WATSON COLLEGE
RESEARCH PORTFOLIO

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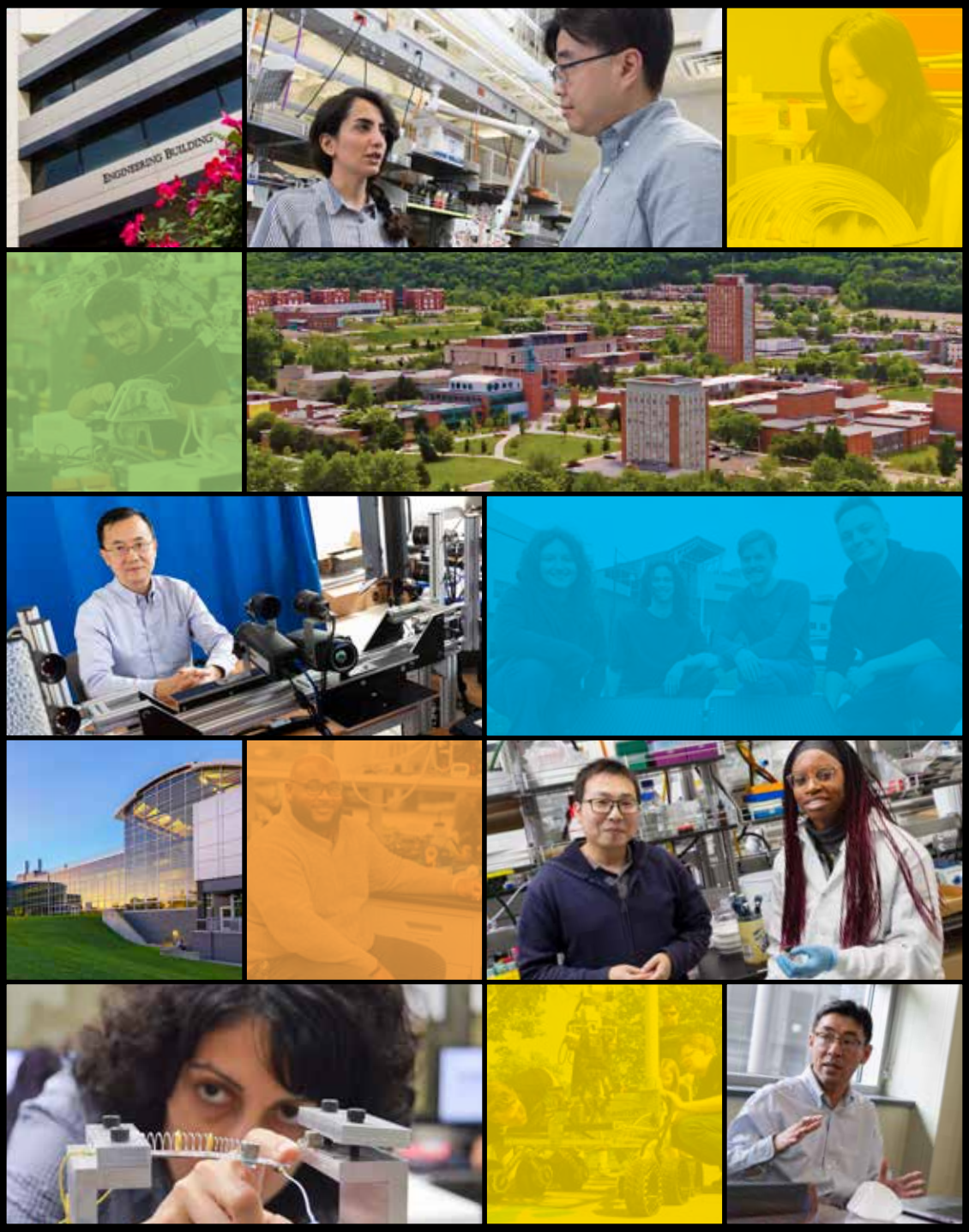
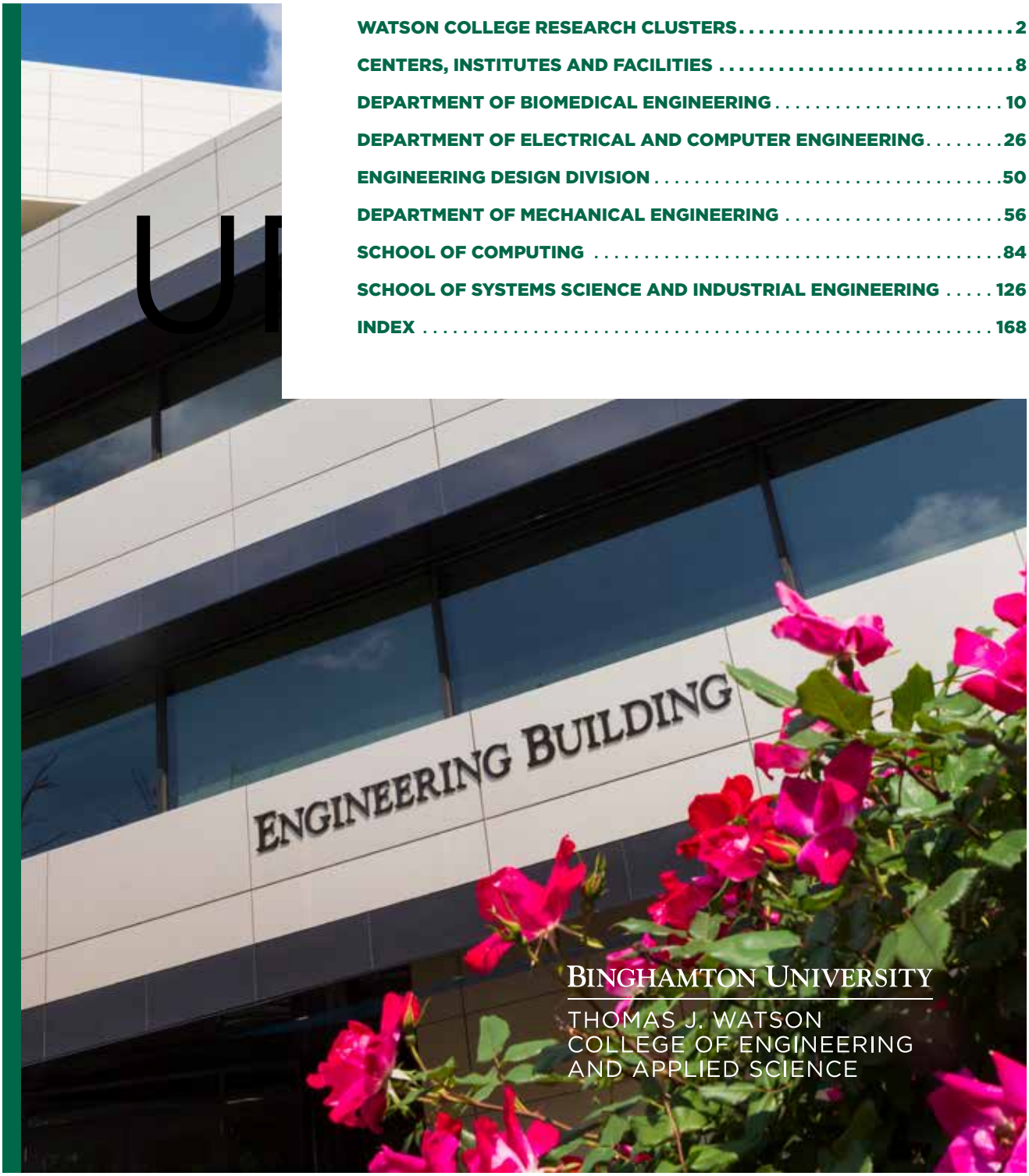


BINGHAMTON UNIVERSITY
STATE UNIVERSITY OF NEW YORK

THOMAS J. WATSON COLLEGE OF ENGINEERING AND APPLIED SCIENCE

Contents



BINGHAMTON UNIVERSITY

THOMAS J. WATSON
COLLEGE OF ENGINEERING
AND APPLIED SCIENCE

Dear colleagues,

At the Thomas J. Watson College of Engineering and Applied Science, research is not just a pursuit — it is a driving force that shapes the future. Every day, our faculty and students engage in pioneering work that advances the frontiers of science and technology, addressing some of the most complex and urgent challenges of our time.

Binghamton University is proud to be a Carnegie R1 research institution, home to world-class scholars across disciplines of vital societal importance. Among our distinguished faculty is Nobel Laureate Sir M. Stanley Whittingham, whose groundbreaking work on lithium-ion battery technology has transformed the global energy landscape.

Watson College has experienced remarkable growth in its research enterprise over the past decade, as reflected in our steadily increasing research funding. Our portfolio is supported by a broad array of sponsors — including the National Science Foundation, National Institutes of Health, Department of Defense, U.S. Naval Research Laboratory, and a range of industry partners and nonprofit organizations — underscoring the confidence placed in our expertise and innovation.

To amplify our impact and foster interdisciplinary collaboration, we have strategically organized our research around four key clusters:

- Energy, Climate and Sustainability
- Healthcare and Biotechnologies
- Microelectronics, Manufacturing and Materials
- Intelligent and Secure Systems

These clusters bring together diverse perspectives and talents, enabling us to develop bold, integrative solutions to the pressing global issues of today and tomorrow.

Our faculty are known for their collaborative spirit and commitment to partnership. As you explore this portfolio, we invite you to consider opportunities for synergy with your organization. We welcome the chance to collaborate and create a meaningful impact together.

Sincerely,

Atul Kelkar

Dean, Thomas J. Watson College of Engineering and Applied Science
Binghamton University – State University of New York

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Watson College Research Clusters

M3
MICROELECTRONICS, MANUFACTURING AND MATERIALS CLUSTER

- Advanced manufacturing
- Advanced materials
- Mechanics of materials
- Microelectronics
- Electronics packaging
- Semiconductors
- Smart sensors for IoT, smart cities, batteries, wearables etc.
- Biomaterials and biosensors

ISS
INTELLIGENT AND SECURE SYSTEMS CLUSTER

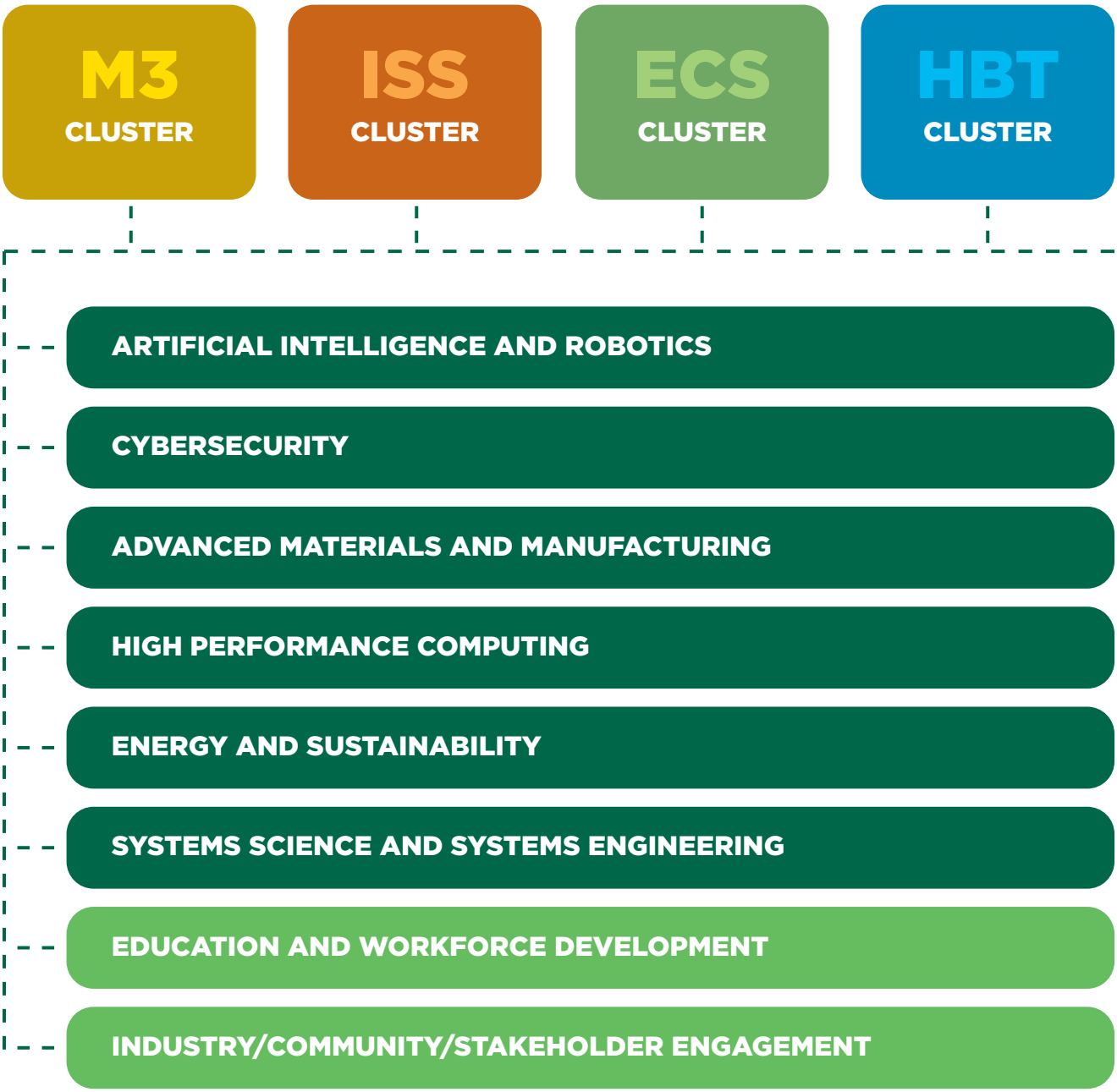
- Trustworthy AI, machine learning
- Cybersecurity, privacy, information assurance
- Computer vision and graphics
- Computer architecture and systems
- Robotics, autonomous systems and human-computer interaction
- Systems science, data science, social media, social networks
- Cloud computing, high-performance computing, quantum computing
- Networking, signal processing, mobile, quantum networking

