

**NC STATE** Engineering



**2023-24**  
NEW FACULTY



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## FROM THE DEAN OF ENGINEERING

Dear Friends and Colleagues,

This year, the College of Engineering at North Carolina State University welcomes 44 new faculty members. I am honored to be a part of this accomplished group as I join the faculty as both a professor and as the Louis Martin-Vega Dean of Engineering. This talented and distinguished group is joining our exceptional faculty at an especially exciting time for our College as we grow our student body to meet our society's increasing need for adept, thoughtful engineers and computer scientists. Together, we are looking forward to building on our strengths, expanding our research infrastructure and broadening our educational opportunities for all of our students.

On behalf of our College, I would like to express my sincere gratitude to our departments' faculty recruiting committees and to our department heads for all the work they've done to attract this outstanding group of new faculty members. Their expertise and insight 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, as well as to support our College's growth and future accomplishments.

Finally, to our new faculty members, welcome to your exciting new chapter, and thank you for joining our College. All of us at the NC State College of Engineering are committed to supporting your pursuit of excellence in research and teaching, encouraging your goals and dreams, and helping you reach new heights in your careers.

Sincerely,

Jim Pfaendtner, Ph.D.  
*Louis Martin-Vega Dean and Professor*



# SARAH SHELTON

DEPARTMENT OF BIOMEDICAL ENGINEERING

Sarah E. Shelton received her B.S. and M.S. degrees in environmental science and engineering from the University of North Carolina at Chapel Hill. She completed a Ph.D. in biomedical engineering from the Joint Department of Biomedical Engineering at the University of North Carolina at Chapel Hill and North Carolina State University. She was a postdoctoral fellow and research associate at the Massachusetts Institute of Technology in the Department of Biological Engineering and at the Dana-Farber Cancer Institute in the Department of Medical Oncology.

Currently, Shelton's work focuses on developing microphysiological systems, also known as organ-on-chip models, to investigate how tissue-specific interactions between cells and their environment influence health and disease. In particular, she is interested in unraveling the immune microenvironment in cancer to more accurately predict response to therapy. Her work centers on building microfluidic devices for generating vascularized micro-tissues that incorporate cells and tissues from patients, and then leveraging imaging and molecular biology tools to analyze the functional and biological behavior of these models.

## Assistant Professor

Ph.D. (2017)

University of North Carolina at Chapel Hill / North Carolina State University

## RESEARCH INTERESTS:

- Designing microfluidic, organ-on-chip models of disease to uncover how the tissue microenvironment shapes pathology and treatment
- Using engineering and imaging tools to study the function and transport of cells and molecules through vasculature

## SELECTED PUBLICATIONS

- Angelidakis E, Zhang S, Kamm RD, Shelton SE. 2023. Impact of fibrinogen, fibrin thrombi and thrombin on cancer cell extravasation using in vitro microvascular networks. *Advanced Healthcare Materials*. 12(19):2202984.
- Shelton SE, Nguyen HT, Barbie DA, Kamm RD. 2021. Engineering Approaches for Studying Immune-Tumor Cell Interactions and Immunotherapy. *iScience*. 24(1): 101985.
- Campisi M, Sundaraman SK, Shelton SE, Knelson E, Ivanova E, Cañadas I, Yoshida R, Osaki T, Lee SWL, Thai T, Han S, Piel B, Gilhooley S, Paweletz CP, Chiono V, Kamm RD, Kitajima S, Barbie DA. 2020. Tumor-Derived cGAMP Regulates Activation of the Vasculature. *Frontiers in Immunology*. 11: 2090.
- Shelton SE, Lindsey BD, Tsuruta JK, Foster FS, Dayton PA. 2016. Molecular Acoustic Angiography: A New Technique for High Resolution Superharmonic Ultrasound Molecular Imaging. *Ultrasound in Medicine and Biology*. 42(3): 679–681.
- Shelton SE, Lee YZ, Aylward SR, Lee M, Foster FS, Dayton PA. 2015. Quantification of Microvascular Tortuosity During Tumor Evolution Utilizing Acoustic Angiography. *Ultrasound in Medicine and Biology*. 41(7): 1896–1904.



# JIM PFAENDTNER

DEPARTMENT OF CHEMICAL AND BIOMOLECULAR ENGINEERING

Jim Pfaendtner is the Louis Martin-Vega Dean of Engineering and professor of chemical engineering at North Carolina State University. Prior to joining NC State in 2023, Pfaendtner was chair and professor of chemical engineering and professor of chemistry at the University of Washington (UW) in Seattle. At the UW, he also served as the university's first associate vice provost for research computing. Pfaendtner received his Ph.D. in chemical engineering from Northwestern University in Chicago and was previously a research associate at the University of Utah in Salt Lake City and ETH Zürich.

His research program is broadly in the area of computational molecular science including methods and applications in the use of machine learning and artificial intelligence for molecular design, applications in biomineralization, interfacial phenomena of biomolecules, biomimetic materials and reaction engineering. From 2016-22, he was the principal investigator and director of an interdisciplinary National Science Foundation graduate training program at the nexus of molecular engineering and data science. In 2022, he was elected to the Washington State Academy of Sciences and also was selected as the recipient of the American Institute of Chemical Engineers / Computational Molecular Science & Engineering Forum Impact Award.

## Louis Martin-Vega Dean of Engineering and Professor

Ph.D. (2007)

Northwestern University

## RESEARCH INTERESTS:

- Computational molecular science and engineering
- Machine learning
- Thermodynamics and interfaces
- Biomolecular phenomena
- Bioinspired systems
- Nanomaterials

## SELECTED PUBLICATIONS

- Rustam, S., Schram, M., Lu, Z., Chaka, A., Rosenthal, W., Pfaendtner, J. Optimization of Thermal Conductance at Interfaces Using Machine Learning Algorithms. *ACS Appl. Mater. Interfaces*. 2022, 14 (28), 32590–32597. DOI:10.1021/acsami.1c23222.
- Qi, X., Jin, B., Cai, B., Yan, F., DeYoreo, J., Chen, C.L., Pfaendtner, J. Molecular Driving Force for Facet Selectivity of Sequence-Defined Amphiphilic Peptoids at Au–Water Interfaces. *J. Phys. Chem. B*. 2022, 126 (27), 5117–5126. DOI: 10.1021/acs.jpcc.2c02638
- Intan, N., Pfaendtner, J. Composition of Oxygen Functional Groups on Graphite Surfaces. *J. Phys. Chem. C*. 2022, 126 (26), 10653–10667. DOI: 10.1021/acs.jpcc.2c01258
- Alamdari, S., Roeters, S., Golbek, T., Schmüser, L., Weidner, T., Pfaendtner, J. Orientation and Conformation of Proteins at the Air–Water Interface Determined from Integrative Molecular Dynamics Simulations and Sum Frequency Generation Spectroscopy. *Langmuir*. 2020, 36 (40), 11855–11865. DOI: 10.1021/acs.langmuir.0c01881
- Yang, W., Zhou, Y., Jin, B., Qi, X., Cai, B., Yin, Q., Pfaendtner, J., De Yoreo, J. J., Chen, C. Designing Sequence-Defined Peptoids for Fibrillar Self-Assembly and Siliification. *J. Col. Inf. Sci.* 2023, 634, 450–459. DOI: 10.1016/j.jcis.2022.11.136



# ANGE-THERESE AKONO

DEPARTMENT OF CIVIL, CONSTRUCTION,  
AND ENVIRONMENTAL ENGINEERING

Ange-Therese Akono received a Diplome D'Ingenieur from the Ecole Polytechnique in Palaiseau, France. She received an M.Sc. and a Ph.D. in civil and environmental engineering from the Massachusetts Institute of Technology in Boston. She was an assistant professor of civil and environmental engineering at the University of Illinois Urbana-Champaign. Prior to joining the North Carolina State University faculty, she was an assistant professor of civil and environmental engineering at Northwestern University in Evanston, Illinois.

Presently, she studies fracture processes in multifunctional, multiscale and multi-physics materials while focusing on small length-scales. In terms of energy science and engineering, she investigates sustainable energy resources such as unconventional resource production, geologic storage of carbon dioxide and clean energy. In terms of construction materials, she studies novel ways to reduce the carbon footprint of the cement industry by using nanomaterials, recycling concrete or discovering low-embodied energy cement-free binders. Another topic is the study of biomaterials for bone regenerative engineering.

Akono has received several awards including the Johnson & Johnson Women in STEM 2D Award in 2022, the American Society of Civil Engineers (ASCE) Leonardo da Vinci Award in 2021, the Royal Society International Exchange Scheme Award in 2019 and the ASCE New Faces of Civil Engineering Professionals Award in 2016.

## SELECTED PUBLICATIONS

- Xu, Y., Guo, P. and Akono, A. T. (2022). Novel wet electrospinning inside a reactive pre-ceramic gel to yield advanced nanofiber-reinforced geopolymer composites. *Polymers*, 14(19), 3943.
- Chen, J., Akono, A. T. (2020). Influence of Multi-Walled Carbon Nanotubes on the Hydration Products of Ordinary Portland Cement Paste. *Cem. Concr. Res.*, 137, 106197–106209.
- Akono, A. T., Kabir, P., Shi, Z., Fuchs, S., Tsotsis, T., Jessen, K., Werth, C. J. (2019). Modeling CO<sub>2</sub>-Induced Alterations in Mt. Simon Sandstone via Nanomechanics. *Rock Mech. Rock Eng.*, 52, 1353–1375.
- Akono, A. T., Kabir, P. (2016). Microscopic Fracture Characterization of Gas Shale via Scratch Testing. *Mech. Res. Comm.* 78, 86–92.
- Akono, A. T., Ulm, F. J. (2011). Scratch test model for the determination of fracture toughness. *Eng. Fract. Mech.*, 78, 334–342.

## Associate Professor

Ph.D. (2013)

Massachusetts Institute of Technology

## RESEARCH INTERESTS:

- Nano-mechanics: bottom-up modeling, elasticity and strength upscaling, statistical nanoindentation, scratch testing and machine learning
- Smart materials: inorganic polymers, nanostructured ceramics, geopolymers and green concrete
- Subsurface energy systems: unconventional resources, organic-rich shale, carbon dioxide geological storage and micro-induced seismicity
- Biomaterials: cortical bone, hard biomineralized tissues and bone scaffolds



# DANJUE CHEN

DEPARTMENT OF CIVIL, CONSTRUCTION,  
AND ENVIRONMENTAL ENGINEERING

Danjue Chen received her Ph.D. from the Georgia Institute of Technology in Atlanta in 2012 and B.S. in environmental science from Peking University in Beijing in 2007. She was a postdoctoral researcher at the University of California, Berkeley and the University of Wisconsin-Madison. Prior to joining North Carolina State University, she was an assistant, and then associate, professor at the Department of Civil & Environmental Engineering at the University of Massachusetts Lowell.

Chen's expertise lies in traffic science and transportation engineering. Her research interests include testing, modeling and control of connected and automated vehicles; traffic flow theory; human-cyber-physical-system of smart vehicles; and smart cities. She integrates analytical, numerical and experimental methods in her research. Chen is a founding member of the Transportation Research Board subcommittee on "traffic flow modeling for connected and automated vehicles." She received the National Science Foundation CAREER award in 2020.

## Associate Professor

Ph.D. (2012)

Georgia Institute of Technology

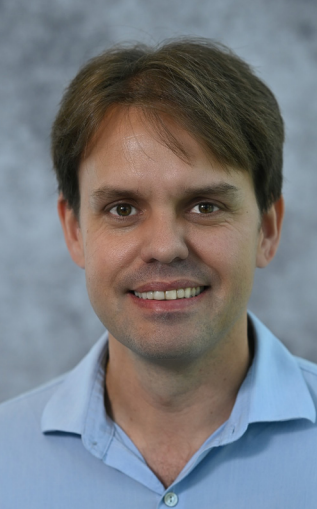
## RESEARCH INTERESTS:

- Connected and automated vehicles
- Traffic flow theory
- Human-cyber-physical-system of smart vehicles
- Smart cities

## SELECTED PUBLICATIONS

- Li T, Chen D, Zhou H, Xie Y, Laval J. Fundamental diagrams of commercial adaptive cruise control: Worldwide experimental evidence. *Transportation Research Part C: Emerging Technologies*. 2022;134:103458.
- Chen D, Srivastava A, Ahn S. Harnessing connected and automated vehicle technologies to control lane changes at freeway merge bottlenecks in mixed traffic. *Transportation research part C: emerging technologies*. 2021;123:102950. issn: 0968-090X
- Li T, Chen D, Zhou H, Laval J, Xie Y. Car-following behavior characteristics of adaptive cruise control vehicles based on empirical experiments. *Transportation research part B: methodological*. 2021;147:67–91. issn: 0191-2615
- Chen D, Ahn S, Chitturi M, Noyce D. Towards vehicle automation: Roadway capacity formulation for traffic mixed with regular and automated vehicles. *Transportation research part B: methodological*. 2017;100:196–221. issn: 0191-2615
- Chen D, Laval J, Zheng Z, Ahn S. A behavioral car-following model that captures traffic oscillations. *Transportation research part B: methodological*. 2012;46(6):744–761. issn: 0191-2615





# ANDERSON R. DE QUEIROZ

DEPARTMENT OF CIVIL, CONSTRUCTION,  
AND ENVIRONMENTAL ENGINEERING

Anderson R. de Queiroz received his B.Sc. in 2005 and M.Sc. in 2007 in electrical engineering from Federal University of Itajubá (UNIFEI) in the state of Minas Gerais in Brazil. He has a Ph.D. in operations research from the University of Texas at Austin (2011). He is an associate professor at the Department of Civil, Construction, and Environmental Engineering at North Carolina State University, where he is a member of the computing & systems group and NC State's Operations Research graduate program.

Prior to joining NC State, he worked as a professor at UNIFEI and at North Carolina Central University in Durham, North Carolina, as a consultant and as a researcher for more than a decade. He is interested in the synergy of data and computational innovation to inform strategic decision-making. He focuses on optimization under uncertainty, data-driven methods and predictive analytics applied to planning, operations and economics in clean and sustainable energy systems, water-energy nexus, coastal engineering and biosecurity.

## Associate Professor

Ph.D. (2011)

University of Texas at Austin

## RESEARCH INTERESTS:

- Energy and power systems economics
- Optimization under uncertainty
- Advanced math programming
- Predictive analytics and machine learning
- Renewable energy and storage integration
- Water-energy nexus
- Civil infrastructure systems
- Biosecurity analytics

## SELECTED PUBLICATIONS

- Faria, V.A.D., de Queiroz, A.R., DeCarolis, J.F. (2023). Scenario generation and risk-averse stochastic portfolio optimization applied to offshore renewable energy technologies. *Energy*, 270, 126946.
- Patankar, N., Eshraghi, H., de Queiroz, A. R., and DeCarolis, J. F. (2022). Using robust optimization to inform US deep decarbonization planning. *Energy Strategy Reviews*, 42, 100892.
- Sioshansi, R., Denholm, P., Arteaga, J., Awara, S., Bhattacharjee, S., Botterud, A., Cole, W., Cortés, A., De Queiroz, A., DeCarolis, J. and Ding, Z. (2021). Energy-storage modeling: State-of-the-art and future research directions. *IEEE Transactions on Power Systems*, 37(2), pp.860-875. (Best Paper Award IEEE PES 2023)
- de Queiroz, A. R., Faria, V. A., Lima, L. M., & Lima, J. W. (2019). Hydropower revenues under the threat of climate change in Brazil. *Renewable Energy*, 133, 873-882.
- Hafiz, F., de Queiroz, A. R., Fajri, P., & Husain, I. (2019). Energy management and optimal storage sizing for a shared community: A multi-stage stochastic programming approach. *Applied Energy*, 236, 42-54.



