018. "Efficient Palette-based Decomposition and Recoloring of Images via RGBXY-Space Geometry." *ACM Transactions on Graphics* 37(6). Also in Proceedings of SIGGRAPH Asia 2018.
2. Liu, Songrun et al. 2017. "Seamless: Seam Erasure and Seam-Aware Decoupling of Shape from Mesh Resolution." *ACM Transactions on Graphics* 36(6). Also in Proceedings of SIGGRAPH Asia 2017.
3. Yao, Jiaxian et al. "Interactive Design and Stability Analysis of Decorative Joinery for Furniture." *ACM Transactions on Graphics* 36(2) 2017.
4. Liu, Songrun, Alec Jacobson, Yotam Gingold. "Skinning Cubic Bézier Splines and Catmull-Clark Subdivision Surfaces." *ACM Transactions on Graphics* 33(6). Also in Proceedings of SIGGRAPH Asia 2014.



S. Dov Gordon
Assistant Professor
PhD Computer Science, University of Maryland, 2010

Dov Gordon has taught at George Mason University since 2015. Prior to joining George Mason University, he was a recipient of the computing innovations postdoctoral fellowship, and spent three years working in a private research lab. His research is in cryptography; he discovers new ways to compute on encrypted data so that user privacy can be maintained throughout the lifetime of the data. His work spans both the theoretical foundations of cryptography, as well as the practical aspects of applying the research to real problems.

Selected Publications

1. Gordon, Dov S., Samuel Ranellucci, Xiao Wang. 2018. "Secure Computation with Low Communication from Cross-Checking." ASIACRYPT.
2. Mazloom, Sahar and S. Dov Gordon. 2018. "Secure Computation with Differentially Private Access Patterns." *ACM Conference on Computer and Communications Security*.
3. Genkin, Daniel, S. Dov Gordon, Samuel Ranellucci. 2018. "Best of Both Worlds in Secure Computation, with Low Communication Overhead." *Applied Cryptography and Network Security*.
4. Gordon, Dov S, Jonathan Katz, Xiao Wang, 2018. "Simple and Efficient Two-Server ORAM." ASIACRYPT.



Larry Kerschberg
Professor
*PhD in Systems Engineering,
Case Western Reserve
University, Cleveland, 1969*

Larry Kerschberg has taught at George Mason University since 1986 and served as chair of the Department of Information and Software Engineering from 1989-1997. His current research interests include social networks, social semantic search, agent-based systems, semantic web, knowledge management, and intelligent information integration. He has over 40 years of experience in both industry and academia, and is the principal inventor on two patents related to intelligent semantic search. He is a founding editor-in-chief of Springer's Journal of Intelligent Information Systems, which has been in continuous publication since 1992.

Selected Publications

1. McDowall, John, Alexander Brodsky, Larry Kerschberg. "A Formal Model for Optimizing Dynamic Service Composition." *14th INFORMS Computing Society Conference*, Richmond, VA, Jan. 11- 13, 2015 pp. 149-160.
2. Kerschberg, Larry. "The Role of Context in Social Semantic Search and Decision Making." *International Journal on Artificial Intelligence Tools*, 23 (6) 2014.
3. McDowall, John and Larry Kerschberg. "Leveraging Social Networks to Improve Service Selection in Workflow Composition." *Int. Conf. on Advances in Social Networks Analysis and Mining*, IEEE Computer Society, Istanbul Turkey, Aug. 26, 2012 pp. 1278-1283.
4. Morrell, Thomas and Larry Kerschberg. "Personal Health Explorer: A Semantic Health Recommendation System." *Workshop on Data-Driven Decision Support and Guidance Systems, 28th IEEE International Conference on Data Engineering*, Arlington, VA, April 1, 2012.

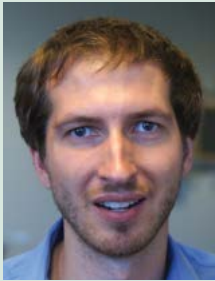


Jana Košecká
Professor
*PhD Computer Science,
University of Pennsylvania,
Philadelphia, 1996*

Jana Košecká has taught at George Mason University since 1999. Her research interests are the acquisition of static, dynamic, and semantic models of environments by means of visual sensing, object recognition, scene parsing, and human-robot interaction. She has over 90 selected publications in referred journals and conferences and is a coauthor of a monograph titled, *Invitation to 3D Vision: From Images to Geometric Models*.

Selected Publications

1. Mousavian, A., D. Anguelov, J. Flynn, J. Kosecka. "3D Bounding Box Estimation Using Deep Learning and Geometry." in *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, 2017.
2. Mousavian, A., H. Pirsiavash, J. Košecká. "Joint Semantic Segmentation and Depth Estimation with Deep Convolutional Networks." 2016 *Fourth International Conference on 3D Vision*, pp. 611-619.
3. Ammirato, P. et al. "A Dataset for Developing and Benchmarking Active Vision." 2017 *IEEE International Conference on Robotics and Automation*, pp. 1378-1385.
4. Georgakis, G. et al. "Synthesizing Training Data for Object Detection in Indoor Scenes." *Robotics Science and Systems*, 2017.

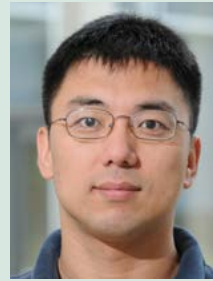


Thomas LaToza
Assistant Professor
*PhD Software Engineering,
Carnegie Mellon University,
2012*

Thomas LaToza has taught at George Mason University since 2015. He works at the intersection of software engineering and human-computer interaction, investigating how humans interact with code and designing new ways to build software. He served as co-chair of the Seventh Workshop on the Evaluation and Usability of Programming Languages and Tools, guest editor of the IEEE Software Theme Issue on Crowdsourcing for Software Engineering, and as co-chair of the Fourth International Workshop on Crowdsourcing in Software Engineering. He is a recipient of the 2019 NSF Career Award. His 2006 paper on Maintaining Mental Models was recognized as a Google Scholar Classic Paper.

Selected Publications

1. LaToza, T.D. et al. 2019 "Microtask Programming." *Transactions on Software Engineering*, to appear.
2. Ko, A.J. et al. 2019 "Teaching Explicit Programming Strategies to Adolescents." *Symposium on Computer Science Education*, Research Track, pp. 469-475.
3. Stol, K. J., LaToza, T.D., and Bird, C. 2017. "Crowdsourcing for Software Engineering." *IEEE Software*, 34 (2), pp. 30-36.
4. Myers, B. A. et al. 2016 "Programmers are Users too: Human-Centered Methods to Improve Software Development." *IEEE Computer*, 49 (7), July 2016, pp. 44-52.



Fei Li
Associate Professor
*PhD Computer Science,
Columbia University, 2008*

Fei Li has taught at George Mason University since 2007. His areas of research interests and expertise include design and analysis of online algorithms, approximation algorithms, randomized algorithms, and scheduling algorithms. He has been on the editorial board of the Sustainable Computing: Informatics and Systems (SUSCOM).

Selected Publications

1. Böhm, Martin et al. "Online Packet Scheduling with Bounded Delay and Lookahead." *Theoretical Computer Science*, Jan. 11 2019.
2. Wang, Huangxin et al. "On Time-Sensitive Revenue Management in Green Data Centers." *Elsevier Journal of Sustainable Computing, Informatics and Systems*, vol. 14, June 2017.
3. Chrobak, Marek et al. "A Greedy Approximation Algorithm for Minimum-Gap Scheduling." *Journal of Scheduling*, vol. 20, issue 3, June 2017, pp. 279-292.
4. Wang, Huangxin, et al. "A Moving Target DDoS Defense Mechanism." *Elsevier Journal of Computer Communications*, vol. 46, no. 15, 2014, pp. 10-21.



Jyh-Ming Lien
Associate Professor
*PhD Computer Science, Texas
A&M University, 2006*

Jyh-Ming Lien is an affiliate of the Motion and Shape Computing (MASC) group and the Autonomous Robotics Laboratory at George Mason University. He has taught at George Mason University since 2007. His research goal is to develop efficient, robust and practical algorithms for designing, manipulating and analyzing shape, structure and motion. His research finds applications in the areas of robotics, computational geometry, and computer graphics.

Selected Publications

1. Hao, Yue et al. "Creating Foldable Polyhebral Nets Using Evolution Control." in Proceedings of the Robotics: Science and Systems Conference, June 2018.
2. Liu, Guilin et al. "Material Editing Using a Physically Based Rendering Network." in *Proceedings of International Conference on Computer Vision* (spotlight presentation) 2017.
3. Lu, Yanyan, Zhonghua Xi and Jyn-Ming Lien. "Online Collision Prediction Among 2D Polygonal and Articulated Obstacles." *International Journal of Robotics Research*, 2015.
4. Liu, Guilin, Zhonghua Xi and Jyn-Ming Lien. "Dual-Space Decomposition of 2D Complex Shapes." in *27th IEEE Conference on Computer Vision and Pattern Recognition*, June 2014.



Jessica Lin
Associate Professor
*PhD Computer Science,
University of California,
Riverside, 2005*

Jessica Lin joined George Mason University in 2005. Her areas of interest and expertise are temporal, spatiotemporal, multimedia, and stream data mining. Her work focuses on the development of efficient algorithms to visualize and discover non-trivial patterns (e.g. anomalies, motifs, contrasting patterns, and latent structure) in massive time series data. Her work has been applied in domains as diverse as medicine, geoinformatics, earth sciences, astronomy, manufacturing, and national security.

Selected Publications

1. Xiaosheng, Li and Jessica Lin. 2019 "Linear Time Motif Discovery in Time Series." in *Proceedings of the 2019 SIAM International Conference on Data Mining*. Calgary, Canada.
2. Gao, Yifeng and Jessica Lin. 2018 "HIME: Discovering Variable-length Motifs in Large-scale Time Series." *Knowledge and Information Systems Journal* pp. 1-30.
4. Senin, Pavel et al. 2018 "GrammarViz 3.0: Interactive Discovery of Variable-length Time Series Patterns." *ACM Transactions on Knowledge Discovery from Data*, 12(1), article no. 10.
5. Lin, Jessica et al. "Experiencing SAX: A Novel Symbolic Representation of Time Series." *Data Mining and Knowledge Discovery*, 15(2) 2007, pp. 107-144.



Sean Luke
Professor
*PhD Computer Science,
University of Maryland, College
Park, 2000*

Sean Luke is the head of the George Mason University Autonomous Robotics Laboratory. He has taught at George Mason University since 2000. His areas of interest and expertise include stochastic optimization and metaheuristics, evolutionary computation, multi-agent systems and multi-agent learning, autonomous robotics and robot swarms, and simulation development. He is the author of *Essentials of Metaheuristics*, and of several very widely used open-source software packages, including the MASON multi-agent simulator and the ECJ evolutionary computation toolkit.

Selected Publications

1. Luke, Sean. "ECJ Then and Now." *GECCO Companion*, 2017.
2. Wicke, Drew and Sean Luke. "Bounty Hunting and Human-Agent Group Task Allocation." AAAI Fall Symposium on Human-Agent Groups, 2017.
3. Wei, Ermo, and Sean Luke. "Lenient Learning in Independent-Learner Stochastic Cooperative Games." *Journal of Machine Learning Research*. 17:84, 2016, pp. 1-42.
4. Luke, Sean, Katherine Russell and Bryan Hoyle. "Ant Geometers." *15th International Conference on the Synthesis and Simulation of Living Systems (ALIFE)*.
5. Luke, Sean. *Essentials of Metaheuristics*. 2009. <http://cs.gmu.edu/~sean/book/metaheuristics/>



Tamara A. Maddox
Associate Professor (Teaching)
*JD Doctor of Jurisprudence,
Marshall-Wythe School of Law,
College of William and Mary,
1991*

Tamara Maddox has been teaching in the Department of Computer Science at George Mason University since 1999. She is the coordinator of the department's Computer Law and Ethics program and Undergraduate Teaching Assistant program. She teaches courses in computer law and ethics and core technical courses in the curriculum, including C, C++, and Java. She was previously the department's assistant chair from 2003-2006.