ECS
ENERGY, CLIMATE AND SUSTAINABILITY CLUSTER

- Clean energy and solar
- Energy storage systems and management
- Energy storage materials
- Power systems and grids
- Electrification of transportation
- Climate, environment and sustainability

HBT
HEALTHCARE AND BIOTECHNOLOGIES CLUSTER

- AI in healthcare and biotechnology
- Biomedical engineering
- Biomanufacturing
- Biosecurity
- Healthcare systems
- Health sciences
- Smart and connected health


M3
CLUSTER
ISS
CLUSTER
ECS
CLUSTER
HBT
CLUSTER
ARTIFICIAL INTELLIGENCE AND ROBOTICS
CYBERSECURITY
ADVANCED MATERIALS AND MANUFACTURING
HIGH PERFORMANCE COMPUTING
ENERGY AND SUSTAINABILITY
SYSTEMS SCIENCE AND SYSTEMS ENGINEERING
EDUCATION AND WORKFORCE DEVELOPMENT
INDUSTRY/COMMUNITY/STAKEHOLDER ENGAGEMENT

	M3 CLUSTER			ISS CLUSTER			HBT CLUSTER		ECS CLUSTER	
	Advanced Manufacturing	Advanced Materials, Mechanics of Materials	Semiconductors, Microelectronics, Electronics Packaging	Artificial Intelligence, Data Science, Systems Science, Social Media, Social Networks	Computer Systems, Theory, Communication, Cybersecurity, Privacy, Cloud, HPC	Robotics, Autonomous Systems, Human-Computer Interaction	Biotechnology and Bioengineering	Smart Health, Healthcare Systems, Health Sciences	Clean Energy, Energy Storage and Management, Power Systems, Power Electronics	Climate and Sustainability
DEPARTMENT OF BIOMEDICAL ENGINEERING										
Guy German	●	●					●	●		
Tracy Hookway	●	●					●	●		
Sha Jin	●						●	●		●
Ahyeon Koh		●					●	●		
Yizeng Li							●			
Fake Lu				●			●	●		
Gretchen Mahler, Interim Chair							●	●		
Siyuan Rao		●	●				●	●		
Daniel S. Reynolds	●	●					●	●		
Yuan Wan		●					●			
Ying Wang		●					●			
Qianbin Wang		●					●	●		
Kaiming Ye							●			

	M3 CLUSTER			ISS CLUSTER			HBT CLUSTER		ECS CLUSTER	
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING										
Emrah Akyol				●					●	
Indranil Bhattacharya, Chair		●	●	●					●	
Yu Chen				●	●			●		
Seokheun Choi	●	●	●	●		●	●	●	●	●
Scott Craver					●					
Pritam Das									●	
Tara Dhakal	●	●	●						●	
Anwar Elhadad								●	●	
Jessica Fridrich				●	●					
David Klotzkin			●					●	●	
Xiaohua Li				●	●					
Yukui Luo				●	●	●		●		
Zixiao Ma				●		●			●	
Vladimir Nikulin					●				●	
Jungwook Paek							●	●		
Ramesh Pokharel			●		●			●		
Douglas Summerville			●		●					
Jianming Wen		●			●					
N. Eva Wu					●	●			●	
Ziang Zhang									●	
Wenfeng Zhao			●	●	●		●			
Ning Zhou					●				●	

	M3 CLUSTER			ISS CLUSTER			HBT CLUSTER		ECS CLUSTER	
	Advanced Manufacturing	Advanced Materials, Mechanics of Materials	Semiconductors, Microelectronics, Electronics Packaging	Artificial Intelligence, Data Science, Systems Science, Social Media, Social Networks	Computer Systems, Theory, Communication, Cybersecurity, Privacy, Cloud, HPC	Robotics, Autonomous Systems, Human-Computer Interaction	Biotechnology and Bioengineering	Smart Health, Healthcare Systems, Health Sciences	Clean Energy, Energy Storage and Management, Power Systems, Power Electronics	Climate and Sustainability
ENGINEERING DESIGN DIVISION										
Sidi Deng				●					●	●
Koenraad Gieskes				●						
Melissa Simonik							●	●		

	M3 CLUSTER			ISS CLUSTER			HBT CLUSTER		ECS CLUSTER	
DEPARTMENT OF MECHANICAL ENGINEERING										
Paul Chiarot, Chair	●		●				●			
Junghyun Cho	●	●	●							●
Cosan Daskiran					●				●	●
Yuyang Gu		●		●	●		●	●		
Pong-Yu Huang							●	●		
Changhong Ke	●	●	●							
Atul Kelkar	●	●							●	●
Hyuna Kwon		●			●					
Dehao Liu	●	●		●						
Ronald Miles								●		
Bruce Murray			●				●		●	
Seungbae Park	●		●							
James Pitarresi				●						
Mir Jalil Razavi Aghjeh		●		●				●		
Bahgat Sammakia			●	●	●			●	●	●
Scott Schiffres	●	●	●		●				●	●
Timothy Singler	●								●	
Jifu Tan	●	●		●	●		●			
Shahrzad Towfighian			●				●	●	●	
Robert Wagner	●	●		●			●	●		
Mohammad Younis			●					●		
Kaiyan Yu	●		●	●		●				
Pu Zhang	●	●		●						
Jingzhou Zhao	●	●	●	●	●	●			●	●
Guangwen Zhou	●	●							●	
Jian Zhou		●	●					●		

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SCHOOL OF SYSTEMS SCIENCE AND INDUSTRIAL ENGINEERING										
Ankit Bansal								●		
Peter Borgesen			●							
Sreenath Chalil Madathil				●				●		
Changqing Cheng				●				●		●
Sung Chung				●						●
Jia Deng	●	●	●							●
Safa ElKefi				●				●		
Zeynep Ertem				●				●		
Carlos Gershenson-Garcia				●				●		
Christopher M Greene						●				
Saad Hamasha	●		●							
Kimberly Harry								●		
Mohammad Khasawneh, Director				●				●		
Sara Kohtz				●					●	
Sadamori Kojaku				●						
Sarah Lam				●				●		
Shuxia Lu				●				●	●	
Xiaotu Ma	●	●							●	●
Jennifer Gillis Mattson								●		
Nagendra Nagarur	●		●	●						
Fuda Ning	●	●								
Mina Ostovari				●				●		
Neha Patankar				●					●	●
Mark Poliks	●	●	●				●	●	●	
Srikanth Rangarajan		●	●	●						●
Luis Rocha				●				●		
Narmada Sambaturu				●				●		
Daryl Santos	●		●							
Hiroki Sayama				●		●		●		
Chao Shi				●		●		●		
Krishnaswami Srihari	●		●					●		
Seiichi Takamatsu	●	●	●			●		●		
Stephanie Tulk Jesso				●		●		●		
Yong Wang	●			●		●		●	●	●
Yuxin Wang									●	●
Zimo Wang	●	●	●	●	●	●		●		●
Daehan Won	●			●				●		
Congyu Wu				●		●		●		
Sangwon Yoon	●		●	●				●		
Yingge Zhou	●						●			

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SCHOOL OF COMPUTING										
Eric Atkinson					●					
Jeremy Blackburn				●	●					
Jayson Boubin				●	●	●				
Pei-hung Chen				●						
Kenneth Chiu		●		●	●		●		●	
Weiying Dai				●				●		
Zeyu Ding				●	●					
Kanad Ghose	●		●		●				●	●
Kartik Gopalan					●					
Nancy Guo				●			●	●		
Madhusudhan Govindaraju					●					
William Hallahan				●						
Dali Ismail					●			●		
Yincheng Jin				●		●		●		
Kyoung-Don Kang				●	●	●				
Leslie Lander					●					
Michael Lewis					●					
Yu David Liu					●	●			●	●
Guoyu Lu				●	●	●				
Patrick Madden	●		●		●					
Weiyi Meng				●						
Nitish Kumar Panigrahy					●					
Dmitry Ponomarev, Interim Director					●					
Aravind Prakash				●	●					
Adnan Siraj Rakin				●	●					
Monika Roznere				●		●				
Seunghee Shin					●					
Sujoy Sikdar				●	●	●				
Kuang-Ching Wang				●	●	●		●		
Zhaohan Xi				●	●					
Zhen Xie				●	●					
Guanhua Yan				●	●					
Ping Yang		●			●					
Lijun Yin				●				●		
Yiming Zeng					●					
Shiqi Zhang				●		●				
Yifan Zhang					●					
Yingxue Zhang				●						
Zhongfei Zhang				●				●		
Kaicheng Yang				●	●					

Centers, Institutes and Facilities

Federally designated centers

Center for Energy-Smart Electronic Systems (ES2)
A NATIONAL SCIENCE FOUNDATION INDUSTRY/UNIVERSITY COOPERATIVE RESEARCH CENTER
Director: Kanad Ghose

New York Node of the Next Flex Flexible Hybrid Electronics Manufacturing Institute
A DEPARTMENT OF DEFENSE MANUFACTURING INNOVATION INSTITUTE
Director: Mark Poliks

New Energy New York
AN ECONOMIC DEVELOPMENT ADMINISTRATION BUILD BACK BETTER REGIONAL CHALLENGE AWARDEE AND A REGIONAL TECH HUB DESIGNEE
Leadership: M. Stanley Whittingham (2019 Nobel Laureate in Chemistry)

Small Scale Systems Integration and Packaging (S3IP)

Small Scale Systems Integration and Packaging
NEW YORK STATE CENTER OF EXCELLENCE AT BINGHAMTON UNIVERSITY
Director: Bahgat Sammakia

Center for Advanced Microelectronics Manufacturing (CAMM)
Director: Mark Poliks

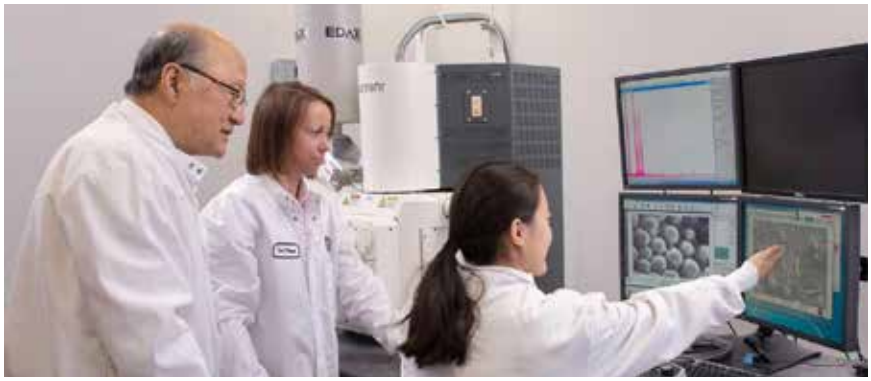
Center for Autonomous Solar Power (CASP)
Director: Tara P. Dhakal