# JESSICA KAMINSKY

DEPARTMENT OF CIVIL, CONSTRUCTION,  
AND ENVIRONMENTAL ENGINEERING

Jessica Kaminsky received her B.S. in civil engineering from Rice University in Houston. She received her Ph.D. in civil engineering from the University of Colorado Boulder. Prior to joining the North Carolina State University faculty, she was an associate professor at the University of Washington.

Kaminsky studies the social sustainability of infrastructure. Presently, her work is focused on the decarbonization of infrastructure. Kaminsky also studies infrastructure systems in lower and middle income contexts, with a particular interest in water, sanitation and hygiene infrastructure.

## Professor

Ph.D. (2013)

University of Colorado Boulder

## RESEARCH INTERESTS:

- Social sustainability of infrastructure
- Civil infrastructure systems
- Infrastructure in lower and middle income contexts
- Global engineering projects and organizations
- Water, sanitation and hygiene
- Infrastructure decarbonization

## SELECTED PUBLICATIONS

- Thelemaque N, Spearing L, Faust K, Kaminsky J. Small Drinking Water Utilities' Resilience: The Case of the COVID-19 Pandemic. *ES&T Water*. 2023. doi.org/10.1021/acsestwater.2c00641.
- Kaminsky J. Improving Public Private Partnerships for Renewable Electricity Infrastructure in Lower and Middle Income Countries. *Journal of Construction Engineering and Management*. 2022;148(5). doi.org/10.1061/(ASCE)CO.1943-7862.0002259.
- Thelemaque N, Cotherman A, Pearson R, Eichelberger L, Neumann R, Kaminsky J. Identifying the Built, Natural, and Social Factors of Successful and Failed Rural Alaskan Water Projects: Perspectives from State and Regional Professionals. *ACS EST Water*. 2022;2(12):2323-2332. doi.org/10.1021/acsestwater.2c00201
- Hamlet L, Kaminsky J. Analytical Utility of the JMP School Water, Sanitation and Hygiene Global Monitoring Data. *Nature Sustainability*. 2022; 6(2):222-232.
- Kaminsky J. The Social Sustainability of Infrastructure: Constructing for Justice. *Engineering Project Organization Journal*. 2021;10. doi.org/10.25219/epoj.2021.00110.



# JACELYN RICE-BOAYUE

DEPARTMENT OF CIVIL, CONSTRUCTION,  
AND ENVIRONMENTAL ENGINEERING

Jacelyn Rice-Boayue completed postdoctoral training at Duke University in Durham, North Carolina, within the Center for the Environmental Implications of Nanotechnology. During that time, she also served as a Fulbright Scholar at the International Institute of Water and Environmental Engineering in Burkina Faso, where she researched and taught courses in the water and sanitation program. She earned her B.S. in civil engineering from the University of Nevada, Las Vegas, and M.S. and Ph.D. in civil, sustainable and environmental engineering from Arizona State University in Tempe, Arizona. Prior to joining the North Carolina State University faculty, she was an assistant professor at the University of North Carolina at Charlotte.

Her research group aims to provide new understanding and solutions to foster sustainable water resource management. Rice-Boayue's research combines modeling, analytical and social science capabilities to examine water quality, environmental health and contaminants, and environmental justice. Much of her work focuses on environmental and human health exposures to wastewater-derived emerging contaminants through model-informed surveillance and field studies.

## Assistant Professor

Ph.D. (2014)

Arizona State  
University

## RESEARCH INTERESTS:

- Integrated water resource management
- Water quality and treatment
- Cross-cultural research
- Participatory geographic information systems

## SELECTED PUBLICATIONS

- Kamanmalek, S., Brooks, B. W., & Rice-Boayue, J. (2022). Spatial Hazards of Antibiotic Resistance in Wastewater-Impacted Streams during Low Instream Flow Conditions. *ACS ES&T Water*, 2(3), 457–464. <https://doi.org/10.1021/acsestwater.1c00386>
- Cadwallader, A., Rice-Boayue, J., & VanBriesen, J. M. (2021). Impact of Nitrogen Removal in Wastewater Treatment on NDMA Formation at Downstream Drinking-Water Treatment Plants. *Journal of Environmental Engineering (New York, N.Y.)*, 147(12). [https://doi.org/10.1061/\(ASCE\)EE.1943-7870.0001927](https://doi.org/10.1061/(ASCE)EE.1943-7870.0001927)
- Rice, J., Stotts, R., Wutich, A., White, D., Maupin, J., & Brewis, A. (2019). Motivators for Treated Wastewater Acceptance across Developed and Developing Contexts. *Journal of Water, Sanitation and Hygiene for Development*, 9(1), 1–6. <https://doi.org/10.2166/washdev.2018.285>
- Rice, J., & Westerhoff, P. (2017). High levels of endocrine pollutants in US Streams during Low Flow Due to Insufficient Wastewater Dilution. *Nature Geoscience*, 10, 587–591. <https://doi.org/10.1038/ngeo2984>
- Rice, J., & Westerhoff, P. (2015). Spatial and Temporal Variation in De Facto Wastewater Reuse in Drinking Water Systems across the USA. *Environmental Science & Technology*, 49(2), 982–989. <https://doi.org/10.1021/es5048057>



# JORGE E. SAN JUAN

DEPARTMENT OF CIVIL, CONSTRUCTION,  
AND ENVIRONMENTAL ENGINEERING

Jorge E. San Juan earned a B.S. in civil engineering from the Universidad de Cartagena in Cartagena, Colombia. He then received an M.S. and Ph.D. in civil and environmental engineering from the University of Illinois Urbana-Champaign at the Ven Te Chow Hydrosystems Lab. San Juan was a postdoctoral associate at the University of Minnesota Twin Cities in the Department of Civil, Environmental, and Geoengineering at the St. Anthony Falls Lab.

His research interests focus on the physical and engineering role of coastal ecosystems altering water currents, sediment transport and the geomorphological evolution of coasts. San Juan investigates the impact of vegetation on waves and currents and its effect on sediment transport. He has recently worked on mud erosion mechanisms driven by water salinity changes.

## Assistant Professor

Ph.D. (2021)

University  
of Illinois  
Urbana-  
Champaign

## RESEARCH INTERESTS:

- Turbulence and mixing induced by biota-flow-sediment interactions in coastal environments
- Understanding nature-based physical mechanisms that can improve engineering and management practices of coastal habitats

## SELECTED PUBLICATIONS

- Jin, C. Gong, Z., Shi, L., Zhao, K., Tinoco, R. O., San Juan, J. E., Geng, L., & Coco, G. (2022). Medium-term observations of salt marsh morphodynamics. *Frontiers in Marine Science*, 9, 1778.
- Jin, C., Coco, G., Tinoco, R.O., Ranjan, P., Gong, Z., Dutta, S., San Juan, J.E., & Friedrich, H. (2022). High-resolution Large Eddy Simulations of Vortex Dynamics Over Ripple Defects. *Journal of Geophysical Research: Earth Surface*, 127(3), e2021JF006328.
- Jin, C., Coco, G., Tinoco, R.O., Ranjan, P., San Juan, J.E., Dutta, S., Friedrich, H. & Gong, Z. (2021). Large Eddy Simulation of three-dimensional flow structures over wave-generated ripples. *Earth Surface Processes and Landforms*, 46(8), 1536–1548.
- Tinoco, R. O., San Juan, J. E., & Mullarney, J. C. (2020). Simplification bias: lessons from laboratory and field experiments on flow through aquatic vegetation. *Earth Surface Processes and Landforms*, 45(1), 121–143.
- San Juan, J. E., Carrillo, G. V., & Tinoco, R. O. (2019). Experimental observations of 3D flow alterations by vegetation under oscillatory flows. *Environmental Fluid Mechanics*, 19(6), 1497–1525.



# TONGCHUAN WEI

DEPARTMENT OF CIVIL, CONSTRUCTION,  
AND ENVIRONMENTAL ENGINEERING

Tongchuan Wei is a research assistant professor in the Department of Civil, Construction, and Environmental Engineering at North Carolina State University. His research interests include measurement and modeling of energy use and air pollutant emissions of on-road and non-road vehicles, transportation related air quality impacts on environmental justice, air quality and associated environmental risk assessment, and engineering cost modeling.

Presently, Wei is engaged in research projects including the quantification and assessment of emissions from North Carolina ferry vessels; assessment of environmental justice and historical transportation impacts in North Carolina; evaluation of techno-economical feasibility of decarbonization energy pathways for U.S. freight rail; and quantification of the burden of disease attributable to ambient air pollution and climate change in the United Arab Emirates.

Wei has a bachelor of engineering in environmental engineering from the University of Jinan, China, a master of engineering in environmental engineering from Illinois Institute of Technology, and a Ph.D. in civil engineering from NC State University.

## Research Assistant Professor

Ph.D. (2021)

North Carolina State University

### RESEARCH INTERESTS:

- Transportation energy use and air pollutant emissions
- Energy and emissions modeling
- Emissions measurement
- Air quality
- Air pollution exposure assessment

### SELECTED PUBLICATIONS

- Rastogi N, Frey HC, Wei T. 2023. Identifying emissions hotspots and strategies to reduce real-world fuel use and emissions for passenger rail: A spatially resolved approach. *Science of The Total Environment*. 896: 165110.
- Wei T, Frey HC. 2022. Intermodal comparison of tailpipe emission rates between transit buses and private vehicles for on-road passenger transport. *Atmospheric Environment*. 281: 119141.
- Wei T, Frey HC. 2021. Sensitivity of light duty vehicle tailpipe emission rates from simplified portable emission measurement systems to variation in engine volumetric efficiency. *Journal of the Air & Waste Management Association*. 71(9): 1127-1147.
- Wei T, Frey HC. 2020. Evaluation of the precision and accuracy of cycle-average light duty gasoline vehicles tailpipe emission rates predicted by modal models. *Transportation Research Record*. 2674(7): 566-584.
- Wei T, Frey HC. 2020. Factors affecting variability in fossil-fueled transit bus emission rates. *Atmospheric Environment*. 233: 117613.



# WESLEY KLEWERTON GUEZ ASSUNÇÃO

DEPARTMENT OF COMPUTER SCIENCE

Wesley Assunção received his B.S. in information systems from Faculdade Assis Gurgacz Toledo in the state of Paraná, Brazil, and his M.S. in informatics and Ph.D. in computer science both from Federal University of Paraná in Curitiba, Brazil. He was an associate professor at the Federal University of Technology - Paraná in Toledo, Brazil; a postdoctoral researcher at the Pontifical Catholic University of Rio de Janeiro; and a senior researcher at the Johannes Kepler University in Linz, Austria.

Assunção is internationally recognized for his work on systematic reuse and variability management for software customization, modernization of legacy systems and software refactoring. Presently, he also studies the use of model-driven engineering to cope with complexity of software development and how teams of engineers collaborate. Most of his work is done in collaboration with international researchers, with several studies in partnership with industries. He has published over 100 papers, including premier conferences and journals in software engineering and artificial intelligence. Assunção has also been serving as reviewer and organizer for many conferences and journals.

## Associate Professor

Ph.D. (2017)

Federal University of Paraná

### RESEARCH INTERESTS:

- Systematic reuse and variability management for software customization
- Modernization of legacy systems
- Software quality and software testing
- Model-driven software development and collaboration among engineers
- AI and ML to solve software engineering problems

### SELECTED PUBLICATIONS

- D. Oliveira et al., "The untold story of code refactoring customizations in practice," 2023 IEEE/ACM 45th Int. Conf. on Softw. Eng. (ICSE), Melbourne, Australia, 2023, pp. 108-120, doi: 10.1109/ICSE48619.2023.00021.
- L. Marchezan, W. K. G. Assunção, E. Herac, F. Keplinger, A. Egyed and C. Lauwerys, "Fulfilling Industrial Needs for Consistency Among Engineering Artifacts," 2023 IEEE/ACM 45th Int. Conf. on Softw. Eng. in Pract. (ICSE-SEIP), Melbourne, Australia, 2023, pp. 246-257, doi: 10.1109/ICSE-SEIP58684.2023.00028.
- W. K. G. Assunção, T. E. Colanzi, L. Carvalho, A. Garcia, J. Alves Pereira, M. J. Lima and C. Lucena, "Analysis of a many-objective optimization approach for identifying microservices from legacy systems," *Empirical Softw. Eng.*, vol. 27, no. 51, 2022, doi: 10.1007/s10664-021-10049-7
- W. K. G. Assunção, S. R. Vergilio and R. E. Lopez-Herrejon, "Automatic extraction of product line architecture and feature models from UML class diagram variants," *Inf. and Softw. Technol.*, vol. 117, 2020, <https://doi.org/10.1016/j.infsof.2019.106198>.
- W. K. G. Assunção, T. E. Colanzi, S. R. Vergilio and A. T. R. Poso, "A multi-objective optimization approach for the integration and test order problem," *Inf. Sciences*, vol. 267, pp. 119-139, May 2014, <https://doi.org/10.1016/j.ins.2013.12.040>





# CAIO BATISTA DE MELO

DEPARTMENT OF COMPUTER SCIENCE

Caio Batista de Melo received his B.S. and M.S. from the University of Brasília and his Ph.D. from the University of California, Irvine. At UC Irvine, he also served as the instructor of record for lower- and upper-division courses during the academic year.

Batista's research has focused on detecting and reasoning about emergent behaviors from both software and system perspectives. His most recent work has focused on autonomous vehicles and how emergent behavior provisions can be deployed in such a context. Additionally, Batista is highly interested in computer science education, with a particular interest in representation. At UC Irvine, he was one of the lead staff members of the CS1 course for four years, and he contributed to shaping the course so it was accessible to incoming students with all levels of experience.

