



Computer Science Newsletter

SPRING 2022

Chair's Message

Despite the challenges posed by the pandemic over the past few semesters, the Department has remained strong. Our graduate and undergraduate enrollments are up by about 20% and 10%, respectively, from last spring.

Our faculty have continued to be successful at obtaining grant funding, with major new projects in cybersecurity, computer science education, and cyber physical systems in 2021. We are also strengthening our ties with industry, and Intel provided a generous gift of \$36K to be used towards several diversity initiatives including supporting our Diversity in Computer Science scholarship.

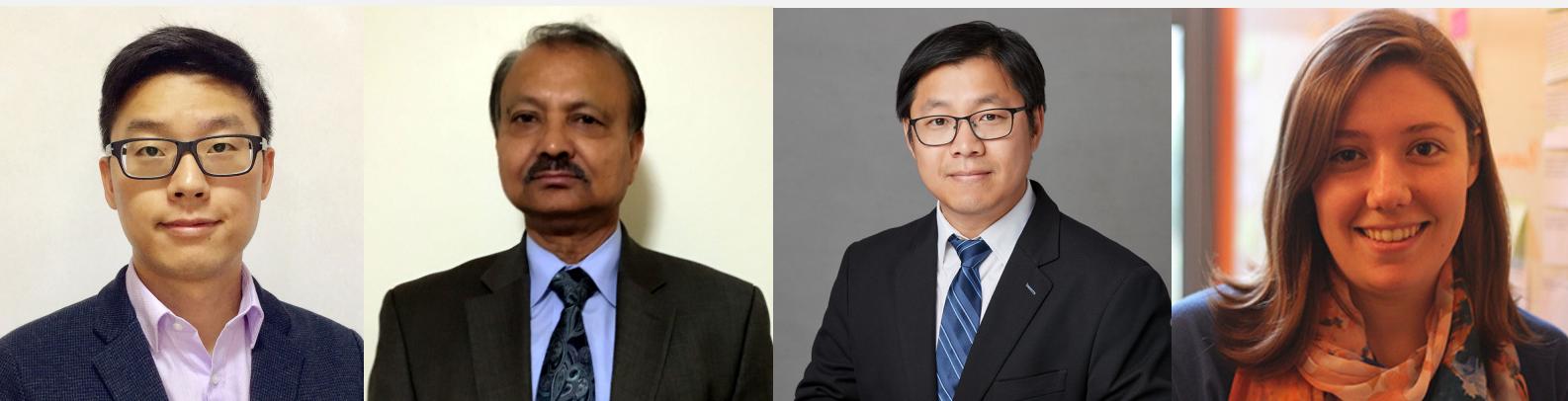
With the UofM's recent achievement of Carnegie R1 status, the Department is well positioned to be a key player moving forward.

Lan Wang
Professor and Chair

New Grant Funding

The department received a \$3.8 million grant from the National Science Foundation to address the growing national demand for cybersecurity professionals. The five-year project, titled "CyberCorps Scholarship for Service: Developing the Cybersecurity Workforce in West Tennessee, Mississippi, and Arkansas," will recruit four cohorts of scholars from the Department of Computer Science, Department of Business Information Technology, College of Engineering, Department of Criminal Justice, and other UofM units. Priority will be given to underrepresented students such as women, minorities, and veterans. The CyberCorps SFS includes a generous annual stipend (\$25K/year for undergraduate students, \$34K/year for graduate students) as well as covering academic and professional fees. Scholarship recipients will commit to post-graduate government employment matching the number of years of support received.

Principal investigator **Prof. Kan Yang** (below left) is leading the project, with **Profs. Dipankar Dasgupta, Myounggyu Won, and Amy Cook** as co-Pls.



Intel has provided a \$36K gift that will be applied towards several diversity initiatives, including sponsoring ten of the department's Diversity in Computer Science scholarships, sponsoring the summer Creative Game Design Camp for high-school students (with coverage of camp tuition for low-income participants), providing industry-based projects for students to work on, and providing access to the Intel Developers Cloud and data center cluster for faculty and student use. This gift was facilitated by Industrial Advisory Board member and department alum **Naga Gurumoorthy** (MS 1997).



