2023 Hopkins Engineering Exploratory Program March 11-19, 2023

WELCOME



SRI SARMA

Vice Dean for Graduate Education and Lifelong Learning and Associate Professor Department of Biomedical Engineering

e are delighted to welcome you to the Hopkins Engineering Exploratory Program (HEEP)! Our goal is to offer you a glimpse of the Whiting School of Engineering's cutting-edge research and outstanding faculty. Additionally, we will provide you with opportunities to explore

the Homewood campus, graduate-level courses, and both Baltimore and Washington D.C. Throughout the week, we will highlight several master's degrees programs in Engineering and will provide guidance on processes to apply. You will have the opportunity to meet with current graduate students and visit departments of interest. Although each program varies, there is a consistency in rigor across the school. The coursework is designed to provide students with a strong foundation in engineering principles and advanced technical skills. Hopkins also offers flexibility. Our master's programs offer both part-time and full-time options, allowing students to balance their education with their professional and personal responsibilities. Hopkins Engineering is known for its interdisciplinary culture, combining engineering with fields such as computer science, biomedical engineering, and materials science to address complex real-world problems. Students also have access to state-of-the-art research facilities and can seek opportunities to work with renowned faculty members on groundbreaking research projects. Our industry partners provide students with opportunities to network with professionals and gain practical experience through internships and co-op programs. Finally, graduates of Johns Hopkins Engineering master's programs are highly sought after by employers in a variety of industries. The university has a strong career services department that provides students with resources and support to help them achieve their professional goals. We hope you find this experience enriching and inspiring—welcome to Johns Hopkins University!

TABLE OF CONTENTS

Program at a Glance	2
Campus Map	4
About WSE	6
Lecturers	7
Anton (Tony) Dahbura	7
Anqi (Angie) Liu	8
Swaroop Vedula	9
Ishan Barman	10
Ehsan Azimi	11
Vishal Patel	12
Yinzhi Cao	13
Mathias Unberath	14
Russell Taylor	15
Nitish Thakor	16
Mark Dredze	17
Alejandro Martin-Gomez	18
Pam Sheff	19
Lauren Gardner	20
Rama Chellappa	21
Rajat Mittal	22
Department	23
Applied Mathematics and Statistics	23
Biomedical Engineering	23
Chemical and Biomolecular Engineering	24
Civil and Systems Engineering	24
Computer Science	25
Electrical and Computer Engineering	25
Environmental and Health Engineering	26
Materials Science and Engineering	26
Mechanical Engineering	27
The Center for Leadership Education	27
Baltimore	28
Resources	29

2023 HEEP AT A GLANCE

Saturday, March 11				
3 p.m.	Arrival and Check-in			
	Inn at the Colonnade-Double Tree			
	Hilton Hotel, Baltimore, MD			
6:30 p.m.	Dinner at the hotel restaurant			
Sunday, March 12				
11 a.m.	Welcome Reception (Brunch)			
	at Ambassador Dining Room			
1 to 1:30 p.m.	Welcome remarks by Sri Sarma			
	(Vice Dean for Education)			
1:30 to 3 p.m.	Student panel at Recreation Center			
	Multi-Purpose Room A			
3 p.m.	Exploring Baltimore			
5 p.m.	Dinner with student mentors at Nolan's			
Monday, March 13	ut AL (Clark Hall 216)			
Day 1: Let's Talk Abo 7:30 to 8:30 a.m.	Breakfast at Hopkins Café			
9 to 10:30 a.m.	Tony Dahbura – The Promise and Perils of AI			
10:30 to 11 a.m.	Mini-sessions from student services offices			
11 a.m. to 12:30 p.m.	Angie Liu – AI Fairness and Bias			
12:30 to 2 p.m.	Lunch at Levering Kitchens			
2 to 3:30 p.m.	Swaroop Vedula – AI in Healthcare			
3:30 to 4 p.m.	Mini-sessions from student services offices			
4 to 5:30 p.m.	Ishan Barman – AI and Optical Imaging			
5:30 to 7 p.m.	Dinner at Nolan's			
7 p.m.	Social event with current graduate students			
	at Levering Lounge			
Tuesday, March 14				
Day 2: Let's Continue 7:30 to 8:30 a.m.	to Talk About AI (Shriver Hall, Clipper Room) Breakfast at Hopkins Café			
9 to 10:30 a.m.	Ehsan Azimi – AR/VR in Healthcare			
10:30 to 11 a.m.	Mini-sessions from student services offices			
11 a.m. to 12:30 p.m.	Vishal Patel – AI and Vision			
12:30 to 2 p.m.	Lunch at Levering Kitchens			
2 to 3:30 p.m.	Yinzhi Cao – AI Security and Privacy			
3:30 to 4 p.m.	Mini-sessions from student services offices			
4 to 5:30 p.m.	Mathias Unberath - Applications of AI			
5:30 to 7 p.m.				
5.50 to 7 p.m.	Dinner at Nolan's			
7 p.m.	Dinner at Nolan's Social event with current graduate students at Levering Lounge			