## Assistant Teaching Professor

Ph.D. (2023)

University of California, Irvine

## RESEARCH INTERESTS:

- Reliable systems
- Emergent behaviors
- Computer science education

## SELECTED PUBLICATIONS

- C. Batista de Melo and N. Dutt, "LOCOCAT: Low-overhead classification of CAN bus attack types," *Embedded Syst. Lett.*, 2023, doi: 10.1109/LES.2023.3299217.
- C. Batista de Melo, A. L. F. Cançado and G. N. Rodrigues, "Characterization of implied scenarios as families of common behavior," *J. of Syst. and Softw.*, vol. 158, pp. 110425, 2019, doi: 10.1016/J.JSS.2019.110425.
- E. A. Rambo et al., "The Self-Aware Information Processing Factory Paradigm for Mixed-Critical Multiprocessing," *IEEE Trans. on Emerg. Topics in Comput.*, vol. 10, no. 1, pp. 250-266, 1 Jan.-March 2022, doi: 10.1109/TETC.2020.3011663.
- N. Sperling et al., "Information Processing Factory 2.0 - Self-awareness for Autonomous Collaborative Systems," presented at the Des., Automat. and Test in Europe Conf., 2023, doi: 10.23919/DATe6975.2023.10137006.
- E. A. Rambo et al., "The Information Processing Factory: A Paradigm for Life Cycle Management of Dependable Systems," presented at the Int. Conf. on Hardware/Softw. Codesign and Sys. Synthesis, 2019, doi: 10.1145/3349567.3357391



# VERONICA CATETÉ

DEPARTMENT OF COMPUTER SCIENCE

Veronica Cateté received her B.S. in computer science from North Carolina State University. She received her M.S. in computer science from the University of North Carolina at Charlotte and a Ph.D. in computer science from NC State University. She was awarded both a National Science Foundation Graduate Research Fellowship and a Microsoft Research Graduate Women in Computing Scholarship. Prior to joining the NC State faculty, she was a research scientist in the Department of Computer Science at NC State in the Game2Learn Lab.

Presently, she studies K-12 computer science education for middle and high school contexts. Specifically, she examines how to broaden participation in computing by adapting concepts from the frontiers of computer science (AI, cybersecurity, distributed computing, etc.) to be accessible and engaging for young women and students of color in rural areas. Cateté also studies teacher professional development and researches ways to support teachers in leading computing activities including providing data driven insights, differentiated curriculum and other assistive tools. Cateté's other project is leading field experiences for university students in engineering and computer science education locally in the Research Triangle and globally in Musanze, Rwanda. All of these endeavors are investigated using both theoretical foundations and mixed-methods field techniques.

## Assistant Professor

Ph.D. (2018)

North Carolina State University

## RESEARCH INTERESTS:

- Computer science education at the secondary level including both student and teacher development of computational thinking
- Curriculum development: scaffolding, engagement, advanced extensions
- Professional development: pedagogical content knowledge, material adoption and creation
- Data-driven insights to promote growth centered learning progressions

## SELECTED PUBLICATIONS

- V. Cateté, A. Isvik, and M. Hill, "A Framework for Socially-Relevant Service-Learning Internship Experiences for High School Students," in *Proc. of the 53rd ACM Tech. Symp. on Comput. Sci. Edu.-Vol. 1*, Feb. 2022, pp. 815-821.
- H. Crews, et al., "Investigating Impacts of STARS Program Components on Persistence in Computing for Black and White College Students," *Res. in Equity and Sustained Participation in Eng., Comput., and Technol. (RESPECT)*, 2022.
- V. Cateté, A. Isvik, and T. Barnes, "Infusing computing: A scaffolding and teacher accessibility analysis of computing lessons designed by novices," in *Proc. of the 20th Koli Calling Int. Conf. on Comput. Educ. Res.*, Nov. 2020, pp. 1-11.
- N. Lytle, et al., "Use, modify, create: Comparing computational thinking lesson progressions for stem classes," in *Proc. of the 2019 ACM Conf. on Innov. and Technol. in Comput. Sci. Educ.*, July 2019, pp. 395-401.
- V. Cateté, et al., "Infusing computational thinking into middle grade science classrooms: lessons learned," in *Proc. of the 13th Workshop in Primary and Secondary Comput. Educ.*, Oct. 2018, pp. 1-6.



# ABIDA HAQUE

DEPARTMENT OF COMPUTER SCIENCE

Abida Haque received her Ph.D. in computer science from North Carolina State University in 2023. Her research interests are in cryptography, with a particular focus on managing user anonymity, decentralizing trust and identifying gaps in current cryptographic schemes. Her work includes enhancing security definitions for ring and group signatures, as well as multi-party computation.

**Assistant  
Teaching  
Professor**

Ph.D. (2023)

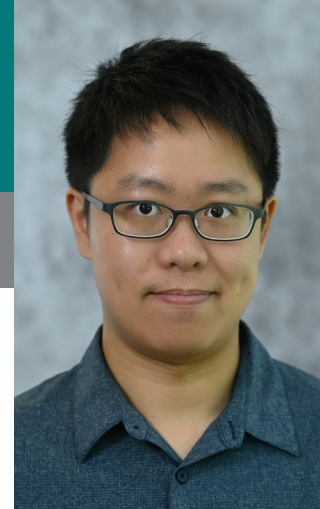
North  
Carolina State  
University

## RESEARCH INTERESTS:

- Algorithms and theory of computation
- Cryptography

## SELECTED PUBLICATIONS

- A. Haque, V. Daza, A. Scafuro, A. Zacharakis and A. Zapico, "Mutual Accountability Layer: Accountable Anonymity within Accountable Trust," presented at the Int. Symp. on Cyber Secur., Cryptology, and Mach. Learn., 2022, <https://eprint.iacr.org/2021/596>
- A. Haque, S. Krenn, D. Slamanig and C. Striecks, "Logarithmic-Size (Linkable) Threshold Ring Signatures in the Plain Model," presented at IACR Int. Workshop on Public Key Cryptography, 2022, <https://eprint.iacr.org/2020/683>
- A. Haque, D. Heath, V. Kolesnikov, R. Ostrovsky and A. Shah, "Garbled Circuits With Sublinear Evaluator," presented at Eurocrypt, 2022, <https://eprint.iacr.org/2022/797>
- A. Haque, V. Madathil, B. Reaves and A. Scafuro, "Anonymous Device Authorization for Cellular Networks," presented at 14th ACM Conf. on Secur. and Privacy in Wireless and Mobile Netw. (WiSeC), 2021.
- A. Haque and A. Scafuro, "Threshold Ring Signatures: New Definitions and PostQuantum Security," presented at IACR Int. Workshop on Public Key Cryptography, 2020, <https://eprint.iacr.org/2020/135>.



# CHIN HO LEE

DEPARTMENT OF COMPUTER SCIENCE

Chin Ho Lee joined the North Carolina State University faculty in 2023 after completing his postdoctoral fellowships at Harvard University in Cambridge, Massachusetts, from 2021-23 and at Columbia University in New York City from 2019-21. He received his Ph.D. in computer science in 2019 from Northeastern University in Boston, and his M.Phil. in computer science and engineering and B.Sc. in mathematics from the Chinese University of Hong Kong.

**Assistant  
Professor**

Ph.D. (2019)

Northeastern  
University

## RESEARCH INTERESTS:

- Theoretical computer science, including computational complexity theory, randomness in computing, analysis of Boolean functions and statistical reconstruction

## SELECTED PUBLICATIONS

- J. Blasoik, P. Ivanov, Y. Jin, C. H. Lee, R. A. Servedio and E. Viola, "Fourier growth of structured  $F_2$  polynomials and applications," presented at RANDOM Conf., 2021.
- E. Chattopadhyay, J. Gaitonde, C. H. Lee, S. Lovett and A. Shetty, "Fractional pseudorandom generators from any fourier level," presented at Comput. Complexity Conf., 2021.
- X. Chen, A. De, C. H. Lee, R. A. Servedio and S. Sinha, "Polynomial-time trace reconstruction in the smoothed complexity model," presented at ACM-SIAM Symp. on Discrete Algorithms, 2021.
- C. H. Lee, "Fourier bounds and pseudorandom generators for product tests," presented at Comput. Complexity Conf., 2019.
- E. Haramaty, C. H. Lee and E. Viola, "Bounded independence plus noise fools products," presented at Comput. Complexity Conf., 2017.



# SHARATH RAGHVENDRA

DEPARTMENT OF COMPUTER SCIENCE

Sharath Raghvendra completed his Ph.D. from Duke University in Durham, North Carolina, in 2012. From 2012-14, he was a postdoctoral fellow at Stanford University in Palo Alto, California. He joined the faculty at Virginia Tech University in Blacksburg, Virginia, in 2014 and was promoted to an associate professor in 2020.

His research is on the design of scalable algorithms for optimization problems. These algorithms can be used within application areas such as machine learning and logistics. His work has been published in top-tier conferences in theoretical computer science and machine learning, such as Association for Computing Machinery (ACM)-Society for Industrial and Applied Mathematics (SIAM) Symposium on Discrete Algorithms (SODA), ACM Symposium on Theory of Computing (STOC), Institute of Electrical and Electronics Engineers (IEEE) Symposium on Foundations of Computer Science (FOCS), Neural Information Processing Systems (NeurIPS) and International Conference on Learning Representation (ICLR).

## Associate Professor

Ph.D. (2012)

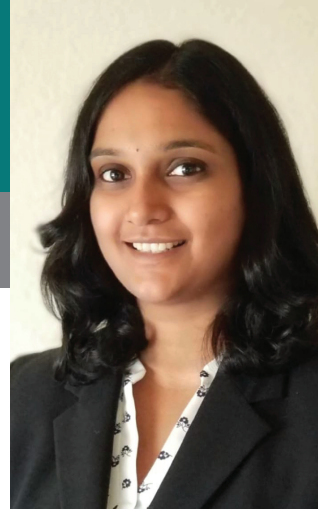
Duke  
University

## RESEARCH INTERESTS:

- Algorithm design
- Computational geometry and topology
- Graph theory
- Machine learning
- Operations research

## SELECTED PUBLICATIONS

- M. K. Asathulla, S. Khanna, N. Lahn and S. Raghvendra, "A faster algorithm for minimum-cost bipartite perfect matching in planar graphs," *ACM Transactions on Algorithms*, vol. 16, no. 1, pp. 1-30, Nov., 2019.
- K. Nayyar and S. Raghvendra, "An input sensitive online algorithm for the metric bipartite matching problem," in *IEEE 58th Annu. Symp. on Found. of Comp. Sci.*, 2017, pp. 505-515.
- N. Lahn, D. Mulchandani and S. Raghvendra, "A graph theoretic additive approximation of optimal transport," presented at Advances in Neural Inf. Process. Syst. 32, Vancouver, BC, CA, Dec. 8-14, 2019.
- A. Choudhary, M. Kerber and S. Raghvendra, "Polynomial-sized topological approximations using the permutahedron," *Discrete & Computational Geometry*, vol. 61, pp. 41-80, 2019.
- S. Raghvendra and P. K. Agarwal, "A near-linear time  $\epsilon$ -approximation algorithm for geometric bipartite matching," *Journal of the ACM*, vol. 67, no. 3, pp. 1-19, 2020.



# CHANDRIKA SATYAVOLU

DEPARTMENT OF COMPUTER SCIENCE

Chandrika Satyavolu received her B.Tech. in Information and Communication Technology (ICT) from the Dhirubhai Ambani Institute of Information and Communication Technology (DA-IICT) in Gandhinagar, Gujarat, India. She received her master's in computer science from San José State University in San José, California, and a Ph.D. in computer science from the University of Oklahoma in Norman, Oklahoma. Her doctoral research is centered on wireless and mobile networks.

Prior to joining the North Carolina State University faculty, Satyavolu worked as a teaching associate professor in the Department of Computer Science and Engineering at the University of Notre Dame in Notre Dame, Indiana. Before that, she worked for California State University, Monterey Bay and Oklahoma City University. She has also worked for Danger Inc. (acquired by Microsoft), Wind River Systems and Institutional Shareholder Services in Norman, Oklahoma. She completed a one-year University of California, Berkeley extension program — the Transforming STEM Teaching Faculty Learning Program, which supports faculty in exploring active learning approaches leading to greater student engagement. She has also participated in Google's training workshop for the Computer Science Summer Institute at California State University, Monterey Bay.

## Associate Teaching Professor

Ph.D. (2014)

University of  
Oklahoma

## RESEARCH INTERESTS:

- Active learning techniques to improve student engagement
- Summer intervention programs to support student preparedness for college
- Wireless and mobile networks

## SELECTED PUBLICATIONS

- C. J. Satyavolu, S. Radhakrishnan, V. Sarangan, T.L. Landers, and M. Veeramani, "Mobile RFID tag reading with non-overlapping tandem readers on a conveyor belt," *Elsevier Ad Hoc Netw.*, vol. 45, pp. 22-33, July 2016.
- M. Veeramani, C. J. Satyavolu, S. Radhakrishnan, and V. Sarangan, "Block the Blocker: A Blocker-Tag Agnostic ALOHA-Based Tag Reading Protocol in Dense RFID System," in *Proc. of IEEE Int. Conf. on Adv. Netw. and Telecomm. Syst. (ANTS)*, 2014, pp. 1-6.
- C. J. Satyavolu, M. Veeramani and S. Radhakrishnan, "Item-level tagging sees more tags: Analyzing the performance of EPC Gen-2 protocol in large scale RFID systems," in *Proc. of IEEE Global Commun. Conf. (GLOBECOM)*, 2014, pp. 38-385.
- C. J. Satyavolu, M. Veeramani, S. Radhakrishnan and J. Ruyle, "Close-coupled chips can coordinate to contain collisions," in *Proc. of IEEE Veh. Technol. Conf. (VTC)*, 2014, pp. 1-5.
- C. J. Satyavolu, S. Radhakrishnan, V. Sarangan and T.L. Landers, "On RFID Tag Reading by a Mobile Reader in a Warehouse," in *Proc. of IEEE Int. Conf. on Adv. Netw. and Telecomm. Syst. (ANTS)*, pp. 1-6, 2013.





# KIMBERLY J. TITUS

DEPARTMENT OF COMPUTER SCIENCE

Kimberly J. Titus received her Ph.D. in physics from North Carolina State University in 1994 with her research focused on semiconductor materials for blue LEDs and lasers. She received a B.S. in physics and a B.A. in mathematics in 1989 from Stetson University in DeLand, Florida.

Titus was a visiting assistant professor in textile engineering at the NC State College of Textiles from 1994-98, developing sensor technology for the apparel and airbag industries. She was an assistant professor in the Department of Mathematics and Computer Science at High Point University in High Point, North Carolina, from 2007-23, teaching a variety of applied mathematics and programming courses.

Her research interests include computer science and data science education. Her research focuses on developing tools and tutorials for programming students in C, C++, R and Python for effective education of the next generation of computer scientists. She is very excited to return to the Wolfpack family as an associate teaching professor of computer science.