New Grant Funding

Prof. Lan Wang is a co-PI of a \$2.7M grant sponsored by the U.S. Army Research Laboratory. The "Multi-UAS Multi-Sensor Intelligence, Surveillance and Reconnaissance" project is led by **Prof. Eddie Jacobs** in the Department of Electrical and Computer Engineering. Other team members include **Profs. Chrysanthi Preza** and **Aaron Robinson** (EECE), along with **Prof. Ron Driggers** (Optical Science, University of Arizona) and **Prof. Kyle Renshaw** (Optics and Photonics, University of Central Florida).

The Center for Information Assurance (CfIA) will lead a \$2M research-based Cybersecurity Education Innovation project funded by the Department of Defense's National Centers of Academic Excellence in Cybersecurity (NCAE-C) program. CfIA has formed a Consortium of NCAE-C institutions with the University of West Florida, North Carolina A&T State University, and The Citadel to improve critical infrastructure cybersecurity. This multi-disciplinary consortium is designed to foster cybersecurity education and training for critical infrastructure sectors in the southeast region and the nation, according to the Principal Investigator **Prof. Dipankar Dasgupta**. This is a 2-year project with yearly effort of \$1M approved as part of the cooperative agreement. CfIA Co-Directors **Dipankar Dasgupta** (Computer Science) and **James McGinnis** (Engineering Technology), along with **Profs. Mohd Hasan Ali** (Electrical Engineering) and **Amanda Rockinson-Szapkiw** (Education), will be leading initiatives on behalf of the UofM.

Center for Information Assurance director **Prof. Dipankar Dasgupta** received a \$251K grant from the National Centers of Academic Excellence in Cybersecurity for "Developing application-specific shared-trust framework for accessing sensitive information." In addition, Dr. Dasgupta is a co-PI on a \$600K grant from DHS/FEMA to develop a cybersecurity training course. The UofM portion of the DHS/FEMA grant is led by **Prof. James McGinnis** (Engineering Technology), and the grant is part of a multi-university \$4M project spearheaded by the University of Arkansas Criminal Justice Institute.



Prof. Sajjan Shiva received funding for his project "Testing Requirements and Functionality of Machine Learning Systems Especially in Cyber Resilient Approaches" from the Department of Homeland Security (DHS), through the Air Force Institute of Technology's (AFIT) Test and Evaluation Center of Excellence.

Faculty and Staff Accolades



Prof. Scott Fleming

received a Dean's Award for Teaching Excellence from the College of Arts and Sciences.

Prof. Vasile Rus received the Jack and Jane Morris Professorship.



Prof. Santosh Kumar received a Distinguished Alumni Award for Academic Excellence from The Ohio State University College of Engineering. In addition, Dr. Kumar was invited to serve in the External Advisory Council of Ohio State's Department of Computer Science & Engineering. His term started in Fall 2021.



Prof. Sajjan Shiva received a College of Arts and Sciences Distinguished Research Award (CASDRA).

Prof. Lan Wang was awarded a 2021-24 Dunavant Professorship. She also served on a panel on "Public Safety's Female Innovators" at the NIST Public Safety Communications Research (PSCR) Annual Conference. She discussed her education and career experience in computer science, and her efforts to promote diversity in STEM education, as well as the challenges faced by the Map901 project and female students' contribution to the project.



Administrative assistant **Rhonda Smothers** received the Spring 2021 Dean's Outstanding Employee Award from the College of Arts and Sciences.

Student and Alumni News

Postdoctoral scholar **Dr. Bhargavi Krishnamurthy** and **Prof. Sajjan Shiva** received the Best Paper Award at the 12th Annual IEEE Information Technology, Electronics and Mobile Communications Conference (IEMCON) in October 2021, for their article "Double-State-Temporal Difference Learning for Resource Provisioning in Uncertain Fog Computing Environment."

Recent doctoral graduates **Rumman Bari** joined Spire Health (a high-tech Silicon Valley startup in Smart Health), **Soujanya Chatterjee** joined Amazon, **Saikat Das** joined Utah Valley State University as an assistant professor, **Kishor Datta Gupta** joined North Carolina A&T University as a postdoc, **Syed Monowar Hossain** joined Facebook, **Ahmad Mahfouz** joined FedEx, **Subash Poudyal** joined Walmart, and **Md Lutfar Rahman** joined Amazon.

Doctoral students **Nazir Saleheen** and **Md Azim Ullah** had a full paper accepted to ACM Conference on Computer and Communications Security (CCS) 2021. Doctoral students **Rumman Bari** and **Sayma Akther** both led a paper each at ACM UbiComp 2021 (published in ACM IMWUT). Doctoral student **Anup Shakya** published a full paper at the 14th International Conference on Educational Data Mining (EDM 2021).