Wednesday, March 15

Day 3: Engineering in 7:30 to 8:30 a.m.	Medicine and Healthcare (Imagine Center) Breakfast at Hopkins Café		
9 to 10:30 a.m.	Russell Taylor – AI in Surgical Procedures		
10:30 to 11 a.m.	Mini-sessions from student services offices		
11 a.m. to 12:30 p.m.	Nitish Thakor – Neuroengineering and		
	Biomedical Instrumentation		
12:30 to 2 p.m.	Lunch at Hopkins Café		
2 to 3:30 p.m.	Mark Dredze – Large Language Models		
3:30 to 4 p.m.	Mini-sessions from student services offices		
4 to 5:30 p.m.	Alejandro Martin-Gomez – AR/VR Application in Medicine		
5:30 to 7 p.m.	Dinner at Hopkins Café		
7 p.m.	Open House Observatory at Physics and Astronomy building		

Thursday, March 16

Day 4: Engineering M	anagement and COVID-19 Dashboard		
(Shriver Hall, Clipper Room)			
7:30 to 8:30 a.m.	Breakfast at Hopkins Café		
9 a.m. to 12 p.m.	Pamela Sheff – Engineering Management		
12:30 to 2 p.m.	Lunch at Hopkins Café		
2 to 3:30 p.m.	Lauren Gardner – COVID-19 Dashboard		
3:30 to 5 p.m.	Rajat Mittal – Exploring the World Through Fluid Mechanics		
5:30 to 8:30 p.m.	Banquet at Inn at the Colonnade Hotel, Canterbury Ballroom		

Friday, March 17

Day 5: Personalized D	Department Visits and Classroom Lectures
(Clark Hall 316)	
7:30 to 8:30 a.m.	Breakfast at Hopkins Café
9 to 10 a.m.	Keynote speaker: Rama Chellappa - Growing with AI
10 to 10:30 a.m.	Provost, Sunil Kumar remarks
10:30 to 11 a.m.	Closing Ceremony

Saturday, March 18

Day 6: Washington D.C. Tour

Sunday, March 19		
11 a.m.	Check-out and Departure	

CAMPUS



March 13

Tony Dahbura *The Promise and Perils of AI*

Angie Liu AI Fairness and Bias

Swaroop Vedula AI in Healthcare

Ishan Barman AI and Optical Imaging

March 14

Ehsan Azimi AR/VR in Healthcare

Vishal Patel AI and Vision

Yinzhi Cao AI Security and Privacy

Mathias Unberath Applications of AI

March 15

Russell Taylor AI in Surgical Procedures

Nitish Thakor Neuroengineering and Biomedical Instrumentation

Mark Dredze Large Language Models

Alejandro Martin-Gomez AR/VR Application in Medicine



ampus bookstore)

March 16 Pamela Sheff

Engineering Management

Lauren Gardner COVID-19 Dashboard

Rajat Mittal

Exploring the World Through Fluid Mechanics

March 17

Rama Chellappa Growing with AI

Where to Eat Levering Kitchens

Levering Café Hopkins Café Nolan's on 33rd

Hotel

Inn at the Colonnade-Double Tree Hilton Hotel, Baltimore, MD

A BOULT WS E HOPKINS ENGINEERING: CREATING A BETTER FUTURE.

Excellence in Education, Research, and Translation

We are the source of many of the discoveries and innovations that have shaped the past and are defining the future. From potable water in the 1920s to 21stcentury prosthetic limbs, to a COVID-19 tracking map, we solve complex global challenges to make the world a better place.



Our faculty members are pioneers in their fields, our students are dedicated and driven, and our entire community contributes to the outstanding resources and breadth of expertise that exemplify Johns Hopkins University.

We are defined by a culture of intentional collaboration. Our strategic partnerships—across the institution and around the world—advance technology, human health, and resiliency.

BY THE NUMBERS	20+	part time/ master's deg certifica	rees and	2,000 undergraduate
g departments	Š 20	ON external	research	students
25+ centers and institutes			ling Numni	2,500+ graduate students
200+ faculty	undergraduate and graduate programs in Biomedical Engineering (U.S. News & World Report)			5,000+ online students
FULL-TIME F	PROGRAMS	13 bachelor's	17 master's	10 doctoral

MONDAY, MARCH 13



ANTON (TONY) DAHBURA

Executive Director of Johns Hopkins Information Security Institute and Co-Director of the Johns Hopkins Institute for Assured Autonomy **Department of Computer Science** ANTONDAHBURA@JHU.EDU

THE PROMISE AND PERILS OF AL 9 to 10:30 a.m. Clark Hall 316

RESEARCH AREAS

Assured Autonomy Information Security Fault Tolerant Computing

Protocol Conformance Testing Sports Analytics Scheduling Optimization

Anton (Tony) Dahbura is the executive director of the Johns Hopkins University Information Security Institute, co-director of the Johns Hopkins Institute of Assured Autonomy, and an associate research scientist in computer science. He has secondary appointments at the Malone Center for Engineering in Healthcare and the Laboratory for Computational Sensing and Robotics.