Center for Energy-Smart Electronic Systems (ES2)
A NATIONAL SCIENCE FOUNDATION INDUSTRY/UNIVERSITY COOPERATIVE RESEARCH CENTER (NSF IUCRC)
Director: Kanad Ghose

Center for Heterogeneous Integration Research in Packaging (CHIRP)
A SEMICONDUCTOR RESEARCH CORPORATION (SRC) DESIGNATED CENTER
Director: Bahgat Sammakia

Integrated Electronics Engineering Center (IEEC)
Director: Seungbae Park

NorthEast Center for Chemical Energy Storage (NECCES)
Director: M. Stanley Whittingham (2019 Nobel Laureate in Chemistry)



Organized Research Centers and Institutes

Center of Biomanufacturing for Regenerative Medicine (CBRM)
Director: Kaiming Ye

Binghamton Center of Complex Systems (CoCo)
Director: Hiroki Sayama

Binghamton Institute for AI and Society
Director: Jeremy Blackburn

Center for Healthcare Systems Engineering (CHSE)
Director: Mohammad Khasawneh

Center for Information Assurance and Cybersecurity (CIAC)
Director: Ping Yang

Center for Imaging, Acoustics and Perception Science (CIAPS)
Director: Lijun Yin

Center for Research in Advanced Sensor Technologies and Environmental Sustainability (CREATES)
Director: Seokheun (Sean) Choi

Watson Institute for Systems Excellence (WISE)
Director: Mohammad Khasawneh

Analytical and Diagnostics Laboratory (ADL)

The Analytical and Diagnostics Laboratory (ADL) — a major initiative under S3IP, a New York State Center of Excellence — is a collection of centralized, interdisciplinary user laboratories open 24/7. These facilities were created to provide easy, affordable access to advanced instrumentation and technical support for Binghamton University researchers and users from external academic institutions and organizations, both non- and for-profit.

The cutting-edge research performed within ADL-managed facilities is enabled by our wide array of world-class, high-tech, scientific instrumentation capable of performing failure analyses of devices, advanced materials characterization, life-science research and so much more.

Our instrumentation is overseen by dedicated ADL scientists and engineers who provide equipment training, maintenance, operator services and consultation to all of our academic and industry users. ADL staff are available for advice in all aspects of research, ranging from sample preparation to measurement and data analysis.

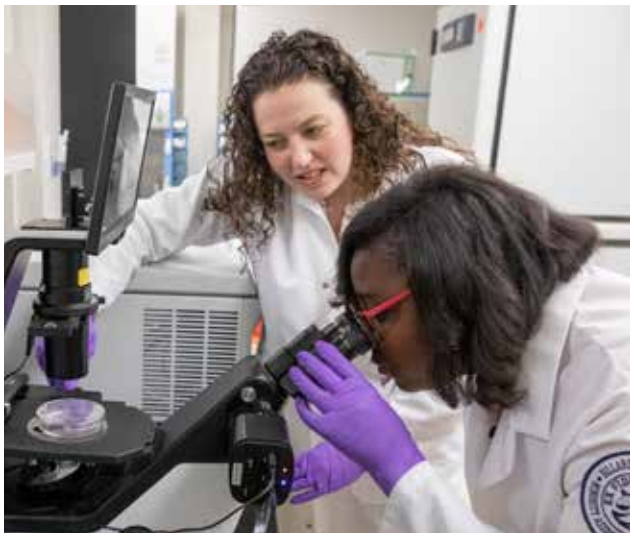
Materials Science Core Facility
Our general purpose, materials science laboratory equipped with a wide range of instrumentation for device and materials characterization.

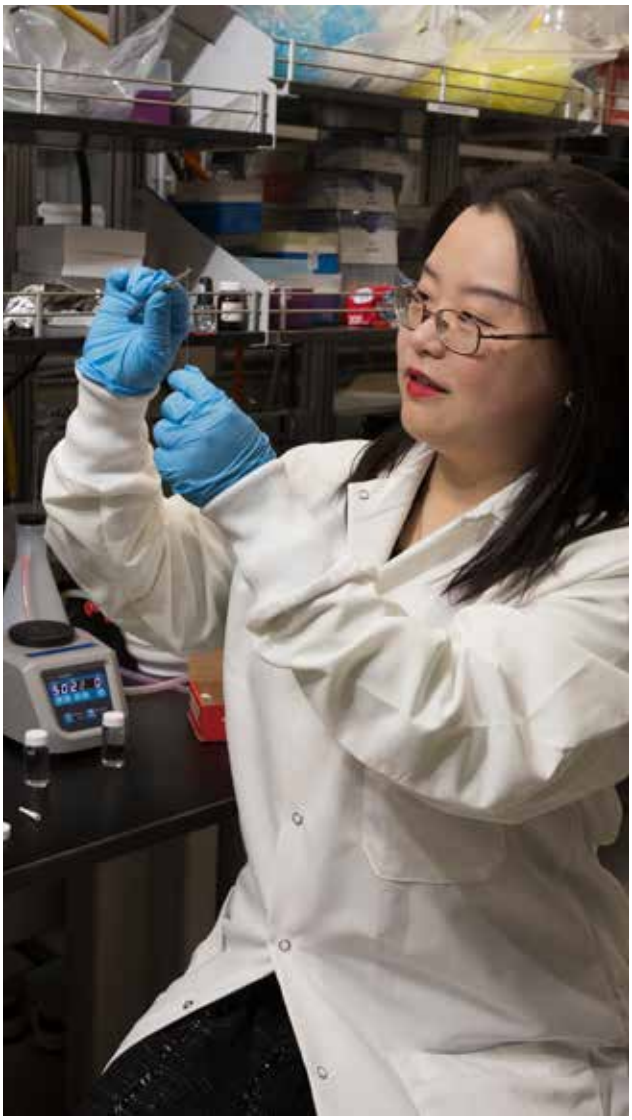
Health Sciences Core Facility
Our new health sciences laboratory with state-of-the-art instrumentation geared towards biological and medical research and development.

Surface Science Core Facility
Our new surface science laboratory focused on advanced, non-destructive characterization of nano-scale materials, surfaces, interfaces and devices.

Learn more at www.binghamton.edu/research/division-offices/strategic-research-initiatives/centers.html →

Department of Biomedical Engineering





Guy K. German

ASSOCIATE PROFESSOR, DIRECTOR OF GRADUATE STUDIES

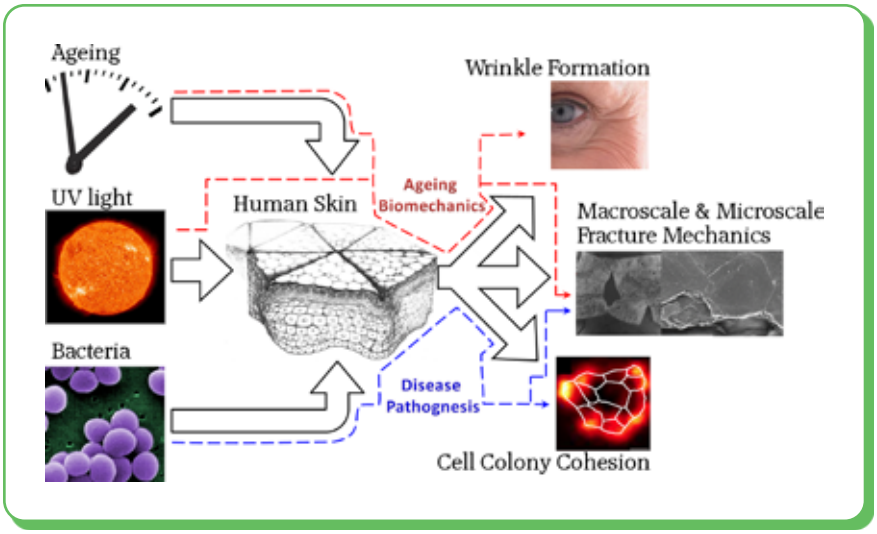
EDUCATION: PhD Mechanical Engineering, University of Edinburgh
EMAIL: ggerman@binghamton.edu
WEBSITE: sites.google.com/a/binghamton.edu/bbsmm
www.binghamton.edu/biomedical-engineering/people/profile.html?id=ggerman

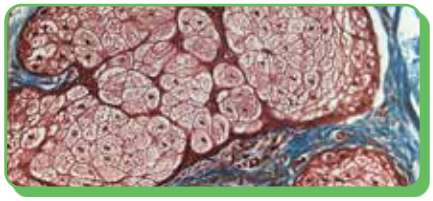
AREAS OF EXPERTISE

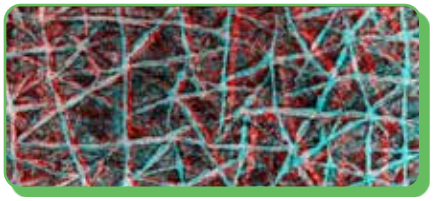
- Biomechanics of skin and brain
- Skin aging and disease pathogenesis
- Interfacial phenomena and wetting
- Cosmetic physics

KEY RESEARCH

- Understanding skin aging and photoaging, including insight into wrinkle formation and increased fracture tendency in aged skin
- Host-microbiome interactions: Understanding the pathogenesis of bacterial skin diseases including eczema/atopic dermatitis, psoriasis and hidradenitis suppuritiva
- Plastocapillarity and spontaneous interfacial wicking
- Surgical site infection prevention and amelioration
- Optimizing surgical sutures for scar minimization
- Next-generation cosmetic design







POTENTIAL APPLICATIONS

- Healthcare: Bacterial disease aetiology and prevention, minimizing infection risk
- Forensic and biometric science: Contemporary biometric identification
- Healthcare: Improving skin health and understanding the impact of age on skin health and function
- Industry: Next-generation cosmetics, design of functional anisotropic materials, protective equipment

SIGNIFICANT PUBLICATIONS/PATENTS

- A. Ittycheri , A. Wiltshire and G. K. German, 'Elucidating the Mechanistic Process of Age Induced Human Skin Wrinkling, *(Accepted for publication in the Journal of the Mechanical Behaviour of Biomedical Materials)*
- Z. W. Lipsky, M. Patsy, C. N. H. Marques, and G. K. German, 'Mechanisms and Implications of Bacterial Invasion Across the Human Skin Barrier', Microbiology Spectrum, 10(3):e0274421 (2023)
- C. Maiorana, R. Jotawar and G. K. German, 'Biomechanical fracture mechanics of composite layered skin-like materials, Soft Matter, 18, 2104–2112 (2022)
- D. Laiacona, J. Cohen, K. Coulon, Z. W. Lipsky, C. Maiorana, R. Boltyanskiy, E. R. Dufresne, and G. K German, 'Non-invasive in-vivo quantification of human skin tension lines', Acta Biomaterialia, 88, 141-148 (2019)

MAJOR PROJECTS/FUNDING

- Private Industry Sponsor, Effects of aging and prolonged exposure to incontinent environments on the structure, function and mechanics of human stratum corneum ($326,000)
- NSF-CMMI, 'CAREER: Understanding the Multi-scale Failure Mechanics of Human Skin with Age, Ultraviolet Photodamage and Bacterial Growth' (Grant: 1653071, $516,000)
- NSF-CMMI, 'RAPID: Ultraviolet Germicidal Irradiation for Disinfecting and Reuse of N95 Respirators (Grant: 2031223, $182,728)

SIGNIFICANT ACHIEVEMENTS

- Binghamton University Watson College Early Stage Distinguish Research Award (2017–18)
- Binghamton University Watson College Outstanding Faculty Service Award (2022–23)
- World Congress on Biomechanics 2022 Session chair: Skin biomechanics
- Organizing Committee: NEBEC 2016, 1st–4th Annual Biomedical Engineering Research Exposition, Binghamton, N.Y.