Doctoral students **Mazharul Hossain** and **Subash Poudyal** were awarded first and second place, respectively, in the Math and Computer Science category at the UofM's 33rd Annual Student Research Forum in Spring 2021.

Alumnus **Sidney D'Mello** (PhD 2009) is leading the NSF-funded AI Institute for Student-AI Teaming at the University of Colorado Boulder. Awarded in August 2020, the five-year, \$20M grant is a multidisciplinary effort involving nine universities along with public school districts, private companies, and community leaders. The project aims to explore AI applications in education and workforce development, particularly among historically underrepresented students. D'Mello, currently an associate professor in the Institute of Cognitive Science and the Department of Computer Science at CU Boulder, completed his PhD at the UofM in 2009 working with Emeritus Professors **Stan Franklin** and **Art Graesser**.

Student Spotlight: Walt Williams



Undergraduate **Walt Williams** has been accepted into Google's Computer Science Research Mentorship program and will also be a Research Scientist Intern at Adobe Research over Summer 2022. Walt has a strong interest in machine learning (ML) research and during his first year in the CS program actively participated in ML competitions hosted on Kaggle, finishing one in the top 11% from 1300 competitors. After his first semester, Walt worked in the Center for Information Assurance for one year, where he published a research paper discussing recent trends in social engineering attacks and how ML can be used to mitigate and prevent them. He also presented workshops for CS and ROTC students discussing ML and its uses in cybersecurity and the military.

After his third semester, Walt was hired as a Research Intern with the AutoML (Automated Machine Learning) team at Microsoft Research over Summer 2021. He was responsible for building a ML model that could locate and classify mitotic and non-mitotic cells in images of breast cancer tissue and published a research paper on his work. Called AMDet, his model was used to provide suggestions to pathologists who were trying to label a new dataset of breast cancer images for digital pathology research.

Walt was recently accepted to Google's Computer Science Research Mentorship program, where he is being advised by Dr. Susanna Ricco. He also received offers from research and ML engineering teams at Adobe and IBM and accepted a Research Scientist Internship with Adobe for Summer 2022. After graduating from UofM, Walt plans to pursue his master's degree in Computer Science at Harvard University with the prestigious National GEM Fellowship. He plans to engage in more research as a graduate student while deciding whether to pursue a PhD or finish his master's degree and immediately enter industry.

Alumni Spotlight: Subash Poudyal

Subash Poudyal is a recent PhD graduate who worked with **Prof. Dipankar Dasgupta** on cybersecurity issues. Subash completed his undergraduate studies in computer science and information technology in 2011 from St. Xavier's College, Tribhuvan University of Nepal, after which he worked for about five years as a professional software engineer. He joined the University of Memphis in 2017. In addition to his research work, he served as a system administrator at the Center for Information Assurance and conducted hands-on labs in topics such as web security, network analysis, secure coding, identity management, penetration testing, and malware analysis for both graduate and undergraduate students.

Recently, Subash's work on ransomware and possible AI-based countermeasures was featured in Analytics India Magazine. Cybercriminals are constantly changing their attack strategy, and security checkpoints often miss catching them. "It is possible to capture malware even if they bypass other checkpoints," says Subash. "There is a need for an intelligent way to combat ransomware attacks. We need to leverage the power of artificial intelligence and advanced reverse engineering techniques to build a robust detection system with low false positives and the ability to catch even zero-day ransomware attacks. Our AI framework is designed to address these challenges."

Subash also presented this work at the April 2021 Hot Topics in the Science of Security (HoTSoS) conference, hosted virtually by the National Security Agency.



2021 Computer Science Graduates

Doctor of Philosophy

Nisrine Ait Khayi

Advisor: Prof. Vasile Rus

Dissertation: Advancement Auto-Assessment of Students' Knowledge States from Natural Language Input

Khan Mohammad Al Farabi

Advisor: Prof. Deepak Venugopal

Dissertation: Explanation Techniques using Markov Logic Networks

Zeyad Alshaikh

Advisor: Prof. Vasile Rus

Dissertation: Expert-Generated and Auto-Generated Socratic Tutoring System for Code Comprehension

Saikat Das

Advisor: Prof. Sajjan Shiva

Dissertation: Detection and Explanation of Distributed Denial of Service (DDoS) Attack through Interpretable Machine Learning

