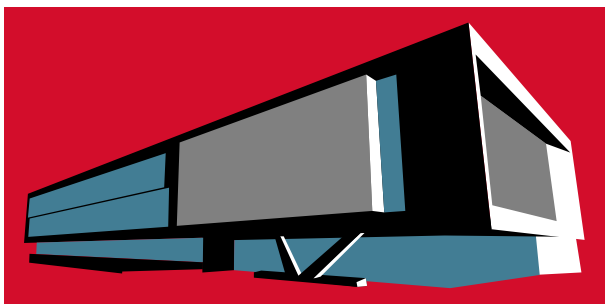
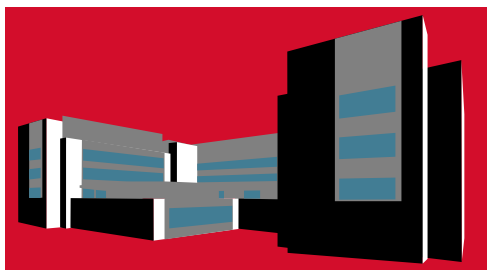
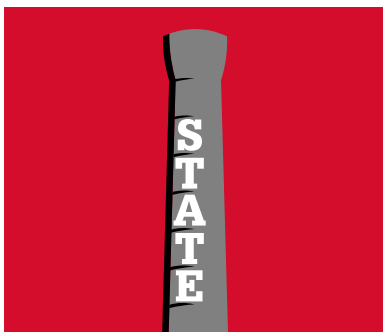
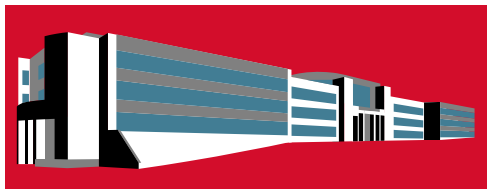


NC STATE
Engineering

2024-25
NEW FACULTY



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FROM THE DEAN OF ENGINEERING

Dear Friends and Colleagues,

This year, the College of Engineering welcomed one of our largest cohorts of new faculty members. In this booklet, you'll learn about the 43 talented faculty members who are joining our faculty in the midst of the College of Engineering's expansion as part of the Engineering North Carolina's Future legislative initiative. We are increasing our student enrollment by 4,000 over the next few years to meet the state's need for more engineers and computer scientists to work in our booming aerospace, software, biotechnology, construction and energy industries. Our faculty plays a critical role in teaching and training these bright students to be the leaders of tomorrow.

I am grateful to our departments' faculty recruiting committees and to our department heads for all the work that they've done to attract and onboard this outstanding group of new faculty members. Their expertise and experience are vital. I would also like to acknowledge the significant support we have received from the state of North Carolina and from NC State University to facilitate this recruitment process.

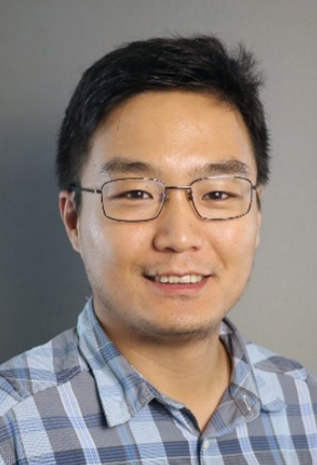
To our new faculty members, thank you for joining the NC State College of Engineering. Your colleagues are committed to supporting your pursuit of excellence in research and teaching. Together, we are looking forward to building on our strengths, expanding our research infrastructure and broadening educational opportunities for all of our students.

Sincerely,

A handwritten signature in black ink that reads "Jim Praendtner". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Jim Praendtner, Ph.D.

Louis Martin-Vega Dean of Engineering and Professor



GENG (FRANK) BAI

DEPARTMENT OF BIOLOGICAL
AND AGRICULTURAL ENGINEERING

Assistant Professor

Ph.D. (2014)

Niigata
University

RESEARCH INTERESTS:

- High-throughput plant phenotyping for plant breeding
- Decision-making models for variable-rate field management
- Crop modeling
- Application of computer vision and instrumentation in precision agriculture

Geng (Frank) Bai received his Ph.D. in environmental science and technology from Niigata University in Niigata, Japan. He received his B.E. and M.E. from China Agricultural University in Beijing, China. He was a postdoctoral fellow and research assistant professor in the Department of Biosystems Engineering at the University of Nebraska-Lincoln.

Agricultural production is an essential part of human civilization, and there is a need for continuous improvements in productivity, efficiency, affordability and sustainability. Despite advancements, there are still significant technology gaps in sensing, data processing and application. Bai's research focuses on developing and applying advanced and reliable technologies in precision and digital agriculture to address these gaps and enhance system efficiency. He plans to enhance the efficiency and sustainability of agricultural systems by leveraging advanced technologies such as sensing, machine learning and crop modeling.

SELECTED PUBLICATIONS

- Bai, G., Barker, B., Scoby, D., Irmak, S., Luck, J. D., Neale, C. M. U., . . . Ge, Y. (2024). High-throughput physiological phenotyping of crop evapotranspiration at the plot scale. *Field Crops Research*, 316. DOI: 10.1016/j.fcr.2024.109507
- Bai, G., Ge, Y., Hussain, W., Baenziger, P. S., & Graef, G. (2016). A multi-sensor system for high throughput field phenotyping in soybean and wheat breeding. *Computers and Electronics in Agriculture*, 128, 181-192. DOI: doi.org/10.1016/j.compag.2016.08.021
- Bai, G., Ge, Y., Leavitt, B., Gamon, J. A., & Scoby, D. (2023). Goniometer in the air: Enabling BRDF measurement of crop canopies using a cable-suspended plant phenotyping platform. *Biosystems Engineering*, 230, 344-360. DOI: 10.1016/j.biosystemseng.2023.04.017
- Bai, G., Ge, Y., Scoby, D., Leavitt, B., Stoerger, V., Kirchgessner, N., . . . Awada, T. (2019). NU-Spidercam: A large-scale, cable-driven, integrated sensing and robotic system for advanced phenotyping, remote sensing, and agronomic research. *Computers and Electronics in Agriculture*, 160, 71-81. DOI: doi.org/10.1016/j.compag.2019.03.009
- Bai, G., Jenkins, S., Yuan, W., Graef, G. L., & Ge, Y. (2018). Field-Based Scoring of Soybean Iron Deficiency Chlorosis Using RGB Imaging and Statistical Learning. *Frontiers in plant science*, 9, 1002-1002. DOI: 10.3389/fpls.2018.01002



MARGO MACDONALD

DEPARTMENT OF BIOMEDICAL ENGINEERING

Margo MacDonald received their Ph.D. in biophysical sciences from the University of Chicago in 2024 and their B.A. and M.S. in physics and biophysics from the University of Pennsylvania in 2018. Their Ph.D. research examined the role of neutrophil extracellular traps (NETs) in coagulation in the lymphatic system in COVID-19, along with the consequences of lymphatic coagulation in novel *in vitro* and *in vivo* models of disease. Their current research interests include how biophysical cues influence inflammatory responses in the vascular system, and cellular scale biomechanics. In addition to their research, MacDonald is dedicated to promoting diversity, equity and inclusion in STEM education and helping improve the accessibility of engineering education.

Assistant Teaching Professor

Ph.D. (2024)

University
of Chicago

RESEARCH / TEACHING INTERESTS:

- Cellular biomechanics
- Biomaterials
- Inflammation and coagulation
- Immunobiophysics

SELECTED PUBLICATIONS

- MacDonald, M.E., et al. (2022). Lymphatic coagulation and neutrophil extracellular traps in lung-draining lymph nodes of COVID-19 decedents. *Blood Advances*, 6(24), 6249-6262.
- Liu, W., Krump, N., MacDonald, M.E., & You, J. (2018). Merkel cell polyomavirus infection of animal dermal fibroblasts. *Journal of Virology*, 92(4), e01610-17.
- Wang, R., Cao, X., Kulej, K., Liu, W., Ma, T., MacDonald, M.E., ..., You, J. (2017). Uncovering BRD4 hyperphosphorylation associated with cellular transformation in NUT midline carcinoma. *Proceedings of the National Academy of the Sciences*, 114(27), E5352-E5361.
- MacDonald, M.E., & You, J. *Merkel Cell Polyomavirus - a new DNA virus associated with human cancer. Infectious Agents-associated Cancers: Epidemiology and Molecular Biology*. Edited by Qiliang Cai, Springer Press, 2017.
- Liu, W., Macdonald, M.E., & You, J. (2016). Merkel cell polyomavirus infection and Merkel cell carcinoma. *Current Opinion in Virology*, 20(10), 20-27.



CRISTIANA BOI

DEPARTMENT OF CHEMICAL AND
BIOMOLECULAR ENGINEERING

Cristiana Boi received her Ph.D. in chemical and environmental engineering (1996) and a Laurea in ingegneria chimica (5-years degree) both from the Alma Mater Studiorum-Università di Bologna, Italy. She holds the National Scientific Qualification as full professor in the Italian higher education system for the disciplinary field of 09/D2 - Systems, methods and technologies of chemical and process engineering. She was the president of the European Membrane Society in 2017 and 2018. Prior to joining North Carolina State University, she was a full-time tenured associate professor at the University of Bologna.

Her research interests are in downstream processing in biotechnology with a focus on membranes and chromatographic processes for highly selective separations. In particular, she is interested in the preparation, modification and characterization of functional materials for bioseparations, biomedical applications, water purification and biopharmaceutical production. Currently, she is working on the purification of extracellular vesicles, the intensification of whey recovery using integrated membrane processes, the development of innovative nature-inspired 3D-printed membranes for blood oxygenators, and the industrialization of membrane adsorbers for the purification of biomolecules.

Associate Research Professor

Ph.D. (1996)

Alma Mater
Studiorum-
Università
di Bologna

RESEARCH INTERESTS:

- Bioseparations
- Biomanufacturing
- Membrane processes
- Chromatography
- Porous media
- Membrane module design
- 3D printing

SELECTED PUBLICATIONS

- Roselli M., Onesti R., Boi C., Bandini S., Recovery of lactose from acid whey by nanofiltration: An experimental study (2025) Separation and Purification Technology, 353, art. no. 128303, DOI: 10.1016/j.seppur.2024.128303
- Lavoie J., Fan J., Pourdeyhimi B., Boi C., Carbonell R.G. Advances in high-throughput, high-capacity nonwoven membranes for chromatography in downstream processing: A review (2024) Biotechnology and Bioengineering, 121 (8), pp. 2300 - 2317, DOI: 10.1002/bit.28457
- Giancaterino S., Boi C., Alternative biological sources for extracellular vesicles production and purification strategies for process scale-up (2023) Biotechnology Advances, 63, art. no. 108092, DOI: 10.1016/j.biotechadv.2022.108092
- Fan J., Sripada S.A., Pham D.N., Linova M.Y., Woodley J.M., Menegatti S., Boi C., Carbonell R.G., Purification of a monoclonal antibody using a novel high-capacity multimodal cation exchange nonwoven membrane (2023) Separation and Purification Technology, 317, art. no. 123920, DOI: 10.1016/j.seppur.2023.123920
- Boi C., Malavasi A., Carbonell R.G., Gilleskie G., A direct comparison between membrane adsorber and packed column chromatography performance (2020) Journal of Chromatography A, 1612, art. no. 460629, DOI: 10.1016/j.chroma.2019.460629



HARVINDER S. GILL

DEPARTMENT OF CHEMICAL AND BIOMOLECULAR ENGINEERING, WITH A JOINT APPOINTMENT IN THE DEPARTMENT OF BIOMEDICAL ENGINEERING

Harvinder S. Gill is the Ronald B. and Cynthia J. McNeill Term Professor in Nanomedicine in the Department of Chemical and Biomolecular Engineering with a joint appointment in the Joint Department of Biomedical Engineering at North Carolina State University and the University of North Carolina at Chapel Hill. Prior to joining NC State, Gill served as a professor of chemical engineering and as the Whitacre Endowed Chair of Science and Engineering at Texas Tech University. He received his Ph.D. in bioengineering from the Georgia Institute of Technology in 2007.

Gill's research addresses some of the pressing biomedical challenges facing human health through fundamental and translational research in the fields of drug delivery, vaccines, immunotherapy and nanomedicine. His research integrates knowledge and tools from various disciplines including micro-nano-technology, immunology and recombinant engineering. His current projects focus on the development of broadly protective vaccines against influenza and coronavirus, and treatment of allergies. Gill's work has made a significant impact in the field of food allergies, especially peanut allergy. His pioneering work on the use of microneedles for the treatment of peanut allergy has resulted in a startup, which is commercializing this technology. His work has led to over 72 peer-reviewed publications, 50 invited talks and 35 invention disclosures of which six are issued, five are pending and two have been licensed to companies. He was elected as a senior member of the National Academy of Inventors (NAI) in 2023. Other prestigious honors include the National Institutes of Health Director's New Innovator Award and the Defense Advanced Research Projects Agency Young Faculty Award.

**Ronald B. and
Cynthia J.
McNeill Term
Professor in
Nanomedicine**

Ph.D. (2007)

Georgia
Institute of
Technology

RESEARCH INTERESTS:

- Drug and vaccine delivery
- Micro-nano-medicine
- Immunoengineering
- Food allergy immunotherapy
- Development of vaccines

SELECTED PUBLICATIONS

- H.S. Gill, "Microneedle technology for allergen immunotherapy via the skin," *Journal of Allergy and Clinical Immunology*, 153 (3), 656-662, 2024. DOI: doi.org/10.1016/j.jaci.2024.01.001
- A.K. Shakya, R.S.J. Ingrole, G. Joshi, M.J. Uddin, S. Anvari, C.M. Davis and H.S. Gill, "Microneedles coated with peanut allergen enable desensitization of peanut sensitized mice," *Journal of Controlled Release* (IF: 7.901), 2019, 314(28) p. 38-47, PMID: 31626861. DOI: doi.org/10.1016/j.jconrel.2019.09.022
- A.K. Shakya, B. Backus, L.D. Nesovic, M. Mallick, O. Banister, C.M. Davis, S. Anvari, and H.S. Gill, "Development of a mini pig model of peanut allergy," *Frontiers in Allergy*, 5, 1278801, DOI: doi.org/10.3389/falgy.2024.1278801
- L.R. Wilks, G. Joshi, N. Rychener and H.S. Gill, "Generation of broad protection against influenza with di-tyrosine-cross-linked M2e nanoclusters", *ACS Infectious Diseases* 10 (5), 1552-1560, 2024, DOI: doi.org/10.1021/acsinfectdis.3c00429
- C.J. Roach, G. Joshi and H.S. Gill, "Comparison of different stabilizing agents and antigen attachment methods on iron oxide nanoparticles for vaccination," *Biomedical Materials & Devices*, 2 (1), 485-497, 2024. DOI: doi.org/10.1007/s44174-023-00117-5



NADINE KOTLARZ

DEPARTMENT OF CIVIL, CONSTRUCTION,
AND ENVIRONMENTAL ENGINEERING

Associate Professor

Ph.D. (2017)

University of
Michigan

RESEARCH INTERESTS:

- Assessing human exposure to emerging chemical and microbial contaminants in drinking water
- Applying bioanalytical tools to evaluate drinking water quality and support water intervention selection

Nadine Kotlarz joined North Carolina State University in March 2024 as an assistant professor in the Department of Civil, Construction, and Environmental Engineering (CCEE). She is part of the environmental process team within CCEE's Environmental, Water Resources, and Coastal Engineering group. Kotlarz is also a part of the Chancellor's Faculty Excellence Program in Environmental Health Science and a faculty mentor in NC State's toxicology program. Kotlarz earned M.S. and Ph.D. degrees in environmental engineering from the University of Michigan. She has a B.S. in environmental engineering from Lehigh University and an M.A. in teaching from Dominican University. For her postdoctoral research in the Department of Biological Sciences at NC State, she investigated drinking water-associated PFAS exposures in North Carolinians.