## Associate Teaching Professor

Ph.D. (1994)

North Carolina State University

## RESEARCH INTERESTS:

- Computer science education: developing tools and tutorials to improve undergraduate performance and programming instruction
- Data science applications using Python and R
- Data literacy
- Effective uses of chatbots in education

## SELECTED PUBLICATIONS

- J.M. Pittman, K. Titus, and L. Williams, "How early is early enough: correlating student performance with final grades," *J. of Higher Educ. Theory and Pract.*, vol. 21, no. 6, pp. 8-14, 2021.
- M.J. Oudshoorn, K.J. Titus, and W.K. Suchan, "Building a new data science program based on an existing computer science program," presented at the FIE2020 Conf., Uppsala, Sweden, Oct. 2020.
- K.J. Titus, M.J. Langford, L.K. Canup, and T.G. Clapp, "Application of fabric testing methods to twill denim, part I: fabric weight, thickness, and compression properties," *Textile Res. J.*, April 1999.
- R.N. Cox, K.J. Titus, and T.G. Clapp, "An on-line monitoring system to recognize stitch defects through thread motion and high speed image analyses," *ASME Trans. J. of Manuf. Sci. & Eng.*, vol. 121, no. 1, pp. 104-108, 1999.
- K.J. Titus, T.G. Clapp, Z. Zhu, and R.P. Gardner, "A preliminary investigation of a beta-particle transmission gauge for seam quality determination," *Textile Res. J.*, vol. 67, no. 1, pp. 23-34, 1997.



# WUJIE WEN

DEPARTMENT OF COMPUTER SCIENCE

Wujie Wen received his B.S. degree in electrical and computer engineering from Beijing Jiaotong University in Beijing; M.S. degree in communication engineering from Tsinghua University in Beijing; and his Ph.D. degree in computer engineering from the University of Pittsburgh. Prior to joining the North Carolina State University faculty, he was an assistant professor and then a tenured associate professor in the Department of Electrical and Computer Engineering at Lehigh University in Bethlehem, Pennsylvania.

His current research efforts include efficient, reliable, secure and privacy-preserving computing, particularly from the aspects of software-hardware co-design and electronic design automation (EDA), as well as their applications to embedded, IoTs, smart medical and intelligent cyber-physical systems. His group has published more than 40 papers on top-tier CSRankings conference venues, including 18 times at the Design Automation Conference (DAC), 12 times at the International Conference on Computer-Aided Design (ICCAD) and at others. Wen received best paper nominations from all four major EDA conferences. He served as the general chair and program chair of the Institute of Electrical and Electronics Engineers (IEEE) Computer Society Annual Symposium on Very large-scale Integration (ISVLSI) in 2018 and 2019, respectively. He is now serving as an associate editor of *Neurocomputing* and *IEEE Circuit and Systems Magazine*. His research is sponsored by the National Science Foundation (NSF), Air Force Research Laboratory and others (over \$4.5M). He is a recipient of the NSF Faculty Early Career Award.

## SELECTED PUBLICATIONS

- Y. Luo, et al., "AdQuant2PNN: Enabling Two-party High-Performance Privacy-Preserving Deep Neural Networks Inference with Adaptive Quantization," presented at the 56th IEEE/ACM Int. Symp. on Microarchitecture, Toronto, CA, Oct. 2023.
- R. Ran, X. Luo, W. Wang, T. Liu, G. Quan, and W. Wen, "SpENCNN: Orchestrating Encoding and Sparsity for Fast Homomorphically Encrypted Neural Network Inference," presented at the 40th Int. Conf. on Mach. Learn., Honolulu, HI, USA, July 2023.
- C. Feng, N. Xu, W. Wen, P. Venkatasubramanian, and C. Ding, "Spectral-DP: Differentially Private Deep Learning through Spectral Perturbation and Filtering," presented at the 44th IEEE Symp. on Secur. and Privacy, San Francisco, CA, USA, May 2023.
- H. Peng, et al., "A Length Adaptive Algorithm-Hardware Co-design of Transformer on FPGA Through Sparse Attention and Dynamic Pipelining," presented at the ACM/IEEE 59th Design Automat. Conf., San Francisco, CA, USA, July 2022.
- Z. Liu, et al., "DeepN-JPEG: A Deep Neural Network Favorable JPEG-based Image Compression Framework," presented at the 55th ACM/IEEE Design Automat. Conf., New York, NY, USA June 2018.

## Associate Professor

Ph.D. (2015)

University of Pittsburgh

## RESEARCH INTERESTS:

- Software-hardware co-design for efficient domain-specific computing
- Design automation
- Hardware acceleration
- Trustworthy and privacy-preserving AI computing
- Machine learning
- Cyber-physical systems (autonomous driving and medical)





# DOMINIK WERMKE

DEPARTMENT OF COMPUTER SCIENCE

Prior to joining the North Carolina State University faculty, Dominik Wermke was a researcher at CISA Helmholtz Center for Information Security and part of the TeamUSEC research group for human-centered security. He received his Dr. rer. nat. (Ph.D. equivalent) in computer science from Leibniz University Hannover, in Hannover, Germany, and both a M.Sc. and B.Sc. from Saarland University in Saarbrücken, Germany.

His research enables developers and administrators to deploy secure, privacy-respecting and trustworthy software that benefits the security of hundreds of dependent code bases, thousands of real-world deployments and millions of end users. His research leverages this multiplicative effect by supporting open source maintainers, developers and system administrators in the shared endeavor toward a more secure and trustworthy software ecosystem.

## Assistant Professor

Dr. rer. nat. (Ph.D. equivalent, 2023)

Leibniz University Hannover

## RESEARCH INTERESTS:

- Usable security, supporting software experts, software supply chain, open source ecosystem
- Designing secure and user-friendly systems, developing tools to assist software professionals, enhancing transparency and trust in the software supply chain, improving collaboration and security in open source communities

## SELECTED PUBLICATIONS

- D. Wermke et al., "Always Contribute Back": A Qualitative Study on Security Challenges of the Open Source Supply Chain," *2023 IEEE Symp. on Secur. and Privacy (SP)*, San Francisco, CA, USA, 2023, pp. 1545-1560, doi: 10.1109/SP46215.2023.10179378.
- M. Fourné, D. Wermke, W. Enck, S. Fahl and Y. Acar, "It's like flossing your teeth: On the Importance and Challenges of Reproducible Builds for Software Supply Chain Security," *2023 IEEE Symp. on Secur. and Privacy (SP)*, San Francisco, CA, USA, 2023, pp. 1527-1544, doi: 10.1109/SP46215.2023.10179320.
- D. Wermke, N. Wöhler, J. H. Klemmer, M. Fourné, Y. Acar and S. Fahl, "Committed to Trust: A Qualitative Study on Security & Trust in Open Source Software Projects," *2022 IEEE Symp. on Secur. and Privacy (SP)*, San Francisco, CA, USA, 2022, pp. 1880-1896, doi: 10.1109/SP46214.2022.9833686.
- N. Huaman et al., "A Large-Scale Interview Study on Information Security in and Attacks against Small and Medium-sized Enterprises." *30th USENIX Secur. Symp. (USENIX Sec '21)*, August 11-13, 2021.



# BOWEN XU

DEPARTMENT OF COMPUTER SCIENCE

Prior to joining the North Carolina State University faculty, Bowen Xu was a postdoctoral researcher at Singapore Management University. His research area is software engineering (SE). Particularly, his research interests lie in SE, machine learning and program analysis. The primary aims of his work are to improve software quality and developers' productivity.

Presently, he focuses more on proposing effective large language models for SE tasks and at the same time, making those models more secure, robust and efficient. He has published works in top-tier software engineering conferences and journals. His works have been nominated for the Association for Computing Machinery Special Interest Group on Software Engineering's Distinguished Paper Award, which is for the top 10 percent among all accepted submissions, as well as won the Highly Commended Full Paper Award, which is the second-best among all accepted submissions, and the Honorable Mention Award.

## Assistant Professor

Ph.D. (2022)

Singapore Management University

## RESEARCH INTERESTS:

- Large language model for coding
- Artificial intelligence (AI) model security for software engineering
- Software text analytics
- Bug and vulnerability analysis

## SELECTED PUBLICATIONS

- B. Xu, T. Hoang, A. Sharma, C. Yang, X. Xia, and D. Lo, "Post2vec: Learning distributed representations of Stack Overflow posts," *IEEE Trans. on Softw. Eng.*, vol. 48, no. 9, pp. 3423-3441, 2021.
- B. Xu, L. An, F. Thung, F. Khomh, and D. Lo, "Why reinventing the wheels? An empirical study on library reuse and re-implementation," *Empirical Softw. Eng.*, vol. 25, pp. 755-789, 2020. (2020).
- B. Xu, A. Shirani, D. Lo, and M. A. Alipour, "Prediction of relatedness in stack overflow: deep learning vs. svm: a reproducibility study," in *Proc. of the 12th ACM/IEEE Int. Symp. on Empirical Softw. Eng. and Meas.*, Oct. 2018, pp. 1-10.
- B. Xu, Z. Xing, X. Xia, and D. Lo, "AnswerBot: Automated generation of answer summary to developers' technical questions," in *Proc. of the 32nd IEEE/ACM Int. Conf. on Automated Softw. Eng.*, Oct. 2017, pp. 706-716.
- B. Xu, D. Ye, Z. Xing, X. Xia, G. Chen, and S. Li, "Predicting semantically linkable knowledge in developer online forums via convolutional neural network," in *Proc. of the 31st IEEE/ACM Int. Conf. on Automated Softw. Eng.*, Aug. 2016, pp. 51-62.



# CHENHAN XU

DEPARTMENT OF COMPUTER SCIENCE

Chenhan Xu received his Ph.D. in computer science and engineering from the University at Buffalo in Buffalo, New York. Before that, he received a B.Eng. in network engineering from Nanjing University of Posts and Telecommunications, China. His research interests lie in the intersection between Internet of Things (IoT), cybersecurity, physiological science and smart health. Presently, Xu's research focuses on modeling, designing, building and evaluating end-to-end sensing and computing systems that aim for precise, broad-spectrum, intelligent and secure human-computer interaction (HCI) and personalized healthcare.

He has published more than 30 research papers in high-impact venues for mobile computing (including MobiCom, the International Conference On Mobile Computing and Networking; MobiSys, the International Conference on Mobile Systems, Applications, and Service; and SenSys, Conference on Embedded Networked Sensor Systems); for human-computer interaction (UbiComp, the premier conference for Ubiquitous Computing, and CHI, the Conference on Human Factors in Computing Systems); for smart health / bioinformatics (including the International Conference on Healthcare Informatics [ICHI] and the Conference on Connected Health: Applications, Systems and Engineering Technologies); and for security (Network and Distributed System Security Symposium). He is the recipient of the Best Student Paper Award at ICHI and Best Paper Awards at MobiSys; SenSys; GlobeCom, the Global Communications Conference; and the International Conference on Communications.

## SELECTED PUBLICATIONS

- C. Xu, et al., "AO-Finger: Hands-free Fine-grained Finger Gesture Recognition via Acoustic-Optic Sensor Fusing," in *Proc. of the 2023 CHI Conf. on Human Factors in Comput. Syst.*, 2023, pp. 1-14.
- C. Xu, et al., "Hearing Heartbeat from Voice: Towards Next Generation Voice-User Interfaces with Cardiac Sensing Functions," in *Proc. of the 20th ACM Conf. on Embedded Networked Sensor Syst.*, 2022, pp. 149-163.
- C. Xu, et al., "The Visual Accelerometer: A High-fidelity Optic-to-Inertial Transformation Framework for Wearable Health Computing," presented at the 2022 IEEE 10th Int. Conf. on Healthcare Inform. (ICHI), Rochester, MN, USA, 2022, pp. 319-329.
- C. Xu, et al., "Cardiacwave: A mmwave-based scheme of non-contact and high-definition heart activity computing," in *Proc. of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technol.*, 2021, pp. 1-26.
- C. Xu, et al., "Waveear: Exploring a mmwave-based noise-resistant speech sensing for voice-user interface," in *Proc. of the 17th Annu. Int. Conf. on Mobile Syst., Appl., and Services*, June 2019, pp. 14-26.

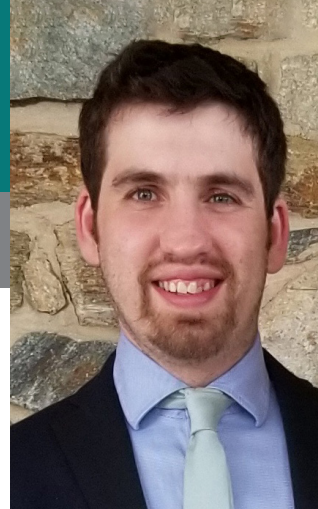
## Assistant Professor

Ph.D. (2023)

University at Buffalo

## RESEARCH INTERESTS:

- IoT/Mobile computing
- Wireless and wearable sensing and computing
- Human-computer interface
- Biometrics
- Mobile health
- Cybersecurity



# DEMITRY FARFURNIK

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Demetry Farfurnik received his B.Sc. in mathematics and physics and his M.Sc. in physics from Tel-Aviv University in Tel-Aviv, Israel. He received his Ph.D. in physics from the Hebrew University of Jerusalem in Israel. Prior to joining the North Carolina State University faculty, he was a postdoctoral associate at the Institute for Research in Electronics and Applied Physics and the Joint Quantum Institute at the University of Maryland in College Park, Maryland.

Presently, Farfurnik studies fundamental science and develops novel quantum technologies utilizing optically-active spin systems in the solid-state such as quantum dots and color centers. He implements experimental protocols that control, probe and improve the quantum properties of spins systems, thereby boosting the capabilities of such systems for sensing and studies of many-body dynamics. Farfurnik also couples optically-active spins to fabricated photonic structures, thereby establishing essential building blocks of future quantum networks.

## Assistant Professor

Ph.D. (2019)

Hebrew University of Jerusalem

## RESEARCH INTERESTS:

- Spin physics
- Quantum photonics
- Quantum dots
- Color centers
- Quantum simulation, communication and sensing utilizing solid-state spins
- Quantum many-body dynamics
- Foundations of quantum mechanics
- Weak quantum measurements

## SELECTED PUBLICATIONS

- D. Farfurnik, H. Singh, Z. Luo, A. S. Bracker, S. G. Carter, R. M. Pettit, and E. Waks, "All-Optical Noise Spectroscopy of a Solid-State Spin," *Nano Lett.*, vol. 23, pp. 1781-1786, 2023.
- H. Singh,\* D. Farfurnik,\* Z. Luo, A. S. Bracker, S. G. Carter, and E. Waks, "Optical Transparency Induced by a Largely Purcell-Enhanced Quantum Dot in a Polarization-Degenerate Cavity," *Nano Lett.*, vol. 22, pp. 7959-7964, 2022.
- D. Farfurnik, A. Jarmola, L. M. Pham, Z. H. Wang, V. V. Dobrovitski, R. L. Walsworth, D. Budker, and N. Bar-Gill, "Optimizing a dynamical decoupling protocol for solid state electronic spin ensembles in diamond," *Phys. Rev. B.*, vol. 92, pp. 060301 (R), 2015.
- D. Farfurnik, N. Alfasi, S. Masis, Y. Kauffmann, E. Farchi, Y. Romach, Y. Hovav, E. Buks, and N. Bar-Gill, "Enhanced concentrations of nitrogen-vacancy centers in diamond through TEM irradiation," *Appl. Phys. Lett.*, vol. 111, pp. 123101, 2017.
- A. Danan, D. Farfurnik, S. Bar-Ad, and L. Vaidman, "Asking Photons Where They Have Been," *Phys. Rev. Lett.*, vol. 111, pp. 240402, 2013.