Selected Publications

1. "Coordinating the Future Agenda at the Intersection of Law and Technology Conference." Participant, University of Florida Levin College of Law. Oct 2018.
2. Maddox, T. "Honesty through Ownership: Increasing Student Involvement Helps to Reduce Plagiarism." *Writing Across the Curriculum*, George Mason University, Apr. 2005.
3. Maddox, T. "Computer Ethics and Privacy." Presented at the U.S. Library of Congress, Washington, D.C., May 2003.
4. Maddox, T. "Ethics and Computers: Could Any Two Topics Be Farther Apart?" *ITRecruiter Magazine*, Nov. 2000.



Daniel Menascé
University Professor
PhD Computer Science,
University of California, Los
Angeles, 1978

Daniel Menascé has taught at George Mason University since 1992. He is a Fellow of the ACM and of the IEEE, a recipient of the Outstanding Faculty Award from the Commonwealth of Virginia in 2017, and the recipient of the 2001 A.A. Michelson Award from the Computer Measurement Group. He has published over 270 articles and five books that received over 11,560 citations. His h-index is 52. His areas of interest and expertise include autonomic computing, software performance engineering, security-performance tradeoffs, cloud computing, service-oriented computing, modeling and analysis of computer systems, and web and e-commerce systems.

Selected Publications

1. Menascé, D.A. and S. Bardhan. "TDQN: Trace-Driven Analytic Queuing Network Modeling of Computer Systems." *The Journal of Systems & Software*, Elsevier, vol. 147, Jan. 2019, pp. 162-171.
2. Connell, W., D.A. Menascé, and M. Albanese. "Performance Modeling of Moving Target Defenses with Reconfiguration Limits." *IEEE Tr. Dependable and Secure Computing*, Nov. 2018.
3. Tadakamalla, V. and D.A. Menascé. "Model-Driven Elasticity Control for Multi-Server Queues Under Traffic Surges in Cloud Environments." in *Proc. 2018 International Conf. on Autonomic Computing*, Trento, Italy, Sept. 3-7, 2018.
4. Bajunaid, N, and D.A. Menascé. "Efficient Modeling and Optimizing of Checkpointing in Concurrent Component-Based Software Systems." *The J. Systems and Software*, vol. 139, May 2018, pp. 1-13.



Amihai Motro
Professor
PhD Computer and Information
Science, University of
Pennsylvania, 1981

Amihai Motro was the director of the Department of Computer Science's PhD program from 2005-2015. He has taught at George Mason University since 1990. His research interests are in database management, information systems (with a focus on information integration), information retrieval, cooperative user interfaces, virtual enterprises, and service-oriented architectures.

Selected Publications

1. Guo, Yun et al. "Exoneration-Based Fault Localization for SQL Predicates." *Journal of Systems and Software* 147, 2019 pp. 230-245.
2. Church, J., and A. Motro. "Efficient Measurement of Service Similarity." *International Journal of Web Services Research* 10, no. 2, 2013, pp. 23-40.
3. Berlin, J., and A. Motro. "Database Schema Matching Using Machine Learning with Feature Selection." *Seminal Contributions to Information Systems Engineering: 25 Years of CAiSE* 2013, pp.315–329.
4. Motro, A. et al. "Optimizing Procurement Decisions in Networked Virtual Enterprises." *International Journal of Decision Support System Technology* 4, no. 3, 2012, pp. 43-67.



Michael Neary
Instructor
*MS Computer Science,
University of Maryland,
Baltimore County, 2018*

Michael Neary is a lecturer of computer science who primarily teaches introductory programming courses. His research interests are in intelligent tutoring systems, educational technology, and computer science education.

Selected Publications

1. Sherman, Alan T. et al. "Cybersecurity: Exploring Core Concepts through Six Scenarios." *Cryptologia*, 42:4, 2018, pp. 337-377.



Jeff Offutt
Professor
*PhD Computer Science,
Georgia Institute of Technology,
1988*

Jeff Offutt is full professor of Software Engineering. He has published over 180 refereed research papers with an h-index of 63, is the co-author of *Introduction to Software Testing*, and is editor-in-chief of *Wiley's Journal of Software Testing, Verification and Reliability*. He is PI and co-PI on two educational research projects. One increases the scale at which introductory programming courses can be taught at universities while dramatically reducing cheating, and the other develops materials to integrate Computer Science standards of learning into K-5 classrooms. He was founding steering committee chair of the IEEE International Conference on Software Testing, Verification, and Validation. He received the Outstanding Faculty Award from the State Council of Higher Education for Virginia in 2019, the university's Teaching Excellence Award, Teaching with Technology, in 2013, was named an Outstanding Faculty member in 2008, 2009, and 2019, and his IEEE Software paper in software engineering education was chosen by ACM as a notable paper for 2014. His current projects include critical systems testing, testing and analysis of web and mobile applications, model-based testing, and software engineering education.

Selected Publications

1. Offutt, Jeff and Sunitha Thummala. "Testing Concurrent User Behavior of Synchronous Web Applications with Petri Nets." *Springer's Software and Systems Modeling*, Feb. 2018.
2. Li, Nan and Jeff Offutt. "Test Oracle Strategies for Model-based Testing." *IEEE Transactions on Software Engineering*, Apr. 2017.
3. Caputo, Deanna D. et al. "Barriers to Usable Security? Three Organizational Case Studies." *IEEE Security & Privacy*, Sept.- Oct. 2016.
4. Ammann, Paul, and Jeff Offutt. *Introduction to Software Testing*, 2nd edition. Cambridge, UK. Cambridge University Press 2017.



Eric Osterweil
Assistant Professor
*PhD Computer Science,
University of California, Los
Angeles, 2010*

Eric Osterweil received his PhD from UCLA in 2010, and has been teaching at George Mason University since 2018. Before joining the Department of Computer Science faculty, Eric was a principle scientist at VeriSign, Inc. His current research is informed by his ongoing memberships in operations, standards, and Internet-governance communities, and focuses on cybersecurity, privacy, and large-scale measurements.

Selected Publications

1. Qi, Alfred Chen et al. "Client-Side Name Collision Vulnerability in the New gTLD Era: A Systematic Study." *ACM Conference on Computer and Communications Security*, Nov. 2017.
2. Qi, Alfred Chen et al. "MitM Attack by Name Collision: Cause Analysis and Vulnerability Assessment in the New gTLD Era." in *37th IEEE Symposium on Security and Privacy*, May 2016.
3. Osterweil, Eric, Danny McPherson, and Lixia Zhan. "The Shape and Size of Threats: Defining a Networked System's Attack Surface." in *Proceedings of the IEEE ICNP Workshop on Secure Network Protocols*, Oct. 2014. Best Paper Award
4. Osterweil, Eric et al. "Quantifying the Operational Status of the DNSSEC Deployment." in *Proceedings of the 6th ACM/USENIX Internet Measurement Conference* Oct. 2008.



John Otten
Instructor
*MS Computer Science, College
of William and Mary, 1992*

John Otten has been teaching at George Mason University since 2014. He has taught courses in C programming, computer ethics, data structures, and software engineering. He has also co-developed and is currently teaching Essentials of Computer Science, a new required course for undergraduate computer science students. Before joining the university, he was employed by General Dynamics for over 21 years. While working in industry, he performed research and developed systems for a wide variety of computer science applications including parallel and high-performance computing, embedded systems, simulations, signal processing, automatic target recognition, automotive networks, and cellular technology

Selected Publications

1. Maddox, T., and Otten, J. "Using an Evolutionary Algorithm to Generate Four-Part 18th-Century Harmony." *Mathematics and Computers in Modern Science: Acoustics and Music, Biology and Chemistry.* World Scientific and Engineering Society Press, 2000.



Parth Pathak
Assistant Professor
PhD Computer Science, North Carolina State University, 2012

Parth Pathak joined George Mason University in the fall of 2016. The focus of his research is to make wireless networks and mobile systems more efficient, accessible, robust and pervasive. His research interests are in next generation wireless networks, mobile systems, ubiquitous computing, Internet of Things (IoT) and cyber physical systems. Before joining George Mason University, he was a post-doc at University of California, Davis. He is currently teaching a graduate course in wireless and mobile computing.

Selected Publications

1. Zhang, Ding, Mihir Garude and Parth H. Pathak. "mmChoir: Exploiting Joint Transmissions for Reliable 60GHz mmWave WLANs." *ACM International Symposium on Mobile Ad Hoc Networking and Computing*, Los Angeles, CA June 2018.
2. Pathak, Parth H. et al. "Visible Light Communication, Networking and Sensing: A Survey, Potential and Challenges." *IEEE Communications Surveys and Tutorials*, 2015.
3. Das, Aveek K. et al. "WiFi-Assisted Non-Intrusive Multi-Modal Estimation of Building Occupancy." *ACM Conference on Embedded Networked Sensor Systems*, Delft, The Netherlands, Nov. 2017.
4. Zhang, Li et al. "AccelWord: Energy Efficient Hotword Detection through Accelerometer." *ACM International Conference on Mobile Systems, Applications, and Services*, Florence, Italy, May 2015.



J. Mark Pullen
Professor
DSc, The George Washington University, 1981

Mark Pullen is the director of the Center of Excellence in Command, Control, Communications, Computing, Intelligence, and Cyber. He has taught at George Mason University since 1992. His research interests include networked multimedia applications (with an emphasis on command and control), networked education and training, distributed virtual simulation, and interoperation of command and control with simulations. He is a fellow of the IEEE, fellow of the ACM, and recipient of the IEEE Harry Diamond Award.

Selected Publications

1. Pullen, J. "Teaching Network Protocol Concepts in an Open Source Simulation Environment." *ACM Innovative Technology in Computer Science Applications*, Larnaca, Cyprus, July 2018.
2. Pullen, J. and O. Mevassvik. "Coalition Command and Control – Simulation Interoperation as a System of Systems." *IEEE International Conference on System of Systems Engineering*, Kongsberg, Norway, June 2016
3. Pullen, J. et al. "Multi-Schema and Multi-Server Advances for C2-Simulation Interoperation in MSG-085." NATO Modeling and Simulation Symposium 2013.
4. Pullen, J. M. and J. Chen. "Distributed Application Launching for High Quality Graphics in Synchronous Distance Education." *ACM Special Interest Group on Computer Science Education Bulletin* 40, no. 3, 2008, pp. 204–208.



Huzefa Rangwala
Professor
*PhD Computer Science,
University of Minnesota,
Minneapolis, 2008*

Huzefa Rangwala is interested in data mining, learning analytics, bioinformatics and high-performance computing, with an emphasis on the development of computational methods for proteins structure and function prediction, metagenomic analysis, and drug design. He is the recipient of the 2013 NSF CAREER award, the 2014 George Mason University Teaching Excellence Award, the 2014 George Mason University Creator, Researcher and Scholar Award and the 2018 George Mason University Undergraduate Research Mentor Award.

Selected Publications

1. Lester, Jaime, Carrie Klein, Adiya Johri, and Huzefa Rangwala. *Learning Analytics in Higher Education: Current Innovations, Future Potential, and Practical Applications*. Routledge, 2018.
2. Rahman, Mohammand and Huzefa Rangwala. "Regmil: Phenotype Classification from Metagenomics Data." in *ACM Conference on Bioinformatics and Computational Biology*, 2018.
3. Ren, Zhiyuan, Xia Ning, and Huzefa Rangwala. "Ale: Additive Latent Effect Models for Grade Prediction." in *Proceedings of the 2018 SIAM International Conference in Data Mining*, 2018.
4. Ning, Yue et al. "Staple: Spatio-temporal Precursor Learning for Event Forecasting." in *Proceedings of the 2018 SIAM International Conference in Data Mining*, 2018.



Dana Richards
Associate Professor
*PhD Computer Science,
University of Illinois, 1984*

Dana Richards has taught at George Mason University since 1994. His research focus is in algorithms. He previously worked at the National Science Foundation and at the University of Virginia.