SELECTED PUBLICATIONS

- Kotlarz N., Guillette T., Critchley C., Collier D., Lea C.S., McCord J., Strynar M., Hopkins Z., Knappe D.R.U., Hoppin J.A. Per- and polyfluoroalkyl ether acids in well water and blood serum in private well users residing by a fluorochemical manufacturing facility near Fayetteville, North Carolina. *J Expo Sci Environ Epidemiol.* 2024 Jan 10:1-11.
- Kotlarz N., Holcomb D., Pasha T., Reckling S., Kays J., Lai Y., Daly S., Palani S., Bailey E., Guidry V., Christensen A., Berkowitz S., Hoppin J.A., Mitasova H., Engel L.E., de los Reyes F.L., Harris A. Timing and trends for municipal wastewater, lab-confirmed case, and syndromic case surveillance of COVID-19 in Raleigh, North Carolina, USA. *Am J Public Health.* 2022 Sept 26.
- Kotlarz N., McCord J., Collier D., Lea C.S., Strynar M., Lindstrom A.B., Wilkie A.A., Islam J.Y., Matney K., Tarte P., Polera M.E., Burdette K., DeWitt J., May K., Smart R.C., Knappe D.R.U., Hoppin J.A.. Measurement of novel, drinking water-associated PFAS in blood from adults and children in Wilmington, North Carolina. *Environ Health Perspect.* 2020 Jul 22;128(7):077005.
- Kotlarz N., Erickson J., Zimbric M., Raskin L., LiPuma J.J., Caverly L.J. Retrospective Analysis of Nontuberculous Mycobacterial Infection and Monochloramine Disinfection of Municipal Drinking Water in Michigan. *mSphere.* 2019 Aug 28;4(4):e00160-19.
- Kotlarz N., Rockey N., Olson T.M., Haig S.J., LiPuma J.J., Raskin L. Biofilms in Full-scale Drinking Water Ozone Contactors Contribute Viable Bacteria to Ozonated Water. *Environ Sci Technol.* Jan 2018.



MEREDITH MARTINEZ

DEPARTMENT OF CIVIL, CONSTRUCTION,
AND ENVIRONMENTAL ENGINEERING

Assistant Teaching Professor

Ph.D. (2022)

Virginia Tech
University

RESEARCH / TEACHING INTERESTS:

- Groundwater sustainability
- Managed aquifer recharge
- Teaching effectiveness
- Student engagement
- JEDI in engineering

Meredith Martinez is an assistant teaching professor and coordinator of advising in the Department of Civil, Construction, and Environmental Engineering. She earned her BSCE at North Carolina State University in 2017 and her Ph.D. in civil engineering from Virginia Tech in 2022. Her Ph.D. research targeted experimental and numerical research to assess the impact of high-capacity managed aquifer recharge on the Potomac Aquifer System in Eastern Virginia. This research focused on characterizing complex aquifer systems through multiple numerical and experimental methods, including intrinsic and artificial tracer tests, in-situ flowmeters and water level analyses. As part of her research, she also assisted with the operation of a 1-MGD (millions of gallons per day) advanced water treatment facility.

Prior to returning to NC State, she spent two years as a hydrologic engineer and hydrogeologist at Jacobs working within their groundwater modeling group. During this time, she obtained licensure as a Professional Engineer in North Carolina. Her work involved developing analytical and numerical groundwater models for technical evaluation of water use scenarios, managed aquifer recharge and groundwater contamination remediation. She participated in various fieldwork trips where she observed well drilling and installation and conducted aquifer field testing for geochemical analysis, aquifer characterization and water quality sampling.

SELECTED PUBLICATIONS

- Martinez M.B., M. Widdowson. (2024) "Multiple Tracers to Evaluate Flow through a Multi-layered Aquifer Using a Novel Transport Approximation." *Hydrogeology Journal*. (in publication)
- Martinez M.B., M. Widdowson. (2023) "Evaluating Flow Distribution in a Multi-aquifer Well During Recharge Using an In-situ Flowmeter." *Groundwater* 62, no. 4: 605-616. doi.org/10.1111/gwat.13379
- Martinez M.B., et al. (2022) "Demonstration of Managed Aquifer Recharge in a Coastal Plain Aquifer: Lessons Learned." *Groundwater* 60, no. 5: 668-674. doi.org/10.1111/gwat.13197
- Bullard M.G., C. Bott, G. Salazar-Benites, M. Widdowson. (2019) "Arsenic Fate and Transport: Implications on Managed Aquifer Recharge," *Proceedings of WEFTEC*, 815-817, Chicago, IL.
- Bullard M.G., et al. (2019) "Managed Aquifer Recharge: Transport and Attenuation in a Coastal Plain Aquifer," *Proceedings of the EWRI World Environmental and Water Resources Congress*, 108-120, Pittsburgh, PA.



BITA AKRAM

DEPARTMENT OF COMPUTER SCIENCE

Bitakram is an assistant professor in the Department of Computer Science. She received her Ph.D. from North Carolina State University in 2019. Her research lies at the intersection of artificial intelligence, human-centered design and adaptive learning technologies with its application on improving access and quality of computer science (CS) education. Akram leads multiple National Science Foundation awards focused on improving CS education through intelligent technology, innovative curriculum and broadening participation in computing.

Assistant Professor

Ph.D. (2019)

North Carolina State University

RESEARCH INTERESTS:

- Advanced learning technologies
- Artificial intelligence and intelligent agents
- Data sciences and analytics
- Graphics, human computer interaction and user experience
- Information and knowledge management
- Introductory programming
- Advance learning technologies

SELECTED PUBLICATIONS

- (2024) Detecting ChatGPT-generated code submissions in a CS1 course using machine learning models.
Hoq, M., Shi Y., Leinonen, J., Babalola, D., Lynch, C., Price, T., Akram, B.
doi.org/10.1145/3626252.363082
- (2023) Analysis of an Explainable Student Performance Prediction Model in an Introductory Programming Course
Hoq, M., Brusilovsky, P. and Akram, B.
doi: 10.5281/zenodo.8115693
- (2023) SANN: Programming Code Representation Using Attention Neural Network with Optimized Subtree Extraction
Hoq, M., Chilla, S.R., Ranjbar, M., Brusilovsky, P. and Akram, B.
doi: 10.1145/3583780.3615047
- (2022) Towards an AI-infused Interdisciplinary Curriculum for Middle-grade Classrooms
Akram, B., Yoder, S., Tatar, C., Boorugu, S., Aderemi, I., and Jiang, S.
doi: 10.1609/aaai.v36i11.21544
- (2022) Increasing Students' Persistence in Computer Science through a Lightweight Scalable Intervention
Akram, B., Fisk, S., Hunt, C., Price, T., Battestilli, L., Barnes, T.
doi.org/10.1145/3502718.3524815



JUSTIN BRADLEY

DEPARTMENT OF COMPUTER SCIENCE

Associate Professor

Ph.D. (2014)

University of Michigan

RESEARCH INTERESTS:

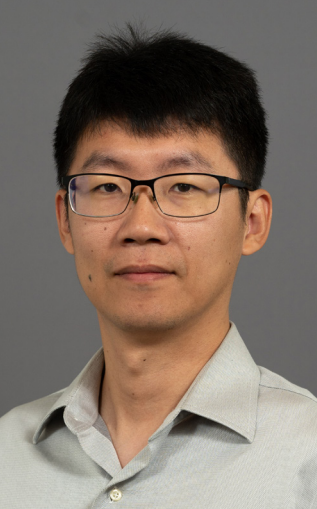
- Cyber-physical systems
- Intelligent aerospace systems
- Real-time computing
- Control theory
- Uncrewed aircraft systems (UAS)
- Swarms (multi-agent systems)
- Autonomous decision making
- Field robotics

Justin Bradley was a Richard L. and Carol S. McNeel Associate Professor of Computing in the School of Computing at the University of Nebraska-Lincoln prior to joining North Carolina State University. He holds a B.S. in computer engineering (2005) and M.S. in electrical engineering (2007) from Brigham Young University (BYU), and M.S. (2012) and Ph.D. (2014) degrees in aerospace engineering from the University of Michigan. He has worked with uncrewed aircraft systems (UAS) since 2005, starting at the Multi-AGent Intelligent Coordination and Control (MAGICC) lab at BYU, the A2Sys lab at the University of Michigan, and most recently as a co-director of the Nebraska Intelligent MoBILE Unmanned System (NIMBUS) lab since 2015. He is a recipient of a 2021 National Science Foundation Faculty Early Career Development (CAREER) Award and is an American Institute of Aeronautics and Astronautics Associate Fellow.

Bradley's research lies at the intersection of computing, control and aerospace disciplines. Of particular interest are decision and control, control software and robot autonomy in aerospace systems. A common theme in his research is developing algorithms that can dynamically adjust their resource utilization in response to uncertainty, adjusting performance as needed to meet demands.

SELECTED PUBLICATIONS

- B. Balasubramaniam, H. Bagheri, S. Elbaum and J. Bradley, "Investigating Controller Evolution and Divergence through Mining and Mutation," 2020 ACM/IEEE 11th International Conference on Cyber-Physical Systems (ICCPs), Sydney, NSW, Australia, 2020, pp. 151-161, DOI: 10.1109/ICCPs48487.2020.00022.
- J. M. Bradley and E. M. Atkins, "Coupled Cyber-Physical System Modeling and Coregulation of a CubeSat," in IEEE Transactions on Robotics, vol. 31, no. 2, pp. 443-456, April 2015, DOI: 10.1109/TRO.2015.2409431
- Plowcha, A., Bradley, J., Hogberg, J., Ammon, T., Nail, M., Duncan, B., & Detweiler, C. (2022). Autonomous, Long-Range, Sensor Placement Using Unmanned Aircraft Systems. *Field Robotics*, 2, 437-467. doi.org/10.55417/fr.2022016
- Sadri-Moshkenani Z, Bradley J, Rothermel G. Survey on test case generation, selection and prioritization for cyber-physical systems. *Softw Test Verif Reliab*. 2022; 32:e1794. doi.org/10.1002/stvr.1794
- Bradley JM, Atkins EM. Optimization and Control of Cyber-Physical Vehicle Systems. *Sensors*. 2015; 15(9):23020-23049. doi.org/10.3390/s150923020



PENG GAO

DEPARTMENT OF COMPUTER SCIENCE

Assistant Professor

Ph.D. (2022)

Colorado School of Mines

RESEARCH INTERESTS:

- Robotics
- Multi-robot collaborative perception
- Collaborative decision-making
- Collaborative learning and control
- Human-robot teaming

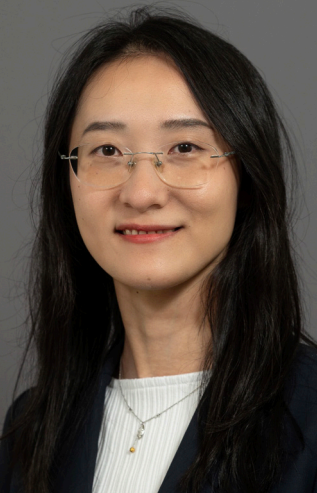
Prior to joining the North Carolina State University faculty, Peng Gao was a postdoc associate at the University of Massachusetts Amherst from 2023-24. He earned the postdoc fellowship from the Maryland Robotics Center at the University of Maryland, College Park, in 2022-23. He obtained his Ph.D. degree in computer science at the Colorado School of Mines in 2022.

Gao is the first author of the best paper award for Agri-Robot at the Institute of Electrical and Electronics Engineers (IEEE) International Conference on Intelligent Robots and Systems (IROS) in 2023. In addition, he now serves as the associate editor for *IEEE Robotics and Automation Letters (RAL)* and *IROS*. He published more than 20 (14 first-author) papers in top-tier robotics and AI conferences and journals, including *Robotics: Science and Systems*; *IEEE International Conference on Robotics and Automation*; *IROS*; *International Conference on Machine Learning*; *Association for the Advancement of Artificial Intelligence*; *International Journal of Robotics Research*; and *Autonomous Robots*.

The central theme of Gao's research focuses on collaborative autonomy to enable team awareness for multi-robot and human-autonomy teaming. This vision seeks to empower autonomous robots with the ability to collaboratively and autonomously comprehend both unstructured environments and their human and robotic teammates. This enables them to react to dynamic and uncertain environments for complex tasks, thus surpassing human-level collaboration in open-world settings.

SELECTED PUBLICATIONS

- Peng Gao, Jing Liang, Yu Shen, Sanghyun Son, and Ming C. Lin, "Visual, Spatial, Geometric-Preserved Place Recognition for Cross-View and Cross-Modal Collaborative Perception" in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023.
- Peng Gao, Yu Shen and Ming C. Lin. "Collaborative Decision-Making Using Spatiotemporal Graphs in Connected Autonomy." in *IEEE International Conference on Robotics and Automation (ICRA)*, 2024.
- Peng Gao, Sriram Siva, Anthony Micciche, and Hao Zhang. "Collaborative Scheduling with Adaptation to Failure for Heterogeneous Robot Teams." in *IEEE International Conference on Robotics and Automation (ICRA)*, 2023.
- Peng Gao, Qingzhao Zhu, Hongsheng Lu, Chuang Gan, and Hao Zhang. "Deep Masked Graph Matching for Correspondence Identification in Collaborative Perception." in *IEEE International Conference on Robotics and Automation (ICRA)*, 2023.
- Peng Gao and Hao Zhang. "Bayesian Deep Graph Matching for Correspondence Identification in Collaborative Perception." in *Robotics Science and System (RSS)*, 2021.



HUINING LI

DEPARTMENT OF COMPUTER SCIENCE

Assistant Professor

Ph.D. (2024)

University at Buffalo

RESEARCH INTERESTS:

- Mobile computing
- Internet-of-things
- Cybersecurity
- Privacy computing
- Mobile health

Huining Li is an assistant professor in the Department of Computer Science at North Carolina State University. She received her Ph.D. from the Department of Computer Science and Engineering at the University at Buffalo in 2024. Her research interests lie broadly in internet-of-things, cybersecurity and mobile computing. Her work has received three Best Paper Awards: at the Association for Computing Machinery's Conference on Embedded Networked Sensor Systems (SenSys) in 2019; at the European Alliance for Innovation's International Conference on Body Area Networks (BODYNETS) in 2021; and at the Institute of Electrical and Electronics Engineers' International Conference on Healthcare Informatics (ICHI) in 2022, as well as one Best Paper Candidate at SenSys in 2022. Li was named among the Massachusetts Institute of Technology's Electrical Engineering and Computer Sciences Rising Stars in 2023, and received the Harold O. Wolf Achievement Award in 2024.