\*Equal contribution



# FU-CHEN HSIAO

DEPARTMENT OF ELECTRICAL  
AND COMPUTER ENGINEERING

Fu-Chen Hsiao received his B.S. in physics from the National Taiwan Normal University in New Taipei, Taiwan, in 2010, M.S. in photonics from the National Cheng Kung University in Tainan, Taiwan in 2012, and Ph.D. in electrical engineering from the University of Illinois Urbana-Champaign in 2021. Prior to joining the North Carolina State University faculty, he was a postdoctoral research fellow in the Department of Electrical and Computer Engineering at NC State.

Hsiao's research focuses on semiconductor material and device physics. His research encompasses the modeling of electronic, optical and transport properties of semiconductors and nanostructures, photonic integrated circuits and semiconductor optoelectronic devices. Currently, his work revolves around investigating the non-radiative recombination process in III-Nitride-based heterostructures to achieve high-speed and high-efficiency LEDs, and the design of high-temperature and high-efficiency III-As/P Laser diodes. He is also engaged in the development of broad spectrum photonic integrated circuits in visible light regime based on wide bandgap semiconductors.

## Assistant Research Professor

Ph.D. (2021)

University  
of Illinois  
Urbana-  
Champaign

## RESEARCH INTERESTS:

- Semiconductor physics
- Optoelectronic device physics
- Photonic integrated circuit
- Electronic band structure calculation

## SELECTED PUBLICATIONS

- Fu-Chen Hsiao, Arnab Hazari, Yia Chung Chang, Pallab Bhattacharya, and John M. Dallesasse. "Modeling photocurrent spectra of high indium content InGaN disk in wire photodiode on silicon substrate." *Physica E: Low dimensional Systems and Nanostructures* 144 (2022): 115371.
- Altairy, Mashael M., Erfu Liu, Ching-Tarn Liang, Fu-Chen Hsiao, Jeremiah van Baren, Takashi Taniguchi, Kenji Watanabe, Nathaniel M. Gabor, Yia-Chung Chang, and Chun Hung Lui. "Electrically switchable intervalley excitons with strong two-phonon scattering in bilayer WSe<sub>2</sub>." *Nano Letters* 22, no. 5 (2022): 1829-1835.
- Fu-Chen Hsiao, Ching Tarn Liang, Yia Chung Chang, and John M. Dallesasse. "Effective bond orbital model of III nitride wurtzite structures based on modified interaction parameters of zinc blende structures." *Computer Physics Communications* 252 (2020): 107139.
- Su, Patrick, Fu-Chen Hsiao, Thomas O'Brien, and John M. Dallesasse. "Wafer-scale method of controlling impurity induced disordering for optical mode engineering in high performance VCSELs." *IEEE Transactions on Semiconductor Manufacturing* 31, no. 4 (2018): 447-453.
- Hazari, Arnab, Fu-Chen Hsiao, Lifan Yan, Junseok Heo, Joanna Mirecki Millunchick, John M. Dallesasse, and Pallab Bhattacharya. "1.3μm Optical Interconnect on Silicon: A Monolithic III-Nitride Nanowire Photonic Integrated Circuit." *IEEE Journal of Quantum Electronics* 53, no. 4 (2017): 1-9.



# ALYSSA KODY

DEPARTMENT OF ELECTRICAL  
AND COMPUTER ENGINEERING

Alyssa Kody received her Ph.D. in electrical engineering from the University of Michigan in Ann Arbor, Michigan, in 2019. Prior to joining North Carolina State University, she was a Maria Goeppert Mayer Fellow at Argonne National Laboratory in Lemont, Illinois, in the Energy Systems and Infrastructure Analysis Division. She was named a 2022 Rising Star in EECS, and her graduate work was supported by the National Science Foundation Graduate Research Program and a Rackham Merit Fellowship. Her research focuses on developing control and optimization algorithms for power and energy systems.

## Assistant Professor

Ph.D. (2019)

University of  
Michigan

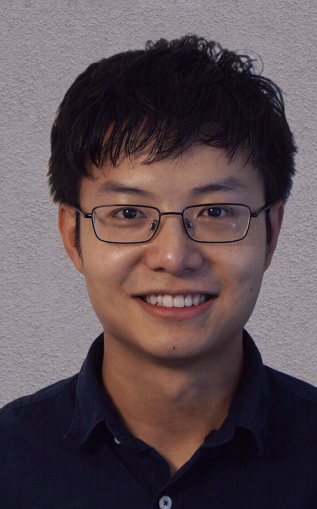
## RESEARCH INTERESTS:

- Power and energy systems
- Renewable energy
- Power systems resilience
- Applied optimization
- Control systems
- Data-driven methods

## SELECTED PUBLICATIONS

- A. Kody, S. Chevalier, S. Chatzivasilieiadis, and D.K. Molzahn, "Modeling the AC power flow equations with optimally compressed neural networks: Application to unit commitment," *Electric Power Syst. Res.*, vol. 213, Art no. 108282, 2022.
- S. Zeng, A. Kody, Y. Kim, K. Kim, and D.K. Molzahn, "A reinforcement learning approach to parameter selection for distributed optimal power flow," *Electric Power Syst. Res.*, vol. 212, Art no. 108546, 2022.
- A. Kody, R. Piansky, and D.K. Molzahn, "Optimizing transmission infrastructure investments to support line de-energization for mitigating wildfire ignition risk," presented at the 11th Bulk Power Syst. Dyn. and Control Symp., Banff, Canada, 2022.
- A. Kody, A. West, and D.K. Molzahn, "Sharing the load: Considering fairness in de-energization scheduling to mitigate wildfire ignition risk using rolling optimization," presented at the 61st Conf. on Decis. and Control, Cancun, Mexico, 2022.





# YUAN LIU

DEPARTMENT OF ELECTRICAL  
AND COMPUTER ENGINEERING

Yuan Liu received his B.S. in physics from Tsinghua University in Beijing. He received his M.S. in electrical engineering and a Ph.D. in chemical physics from Brown University in Providence, Rhode Island. Prior to joining the North Carolina State University faculty, he was a postdoctoral researcher in the Research Laboratory of Electronics and Department of Physics at the Massachusetts Institute of Technology in Boston.

Presently, he studies quantum and classical algorithms to solve challenging problems in quantum chemistry, chemical physics and material science, including correlated electronic structure and real-time dynamics. Liu also studies protocols to leverage continuous-variable quantum systems such as bosonic oscillators for computation, information processing and sensing. Another topic is the study of algorithmic-level quantum error correction. These topics are investigated from theoretical and computational perspectives, with possible experimental collaborations.

Liu is an assistant professor in both the NC State Department of Electrical and Computer Engineering and Department of Computer Science.

## Assistant Professor

Ph.D. (2020)

Brown  
University

## RESEARCH INTERESTS:

- Quantum algorithms and simulation
- Quantum engineering
- Theoretical chemistry and chemical physics
- Continuous-variable quantum information/signal processing
- Quantum metrology and sensing

## SELECTED PUBLICATIONS

- Y. Liu,\* O. R. Meitei, Z. E. Chin, A. Dutt, M. Tao, I. L. Chuang, and T. Van Voorhis,\* "Bootstrap embedding on a quantum computer," *J. Chem. Theory Comput.*, vol. 19, no. 8, pp. 2230-2247, 2023.
- A. K. Tan,\* Y. Liu,\* M. C. Tran,\* and I. L. Chuang, "Perturbative model of noisy quantum signal processing," *Phys. Rev. A*, vol. 107, no. 4, pp. 042429, 2023.
- J. M. Martyn, Y. Liu, Z. E. Chin, and I. L. Chuang, "Efficient fully-coherent quantum signal processing algorithms for real-time dynamics simulation," *J. Chem. Phys.*, vol. 158, pp. 024106, 2023.
- Y. Liu,\* J. Sinanan-Singh, M. T. Kearney, G. Mintzer, and I. L. Chuang, "Constructing qudits from infinite-dimensional oscillators by coupling to qubits," *Phys. Rev. A*, vol. 104, no. 3, pp. 032605-1, 2021.
- Y. Liu, M. Cho, and B. M. Rubenstein, "Ab initio finite temperature auxiliary field quantum Monte Carlo," *J. Chem. Theory Comput.*, vol. 14, no. 9, pp. 4722-4732, 2018.

\*Corresponding Author



# ADOLFO R. ESCOBEDO

EDWARD P. FITTS DEPARTMENT OF  
INDUSTRIAL AND SYSTEMS ENGINEERING

Adolfo R. Escobedo is an associate professor in the Edward P. Fitts Department of Industrial and Systems Engineering at North Carolina State University, where he is also a member of the Operations Research graduate program. Escobedo received his B.A. in mathematics from California State University, Los Angeles in 2009 and his Ph.D. in industrial and systems engineering in 2016 from Texas A&M University in College Station, Texas. Prior to joining the NC State faculty, he was an assistant professor in the Industrial Engineering program of the School of Computing and Augmented Intelligence at Arizona State University in Tempe, Arizona.

Escobedo's research centers on the development of operations research and computational methods and is driven by modern societal challenges. His current work addresses various problems in the development of sustainable infrastructures, including planning and operation of power systems to withstand environmental stressors, design of rural-urban recycling systems and service territory districting. His other ongoing research efforts include the development of social choice-inspired methodologies for improving outcomes in group decision-making and crowdsourcing as well as the design of numerical linear algebra algorithms for increasing the reliability of optimization solvers.

## Associate Professor

Ph.D. (2016)

Texas A&M  
University

## RESEARCH INTERESTS:

- Methodologies
  - Operations research
  - Discrete optimization
  - Design and analysis of algorithms
  - Computational social choice
  - Numerical linear algebra
- Applications
  - Development of sustainable infrastructures
  - Planning and operation of power systems
  - Circular economy
  - Service territory districting
  - Group decision-making
  - Crowdsourcing

## SELECTED PUBLICATIONS

- Escobedo AR. 2023. Exact matrix factorization updates for nonlinear programming. *INFORMS Journal on Computing*.
- Kassem Z, Escobedo AR. 2023. Models and network insights for edge-based districting with simultaneous location-allocation decisions. *IIE Transactions*. 55(8):768-780.
- Skolfield JK, Escobar LM, Escobedo AR. 2022. Derivation and generation of path-based valid inequalities for transmission expansion planning. *Annals of O.R.* 312(1):1031-1049.
- Yasmin R, Grassel J, Hassan MM, Fuentes O, Escobedo AR. 2021. Enhancing image classification capabilities of crowdsourcing-based methods through expanded input elicitation. *AAAI Conference on Human Computation and Crowdsourcing (HCOMP)*. 9(1):66-178.
- Yoo Y, Escobedo AR. 2021. A new binary programming formulation and social choice property for Kemeny rank aggregation. *Decision Analysis*. 18(4):296-320.





# JORDAN KERN

EDWARD P. FITTS DEPARTMENT OF  
INDUSTRIAL AND SYSTEMS ENGINEERING

Jordan Kern is an assistant professor in the Edward P. Fitts Department of Industrial and Systems Engineering at North Carolina State University. He also has graduate faculty appointments in NC State's Operations Research graduate program and the Department of Civil, Construction, and Environmental Engineering. Kern is a three-time graduate of the University of North Carolina at Chapel Hill — a B.S. in environmental science and M.S. and Ph.D. in environmental engineering. His group's research tries to advance optimal design and management of low-to-zero carbon energy systems, with a special focus on: 1) building high resolution models of real-world energy systems; 2) simulating system dynamics under uncertainty and stress; and 3) informing optimal decision making around capital investment and short-term operations. His group's research has been featured frequently in the national media, including *NPR*, *LA Times*, *Vox* and *TIME*. Since 2016, his group has received \$3.16 million in extramurally funded research awards (part of \$43 million in total collaborative funds). In 2022, he received the National Science Foundation CAREER award.

## Assistant Professor

Ph.D. (2014)

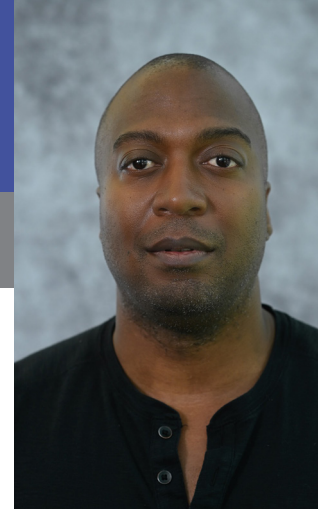
University  
of North  
Carolina at  
Chapel Hill

## RESEARCH INTERESTS:

- Open source software
- Uncertainty characterization
- Optimization
- Stochastic simulation of energy systems
- Climate and weather risk assessment
- Multi-sector dynamics
- Grid security
- Long-term system planning and short-term operations
- Forecasts
- Value of information

## SELECTED PUBLICATIONS

- Zeighami A, Kern JD, Yates A, Weber P, Bruno A. 2023. U.S. west coast droughts and heat waves exacerbate pollution inequality and can undermine emission control policies. *Nature Communications*. 14:1415. <https://doi.org/10.1038/s41467-023-37080-0>
- Akdemir K, Kern JD, Lamontagne J. 2022. Assessing risks for New England's wholesale electricity market from wind power losses during extreme winter storms. *Energy*. 251:123886. <https://doi.org/10.1016/j.energy.2022.123886>
- Wessel J, Kern, JD, Voisin N, Oikonomou K, Haas J. 2022. Technology pathways could help drive the U.S. West Coast grid's exposure to hydrometeorological uncertainty. *Earth's Future*. 10(1):e2021EF002187. <https://doi.org/10.1029/2021EF002187>
- Hill J, Kern JD, Rupp D, Voisin N, Characklis G. 2021. The effects of climate change on interregional electricity market dynamics on the U.S. west coast. *Earth's Future*. 9(12):e2021EF002400. <https://doi.org/10.1029/2021EF002400>
- Su Y, Kern JD, Denaro S, Hill J, Reed P, Sun Y, Cohen J, Characklis G. 2020. An open source model for quantifying risks in bulk electric power systems from spatially and temporally correlated hydrometeorological processes. *Environmental Modelling and Software*. 126:104667. <https://doi.org/10.1016/j.envsoft.2020.104667>



# FRED LIVINGSTON

EDWARD P. FITTS DEPARTMENT OF  
INDUSTRIAL AND SYSTEMS ENGINEERING

Fred Livingston received his Ph.D. from the Department of Electrical and Computer Engineering at North Carolina State University in 2014. Before joining the NC State faculty, he was a principal robotic engineer for defense contractors. He developed autonomous solutions for health systems, maritime systems, precision agriculture and search and rescue for the Department of Defense. Livingston's research focuses on multi-agent cyber-physical systems and their algorithms, enabling them to make intelligent decisions for real-world applications in active and uncertain environments. He explores the integration of cutting-edge technologies like decentralized sensor fusion, edge computing, machine learning, robot manipulation, advanced control and computer vision for advanced autonomy. The integration of these disciplines necessitates cross-disciplinary collaboration from all branches of engineering.