Selected Publications

1. Banerjee, Indranil, Dana Richards. "New Results on Routing via Matchings on Graphs." *Fundamentals of Computation Theory*, 2017, pp. 69-81.
2. Avramovic, Ivan and Dana Richards. "Analysis of Consensus Sorting via Cycle Metric." *Conference on Combinatorial Optimization and Applications*, 2018.
3. Avramovic, Ivan and Dana Richards. "NP-completeness of Shortest Leaf-to-Leaf Distance in a Tree." *Intl Conf on Computing, Networking, and Communications* 2019.



Katherine Russell
Instructor
MS Computer Science, George Mason University, 2011

Katherine "Raven" Russell has taught at George Mason University since 2014. Her current research areas are in delay tolerant and information-centric networking. She has over ten years of industry experience as a professional web developer, and is currently a PhD candidate in the Department of Computer Science.

Selected Publications

1. Russell, K., Simon, R. "Evaluation of a Geo-Region Based Architecture for Information Centric Disruption Tolerant Network." in *Proceedings of the 2019 International Conference on Computing, Networking and Communication*, Honolulu, HI, Feb. 2019.
2. Luke, S., Russell, K., Hoyle, B. "Ant Geometers. " in *Proceedings of the 15th International Conference on the Synthesis and Simulation of Living Systems (ALIFE)*, Cancun, Mexico, July 2016.
3. Russell, K., Schader, M., Andrea, K., Luke, S. "Swarm Robot Foraging with Wireless Sensor Motes. " in *Proceedings of the 14th International Conference on Autonomous Agents and Multiagent Systems*, Istanbul, Turkey, May 2015.

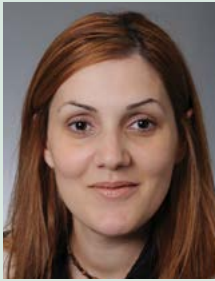


Sanjeev Setia
Professor
PhD Computer Science, University of Maryland, College Park, 1993

Sanjeev Setia's research interests are in ad hoc and sensor networks, network security, performance evaluation of computer systems, and computer science education. In recent years, he has worked extensively on security mechanisms and protocols for ad hoc and wireless sensor networks. He has served as Chair of the Department of Computer Science since September 2011.

Selected Publications

1. Roy, Sankardas, Mauro Conti, Sanjeev Setia, Sushil Jajodia. "Secure Data Aggregation in Wireless Sensor Networks: Filtering Out the Attacker's Impact." *IEEE Transactions on Information Forensics and Security* 9, no. 4, 2014, pp. 681-694.
2. Zhu, Bo, Sanjeev Setia, Sushil Jajodia, Sankardas Roy, and Lingyu Wang. "Efficient Distributed Detection of Node Replication Attacks in Sensor Networks." *IEEE Transactions on Mobile Computing*. 9, no. 7, 2010 pp. 213-926.
3. Roy, Sankardas, Mauro Conti, Sanjeev Setia, and Sushil Jajodia. "Secure Median Computation in Wireless Sensor Networks." *Ad Hoc Networks*. 7, no. 8, 2009 pp. 1448-1462.
4. Huang, Leijun and Sanjeev Setia. "CORD: Energy-Efficient Reliable Bulk Data Dissemination in Sensor Networks." in *Proceedings of the 27th IEEE International Conference on Computer Communications*, March 2008.



Amarda Shehu
Professor
PhD Computer Science, Rice University, 2008

Amarda Shehu is the Co-Director of the Center for Adaptive Human-Machine Partnership (CAHMP), a Transdisciplinary Center for Advanced Study at George Mason University. She also holds affiliate appointments in the Department of Bioengineering and in the School of Systems Biology. Shehu has taught at George Mason University since 2008. Her research focuses on novel algorithms in artificial intelligence and machine learning to bridge between computer and information science, engineering, and the life sciences. Shehu has published over 120 technical papers with postdoctoral, graduate, undergraduate, and high-school students. She is the chair of the steering committee of the *ACM/IEEE Journal on Transactions in Bioinformatics and Computational Biology*, where she is also an associate editor. Shehu is the recipient of an NSF CAREER Award. Her research is supported by various NSF programs, including Information Integration and Informatics, Foundations of Emerging Technologies, Robust Intelligence, Computing Core Foundations, and Software Infrastructure, and various state and private research awards. Shehu received the 2018 Mason University Teaching Excellence Award, the 2014 Mason Emerging Researcher/Scholar/Creator Award, and the 2013 Mason OSCAR Undergraduate Mentor Excellence Award.

Selected Publications

1. Kabir, Kazi Lutful, Liban Hassan, Zahra Rajabi, and Amarda Shehu. "Graph-based Community Detection for Decoy Selection in Template-free Protein Structure Prediction." *Molecules* 24(3), 741, 2019.
2. Qiao, Wanli et al. "From Mutations to Mechanisms and Dysfunction via Computation and Mining of Protein Energy Landscapes." *BMC Genomics* 19 (Suppl7), 2018, 671.
3. Veltri, Daniel, Uday Kamath, and Amarda Shehu. "Deep Learning Improves Antimicrobial Peptide Recognition." *Bioinformatics* 34(16), 2018, pp. 2740-2747.
4. Sapin, Emmanuel, Kenneth De Jong, and Amarda Shehu. "From Optimization to Mapping: An Evolutionary Algorithm for Protein Energy Landscapes." *IEEE/ACM Trans Comp Biol and Bioinf* 15(3) 2018, pp. 719-731.
5. Maximova, Tatiana et al. "Sample-Based Models of Protein Energy Landscapes and Slow Structural Rearrangements." *Journal of Computational Biology*, 25(1), 2017, pp. 33-50.



Mark Snyder
Associate Chair and Associate Professor (Teaching)
PhD Computer Science, University of Kansas, 2011

Mark Snyder has taught at George Mason University since 2011. His research interests are in languages and type theory, domain specific languages, and the application of functional languages.

Selected Publications

1. Frisby, N., Peck, M., Snyder, M., Alexander, P. "Model Composition in Rosetta." in *Engineering of Computer-Based Systems*, 2011. Las Vegas, NV.
2. Snyder, M., Alexander, P. "Monad Factory: Type-Indexed Monads," in *TFP 2010: Post-Proceedings of Trends in Functional Programming*. Norman, OK, 2010, pp. 106-120.
3. Snyder, M., Frisby, N., Kimmell, G., and Alexander, P. "Writing Composable Software with InterpreterLib." *Software Composition* 2009. ETH, Zurich, Switzerland.



Robert Simon
Professor
*PhD Computer Science,
University of Pittsburgh, 1996*

Robert Simon has taught at George Mason University since 1996. His research interests are in wireless and mobile networking, distributed systems, system and network level modeling and performance analysis and cyber security. He has received numerous grants, from NSF, multiple DoD agencies and industry.

Selected Publications

1. Bandari, M., R. Simon, and H. Aydin. "On Minimizing Expected Energy Usage of Embedded Wireless Systems with Probabilistic Workloads." *Journal of Sustainable Computing*.
2. Wang, H. and R. Simon. "Modeling Wireless Sensor Networks with Energy Harvesting: A Stochastic Calculus Approach." IEEE WIOpt 2016, Tempe, AZ, May 2016.
3. Gumusalan, A., R. Simon, and H. Aydin. "Adaptive Transmission Scheduling for Energy-Aware Real-Time Wireless Communication." *ACM International Conference on Embedded Wireless Systems and Networks* Graz, Austria, Feb. 2016.
4. Andrea, Kevin and Robert Simon. "Design and Evaluation of an RPL-based Multi-Sink Routing Protocol for Low-Power and Lossy Networks." *ACM International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems*, Cancun, Mexico, Nov. 2015.



Arun Sood
Professor
*PhD Electrical Engineering,
Carnegie Mellon University, 1971*

Arun Sood has taught at George Mason University since 1987. His areas of interest are security architectures, intrusion tolerance, image analysis and computer vision, optimization, parallel and distributed processing, performance modeling, and simulation and modeling. His research team developed "Self-Cleansing Intrusion Tolerance Technology," which was the winner of the Global Security Challenge sponsored by the Security Technology of Tomorrow Challenge.

Selected Publications

1. Nagarajan, Ajay and Arun Sood. "SCIT Based Moving Target Defense Reduces and Shifts Attack Surface." *11th International Workshop on Security in Information Systems*, Apr. 2014, Lisbon, Portugal.
2. Nguyen, Quyen, and Arun Sood. "Comparative Analysis of Intrusion-Tolerant System Architectures." in *Proceedings of the IEEE Symposium on Security and Privacy*, 2011.
3. Nguyen, Quyen L., and Arun Sood. "Multiclass S-Reliability for Services in SOA." in *Proceedings of the 5th International Conference on Software Engineering Advances*, Nice, France, 2010.
4. Nagarajan, Ajay, and Arun Sood. "SCIT and IDS Architectures for Reduced Data Ex-Filtration." in *Proceedings of the 4th Workshop on Recent Advances in Intrusion-Tolerant Systems*, Chicago, IL, 2010



Shvetha Soundararajan
Assistant Professor (Teaching)
*PhD Computer Science, Virginia
Tech, 2013*

Shvetha Soundararajan has taught at George Mason University since 2016. Her research interests include agile transformation, requirements engineering, software architecture, and computer science education.

Selected Publications

1. Soundararajan, S., O. Balci, and J. D. Arthur. "Assessing an Organization's Capability to Effectively Implement Its Selected Agile Method(s): An Objectives, Principles, Strategies Approach." in *Proceedings of the Agile Conference 2013*, Aug. 2013, pp. 22-31.
2. Soundararajan, S., J. D. Arthur, and O. Balci. "A Methodology for Assessing Agile Software Development Methods." in *Proceedings of the Agile Conference 2012*, Aug. 2012, pp. 51-54.
3. Soundararajan, S., A. Chigani, and J. D. Arthur. "Understanding the Tenets of Agile Software Engineering: Lecturing, Exploration and Critical Thinking." in *Proceedings of the 43rd ACM Technical Symposium on Computer Science Education* Mar. 2012, pp. 313-318.
4. Soundararajan, S., and J. D. Arthur. "A Structured Framework for Assessing the 'Goodness' of Agile Methods." in *Proceedings of the 18th IEEE International Conference and Workshop on the Engineering of Computer Based Systems*, Apr. 2011, pp. 14-23.



Angelos Stavrou
Professor
*PhD Computer Science,
Columbia University, 2007*

Angelos Stavrou is the Director of the Center for Assurance Research and Engineering (CARE). He has served as PI on research awards from NSF, DARPA, IARPA, DHS, AFOSR, ARO, ONR. He is a member of NIST's Mobile Security team with more than 125 peer-reviewed articles. Stavrou received his M.Sc. in Electrical Engineering, M.Phil. and PhD (with distinction) in Computer Science from Columbia University. He holds an M.Sc. in theoretical Computer Science from University of Athens, and a B.Sc. in Physics with distinction from University of Patras, Greece. Stavrou is an Associate Editor of *IEEE Transactions on Reliability* and a co-chair of the IEEE Blockchain initiative. His research includes security and reliability for distributed systems, security principles for virtualization, and anonymity focused on building and deploying large-scale systems. He received the Department of Computer Science Outstanding Research Award in 2010, 2016 and 2018 and the 2012 Emerging Researcher, Scholar, Creator Award. In 2013, he received the IEEE Reliability Society Engineer of the Year award. He is a NIST guest researcher, a member of the ACM and USENIX, and a senior IEEE member. His team was awarded the DHS Cyber Security Division's "Significant Government Impact Award" in 2017. Stavrou is supported by two DHS grants, and two NSF grants: NSF CNS-1421747 on "Scalable Techniques for Better Situational Awareness: Algorithmic Frameworks and Large-Scale Empirical Analyses" and NSF DUE-1303299 on "Bridging the Cybersecurity Leadership Gap: Assessment, Competencies and Capacity Building. Projects include research in security mobile and IoT devices.