Kishor Datta Gupta

Advisor: Prof. Dipankar Dasgupta

Dissertation: Robust Filtering Schemes for Machine Learning Systems to Defend Adversarial Attack

Ahmed Mosbah Elsaeed Mahfouz

Advisor: Prof. Sajjan Shiva

Dissertation: Towards a Holistic Efficient Stacking Ensemble Intrusion Detection System using Newly Generated Heterogeneous Datasets

Sambriddhi Mainali

Advisors: Profs. Max Garzon and Russell Deaton (EECE)

Thesis: Biomolecule Inspired Data Science

Tyler G Moore

Advisor: Prof. Max Garzon

Dissertation: Probabilistic Analysis of Self-assembly

Subash Poudyal

Advisor: Prof. Dipankar Dasgupta

Dissertation: Multi-level Analysis of Malware using Machine Learning

Md Lutfar Rahman

Advisor: Prof. Tom Watson

Dissertation: Unordered CNF Games



2021 Computer Science Graduates

Master of Science

Rodrigo Araujo Borges

Advisor: Prof. Dipankar Dasgupta

Farida R Bagana (Applied Computer Science)

Advisor: Prof. Max Garzon

Andrew D Edmiston

Advisor: Prof. Amy Cook

Yumi Kansakar

Advisor: Prof. Xiaofei Zhang

Thesis: Efficient Core Maintenance on Dynamic Graphs

Sri Satya Lahari Karadla

Advisor: Prof. Weizi Li

Rabie M Rabie

Advisor: Prof. Sajjan Shiva

Suraj Sharma Sapkota

Advisor: Prof. Vasile Rus

Sabira Khanam Shorna

Advisor: Prof. Dipankar Dasgupta

Thesis: Performance Analysis of 5G DDoS Attack using Machine Learning