## Associate Teaching Professor

Ph.D. (2014)

North  
Carolina State  
University

## RESEARCH INTERESTS:

- Advancement of cyber-physical systems for autonomy that utilize multi-agent robotics technologies, decentralized control, sensor fusion, optimal motion planning, edge computing, reinforcement learning, blockchain, smart contracts, perception and security

## SELECTED PUBLICATIONS

- Youngs A, Livingston F, Johnson J, Grant E, T. Henderson. 2023. A Micro-Computer Based Tactical Combat Casualty Care Trainer. 12th Conference on New Technologies for Computer/Robot Assisted Surgery; Paris, France.
- Aldridge H, Livingston. 2022. Rapid Development of Secure Robotic Platforms. Future Force Capabilities Conference and Exhibition; Austin, Texas.
- Aldridge H, Livingston F. 2021. Secure Rapid Prototyping for Unmanned Systems. NDIA Ground Vehicle Systems Engineering and Technology Symposium; Novi, Michigan.
- Livingston F, Grant E, Lee G. 2010. On the Design of a KANSEI Robot Testbed for Understanding Human Machine Interaction. International Conference on KANSEI Engineering and Emotion Research; Paris, France.



# ZHUOTING (APRIL) YU

EDWARD P. FITTS DEPARTMENT OF  
INDUSTRIAL AND SYSTEMS ENGINEERING

Zhuoting (April) Yu received her Ph.D. and M.S. in operations research from the H. Milton Stewart School of Industrial and Systems Engineering at the Georgia Institute of Technology in Atlanta. She received her B.S. in statistics from the School of Mathematical Sciences, Nankai University in Tianjin, China.

Yu's research interests focus on stochastic modeling and optimization, with applications to health systems and queueing systems. Her recent works address a wide range of real-world problems, including childhood immunization scheduling optimization, vaccine pricing, infectious disease control, and liver transplantation.

## Assistant Professor

Ph.D. (2023)

Georgia  
Institute of  
Technology

## RESEARCH INTERESTS:

- Operations research
- Stochastic modeling and optimization
- Health systems
- Queueing systems
- Supply chain management

## SELECTED PUBLICATIONS

- Yu Z, Keskinocak P, Sokol J, Chen YH. 2022. Flexible analytic model to inform multi-stakeholder pediatric vaccine scheduling decisions. *Vaccine*. 40(52):7631-7639.
- Yu Z, Keskinocak P, Steimle LN, Yildirim I. 2022. The impact of testing resources and compliance with self-isolation on COVID-19: a mathematical modeling study. *AJPM Focus*. 1:100006.
- Yu Z, Andradóttir S, Ayhan H. 2023. Optimal control of supervisors balancing individual and joint responsibilities. *Probability in the Engineering and Informational Sciences*. 1-20.
- Yu Z, Keskinocak P, Magliocca JF, Romero, Jr, R, Sokol J. 2023. Split or whole liver Transplantation? Utilization and post-transplant survival. *Hepatology Communications*.
- Hu W, Yu Z, Toriello A, Dessouky MM. 2020. Decomposition-based approximation algorithms for the one-warehouse multi-retailer problem with concave batch order costs. *Naval Research Logistics*. 67(7):503-523.



# ALEXEY GULYUK

DEPARTMENT OF MATERIALS SCIENCE  
AND ENGINEERING

Alexey Gulyuk received his B.S. in engineering physics from the Belarusian State University in Minsk, Belarus. He received his M.S. in physics from North Carolina Central University in Durham, North Carolina, and a Ph.D. in materials science and engineering from North Carolina State University. He is a part of the Science and Technologies for Phosphorus Sustainability (STEPS) Center, a National Science Foundation Science and Technologies Center, at NC State. Prior to joining the faculty, he was a postdoctoral researcher in the Yingling Research Group at NC State.

Presently, he studies the problematics of gathering, storage, sharing and analysis of big amounts of heterogeneous data. This research involves such novel concepts as convergence informatics addressing issues of phosphorus sustainability. Gulyuk has experience in the development, characterization and analysis of biocompatible materials like wide-bandgap semiconducting biointerfaces for purposes including biosensing and bioelectronics. Gulyuk's research background incorporates both theory and experimental techniques.

## Assistant Teaching Professor

Ph.D. (2020)

North  
Carolina State  
University

## RESEARCH INTERESTS:

- Data science and convergence informatics for phosphorus sustainability
- Wide-bandgap semiconductor biointerfaces
- Surface characterization

## SELECTED PUBLICATIONS

- Peerless, J.S., Gulyuk, A.V., Milliken, N. JB., Kim, GD., Reid, E., Lee, JW., Dooil Kim, D., Hendren, Z., Choi, YC., Yingling, Y.G., T. 2023, "Role of Nanoscale Morphology on the Efficiency of Solvent-Based Desalination Method." *ACS ES&T Water* 3, 400-409.
- Nash, J., Manning, MD., Gulyuk, A.V., Kuznetsov, A.E., Yingling, Y.G., T. 2022, "Gold nanoparticle design for RNA compaction." *Biointerfaces* 17, 061001.
- Gulyuk, A.V., LaJeunesse, D.R., Collazo, R., Ivanisevic, A. 2021, "Tuning microbial activity via programmatic alteration of cell/substrate interfaces." *Advanced Materials* 33 (46), 2004655.
- Gulyuk, A.V., LaJeunesse, D.R., Reddy, P., Kirste, R., Collazo, R., Ivanisevic, A. 2019, "Interfacial Properties of Doped Semiconductor Materials Can Alter the Behavior of Pseudomonas aeruginosa Films." *ACS Applied Electronic Materials* 1 (8), 1641-1652.
- Gulyuk, A.V., LaJeunesse, D.R., Collazo, R., Ivanisevic, A. 2019, "Characterization of Pseudomonas aeruginosa Films on Different Inorganic Surfaces before and after UV Light Exposure." *Langmuir* 34 (36), 10806-10815.



# MARTIN SEIFRID

DEPARTMENT OF MATERIALS SCIENCE  
AND ENGINEERING

Martin Seifrid received his Ph.D. in chemistry from the University of California, Santa Barbara, where he worked in the Center for Polymers and Organic Solids under the supervision of Professor Guillermo C. Bazan. His doctoral research involved investigating the relationship between molecular design and solid-state structure and properties of organic semiconducting materials.

Seifrid conducted his postdoctoral research with Professor Alán Aspuru-Guzik at the University of Toronto where he developed self-driving laboratories, and worked on autonomous molecular design, automated synthesis and characterization for organic lasing materials.

He is joining the North Carolina State University Department of Materials Science and Engineering as an assistant professor. His group will develop self-driving laboratories — automated experiments guided by machine learning — and leverage them to design precisely controlled organic mixed ionic-electronic conducting materials with applications in sensing, energy storage, healthcare and neuromorphic computing.

## Assistant Professor

Ph.D. (2019)

University of  
California,  
Santa Barbara

## RESEARCH INTERESTS:

- Self-driving laboratories
- Organic mixed ionic-electronic conductors
- Soft matter
- Machine learning
- Laboratory automation

## SELECTED PUBLICATIONS

Seifrid M, Pollice R, Aguilar-Granda A, Chan ZM, Hotta K, Ser CT, Vestfrid J, Wu TC, Aspuru-Guzik A. 2022. Autonomous chemical experiments: challenges and perspectives on establishing a self-driving lab. *Acc Chem Res.* 55(17):2454-2466. doi: 10.1021/acs.accounts.2c00220

Seifrid M, Hickman RJ, Aguilar-Granda A, Lavigne C, Vestfrid J, Wu TC, Gaudin T, Hopkins EJ, Aspuru-Guzik A. 2022. Routescore: punching the ticket to more efficient materials development. *ACS Cent. Sci.* 8(1):122-131. doi: 10.1021/acscentsci.1c01002

Halaby S, Martynowycz MW, Zhu Z, Tretiak S, Zhugayevych A, Gonen T, Seifrid M. 2021. Microcrystal electron diffraction for molecular design of functional non-fullerene acceptor structures. *Chem. Mater.* 33(3):966-977. doi: 10.1021/acs.chemmater.0c04111

Seifrid M, Reddy GNM, Chmelka BF, Bazan GC. 2020. Insight into the structures and dynamics of organic semiconductors through solid-state NMR spectroscopy. *Nat Rev Mater.* 5:910-930. doi: 10.1038/s41578-020-00232-5

Seifrid M, Reddy GNM, Zhou C, Chmelka BF, Bazan GC. 2019. Direct observation of the relationship between molecular topology and bulk morphology for a  $\pi$ -conjugated material. *J. Am. Chem. Soc.* 141(13):5078-5082. doi: 10.1021/jacs.8b13200



# SAJJAD BIGHAM

DEPARTMENT OF MECHANICAL  
AND AEROSPACE ENGINEERING

Sajjad Bigham is an associate professor in the Department of Mechanical and Aerospace Engineering at North Carolina State University. Prior to joining NC State in January 2023, he was the Lou and Herbert Wacker Associate Professor and the director of the Energy-Thermal-Fluid (ETF) area in the Department of Mechanical Engineering – Engineering Mechanics at Michigan Technological University in Houghton, Michigan from 2016-22. He received his Ph.D. in mechanical engineering from the University of Florida in Gainesville, Florida.

Bigham is the group leader of the Energy-X Lab (Energy eXploration Laboratory) at NC State. He has 15 years of experience in thermally activated technologies and energy efficiency R&D. His research group, Energy-X Lab, is an interdisciplinary research laboratory striving to establish a high-impact research and education program for tackling high-risk, high-reward problems. He has extensive experience in managing large, interdisciplinary, multi-institutional collaborative research efforts sponsored by the Department of Energy's Building Technologies Office / Solar Energy Technologies Office, Advanced Research Projects Agency-Energy, Department of Defense, NASA and industry, among others. He has over 65 peer-reviewed journal and conference publications, one book chapter and three U.S. patents.

## Associate Professor

Ph.D. (2016)

University  
of Florida

## RESEARCH INTERESTS:

- Heat transfer and thermal management
- Thermal energy systems multiphase flows and phase-change phenomena
- Sorption-based selective gas management (e.g., moisture and carbon)
- Heat pump and HVAC&R systems
- Desalination systems

## SELECTED PUBLICATIONS

R. H. Mohammeda, M. Ahmadi, H. Ma, and S. Bigham, "Desiccants enabling energy-efficient buildings: A review," *Renewable and Sustain. Energy Rev.*, vol. 183, 2023, Art. no. 113418.

M. Ahmadi, B. Ahmadi, and S. Bigham, "Wickability-optimized textured liquid-desiccant air dehumidifiers for independent moisture management in energy-efficient buildings," *Energy Convers. Manage.*, vol. 260, 2022, Art. no. 115637.

U. Puttur, M. Ahmadi, B. Ahmadi, and S. Bigham, "A novel lung-inspired 3D-printed desiccant-coated heat exchanger," *Energy Convers. Manage.*, Vol. 252, 2022, Art. no. 115074.

S. Pinnu and S. Bigham, "Multiple-effect desiccant-based zero liquid discharge desalination systems," *Desalination*, vol. 502, 2021, Art. no. 114942.

M. Ahmadi and S. Bigham, "Gradient Wick Channels for Enhanced Flow Boiling HTC and Delayed CHF," *Int. J. Heat Mass Transf.*, vol. 167, 2021, Art. no. 120764.





# JAMES BRAUN

DEPARTMENT OF MECHANICAL  
AND AEROSPACE ENGINEERING

## Assistant Professor

Ph.D. (2019)

Purdue  
University

## RESEARCH INTERESTS:

- Rotating detonation combustors
- Supersonic flows
- Shock waves
- Bladeless turbines
- Multi-phase flows
- Aero-thermal measurement techniques
- Diffusers
- Nozzles

James Braun is an assistant professor in the Department of Mechanical and Aerospace Engineering at North Carolina State University, where he is leading the research group BE-FAST (Braun's Engineering Factory for Advanced Supersonic Technologies). He received his Ph.D. in 2019 from Purdue University in West Lafayette, Indiana. He received his master's degree at the KU Leuven in Belgium in 2014 and performed a research master in 2015 at the von Karman Institute for Fluid Dynamics in Sint-Genesius-Rode Belgium. Prior to joining NC State, he was an assistant research professor at Purdue. He did a postdoc at Purdue and was an Oak Ridge Institute for Science and Education (ORISE) fellow working with the National Energy Technology Laboratory (NETL).

His research interests include novel supersonic propulsion concepts for airbreathing and aerospace applications, through wind tunnel experiments and computational fluid dynamic (CFD) simulations. He is actively working on rotating detonation technology, multi-phase modeling and bladeless power extraction technology.

## SELECTED PUBLICATIONS

- U. Vyas, J. Braun, V. Andreoli, and G. Paniagua, "Short engine intakes: design and trade-off aerodynamic recommendations," *Aerosp. Sci. and Technol.*, vol. 134, Art. no. 108164, March 2023, <https://doi.org/10.1016/j.ast.2023.108164>.
- V. Athmanathan, J. Braun, Z. M. Ayers, C. A. Fugger, A. M. Webb, M. N. Slipchenko, G. Paniagua, S. Roy, and T. Meyer, "On the effects of reactant stratification and wall curvature in non-premixed rotating detonation combustors," *Combustion and Flame*, vol. 240, Art. no. 112013, June 2022 <https://doi.org/10.1016/j.combustflame.2022.112013>.
- J. Braun, G. Paniagua, and F. Falempin, "Energy analysis of a detonation combustor with a bladeless turbine, a propulsion unit for subsonic to hypersonic flight," *Energy Convers. and Manage.*, vol. 262, Art. no. 115491, June 2022 <https://doi.org/10.1016/j.enconman.2022.115491>.
- J. Braun, G. Paniagua, F. Falempin, and F. Le Naour, "Design of axial bladeless turbines for supersonic flows," *ASME. J. Eng. Gas Turbines Power*, vol. 142, no. 4, Art. no. 041024, April 2020, doi: <https://doi.org/10.1115/1.4045359>.
- J. Braun, B. H. Saracoglu, T. E. Magin, and G. Paniagua, "One-dimensional analysis of the magnetohydrodynamic effect in rotating detonation combustors," *AIAA J.*, vol. 54, no. 12, pp. 3761-3767, 2016, doi: 10.2514/1.J054989.