Selected Publications

1. Elsabagh, Mohamed, Daniel Barbará, Dan Fleck, Angelos Stavrou. "On Early Detection of Application-Level Resource Exhaustion and Starvation." *Journal of Systems and Software* 137, 2018, pp. 430-447.
2. Zhang, Fengwei, Kevin Leach, Angelos Stavrou, Haining Wang. "Towards Transparent Debugging." *IEEE Trans. Dependable Sec. Comput.* 15(2), 2018, pp. 321-335.
3. Hao, Shuai, Yubao Zhang, Haining Wang, Angelos Stavrou. "End-Users Get Maneuvered: Empirical Analysis of Redirection Hijacking in Content Delivery Networks." *USENIX Security Symposium 2018*, pp. 1129-1145.
4. Kolia, Constantinos, Georgios Kambourakis, Angelos Stavrou, Jeffrey M. Voas. "DDoS in the IoT: Mirai and Other Botnets." *IEEE Computer* 50(7), 2017, pp. 80-84.



Gheorghe Tecuci
Professor
*PhD Computer Science,
University of Paris-Sud
and Polytechnic Institute of
Bucharest, 1988*

Gheorghe Tecuci is the director of the Learning Agents Center, Member of the Romanian Academy and former Chair of Artificial Intelligence in the Center for Strategic Leadership of the U.S. Army War College. He has followed a career-long interest in the development of a computational theory and technology, enabling non-computer scientists to directly teach their expertise to cognitive agents, enabling these agents to act as cognitive assistants to experts, as expert consultants to non-experts, and as intelligent tutors to students. Recently, he has focused on the development of cognitive agents for evidence-based reasoning tasks, such as intelligence analysis, cybersecurity, and medicine. Such agents start with a significant amount of domain-independent knowledge of evidence-based reasoning, significantly accelerating their teaching. Tecuci has published over 200 papers, including 11 books, with contributions to artificial intelligence, instructable agents, knowledge engineering, machine learning, evidence-based reasoning, and critical thinking.

Selected Publications

1. Tecuci, G., Marcu D., Boicu M., Schum D.A. *Knowledge Engineering: Building Cognitive Assistants for Evidence-Based Reasoning*, Cambridge University Press, 2016.
2. Tecuci, G., Schum D.A., Marcu D., Boicu M. *Intelligence Analysis as Discovery of Evidence, Hypotheses, and Arguments: Connecting the Dots*, Cambridge University Press, 2016.
3. Tecuci, G., Meckl S., Marcu D., Boicu M. "Evidence-Based Detection of Advanced Persistent Threats" Special Issue on Evidence-Based Reasoning and Applications, *Computing in Science and Engineering*, 20(6) 2016, pp.54-65.
4. Tecuci, G., Kaiser L., Marcu D., Uttamsingh C., Boicu M. "Evidence-Based Reasoning in Intelligence Analysis: Structured Methodology and System." Special Issue on Evidence-based Reasoning and Applications, *Computing in Science and Engineering*, 20 (6) 2018, pp. 9-21.



Pearl Y. Wang
Associate Professor
*PhD Mathematics, University of
Wisconsin, Milwaukee, 1983*

Pearl Wang joined George Mason University in 1983 as a founding member of the Department of Computer Science and served as the Associate Chair for several years. She is also an ABET volunteer and serves on ABET CAC Commission and the CSAB Board. She is currently a member of the Steering Committee for the CC2020 curriculum report project. Her research interests have included interconnection networks for massively parallel systems, and the development of sequential and parallel algorithms for combinatorial optimization problems. She has served on the editorial boards of professional journals, including the *IEEE Transactions on Parallel and Distributed Systems*, the *Journal of Parallel and Distributed Computing*, and the *European Journal of Operational Research*.

Selected Publications

1. Dorband, John E., Christine L. Mumford, Pearl Y. Wang. "Developing an aCe Solution for Two-Dimensional Strip Packin." IPDPS 2004.
2. Valenzuela, Christine L., Pearl Y. Wang. "VLSI Placement and Area Optimization Using a Genetic Algorithm to Breed Normalized Postfix Expressions." *IEEE Trans. Evolutionary Computation* 6(4), 2002, pp. 390-401.
3. Wang, Pearl, Y., Christine L. Valenzuela. "Data Set Generation for Rectangular Placement Problems." *European Journal of Operational Research* 134(2), 2001, pp. 378-391.
4. Valenzuela, Christine, L., Pearl Y. Wang. "A Genetic Algorithm for VLSI Floorplanning." PPSN 2000, pp. 671-680



Xinyuan (Frank) Wang
Associate Professor
PhD Computer Science,
North Carolina State University,
2004

Xinyuan (Frank) Wang’s research interests are around computer network and system security. His work includes malware analysis and defense, attack attribution, anonymity and privacy, covert channel and steganography, VoIP security, and digital forensics. He has developed CipherXRay – a novel binary analysis framework that can automatically identify and recover the cryptographic operations and transient secrets from the execution of potentially obfuscated binary executables. Dr. Wang is a recipient of an NSF CAREER award and the lead inventor of ten US patents.

Selected Publications

1. Wang, Xinyuan. “On the Feasibility of Real-Time Cyber Attack Attribution on the Internet.” in *Proceeding of the 35th IEEE MILCOM*, Nov. 2016
2. Wang, Xinyuan and Douglas Reeves. *Traceback and Anonymity*. Springer, 2015.
3. Farley, Ryan, Xinyuan Wang. “CodeXt: Automatic Extraction of Obfuscated Attack Code from Memory Dump.” in *Proceedings of the 17th Information Security Conference*, Oct. 2014.
4. Farley, Ryan, Xinyuan Wang. “Exploiting VoIP Softphone Vulnerabilities to Disable Host Computers Attack and Mitigation.” *International Journal of Critical Infrastructure Protection*. vol.7 no. 3, Sept. 2014, pp.141-154.
5. Li, Xi, Xinyuan Wang, Wentao Chang. “CipherXRay: Exposing Cryptographic Operations and Secrets from Monitored Binary Execution.” *IEEE Transactions on Dependable and Secure Computing (TDSC)*. vol. 11 no. Mar.2 2014, pp. 101-114.



Harry Wechsler
Professor
PhD Computer and Information
Science, University of California,
Irvine, 1975

Harry Wechsler has taught at George Mason University since 1988. His expertise includes image analysis and computer vision; data mining, machine learning, and pattern recognition; contents based image retrieval (CBIR); and cyber security, biometrics, and identity management. His research focuses on robust authentication for uncontrolled settings characterized by incomplete information and uncertainty. He is a Fellow of the IEEE, and a Fellow of the IAPR. He holds, together with his former doctoral students, seven patents.

Selected Publications

1. Toor, S., H. Wechsler, M. Nappi, and K-K. R. Cho. “Visual Question Authentication Protocol.” *Computers and Security*, vol. 76, 2018, pp. 285-294.
2. Wechsler, H. “Biometrics, Forensics, Security, and Privacy Using Smart Identity Management and Interoperability: Validation and Vulnerabilities of Various Techniques.” *Review of Policy Research* 29, no. 1, 2012, pp. 63-89.
3. Ho, S. S., and H. Wechsler. “A Martingale Framework for Detecting Changes in the Data Generating Model in Data Streams.” *IEEE Transactions on Pattern Analysis and Machine Intelligence* 32, no. 12, 2010, pp. 2113–2127.
4. Li, F., and H. Wechsler. “Face Authentication Using Recognition-by-Parts, Boosting and Transduction.” *International Journal of Artificial Intelligence and Pattern Recognition* 23, no. 3, 2009, pp. 545–573.
5. Chen, V., F. Li, S. S. Ho and H. Wechsler 2006. “Micro-Doppler Effect in Radar-Phenomenon, Model, and Simulation Study.” *IEEE Trans. on Aerospace and Electronic Systems*, vol. 42, no. 1, pp. 2-21, Google Classic Paper.



Elizabeth White
Associate Chair and Associate
Professor
*PhD Computer Science,
University of Maryland, College
Park, 1995*

Elizabeth White has taught at George Mason University since 1994. Her areas of interest and expertise include compilers, software architecture, distributed computing, and dynamic reconfiguration. She is an NSF CAREER Award recipient.

Selected Publications

1. Doyle, Gerald S., Elizabeth L. White. "Comparative Architecture Performance Analysis at Design Time." Int. CMG Conference 2007, pp. 231-242.
2. White, Elizabeth L., Ranjan Sen, Nina Stewart. "Hide and Show: Using Real Compiler Code for Teaching." SIGCSE 2005, pp. 12-16.
3. White, Elizabeth L. "General Strategies for Dynamic Reconfiguration." ACM SIGSOFT Software Engineering Notes 25(1) 2000, 93.
4. White, Elizabeth L., Jeffrey Ruby, Laura Denise Deddens. "Software Visualization of LR Parsing and Synthesized Attribute Evaluation." *Software: Practice & Experience*. 29(1), 1999, pp. 1-16.



Duminda Wijesekera
Professor
*PhD Mathematical Logic,
Cornell University, 1990
PhD Computer Science,
University of Minnesota, 1998*

Duminda Wijesekera is a professor in the Department of Computer Science and a visiting research scientist at the National Institute of Standards and Technology (NIST). He leads the Laboratory of Radio and RADAR Engineering (RARE), collaboration between academia, industry and government located at George Mason University.

His current research addresses multiple areas. The first is the security and safety of cyber physical systems. Research in this area includes safety and security of Intelligent Transportation Systems (ITS) that includes trains, aircraft, ships, and automobiles and creating secure cognitive radio networks that ensure mandated safety guarantees for these transportation modes. He also collaborates on systems and communication security of power grids.

Selected Publications

1. Kacem, Thabet, Alexander Barreto, Duminda Wijesekera and Paulo Costa. "ADS-B Sec: A Novel Framework to Secure ADS-B, ICT Express." *IEEE Transactions on Intelligent Vehicles*, issue 4, Dec. 2018, pp. 511-521.
2. Yuvvary, Chaitanya, Duminda Wijesekera, and Zoran Duric. "Stable and Safe Automated Driving Using 3D Road Geometric Features." 89th IEEE Vehicular Technology Conference, Apr. 28, 2019, Kuala Lumpur, Malaysia.
3. Seymor, Paul, Duminda Wijesekera, and Cin-Dao Kan. "Secure Out-Door Smart Parking Using Dual-Model Bluetooth Mesh Networks." 89th IEEE Vehicular Technology Conference, Apr. 28, 2019, Kuala Lumpur, Malaysia.
4. Wang, Yongxin et al. "Safety and Security Analysis for Movable Rail Bridges." IEEE/ASME Joint Rail Conference. Apr. 9-12, 2019 Snowbird, UT.



Lap-Fai (Craig) Yu
Assistant Professor
PhD in Computer Science,
University of California, Los
Angeles, 2013

Craig Yu has taught at George Mason University since 2019. His research interests include computer graphics, computer vision, human-computer interaction, and virtual reality, particularly on devising novel computational design tools and extended reality technologies. He is the lead inventor of Make-it-Home (SIGGRAPH 2011), a pioneering system for automating interior design and virtual world generation.

Selected Publications

1. Alghofaili, Rawan et al., 2019. "Lost in Style: Gaze-driven Adaptive Aid for VR Navigation." in *Proceedings of the ACM Conference on Human Factors in Computing Systems*, Glasgow, UK.
2. Lang, Yining, Wei Liang, Lap-Fai Yu. 2019. "Virtual Agent Positioning Driven by Scene Semantics in Mixed Reality." in *Proceedings of the 26th IEEE Conference on Virtual Reality and 3D User Interfaces*. Osaka, Japan.
3. Duncan, Noah, Lap-Fai Yu, Sai-Kit Yeung. 2016. "Interchangeable Components for Hands-On Assembly Based Modelling." *ACM Transactions on Graphics*, 35(6), in *Proceedings of SIGGRAPH Asia*, Macao, China.
4. Lap-Fai Yu et al. 2011. "Make it Home: Automatic Optimization of Furniture Arrangement." *ACM Transactions on Graphics* 30(4). in *Proceedings of SIGGRAPH 2011*, Vancouver, Canada.