Ahuti Shrestha

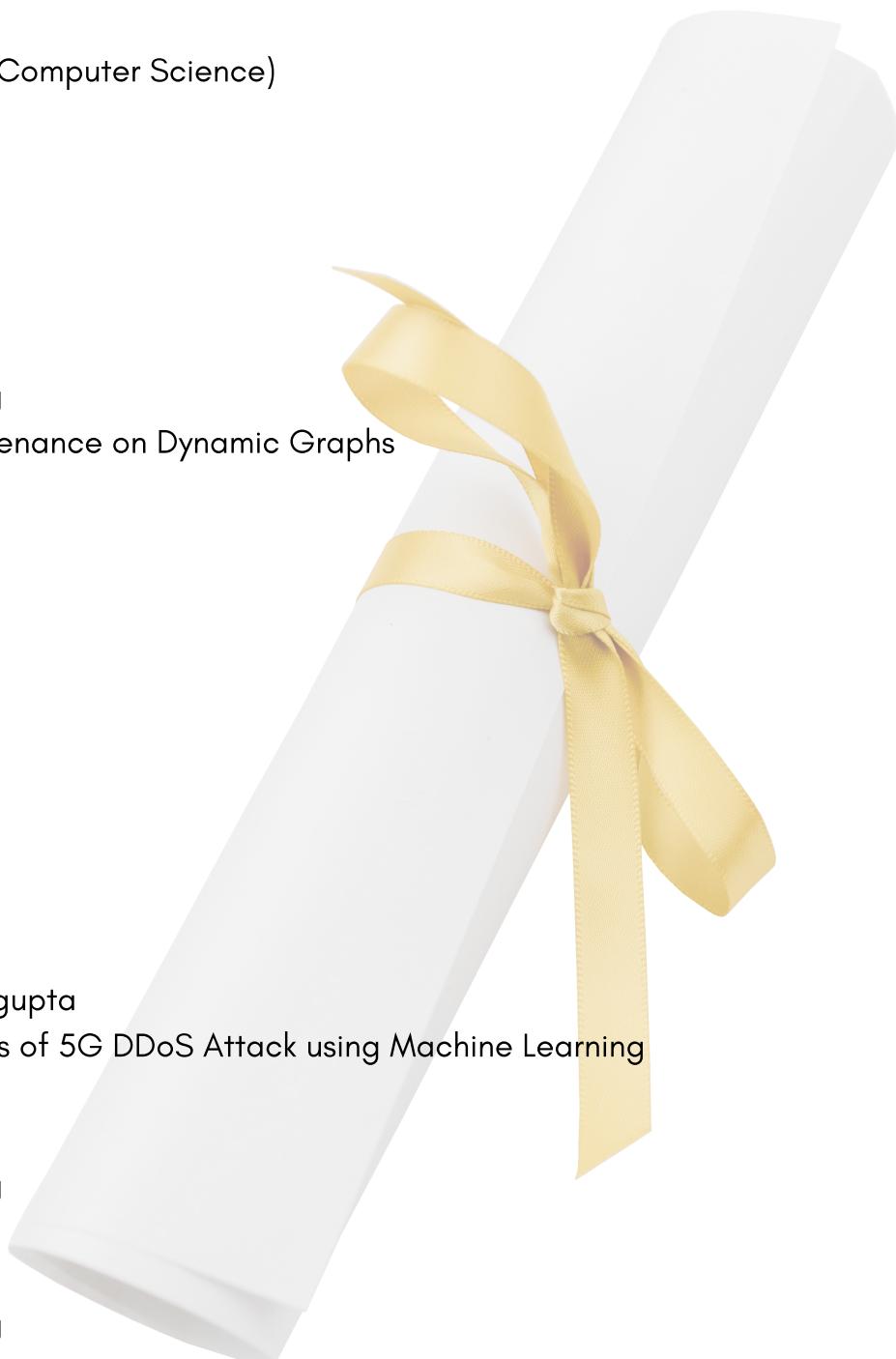
Advisor: Prof. Xiaofei Zhang

Monali V Trivedi

Advisor: Prof. Xiaofei Zhang

Sai Roopa Tummala

Advisor: Prof. Xiaofei Zhang



2021 Computer Science Graduates

Bachelor of Science

Umair Ahmed
Waseem Alghunaim
Hannah M Atkins
Scott H Baxter
Corey E Bedell
Dustin S Black
Kieran R Blazier
Keith L Burks
Keaton A Burleson
George Chen
Jeremy R Clark
Avery L Clary
Jasmine C Coleman
Luke H Conner
Kristin N Davis
Luis A Del Mar
Adam A Denney
Ananya Dirghangi
Marrissa F Dobmeier
Brett G Edmonds
Illyas M Egal
Zachary B Ellis
Wesley J Green
Souad Hadidi
Stephen C Hooker
Chandler S Hunter
Rashaad Jones
Sachita Khanal
Chandler Lambert
Tam N Le
Christine A Lin
Collin P Lucido
Racha A Mansour
Bradley J Martin
Ryan McKinstry

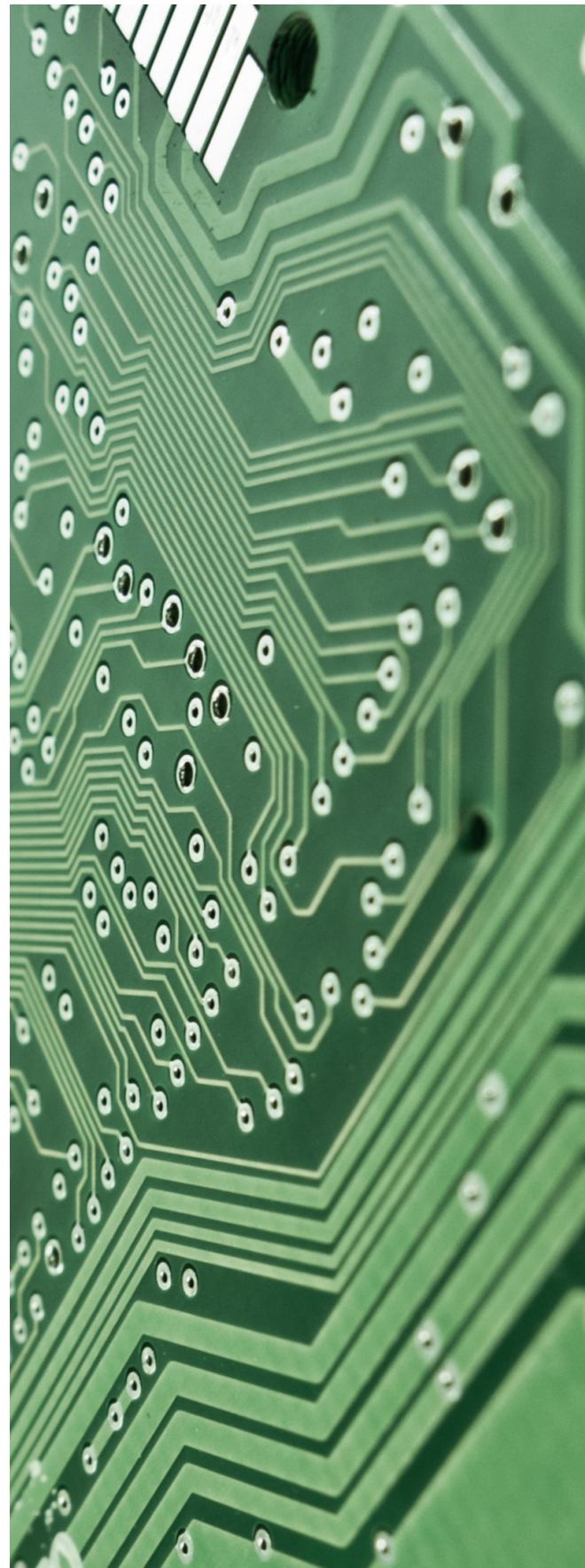
Canon P McLarnon
Michael R Methvin
Ashlee Miller
Eboni N Miller
Michael A Moore
Abdulrahman O Moussa
Aaron B Nguyen
Christopher Nguyen
Khoa H Nguyen
Jordan W Nichols
Ashmal Noorani
Emmanuel N Opara
Christopher J Paden
Jaya Surya Palusum
Mun Young Park
Sahil Patel
Bao Q Phan
Bennett C Poorman
Nathan A Porter
Dustin B Purser
Jacob C Rainey
Justin E Schweigert
Nathan L Seymour
Janet P Sihapanya
Jonathan A Snider
Stephen C Sohns
Kara M Straub
Ala B Sweileh
Dalton R Thomas
Samuel R Vasquez
Taylor M Villarreal
Nhan T Vo
Rhodes A White