Dahbura's research focuses on computer science, security, online privacy, artificial intelligence, fault-tolerant computing, distributed systems, and testing. He is also advising students' analytic research of baseball that includes, among other topics, whether batters perform differently in games with wide score margins. He is part owner of the Hagerstown Suns minor league baseball team and, with his wife, Marlaina, provides data analytics consulting for professional teams in Mexico.

He received his BSEE, MSEE, and PhD in electrical engineering and computer science from the Johns Hopkins University in 1981, 1982, and 1984, respectively.

MONDAY, MARCH 13 (CONT'D) ANQI (ANGIE) LIU



Assistant Professor Department of Computer Science ALIU@CS.JHU.EDU ANOILIU-AI.GITHUB.IO/#ABOUT

AI FAIRNESS AND BIAS 11 a.m. to 12:30 p.m. Clark Hall 316

RESEARCH AREAS Statistical Machine Learning Deep Learning

Sequential Decision Making

Scheduling Optimization Anqi (Angie) Liu is an assistant professor in the Department of Computer Science. She is broadly interested in developing principled machine learning algorithms for building more reliable, trustworthy, and human-compatible AI systems in the real world. Her research focuses on enabling the machine learning algorithms to be robust to the changing data and environments, to provide accurate and honest uncertainty estimates, and to consider human preferences and values in the interaction. She is particularly interested in high-stake applications that concern the safety and societal impact of AI.

She develops, analyzes, and applies methods in statistical machine learning, deep learning, and sequential decision making. Her recent projects cover topics in different types of distribution shifts, active learning, safe exploration, off-policy learning, fair machine learning, semi-supervised learning, cost-sensitive classification, and hierarchical classification.

She completed her postdoc in the Department of Computing and Mathematical Sciences at the California Institute of Technology and obtained her PhD from the Department of Computer Science at the University of Illinois at Chicago.

MONDAY, MARCH 13 (CONT'D) SWAROOP VEDULA



Assistant Research Professor Malone Center for Engineering in Healthcare VEDULA@JHU.EDU

Al IN HEALTHCARE 2 to 3:30 p.m. Clark Hall 316

RESEARCH AREAS Surgery

Epidemiology

Biostatistics Machine Learning

Swaroop Vedula is an epidemiologist and a medical doctor with surgical training. His research interests overlap several disciplines including clinical trials, different areas of surgery, epidemiology, biostatistics, and machine learning. He works on research related to measuring surgical skill and competency, technology for acquisition of motor and cognitive skill by surgeons, methods for fair comparisons of surgical interventions to estimate treatment effectiveness, analytics for surgical processes, and robotic assistance for skill acquisition and surgical coaching.

MONDAY, MARCH 13 (CONT'D) ISHAN BARMAN



Associate Professor Department of Mechanical Engineering IBARMAN@JHU.EDU

AI AND OPTICAL IMAGING 4 to 5:30 p.m. Clark Hall 316

RESEARCH AREAS Spectroscopy Biomedical Optic

Biosensors

Ishan Barman is an associate professor of mechanical engineering with a joint appointment in the Johns Hopkins Sidney Kimmel Comprehensive Cancer Center. His research focuses on bioengineering, optics, and spectroscopy, with a particular interest in developing integrative photonics solutions to complex problems in biological research and diagnosis. He seeks to advance photonics methods for applications in clinical diagnosis, on the comprehensive characterization of biomolecules, the investigation of pharmaceutical drugs and their interaction with biological systems, and on rapid measurements in microfluidic platforms.

Barman received his BTech at the Indian Institute of Technology and his SM and PhD at the Massachusetts Institute of Technology. Following a postdoctoral fellowship at the Laser Biomedical Research Center at MIT, Barman established his independent group, the Barman Laboratory, at Johns Hopkins in 2014. By combining optical spectroscopy, chemical imaging, and nanoplasmonics, the Barman Laboratory integrates insight about structural and molecular data to develop noninvasive approaches to disease mechanisms.

TUESDAY, MARCH 14 Ehsan Azimi



Assistant Research Professor Department of Computer Science EAZIMI1@JHU.EDU

AR/VR IN HEALTHCARE 9 to 10:30 a.m. Shriver Hall, Clipper Room

RESEARCH AREAS Augmented Reality Robotics

Human-Computer Interaction

Ehsan Azimi, assistant professor of computer science, is an affiliate of the Malone Center for Engineering in Healthcare. Azimi's research areas include augmented reality, robotics, and human-computer interaction. He is also a Provost's Postdoctoral Fellow and Siebel Scholar.

Before his appointment at Johns Hopkins, he worked at Harvard Medical School where he innovated a method that improves the resolution and dynamic range of a medical imaging system. He holds multiple patents, and his work has led to more than 30 peer-reviewed articles accepted for journals and conferences.