Yutao Zhong
Associate Professor (Teaching)
PhD Computer Science,
University of Rochester, 2005

Yutao Zhong's research interests are in program performance analysis and optimization, programming languages, and compilers. She worked in the Department of Computer Science between 2005 and 2010 and rejoined the department in 2014. She has been promoted to term associate professor, effective fall 2019.

Selected Publications

1. Zhong, Yutao, Xipeng Shen, and Chen Ding. "Program Locality Analysis Using Reuse Distance." *ACM Transactions on Programming Languages and Systems*, vol. 31, no. 6, Aug. 2009.
2. Shen, Xipeng, Yutao Zhong, and Chen Ding. "Predicting Locality Phases for Dynamic Memory Optimization." *Journal of Parallel and Distributed Computing*, vol. 67, no. 7, July 2007.
3. Zhong, Yutao et al. "Miss Rate Prediction across Program Inputs and Cache Configurations." *IEEE Transactions on Computers*, vol. 56, no. 3, Mar. 2007.
4. Zhong, Yutao and Wentao Chang. "Sampling-Based Program Locality Approximation." in *Proceedings of 2008 International Symposium on Memory Management*, Tucson, AZ, June 2008.



An Wang



Laurel Fielding CTO- Netcomm



Zachary Ferguson

ALUMNI PROFILES

Computer Science Department graduates have distinguished themselves in academic, government, and business careers in the metro Washington, DC community and across the globe. Our featured alumni have maintained their research interests while applying their academic foundations to reach the top of their professional careers.

AN WANG

An Wang's enthusiasm for her research in large scale distributed systems and cyber security, her students, and her choice to pursue an academic career is infectious. A 2018 PhD graduate, Wang is an assistant professor at Case Western Reserve University. She says, "Academia allows me to be innovative." That's a statement with a promise coming from someone who has worked on projects at some of the tech industry's most creative places such as Nokia Bell Labs and Facebook.

Wang's Mason story begins in China in 2012. At the conclusion of her BS degree in Computer Science from Jilin University, she wanted to pursue a PhD program in the United States. But where? Programs and opportunities crisscrossed the nation. With an aunt living in Seattle, the idea of a West Coast university was appealing. Then she connected with Songqing Chen and his research in Internet content delivery, cloud computing, cyber security, and distributed systems. His work and his lab was a strong fit for her

research interests. Additionally, she was impressed with the size of Mason's CS department and excited about being near Washington, DC.

"Cyber security can be applied everywhere. Network security and large scale systems issues are important."

"I had lots of research projects to choose from," says Wang. "The CS faculty is involved in many different disciplines, it was a rich research environment."

"An is one of my best students," says Songqing Chen. "She started to work on SDN when it was in its infancy. Today SDN has been adopted by all major industrial players, such as Google, Facebook. Her dissertation addressed several critical issues in SDN, particular the software defined

measurement in SDN. Her work attracted lots of attentions and some of the work has been open sourced."

Wang also started work as a graduate research assistant and discovered how much she enjoys working with students. "I really like interacting with faculty and students, sharing ideas and projects."

An was faced with a second major career decision, where to go and what do to after completing her PhD. She had offers from industry even before she finished and Chen is happy to brag for her that she had more than five tenure-track assistant professorship offers from major research universities.

She likes the environment at Case Western and is especially interested in the university's collaboration with area businesses, such as the local energy companies. "I'm now working on writing grants and proposals where I can be the full PI." She wants to establish more connections with industry and other national labs.

Of her students at Case Western she says, "We have great discussions in

class and two of our projects have turned into serious research and conference papers.”

When asked about her thoughts as a woman working in CS she laughs and admits it’s a challenge. “I’m one of three female faculty members in the entire department. Case also has more male student than females.” She says the department is working to discuss these issues with women to hear more about their concerns and she works on a committee to promote women in STEM.

Her current research is on the IOT security environment. “This is a hot topic,” she says. She’s working on some projects with her master’s students. “Cyber security can be applied everywhere. Network security and large scale systems issues are important.” Case’s industry collaborations give her a path to put her ideas into practice. It’s both academic rewarding and essential for the Cleveland community she now happily calls home.

LAUREL FIELDING

Computer Science at George Mason University is more than a course of study. CS is a community of students, faculty, researchers, industry, and alumni who engage in a continuous technology conversation. This course of study has at its core, innovation and future- forward thinking.

Laurel Fielding, a 2007, MS graduate in software engineering, Industry Advisory Board Member, and adjunct faculty member represents the spirit and strength of the CS community.

As the CTO of Netcomm, Laurel is a technology conductor. And while this isn’t a professional C-suite title, it embodies the blend of the traditional CTO functions and her enthusiasm for her employees, customers, students, and her passion for learning and teaching.

Laurel’s CS journey is a lesson in itself to students. Opportunities are everywhere if you’re curious and

interested. Her first taste of tech began in the midst of the dot-com boom. “I was working for a start-up company in Rosslyn, Virginia,” she says. “I was doing marketing work and realized what the company needed was more ASP programmers.” She changed jobs, was fortunate to find a mentor, and began gathering and improving her skills.

Laurel has a non-technical undergraduate degree in philosophy and never imagined a career in IT. She explains she has a logic and problem solving brain and the work was interesting and changing fast.

The more involved in computers she became with each new job, the more she realized she wanted deeper skills. That push led her to George Mason University. Like many Virginia students, the school’s location was the driving factor in her choice. The University has a mission to meet the needs of the business community and local students. As a working professional, the program was ideal.

Laurel took several years to complete her studies fitting in her career and having children. Today she mentors staff and students alike with the well-learned advice, “you can do this one class at a time.” Her patience and focus paid off.

“I had a personal goal to become the CTO of an organization by the time I was forty.” Now guiding the technology programs at Netcomm, she says she likes her role and how she is involved in lots of different things. She enjoys the challenge of IT and how she needs to continue learning to stay at the top of her field.

Laurel’s continued involvement with the CS department and community is important to keeping her edge. She joined the Industry Advisory Board in 2015. This volunteer board provides industry insight into the real-world technology challenges in the DC market. They help inform the department about trends and needs for specific classes. This gives CS students an edge in the market.

Laurel also keeps her edge by teaching. She joined the adjunct faculty staff and teaches CS software

“I don’t love the separation of women in tech programs because in the workforce men and women must work together..”

engineering 619. “Teaching was a new experience for me and I was nervous. Once I got into the class, I realized how much I love it.” She says she enjoys working with the students, graduate students like she once was, who are coming from professional careers. They bring ideas and problems to the class and leave with solutions and skills.

She says she can see herself returning to school for a PhD. Her personal tech interests overlap with her CTO role. She’s interested and concerned with issues of technology and privacy. She sees the need to have important conversations about technology. She’s a supporter of women in tech careers as well. She works with the University of Maryland and supports an all-women’s hack-a-thon. “I don’t love the separation of women in tech programs because in the workforce men and women must work together,” she says. “However, we have to work through the social constraints, girls who believe math is hard. We lose them as early as the sixth grade.” At Netcomm she promotes a diversified workforce and says they have a good balance of men and women.

Laurel wants to have a voice in the technology community and the CS department is helping her achieve that. The more involved she remains, the stronger her resolve is to mentor others and pursue her own interests. It’s more than a career, it’s a vision and a passion.

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ALUMNI PROFILE *Continued...*

ZACHARY FERGUSON

Like many students, Zachary Ferguson came to his computer science major with an interest in game development. However, he diverted his studies when he discovered the many different opportunities and directions available at George Mason University.

Zachary's George Mason University story starts close to his home. A Northern Virginia native, he was interested in staying nearby. His college search led him to the university because of its unique applied computer science concentration in computer game design. "The campus community was important to me," Zachary says, "I wanted to be in a place where I felt I was part of the school." His CS direction changed, however, when he began working with Professor Yotam Gingold in the Creativity and Graphics Lab (CraGL).

CS at Mason offers various research opportunities and Zachary jumped on

the chance. His work concentrated on 3D modeling and animation. "Our research helps 3D artists and animators working with textured 3D objects."

"I like the idea of teaching and the freedom to choose your own research topics."

The research led to a paper presented at SIGGRAPH Asia 2017: "Seamless: Seam erasure and seam-aware decoupling of shape from mesh resolution."

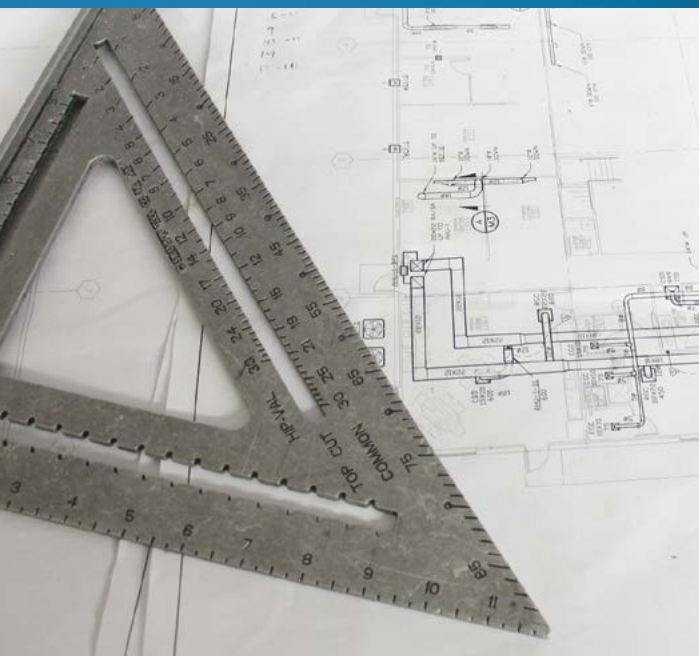
"Working with Yotam and his Ph.D. student, Songrun Liu, to create something original was a great opportunity," says Zachary. "Looking back, I am stunned by how much I

learned and advanced my skills through research." He also says the experience of putting a paper together, working through comments and revisions, has been invaluable.

In addition to a published paper as an undergrad, Zachary received the 2017 Distinguished Academic Achievement Award.

Upon graduation, Zachary moved into a Ph.D. program at New York University. He was interested in continuing with his graphics research. He just completed his second year and enjoys the research his new team does. He has several years to go before he finishes, but looking ahead, he sees himself moving into academia.

"I like the idea of teaching and the freedom to choose your own research topics." He definitely caught the research bug at George Mason University and is using it to advance his interests and the computer graphics field. ■



PLANNING FOR THE FUTURE:

A NEW SCHOOL OF COMPUTING

What's so special about Northern Virginia? A great quality of life, a business-friendly community, and of course, George Mason University.

It's no wonder to us that Amazon selected Northern Virginia as the site of its newest headquarters. The region has what Amazon needs - people. According to the Computing Technology Industry Association (CompTIA), Virginia has the third highest concentration of technology workers in the country. Additionally, we have a higher number of women and African Americans working in tech than any other areas of the nation.

Amazon is expected to bring in 25,000 jobs to the area; spurring business growth across the region. In January, Microsoft also announced an expansion of its Virginia-based data center capabilities.

With more tech needs comes the need for more tech workers. As part of its bid to lure Amazon, the Virginia State Assembly promised an investment in a "tech talent investment fund" to train more undergraduate and graduate students in computer science and related fields in the next twenty years.

George Mason University will be a major beneficiary of the new fund; which stands to reason, since our existing Arlington Campus is adjacent to the new Amazon headquarters.

The university has pledged to invest more than \$250 million over the next five years to grow programs, hire large numbers of new faculty, and expand its campus in Arlington to 1.2 million square feet.

"This is a significant moment for the region, and the result of our tremendous collaboration with partners in the public and private sectors," said George Mason University President, Ángel Cabrera. "Our goal is to not only produce high-quality

graduates who can take on big roles at existing companies like Amazon, but to also have graduates who can start the Amazons of the future."

The university also has plans to launch a new School of Computing, to bring the power of computing to a wide variety of fields. It will collaborate across the university, to advance the application of computing technology and data sciences to fields ranging from government to business to education to health care.