Li focuses on applying research advancements to the field of mobile health. She involves developing mobile health systems in assisting with chronic wound care, Parkinson's disease management and mental health therapy. Within these research projects, she has invented a set of technical innovations such as precise measurement in biomarkers, high accessibility in mHealth (mobile health) services and fairness in privacy protection. Particularly, her works create privacy-by-design sensing mechanisms and address the complexities of safeguarding data privacy while maintaining fairness in heterogeneous and dynamic mobile environments.

SELECTED PUBLICATIONS

- Huining Li, et al., "TherapyPal: Towards a Privacy-Preserving Companion Diagnostic Tool based on Digital Symptomatic Phenotyping", ACM International Conference on Mobile Computing and Networking (MobiCom'23), Madrid, Spain, October 2023.
- Huining Li, et al., "NeuralGait: Assessing Brain Health using Your Smartphone", ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT/ UbiComp'22), Volume 6, Number 4, December 2022.
- Huining Li, et al., "VocalPrint: Exploring A Resilient and Secure Voice Authentication via mmWave Biometric Interrogation", ACM Conference on Embedded Networked Sensor Systems (SenSys'20), Yokohama, Japan, November 2020.
- Huining Li, et al., "Privacy computing using deep compression learning techniques for neural decoding", Elsevier Smart Health (SH), Volume 23, March 2022.
- Baicheng Chen, Huining Li, et al., "ThermoWave: A New Paradigm of Wireless Passive Temperature Monitoring via mmWave Sensing", ACM International Conference on Mobile Computing and Networking (MobiCom'20), London, UK, October 2020.



ADITI MALLAVARAPU

DEPARTMENT OF COMPUTER SCIENCE

Assistant Professor

Ph.D. (2021)

University of Illinois at Chicago

RESEARCH INTERESTS:

- Data mining
- Learning analytics
- Machine learning
- Computer vision
- Data science
- Visualization
- Artificial intelligence
- Open-ended learning systems
- Technology in informal social settings (e.g., museums)
- Human-computer interaction
- Learning in XR (virtual reality and mixed reality)

Aditi Mallavarapu received her B.E in computer engineering from Savitribai Phule Pune University, in Pune, India, and her M.S. and Ph.D. degrees in computer science from the University of Illinois at Chicago. Prior to joining North Carolina State University faculty, she was a postdoctoral research associate at the National Science Foundation (NSF) AI Institute for Inclusive Intelligent Technologies for Education (INVITE), affiliated with the University of Illinois Urbana-Champaign. She was also a postdoctoral researcher at Digital Promise working with the NSF hub Center for Integrated Research in Learning and Computer Sciences (CIRCLS); a visiting scholar at the University of Pittsburgh; and a research assistant at the New York Hall of Science. Between her academic training, she also obtained experience working as a software developer.

Her work specializes in innovating and implementing human-centered computational techniques in open-ended learning settings that support exploration-based learning (e.g., in museum exhibits and serious games), as well as in investigating interdisciplinary research communities using network science (an effort applauded by the evaluation team at the NSF). One of her early works is regarded as the first to apply educational data mining techniques to reveal patterns of explorations in open-ended learning environments. She was awarded the emergent scholar in research title at CIRCLS for her interdisciplinary research contributions.

SELECTED PUBLICATIONS

- Mallavarapu, A., Lyons, L., & Uzzo, S. (2022). Exploring the Utility of Social-Network Derived Collaborative Opportunity Temperature Readings for Informing Design and Research of Large-Group Immersive Learning Environments. *Journal of Learning Analytics*, 9(1), 53–76. doi.org/10.18608/jla.2022.7419
- Mallavarapu, A., Uzzo, S., & Lyons, L. (2021). Formative Fugues: Reconceptualizing Formative Feedback for Complex Systems Learning Environments. *International Journal of Complexity in Education*, 2(2), 4–46.
- Mallavarapu, A., Lyons, L., Slattery, B., Shelley, T., Minor, E., & Zellner, M. (2015). Developing Computational Methods to Measure and Track Learners' Spatial Reasoning in an Open-Ended Simulation. *Journal of Educational Data Mining* 7(2), 49-82.
- Mallavarapu, A., Walker, E., Cassandra, K., Gardner, S., Roschelle, J., & Uzzo, S. (2023) Network based methodology for characterizing interdisciplinary expertise in emerging research in the proceedings of the International Conference of Complex Networks and their Applications, Menton, France. Springer.
- Mallavarapu, A., Lyons, L., Uzzo, S., Thompson, W., Levy-Cohen, R., & Slattery, B. (2019). Connect-to-Connected Worlds: Piloting a Mobile, Data-Driven Reflection Tool for an Open-Ended Simulation at a Museum. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (pp. 1-14). ACM Press.



ISABELLA WHITE

DEPARTMENT OF COMPUTER SCIENCE

Isabella White is the director of cybersecurity education and an assistant teaching professor in the Department of Computer Science at North Carolina State University. She joined the department in July 2024 after graduating with her Ph.D. and M.S. in computer science from NC State.

White has several publications in the Association for Computing Machinery's Special Interest Group on Computer Science Education (SIGCSE) conferences that focus on her previous work investigating the corpus of K-12 computing education research and project-based learning curriculum development for high school level computer science classrooms. As the director of cybersecurity education, she mentors undergraduate students in the department's cybersecurity scholarship programs and assists in facilitating the SECURE IT summer camps and workshops for middle school students interested in cybersecurity.

Assistant Teaching Professor

Ph.D. (2024)

North Carolina State University

RESEARCH / TEACHING INTERESTS:

- Advanced learning technologies
- Cybersecurity
- Software engineering and programming languages

SELECTED PUBLICATIONS

Gransbury, I., McGill, M. M., & DeLyser, L. A. (2024, June). Barriers to Conducting Primary and Secondary Computing Education Research. In 2024 ASEE Annual Conference & Exposition.

McGill, M., Gransbury, I., DeLyser, L. A., Rosato, J., & Smith, J. M. (2024, June). Board 233: Creating the Capacity for CS Education Researchers to Produce Research That is High-quality and Equity-Focused. In 2024 ASEE Annual Conference & Exposition.



STANLEY S. CHEUNG

DEPARTMENT OF ELECTRICAL
AND COMPUTER ENGINEERING

Associate Professor

Ph.D. (2014)

University
of California,
Davis

RESEARCH INTERESTS:

- Novel heterogeneous semiconductor photonic devices
- Large-scale integrated photonics for optical interconnects, sensing and computing
- Neuromorphic / quantum-inspired computational accelerators

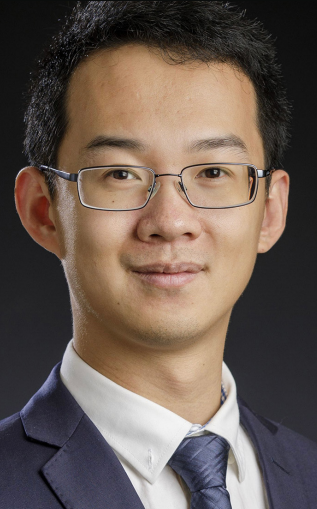
Stanley S. Cheung received his B.S. degree in electrical engineering from the University of Southern California in Los Angeles; his M.S. degree in electrical engineering from Columbia University in New York City; and his Ph.D. degree in electrical engineering from the University of California, Davis.

Prior to joining the North Carolina State University faculty, Cheung was a principal research scientist with Hewlett-Packard Laboratories in Milpitas, California, working on large-scale integrated photonics research for optical interconnects and accelerators. He has made key technical contributions on multiple U.S. government customer contracts and has helped contribute to the formation of a corporate optical interconnect business unit from early advanced R&D. Prior to HP Labs, he worked at Psi-Quantum, L-3 Harris, MIT Lincoln Laboratory and Lawrence Livermore National Laboratory. He has authored or co-authored more than 96 journal and conference papers and has 21 granted U.S. / international patents with another 50+ pending. He serves as an associate editor for *IEEE Access* and as an editorial board member of *Nature Portfolio's Nanophotonics* and *Light: Science & Applications*.

His research is multidisciplinary and aims to establish an innovative research program by addressing the advantages of photonics research applied to: 1) neuromorphic computing, 2) quantum-inspired classical computing, 3) quantum sensing, 4) high-bandwidth/energy-efficient interconnects and 5) space-based photonics.

SELECTED PUBLICATIONS

- S. Cheung, B. Tossoun, Y. Yuan, Y. Peng, Y. Hu, W.V. Sorin, G. Kurczveil, D. Liang, and R. G. Beausoleil, "Energy efficient photonic memory based on electrically programmable embedded III-V/Si memristors: switches and filters," *Nature Communications Engineering* 3 (1), 49, 2024.
- S. Cheung, D. Liang, Y. Yuan, Y. Peng, B. Tossoun, Y. Hu, X. Xiao, W.V. Sorin, G. Kurczveil, and R. G. Beausoleil, "Ultra-power-efficient, electrically programmable, multi-state photonic flash memory on a heterogeneous III-V/Si platform," *Laser & Photonics Review* (18), 5, 2024.
- B. Tossoun, D. Liang, S. Cheung, Z. Fang, X. Sheng, J. P. Strachan, and R. G. Beausoleil, "High-speed and energy-efficient non-volatile silicon photonic memory based on heterogeneously integrated memristor," *Nature Communications* 15 (1), 551, 2024.
- Y. Yuan, Y. Peng, W. V. Sorin, S. Cheung, Z. Huang, D. Liang, M. Fiorentino, and R. G. Beausoleil, "A 5x 200 Gbps microring modulator silicon chip empowered by two-segment Z-shape junctions," *Nature Communications* 15 (1), 918, 2024.
- Y. Peng Y. Yuan, W. V. Sorin, S. Cheung, Z. Huang, D. Liang, M. Fiorentino, and R. G. Beausoleil, "1.28 Terabit-per-second all-silicon avalanche receiver," *Nature Photonics*, 2024.



HANTAO CUI

DEPARTMENT OF ELECTRICAL
AND COMPUTER ENGINEERING

Associate Professor

Ph.D. (2018)

University of
Tennessee,
Knoxville

RESEARCH INTERESTS:

- Power system modeling, simulation and dynamics
- Renewable energy
- Scientific computing and open-source software

Hantao Cui received his Ph. D. in electrical engineering in 2018 from the University of Tennessee, Knoxville, where he worked as a research associate and research assistant professor in the National Science Foundation (NSF) / Department of Energy-funded CURENT (Center for Ultra-Wide-Area Resilient Electric Energy Transmission Networks) Engineering Research Center from 2017 to 2021. He received his B.S. and M.S. in electrical engineering from Southeast University, China, in 2011 and 2013. Prior to joining the faculty at North Carolina State University, he was an assistant professor of electrical and computer engineering at Oklahoma State University in Stillwater, Oklahoma, from 2021 to 2024.

Cui's current research efforts include numerical simulation of power and energy systems and applications of computational techniques for sustainable energy. He is interested in high-performance algorithms and implementations for optimization and solving discrete differential-algebraic equations. He is also interested in the cyberinfrastructure for open-source research and training. Cui is the author of the open-source ANDES simulator for power system analysis and was the chief technologist of the CURENT Large Scale Testbed, which won a 2020 R&D 100 award. His work received the Best Paper Award at the 2022 Power and Energy Society General Meeting and the 2017 Highly Cited Award from Applied Energy. He received a 2024 NSF Faculty Early Career Development (CAREER) Award.

SELECTED PUBLICATIONS

- H. Cui, "Bus Admittance Matrix Revisited: Performance Challenges on Modern Computers," in IEEE Open Access Journal of Power and Energy, vol. 11, pp. 83-93, 2024, doi: 10.1109/OAJPE.2024.3366117.
- H. Cui et al., "Disturbance Propagation in Power Grids With High Converter Penetration," in Proceedings of the IEEE, vol. 111, no. 7, pp. 873-890, July 2023, doi: 10.1109/JPROC.2022.3173813.
- H. Cui, F. Li and K. Tomsovic, "Hybrid Symbolic-Numeric Framework for Power System Modeling and Analysis," in IEEE Transactions on Power Systems, vol. 36, no. 2, pp. 1373-1384, March 2021, doi: 10.1109/TPWRS.2020.3017019.
- H. Cui and Y. Zhang, "Andes_gym: A Versatile Environment for Deep Reinforcement Learning in Power Systems," 2022 IEEE Power & Energy Society General Meeting (PESGM), Denver, CO, USA, 2022, pp. 01-05, doi: 10.1109/PESGM48719.2022.9916967.
- H. Cui, F. Li, X. Fang, H. Chen and H. Wang, "Bilevel Arbitrage Potential Evaluation for Grid-Scale Energy Storage Considering Wind Power and LMP Smoothing Effect," in IEEE Transactions on Sustainable Energy, vol. 9, no. 2, pp. 707-718, April 2018, doi: 10.1109/TSTE.2017.2758378.



MIHAIL CUTITARU

DEPARTMENT OF ELECTRICAL
AND COMPUTER ENGINEERING

Mihail Cutitaru received his Ph.D. in electrical and computer engineering in 2014 and B.S. in computer engineering in 2010, both from Old Dominion University. Prior to joining North Carolina State University's faculty, he was a teaching associate professor at Lehigh University and senior lecturer at the University of Maryland, Baltimore County. His teaching interests are in the areas of digital logic, computer architecture, embedded systems and robotics. He is a member of the Institute of Electrical and Electronics Engineers.

Associate Teaching Professor

Ph.D. (2014)

Old Dominion
University

RESEARCH / TEACHING INTERESTS:

- Digital logic
- Computer architecture
- Embedded systems
- Robotics
- Engineering education

SELECTED PUBLICATIONS

Mihail Cutitaru, Lee A. Belfore, II, "A Partially-Adiabatic Energy-Efficient Logic Family as a Power Analysis Attack Countermeasure," in Proc. of the Asilomar Conference on Signals, Systems, and Computers (ACSSC), 2013.

Mihail Cutitaru, Lee A. Belfore, II, "An Energy-Efficient 32-bit Kogge-Stone Adder Using a Dual-Phase Partially-Adiabatic Logic Family," in Proc. of the Intl Conf. on Computer Applications in Industry and Engineering (CAINE), 2013.

Mihail Cutitaru, Lee A. Belfore, II, "Arithmetic Circuits Using New Single-Phase Partially Adiabatic Logic Family," in Proc. of the IEEE Midwest Symposium on Circuits and Systems (MWSCAS), 2013.

Mihail Cutitaru, Lee A. Belfore, II, "New Single-Phase Adiabatic Logic Family," in Proc. of the Intl Conf. on Computer Design (CDES), pp. 5-9, 2012.

Mihail Cutitaru, Lee A. Belfore, II, "Improved Cost Reversible Multiplier Design," in Proc. of the Intl Conf. on Computer Design (CDES), pp. 35-38, 2011.