Azimi earned his PhD in computer science from Johns Hopkins University.

IIFSDAY, MARCH 14 (CONT'D) VISHAI PATFI



Associate Professor Department of Electrical and **Computer Engineering** VPATEL36@JHU.EDU

ALAND VISION 11 a.m. to 12:30 p.m. Shriver Hall, Clipper Room

RESEARCH AREAS

Biomedical Image Analysis Biometrics Machine Learning **Computer Vision**

Signal and Image Processing

Vishal M. Patel is an associate professor of electrical and computer engineering and a member of the Vision and Image Understanding Lab. His research interests are focused on biomedical image analysis, biometrics, computer vision, machine learning, and signal and image processing.

Patel is an associate editor of the IEEE Transactions on Pattern Analysis and Machine Intelligence journal and serves on the Machine Learning for Signal Processing (MLSP) Committee of the IEEE Signal Processing Society. He serves as the vice president of conferences for the IEEE Biometrics Council.

He has received a number of awards including the 2021 IEEE Signal Processing Society (SPS) Pierre-Simon Laplace Early Career Technical Achievement Award, the 2021 NSF CAREER Award, and the 2021 IAPR Young Biometrics Investigator Award (YBIA).

Prior to joining Hopkins, he was an A. Walter Tyson Assistant Professor in the Department of ECE at Rutgers University and a member of the research faculty at the University of Maryland Institute for Advanced Computer Studies (UMIACS). He completed his PhD in electrical engineering at the University of Maryland, College Park in 2010.

TUESDAY, MARCH 14 (CONT'D) YINZHI CAO



Assistant Professor Department of Computer Science YINZHI.CAO@JHU.EDU YINZHICAO.ORG

AI SECURITY AND PRIVACY 2 to 3:30 p.m. Shriver Hall, Clipper Room

RESEARCH AREAS Security and Privacy of Machine Learning Web

Mobile Payment Systems

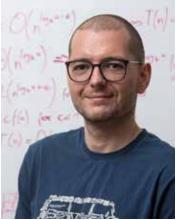
Yinzhi Cao is an assistant professor in computer science whose research focuses on the security and privacy of our web, network, and mobile systems. He joined Johns Hopkins in 2018 from Lehigh University, where he was an assistant professor.

Cao has been awarded the 2022 DARPA Young Faculty Award (YFA), 2021 NSF CAREER, and 2017 and 2022 Amazon Research Awards.

Cao is affiliated with the Johns Hopkins University Institute of Assured Autonomy (IAA) and the Johns Hopkins University Information Security Institute (ISI). His current projects are vulnerability analysis of web applications and security, privacy, and fairness analysis of machine learning systems.

Cao received his BE in electronic engineering from Tsinghua University (China) and his PhD in computer science from Northwestern University.

IUESDAY, MARCH 14 (CONT'D) MATHIAS UNBERATH



Assistant Professor Department of Computer Science MATHIAS@JHU.EDU MATHIASUNBERATH.GITHUB.IO

APPLICATIONS OF AI 4 to 5:30 p.m. Shriver Hall, Clipper Room

RESEARCH AREAS Imaging Computer Vision

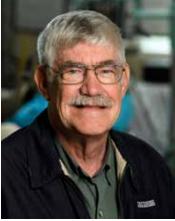
Machine Learning Interaction Design

Signal and Image Processing Mathias Unberath is an assistant professor in the Department of Computer Science, as well as a core faculty member in the Laboratory for Computational Sensing and Robotics and the Malone Center for Engineering in Healthcare. He holds a secondary appointment in ophthalmology.

With his group—the Advanced Robotics and Computationally AugmenteD Environments (ARCADE) lab—he advances healthcare by creating collaborative intelligent systems that support clinical workflows. Through synergistic research on imaging, computer vision, machine learning, and interaction design, he builds human-centered solutions that are embodied in emerging technology such as mixed reality and robotics.

He completed his PhD in computer science at the Friedrich-Alexander-Universität Erlangen-Nürnberg from which he graduated summa cum laude. While completing a bachelor's in physics and a master's in optical technologies at FAU Erlangen, Mathias studied at the University of Eastern Finland as an ERASMUS scholar and then joined Stanford University as a DAAD fellow.

WEDNESDAY, MARCH 15



RUSSELL TAYLOR

John C. Malone Professor **Department of Computer Science Department of Mechanical Engineering** RHT@JHU.EDU

AI IN SURGICAL PROCEDURES 9 to 10:30 a.m. **Imagine Center**

RESEARCH AREAS Computer Science Robotics Human-Machine **Cooperative Systems**

Medical Imaging and Modeling Computer-Integrated Interventional Systems

Russell H. Taylor is the John C. Malone Professor in the Department of Computer Science and the director of the Laboratory for Computational Sensing and Robotics with secondary appointments in mechanical engineering, otolaryngology, head and neck surgery, radiology, and surgery.