"Mason's a research university, and part of our mission is actually working with corporations in the region, and creating new ventures, new tech ventures. We're very excited about the possibilities that Amazon brings, particularly in the consumer market, attracting building companies that have a focus on the consumer marketplace, rather than the federal marketplace," said Deborah Crawford, vice president for research innovation and economic impact at George Mason University.

The university is committed to doubling the number of students they are producing with tech degrees at the undergraduate level, currently 5,000, with similar goals at the graduate level.

"We are looking at offering both online and hybrid programs that appeal to working professionals who want to up-skill their capabilities in tech," said Crawford. The university will also continue its partnership with Northern Virginia Community College to help students afford a degree and help students changing careers.

New spaces, improved resources, and a commitment to growth and education will keep computer science studies as a cornerstone to the region's growing tech economy. ■



THE DRIVE TO RESEARCH

AND THE RESEARCH OF DRIVING

The Department of Computer Science boasts several active research projects. Some are theoretical, but others, like the work coming from the Radar and Engineering Lab (RARE) are lockstep, and at times several steps ahead of the most talked about advances in technology.

Professor Duminda Wijesekera oversees the projects and research and is the Director of the RARE Lab. His students describe him as innovative and enterprising with deep knowledge and foresight. And maybe a little fearless. When asked about an upcoming sensor test on self-driving cars, he laughed and said he may attach the sensors to his own car.

And while that may sound unsafe for an experiment, safety is what his research is all about. As an educator, researcher, and consultant, Wijesekera has been working with private industry and the federal government for decades on sensor and radio technology with a specialty in positive train control systems. And while that work continues, one of the RARE lab's deepest projects concerns systems for driverless vehicles.

To have a sense of today's driverless car research needs, it's important to go back to the starting line. In 2004, the Defense Advanced Research Projects Agency (DARPA) "ran its path breaking Grand Challenge with the goal of spurring on American ingenuity to accelerate the development of autonomous vehicle technologies that could be applied to military requirements." A second challenge was held in 2005 and DARPA reports, "challenges helped to create a mindset and research community that a decade later would render fleets of autonomous cars and other ground vehicles a near certainty for the first quarter of the 21st century."

If this is true, by 2025 we should be sitting back and letting our cars and trucks take us where we need to travel.

However, as Wijesekera explains, not so fast. He predicts we won't see reliable and safe autonomous vehicles until 2040 or 2050. Several companies have made great strides in driverless technology. Close to fifty companies are now working on driverless tech, including car giants GM, Ford, and BMW and tech giants Waymo (formerly Google's self-driving car project), Apple, and Tesla.

It's essential for the industry to experiment and to test, but as headlines show, accidents are happening with Uber, Waymo, and Tesla making the news. The vehicles need to react to more than stop lights and speed limits.

Wijesekera explains just a few of the issues with current sensor technology. The cameras fitted on modern

vehicles don't work well in low light. The fatal 2018 Uber crash in Arizona involving a self-driving car (Volvo SUV) was determined to be caused in part by low light. Thermal imaging has problems too. While human heat signatures can be detected, if a car's engine is running hot, the sensors may not see the people. Work needs to be done on sensor and camera placement to allow for these variables in different vehicles.

He further explains there is a need for mechanical systems that connect basic functions such as ABS braking systems; communication between vehicles through radio signals to determine traffic and controls such as railroad crossing gates and traffic lights; and additional sensors for thermal imaging. Add a layer, and there is a need to modify roads and mark street signs, guard rails, etc. This is also connected through wireless technology where everything has to be hardened against cyber security threats.

In basic terms, a vehicle on the road needs to transmit location, speed, and surroundings/conditions such as road surface to the cars in its immediate vicinity. Sensor radios have a one kilometer range. There is no need to accept transmissions from vehicles beyond this range. The car doesn't need to know what is happening a mile up the road. The cars process a constant flow of signals, about ten messages a second with a ten second processing time. However, a cyber-attack could disrupt the signals making it take longer to react or overload the vehicle with more signals than it needs or signals from vehicles out of range. The vehicle wouldn't be able to determine which signals are the ones to follow. The result is a crash.

OFF THE ROAD AND INTO THE LAB

The RARE Lab's goal is not to design and launch an autonomous vehicle, though the researchers all think that would be a great project if it were not for funding limitations.

The lab's PhD students, Santos Jha, Chaitanya Yavvari, Paul Seymore, and Yongxin Wang are researching three key areas: cyber security, sensors, and parking detection. The lab is also cross-disciplinary and works with Dr. Cing-Dao (Steve) Kan, Professor and Director of the Center for Collision Safety and Analysis, part of the College of Science.

The center has expertise in vehicle safety collisions. Kan and his team have developed fifteen vehicle models that are used to run and crash on simulated road and highway conditions. These highly accurate simulations are used to analyze passenger risk, crashes, road conditions, and physical materials. Computer simulations allow researchers to collect almost unlimited data in the space of time it would take to run actual road tests. This along with not having to crash actual cars is both fast and cost-effective.

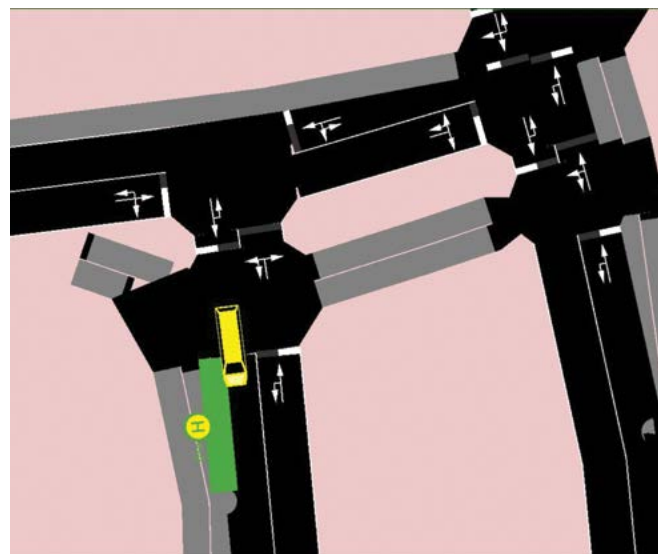
However, both Kan and Wijesekera agree, you can't account for human factors. Cars can be tested on icy roads, low light, and heavy traffic, but you can never predict a scenario when people are involved. For instance, how will they react when an emergency vehicle comes on the scene?

Chaitanya Yavvari, who is working on vehicle sensor issues, describes a potential and yet to be determined problem with driverless cars in a city. Cars will follow speed limits and obey all traffic lights and signs, that's a good thing. Additionally,

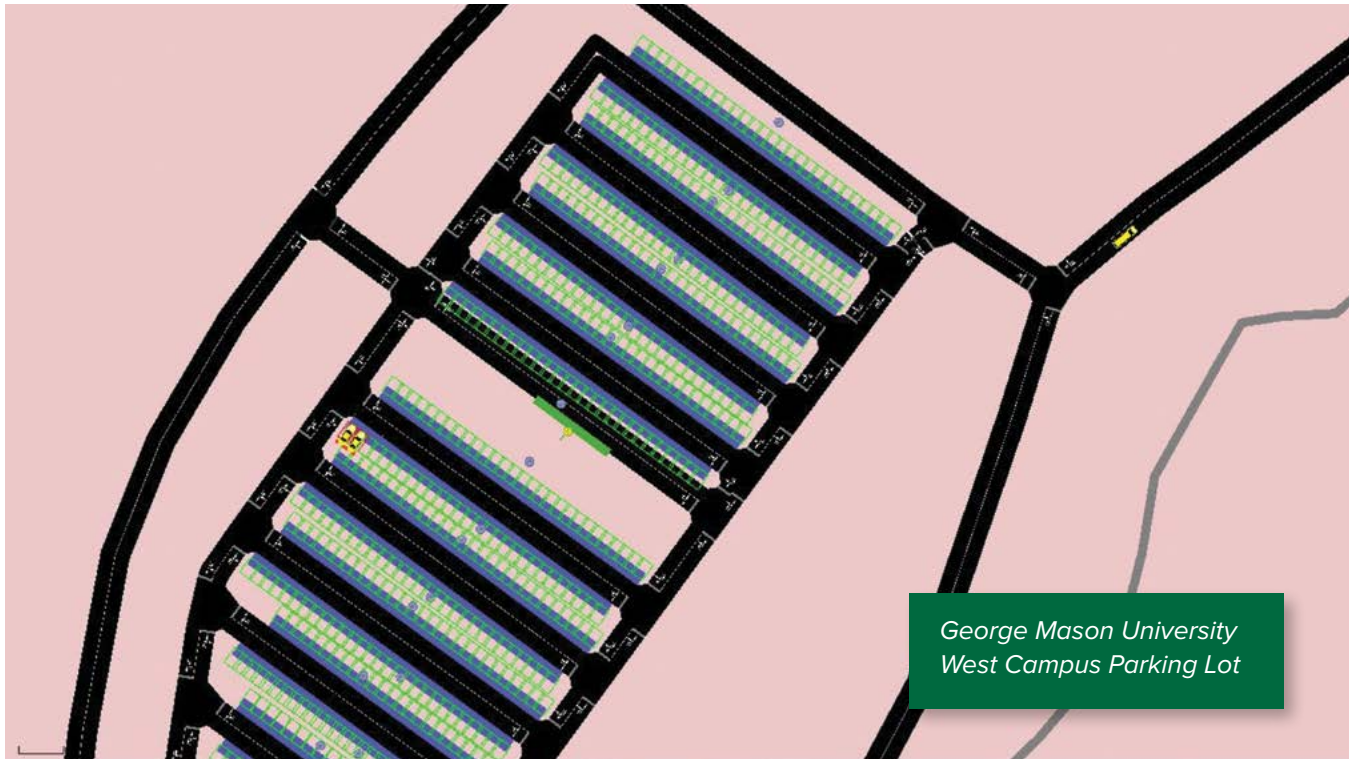
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George Mason University's Road Network



A simulated automated vehicle traveling through an intersection



DRIVE continued...

the default will be to stop and allow pedestrians to cross roads. That's essential for safety. This means driverless cars will move slower than traditional traffic. If you've ever been behind a slow driver, you can imagine how aggravated the other drivers may become. They may not behave according to road rules. Add a common scenario of a busy city where pedestrians don't wait for lights and dash across intersections at will (i.e., New York City) and the driverless cars will struggle to move at all.

Yongxin Wang explains another sensor problem with detecting people. The majority of vehicle accidents happen at intersections. If a pedestrian is blocked by a building or object, vehicles that rely only on cameras may not detect the person. This turns the busy intersection into a series of blind spots. Currently, four types of sensors are available: cameras that detect color images; thermal to register heat signatures, LiDAR that uses pulsed laser images to detect light and distances; and radar to detect movement.

A series of sensors will be needed to account for low light, severe weather, and daylight versus dark. With the right sensor mix, the vehicles will be able to detect people and transmit this vital data to the surrounding autonomous vehicles.

These essential human factor issues are leading to the RARE Lab's next test, a real road test on Intelligent Parking using a Blue Tooth system. The plan is to fit sensors onto a car and use the campus' Patriot Drive loop as a control track. The

campus with defined loops is situated between two major roads. The team has already designed and run computer models with data provided by campus parking services. The test is to determine if autonomous driving buses can move students efficiently from parking lots to main campus. The test will determine the quality of the designed sensors and how they communicate with the vehicles systems, speed the vehicle can travel, autobraking, and the time it takes to complete specific tasks.

Santos Jha, who is working on cyber security issues, says the goal of a driverless vehicle is to leave its resting station, perform its mission (transporting passengers or goods) and return safely. He admits this should be everyone's goal who gets into a vehicle too. But what happens if a bad actor is able to disrupt a vehicle's onboard systems or communication protocols? Anything from a traffic jam to a crash. His work is in developing cryptography protocols to build resiliency and harden systems. The lab has already published a paper with the IEEE on how long it will take a system to process a message under heavy traffic conditions.