JOHN GAJDA

DEPARTMENT OF ELECTRICAL
AND COMPUTER ENGINEERING

Professor of the Practice

M.S. (1994)

North
Carolina State
University

RESEARCH / TEACHING INTERESTS:

- Distribution system protection
- Generator interconnections
- Protective relay and inverter-based resource settings management
- Distribution and transmission regulatory policy

John Gajda teaches power systems courses in the Master of Science in Electric Power Systems Engineering program. Before joining the North Carolina State University faculty in 2024, he worked extensively across the energy and electric utility industry for over 30 years, and was an adjunct lecturer in the Department of Electrical and Computer Engineering for more than 10 years. His roles have spanned industry, regulatory agencies, cooperative utilities, investor-owned utilities, consulting, solar power, federal government and academia.

Gajda's areas of teaching and research expertise are distribution system protection, generator interconnections, protective relay and inverter-based resource settings management and distribution and transmission regulatory policy. He has served on multiple Institute of Electrical and Electronics Engineers (IEEE) working groups related to generator interconnections, has testified multiple times before the North Carolina Utilities Commission, and has submitted an affidavit before the Federal Energy Regulatory Commission. Gajda has developed and written multiple utility internal design standards and manuals. He is a licensed professional engineer in the states of North Carolina, South Carolina, Virginia, Tennessee and Alabama, and is a senior member of IEEE.

SELECTED PUBLICATIONS

- Affidavit filed at FERC as part of North Carolina Utilities Commission's comments on FERC's Generator Interconnection proposed rulemaking (Joint Comments of the North Carolina Utilities Commission et al. under RM22-14, filed October 13, 2022)
- Testimony, on behalf of Carolinas Clean Energy Business Association & Strata Clean Energy, in IEEE 1547 interconnection standard technical conference at the North Carolina Utilities Commission (Docket E-100 Sub 101B; April 12, 2021)
- Testimony, on behalf of Duke Energy in generator interconnection hearings at North Carolina Utilities Commission (Docket E-100 Sub 101; January 28-29, 2019)
- Technical paper "Distributed Generation Intertie With Advanced Recloser Control", co-authored and presented at Georgia Tech Relay Conference, May 2008, Atlanta, GA



PRIYA GILL

DEPARTMENT OF ELECTRICAL
AND COMPUTER ENGINEERING

Professor of the Practice

Ph.D.

(expected 2025)

Texas Tech
University

RESEARCH / TEACHING INTERESTS:

- Innovation, entrepreneurship and research commercialization
- Drivers of innovation capability in a company
- Impact of innovation
- Entrepreneurship success factors

Priya Gill received her MBA from the Georgia Institute of Technology in 2004. She earned her B.S. in electrical engineering from Osmania University College of Engineering in 1993 in Hyderabad, India. She is currently working on finishing her Ph.D. in systems and engineering management from Texas Tech University. Prior to joining North Carolina State University, she worked at Texas Tech University as an assistant professor of practice, starting there as an instructor in 2015. There, she designed an Entrepreneurship for Engineers course and a New Product Development using Lean Launch Methods course. Prior to that, she worked for over 15 years in industry in engineering consulting, management consulting and independent power production company in large projects as an engineer and a manager. Her experience is in oil and gas, petrochemicals, aerospace and utility industries.

At Texas Tech, she mentored over 10 startup companies. She was also the director of team mentoring at Texas Tech's Innovation Hub. She is a regional and national I-Corps instructor. She will be teaching in the Engineering Entrepreneurship Program at NC State and will be involved with the programs at the university's Innovation and Entrepreneurship center.

Her research is focused on the areas of innovation, entrepreneurship and research commercialization. Specifically, she is studying the drivers of innovation capability in a company and the impact of innovation. She is also studying entrepreneurship success factors. In research commercialization, she works collaboratively with faculty to help bring their research to the market. One such project that she is working on with the team at Texas Tech is to recycle wind turbines.



PASCHALIS GKOUPIDENIS

DEPARTMENT OF ELECTRICAL AND
COMPUTER ENGINEERING WITH A JOINT
APPOINTMENT IN THE DEPARTMENT OF PHYSICS

Associate Professor

Ph.D. (2014)

University
of Ioannina

RESEARCH INTERESTS:

- Organic neuromorphic electronics
- Neuromorphic bioelectronics
- Neuromorphic engineering
- Organic bioelectronics
- Biosensors
- Organic mixed conductors
- Ion transport

Paschalis Gkoupidenis has a B.Sc. in physics from the University of Ioannina (2005), an M.Sc. in microelectronics from the University of Athens (2007) and a Ph.D. in materials science from National Centre of Scientific Research, "Demokritos," in Athens, Greece (2014). During his Ph.D., Gkoupidenis worked on understanding the ionic transport mechanisms of organic electrolytes. In 2015, he started as a postdoctoral scholar at the Department of Bioelectronics (EMSE, France), where he worked on the design and development of organic neuromorphic devices based on mixed ionic-electronic conductors. In 2017, he joined the Max Planck Institute for Polymer Research (Germany) as a group leader (equivalent to assistant professor) at the Department of Molecular Electronics. The research in his group focused on the fields of organic neuromorphic electronics and bioelectronics. Gkoupidenis is one of the founders of the field of organic neuromorphic electronics. His research has been featured frequently in the international media (*Scientific American*, *Yale Scientific*, *Max Planck Society Newsroom*), and he frequently delivers invited talks at key conferences (Materials Research Society, International Society for Optics and Photonics).

In 2024, Gkoupidenis joined the North Carolina State University faculty as an associate professor. He has a joint appointment in the Department of Electrical and Computer Engineering and the Department of Physics. In his future research, he will be working on emulating and interfacing biological systems with organic neuromorphic electronics. In the long term, this endeavor aims at: i) the understanding of biological signal processing via reverse-engineering; ii) the integration of intelligence in unconventional applications such as sensors, actuators, (soft) robotics and biocomputing; and iii) the implementation of energy-efficient, multimodal and natural-like communication in bioelectronic interfaces.

SELECTED PUBLICATIONS

- P. Belleri, J. Pons i Tarrés, I. McCulloch, P. W. M. Blom, Z. M. Kovács-Vajna, P. Gkoupidenis*, F. Torricelli, "Unravelling the operation of organic artificial neurons for neuromorphic bioelectronics", *Nat. Commun.* 15, 5350 (2024).
- I. Krauhausen, S. Griggs, I. McCulloch, J. M. J. den Toonder, P. Gkoupidenis*, Y. van de Burgt, "Bio-inspired multimodal learning with organic neuromorphic electronics for behavioral conditioning in robotics", *Nat. Commun.* 15, 4765 (2024).
- P. Gkoupidenis*, Y. Zhang, H. Kleemann, H. Ling, F. Santoro, S. Fabiano, A. Salleo, Y. van de Burgt, "Organic mixed conductors for bioinspired electronics", *Nat. Rev. Mater.* 9 (2), 134 (2024).
- T. Sarkar, K. Lieberth, A. Pavlou, T. Frank, V. Mailaender, I. McCulloch, P. W. M. Blom, F. Torricelli, P. Gkoupidenis*, "An organic artificial spiking neuron for in situ neuromorphic sensing and biointerfacing", *Nat. Electron.* 5, 774 (2022).
- I. Krauhausen, D. Koutsouras, A. Mellinas, S. T. Keene, H. Ledanseur, K. Lieberth, A. Giovannitti, F. Torricelli, I. McCulloch, P. W. M. Blom, A. Salleo, Y. van de Burgt, P. Gkoupidenis*, "Organic neuromorphic electronics for sensorimotor integration and learning in robotics", *Sci. Adv.* 7, 50 (2021).



ALI GURBUZ

DEPARTMENT OF ELECTRICAL
AND COMPUTER ENGINEERING

Associate Professor

Ph.D. (2008)

Georgia
Institute of
Technology

RESEARCH INTERESTS:

- Radar and array signal processing
- Computational imaging
- Remote sensing
- Compressive sensing
- Integrated communications and sensing
- Physics-aware and explainable machine learning

Ali Gurbuz received his B.S. in electrical engineering from Bilkent University, Ankara, Turkey, and his M.S. and Ph.D. degrees in electrical and computer engineering from the Georgia Institute of Technology in Atlanta. Prior to joining the North Carolina State University faculty, he was a postdoctoral fellow at Georgia Tech and held assistant and associate professor positions at Mississippi State University. He is a National Science Foundation Faculty Early Career Development (CAREER) awardee and a Turkish Academy of Sciences Best Young Scholar. He is currently an associate editor for the Institute of Electrical and Electronics Engineers *Transactions on Aerospace and Electronic Systems*.

Gurbuz's research integrates signal/image processing and machine learning for radar, remote sensing and wireless communication applications. His interests include compressive sensing, physics aware and explainable machine learning for inverse problems, computational imaging, multi-sensor activity sensing, radar/communication coexistence, passive sensing, unmanned aerial vehicle (UAV)-based remote sensing and precision agriculture.

SELECTED PUBLICATIONS

- S. Biswas, A. Manavi Alam and A. C. Gurbuz, "HRSpecNET: A Deep Learning-Based High-Resolution Radar Micro-Doppler Signature Reconstruction for Improved HAR Classification," in *IEEE Transactions on Radar Systems*, vol. 2, pp. 484-497, 2024
- S. Biswas, C. O. Ayna, S. Z. Gurbuz and A. C. Gurbuz, "CV-SincNet: Learning Complex Sinc Filters From Raw Radar Data for Computationally Efficient Human Motion Recognition," in *IEEE Transactions on Radar Systems*, vol. 1, pp. 493-504, 2023.
- R. Mdrafi and A. C. Gurbuz, "Joint Learning of Measurement Matrix and Signal Reconstruction via Deep Learning," in *IEEE Transactions on Computational Imaging*, vol. 6, pp. 818-829, 2020.
- O. Eroglu, M. Kurum, D. Boyd, and A. C. Gurbuz, "High Spatio-Temporal Resolution CYGNSS Soil Moisture Estimates Using Artificial Neural Networks," *Remote Sensing*, vol. 11, no. 19, pp.1-32, 2019.
- A. C. Gurbuz, J. H. McClellan, and W.R. Scott, "A Compressive Sensing Data Acquisition and Imaging Method for Stepped-Frequency GPRs," in *IEEE Tran. on Signal Processing*, vol.57, no.7, pp. 2640-2650, July 2009



SEVGI ZUBEYDE GURBUZ

DEPARTMENT OF ELECTRICAL
AND COMPUTER ENGINEERING

Associate Professor

Ph.D. (2009)

Georgia
Institute of
Technology

RESEARCH INTERESTS:

- Cyber-physical human systems (CPHS)
- Radar systems and radar signal processing
- Physics-aware artificial intelligence and machine learning (AI/ML)
- Human-computer interaction
- Remote health monitoring

Sevgi Zubeyde Gurbuz received her B.S. and M.Eng. degrees from the Massachusetts Institute of Technology in 1998 and 2000, respectively, and her Ph.D. from the Georgia Institute of Technology in 2009, all in electrical engineering. From 1998 to 2004, she served as an active duty officer in the U.S. Air Force, including one tour at the Air Force Research Laboratory in Rome, New York, and a 6-month overseas deployment in Turkey as an interpreter. Most recently, she was an associate professor of electrical and computer engineering at the University of Alabama, Tuscaloosa.

Zubeyde's research advances RF-enabled cyber-physical human systems (CPHS), radar signal processing and machine learning algorithms for human-computer interaction, remote health monitoring and defense applications. She has pioneered radar-based American Sign Language recognition, for which she was awarded a patent in 2022, and is developing novel, interactive RF sensing paradigms built upon physics-aware machine learning and fully adaptive (cognitive) radar that provide for unique AI/ML solutions to radar perception problems. She is the recipient of numerous awards, including a National Science Foundation Faculty Early Career Development (CAREER) award and a SPIE Rising Researcher Award. She serves as a member of the Institute of Electrical and Electronics Engineers (IEEE) Radar Systems Panel, and as associate editor for *IEEE Transactions on Aerospace and Electronic Systems* and *IEEE Transactions on Radar Systems*.

SELECTED PUBLICATIONS

- S. Z. Gurbuz, M. M. Rahman, Z. Bassiri and D. Martelli, "Overview of Radar-Based Gait Parameter Estimation Techniques for Fall Risk Assessment," in *IEEE Open Journal of Engineering in Medicine and Biology*, June 2024.
- E. Kurtoglu, K. DeHaan, C. Kobek Pezzarossi, D. J. Griffin, C. Crawford, S. Z. Gurbuz, "Interactive Learning of Natural Sign Language with Radar," in *IET Radar Sonar and Navigation*, May 2024.
- M. M. Rahman, S. Z. Gurbuz and M. G. Amin, "Physics-Aware Generative Adversarial Networks for Radar-Based Human Activity Recognition," in *IEEE Transactions on Aerospace and Electronic Systems*, vol. 59, no. 3, pp. 2994-3008, June 2023.
- M. M. Rahman, E. A. Malaia, A. C. Gurbuz, D. J. Griffin, C. Crawford and S. Z. Gurbuz, "Effect of Kinematics and Fluency in Adversarial Synthetic Data Generation for ASL Recognition With RF Sensors," in *IEEE Transactions on Aerospace and Electronic Systems*, vol. 58, no. 4, pp. 2732-2745, Aug. 2022.
- E. Kurtoglu, A. C. Gurbuz, E. A. Malaia, D. Griffin, C. Crawford and S. Z. Gurbuz, "ASL Trigger Recognition in Mixed Activity/Signing Sequences for RF Sensor-Based User Interfaces," in *IEEE Transactions on Human-Machine Systems*, vol. 52, no. 4, pp. 699-712, Aug. 2022.



SABRE KAIS

DEPARTMENT OF ELECTRICAL
AND COMPUTER ENGINEERING

Goodnight Distinguished Chair in Quantum Computing

Ph.D. (1989)

Hebrew
University of
Jerusalem

RESEARCH / TEACHING INTERESTS

- Developing quantum computing algorithms and quantum machine learning methods for the simulations of complex many-body systems
- Introduction and advanced courses in quantum mechanics, quantum information and quantum computing

Prior to joining the faculty at North Carolina State University as the Goodnight Distinguished Chair in Quantum Computing in the Department of Electrical and Computer Engineering (ECE), Sabre Kais was a distinguished professor of chemistry and ECE, as well as a courtesy professor of computer science and physics at Purdue University. He received his B.Sc., M.Sc. and Ph.D. from the Hebrew University of Jerusalem in 1983, 1984 and 1989, respectively. He has published over 280 papers in peer-reviewed journals. The research in his group is mainly devoted to quantum information and quantum computing for complex many-body systems. He was the director of the National Science Foundation (NSF)-funded Center of Innovation on "Quantum Information for Quantum Chemistry" from 2010 to 2013 and was the director of the Center for Quantum Technology at Purdue. He was an external research professor at the Santa Fe Institute from 2013 to 2019. He is a Fellow of the American Physical Society, a Fellow of the American Association for the Advancement of Science, a Guggenheim Fellow and a Purdue University Faculty Scholar. He has received the NSF Faculty Early Career Development (CAREER) Award, the 2012 Sigma Xi Research Award, the 2019 Herbert Newby McCoy Award from Purdue and the Visiting Miller Professorship Award from Berkeley for 2024-25.