Taylor's research interests include computer science, robotics, human-machine cooperative systems, medical imaging and modeling, and computer-integrated interventional systems.

He is a Fellow of the IEEE, the National Academy of Inventors, AIMBE, the MICCAI Society, and the Engineering School of the University of Tokyo, and was elected to the National Academy of Engineering. He is the recipient of numerous awards, including the IEEE Robotics Pioneer Award, IEEE EMBS Technical Field Award, the MICCAI Society Enduring Impact Award, and the Honda Prize. He has served on numerous editorial and scientific advisory boards

He received a Bachelor of Engineering Science degree from Johns Hopkins University and a PhD in computer science from Stanford University.

WEDNESDAY, MARCH 15 (CONT'D)



Professor

Department of Biomedical Engineering Department of Electrical and Computer Engineering

NTHAKOR@BME.JHU.EDU NEUROENGINEERING.BME.JHU.EDU

NEUROENGINEERING AND BIOMEDICAL INSTRUMENTATION 11 a.m. to 12:30 p.m.

Imagine Center

RESEARCH AREAS Imaging and Medical Devices

Neuroengineering

Nitish Thakor is a professor of biomedical engineering at the Whiting School of Engineering and neurology at the Johns Hopkins University School of Medicine. He also has an appointment in the Whiting School's Department of Electrical and Computer Engineering. He conducts research on neurological instrumentation, biomedical signal processing, micro and nanotechnologies, neural prosthesis, clinical applications of neural and rehabilitation technologies, and brain-machine interface.

Thakor directs the Laboratory for Neuroengineering and is also the director of the NIH Training Grant on Neuroengineering.

One of Thakor's research projects, in collaboration with a multi-university consortium funded by DARPA, focuses on developing a next-generation neurally controlled upper limb prosthesis. He is actively engaged in developing international scientific programs, collaborative exchanges, tutorials, and conferences in the field of biomedical engineering.

He received his undergraduate degree from the Indian Institute of Technology. He earned both a master's and doctoral degree in biomedical engineering from the University of Wisconsin-Madison. Thakor joined the Johns Hopkins faculty in 1983.

WEDNESDAY, MARCH 15 (CONT'D) MARK DREDZE



WAKK UKLULL John C. Malone Associate Professor Department of Computer Science

MDREDZE@CS.JHU.EDU

LARGE LANGUAGE MODELS 2 to 3:30 p.m. Imagine Center

RESEARCH AREAS Big Language Data

Public Health Informatics

Mark Dredze, a John C. Malone Associate Professor in the Department of Computer Science, is internationally recognized for mining big language data to pioneer new applications in public health informatics. One of the founders of this emerging field, he develops machine learning and natural language processing tools to gain insights from the web's endless data to better understand human behavior and to inform public health policy and interventions. His research is providing unprecedented insights on suicide prevention, vaccine refusal, HIV, tobacco, gun violence, and other public health issues.

Dredze holds a secondary appointment in the Johns Hopkins University School of Medicine Department of Health Sciences Informatics and is a visiting professor at the Applied Physics Laboratory.

He received a BS in computer science, a BS in computer engineering, and a minor in psychology from Northwestern University, an MA in modern Jewish history from Yeshiva University, and a PhD in computer science from the University of Pennsylvania.

WEDNESDAY, MARCH 15 (CONT'D) ALEJANDRO MARTIN-GOMEZ



Assistant Research Professor Department of Computer Science ALEJANDRO.MARTIN@JHU.EDU

AR/VR APPLICATION IN MEDICINE 4 to 5:30 p.m. Imagine Center

RESEARCH AREAS Visual Perception

Augmented and Virtual Reality

Alejandro Martin-Gomez is an assistant research professor in the Department of Computer Science and a member of the Laboratory for Computational Sensing and Robotics (LCSR). His research interests include the study of fundamental concepts of visual perception and their transferability to medical applications that involve using augmented and virtual reality.

His work has been published in journals and conference proceedings, including the *IEEE International Symposium on Mixed and Augmented Reality*, at the IEEE Conference on Virtual Reality and 3D User Interfaces, and in *IEEE Transactions on Visualization and Computer Graphics*. He also has served as a mentor and adviser to several students and scholars at the Technical University of Munich, Johns Hopkins University, and more recently, at the Friedrich-Alexander University of Erlangen-Nürnberg. In addition, he is involved in professional editorial activities and has been a program committee member for the International Symposium on Mixed and Augmented Reality in 2016, 2018, and 2021.

Before joining Johns Hopkins, Martin-Gomez completed his PhD in computer science at the Technical University of Munich, from which he graduated summa cum laude.

THURSDAY, MARCH 16



PAM SHEFF

Director, Center for Leadership Education and Master of Science in Engineering Management Program **Center for Leadership Education** PSHEFF@JHU.EDU

ENGINEERING MANAGEMENT 9 a.m. to 12 p.m. Shriver Hall, Clipper Room

RESEARCH AREAS Business Communications

Pamela H. Sheff is the director of the Center for Leadership Education and the Master of Science in Engineering Management Program at Johns Hopkins University.