# DARIUS CARTER

DEPARTMENT OF MECHANICAL  
AND AEROSPACE ENGINEERING

## Assistant Professor

Ph.D. (2021)

University of  
Virginia

## RESEARCH INTERESTS:

- Near and complex boundary flight for multirotor vehicles
- Multirotor aerodynamic interactions
- Fluid-structure interactions
- Wind energy
- Urban air mobility
- Multiple air vehicle performance

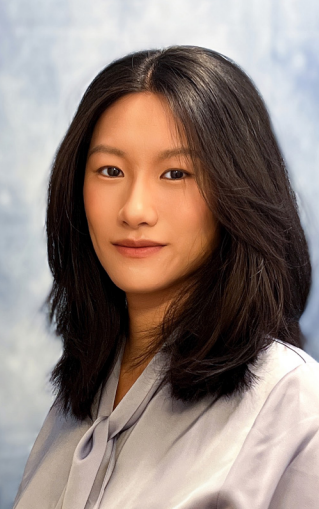
Darius Carter received his B.S. in mechanical engineering from the University of Virginia in Charlottesville, Virginia, in 2017. He also received a Ph.D. in mechanical and aerospace engineering from the University of Virginia in 2021. He was a President's Postdoctoral Fellow in the Daniel Guggenheim School of Aerospace Engineering at the Georgia Institute of Technology in Atlanta under Juergen Rauleder from 2021 to 2023. During his postdoctoral fellowship, he was an instructor for the department's aerodynamics course.

Carter's current research involves understanding near-boundary flight regimes for multirotor vehicles. Near boundary flight has both performance benefits and penalties for a rotorcraft vehicle. His research looks to unlock the underlying aerodynamics to optimize the performance benefits for a vehicle in near-boundary flight. He also is currently investigating aerodynamic interactions of a multirotor, whether between two vehicles or multiple rotors interacting on a single platform. His research is done experimentally using wind tunnels and hover platforms.

## SELECTED PUBLICATIONS

- D. Carter and J. Rauleder, "Multirotor interactional aerodynamics with boundary effects," presented at the AIAA Aviation 2023 Forum, San Diego, CA, USA, June 12-16, 2023, <https://doi.org/10.2514/6.2023-3237>.
- D. Carter, L. Bouchard, and D. Quinn, "Influence of the ground, ceiling, and sidewall on micro quadrotors," *AIAA J.*, vol. 59, no. 4, pp. 1398-1405, 2021.
- S. Gao, C. Di France, D. Carter, D. Quinn, and N. Bezzo, "Exploiting ground and ceiling effects on autonomous UAV motion planning," presented at the 2019 Int. Conf. on Unmanned Aircr. Syst., Atlanta, GA, USA, June 11-14, 2019, doi:10.1109/ICUAS.2019.8798091.





# CHUYI CHEN

DEPARTMENT OF MECHANICAL  
AND AEROSPACE ENGINEERING

Chuyi Chen received her Ph.D. degree in mechanical engineering and materials science at Duke University, and her M.S. and B.S. degrees in acoustics from Nanjing University. Prior to joining NC State, Chen was a postdoctoral fellow in the Koch Institute for Integrative Cancer Research at the Massachusetts Institute of Technology in Cambridge, Massachusetts. She is the recipient of the Ludwig Center Postdoctoral Fellowship. Chen has published over 20 articles in journals such as *Nature Materials*, *Nature Communications*, *Science Advances*, *PNAS*, *ACS Nano* and *Lab on a Chip*. Her research focuses on acoustics, fluid dynamics, micro/nano systems, metamaterials, sensing and imaging with applications in healthcare, biology, materials and manufacturing.

**Assistant  
Professor**

Ph.D. (2021)

Duke  
University

## RESEARCH INTERESTS:

- Acoustics
- Acoustofluidics
- Microfluidics
- Fluid dynamics
- Biomedical micro/  
nano systems
- Imaging
- Sensing

## SELECTED PUBLICATIONS

- S. Yang, et al., "Harmonic acoustics for dynamic and selective particle manipulation," *Nat. Mater.*, vol. 21, no. 5, pp. 540-546, Mar. 2022.
- J. Zhang, et al., "A solution to the biophysical fractionation of extracellular vesicles: Acoustic Nanoscale Separation via Wave-pillar Excitation Resonance (ANSWER)," *Sci. Adv.*, vol. 8, no. 47, Nov. 2022, Art. no. p.eade0640.
- C. Chen, et al., "Acoustofluidic rotational tweezing enables high-speed contactless morphological phenotyping of zebrafish larvae," *Nat. Comm.*, vol. 12, no. 1, pp. 1-13, Feb. 2021.
- Y. Gu, et al., "Acoustofluidic centrifuge for nanoparticle enrichment and separation," *Sci. Adv.*, vol. 7, no. 1, Jan. 2021, Art. no. p.eabc0467.
- C. Chen, et al., "Three-dimensional numerical simulation and experimental investigation of boundary-driven streaming in surface acoustic wave microfluidics," *Lab on a Chip*, vol. 18, no. 23, pp. 3645-3654, Dec. 2018.



# VEERARAGHAVA RAJU HASTI

DEPARTMENT OF MECHANICAL  
AND AEROSPACE ENGINEERING

Veeraraghava Raju Hasti received his M.S. and Ph.D. in mechanical engineering in 2016 and 2019, respectively, from Purdue University in West Lafayette, Indiana. Prior to joining North Carolina State University's faculty, he was a research assistant professor at Purdue. Hasti is serving as vice chair of the Gas Turbine Engines Technical Committee of the American Institute of Aeronautics and Astronautics (AIAA). He is an associate editor of the journal *Frontiers in Aerospace Engineering* and an associate fellow of the American Institute of Aeronautics and Astronautics.

Hasti's research is focused on the development of transformational digital tools and technologies using physics-based and data-driven approaches to enable connected, resilient, reliable, safe and affordable energy and propulsion systems for a sustainable future.

**Assistant  
Research  
Professor**

Ph.D. (2019)

Purdue  
University

## RESEARCH INTERESTS:

- Application of artificial intelligence for automated knowledge discovery, decision-making, real-time health monitoring and prognostics and digital twins
- Immersive visualization and simulation
- Scientific machine learning and reduced-order modeling
- Turbulence, combustion and emissions, sprays and particle laden flows
- Multiscale and multiphysics modeling and simulation
- Computational fluid dynamics and high-performance computing
- Low emission propulsion systems
- Energy systems modeling, multi-criteria analysis and optimization
- Renewable energy and smart energy systems

## SELECTED PUBLICATIONS

- V. R. Hasti and D. Shin, "Denoising and fuel spray droplet detection from light-scattered images using deep learning," *Energy and AI*, vol. 7, 2022, Art. no. 100130.
- V. R. Hasti, A. Navarkar, and J. P. Gore, "A data-driven approach using machine learning for early detection of the lean blowout," *Energy and AI*, vol. 5, 2021, Art. no. 100099.
- V. R. Hasti, P. Kundu, S. Som, S. Hee Won, F. L. Dryer, and J. P. Gore, "Computation of Conventional and Alternative Jet Fuel Sensitivity to Lean Blowout," *J. of the Energy Inst.*, vol. 101, pp. 19-31, 2022.
- V. R. Hasti, P. Kundu, S. Som, and J. P. Gore, "Numerical Simulations and Analysis of the Turbulent Flow Field in a Practical Gas Turbine Engine Combustor," *Proc IMechE Part A: Jour. of Power and Energy*, vol. 236, no. 4, 2021, Art. no. 095765092110632.
- V. R. Hasti, R. P. Lucht, and J. P. Gore, "Large eddy simulation of hydrogen piloted CH<sub>4</sub> / air premixed combustion with CO<sub>2</sub> dilution," *J. of the Energy Inst.*, vol. 93, no. 3, pp. 1099-1109, 2020.



# MOHAMMAD HEIRANIAN

DEPARTMENT OF MECHANICAL  
AND AEROSPACE ENGINEERING

Mohammad “Mosi” Heiranian obtained his B.S. in mechanical engineering from the University of Manitoba in Winnipeg, Canada, and his M.S. and Ph.D. in theoretical and applied mechanics from the University of Illinois Urbana-Champaign. Prior to becoming a faculty member at North Carolina State University, he was a postdoctoral associate in the Department of Chemical and Environmental Engineering at Yale University in New Haven, Connecticut.

Heiranian’s expertise is in using the fundamentals of physics in conjunction with large-scale computer calculations to predict physical, chemical and material properties of systems across different scales from quantum to continuum. His research has focused on developing nanofluidic theories for flow in nanopores by revisiting classical theories of fluid mechanics. His research has led to the discovery of novel materials and design features for water desalination, clean power generation, single-biomolecule detection and disease diagnosis. Recently, his research has focused on understanding ion-selective transport in nanopores to guide the design and development of highly-selective membrane materials for water and energy applications.

## Assistant Professor

Ph.D. (2020)

University of Illinois  
Urbana-Champaign

## RESEARCH INTERESTS:

- Nanofluidics and membrane processes with applications in water security, energy and environment
- Multiscale modeling and machine learning techniques to understand interfacial fluidic behavior for creating advanced technologies at the interface between fluid dynamics and nanoscience

## SELECTED PUBLICATIONS

- M. Heiranian and N. R. Aluru, “Modified Lucas-Washburn theory for fluid filling in nanotubes,” *Phys. Rev. E*, vol. 105, no. 5, Art. no. 055105, May 2022.
- M. Heiranian, R. M. DuChanois, C. L. Ritt, C. Violet, and M. Elimelech, “Molecular simulations to elucidate transport phenomena in polymeric membranes,” *Environ. Sci. & Technol.*, vol. 56, no. 6, pp. 3313-3323, 2022.
- M. Heiranian, A. Taqieddin and N. R. Aluru, “Revisiting Sampson’s theory for hydrodynamic transport in ultrathin nanopores,” *Phys. Rev. Res.*, vol. 2, no. 4, Art. no. 043153, 2020.
- M. Heiranian and N. R. Aluru, “Nanofluidic transport theory with enhancement factors approaching one,” *ACS Nano*, vol. 14, no. 1, pp. 272-281, 2020.
- M. Heiranian, A. Barati Farimani, and N. R. Aluru, “Water desalination with a single-layer MoS<sub>2</sub> nanopore,” *Nature Communications*, vol. 6, Art. no. 8616, 2015.



# DONGGUN LEE

DEPARTMENT OF MECHANICAL  
AND AEROSPACE ENGINEERING

Donggun Lee received his B.S. and M.S. in mechanical engineering from the Korea Advanced Institute in Science and Technology in Daejeon, South Korea. He received his Ph.D. in mechanical engineering from the University of California, Berkeley. Prior to joining the North Carolina State University faculty, he was a postdoctoral associate at the Massachusetts Institute of Technology in Boston.

Lee’s research field is control, robotics and machine learning. He focuses on developing theoretical frameworks for safety-critical systems and transferring these techniques to the real world. His research bridges control, game theory and machine learning to develop general control frameworks that simultaneously achieve safety, optimal performance and computational efficiency. His methods have been applied to various applications, including autonomous driving, aerial vehicles, robot navigation and battery charging.

## Assistant Professor

Ph.D. (2022)

University of California,  
Berkeley

## RESEARCH INTERESTS:

- Control frameworks to combine optimal control, game theory and machine learning for safety-critical applications, including autonomous driving, aerial and ground vehicles, power systems and battery charging
- Computationally efficient control schemes
- Hardware-software codesign

## SELECTED PUBLICATIONS

- D. Lee, S. Deka, and C. J. Tomlin, “Convexifying state-constrained optimal control problems,” *IEEE Trans. on Autom. Control*, 2023, doi: 10.1109/TAC.2022.3221704.
- D. Lee and C. J. Tomlin, “Efficient computation of state-constrained reachability problems using Hopf-Lax formulae,” *IEEE Trans. on Autom. Control*, 2023, doi: 10.1109/TAC.2023.3241180.
- H. Seo, D. Lee, C. Y. Son, I. Jang, C. J. Tomlin, and H. J. Kim, “Real-time robust receding horizon planning using Hamilton-Jacobi reachability analysis,” *IEEE Trans. on Robot.*, vol. 39, no. 1, pp. 90-109, Feb. 2023, doi: 10.1109/TRO.2022.3187291.
- S. A. Deka, D. Lee, and C. J. Tomlin, “Towards cyber-physical systems robust to communication delays: a differential game approach,” *IEEE Control Syst. Lett.*, vol. 6, pp. 2042-2047, 2022, doi: 10.1109/LCSYS.2021.3135746.
- D. Lee and C. J. Tomlin, “A Hopf-Lax formula in Hamilton-Jacobi analysis for reach-avoid problems,” *IEEE Control Syst. Lett.*, vol. 5, no. 3, pp. 1055-1060, July 2021, doi: 10.1109/LCSYS.2020.3009933.



# LIMING XIONG

DEPARTMENT OF MECHANICAL  
AND AEROSPACE ENGINEERING

Liming Xiong received his B.Sc. degree in 2001 and M.Sc. degree in 2004 in engineering mechanics and solid mechanics from Dalian University of Technology and Huazhong University of Science & Technology in Dalian, China. He also earned a M.Sc. degree in 2006 in materials science from George Washington University in Washington, D.C., and then a Ph.D. in 2011 in mechanical and aerospace engineering from the University of Florida in Gainesville, Florida. Prior to joining North Carolina State University in 2023, he worked from 2014 to 2022 as an assistant and then a tenured associate professor at Iowa State University in Ames, Iowa.

Xiong is interested in a fusion of atomistic and multiscale computational mechanics with the physics/chemistry of materials in their manufacturing, characterization, testing and applications. He focuses on the development of massively parallelized computational tools that can predict the mechanical, thermal and mass transport behavior in a variety of engineering materials such as metals, alloys, ceramics, polymers and composites when exposed to extreme stresses, temperature, irradiation, corrosion and even a combination of them.

## Associate Professor

Ph.D. (2011)

University  
of Florida

## RESEARCH INTERESTS:

- Atomistic-to-macroscale modeling of materials and its fusion with material physics / chemistry
- Multiscale simulations of mechanical, thermal and mass transport in materials under multi-physical stimuli
- Data-driven manufacturing, characterizing, testing, and design of advanced alloys, ceramics and composites
- Dislocation, twinning, phase transformation, damage, and fracture in metals, semiconductors, oxides, ices, etc.



# MARY ZADEH

DEPARTMENT OF MECHANICAL  
AND AEROSPACE ENGINEERING

Mary Zadeh is an assistant teaching professor in the Department of Mechanical and Aerospace Engineering at North Carolina State University. She earned her Ph.D. in mechanical engineering from Michigan Tech University in Houghton, Michigan.

Prior to joining NC State, she was an assistant teaching professor in the Department of Mechanical Engineering-Engineering Mechanics at Michigan Tech University where she was recognized as the 2021-22 Teacher of the Year Finalist.

Zadeh's specialties include optical and laser-based diagnostics, image processing methodologies, thermodynamic modeling and spark ignition characterization.

## Assistant Teaching Professor

Ph.D. (2020)

Michigan Tech  
University

## RESEARCH INTERESTS:

- Combustion
- Alternative fuel sources
- Hybrid and plug-in hybrid electric vehicles
- Big data
- Machine learning

## SELECTED PUBLICATIONS

- M. Zadeh, H. Schmidt, S. Lee, and J. Naber, "Probing Spark Discharge Behavior in High-speed Cross-flows through Modeling and Experimentation," *SAE Int.*, 2020, <https://doi.org/10.4271/2020-01-1120>.
- M. Zadeh, H. Schmidt, W. Atkinson, and J. Naber, "Spark Mechanism in High Speed Flow," *SAE Int.*, 2019, <https://doi.org/10.4271/2019-01-0729>.