SELECTED PUBLICATIONS

- S. Kais, "Entanglement, Electron Correlation, and Density Matrices," *Adv. Chem. Phys.* **134**, 493 (2007).
- H. Wang, S. Kais, A. Aspuru-Guzik, and M. R. Hoffmann, "Quantum Algorithm for Obtaining the Energy Spectrum of Molecular Systems," *Phys. Chem. Chem. Phys.* **10**, 5388 (2008).
- R. Xia and S. Kais, "Quantum Machine Learning for Electronic Structure Calculations," *Nature Communications*, **9**, 4195 (2018).
- M. Sajjan, J. Li, R. Selvarajan, S. H. Sureshbabu, S. S. Kale, R. Gupta, V. Singh, and S. Kais, "Quantum Machine Learning for Chemistry and Physics," *Chem. Soc. Rev.* **51**, 6475 (2022).
- J. Li, B. A. Jones and S. Kais, "Toward perturbation theory methods on a quantum computer," *Science Advances* **9**, eadg4576 (2023).



JAMES REYNOLDS

DEPARTMENT OF ELECTRICAL
AND COMPUTER ENGINEERING

Assistant Research Professor

Ph.D. (2021)

North
Carolina State
University

RESEARCH INTERESTS:

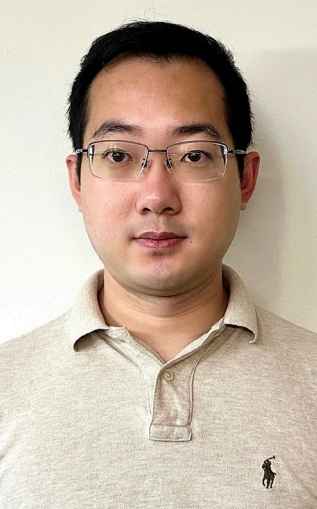
- Smart agriculture
- E-textiles
- Wearables
- Embedded hardware
- Health monitoring

James Reynolds received his B.S. in engineering from Bob Jones University in Greenville, South Carolina. He then received his M.S. and Ph.D. in electrical engineering from North Carolina State University. Afterwards, he served as a postdoctoral research scholar in the Integrated Bionic MicroSystems Laboratory under Distinguished Professor Alper Bozkurt at NC State University.

His passion is interdisciplinary research. He excels at systems integration and embedded hardware engineering as a means of advancing science and technology in all aspects of society. Currently, he is developing next generation e-textiles for intelligence gathering, animal implants for improved health care and research, wireless systems for mussel and moth activity monitoring, and devices for measuring volatile organic compounds.

SELECTED PUBLICATIONS

- Reynolds, J., Wilkins, M., Martin, D., Taggart, M., Rivera, K. R., Tunc-Ozdemir, M., ... & Daniele, M. A. (2024). Evaluating Bacterial Nanocellulose Interfaces for Recording Surface Biopotentials from Plants. *Sensors*, 24(7), 2335.
- Ahmed, P., Reynolds, J., & Bozkurt, A. (2024). A Subcutaneously Injectable Implant for Multimodal Physiological Monitoring in Animals. *IEEE Sensors Journal*
- Reynolds, J., Taggart, M., Martin, D., Lobaton, E., Cardoso, A., Daniele, M., & Bozkurt, A. (2023). Rapid Drought Stress Detection in Plants Using Bioimpedance Measurements and Analysis. *IEEE Transactions on AgriFood Electronics*.
- Reynolds, J., Williams, E., Martin, D., Reading, C., Ahmed, P., Huseeth, A., & Bozkurt, A. (2022). A Multimodal Sensing Platform for Interdisciplinary Research in Agrarian Environments. *Sensors*, 22(15), 5582.
- Ahmed, P., Reynolds, J., Levine, J. F., & Bozkurt, A. (2021). An accelerometer-based sensing system to study the valve-gaping behavior of bivalves. *IEEE Sensors Letters*, 5(4), 1-4.



KAIXIONG ZHOU

DEPARTMENT OF ELECTRICAL
AND COMPUTER ENGINEERING

Assistant
Professor

Ph.D. (2023)

Rice
University

RESEARCH INTERESTS:

- Machine learning
- Data mining
- AI for science and engineering

Kaixiong Zhou is an assistant professor in the Department of Electrical and Computer Engineering at North Carolina State University. Prior to joining NC State, he was a postdoctoral researcher in the Institute for Medical Engineering and Science at the Massachusetts Institute of Technology. He received his Ph.D. in computer science from Rice University in 2023. He received the B.S. from Sun Yat-Sen University (SYSU) in 2015 and received the M.E. degree from the University of Science and Technology of China (USTC) in 2018.

His research interests lie in developing efficient, trustworthy and use-inspired machine learning algorithms in the fields of graph representation learning, language models and AI for science and engineering. His research contributes to tackling challenges in various applications including synthetic biology, drug discovery and network analysis.

SELECTED PUBLICATIONS

Kaixiong Zhou, Xiao Huang, Yuening Li, Daochen Zha, Rui Chen, and Xia Hu. "Towards Deeper Graph Neural Networks with Differentiable Group Normalization", *Conference on Neural Information Processing Systems (NeurIPS)*, 2020.

Kaixiong Zhou, Xiao Huang, Daochen Zha, Rui Chen, Li Li, Soo-Hyun Choi, and Xia Hu. "Dirichlet Energy Constrained Learning for Deep Graph Neural Networks", *Conference on Neural Information Processing Systems (NeurIPS)*, 2021.

Xin Juan, Kaixiong Zhou, Ninghao Liu, Tianlong Chen, Xin Wang. "Molecular Data Programming: Towards Molecule Pseudo-labeling with Systematic Weak Supervision", *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

Hengrui Gu, Kaixiong Zhou, Xiaotian Han, Ninghao Liu, Ruobing Wang, Xin Wang. "PokeMQA: Programmable knowledge editing for Multi-hop Question Answering", *Annual Meeting of the Association for Computational Linguistics (ACL)*, 2024.

Zhaozhuo Xu, Zirui Liu, Beidi Chen, Yuxin Tang, Jue Wang, Kaixiong Zhou, Xia Hu, Anshumali Shrivastava. "Soft Prompt Recovers Compressed LLMs, Transferably", *International Conference on Machine Learning (ICML)*, 2024.



KAI LAN

DEPARTMENT OF FOREST BIOMATERIALS

Assistant Professor

Ph.D. (2020)

North Carolina State University

RESEARCH INTERESTS:

- Sustainable bioenergy and sustainable biomaterials
- Carbon footprint and climate change mitigation
- Upcycling solid waste
- Green building
- Artificial intelligence
- Process design and simulation
- Techno-economic analysis (TEA) and life cycle assessment (LCA) of emerging technologies

Kai Lan received his Ph.D. in forest biomaterials from the North Carolina State University in 2020, M.S. in mechanical engineering from the University of Michigan in 2016, and B.S. in mechanical engineering from Shanghai Jiao Tong University in 2014. He was a postdoctoral associate at Yale University from 2021-23.

Lan's research focuses on developing new methods and integrated modeling frameworks to assess and advance industrial systems and the built environment related to sustainable bioenergy and biomaterials. His research uses interdisciplinary approaches in industrial ecology, sustainable engineering, artificial intelligence and ecological modeling to develop systems analysis tools to support engineering and policy decisions toward sustainability, especially in the context of climate change mitigation and circular economy. Lan leads the Sustainability Analysis and Innovation Lab (SAIL). He was selected as the associate member of the Young Academy for Sustainability Research.

SELECTED PUBLICATIONS

- Lan, K., Zhang, B., Lee, T., & Yao, Y. (2024). Soil organic carbon change can reduce the climate benefits of biofuel produced from forest residues. *Joule*.
- Lan, K.#, Zhang, B.#, Harris, T. B., Ashton, M. S. and Yao, Y.* (2023). Climate-smart forestry through innovative wood products and commercial afforestation and reforestation on marginal land. *Proceedings of the National Academy of Sciences*, 120(23), e2221840120.
- Lan, K., Zhang, B., & Yao, Y. (2022) Circular utilization of urban tree waste contributes to the mitigation of climate change and eutrophication. *One Earth*, 5(8), 944-957.
- Lan, K., & Yao, Y. (2022). Dynamic life cycle assessment of energy technologies under different greenhouse gas concentration pathways. *Environmental Science & Technology, Cover Paper*, 56(2), 1395–1404.
- Lan, K., Ou, L., Park, S., Kelley, S. S., English, B. C., Yu, T. E., Larson, J., & Yao, Y. (2020). Techno-Economic Analysis of Decentralized Preprocessing Systems for Fast Pyrolysis Biorefineries with Blended Feedstocks in the Southeastern United States. *Renewable & Sustainable Energy Reviews*, 143, 110881.



JINGXIN WANG

DEPARTMENT OF FOREST BIOMATERIALS

Head and Professor

Ph.D. (1997)

University of Georgia

RESEARCH INTERESTS:

- Sustainable biomaterials
- Bioenergy and bioproducts
- Forest carbon management and decarbonized bioeconomy
- Computer simulation and system modeling
- Forest ecosystem services and climate change

Jingxin Wang is head of the Department of Forest Biomaterials at North Carolina State University, as well as a professor. Before joining NC State University, he was the Benedum Distinguished Scholar, Davis Michael Professor of Forestry and Natural Resources and the director of WVU Sustainable Biomaterials & Bioenergy at West Virginia University in Morgantown, West Virginia. He received his degrees in forest / mechanical engineering from Northeast Forestry University in Harbin, China. He received an M.S. in computer science from West Virginia University and a Ph.D. in forest resource management from the University of Georgia in Athens, Georgia.

Wang has taught forest and biomass harvesting logistics and analysis, computing applications in forest and natural resources for both undergraduate and graduate students for more than 20 years. He has authored or coauthored 200+ refereed papers, and 12 books or book chapters. Currently, he is a leading PI for several U.S. Department of Agriculture and U.S. Department of Energy biomass energy and bioproducts projects. He has served as an editorial board member and associate editor for four international journals. He is an active member in six international professional societies.

SELECTED PUBLICATIONS

- Zhao, J., J. Wang, and N. Anderson. 2024. Machine learning applications in forest and biomass supply chain management: A review. *Int J. of Forest Engineering*. <https://doi.org/10.1080/14942119.2024.2380230>.
- Zhao, J., Smith, J. Wang, X. Zhang, R. Bergman. 2024. Life-cycle impact assessment of hardwood forest resources in the eastern United States. *Science of the Total Environment* 909 (2024) 168548. <https://doi.org/10.1016/j.scitotenv.2023.168458>.
- Hu, W., J. Wang, J. Hu, J. Schuler, S. Grushecky, C. Jiang, W. Smith, N. Nan, and E. Sabolsky. 2024. Combustion behaviors, kinetics, and thermodynamics of naturally decomposed and torrefied northern red oak (*Quercus rubra*) forest logging residue. *Energies* 2024, 17(7), 1607; <https://doi.org/10.3390/en17071607>.
- Jiang, C., J. Hu, C. Zhang, G. Hota, J. Wang, and N. Ahkmedov. 2023. Lignin Oligomers from Mild Base-catalyzed Depolymerization for Potential Application in Aqueous Soy Adhesive as Phenolic Blends. *Reaction Chemistry & Engineering*, 2023, <https://doi.org/10.1039/D3RE00224A>.
- Hu, W., Wang, J. Hu, J. Schuler, S. Grushecky, N. Nan, W. Smith, and C. Jiang. 2023. Thermodegradation of naturally decomposed forest logging residues: Characteristics, kinetics, and thermodynamics. *Bioresource Technology*. 376 (2023) <https://doi.org/10.1016/j.biortech.2023.128821>.



TING-FENG YEH

DEPARTMENT OF FOREST BIOMATERIALS

Associate Professor

Ph.D. (2005)

North Carolina State University

RESEARCH INTERESTS:

- Woody cell wall chemistry
- Wood formation process
- Plant cell wall biosynthesis
- Chemical processing and utilization of lignocelluloses
- Plant secondary metabolites
- Chemistry of pulping and bleaching processes

Ting-Feng Yeh received his B.S. and M.Sc. in forest product utilization and chemistry at National Taiwan University in 1995 and 1997. He then received his Ph.D. in wood and paper science at North Carolina State University in 2005. He was a postdoctoral researcher of the Forest Biotechnology Group in the Department of Forestry and Environmental Resources at NC State from 2006 to 2008. Prior to joining the NC State faculty, he was an assistant and then associate professor at the School of Forestry and Resource Conservation, National Taiwan University.

His research interests focused on the chemistry of woody cell wall, wood formation process, plant cell wall biosynthesis, the chemical processing and utilization of lignocelluloses, plant secondary metabolites and the chemistry of pulping and bleaching processes.

SELECTED PUBLICATIONS

- Liu, L.Y.; Chiang, W.S.; Chang, H.m.; Yeh, T.F. (2024) Phenolation to improve hardwood kraft lignin for wood adhesive application. *Polymers* 16(13):1923.
- Chen, Y.J.; Huang, Y.L.; Chen, Y.H.; Chang, S.T.; Yeh, T.F. (2022) Biogenic volatile organic compounds and protein expressions of *Chamaecyparis formosensis* and *Chamaecyparis obtusa* var. *formosana* leaves under different light intensities and temperatures. *Plants* 11(12):1535.
- Yeh, T.F.; Chu, J.H.; Liu, L.Y.; Chen, S.Y. (2020) Differential gene profiling of the heartwood formation process in *Taiwania cryptomerioides* Hayata xylem tissues. *International Journal of Molecular Sciences* 21(3):960.
- Chen, S.Y.; Yen, P.L.; Chang, T.Z.; Chang, S.T.; Huang, S.K.; Yeh, T.F. (2018) Distribution of living ray parenchyma cells and major bioactive compounds during the heartwood formation of *Taiwania cryptomerioides* Hayata. *Journal of Wood Chemistry and Technology* 38(2):84-95.
- Yeh, T.F.; Chang, M.J.; Chang, W.J. (2014) Comparison of dilute acid and sulfite pretreatments on *Acacia confusa* for biofuel application and the influence of its extractives. *Journal of Agricultural and Food Chemistry* 62(44):10768-10775.



S. MOHAMMAD HOSSEINIAN

EDWARD P. FITTS DEPARTMENT OF
INDUSTRIAL AND SYSTEMS ENGINEERING

Assistant Professor

Ph.D. (2021)

Texas A&M
University

RESEARCH INTERESTS:

- Operations research
- Mathematical programming
- Combinatorial optimization
- Medical decision-making

S. Mohammad Hosseinian is an assistant professor in the Edward P. Fitts Department of Industrial and Systems Engineering and a graduate faculty member in the Operations Research program at North Carolina State University. Prior to joining NC State, he was an assistant professor of industrial and systems engineering at the University of Cincinnati (UC) and an associate research member of the UC Cancer Center. He received his Ph.D. in industrial engineering from Texas A&M University in 2021. Subsequently, he worked as a postdoctoral researcher in the Department of Computational Applied Mathematics and Operations Research at Rice University, with a joint appointment in the Department of Radiation Oncology at MD Anderson Cancer Center.

Hosseinian is the recipient of the 2022 Pritsker Doctoral Dissertation Award (2nd place) from the Institute of Industrial and Systems Engineers and the 2020-21 Outstanding Engineering Doctoral Student Award from Texas A&M University. His primary research interests are in optimization methodologies and their applications in medical decision-making.