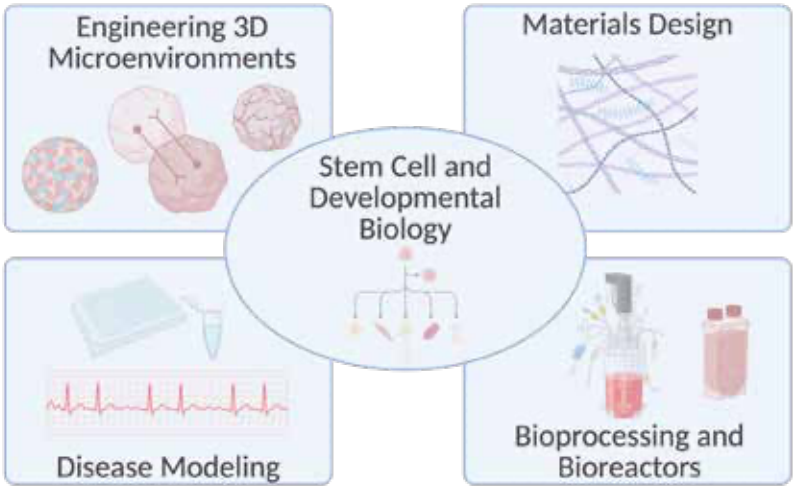
Tracy Hookway

ASSOCIATE PROFESSOR

EDUCATION: BS, Lehigh University; PhD, Worcester Polytechnic Institute; Postdoctoral, Georgia Institute of Technology; Postdoctoral, Gladstone Institute of Cardiovascular Disease
EMAIL: thookway@binghamton.edu
WEBSITE: www.binghamton.edu/biomedical-engineering/people/profile.html?id=thookway

AREAS OF EXPERTISE

- Biomanufacturing and tissue engineering
- Regenerative medicine and therapeutic discovery
- Stem-cell engineering
- Cardiac and neural organoids
- Bioreactor and bioprocess technologies



KEY RESEARCH

- Engineering micro-scale models of cardiac and neural tissues
- Understanding multicellular contributions to engineered tissue models
- Identifying therapeutic targets for cardiac fibrosis
- Modifying natural materials for dental applications
- Measuring cardiometabolic changes with varied diet

POTENTIAL APPLICATIONS

- Cardiovascular disease
- Arrhythmia diagnosis and intervention
- Autonomic disorders
- Women's health
- Dental regeneration

SIGNIFICANT PUBLICATIONS/PATENTS

- Allen K, Pachter N, Bandl A, Hookway TA. "Electrical stimulation of iPSC-derived cardiomyocytes leads to hypertrophic growth." Accepted, preprint on bioRxiV (doi.org/10.1101/2024.05.19.594880).
- Butler K, Ahmed S, Jablonski J, Hookway TA. "Engineered heart microtissue biofabrication using iPSC-derived epicardial cells." Revision under review, preprint on bioRxiV (doi.org/10.1101/2024.05.13.593960)
- Hookway TA, Matthys OB, Joy D, Sepulveda JE, Thomas R, McDevitt TC. "Bi-directional impacts of heterotypic interactions in engineered 3D human cardiac microtissues revealed by single-cell RNA-sequencing and functional analysis." BioRxiv (doi.org/10.1101/ 2020.07.06.190504)].
- Butts JC, McCreedy DA, Martinez JA, Mendoza-Camacho FN, Hookway TA, Gifford CA, Taneja P, Noble-Haeusslein L, McDevitt TC. "Differentiation of V2a interneurons from human pluripotent stem cells." PNAS, 114(19):4969-4974, 2017.

LIST OF SOME PROJECTS/FUNDING

- 2023-2028: NSF CAREER - Engineering Autonomic Control of Cardiac Tissues
- 2020-2024: NIH R15 - Heterotypic Impacts of Epicardial Cells on Engineered Cardiac Microtissue Function
- 2022-2023: BU TAE - Mechanics of Normal and Abnormal Growth and Folding of Brain Organoids
- 2019-2020: Watson/UHS Seed Grant - The Effects of Ethanol on Cardiac Microtissue Function

SIGNIFICANT ACHIEVEMENTS

- 2023: NSF CAREER Award, National Science Foundation
- 2023: Watson College Distinguished Educator Award, Binghamton University
- 2018: Junior Faculty Award, BMES Advanced Biomanufacturing Group
- 2015-16: American Heart Association Postdoctoral Fellowship
- 2011: Koerner Family Fellowship, School of Engineering, Worcester Polytechnic Institute
- 2010: Potvin Award, Biomedical Engineering Department, Worcester Polytechnic Institute
- 2006–07: Arvid Marietta Anderson Graduate Fellowship, Worcester Polytechnic Institute

Sizhe Huang

LECTURER

EDUCATION: PhD in Biomedical Engineering, Binghamton University
EMAIL: sizhehuang@binghamton.edu
WEBSITE: www.binghamton.edu/biomedical-engineering/people/profile.html?id=sizhehuang

AREAS OF EXPERTISE

- Biomaterials
- Neuroengineering

KEY RESEARCH

- Soft and multifunctional neural probes

POTENTIAL APPLICATIONS

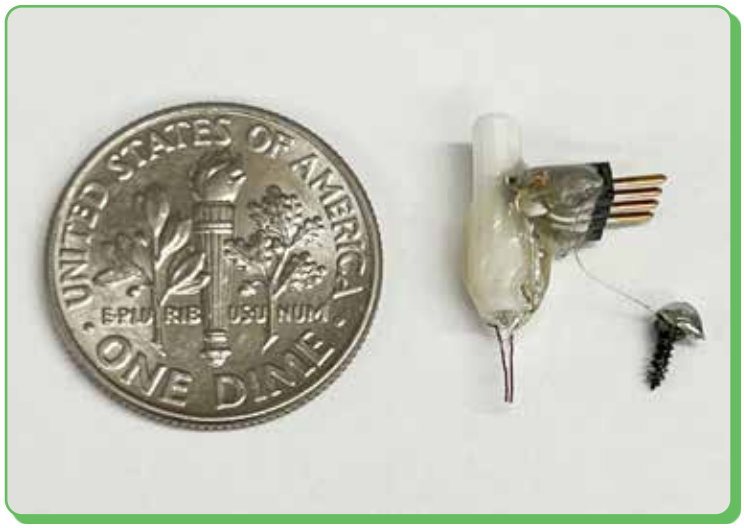
- Bidirectional bioelectronics for neuromodulation
- Neural interfaces for spinal cord injury recovery
- Stable neural interfaces for chronic use

SIGNIFICANT PUBLICATIONS/PATENTS

- Huang, S., Xiao, R., Lin, S. et al. Anisotropic hydrogel microelectrodes for intraspinal neural recordings in vivo. Nat Communication 16, 1127 (2025).
- Huang, S., Liu, X., Lin, S. et al. Control of polymers' amorphous-crystalline transition enables miniaturization and multifunctional integration for hydrogel bioelectronics. Nat Communication 15, 3525 (2024).
- Liu, X., Rao, S., Huang, S. et al. Fatigue-resistant hydrogel optical fibers enable peripheral nerve optogenetics during locomotion. Nat Methods 20, 1802–1809 (2023).
- Huang, S., Villafranca, S., Mehta, I., et al. A nanoscale inorganic coating strategy for stabilizing hydrogel neural probes in vivo. Journal of Materials Chemistry B 11, no. 32 (2023): 7629-7640.
- Rao, S, Huang, S., Wang, Q., et al. "Miniaturized hydrogel and uses thereof." U.S. Patent Application No. 18/440,095.

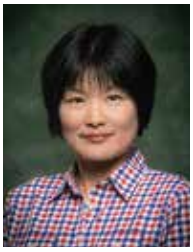
SIGNIFICANT ACHIEVEMENTS

- Graduate Award for Excellence in Research



Sha Jin

PROFESSOR



EDUCATION: PhD in Bioengineering and Bioinformatics, Kyushu Institute of Technology, Japan
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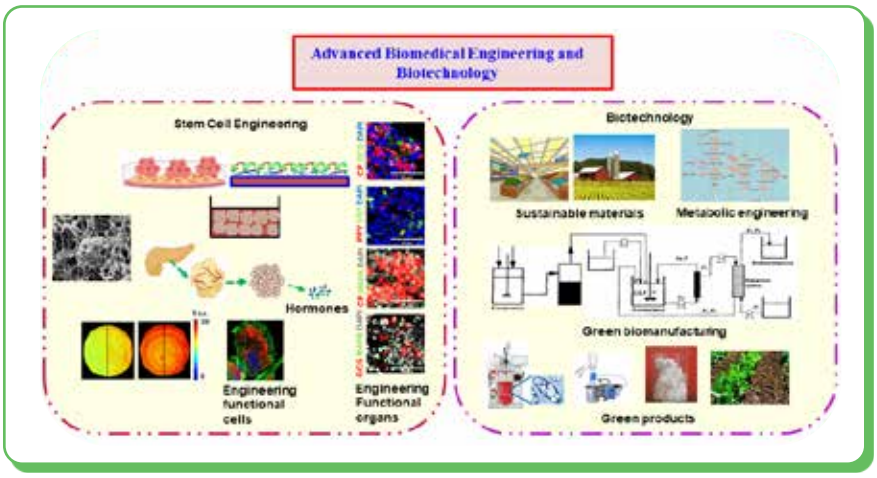
AREAS OF EXPERTISE

- Bioengineering
- Biotechnology
- Stem cell biology
- Tissue engineering

KEY RESEARCH

- Engineering microenvironments for generation of clinically relevant tissues from stem cells
- Understanding microenvironmental signaling critical for the maturation of engineered tissues
- Exploring the potential of creating green manufacturing for a sustainable environment



POTENTIAL APPLICATIONS

- Education: Nurturing young generation researchers and introducing state-of-the-art knowledge to students
- Healthcare: Cell-based therapy, disease modeling, drug discovery
- Environment: Green product manufacturing

SIGNIFICANT PUBLICATIONS/PATENTS

- Hu, M., Liu, T., Huang, H., Ogi, D., Tan, Y., Ye, K. and Jin, S. (2025) "Extracellular matrix proteins refine microenvironments for pancreatic organogenesis from induced pluripotent stem cell differentiation." Theranostics. 15(6):2229-2249.
- Jin, S., Ye, K., and Bi, H. (2024) "Microenvironments for self-assembly of islet organoids from stem cells differentiation." US Patent 11,987,813
- Huang, H., Karanth, SS., Guan, Y., Freeman, S.R., Soron, R., Godovich, S.D., Guan, J., Ye, K. and Jin, S. (2024) "Oxygenated scaffolds for pancreatic endocrine differentiation from iPSCs". Advanced Healthcare Materials. 2302275, DOI: 10.1002/adhm.202302275
- Bi, H., Ye, K., and Jin, S. (2020) "Proteomic analysis of decellularized pancreatic matrix identifies collagen V as a critical regulator for islet organogenesis from human pluripotent stem cells." Biomaterials. Mar:233:119673

MAJOR PROJECTS/FUNDING

- 2024-26: BioMADE — "Biomanufacturing Project Management Certificate Program"
- 2024-25: New York State Pollution Prevention Institute — "Eliminating Landfilled Food Waste by Upcycling to Environmentally Friendly Green Products"
- 2022-24: New York State Pollution Prevention Institute — "Reducing Food Waste by Converting It into Ecofriendly Biodegradable Plastics"
- 2019-24: NSF — "Molecular Mechanisms of Tissue Specific Signaling for Islet Self-Assembly"
- 2019-24: NIH — "Generation of Islet Organoids in Oxygenated Scaffolds"
- 2019-22: NSF — "MRI: Acquisition of a High-Throughput Flow Cytometer for Health Science Research and Training"

SIGNIFICANT ACHIEVEMENTS

- 2021: Chancellor's Award for Excellence in Scholarship and Creative Activities
- 2019: Watson College Outstanding Faculty Service Award
- 2017: Best Research Article Award by International Journal of Molecular Sciences for "An RNA-DNA Hybrid Aptamer for Nanoparticle-Based Prostate Tumor Targeted Drug Delivery"

Ahyeon Koh

ASSOCIATE PROFESSOR

EDUCATION: PhD in Chemistry, University of North Carolina-Chapel Hill
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AREAS OF EXPERTISE

- Electrochemical biosensors
- Flexible and stretchable sensors
- Biocompatible sensors and materials
- Analytical devices for biomedical applications

KEY RESEARCH

- Releasing a therapeutic reagent in a controlled manner from biomedical devices
- Employing flexible and stretchable platforms with superior biomechanical properties
- Developing biomaterials with an emphasis on bio-inspired and bio-mimic technologies
- Developing sustainable microfabrication strategies

POTENTIAL APPLICATIONS

- Wearable biosensing
- Point-of-care and diagnostic/prognostic biomedical application