Everyone in the lab is working on a specific piece of the puzzle, but they all collaborate and share work and results. Like a car with a myriad of moving parts and control systems, everything must communicate to move. The team is excited about the parking experiment, moving from computer models to the street. The promise of computer science research in practice. ■

EXTERNAL FUNDING

Ammann, Paul

Tools for Automated Detection and Assessment of Security Vulnerabilities in Mobile Applications
US Department of Homeland Security
9/23/2014 - 6/22/2018
\$190,198

Automated Test Decision Framework
The MITRE Corporation
12/1/2017 - 8/31/2018
\$34,174

Aydin, Hakan

CSR: Small: Collaborative Research: Dependable Real-Time Computing on Heterogeneous Chip Multiprocessor
National Science Foundation
8/15/2014 - 7/31/2018
\$269,966

Energy-aware standby-sparing for periodic real-time applications on heterogeneous chip multiprocessor systems
University of Texas at San Antonio
7/25/2017 - 8/24/2017
\$6,756

Baldimtsi, Foteini

SaTC: CORE:Small: Collaborative: A Broad Treatment of Privacy in Blockchains
National Science Foundation
9/1/2017 - 8/31/2020
\$250,000

IBM
10/1/2016 - 9/30/2017
\$40,000

Barbara, Daniel

Advanced Predictive Analysis Capabilities
Decisive Analytics Corporation
3/15/2017 - 9/14/2017
\$27,738

Parsing and Role Labeling in Combination Effort
Decisive Analytics Corporation
10/22/2018 – 9/10/2020
\$302,376

Bell, Jonathan

Blockchaining Collaborative Data Management
National Security Agency
5/18/2018 - 5/18/2023
Co-PI: Baldimtsi, Foteini; LaToza, Thomas
\$250,000

SHF: Medium: Collaborative Research: Enhancing Continuous Integration Testing for the Open-Source Ecosystem
National Science Foundation
10/1/2018 - 9/30/2022
\$399,591
Enabling Testing and Dynamic Analysis Research at a Very Large Scale
Amazon Web Services
12/18
\$8,000

NSF Student Travel Grant for 2018 ACM SIGPLAN Conference on Systems, Programming, Languages and Applications: Software for Humanity (SPLASH)
National Science Foundation
8/1/2018 - 1/31/2019
\$30,000

CAREER: Amplifying Developer-Written Tests for Code Injection Vulnerability Detection
National Science Foundation
5/1/2019 - 4/30/2024
\$500,000

NSF Student Travel Grant for 2019 ACM SIGPLAN Conference on Systems, Programming, Languages and Applications: Software for Humanity (SPLASH)
National Science Foundation
8/1/2019 - 1/31/2020
\$30,000

Brodsky, Alexander

Decision Support Systems for Smart Manufacturing Processes: Toward Standards on Reusable Knowledge Base for Analytics and Optimization
US Department of Commerce
6/1/2016 - 5/31/2018
Co-PI: Menasce, Daniel
\$144,925

Student Support: NIST-ASTM-NSF-ASME Workshop & Competition on Formalizing Manufacturing Processes for Structured Sustainability Assessments
National Science Foundation
5/1/2017 - 10/31/2017
\$30,000

Manufacturing model repository: methods and standards for construction, reuse, and decision support
US Department of Commerce
3/1/2018 - 2/29/2020
Co-PI: Menasce, Daniel
\$145,052

Chen, Songqing

Moving Target Defense Through Dynamic Virtual Machine Placement in Clouds
US Department of the Army
6/1/2015 - 5/31/2018
Co-PI: Li, Fei
\$390,000

CSR: Small: Towards Energy-efficient Internet Mobile Streaming
National Science Foundation
10/1/2015 - 9/30/2020
Co-PI: Li, Fei
\$495,426

DDoS Detection and Mitigation via Programmable SDN Traffic Measurement
US Department of Commerce
6/1/2016 - 5/31/2018
\$100,000

Building Scalable and Programmable Machine Learning Based Network Anomaly Detection in SDN
US Department of Commerce
9/1/2018 - 8/31/2020
\$100,000

Domeniconi, Carlotta

Development of Competitive Intelligence Analysis Enhancement Using Structured and Unstructured Data
FedSavvy Strategies, LLC
8/22/2016 - 8/21/2017
\$52,516

EXTERNAL FUNDING ...CONTINUED

Gingold, Yotam

CAREER: Direct Manipulation of Numerical Optimization for Structured Geometry Creation
National Science Foundation
2/1/2015 - 1/31/2020
\$549,373

Gordon, Samuel Dov

Jana: Ensuring Secure, Private, and Flexible Data Access
Galois Inc
9/15/2015 - 7/31/2019
\$415,883

TWC: Medium: Collaborative: New Protocols and Systems for RAM-Based Secure Computation
National Science Foundation
5/15/2016 - 4/30/2020
\$371,035

Applying Secure Multiparty Computation to the Secure Evaluation of Tor Network Statistics
US Department of the Navy
1/3/2017 - 1/2/2018
\$156,664

Kosecka, Jana

NRI: Collaborative Research: Task Dependent Semantic Modeling for Robot Perception
National Science Foundation
9/1/2015 - 8/31/2019
\$267,486

LaToza, Thomas

Crowd Programming
Regents of the University of California
1/1/2016 - 6/30/2019
\$325,000

SHF: Medium: Collaborative Research: Programming Strategies
National Science Foundation
10/1/2017 - 9/30/2021
\$606,791

CAREER: SHF: Debugging Mental Models
National Science Foundation
2/1/2019 - 1/31/2024
\$514,962

Li, Fei

STTR Phase I: Accelerating the dissemination of healthcare interventions that improve care for high-need/high-cost patients
Health Network Research Group, LLC
1/1/2018 - 2/28/2019
\$67,500

Lien, Jyh-Ming

II-NEW: Acquisition of a Light Detection and Ranging (LiDAR) Scanner System
National Science Foundation
5/1/2012 - 4/30/2017
Co-PI: Kosecka, Jana; Wong, David W (Geography and GeoInformation Science); Camelli, Fernando E (Computational and Data Science); Chen, Jim X
\$200,775

Multifunctional Origami Structures - Advancing the Emerging Frontier of Active Compliant Mechanisms
Pennsylvania State University
8/1/2012 - 7/31/2017
\$255,000

DDDAMS-Based Urban Surveillance and Crowd Control via UAV's and UGV's

University of Arizona
3/15/2017 - 6/30/2018
\$63,358

Modeling of Laser Formed Structures

US Department of the Army
5/1/2019 - 4/30/2021
\$60,000

Lin, Jessica

NRL: User Information Demand Modeling
Naval Research Laboratory
09/30/2016-09/29/2017
Co-PI: Huzefa Rangwala
\$73,968

Trajectory Pattern Mining and user Behavior Characterization on Large-Scale Track Data

Strategic Analysis Inc.
3/1/2017 - 9/29/2017
Co-PI: Rangwala, Huzefa
\$51,127

NA-22 Project: Anomaly Detection and Surety for Safeguards Data
Sandia National Laboratories
3/1/2019 - 9/30/2019
\$285,000

Scalable Multivariate Temporal Pattern Discovery

Semiconductor Research Corporation
6/1/2015 - 11/30/2017
\$160,000

Luke, Sean

CI-EN: Enhancement of ECJ, A High-Performance Community Metaheuristics Library for Stochastic Optimization Research
National Science Foundation
9/1/2016 - 8/31/2020
\$482,991

CI-EN: Enhancement of a Large-scale Multiagent Simulation Tool

National Science Foundation
9/1/2017 - 8/31/2020
Co-PI: Simon, Robert P; Crooks, Andrew T (Computational and Data Sciences)
\$896,303

Menasce, Daniel A

RASS: Resilient Autonomic Software Systems
US Department of the Air Force
10/15/2015 - 10/14/2018
Co-PI: Hassan Gomaa
\$1,016,641

Offutt, Jeff

SPARC: Self-Paced Learning Increases Retention and Capacity
Google
6/1/2015 - 5/31/2020
Co-PI: Kinga Dobolyi, Liz White, Jaime Lester (Higher Education Program), Paul Amman, Pearl Wang, Sanjeev Setia and Huzefa Rangwala
\$900,000

Pathak, Parth

NeTS: Small: Collaborative Research: Transparent Cross-technology Communication in Wireless Networks
National Science Foundation
10/1/2017 - 9/30/2020
\$266,000

II-NEW: 60 GHz Millimeter-wave Testbed for Multi-gigabit Wireless Networking

National Science Foundation
10/1/2017 - 9/30/2019
Co-PI: Simon, Robert P; Mark, Brian L (Electrical and Computer Engineering); Tian, Zhi (Electrical and Computer Engineering)
\$843,718

NeTS: Small: Collaborative Research: Reliable 60 GHz WLANs through Coordination: Measurement, Modeling and Optimization

National Science Foundation
10/1/2018 - 9/30/2021
\$263,116

Multimodal American Sign Language Recognition

Google Research Awards
05/01/2019 - 04/30/2020
Co-PIs: Kosecka, Jana; Rangwala, Huzefa
\$50,894

Pullen, J Mark

Expedited Command and Control-Simulation Interoperation Standards Development

Griffiss Institute
3/1/2016 - 7/31/2019
\$261,700

C2SIM Cyber Prototype

COLSA Corporation
3/30/2018 - 1/30/2020
\$170,199

Support on USSOCOM Command Data Interoperability

Cognitics, Inc.
1/15/2019 - 8/2/2019
\$45,000

C2SIM Sandbox

North Atlantic Treaty Organization (NATO)
7/1/2016 - 12/18/2019
\$90,055

Huzefa Shabbir Rangwala

NSF REU Site: Undergraduate Research in Educational Data Mining

National Science Foundation
02/01/2018-01/31/2021
Co-PI: Mark Snyder
\$360,000

Tracing Networks of Gangs using Data Analytics.

Department of Homeland Security
11/01/2017-10/31/2020
\$750,000

BIGDATA: IA: DKA: Collaborative Research: Learning Data Analytics: Providing Actionable Insights to Increase College Student Success.

National Science Foundation
09/01/2014-08/31/2018
Co-PI: Aditya Johri (Information Sciences and Technology) and Jaime Lester (Higher Education Program)
\$766,202

NSF CAREER: Annotating the Microbiome Using Machine Learning Methods.