SELECTED PUBLICATIONS

- S. Hosseinian, M. Hemmati, C. Dede, T. Salzillo, L. van Dijk, A. Mohamed, S. Lai, A. J. Schaefer, and C. D. Fuller. "Cluster-Based Toxicity Estimation of Osteoradionecrosis via Unsupervised Machine Learning: Moving Beyond Single Dose-Parameter Normal Tissue Complication Probability by Using Whole Dose-Volume Histograms for Cohort Risk Stratification." *International Journal of Radiation Oncology, Biology, Physics* 119.5 (2024): 1569-1578.
- T. Ajayi, S. Hosseinian, A. J. Schaefer, and C. D. Fuller. "Combination Chemotherapy Optimization with Discrete Dosing." *INFORMS Journal on Computing* 36.2 (2024): 434-455.
- S. Hosseinian and S. Butenko. "Polyhedral Properties of the Induced Cluster Subgraphs." *Discrete Applied Mathematics* 297 (2021): 80-96.
- S. Hosseinian, D. Fontes, and S. Butenko. "A Lagrangian Bound on the Clique Number and an Exact Algorithm for the Maximum Edge Weight Clique Problem." *INFORMS Journal on Computing* 32.3 (2020): 747-762.
- S. Hosseinian, D. Fontes, and S. Butenko. "A Nonconvex Quadratic Optimization Approach to the Maximum Edge Weight Clique Problem." *Journal of Global Optimization* 72.2 (2018): 219-240.



COREY KIASSAT

EDWARD P. FITTS DEPARTMENT OF
INDUSTRIAL AND SYSTEMS ENGINEERING

Teaching Professor

Ph.D. (2013)

University of
Toronto

RESEARCH / TEACHING INTERESTS:

- Lean Six Sigma applications for achieving excellence in health care, manufacturing and sustainability transformations
- Pedagogical excellence for innovative and impactful engineering education

Corey Kiassat received his Ph.D. in industrial engineering from the University of Toronto in 2013. His doctoral dissertation was at the interface of operations research, human factors and quantitative human resource management. His research focused on the effect of human-related factors, such as skill and shift work, on performance of systems. He earned a Bachelor of Applied Science in industrial engineering, also from the University of Toronto, followed by an MBA from York University.

Prior to joining North Carolina State University, Kiassat was the inaugural associate dean of the School of Computing and Engineering at Quinnipiac University. In addition, he was a tenured professor of industrial engineering, with a cross-appointment as a professor of medical sciences at Quinnipiac's Frank H. Netter MD School of Medicine. He was one of the founding faculty members to start the School of Engineering in 2013. His leadership roles included industry partnerships, fundraising, strategic development, operational efficiency, student success programs, curricular design and accreditation. In his applied research work, he worked with hospitals across Connecticut on productivity and efficiency initiatives.

Prior to an academic career, Kiassat — a Professional Engineer — spent 11 years at General Motors. In addition, he was a co-founder of Executive Health Center, a health care company focused on personalized preventive care.

SELECTED PUBLICATIONS

- Mirabella, A., McAmis, N., Kiassat, C., Feinn, R., Singh, G. (May 2021). *Preferences to Improve Rounding Efficiency Amongst Hospitalists: A Survey Analysis*. *Journal of Community Hospital Internal Medicine Perspectives*, 11(4), 501-506.
- Kiassat, C., Safaei, N. (May 2019). *Effect of Imprecise Skill Level on Workforce Allocation in a Dynamic Market*. *Computers and Industrial Engineering*. 131, 464-476.
- Buyurgan, N., Kiassat, C. (January 2017). *Developing a New Industrial Engineering Curriculum Using a Systems Engineering Approach*. *European Journal of Engineering Education*, 42(6), 1263-1276.
- Kiassat, C. (June 2024). *Reimagining Industrial Engineering: Embedding Sustainability and Societal Impact in Course Design*. *American Society of Engineering Education (ASEE) Annual Conference*, Paper ID 42236.
- Appow, S., Kiassat, C., Ben-Avie, M. (June 2022). *School of Engineering First-year Academy to Help Underprepared Students*. *ASEE Annual Conference*, session T28192.



BRANDON MCCONNELL

EDWARD P. FITTS DEPARTMENT OF
INDUSTRIAL AND SYSTEMS ENGINEERING

Brandon McConnell is an associate research professor in the Edward P. Fitts Department of Industrial and Systems Engineering (ISE) and the Military & Veteran Liaison for the College of Engineering. After serving as an Infantry officer in the U.S. Army, McConnell now leads the Military Operations Research Group consisting of Operations Research (OR) and ISE students interested in military and national security challenges. He also mentors and advises active-duty and veteran students from OR and ISE. He has worked at NC State since 2018 and was promoted to associate research professor in 2024.

McConnell's research interests broadly include military operations research and expeditionary logistics with risk, as well as inventory control, production applications, health care systems and national security. A central theme to his research is making these decisions under conditions of uncertainty or while managing a set of risks. His previous work has included nonstationary queuing theory, scheduling and forecasting to conduct capacity planning and performance analysis for expeditionary logistics networks with risk, noncombatant evacuation planning and automation to support planning air movement operations.

Associate Research Professor

Ph.D. (2018)

North
Carolina State
University

RESEARCH INTERESTS:

- Military operations research
- Decision-support and planning problems
- Decision-making under uncertainty
- Applied AI in military decision-making

SELECTED PUBLICATIONS

- Nelson, R., King, R., McConnell, B.M., & Thoney-Barletta, K. 2023. US Army Aviation Air Movement Operations Assignment, Utilization, and Routing, *Journal of Defense Analytics and Logistics*, Vol 7, No 1, 2–28.
- Lawrence, B., Mittal, V., Evangelista, P., & McConnell, B.M. 2022. A Data-Centric Approach to Analyze Military Operations Leveraging National Training Center Data, *Journal of DoD Research and Engineering*. Vol 5, No 4, 1–9.
- McConnell, B.M., Hodgson, T., King, R., Kay, M., Liu, Y., Parlier, G., Thoney-Barletta, K., & Wilson, J. 2021. Assessing Uncertainty & Risk in an Expeditionary Military Logistics Network, *Journal of Defense Modeling & Simulation*, Vol 18, No 2, 135–156.
- Kearby J., Winz, R., Hodgson T., Kay, M., King, R., & McConnell, B.M. 2020. Modeling and Transportation Planning for Noncombatant Evacuation Operations in South Korea, *Journal of Defense Analytics and Logistics*, Vol 4, No 1, 41–69.
- Rogers, M., McConnell, B.M., Hodgson, T., Kay, M., King, R., Parlier, G., & Thoney-Barletta, K. 2018. A Military Logistics Network Planning System (MLNPS), *Military Operations Research*, Vol 23, No 4, 5–24.



RENRAN TIAN

EDWARD P. FITTS DEPARTMENT OF
INDUSTRIAL AND SYSTEMS ENGINEERING

Assistant Professor

Ph.D. (2013)

Purdue
University

RESEARCH INTERESTS:

- Human-centered computing
- Human-AI interaction
- Cognitive psychology
- Crowdsourcing
- Automated driving

Renran Tian is an assistant professor in the Edward P. Fitts Department of Industrial and Systems Engineering at North Carolina State University. Before joining NC State, he was an assistant professor in the Department of Computer Information Technology at Purdue University in Indianapolis. He earned his Ph.D. in industrial engineering from Purdue University in 2013 and holds a B.S. and M.S. in mechanical engineering from Tsinghua University, China.

Tian's research focuses on applying human factors principles and cognitive psychology models to develop human-centered AI systems, with applications in transportation, health care and education. Throughout his career, he has secured over \$3.1 million in funding as the principal investigator from the National Science Foundation (NSF), the Indiana Department of Transportation and industry sponsors. Tian has over 60 peer-reviewed publications in journals, books and proceedings. He serves as the chair of the Technical Committee on Human-Centered AI in Transportation for the Institute of Electrical and Electronics Engineers' Intelligent Transportation Systems Society, responsible for organizing conference sessions, workshops and student competitions. Additionally, he has served as an organizer, associate editor and session chair for more than 30 international conferences. Tian was recognized with the NSF Faculty Early Career Development (CAREER) Award in 2022 for his research on modeling pedestrian intentions.

SELECTED PUBLICATIONS

- Elahi, M.F., Li, T. and Tian, R., 2024, May. Exploring Collective Theory of Mind on Pedestrian Behavioral Intentions. In *Extended Abstracts of the CHI Conference on Human Factors in Computing Systems* (pp. 1-8).
- Zhang, Z., Tian, R. and Ding, Z., 2023, June. Trep: Transformer-based evidential prediction for pedestrian intention with uncertainty. In *Proceedings of the AAAI Conference on Artificial Intelligence* (Vol. 37, No. 3, pp. 3534-3542).
- Zhang, Z., Tian, R., Sherony, R., Domesy, J. and Ding, Z., 2022. Attention-based interrelation modeling for explainable automated driving. *IEEE Transactions on Intelligent Vehicles*, 8(2), pp.1564-1573.
- Zhang, Z., Tian, R., Duffy, V.G. and Li, L., 2024. The comfort of the soft-safety driver alerts: Measurements and evaluation. *International Journal of Human-Computer Interaction*, 40(4), pp.904-914.
- Chen, T., Tian, R. and Ding, Z., 2021. Visual reasoning using graph convolutional networks for predicting pedestrian crossing intention. In *Proceedings of the IEEE/CVF international conference on computer vision* (pp. 3103-3109).



ETANA FEREDE

DEPARTMENT OF MECHANICAL
AND AEROSPACE ENGINEERING

Etana Ferede is an aerospace engineer specializing in aerospace structures, computational mechanics and wind energy. He earned a Ph.D. in 2016 from Delft University of Technology, Faculty of Aerospace Engineering in Delft, Netherlands, with a focus on structural mechanics and composite design and analysis. He has extensive experience in wind turbine design and analysis, as well as a broad knowledge of composite analysis and multidisciplinary optimization. His research focuses on load alleviation for wind turbines using adaptive materials, the analysis of multi-rotor wind turbines and the optimization of composite blades for high-speed rotorcraft, among other interests. Currently, he is teaching Aerospace Structures and Strength of Mechanical Components.

Assistant Teaching Professor

Ph.D. (2016)

Delft
University of
Technology

RESEARCH / TEACHING INTERESTS:

- Wind turbine design and analysis
- Aeroelastic analysis
- Analysis of composite structures
- Multidisciplinary optimization of composite structures
- Analysis of Vertical Takeoff and Landing Vehicles (VTOL)
- Aerospace structures
- Wind energy

SELECTED PUBLICATIONS

- Stillman, A. N., Ferede, E., & Gandhi, F. (2023). Vibratory Load Reduction on a Quad-Rotor Wind Turbine using Relative Rotor Phasing. In AIAA SCITECH 2023 Forum (p. 2095).
- Ferede, E., Stillman, A., & Gandhi, F. (2022, May). Aeroelastic Stability Analysis of a Quad-Rotor Wind Turbine. In Journal of Physics: Conference Series (Vol. 2265, No. 4, p. 042056). IOP Publishing.
- Ferede, E., Karakalas, A., Gandhi, F. and Lagoudas, D. (2021). "Numerical Investigation of Autonomous Camber Morphing of a Helicopter Rotor Blade using Shape Memory Alloys," Proceedings of the 77th Vertical Flight Society Annual Forum, Virtual, May 10-14, 2021.
- Ferede, E, Gandhi, F. Aeroelastic load analysis of a co-rotating quad-rotor wind turbine. Wind Energy. 2021; 1- 18. doi:10.1002/we.2681
- Ferede E, Gandhi F. Design, fabrication, and testing of an active camber rotor blade tip. Journal of Intelligent Material Systems and Structures. December 2021. doi:10.1177/1045389X211063940



FARHAN GANDHI

DEPARTMENT OF MECHANICAL
AND AEROSPACE ENGINEERING

Farhan Gandhi obtained his B. Tech. in aeronautical engineering from Indian Institute of Technology (IIT)-Bombay in 1989, and Ph.D. in aerospace engineering from the University of Maryland's Alfred Gessow Rotorcraft Center in 1995. Prior to joining the faculty at North Carolina State University as the Hassan A. Hassan Distinguished Professor in Aerospace Engineering, he held faculty roles at Pennsylvania State University and Rensselaer Polytechnic Institute.

Gandhi is a Fellow of the American Institute of Aeronautics and Astronautics (AIAA), the Royal Aeronautical Society and the Vertical Flight Society. He has chaired multiple major technical conferences and technical committees. He is one of the nation's top experts on vertical take-off and landing (VTOL) aircraft aeromechanics, advanced VTOL configurations (including multi-rotor eVTOL aircraft for advanced air mobility applications), reconfigurable vertical lift and adaptive structures. He held a joint faculty appointment with the U.S. Army Research Lab, Vehicle Technology Directorate, from 2018-21.

Over a 29-year academic career, Gandhi has published approximately 360 technical papers in journals and major conference proceedings and has advised 29 Ph.D. students to graduation. He currently leads a vibrant research group of two research scientists and eight Ph.D. students. On 12 occasions, Gandhi has been a plenary or keynote speaker at major technical conferences and has delivered prestigious named lectures such as the 2022 Royal Aeronautical Society's Cierva Lecture in Vertical Lift, and the 2019 AIAA Adaptive Structures Lecture.

Hassan A. Hassan Distinguished Professor

Ph.D. (1995)

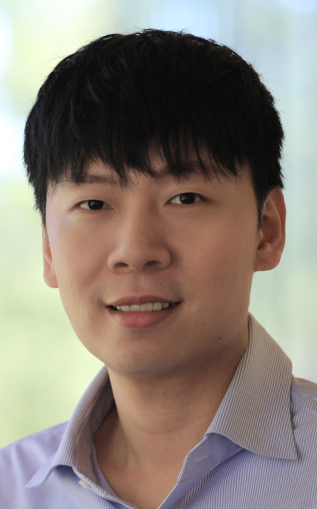
University
of Maryland

RESEARCH INTERESTS:

- Multi-rotor / rotor-wing interactional aerodynamics, aeroacoustics and flight controls
- eVTOL aircraft flying qualities
- Fault identification and fault tolerance
- Vibration reduction
- eVTOL aircraft configuration design and analysis

SELECTED PUBLICATIONS

- Niemiec, R., and Gandhi, F., "Multirotor Controls, Trim, and Autonomous Flight Dynamics of Plus- and Cross-Quadcopters," *Journal of Aircraft*, Vol. 54, No. 5 (2017), pp. 1910-1920, doi: 10.2514/1.C034165.
- Niemiec, R., Gandhi, F., and Singh, R., "Control and Performance of a Reconfigurable Multi-Copter," *Journal of Aircraft*, Feb 2018, 12 pages, DOI: 10.2514/1.C034731.
- McKay, M. E., Niemiec, R., and Gandhi, F., "Analysis of Classical and Alternate Hexacopter Configurations with Single Rotor Failure," *Journal of Aircraft*, April 2018, 8 pages, DOI: 10.2514/1.C035005.
- Misiorowski, M., Gandhi, F., and Oberai, A., "Computational Study of Diffuser Length on Ducted Rotor Performance in Edgewise Flight," *AIAA Journal*, Vol. 57, No. 2, Feb 2019, pp. 796-808. <https://doi.org/10.2514/1.J057228>.
- Misiorowski, M., Gandhi, F., and Oberai, A., "Computational Study on Rotor Interactional Effects for a Quadcopter in Edgewise Flight," *AIAA Journal*, Volume 57, Number 12, December 2019. <https://doi.org/10.2514/1.J058369>.