She is an award-winning writer and marketing communications consultant who founded Sheff & Lano Communications, which specialized in developing and writing public and in-house communications for corporate, institutional, and government clients.

Sheff is a founder of the Goucher Prison Education Partnership which offers a liberal arts college degree program to people incarcerated in the state of Maryland.

She serves on the board of Advocates for the Goucher Prison Education Partnership.

She holds a PhD in English from Harvard University and has previously taught in both the writing program and communications department at Goucher College. She has developed and taught business communications courses for private companies, and prior to becoming a consultant, served for three years as the assistant public affairs director and editorial director for WMAR-TV.

THURSDAY, MARCH 16 (CONT'D) LAUREN GARDNER



Alton and Sandra Cleveland Professor Department of Civil and Systems Engineering

L.GARDNER@JHU.EDU SYSTEMS.JHU.EDU/LAUREN_GARDNER

COVID-19 DASHBOARD 2 to 3:30 p.m. Shriver Hall, Clipper Room

RESEARCH AREAS Data Analysis Public Health

Civil Systems Engineering

Lauren Gardner is the Alton and Sandra Cleveland Professor in the Department of Civil and Systems Engineering at Johns Hopkins Whiting School of Engineering and holds a joint appointment in the Bloomberg School of Public Health.

She is the creator of the interactive web-based dashboard used by public health authorities, researchers, and the general public around the globe to track the outbreak of the novel coronavirus that spread worldwide beginning in January 2020, infecting more than 47 million people and killing more than 1.2 million people around the world. The dashboard, which debuted on January 22, 2020, continues to be cited every day by multiple major media outlets. It served as a resource for a number of federal agencies, including U.S. Vice President Mike Pence's coronavirus task force.

Gardner was named one of *TIME*'s 100 Most Influential People of 2020 for "democratizing data" and filling "a void of public health leadership" during the pandemic. She also won the 2022 Lasker~Bloomberg Public Service Award, America's top medical research prize.

Prior to joining JHU in 2019, Gardner was a senior lecturer in civil engineering at the University of New South Wales (UNSW) Sydney, in Australia. She received her BSArchE in architectural engineering, her MSE in civil engineering, and her PhD in transportation engineering at the University of Texas at Austin.

THURSDAY, MARCH 16 (CONT'D) RAJAT MITTAL



Professor

Department of Mechanical Engineering MITTAL@JHU.EDU

EXPLORING THE WORLD THROUGH FLUID MECHANICS 3:30 to 5 p.m. Shriver Hall, Clipper Room

RESEARCH AREAS Computational Fluid Dynamics Biomedical Flows Active Flow Control

Immersed Boundary Methods Fluid Dynamics of Locomotion

Rajat Mittal, a professor of mechanical engineering, is an expert in computational fluid dynamics with a secondary appointment in the JHU School of Medicine.

Mittal's work has had a significant impact on the field of computational fluid mechanics and computational biomechanics. His recent research has focused on active and passive control of flows, swimming and flying in animals, multiphysics modeling of heart murmurs, blood clots and heart valves, and the biomechanics of digestion. His research has received funding from the National Institutes of Health, National Science Foundation, U.S. Air Force, Office of Naval Research, Army Research Office, Defense Advanced Research Projects Agency (DARPA), and NASA.

He is an associate editor for four peer-reviewed journals and has published more than 200 papers in academic journals. He has served as a technical consultant for a variety of organizations and has received several fellowships and awards.

Mittal earned his bachelor's degree in aeronautical engineering from the Indian Institute of Technology, Kanpur. He received a master's in aerospace engineering from the University of Florida and a doctorate in applied mechanics from the University of Illinois at Urbana-Champaign. He completed postdoctoral research at the Center for Turbulence Research at Stanford University, where he conducted research in large-eddy simulation of complex turbulent flows.

FRIDAY, MARCH 17



RAMA CHELLAPPA

Bloomberg Distinguished Professor Department of Electrical and **Computer Engineering Department of Biomedical Engineering** RCHELLA4@JHU.EDU AIEM.JHU.EDU

GROWING WITH AI 9 to 10 a.m. Clark Hall 316

RESEARCH AREAS Computer Vision Biomedical Data Science

Artificial Intelligence Machine Learning

Rama Chellappa, a Bloomberg Distinguished Professor of electrical and computer engineering and biomedical engineering and chief scientist at the Johns Hopkins Institute for Assured Autonomy, is a pioneer in artificial intelligence. His work in computer vision, pattern recognition, and machine learning have had a profound impact on areas including biometrics, smart cars, forensics, and 2D and 3D modeling of faces, objects, and terrain. His work in motion capturing and imaging shows promise for future use in healthcare and medicine. He is also a member of Johns Hopkins' Mathematical Institute for Data Science and the Center for Imaging Science.