SIGNIFICANT PUBLICATIONS/PATENTS

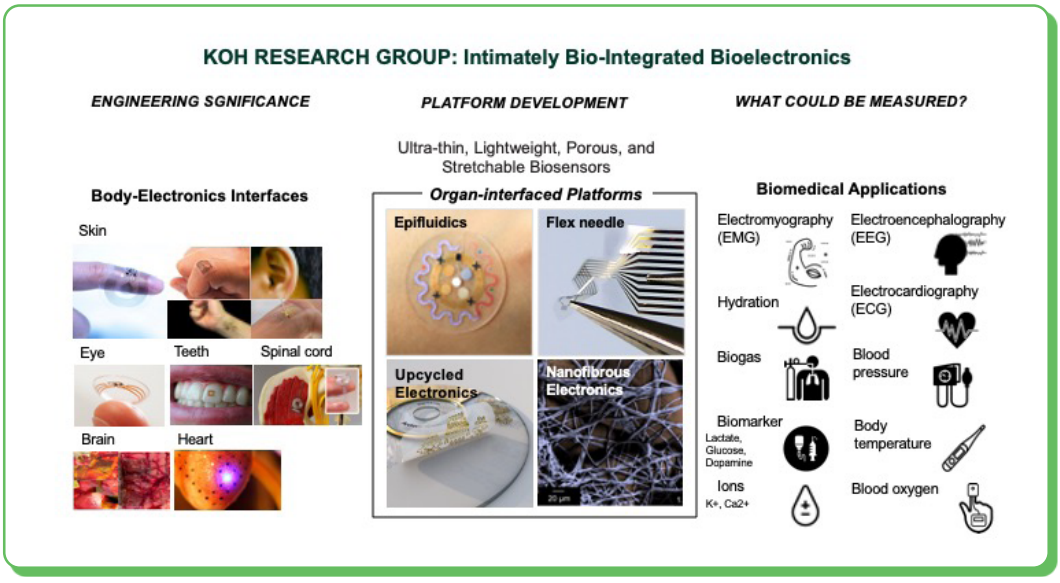
- Yang, J.H., David, U., Noh, Y.S., Koh, A., "Soft microfluidic platform with chronometric thermal valve feature for skin-interfaced, chronosampling sweat collection device development." Sensors and Actuator B:Chemical, 2023, 395, 1344415.
- Brown, M.S.; Browne, K.; Kirchner, N.; and Koh, A. "Adhesive-free, Stretchable, and Permeable Multiplex Wound Care Platform" ACS Sensors, 2022, 7,1996-2005
- Brown, M. S., Somma, L., Mendoza, M., Noh, Y., Mahler, G. J., Koh, A.," Upcycling Compact Discs for Bioelectronic Applications" Nature Communication, 2022, 13, 3727 (Editor's highlight featured article)

MAJOR PROJECTS/FUNDING

- 2024-27: "Engage Assess SecretE (EASE): A Platform for Treating Chronic Inflammation," ARPA-H, $911,661 (Total $42.8 million), Role: co-PI
- 2023-28: "CAREER: Artificial Extracellular Matrix Biosensors (e-ECM)," NSF CBET, #2238173, $500,120, Role: PI (Share 100%)
- 2020-23: "Stretchable Papertronics" NSF ECCS, #2020486, $345,000, Role: PI (Share 60%)

SIGNIFICANT ACHIEVEMENTS

- 2023: Watson Early-Stage Distinguished Research Award
- 2023: NSF CAREER Award



Yizeng Li

ASSISTANT PROFESSOR

EDUCATION: PhD in Mechanical Engineering, University of Michigan—Ann Arbor
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AREAS OF EXPERTISE

- Mathematical biology
- Biophysics
- Electrophysiology
- Computational physics

KEY RESEARCH

- Role of Hydraulic Resistance: Elucidating how cells sense and respond to fluid in confined environments. This includes the effect of external hydraulic resistance on cell migration and the transition between different migration modes.
- Cytoskeletal Dynamics and Cell Volume: Investigating the roles of actomyosin and ion exchangers in cell volume regulation. Identifying volume regulatory mechanism in normal and cancer cells.
- Mechanosensitivity and Cell Polarization: Studying how cells respond to mechanical cues such as substrate stiffness, hydraulic resistance, and external forces. This includes the role of membrane channels and small GTPases.
- Fluid-Structure Interaction: Modeling the interaction between cells and the surrounding fluid environment, including the effects of viscosity and hydraulic resistance.

POTENTIAL APPLICATIONS

- Targeting cancer metastasis by understanding how cells sense and respond to hydraulic pressure and mechanical cues in confined environments. This includes identifying key mechanosensors and how they influence cell decision-making.
- Improving drug delivery in solid cancers by understanding the role of interstitial fluid pressure.
- Engineering tissues with controlled hydraulic properties to influence cell behavior and tissue development. This may allow for manipulation of cellular behavior across various fields, from fundamental biology to biophysical applications.
- Studying cell volume regulation: Addressing biological problems related to cell ionic homeostasis and understanding the mechanisms of water- and osmosis-driven cell migration.

Fake "Frank" Lu

ASSOCIATE PROFESSOR

EDUCATION: BS, Zhejiang University; MS, Zhejiang University; PhD, National University of Singapore
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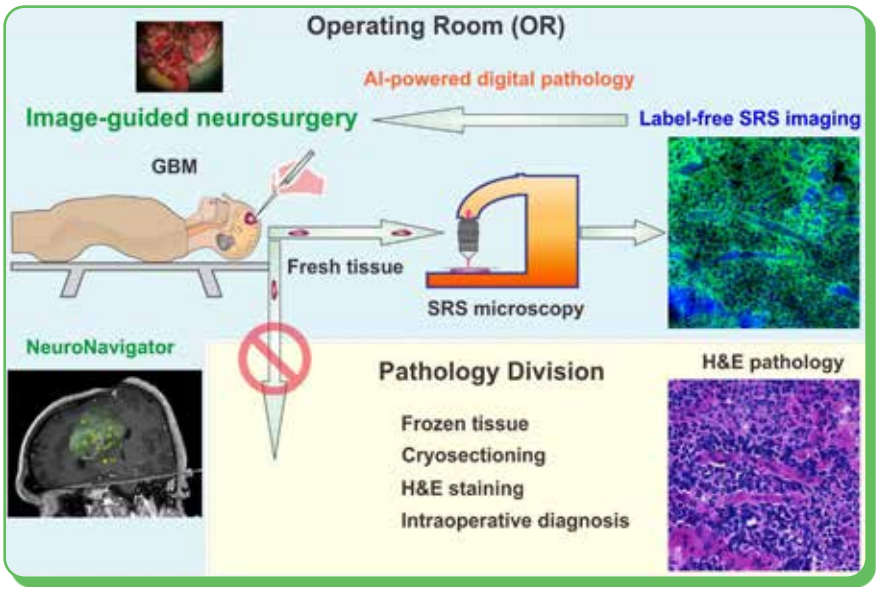
WEBSITE: www.binghamton.edu/biomedical-engineering/research/lu-lab/index.html

AREAS OF EXPERTISE

- Biophotonics and translational optical imaging, focusing on advancing stimulated Raman scattering (SRS) microscopy for biomedical applications

KEY RESEARCH

- Stimulated Raman scattering (SRS) microscopy
- Multiphoton microscopy and ptychography
- AI-based SRS label-free digital neuropathology
- Live-cell imaging for lipid metabolism studies in cancer
- Imaging drug delivery using SRS/Raman-tags



SIGNIFICANT PUBLICATIONS/PATENTS

- Yuan Y, Shah N, Almohaisin MI, Saha S, Lu F. Assessing fatty acid-induced lipotoxicity and its therapeutic potential in glioblastoma using stimulated Raman microscopy. Scientific Reports. 2021 Apr 1;11(1):1–4.
- Sun M, Yuan Y, Lu F., and Di Pasqua, AJ. Physicochemical Factors That Influence the Biocompatibility of Cationic Liposomes and Their Ability to Deliver DNA to the Nuclei of Ovarian Cancer SK-OV-3 Cells. Materials (Basel, Switzerland). 2021 Jan 16;14(2):416.
- Wang F, Yuan Y, Sun Q, Dai M, Ai L, Lu F. Design and implementation of the galvanometer scanning system for reflectance confocal and stimulated Raman scattering microscopy. Chinese Optics Letters. 2020 Dec 10;18(12):121703.
- Randall EC, Emdal KB, Laramy JK, Kim M, Roos A, Calligaris D, Regan MS, Gupta SK, Mladek AC, Carlson BL, Johnson AJ, Lu F.K., Xie XS, et. al. Integrated mapping of pharmacokinetics and pharmacodynamics in a patient-derived xenograft model of glioblastoma. Nature communications. 2018 Nov 21;9(1):1–3.
- Yang W., Li A., Suo Y., Lu F.K., Xie X.S. Simultaneous two-color stimulated Raman scattering microscopy by adding a fiber amplifier to a two-picosecond OPO-based SRS microscope. Opt. Lett. 42:523–526 (2017).
- Lu F.K., Calligaris D., Olubiyi O.I., Norton I., Yang W., Santagata S., Xie X.S., Golby A.J., Agar N.Y.R. Label-Free Neurosurgical Pathology with Stimulated Raman Imaging. Cancer Res. 76(12):3451–62 (2016).
- Valdes P.A., Roberts D.W., Lu F.K., Golby AJ. Optical technologies for intraoperative neurosurgical guidance. Neurosurg. Focus; 40(3):E8 (Invited Review; Cover Page; 2016).
- Lu F.K., Basu S., Igras V., Hoang M.P., Ji M., Fu D., Holtom G.R., Neel V.A., Freudiger C.W., Fisher D.E., Xie X.S. Label-free DNA imaging in vivo with stimulated Raman scattering microscopy. PNAS 112(37):11624–9 (2015).
- Lu F.K., Ji M., Fu D., Ni X., Freudiger C.W., Holtom G., Xie X.S. Multicolor stimulated Raman scattering (SRS) microscopy. Mol. Phys. 110(15–16):1927–32 (Invited paper; 2012).
- Fu D., Lu F.K., Zhang X., Freudiger C., Pernik D.R., Holtom G., Xie X.S. Quantitative chemical imaging with multiplex stimulated Raman scattering microscopy. J. Am. Chem. Soc. (8): 3623–6 (2012).
- Lu F., Zheng W., Huang Z. Coherent anti-Stokes Raman scattering microscopy using tightly focused radially polarized light. Opt. Lett. 34(12):1870–2 (2009).
- Lu F., Zheng W., Sheppard C., Huang Z. Interferometric polarization coherent anti-Stokes Raman scattering (IP-CARS) microscopy. Opt. Lett. 33(6):602–4 (2008).

SIGNIFICANT ACHIEVEMENTS

- 2021: First place in Binghamton University Art of Science Competition (Visualizing the Unseen Category)
- 2020: SSD Recognition Honoree
- 2020: Best Poster Award on SPIE Photonics West BiOS Conference
- 2015–20: K99/R00 NIH Pathway to Independence Award

Gretchen Mahler

PROFESSOR AND INTERIM DEPARTMENT CHAIR

EDUCATION: BS, University of Massachusetts at Amherst; PhD, Cornell University
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AREAS OF EXPERTISE

- Development, characterization and validation of cell culture organ and tissue microfluidic models
- Development of barrier tissue organs on a chip, including the GI tract, kidney, breast epithelium and valvular endothelium for mechanobiological and toxicity testing

KEY RESEARCH

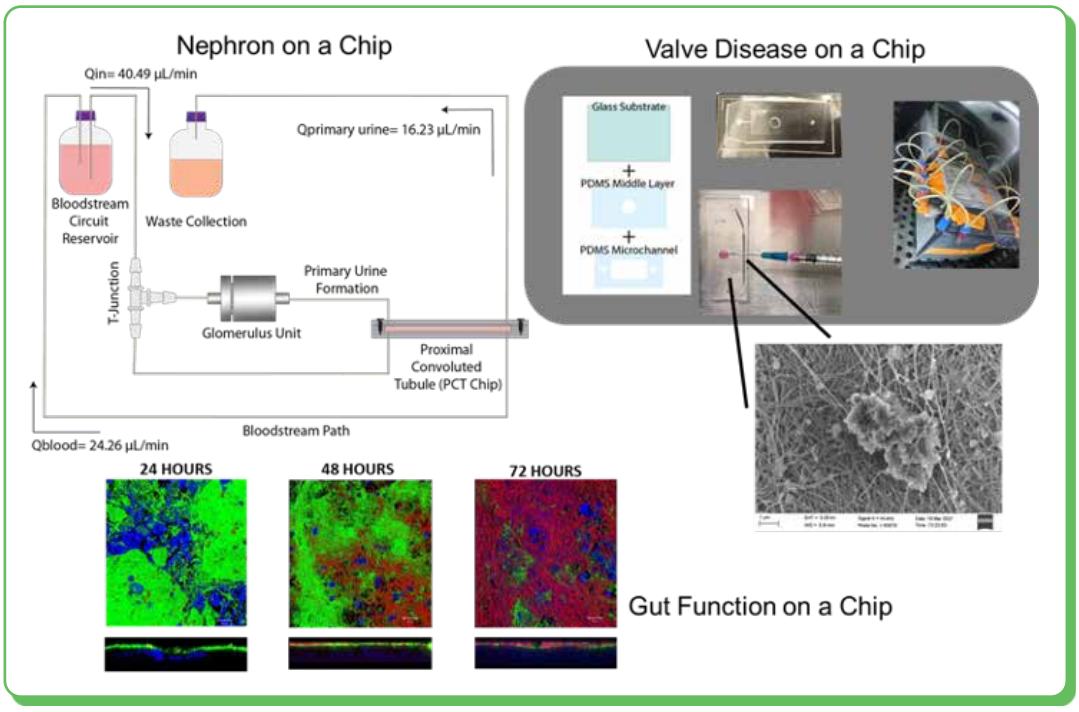
- Organ-on-a-chip technology
- Tissue engineering
- Nantoxicology