JAEMIN LEE

DEPARTMENT OF MECHANICAL
AND AEROSPACE ENGINEERING

Assistant Professor

Ph.D. (2022)

University
of Texas
at Austin

RESEARCH INTERESTS:

- Safety-critical whole-body planning and control for legged robots and humanoids
- Sensor-based versatile loco-manipulation
- AI-based task scheduling of autonomous robots

Jaemin Lee received his Ph.D. in mechanical engineering from the University of Texas at Austin and received his M.S. from Seoul National University (SNU) in Seoul, South Korea. He received his B.S. in mechanical engineering from Konkuk University in Seoul. Prior to joining the North Carolina State University faculty, he served as a postdoctoral scholar in Mechanical and Civil Engineering at the California Institute of Technology (Caltech), in Pasadena, California. In addition, he worked as a research scientist at the Korea Institute of Science and Technology (KIST) in Seoul. As a visiting student at Istituto Italiano di Tecnologia (IIT) in Genoa, Italy, he was awarded a fellowship from the Korea National Research Foundation.

Lee's research interests span the area of robotics, optimal planning, whole-body control, safety-critical control, autonomy, learning-based control and hybrid dynamical systems, with a special focus on applications to loco-manipulation of legged robots or humanoids with experimental validations. His laboratory specializes in the creation of innovative robotic systems and the development of advanced planning and control algorithms with optimization and learning techniques. The overarching aim is to deploy autonomous robotic systems effectively in unstructured environments for real-world applications, leveraging AI integration.

SELECTED PUBLICATIONS

- J. Lee, N. Mansard, and J. Park. "Intermediate desired value approach for task transition of robots in kinematic control." *IEEE Transactions on Robotics* 28.6 (2012): 1260-1277.
- J. Lee, E. Bakolas, and L. Sentis. "An efficient and direct method for trajectory optimization of robots constrained by contact kinematics and forces." *Autonomous Robots* 45.1 (2021): 135-153.
- D. Kim, S. J. Jorgensen, J. Lee, J. Ahn, J. Luo, and L. Sentis. "Dynamic locomotion for passive-ankle biped robots and humanoids using whole-body locomotion control." *The International Journal of Robotics Research* 39.8 (2020): 936-956.
- J. Lee, J. Ahn, D. Kim, S. Bang, and L. Sentis. "Online gain adaptation of whole-body control for legged robots with unknown disturbances." *Frontiers in Robotics and AI* 8 (2022): 788902.
- J. Lee, E. Bakolas, and L. Sentis. "Hierarchical task-space optimal covariance control with chance constraints." *IEEE Control Systems Letters* 6 (2022): 2359-2364.



MARK MORETTO

DEPARTMENT OF MECHANICAL
AND AEROSPACE ENGINEERING

Assistant Professor

Ph.D. (2022)

University
of Colorado
Boulder

RESEARCH INTERESTS:

- Astrodynamics
- Spacecraft navigation
- Multi-object tracking
- Planetary science
- Space sustainability and policy

Mark Moretto received his Ph.D. and M.S. in aerospace engineering sciences from the University of Colorado Boulder in 2022 and 2019, respectively. He also received B.S. degrees in aerospace engineering and astronomy from the University of Maryland in 2017. Prior to arriving at North Carolina State University, Moretto was a postdoc at the University of Colorado Boulder from 2022-24.

Moretto's research interests lie at the intersection of aerospace engineering and planetary science. He uses astrodynamics and estimation techniques to improve the safety, operations, and mission value of spacecraft in Earth orbit, around small-bodies in the solar system, and in interplanetary flight. Moretto recently earned NASA funding to study the efficacy of active debris removal from Earth orbit using combined space debris and economic modeling.

Moretto's Ph.D. was funded through a NASA Space Technology Research Fellowship and a Dean's Assistantship. He has earned numerous accolades for his work, including a Goldwater Scholarship (2016) and the National Young Astronomer Award (2013), as well as being named one of *Astronomy Magazine's* "25 Rising Stars" in 2022, and one of *Aviation Week's* "20 Twenties" in 2019.

SELECTED PUBLICATIONS

- Rao, Akhil, Mark Moretto, Marcus Holzinger, Daniel Kaffine, and Brian Weeden. "OPUS: An Integrated Assessment Model for Satellites and Orbital Debris." arXiv preprint arXiv:2309.10252 (2023).
- Moretto, Mark, and Jay McMahon. "Orbit averaging applied to inverse-square perturbations: Application to coma drag, thermal radiation pressure, and heliocentric solar sailing." *Celestial Mechanics and Dynamical Astronomy* 135, no. 1 (2023): 1.
- Moretto, M. and McMahon, J., 2020. Evolution of orbits about comets with arbitrary comae. *Celestial Mechanics and Dynamical Astronomy*, 132(6-7), p.37.
- Moretto, M. J., L. M. Feaga, and M. F. A'Hearn. "Abundances and spatial distributions of H₂O and CO₂ at comet 9P/Tempel 1 during a natural outburst." *Icarus* 296 (2017): 28-38.



LAURA PAQUIN

DEPARTMENT OF MECHANICAL
AND AEROSPACE ENGINEERING

Assistant Professor

Ph.D. (2022)

University
of Maryland

RESEARCH INTERESTS:

- Boundary-layer transition
- Hypersonic aerodynamics and thermodynamics
- Non-intrusive diagnostic techniques
- Ultrafast laser diagnostics
- Novel image processing methods

Laura Paquin received her Ph.D. in aerospace engineering from the University of Maryland (UMD) in 2022. Prior to that, she received her B.S. in aerospace engineering from the University of Notre Dame and her M.S. (2019) from UMD. Her graduate degree was supported by the National Defense Science and Engineering Graduate (NDSEG) fellowship, and her thesis work investigated the effects of cooling on hypersonic boundary-layer instabilities. After completing a post-doctoral research project at UMD that leveraged the T5 high-enthalpy tunnel at Caltech, Paquin joined the Spacecraft Engineering Division at the Naval Research Lab (NRL) in Washington, D.C. As a Karles fellow at NRL, Paquin independently established an ultrafast laser diagnostics lab, constructed a supersonic free jet facility and measured flow velocity of the jet using Femtosecond Laser Electronic Excitation Tagging (FLEET) through a collaboration with the West Virginia Center for KINETIC Plasma Physics at West Virginia University.

Paquin's research experience is largely concentrated in the field of hypersonic aerothermodynamics. Interested in external aerodynamics on hypersonic vehicles, she plans to establish a laboratory capable of testing wind-tunnel models at flight-relevant enthalpies. Her background is in optical diagnostics such as Schlieren imaging, temperature-sensitive paint, particle image velocimetry and FLEET (femtosecond laser electronic excitation tagging). She plans to break ground in the areas of high-enthalpy boundary layer transition, ultrafast laser diagnostic system development and non-intrusive gas velocity/temperature measurements.

SELECTED PUBLICATIONS

- Paquin, Laura A., et al. "Time-resolved wave packet development in highly cooled hypersonic boundary layers." *Journal of Fluid Mechanics* 983 (2024): A36.
- Paquin, Laura A., Shaun N. Skinner, and Stuart J. Laurence. "Hypersonic boundary-layer disturbances on a cooled, slender cone at Mach 6." *Journal of Spacecraft and Rockets* 60.2 (2023): 533-544.
- Juliano, Thomas J., Laura A. Paquin, and Matthew P. Borg. "HiFiRE-5 boundary-layer transition measured in a Mach-6 quiet tunnel with infrared thermography." *AIAA Journal* 57.5 (2019): 2001-2010.
- Paquin, Laura A., Shaun Skinner, and Stuart J. Laurence. "Boundary-Layer Disturbances and Surface Heat-Flux Profiles on a Cooled Slender Cone." *AIAA SciTech 2022 Forum*. 2022.
- Paquin, Laura A., et al. "Hypersonic boundary-layer instability on a highly cooled cone. Part II: schlieren analysis of boundary-layer disturbances." *AIAA SciTech 2022 Forum*. 2022.



SUSMITA SARKAR

DEPARTMENT OF MECHANICAL
AND AEROSPACE ENGINEERING

Assistant Professor

Ph.D. (2023)

Purdue
University

RESEARCH INTERESTS:

- High-performance, cost-effective lithium-ion and next-generation batteries
- Innovative design and manufacturing for energy storage
- Electron microscopy and tomography for materials-level understanding
- Characterization techniques for electrochemical interfaces
- Stretchable batteries for health care and robotics
- Polymer electrolytes for energy storage
- Thermally safe batteries for power grids and electric vehicles
- Multiphysics / multiscale experiments and simulations

Susmita Sarkar is an assistant professor in the Department of Mechanical and Aerospace Engineering at North Carolina State University, where she is leading a research group focused on advancing the field of energy storage. Before joining NC State, she was a Schmidt Science Fellow at Stanford University in Stanford, California. She obtained her Ph.D. from the School of Mechanical Engineering at Purdue University in West Lafayette, Indiana.

Sarkar's research bridges fundamental sciences with innovative technologies to create high-performance, cost-effective lithium-ion and next-generation batteries. Her multidimensional approach advances energy storage through innovative design and manufacturing, enhancing performance and reliability. She is exploring polymer materials for stretchable batteries in health care and robotics, while also focusing on thermally safe batteries for power grids and electric vehicles.

SELECTED PUBLICATIONS

- Susmita Sarkar, Matthew J Lefler, Bairav S Vishnugopi, R Blake Nuwayhid, Corey T Love, Rachel Carter, and Partha P Mukherjee, 'Fluorinated Ethylene Carbonate as Additive for Robust Sodium Solid Electrolyte Interface in Glyme Electrolytes', *Cell Reports Physical Science*, 4, 101356, 2023.
- Susmita Sarkar, Hernando J. Gonzalez Malabet, Megan Flannagin, Alex L'Antigua, P. Schevchenko, and George J. Nelson, and Partha P. Mukherjee, 'Multiscale Mechano-electrochemical Degradation Analytics of Sn Electrodes for Sodium-ion Batteries', *ACS Applied Materials & Interfaces*, 14, 26, 29711–29721, 2022.
- Susmita Sarkar and Partha P. Mukherjee, 'Synergistic Voltage and Electrolyte Mediation Improves Sodiation Kinetics in μ -Sn Alloy-anodes', *Energy Storage Materials*, 43, 305-316, 2021.
- Susmita Sarkar, John Hoffman, and Jonghyun Park, 'Micro-Macroscopic Modeling of a Lithium-Ion Cell by Considering Grain Boundaries of Active Materials', *Electrochimica Acta*, 393, 139052, 2021.
- Susmita Sarkar, Rajan Kumar Patel, Xinhua Liang, and Jonghyun Park, 'Unveiling the role of CeO₂ atomic layer deposition coatings on LiMn₂O₄ cathode materials', *ACS Applied Materials & Interfaces*, 9, (36), 30599-30607, 2017.



GREG WATKINS

DEPARTMENT OF MECHANICAL
AND AEROSPACE ENGINEERING

Greg Watkins is a proud alumnus of North Carolina State University, where he received his bachelor's degree in mechanical engineering. He earned a master of engineering management from Old Dominion University and Ph.D. in mechanical engineering from the University of North Carolina at Charlotte. Prior to joining the NC State University faculty, he held academic positions at California State University, Chico, the University of North Carolina at Charlotte, and Central Piedmont Community College. He also has nine years of industrial work experience for the U.S. Navy.

Watkins' areas of expertise include design, mechanics of materials, fluid mechanics, parametric modeling, rapid prototyping, finite element analysis, numerical methods, computational fluid dynamics, low speed aerodynamics and human-powered vehicle design. His research interests include use of today's simulation tools in the solution of applied complex problems in solid mechanics, thermal systems and fluid flow. He has extensive experience developing and managing externally funded multidisciplinary capstone design programs.

Teaching Professor

Ph.D. (2002)

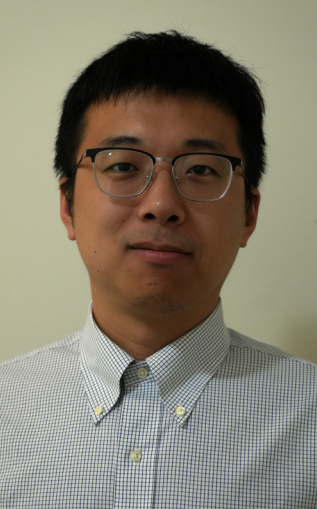
University
of North
Carolina at
Charlotte

RESEARCH / TEACHING INTERESTS:

- Finite element analysis
- Computational fluid dynamics
- Low speed aerodynamics
- Human-powered vehicle design
- Single track vehicle stability

SELECTED PUBLICATIONS

- Watkins, G.K., *Incorporating new ABET Outcomes into a Two-Semester Capstone Design Course*, Proceedings of the 2022 Capstone Design Conference, Dallas, Texas
- Watkins, G.K., *Peer Project Management for Capstone Design Teams*, Proceedings of the 2018 ASEE Annual Conference, Salt Lake City, Utah
- Watkins, G.K., *A Technical Elective Course in Modeling and Simulation - Teaching the Capabilities and Limitations of Professional Level Software*, COMPUTERS IN EDUCATION JOURNAL, Vol. 7, No. 4, October – December 2016
- Watkins, G.K., *A Comprehensive Strategy for Recruiting Externally Funded Capstone Design Projects*, Proceedings of the 2016 Capstone Design Conference, Columbus, Ohio
- Watkins, G.K., *Theory and Commercial Software - Finding the Balance in a Finite Elements Course*, COMPUTERS IN EDUCATION JOURNAL, Vol. 5, No. 3, July – September 2014



HUAIYU WU

DEPARTMENT OF MECHANICAL
AND AEROSPACE ENGINEERING

Huaiyu Wu received his B.S. and M.S. from the Department of Mechanical Engineering, Shandong University in Jinan, China. He received his Ph.D. from the Department of Mechanical and Aerospace Engineering at North Carolina State University.

Wu's expertise is in the development of innovative ultrasound transducers and arrays for biomedical related applications. His recent research is focusing on the applications of miniaturized ultrasonic devices with integration of catheters for diagnosis and therapy of cardiovascular diseases. His research has been applied for intravascular ultrasound imaging, sonothrombolysis, ultrasound assisted drug delivery and tissue ablations.