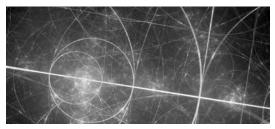
Chellappa's research has shaped the field of facial recognition technologydeveloping detailed face models based on shape, appearance, texture, and bone and muscle structure. He also is known as an expert in machine learning, a branch of artificial intelligence that instructs computer systems to perform tasks based on patterns and inferences.

He earned his doctorate in electrical engineering from Purdue University in Indiana.

DEPARTMENTS APPLIED MATHEMATICS AND STATISTICS

Solutions for Real-World Problems.

Powered by the unique juxtaposition of mathematics and statistics, the Department of Applied Mathematics and Statistics (AMS) emphasizes research and education that advances fundamental



knowledge of mathematics and statistics, as well as the application of mathematical models to solve problems across science, engineering, medicine, and society. Our degree programs and research all reflect this interdisciplinary focus. Building upon the department's historic focus on applied mathematics, we have developed major training and research areas in probability and statistics, operations research and optimization, discrete mathematics, financial mathematics, and applied analysis and computational mathematics. Our collaborative work with colleagues from across the university has led to advances in medical imaging, social network analysis, bioinformatics, and the understanding of turbulence.

BIOMEDICAL ENGINEERING Engineering the Future of Medicine.



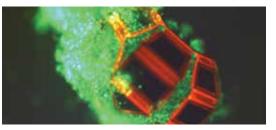
The Department of Biomedical Engineering (BME) is home to the nation's first and top-ranked training program in the field, setting the bar for BME research and education for more than 50 years. Our unique position

within the Johns Hopkins schools of Engineering and Medicine fosters close collaborations between leading engineers, physicians, and industry partners, providing the pathways needed to translate research advances to clinical use. Our pioneering students and faculty are developing the technologies that diagnose and treat disease, transforming the practice of medicine, and improving human health on a global scale.

DEPARTMENTS (CONT'D) CHEMICAL AND BIOMOLECULAR ENGINEERING

Innovating for Impact.

Combining an interdisciplinary culture of innovation with world-class faculty and deep connections to Johns Hopkins School of Medicine, the Department of Chemical and Biomolecular Engineering (ChemBE) is



tackling some of the world's most challenging problems. Using the tools of chemistry, biology, physics, and data science, we develop chemical and biological technologies for an array of industries—chemical and pharmaceutical production, biomedicine, biotechnology, material design, food, and energy—making an impact worldwide.

CIVIL AND SYSTEMS ENGINEERING Civilization Engineered.



The Department of Civil and Systems Engineering (CaSE) is redefining the practice of civil engineering by integrating civil and systems engineering to bring scientifically grounded analysis to grand societal

challenges. Our goal is to improve the safety, security, and resiliency of an increasingly fragile and complex infrastructure that is threatened by evolving natural and human-made hazards. Building on our department's longstanding strengths in mechanics of materials, structures, and systems, and cross-fertilized with research from other fields, CaSE is tackling five fundamental civil engineering challenges of the coming century: resilient cities, human safety and security, space exploration and habitation, decision-making for health, and future energy infrastructure.

DEPARTMENTS (CONT'D) COMPUTER SCIENCE

Powering Discovery and Innovation in Engineering, Science, and Society.

The mission of the Department of Computer Science is to enhance discovery and innovation in engineering, science, and society through research and education. Our research is intensely collaborative and



interdisciplinary. Our faculty members' expertise is broad, encompassing core computer science and a range of application areas. As leaders of major universitywide computing-intensive initiatives, they contribute to the advancement of knowledge across disciplines and are making an impact on the world in areas ranging from medical robotics to cybersecurity. Equally important is the preparation of skilled, visionary graduates who are advancing knowledge and fulfilling the promise of today's revolution in computation and artificial intelligence through a diverse and inclusive community.

ELECTRICAL AND COMPUTER ENGINEERING



While research conducted in the Department of Electrical and Computer Engineering (ECE) covers a wide range of applications, the question that underlies every ECE project remains the same: How can we help? Through

our research collaborations with partners from across the university and around the world, we are accelerating our understanding of science and engineering to fuel innovations that make an impact on society and shape our experiences of the world—from smart tools that reduce human error in surgery and prosthetics that are controlled by the user's mind to ultrafast photonics that speed information transmission and advances that are making alternative energy technologies more efficient.

DEPARTMENTS (CONT'D) ENVIRONMENTAL AND HEALTH ENGINEERING

Working Toward a Healthy and Sustainable World.

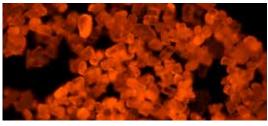
Faculty and students in the cross-divisional Department of Environmental Health and Engineering (EHE) translate fundamental science into innovative, multidisciplinary solutions to critical and complex challenges at the



interface of public health and engineering. The department's unique structure, spanning Johns Hopkins Whiting School of Engineering and Bloomberg School of Public Health, expresses both divisions' deep commitment to cross-disciplinary research and education. With faculty whose expertise ranges from basic physical, chemical, and biological sciences to population studies, clean energy, and environmental policy, the department's dual affiliation fosters original and impactful research and enables novel academic offerings.