SIGNIFICANT PUBLICATIONS/PATENTS

- "Microfluidic blood-milk barrier and physiologically based pharmacokinetic model to predict lofexidine secretion into breast milk," Journal of Pharmaceutical Sciences 114 (6), 103767, 2025
- "Small Intestine on a Chip Demonstrates Physiologic Mucus Secretion in the Presence of Lacticaseibacillus rhamnosus Biofilm," Biotechnology and Bioengineering, 122: 1816-1827, 2025
- "Multiscale computational modeling of aortic valve calcification," Biomech Model Mechanobiol 23, 581–599 (2024).
- "Incorporation of Targeting Biomolecule Improves Interpolymer Complex-Superparamagnetic Iron Oxide Nanoparticles Attachment to and Activation of T2 MR Signals in M2 Macrophages," International Journal of Nanomedicine, 18, 473–487, 2023

SIGNIFICANT ACHIEVEMENTS

- 2017: Provost's Award for Outstanding Graduate Director
- 2015: Lush Prize
- 2015: Dr. Nuala McGann Drescher Award
- 2008: The Hartwell Foundation Postdoctoral Fellowship
- 2007: The Austin Hooey Graduate Research Excellence Recognition Award



Siyuan Rao

ASSISTANT PROFESSOR

EDUCATION: PhD in Material Physics and Chemistry, Beihang University, China
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AREAS OF EXPERTISE

- Neuroengineering
- Bioelectronics

KEY RESEARCH

- Non-invasive magnetic neuromodulation
- Multifunctional neural probes
- Non-viral delivery to the nervous system

POTENTIAL APPLICATIONS

- Brain-machine interfaces
- Functional recovery and rehabilitation after spinal cord injuries
- Chronic pain panagement

SIGNIFICANT PUBLICATIONS/PATENTS

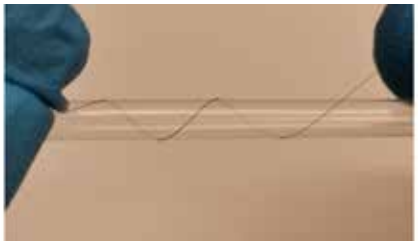
- Huang S, Xiao R, Lin S, Jang G, Hong E, Gupta S, Lu F, Chen B, Liu X, Sahasrabudhe A, Zhang Z, He Z, Crosby AJ, Sumaria K, Liu T, Wang Q*, Rao S*. “Anisotropic Hydrogel Microelectrodes for Intraspinal Neural Recordings in vivo.” Manuscript in press on Nature Communications.
- Huang S, Liu X, Lin S, Glynn C, Felix K, Sahasrabudhe A, Maley C, Xu J, Chen W, Hong E, Crosby AJ, Wang Q*, Rao S*. “Control of polymers’ amorphous-crystalline transition enables miniaturization and multifunctional integration for hydrogel bioelectronics.” Nature Communications. 2024;15(1):3525
- Liu X*, Rao S*, ChenW, Felix K, Ni J, Sahasrabudhe A, Lin S, Wang Q, Liu Y, He Z, Xu J, Huang S, Hong E, Yau T, Anikeeva P*, Zhao X*. “Fatigue-resistant hydrogel optical fibers enable peripheral nerve optogenetics during locomotion.” Nature Methods. 2023;20(11):1802–9
- Rao S, Chen R, LaRocca AA, Christiansen MG, Senko AW, Shi CH, Chiang P-H, Varnavides G, Xue J, Zhou Y. “Remotely controlled chemomagnetic modulation of targeted neural circuits.” Nature Nanotechnology. 2019;14(10):967–73

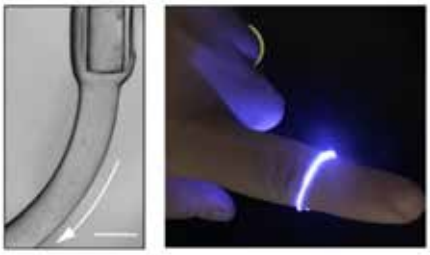
MAJOR PROJECTS/FUNDING

- 2021–25: Magnetic Modulation on Targeted Neural Circuits in Autism, National Institute of Health
- 2023–28: CAREER: Multifunctional Soft Neural Probes for Elucidating Spinal Cord Injury Pathophysiology, National Science Foundation (NSF)
- 2023–26: Non-invasive Cell-type-specific Magnetic Neural Modulation, Air Force Office of Scientific Research (AFOSR)

SIGNIFICANT ACHIEVEMENTS

- 2024: Rising Stars of Mechanical Engineering, American Society of Mechanical Engineers
- 2023: NSF CAREER Award
- 2022: AFOSR Young Investigator Program
- 2019: NIH Pathway to Independence Award





Daniel S. Reynolds

ASSISTANT PROFESSOR

EDUCATION: Postdoctoral, Harvard University; PhD, Boston University; BS, University of Rochester
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AREAS OF EXPERTISE

- Biomaterials
- Bioprinting and additive manufacturing
- Microphysiological/organ-on-chip systems
- Cancer engineering

KEY RESEARCH

- Novel printable biomaterials and bioprinting technologies
- Bioprinted in vitro tumor models for immuno-oncology
- Injectable biomaterials-based drug and cell delivery systems

POTENTIAL APPLICATIONS

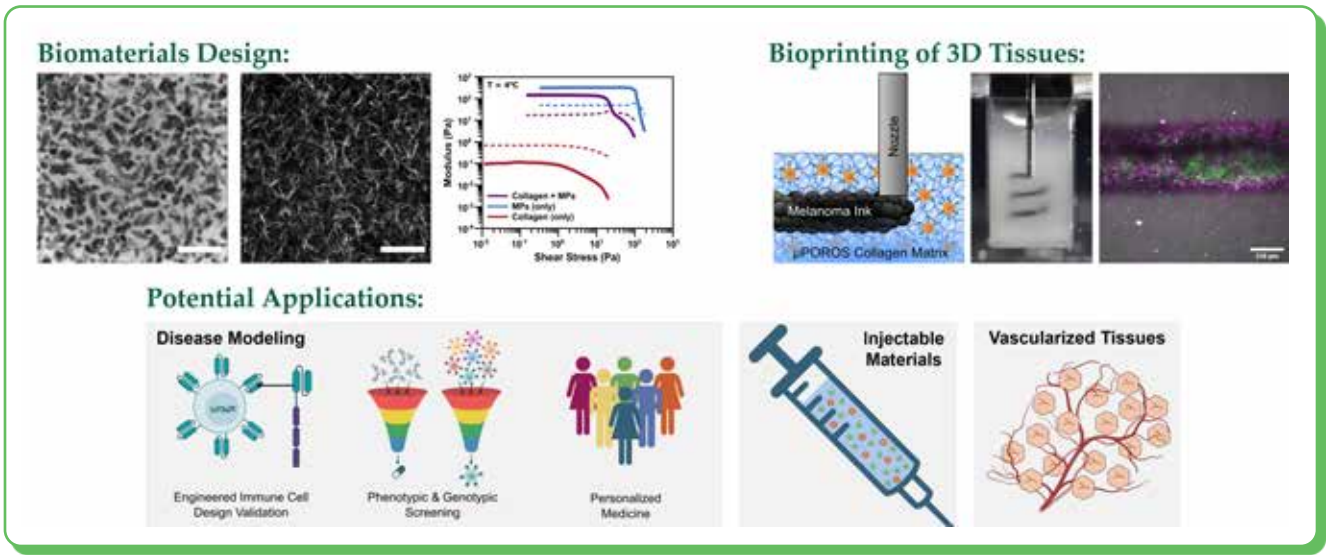
- Pre-clinical in vitro disease modeling
- Engineering vascularized tissues for regenerative medicine

SIGNIFICANT PUBLICATIONS/PATENTS

- P.P. Stankey, S. Uzel, K. Kroll, A. Ainscough, D.S. Reynolds, A. Elamine, B. Fichtenkort, J.A. Lewis. “Embedding biomimetic vascular networks via coaxial sacrificial writing into functional tissue.” Adv. Mater. 36:36 (2024).
- D.S. Reynolds, I. de Lazaro, M. Blache, Y. Liu, N. Jeffreys, R. Doolittle, E. Grandidier, J. Olszewski, M. Dacus, D.J. Mooney, J.A. Lewis. “Microporogen-structured collagen matrices for embedded bioprinting of tumor models for immuno-oncology.” Adv. Mater. 35:33 (2023).
- P.P. Stankey, S.G.M Uzel, D.S. Reynolds, J.A. Lewis. “Methods for embedded 3D printing of functional constructs for biological, robotic or other applications”. U.S. Provisional Patent Application No. 63/539,871.
- D.S. Reynolds, S. Uzel, R. Doolittle, L. Perry, J.A. Lewis. “Suturable cuff, method of integrating a tissue construct with a host organ or vasculature, and method of making a suturable cuff”. U.S. Patent Application No. 63/313,085.
- D.S. Reynolds, J.A. Lewis. “Printable bioink and method of printing tissue/organ model or therapeutic construct” U.S. Patent Application PCT/US22/32324.

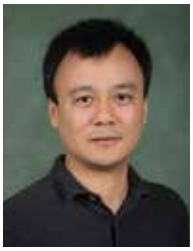
SIGNIFICANT ACHIEVEMENTS

- 2025: Travel Grant Award for National Academies Workshop on Cancer Engineering
- 2023: Semi-Finalist for Harvard President’s Innovation Challenge Ingenuity Award
- 2022: Best Poster at PREDiCT Tumor Models Immuno Oncology Summit
- 2021: Best Poster Nomination at the Materials Research Society Fall Meeting
- 2013-15: National Science Foundation Graduate Research Fellowship



Yuan Wan

ASSOCIATE PROFESSOR



EDUCATION: PhD in Bioengineering, University of Texas Arlington
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AREAS OF EXPERTISE

- Liquid biopsy
- Drug delivery nanocarrier
- Biomimetic micro/nano-technologies

KEY RESEARCH

- Liquid biopsy in combination with artificial intelligence medical imaging for early diagnosis of lung cancer
- Chimeric nanobody-based liposome/lipid nanoparticle self-assembly
- Data mining of clinical data for identification of new diagnostic and/or therapeutic biomarkers

POTENTIAL APPLICATIONS

- Early diagnosis of lung cancer
- Cancer-targeting drug delivery or mRNA vaccine
- New biomarkers for lung cancer diagnosis and therapy