**Assistant
Research
Professor**

Ph.D. (2022)

North
Carolina State
University

RESEARCH INTERESTS:

- Ultrasound device development
- Ultrasound imaging and therapy
- Drug delivery

SELECTED PUBLICATIONS

- Wu, H., Kim, J., Zhang, B., Owens, G., Stocker, G., Chen, M., ... & Jiang, X. (2024). Rotational Intravascular Multidirectional Ultrasound Catheter for Sonothrombolysis of Retracted Clots: An in Vitro and in Vivo Study. *Engineering*.
- Zhang, B., Wu, H., Kim, H., Welch, P. J., Cornett, A., Stocker, G., ... & Jiang, X. (2023). A model of high-speed endovascular sonothrombolysis with vortex ultrasound-induced shear stress to treat cerebral venous sinus thrombosis. *Research*, 6, 0048.
- Wu, H., Tang, Y., Zhang, B., Klippel, P., Jing, Y., Yao, J., & Jiang, X. (2023). Miniaturized stacked transducer for intravascular sonothrombolysis with internal-illumination photoacoustic imaging guidance and clot characterization. *IEEE Transactions on Biomedical Engineering*, 70(8), 2279-2288.
- Wu, H., Zhang, B., Huang, C. C., Peng, C., Zhou, Q., & Jiang, X. (2022). Ultrasound-guided intravascular sonothrombolysis with a dual mode ultrasound catheter: In vitro study. *IEEE transactions on ultrasonics, ferroelectrics, and frequency control*, 69(6), 1917-1925.
- Wu, H., Goel, L. D., Kim, H., Zhang, B., Kim, J., Dayton, P. A., ... & Jiang, X. (2021). Dual-frequency intravascular sonothrombolysis: An in vitro study. *IEEE transactions on ultrasonics, ferroelectrics, and frequency control*, 68(12), 3599-3607.



KINGA UNOCIC

DEPARTMENT OF MATERIALS
SCIENCE AND ENGINEERING

Associate Professor

Ph.D. (2008)

The Ohio
State
University

RESEARCH INTERESTS:

- Materials processing
- Alloy development
- Mechanical behavior
- Radiation effects
- High-temperature oxidation
- Corrosion
- Catalysis

Kinga Unocic is an associate professor in the Department of Materials Science and Engineering at North Carolina State University. She received her M.S. degree in metallurgical engineering from the AGH University of Science and Technology in Krakow, Poland, and her Ph.D. in materials science and engineering from The Ohio State University in 2008. From 2009-24, she was an R&D staff scientist at Oak Ridge National Laboratory.

Her current research focuses on developing cutting-edge analytical and in situ/operando electron microscopy methods to study how environmental factors influence the physical behavior of advanced materials. Her research interests include high-temperature oxidation, corrosion, materials in extreme environments, radiation effects, novel materials processing, alloy development, mechanical behavior and catalysis.

SELECTED PUBLICATIONS

- K.A. Unocic, Y. Chen, D. Shin, B.A. Pint, E. A. Marquis, "STEM and APT characterization of scale formation on a La,Hf,Ti-doped NiCrAl model alloy," *Micron* 109 41-52 (2018).
- K.A. Unocic, F.S. Walden, N.L. Marthe, A.K. Datye, W.C. Bigelow, L.F. Allard, Introducing and Controlling Water Vapor in Closed-Cell *In Situ* Electron Microscopy Gas Reactions *Microscopy and Microanalysis* 26 (2), 229-239 (2020).
- Q. Guo, M. Kirka, L. Lin, D. Shin, J. Peng, K.A. Unocic, "*In situ* transmission electron microscopy deformation and mechanical responses of additively manufactured Ni-based superalloy," *Scripta Materialia* 186 57-62 (2020).
- D.A. McClintock, M.N. Gussev, C. Campbell, K. Mao, T.G. Lach, W. Lu, D.A. McClintock, M.N. Gussev, C. Campbell, K. Mao, T.G. Lach, W. Lu, J.A. Hachtel, K.A. Unocic, "Observations of radiation-enhanced ductility in irradiated Inconel 718: Tensile properties, deformation behavior, and microstructure," *Acta Materialia* 231, 117889 (2022).
- S.C. Purdy, G. Collinge, J. Zhang, S.N. Borate, K.A. Unocic, Q. Wu, E.C. Wegener, A. J. Kropf, N. River Samad, S.F. Yuk, D. Zhang, S. Habas, T.R. Krause, J.W. Harris, M-S Lee, V-A Glezakou, R. Rousseau, A.D. Sutton, and Z. Li, "Dynamic Copper Site Redispersion through Atom Trapping in Zeolite Defects," *J. Am. Chem. Soc.* 146, 8280-8297 (2024).



RAYMOND R. UNOCIC

DEPARTMENT OF MATERIALS
SCIENCE AND ENGINEERING

Associate Professor

Ph.D. (2008)

The Ohio
State
University

RESEARCH INTERESTS:

- Scanning transmission electron microscopy and spectroscopy
- Nanomaterials
- Energy storage and conversion
- Catalysis
- Microelectronics
- Structural materials
- Atomic engineering
- Data science and machine learning

Raymond Unocic is an associate professor in the Department of Materials Science and Engineering at North Carolina State University. Prior to joining NC State, he was an Alvin M. Weinberg Fellow, senior R&D staff scientist and group leader for the Materials MicroAnalysis Group in the Center for Nanophase Materials Sciences at Oak Ridge National Laboratory. Over the course of his research career, he has published over 200 peer-reviewed journal articles, four book chapters and holds five U.S. patents. He has received several notable awards including: the National Collegiate Inventors Award, MicroAnalysis Society's Birks Award, two R&D 100 awards and several ORNL UT-Battelle Research Team Awards. With expertise in aberration-corrected, analytical, cryo and in situ/operando scanning transmission electron microscopy, his research program is focused on pioneering novel microscopy-based characterization methods for nanoscience research with the purpose of probing atomic-scaled structure, chemistry and dynamic behavior of materials to establish structure-property-function correlations.

Unocic received his Ph.D. in materials science and engineering from The Ohio State University, M.S. in materials science and engineering from Lehigh University and B.S. in metallurgical engineering from The Ohio State University.

SELECTED PUBLICATIONS

- M.G. Boebinger, D.E. Yilmaz, A. Ghosh, S. Misra, T.S. Mathis, S.V. Kalinin, S. Jesse, Y. Gogotsi, A. van Duin, R.R. Unocic, "Direct Fabrication of Atomically Defined Pores in MXenes using Feedback-Driven STEM," *Small Methods*, 2400203, (2024).
- M.G. Boebinger, C. Brea, L.P. Ding, S. Misra, O. Olunloyo, Y. Yu, K. Xiao, A.R. Lupini, F. Ding, G. Hu, P. Ganesh, S. Jesse, R.R. Unocic, "The Atomic Drill Bit: Precision Controlled Atomic Fabrication of 2D Materials," *Advanced Materials*, 35(14), 2210116, (2023).
- K.M. Roccapiore, M.G. Boebinger, O. Dyck, A. Ghosh, R.R. Unocic, S.V. Kalinin, M. Ziatdinov, "Probing Electron Beam Induced Transformations on a Single-Defect Level via Automated Scanning Transmission Electron Microscopy," *ACS Nano*, 16(10), 17116-17127, (2022).
- X. Sang, X. Li, W. Zhao, J. Dong, C.M. Rouleau, D.B. Geohegan, F. Ding, K. Xiao, R.R. Unocic, "*In situ* Edge Engineering in Two-dimensional Transition Metal Dichalcogenides," *Nature Communications*, 2051, (2018).
- R.L. Sacci, J.M. Black, N. Balke, N.J. Dudney, K.L. More, R.R. Unocic, "Nanoscale Imaging of Fundamental Li Battery Chemistry: Solid-electrolyte Interphase Formation and Preferential Growth of Lithium Metal Nanoclusters," *Nano Letters*, 15(3), 2011-2018, (2015).



RAOUL FARER

DEPARTMENT OF TEXTILE ENGINEERING,
CHEMISTRY AND SCIENCE

Executive Deputy Director of the Nonwovens Institute and Professor

Ph.D. (1999)

North
Carolina State
University

RESEARCH INTERESTS:

- Fiber and polymer science
- Nonwoven technologies
- Filament spinning
- Sustainability in the nonwovens industry and beyond
- Applications for bio-based materials and recycling technologies
- Inline quality monitoring systems
- Liquid & air filtration
- Textile technology

Raoul Farer is the executive deputy director of the Nonwovens Institute (NWI) and professor of textile engineering, chemistry and science at the Wilson College of Textiles at North Carolina State University. He received a B.Sc. in textile engineering from Philadelphia University in 1994, followed by an M.Sc. in textile management and technology (1996) and a Ph.D. in fiber and polymer science (1999), both at NC State University. During his time as a graduate student at NC State, Farer participated in the fundamental nonwovens research program at NWI, studying novel dispersion technologies for wet-laid nonwovens and the formation of 3D meltblown structures via a robotic system.

Prior to returning to NC State in 2024, Farer had a distinguished 24-year career with Freudenberg Performance Materials, with various assignments in Germany, Spain and the United States. During his time with Freudenberg, he held roles of progressive responsibility, covering research and development, production, operations, management and technology. He has intricate knowledge and specialized experience in numerous nonwoven technologies, including wet laid, dry laid, meltblown and spunbond, as well as various nonwoven bonding technologies, including thermal bonding, chemical bonding, hydroentanglement and needle-punching.

Farer has also been an active participant in NWI's Industrial Advisory Board (IAB), most recently as chair of its executive committee (2022-2024).

SELECTED PUBLICATIONS

- P. Kritzer, R. Farer, G. Frey, M. Appelgrün, R.P. Schwöbel, "Ultra-thin, porous and mechanically stable nonwoven and its use," Patent DE 103 36 380 B4, Aug. 2005.
- J.F. Audebert, H.J. Feistner, M. Weiss, G. Frey, R. Farer, "Nonwoven Separator for Electrochemical Cell," Patents DE 101 54 896 C2 & EP 1 444 743 A2, Nov. 2004.
- R. Farer, A.M. Seyam, T.K. Ghosh, S.K. Batra, E Grant, G Lee, "Forming Shaped/ Molded Structures by Integration of Meltblowing and Robotic," *Textile Research Journal*, vol. 73, pp. 15-21, 2003.
- R. Farer, S.K. Batra, T.K. Ghosh, E. Grant, A.M. Seyam, "Study of Meltblown Structures Formed by Robotic and Meltblowing Integrated System: Impact of Process Parameters on Fiber Diameter Distributions," *International Nonwovens Journal*, 12, vol. 1, pp. 36-42, Apr 2003.
- R. Farer, A.M. Seyam, T.K. Ghosh, E Grant, S.K. Batra, "Meltblown Structures Formed by Robotic and Meltblowing Integrated System: Impact of Process Parameters on Fiber Orientation and Diameter Distributions," *Textile Research Journal*, 72 (12), 1033-1040, 2002.



MADILYNN SMITH

DEPARTMENT OF TEXTILE ENGINEERING,
CHEMISTRY AND SCIENCE

Madilynn Smith is thrilled to be a new assistant teaching professor within the Department of Textile Engineering, Chemistry and Science. She was born to a musical family in Nashville, Tennessee, but has called North Carolina her home for the last nine years. She received her undergraduate degree in chemistry from the University of Tennessee in Knoxville and minored in secondary education before becoming a fully licensed high school teacher. Not ready to end her formal education quite yet, she uprooted and moved to North Carolina where she began her higher education journey.

Smith is a two-time North Carolina State University graduate, earning a master's degree in textile chemistry in 2017 and a Ph.D. in fiber and polymer science in 2020. She then completed two postdoctoral appointments at NC State within the College of Natural Resources and the Wilson College of Textiles.

She is excited about being in a teaching-prominent role while also supporting the recruitment and research within the college. Outside of work, she and her husband are navigating life as parents of a wild toddler (with another on the way) and hanging out with their fluffy little dog, Levi.

Assistant Teaching Professor

Ph.D. (2020)

North
Carolina State
University

RESEARCH / TEACHING INTERESTS:

- Improvement of teaching practices in undergraduate chemistry labs
- Integration of active learning and creativity into lab and lecture courses
- The fate of microplastics and sustainable alternatives
- Particulate protective garments for first responders

SELECTED PUBLICATIONS

- Evaluating the Material-Level Performance of Particulate-Blocking Firefighter Hoods, Performance of Protective Clothing and Equipment: Innovative Solutions to Evolving Challenges (2020)
- Enzyme-assisted dewatering and strength enhancement of cellulosic fibers for sustainable papermaking: A bench and pilot study, JOURNAL OF CLEANER PRODUCTION (2024)
- Aquatic Aerobic Biodegradation of Commonly Flushed Materials in Aerobic Wastewater Treatment Plant Solids, Seawater, and Lakewater, BIORESOURCES (2024)



MD ABDUL "RUSSELL" QUDDUS

DEPARTMENT OF TEXTILES ENGINEERING,
CHEMISTRY AND SCIENCE

Assistant Professor

Ph.D. (2018)

Mississippi
State
University

RESEARCH INTERESTS:

- Supply chain and logistics
- Big data analytics and data science
- Operations research
- Geospatial analytics for optimization
- Simulation

Md Abdul "Russell" Quddus received his Ph.D. in industrial and systems engineering from Mississippi State University in Starkville, Mississippi. He started the master's program in industrial engineering at Lamar University in Beaumont, Texas, before transferring to Mississippi State University for his Ph.D. He holds a B.Sc. degree in industrial and production engineering from Khulna University of Engineering and Technology, Bangladesh. He served as an assistant professor in industrial and systems engineering in the Department of Engineering and Technology at Southeast Missouri State University. He also has over five years of experience at FedEx Express as a senior operations research advisor, where he worked on various logistics research projects.

His research focuses on supply chain and logistics, big data analytics, stochastic programming, geospatial analytics for optimization and simulation. Furthermore, his specialties also include the application of AI, machine learning, cloud computing, and operations research techniques to solve large-scale supply chain network and risk management problems and sustainable manufacturing.

Quddus's publications have appeared in journals such as *Transportation Research Part E*, *International Journal of Production Economics*, *Expert Systems with Applications*, *Applied Energy*, *Annals of Operations Research* and several conference proceedings. He is a member of the Institute for Operations Research and the Management Sciences (INFORMS) and the Institute of Industrial and Systems Engineers (IISE).

SELECTED PUBLICATIONS

- Quddus M.A., Shahvari, O., Marufuzzaman, M., Eksioğlu, S. D., Castillo-Villar, K. K. (2021) "Designing a reliable electric vehicle charging station expansion under uncertainty." *International Journal of Production Economics*, 236, 108132.
- Quddus M.A., Kabli M., Marufuzzaman M. (2019) "Modeling electric vehicle charging station expansion with an integration of renewable energy and Vehicle-to-Grid sources." *Transportation Research Part E: Logistics and Transportation Review*, 128:251-279. (Best paper Award INFORMS ENRE 2017)
- Poudeh S.R., Quddus M.A., Marufuzzaman M., Bian L. (2019) "Managing Congestion in a Multi-Modal Transportation Network under Biomass Supply Uncertainty." *Annals of Operations Research*, 1-43.
- Quddus M.A., Shahvari O., Marufuzzaman M., Usher J.M., Jaradat R. (2018) "A Collaborative Energy Sharing Optimization Model among Electric Vehicle Charging Stations, Commercial Buildings, and Power Grid." *Applied Energy*, 229:841-857.
- Quddus M.A., Chowdhury S., Marufuzzaman M., Yu F. (2017) "A Two-Stage Chance-Constrained Stochastic Programming Model for a Bio-fuel Supply Chain Network." *International Journal of Production Economics*, 195:27-44.



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