National Science Foundation
03/01/2013-02/28/2018
\$550,000

Shehu, Amarda

Collaborative: A plug-and-play software platform of robotics-inspired algorithms for mapping protein structures and motions

National Science Foundation
2/1/2015 - 1/31/2019
\$217,288

CCF: AF: Small: Novel Stochastic Optimization Algorithms to Advance the Treatment of Dynamic Molecular Systems

National Science Foundation
7/1/2014 - 6/30/2018
Co-PI: De Jong, Kenneth
\$407,997

CAREER: Probabilistic Methods for Addressing Complexing and Constraints in Protein Systems

National Science Foundation
3/1/2012 - 2/28/2018
\$565,851

III: Medium: Collaborative Research: Guiding Exploration of Protein Structure Spaces with Deep Learning

National Science Foundation
7/1/2018 - 6/30/2021
\$499,074

Simon, Robert P

Internet of Things
VECTARE LLC
1/1/2016 - 9/30/2019
\$244,144

Distributed System Pattern Discovery Using Time Series Discords

VECTARE LLC
6/8/2016 - 9/30/2019
\$331,078

VECTARE/DOD/Interactive Monitoring of IoT Devices

VECTARE LLC
11/1/2016 - 9/30/2017
\$79,272

Information Assurance Research for Wireless Mediums

VECTARE LLC
3/1/2017 - 9/30/2017
Co-PI: Jones, James H (Electrical and Computer Engineering)
\$194,755

Information Assurance Research for Industrial Control and Logistics Systems (IARICL)

VECTARE LLC
10/1/2017 - 9/30/2019
Co-PI: Liz White
\$174,970

Industrial Internet of Things

VECTARE LLC
11/1/2018 - 9/30/2019
\$76,787

Design and evaluation of address-agile multicasting for disruption-tolerant networking

Axiom, Inc.
5/19/2016 - 5/22/2017
\$35,849

Stavrou, Angelos

Enhanced Cyber Defense by Leveraging Involuntary Analog Emissions

Defense Advanced Research Projects Agency (DARPA); Power Fingerprinting, Inc.
Co PI: Auffret, Jean-Pierre (Center for Assurance Research and Engineering)
05/01/2016 - 04/30/2020
\$1,454,051

TWC: TTP Option: Small: Collaborative: Scalable Techniques for Better Situational Awareness: Algorithmic Frameworks and Large-Scale Empirical Analyses

National Science Foundation
9/1/2014 - 8/31/2017
\$174,900

EXTERNAL FUNDING ...CONTINUED

Democratizing DDoS Defenses Using Secure Indirection Networks

Defense Advanced Research Projects Agency (DARPA)
4/1/2016 - 6/30/2019
Co-PI: Fleck, Daniel P (CSIS)
\$4,213,701

Extreme DDoS Defense- TA3

Vencore Labs Inc
4/20/2016 - 12/31/2019
\$944,150

Towards Measuring Security for IoT

US Department of Commerce
9/1/2016 - 8/31/2019
\$473,632

Anti-Ransomware Testing

Mitsui Bussan Secure Directions, Inc
2/9/2018 - 8/30/2019
Co-PI: Fleck, Daniel P (Center for Assurance Research and Engineering)
\$23,200

Tecuci, Gheorghe D

Teaching Critical Thinking Skills in Science with sInvestigator

National Science Foundation
10/1/2016 - 9/30/2019
Co-PI Boicu, Mihai (Information Science and Technology); Holincheck, Nancy M (College of Education and Human Development); Marcu, Dorin (Learning Agents Center); Trefil, James S (Physics)
\$300,000

Co-Arg: Cogent Argumentation System with Crowd Elicitation

IARPA
1/3/2017 - 12/2/2018
Co-PI: Marcu, Dorin (Learning Agents Center); Boicu, Mihai (Information Science and Technology); Holincheck, Nancy M (College of Education and Human Development); Motti, Vivian (Information Sciences and Technology); Winston, Thomas. (Information Sciences and Technology)
\$2,930,784

Agile Cognitive Assistants for Advanced Persistent Threat Detection

Air Force Research Laboratory (AFRL)
1/11/2017 - 1/24/2019
Co-PI: Marcu, Dorin (Learning Agents Center); Boicu, Mihai (Information Science and Technology)
\$649,999

Wang, Xinyuan

Tactical Immune System (TIS) Based on Dynamically Assigned Sense of Self

CyberRock, Inc.
9/1/2016 - 5/31/2017
\$64,703

Tactical Immune System based on Dynamically Assigned Sense of Self (Phase II)

CyberRock, Inc.
1/1/2018 - 8/31/2019
\$280,352

Wijesekera, Duminda

Cyber Security Risk Management for Connected Railroads

Rutgers University/Federal Railroad Administration
9/2017-5/2019
\$300,000

Three Level Model for Forensic Investigations in Clouds

National Institute of Standards and Technology (NIST)
8/15/16-8/15/17
\$60,000

DHS/Career Development Program US Department of Homeland Security

1/2012-12/2017
Co-PIs: Stavrou, Angelos; Simon, Robert
\$256,336

Secure SDR Communication Protocols and Configuration Management for PTC

US Department of Transportation/ Federal Railroad Administration
4/1/2015 - 3/31/2018
\$550,000

Using the Policy Machine to Enforce Access to Health Records

US Department of Commerce
9/1/2015 - 3/31/2017
\$139,984

A Three-level Graph Based Model for Forensic Analysis on Planned Missions

National Institute of Standards and Technology (NIST)
8/15/2016 - 8/14/2017
\$60,000

Technical Support for DOT Positive Train Control Program

Syntek Technologies Inc
9/1/2016 - 8/31/2018
Co-PI: Costa, Paulo Cesar (Systems Engineering and Operations Research)
\$1,296,887

Global Impact of Conflict Economies Due to Evolving Clandestine Organ Trade

North Carolina State University
1/3/2017 - 12/31/2017
\$85,997

Cyber Security Risk Management for Connected Railroads

Rutgers University/Federal Railroad Administration
9/22/2017 - 11/21/2019
\$300,000

Cloud Forensic Analysis using Volatile Memory, System calls and IDS Alerts

National Institute of Standards and Technology (NIST)
8/15/2018 - 8/14/2019
\$85,000

Sharing Human Genomic Data

Logistics Management Institute LMI
Co-PI: Bo, Yu (VSE)
10/3/2016 - 9/30/2017
\$50,000

GRANTS WITH PIS IN OTHER DEPARTMENTS GEORGE MASON UNIVERSITY

CyberSecurity Curricula Development

Department of Defense
9/14/2017 - 9/1/2019
PI: Auffret, Jean-Pierre (Center
for Assurance Research and
Engineering)
Co-PI: Stavrou, Angelos
\$135,170

CDI Type II: Cyber-Enabled Understanding of Complexity in Socio-Ecological Systems via Computational Thinking

National Science Foundation
9/1/2011-6/30/2017
PI: Cioffi-Revilla, Claudio (Center for
Social Complexity)
Co-PI: Luke, Sean; Schopf, Paul
(Atmospheric, Oceanic and Earth
Sciences)
\$1,946,568

Megacities Command and Control Assessment Capability

Defense Advanced Research Projects
1/24/2017 - 7/24/2017
PI: Hieb, Michael R. (C4I and Cyber
Center)
Co-PI: Pullen, J Mark; Crooks, Andrew
T (Computational and Data Science);
Allbeck, Jan M
\$374,998

Preparing K-5 Teachers to Integrate the Computer Science Standards of Learning in Inclusive Classrooms to Support Students with High Incidence Disabilities

National Science Foundation
10/1/2018-09/2021
PI: Amy Hutchison (College of
Education and Human Development)
Co-PI: Offutt, Jeff
\$999,423

Collaborative Research: Deep Insights Anytime, Anywhere (DIA2)

National Science Foundation
4/18/2014- 8/31/2017
PI: Johri, Aditya (Information Sciences
and Technology)
Co-PI: Domeniconi, Carlotta
\$372,251

Network Analysis and Opportunities for Disruption of Organ Trafficking

National Science Foundation
PI: Koizumi, Naoru (Center for Study
of International Medical Policies and
Practices)
Co-PI: Wijesekera, Duminda
2018-2020
\$291,510

III: Summarizing Heterogenous Crowdsourced & Web Streams Using Uncertain Concept Graphs.

National Science Foundation
08/01/2018-07/29/2021
PI: Purohit, Hemant (Information
Sciences and Technology)
Co-PI: Rangwala, Huzefa
\$259,701

Statistical Inference for Molecular Landscapes

National Science Foundation
8/1/2018 - 7/31/2021
PI: Qiao, Wanli (Statistics)
Co-PI: Shehu, Amarda
\$118,718

High-dimensional Statistics and Biomolecular Modeling as a Powerful Microscope over Pathogenic Mutations in Proteinopathies

Jeffress Memorial Trust
6/30/2017 - 3/30/2019
PI: Qiao, Wanli (Statistics)
Co-PI: Shehu, Amarda
\$100,000

Close Air Support Experimentation Campaign

Griffiss Institute/ US Department of
the Air Force
3/15/2016 - 3/31/2017
PI: Roeting, William H (C4I and Cyber
Center)
Co-PI: Pullen, J Mark
\$1,499,955

Mobile Unmanned/manned Distributed Lethality Airborne Network (MUDLAN), Joint Capabilities Technology Demonstration (JCTD) Phase 1

Alion Science & Technology
Corporation
9/13/2017 - 6/20/2019
PI: Roeting, William H (C4I and Cyber
Center)
Co-PI: Pullen, J Mark
\$7,561,429

Mobile Manned/Unmanned Distributed Lethality Airborne Network (MUDLAN)

US Department of the Air Force
3/2/2018 - 3/1/2021
PI: Roeting, William H (C4I and Cyber
Center)
Co-PI: Pullen, J Mark
\$20,095,000

MUDLAN Enhanced Rapid Integration for Transition (MERIT)

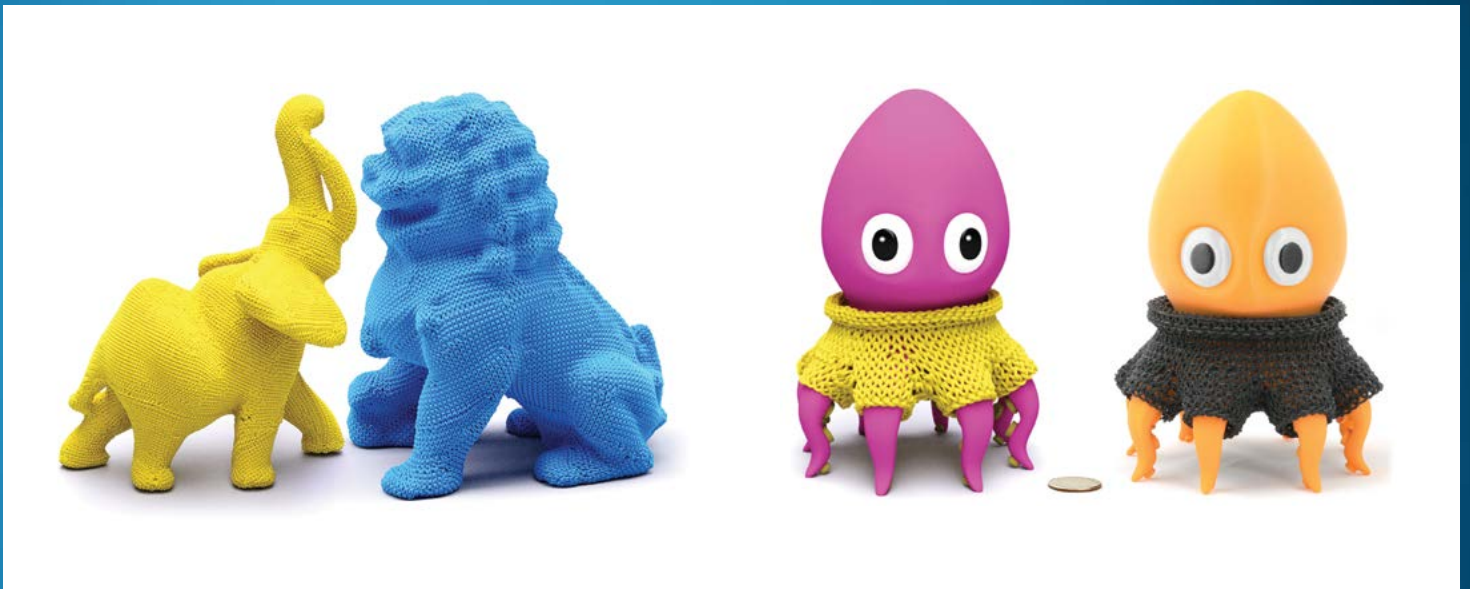
US Department of the Air Force
8/14/2018 - 8/13/2022
PI: Roeting, William H (C4I and Cyber
Center)
Co-PI: Pullen, J Mark; Crissman,
Sherry (C4I and Cyber Center)
\$33,300,012

CPS: Synergy: A Novel Biomechatronic Interface Based on Wearable Dynamic Imaging Sensors.

National Science Foundation
02/01/2014-01/31/2018
PI: Siddhartha Sikdar
(Bioengineering)
Co-PI: Huzefa Rangwala, Jana
Kosecka and Houman Homayoun
(Electrical and Computer
Engineering)
02/01/2014-01/31/2018
\$995,055

The finest clothing made is a person's own skin, but of course society demands something more than this.

– Mark Twain



Images from Seamless: Seam erasure and seam-aware decoupling of shape from mesh resolution Songrun Liu*, Zachary Ferguson*, Alec Jacobson, Yotam Gingold (*Joint first authors) ACM Transactions on Graphics. Presented at SIGGRAPH Asia 2017. Images courtesy Zachary Ferguson