SIGNIFICANT PUBLICATIONS/PATENTS

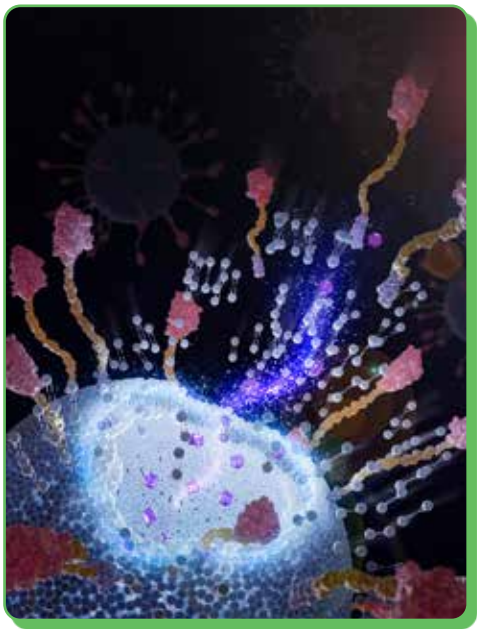
- M. Rahman, J. Wang, G. Wang, Z. Su, Y. Li, Y. Chen, J. Meng, Y. Yao, L. Wang, S. Wilkens, J. Tan, J. Luo, T. Zhang, C. Zhu, L. Wang, L. Lee, and Y. Wan*, “Chimeric Nanobody-Decorated Liposomes by Self-Assembly.” Nat Nanotech, (2024) 19:818–824
- L. Wang, W. Mao, G. Wang, Y. Chen, M. Rahman, P. Prisinzano, B. Kong, J. Wang, L. Lee, and Y. Wan*, “Bioinspired Engineering of Fusogen and Targeting Moiety Equipped Nanovesicles.” Nat Comm, (2023) 14: 3366
- Y. Wan, G. Cheng, X. Liu, S. Hao, M. Nisic, C. Zhu, Y. Xia, W. Li, Z. Wang, W. Zhang, S. Rice, A. Sebastian, I. Albert, C. Belani, and S. Zheng, “Rapid Isolation of Extracellular Vesicles via Lipid-based Nanoprobes.” Nat Biomed Eng, (2017) 1(4):0058
- Y. Wan and M. Rahman, “Chimeric Nanobody-Decorated Liposome By Self-Assembly,” US Patent App. No. 19/052,232

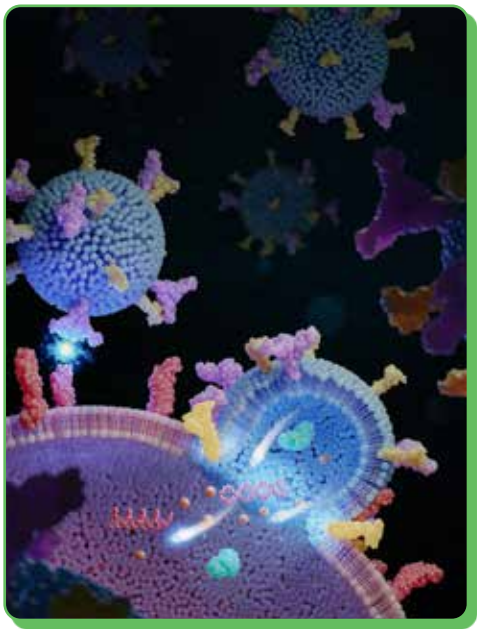
MAJOR PROJECTS/FUNDING

- Liquid biopsy of solitary pulmonary nodule with extracellular vesicles (PI, NIH R37CA255948)
- Lipid nanoprobe integrated microdevice for extracellular vesicle isolation and duplex sequencing based mutation detection for non-invasive lung cancer diagnosis (co-I, NIH R01CA230339)

SIGNIFICANT ACHIEVEMENTS

- 2022: Early Stage Distinguished Research, Watson College, Binghamton University
- 2021: MERIT Award, National Cancer Institute





Ying Wang

ASSISTANT PROFESSOR

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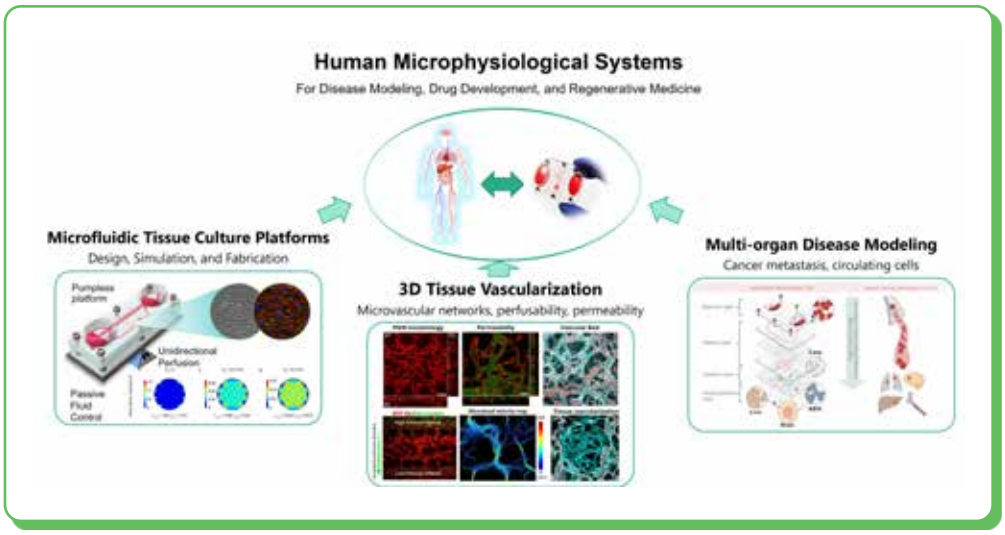
AREAS OF EXPERTISE

- Microphysiological systems and body-on-a-chip technology
- Advanced 3D tissue engineering and vascularization
- Innovative microfluidic design and applications
- 3D bioprinting and biofabrication



KEY RESEARCH

- Engineering body-on-a-chip systems to model breast cancer metastasis and circulating tumor cell dynamics
- Developing microfluidic platforms to support organoid culture and enable in vitro vascularization
- Creating scalable bone tissue constructs using ADSC-derived materials for regenerative applications
- Developing biomaterials to control vascularization and enhance engineered tissue functionality

POTENTIAL APPLICATIONS

- Cancer Research and Drug Development: Personalized cancer models for studying metastasis and testing therapeutics
- Regenerative Medicine: Scalable engineered bone constructs for orthopedic, craniofacial and dental tissue repair
- Tissue Engineering: Advanced biomaterials for vascularized organoids and functional tissue grafts
- Biomedical Devices: Microfluidic systems for high-throughput screening and organ-on-chip applications

SIGNIFICANT PUBLICATIONS/PATENTS

- Wang Y, Abaci HE, Shuler ML. “Microfluidic blood-brain barrier model provides in vivo-like barrier properties for drug permeability screening.” Biotechnol Bioeng. 2017 Jan;114(1):184-194.
- Wang Y, Shuler ML. “UniChip enables long-term recirculating unidirectional perfusion with gravity-driven flow for microphysiological systems.” Lab Chip. 2018 Aug 21;18(17):2563-2574.
- Wang, Y., & Shuler, M. L. (2025). “Recirculating Unidirectional Perfusion Flow Devices and Methods of Use Thereof.” U.S. Patent No. 12,257,579. Issued March 25, 2025.

MAJOR PROJECTS/FUNDING

- Biological Validation with Body-on-Chip for In Silico AI-Based Drug Discovery (collaboration)
- Perfusable Brain Organoids-on-a-Chip: A Pumpless, Open-Well Model of Neurovascular and Cortical Function (pending).

SIGNIFICANT ACHIEVEMENTS

- 2024: Upstate New York Microphysiological Symposium 2024 Exceptional Abstract Awards
- 2018: Biotechnology and Bioengineering Gaden Award-winning article
- 2011: BMES Best Design and Research Award

Qianbin Wang

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Mechanotransduction
- Interfacial chemistry
- Glaucoma
- Neuroengineering

KEY RESEARCH

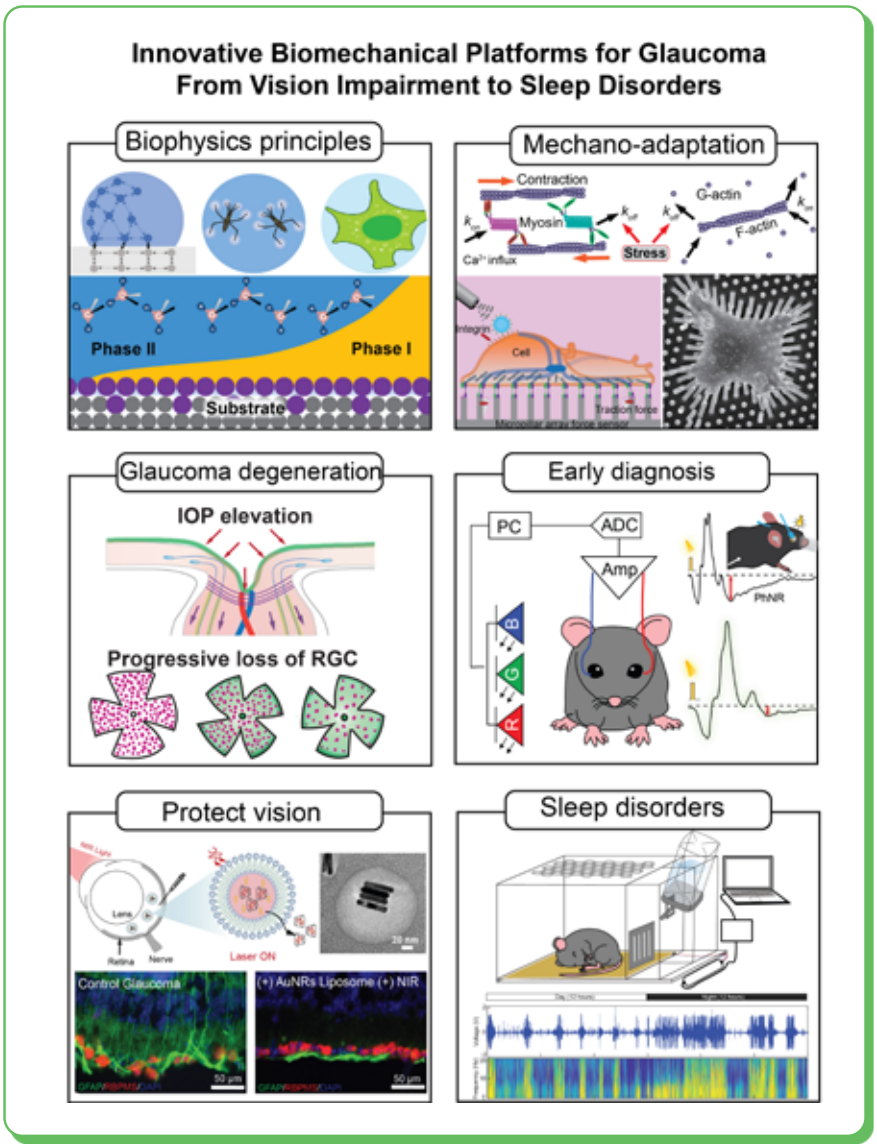
- Mechanotransduction in neuronal systems
- Non-invasive bioinstrumentation for early disease detection
- Gene delivery techniques for ocular applications
- Interfacial chemistry for biomedical applications

POTENTIAL APPLICATIONS

- Glaucoma early detection
- Glaucoma treatment

SIGNIFICANT PUBLICATIONS/ PATENTS

- Matuwana, Dorcas, et al. "Near-infrared activated liposomes for neuroprotection in glaucoma." Journal of Materials Chemistry B 12.42 (2024): 10902-10914.
- Hong, Eunji, et al. "Biologically Driven In Vivo Occlusion Design Provides a Reliable Experimental Glaucoma Model." bioRxiv (2024): 2024-01.
- Huang, Sizhe, et al. "Anisotropic hydrogel microelectrodes for intraspinal neural recordings in vivo." Nature Communications 16.1 (2025): 1127.
- Huang, Sizhe, et al. "Control of polymers' amorphous-crystalline transition enables miniaturization and multifunctional integration for hydrogel bioelectronics." Nature Communications 15.1 (2024): 3525.