MATERIALS SCIENCE AND ENGINEERING

Improving the Material World.



Materials scientists are, by nature, visionaries who imagine the world as it could be and then develop the materials needed to realize their vision. The Department of Materials Science (MatSci) brings together students and

faculty with diverse interests in areas including biomaterials, nanomaterials, organic semiconductors, metals, materials characterization, and thin films. Working in collaboration with colleagues from multiple disciplines, they are improving and inventing materials that solve global problems affecting human health, energy, security, and the environment. Recent projects have included the development of new drug delivery systems; semiconductor materials and chemical sensing; work in the structure of metals at the atomic scale; materials for clean energy, fuel cells, and nanoparticles; and the engineering of structural materials.

DEPARTMENTS (CONT'D) MECHANICAL ENGINEERING

A Force for Innovation.

Mechanical engineering today is tackling big societal problems, examining phenomena at a small scale using ever-more powerful imaging technology and computers to provide solutions for large-scale



applications. In all of its activities, the focus of JHU's Department of Mechanical Engineering (MechE) is on meeting these needs by addressing real problems in real time, by collaborating with partners around the globe. Unlocking the mysteries of the basic forces and processes—around and within us—that determine how things work, our faculty members are defining the future of their fields of inquiry and are developing innovations that are shaping our lives today—and for generations to come.

THE CENTER FOR LEADERSHIP EDUCATION

Engineering Leadership.



The Center for Leadership Education (CLE) offers coursework, minors, competitions, graduate programs, hands-on experiences, and networking opportunities to prepare students for leadership roles in the professional world.

More than 1,500 students each semester from Johns Hopkins' schools of Engineering, Public Health, Peabody Institute, and Arts and Sciences take courses through the CLE.

At the graduate level, CLE offers a Master of Science in Engineering Management, a Master of Science in Global Innovation and Leadership through Engineering (coming in fall 2023), and an extensive suite of professional development courses.

BALLING IN BALTIMORE

With its cultural heritage, rich history, and unique neighborhoods, Baltimore is a city with something to offer everyone.



Welcome to the Charm City

From popular tourist attractions—the Inner Harbor, the National Aquarium, and Fort McHenry (birthplace of "The Star Spangled Banner")—to more off-the-beaten-path destinations—the Edgar Allan Poe House and Museum or the tranquil Sherwood Gardens—there is always something new to discover. The city hosts events both big and small throughout the year. Baltimore sports fans are passionate about their Orioles and the Ravens; sci-fi lovers can geek out at Baltimore Comic-Con; and hundreds drop by the Baltimore Farmer's Market every Sunday to pick up fresh local produce, cheeses, flowers, and breads (and perhaps a cup of locally roasted Zeke's coffee, too). There's the Maryland Film Festival each spring, a book festival each fall, and Artscape—America's largest free crafts festival—in the summer.

Student Favorites

Baltimore is where JHU students grow and build their lives. Our students enjoy exploring Baltimore's many neighborhoods, including Charles Village and Hampden (home to the famous holiday lights on 34th Street and the colorful, quirky Honfest); Mount Vernon and Station North, a prime destination for artists and arts enthusiasts alike; the historic waterfront neighborhoods of Fells Point, Canton, and Federal Hill.

Hopkins in the Community

With our main campus located in Baltimore, Johns Hopkins is truly and proudly a city resident. Community engagement is part of who we are as a university.

Our commitment to our local communities is based on the simple truth that the health and well-being of the university are inextricably tied to the physical, social, and economic well-being of the city in which we live.

EMERGENCY CONTACTS

Hong Lan 443-540-9028

HLAN1@JHMI.EDU

Christine Kavanagh

CHRISTINEKAVANAGH@JHU.EDU

Security 410-526-4600

EMERGENCIES

Call 911 immediately for medical emergencies.

Local Area Hospitals

Union Memorial Hospital 410-554-2000

LOCAL PHARMACIES

CVS Pharmacy 3200 Saint Paul Street 410-243-1025 Johns Hopkins Hospital 410-955-5000

CVS Pharmacy 2504 North Charles Street 410-662-7594

INTERNET CONNECTION ON CAMPUS

- Guests, patients, visitors, students, and staff who simply need internet-only access can use the JHGuestnet wireless network.
- The JHaccess Wireless network provides wireless connectivity for all medical devices.
- Guests visiting Johns Hopkins from other institutions can use eduroam for their connectivity needs.

SOCIAL MEDIA

FACEBOOK.COM/JHUENGINEERING

O HOPKINSENGINEER

Please use the hashtag #March2023HEEP when tagging images.

WE WANT YOUR FEEDBACK Scan the QR code to fill out a brief survey.