CS Minors

Jeffrey A Black
Steven O Chandler
Daniel P O'Malley
Manuel A Palma

2021 Computer Science Internships

Laith Alabdalla - UMRF
Waseem Alghunaim - UMRF
Hannah Atkins - Methodist Le Bonheur Healthcare
Scott Baxter - AutoZone
Corey Bedell - Apple
Rodrigo Borges - FedEx Services
Keith Burks - UMRF
Keaton Burleson - FedEx Express
Stephano Casuso - Virtuality
Thomas Cazort - Germantown Municipal School District
George Chen - Farmers Insurance
Avery Clary - Memphis Zoo
Jose Cupido - Southern Bride
Serena Dean - UMRF
Ilyas Egal - UMRF
Josh Glaser - Motivating Systems
Souad Hadidi - People Shores
Blake Hastings - First Touch Payment Solutions
Md Hawlader - Google
Marshall Lussier - Domino's Pizza
Arielle Morris - UMRF
Christopher Nguyen - FedEx Services
Jaya Palusum - UMRF
Sahil Patel - First Touch Payment Solutions
Spencer Pursley - ALSAC/St. Jude
Rabie Rabie - Intel
Md Lutfar Rahman - Facebook
Brandun Spearman - Lehman-Roberts Company
Kara Straub - UMRF
Dalton Thomas - TBDN
Randy Tran - Vanderbilt University
Sai Tummala - Inteliroute
Azim Ullah - Amazon
Walt Williams - Microsoft Research



Data Science in Python Workshops

Since 2016, the Department has held a regular series of workshops on using Python in data science, aimed at professional clients. These workshops are typically offered in sets of two: an introductory session on Python Programming and Data Analytics, and a follow-up advanced session on Data Science and Machine Learning.

These workshops continued to be held virtually throughout the COVID pandemic. For upcoming workshop dates and to register, please see memphis.edu/cs/outreach/ds_workshops.php.

Supporting the Department

The Department has been fortunate to receive several generous gifts from donors. Gifts can endow professorships, scholarships, fellowships, classrooms, and labs for our students. They can also be used to help defray travel expenses for conferences to present research papers, as well as many other activities that are extremely meaningful to our students and the Memphis community.

If you are interested in making a tax-deductible donation, please visit the University of Memphis Giving site at <http://bit.ly/2wFQwim>. Select *All CAS Funds* at the top, then *Computer Science Discretionary Fund* (for general support) or *Diversity in Computer Science Scholarship* (to support that specific award). Your support is greatly appreciated!

Past donors are recognized on our website at memphis.edu/cs/giving.



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