# ZEINAB ALSMADI

DEPARTMENT OF NUCLEAR ENGINEERING

Zeinab Alsmadi earned her B.Sc. in nuclear engineering from Jordan University of Science and Technology in Irbid, Jordan, in 2016, master of materials science and engineering (MMSE) from North Carolina State University in 2020 and Ph.D. in nuclear engineering from NC State in 2020. She held a postdoctoral research scholar position in the Department of Nuclear Engineering at NC State from 2020 to 2023. She has extensive expertise and several publications in the fields of nuclear materials science, radiation shielding and corrosion science.

Alsmadi's research focuses on understanding the relationship between microstructure, processing, mechanical properties and functionality of materials for nuclear energy systems, and on the assessment of shielding and corrosion properties of single-layered and multi-layered coating barriers on the inner canister of spent nuclear fuel waste storage such as dry casks. It also focuses on the assessment of different stainless-steel alloys as candidate canister materials as well as candidate structural materials for other nuclear systems, to enhance their radiation shielding efficiency and corrosion resistance.

Alsmadi teaches undergraduate and graduate courses in the areas of introduction to nuclear energy, laboratory projects in nuclear engineering, particle material interaction and nuclear waste technology.

## SELECTED PUBLICATIONS

- Z. Y. Alsmadi and M. A. Bourham, "Shielding and corrosion properties of the Alloy 709 as canister material for spent nuclear fuel dry casks," *Defense Technol.*, vol. 21, pp. 116-124, March 2023, <https://doi.org/10.1016/j.dt.2022.08.002>.
- Z. Y. Alsmadi, H. Aboueilla, A. S. Alomari, and K. L. Murty, "Stress-controlled creep-fatigue of an advanced austenitic stainless steel at elevated temperatures," *Mater.*, vol. 15, 2022, Art. no. 3984, <https://doi.org/10.3390/ma15113984>.
- Z. Y. Alsmadi and M. A. Bourham, "An assessment of protective coating dry cask canisters with structurally amorphous metals (SAMs) for enhanced radiation shielding," *Nucl. Eng. and Des.*, vol. 388, 2022, Art. no. 111647, <https://doi.org/10.1016/j.nucengdes.2022.111647>.
- Z. Y. Alsmadi and K.L. Murty, "High-temperature effects on creep-fatigue interaction of the Alloy 709 austenitic stainless steel," *Int. J. of Fatigue*, vol. 143, 2021, Art. no. 105987, <https://doi.org/10.1016/j.ijfatigue.2020.105987>.
- Z. Y. Alsmadi, A. Alomari, N. Kumar, and K.L. Murty, "Effect of hold time on high temperature creep-fatigue behavior of Fe-25Ni-20Cr (wt.%) austenitic stainless steel (Alloy 709)," *Mater. Sci. and Eng.: A*, vol. 771, 2020, Art. no. 138591, <https://doi.org/10.1016/j.msea.2019.138591>.

## Assistant Teaching Professor

Ph.D. (2020)

North Carolina State University

## RESEARCH INTERESTS:

- Nuclear material science
- Radiation shielding
- Corrosion science
- Nuclear waste management



# WEN JIANG

DEPARTMENT OF NUCLEAR ENGINEERING

Wen Jiang received his B.S. and M.S. in aeronautic science and engineering from the Beijing University of Aeronautics and Astronautics in Beijing, China. He received his Ph.D. in mechanical engineering and materials science from Duke University in Durham, North Carolina. He was a postdoctoral researcher in the Fuels Modeling and Simulation Department at Idaho National Laboratory. Prior to joining the North Carolina State University faculty, he was a computational scientist in the Computational Mechanics and Materials Department at the Idaho National Laboratory.

Jiang works on computational method development for nuclear material modeling and multi-physics simulation. He is a key developer for the BISON nuclear fuel simulation code, which won the R&D 100 Award in 2022, and he leads the development of open-source multi-scale additive manufacturing simulation code in the MOOSE Application Library for Advanced Manufacturing Utilities. In addition, he is actively contributing to the open-source MOOSE simulation framework, structural component aging simulation codes Grizzly and mesoscale microstructural evolution simulation code MARMOT. He currently leads the development of multi-scale TRi-structural ISOtropic (TRISO) particle fuels modeling for the Department of Energy's (DOE) Nuclear Energy Advanced Modeling and Simulation program. He is also involved in DOE's Advanced Gas Reactor (AGR) Fuel Development and Qualification Program where he performs TRISO fuel performance calculations with BISON in support of analysis of the AGR irradiation tests. He is fully engaged with nuclear reactor companies, including BWXT, Westinghouse, Kairos Power, USNC and Radiant, in support of their TRISO fuel qualification and licensing for commercialization.

## SELECTED PUBLICATIONS

- W. Jiang, J. Hales, B. W. Spencer, and B. P. Collin, "TRISO particle fuel performance and failure analysis with BISON," *J. Nucl. Mater.*, vol. 548, May 2021, p. 152795.
- W. Jiang, B. W. Spencer, and J. E. Dolbow, "Ceramic nuclear fuel fracture modeling with the extended finite element method," *Eng. Fract. Mech.*, vol. 223, an. 2020, p. 106713.
- W. Jiang, C. Annavarapu, J. E. Dolbow, and I. Harari, "A robust Nitsche's formulation for interface problems with spline-based finite elements," *Int. J. Numer. Methods Eng.*, vol. 104, no. 7, Nov. 2015, pp. 676-96.
- W. Jiang, T. Hu, L. K. Aagesen, and Y. Zhang, "Three-dimensional phase-field modeling of porosity dependent intergranular fracture in UO<sub>2</sub>," *Comput. Mater. Sci.*, vol. 171, Jan. 2020, p. 109269.
- W. Jiang and T. Kim, "Spline-based finite-element method for the stationary quasi-geostrophic equations on arbitrary shaped coastal boundaries," *Comput. Methods Appl. Mech. Eng.*, vol. 299, Feb. 2016, pp. 144-60.

## Assistant Professor

Ph.D. (2015)

Duke University

## RESEARCH INTERESTS:

- Nuclear fuel performance modeling
- Numerical methods for evolving interfaces
- Multiscale and multiphysics modeling
- Advanced manufacturing modeling
- Computational mechanics
- Structural component aging modeling
- Statistical failure analysis





# LISA MARSHALL

DEPARTMENT OF NUCLEAR ENGINEERING

Lisa Marshall holds an undergraduate degree in interdisciplinary studies from Carleton University in Ottawa, Canada; a graduate certificate in geographic information systems (GIS) from North Carolina State University; a master's degree in geography from the University of North Carolina at Chapel Hill; completed the graduate certificate in engineering education; and is completing a doctoral degree in higher education (engineering focus) from NC State University. She is the inaugural director of outreach, retention and engagement in the Department of Nuclear Engineering at NC State from 2001 to present. She is also the inaugural Assistant Extension Professor within the College of Engineering and among national nuclear engineering programs. She has extensive experience in engineering education; energy geography; GIS; diversity, equity and inclusion in STEM; and academic affairs.

Marshall's research focuses on nuclear engineering education for pre-college, college student success, co-curricular engineering education, diversity and inclusion in engineering education and engagement scholarship. She is the current vice president/president-elect for the American Nuclear Society, co-principal investigator on a U.S. Department of Energy-funded Consortium for Consent-based Siting of Interim Storage, and a member of several OECD Nuclear Energy Agency (NEA) Global Forum Working Groups. She previously served as the educational outreach director for the U.S. Department of Energy National Nuclear Security Administration (NNSA)-funded Consortium for Nonproliferation Enabling Capabilities, and past Justice, Equity, Diversity and Inclusion (JEDI) committee co-chair for the American Association of Geographers.

Marshall teaches introductory engineering undergraduate courses, as well as an upper level course in energy geographies.

## SELECTED PUBLICATIONS

- L. Bottomley, et al., "Developing sustainable, mutually collaborative, global partnerships," presented at the WEEF-GEDC 2021, Madrid, Spain, Nov. 15-18, 2021.
- American Association of Geographers 3-Year Justice, Equity, Diversity & Inclusion Strategic Plan*, American Association of Geographers, Washington, D.C., USA, 2021, pp. 1-8.
- L. Marshall, "Geographies of Energy – a course in socio-technical decision making," *Nucl. Technol.*, vol. 207, no. 9, July 2021.
- L. Marshall, "Geography & nuclear technology," *Amer. Nucl. Soc. Nucl. News*, vol. 63, no. 10, Sept. 2021.
- L. Marshall, et al., "Thought leaders on capacity factors and nuclear power," *Amer. Nucl. Soc. Nucl. News*, vol. 63, no. 6, May 2020.

## Assistant Extension Professor

Ph.D. (2025)

North Carolina State University

## RESEARCH INTERESTS:

- Nuclear engineering education
- Energy studies
- Engagement scholarship
- JEDI in engineering



# AMANDA MILLS

DEPARTMENT OF TEXTILE ENGINEERING, CHEMISTRY AND SCIENCE

Amanda Mills received her B.S. in mechanical engineering from Mississippi State University in Starkville, Mississippi. She received her M.S. and Ph.D. in mechanical engineering from North Carolina State University. Afterwards, she served as an industry project manager for the NEXT Research Lab at NC State. Mills joined the NC State Textile Engineering / Textile Technology Senior Design program as a program manager before transitioning to her current, co-director role. Most recently, she was a research assistant professor of textile engineering and textile technology in the Department of Textile Engineering, Chemistry and Science.

Presently, she studies and develops innovative methods for electronics integration into textiles with the SHIFT lab. She creates full-system demonstration platforms to examine the impact of the textile structure and material on device performance and vice versa. She works to develop novel all-textile sensors and actuators for physiological monitoring, acoustic recording and thermal actuation among other applications. Other research activities include fabric simulation and modeling for digital design and virtual reality implementation.

## Assistant Professor

Ph.D. (2017)

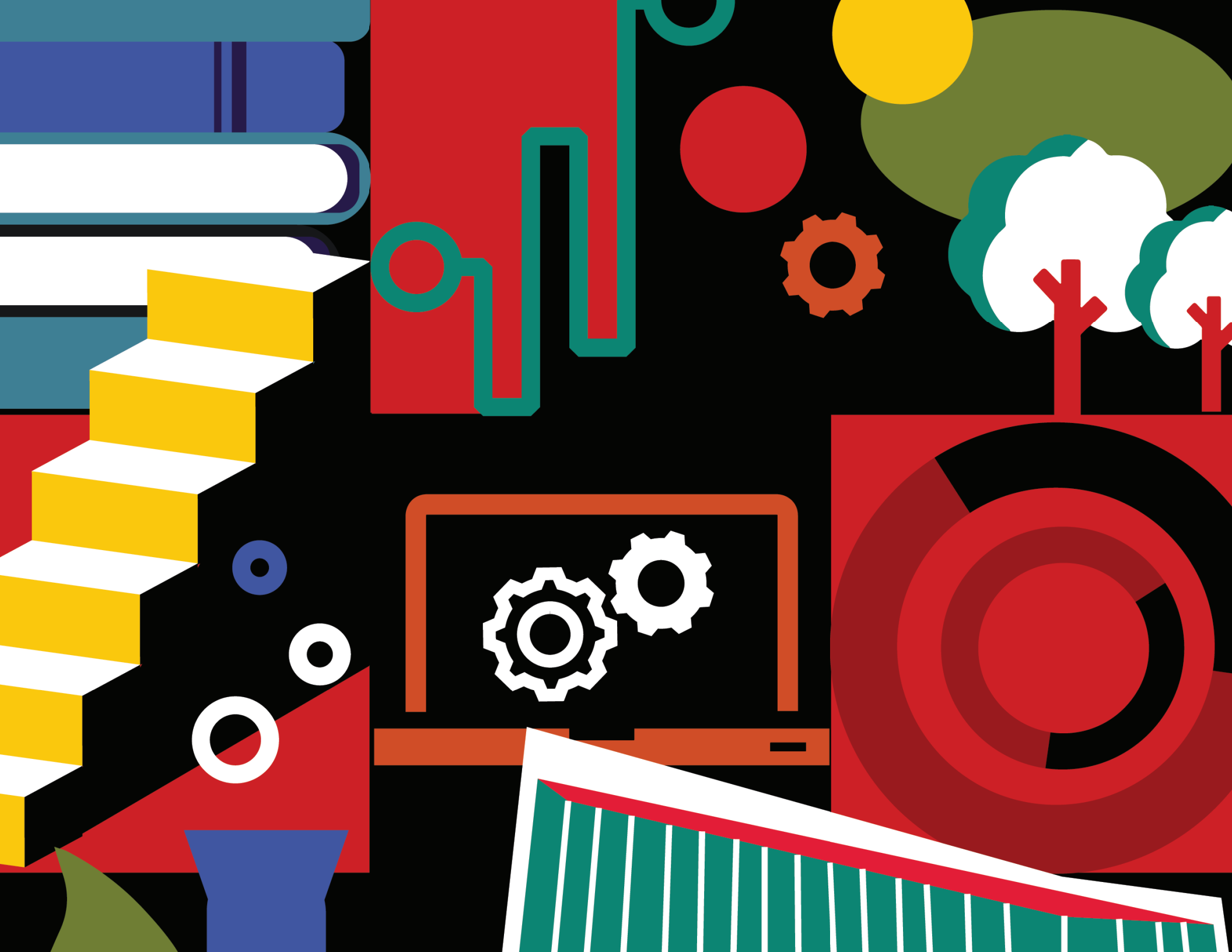
North Carolina State University

## RESEARCH INTERESTS:

- Textile system design
- Conductive yarns
- In-fiber devices
- Manufacturing smart textile systems
- Ink-jet printing

## SELECTED PUBLICATIONS

- Y Zhou, F Mohaddes, C Lee, S Rao, AC Mills, AC Curry, B Lee, V Misra. 2022. A Wearable Electrocardiography Armband Resilient Against Artifacts. *IEEE Sensors Journal* 22(19): 18970 – 18977.
- ZB Rosenberg, CG Knowles, AC Mills, JS Jur. 2022. *Design Strategies for E-Textiles. In Smart Clothes and Wearable Technology 2nd Edition*. Elsevier. 485 – 505.
- C Knowles, A Mills, Y Shen, J Jur. 2022. Virtual Hands-on Learning – The Development of an Online Engineering Design Course with a Virtual Product Inspection Portal. ASEE Annual Conference & Exposition.
- B Ju, I Kim, BM Li, CG Knowles, A Mills, L Grace, JS Jur. 2021. Inkjet Printed Textile Force Sensitive Resistors for Wearable and Healthcare Devices. *Advanced Healthcare Materials* 10 (20): 2100893.
- A Myers, R Hodges, JS Jur. 2017. Human and Environmental Analysis of Wearable Thermal Energy Harvesting. *Energy Conversion and Management* 143: 218 – 226.





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