MAJOR PROJECTS/FUNDING

- 2022-2024: Industry-sponsored research grant, drug screening in experimental glaucoma mouse models, PI
- 2025-2030: CAREER: An integrated platform to understand neurodegeneration in glaucoma blindness, NSF, PI
- 2025-2027: Identifying Cellular Intraspinal Electrophysiological Features of "Spinal Shock," NIH R21, Co-I
- 2025-2027: Multifunctional Soft Intraspinal Probes to Study KCC2 Mediated Functional Recovery from SCI, Craig H. Neilsen Foundation, Co-I

SIGNIFICANT ACHIEVEMENTS

- 2025: Emerging Investigators by Journal of Materials Chemistry B
- 2025: NSF CAREER award

Kaiming Ye

SUNY DISTINGUISHED PROFESSOR

EDUCATION: PhD in Engineering, East China University of Science and Technology
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AREAS OF EXPERTISE

- Biomanufacturing and tissue foundry
- Regenerative medicine and organoid development
- Cancer immunotherapy and biomarker discovery for cancer diagnosis and therapy
- Bioinformatics
- Synthetic biology for producing living materials
- Biomanufacturing workforce development

KEY RESEARCH

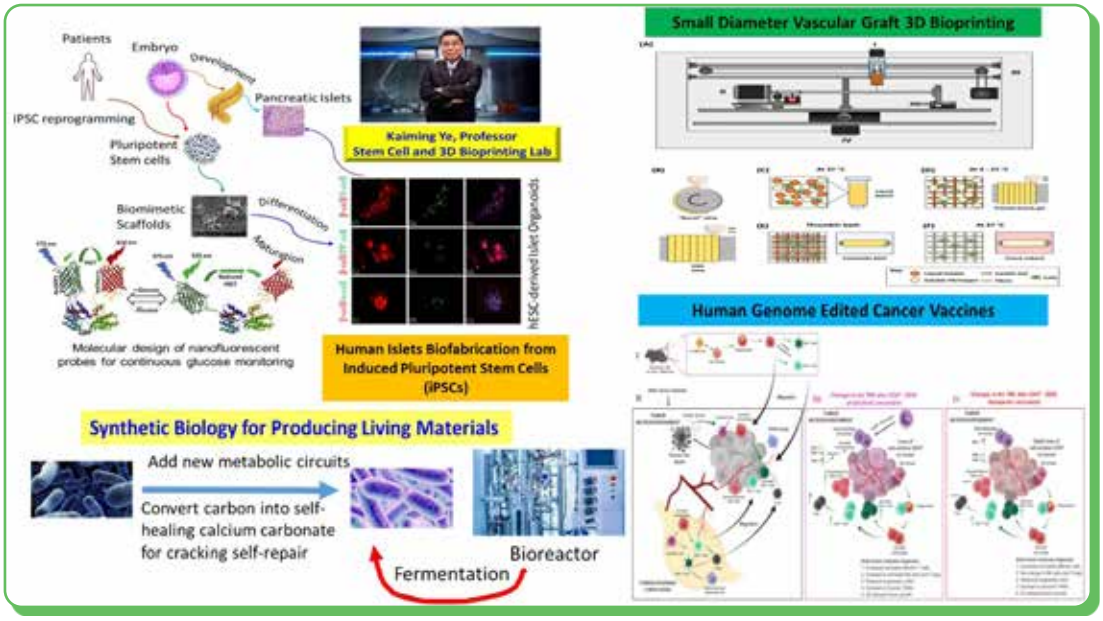
- Assessing the impact of islet and stem cell transplantation in diabetic animals
- Bioprinting small-diameter vascular grafts for heart bypass surgery
- 3D printed colorectal cancer organoids for personalized treatment and dissecting key factors in the tumor microenvironment that suppresses chemo- and immunotherapy
- EV-based microRNA suicide gene delivery to eliminate liver cancer cells from tumors
- Biomanufacturing project management workforce development

POTENTIAL APPLICATIONS

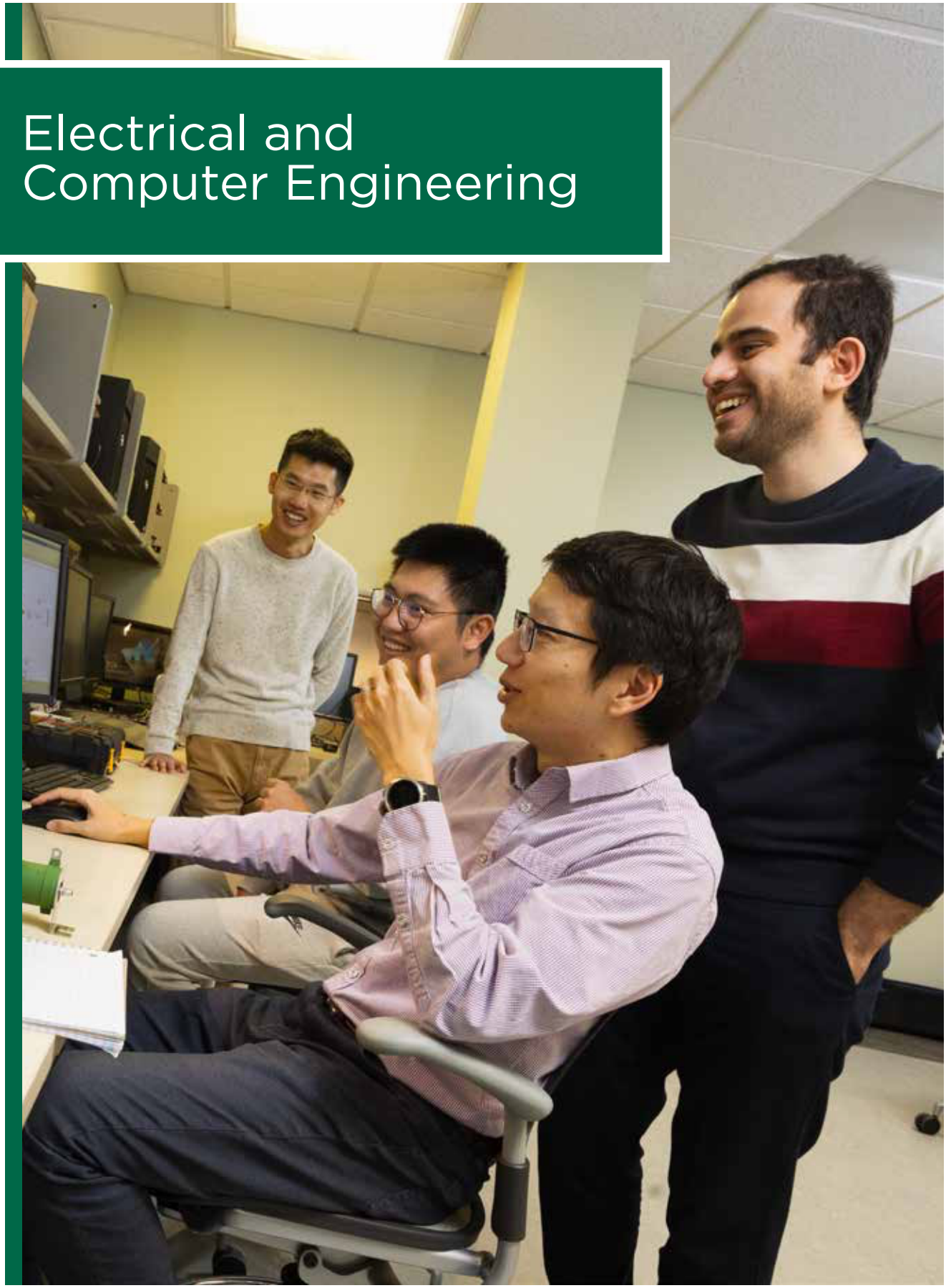
- Diabetes treatment
- Cancer treatment and diagnosis
- Self-healing and self-repair concrete
- Bypass surgery

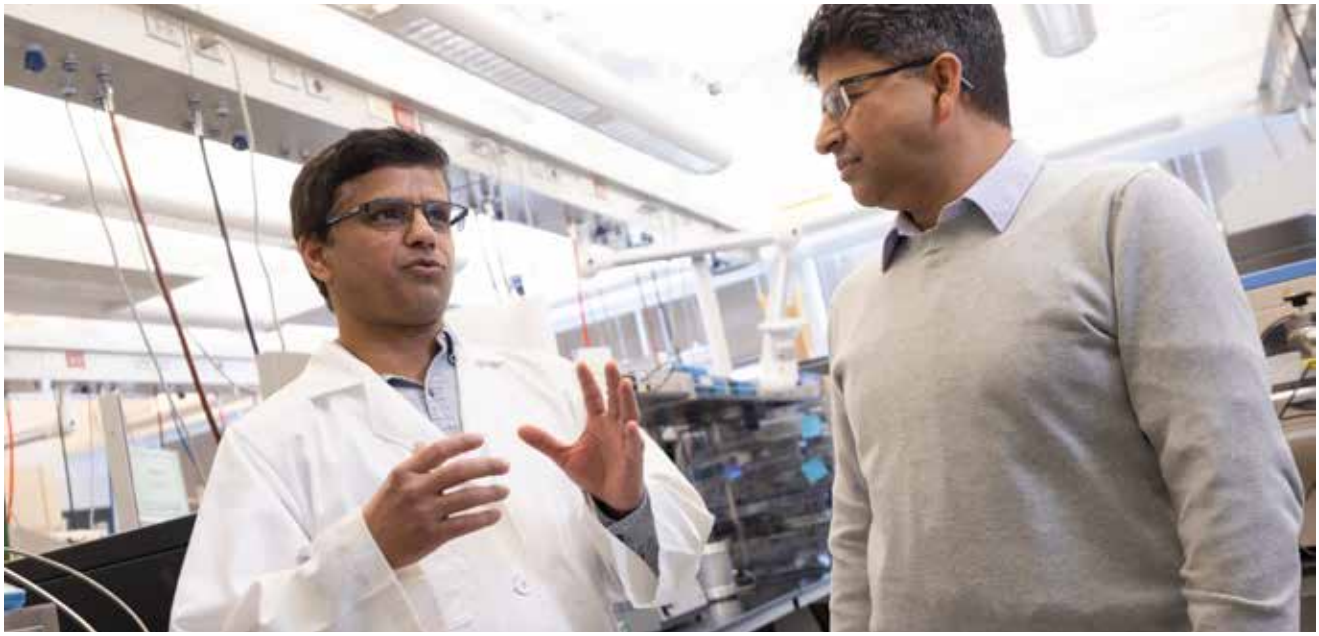
SIGNIFICANT PUBLICATIONS/PATENTS

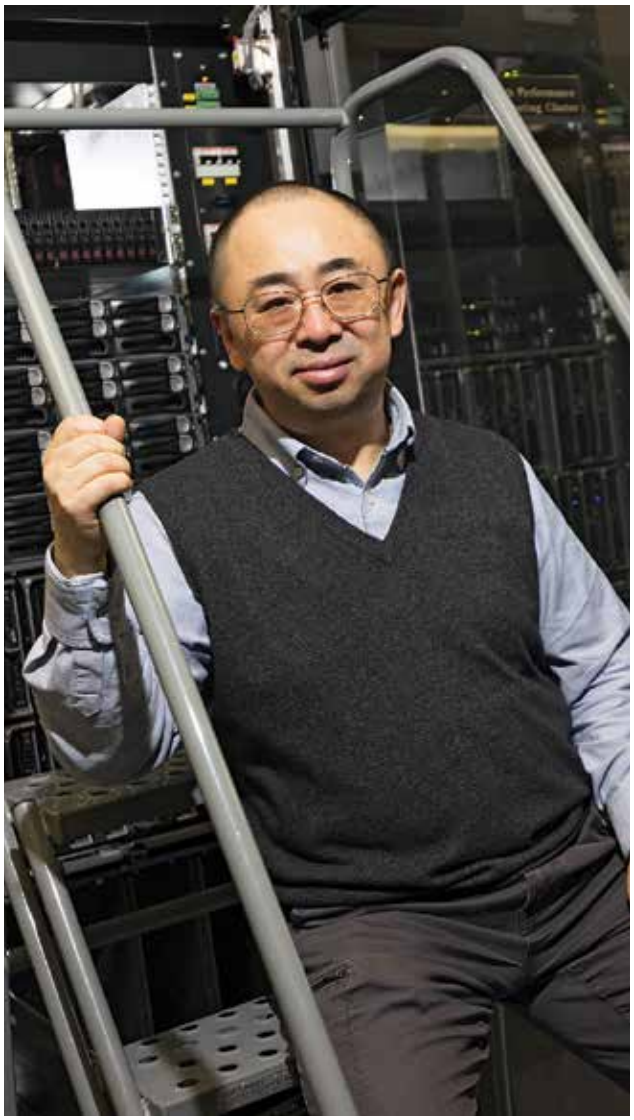
- Li, M, Freeman, S., Janusz, F. B., K. Q. Cai, Kim, A., Jin, S., Cukierman, E., Ye, K. (2024) "A bioprinted sea-and-island multicellular model for dissecting pancreatic tumor stroma reciprocity and adaptive metabolism." Biomaterials, 310, 122631: doi: 10.1016/j.biomaterials.2024.122631
- Ye, K. and Jin. S. (2025) "Genome-Edited Cancer Cell Vaccines," US Patent 19/030374
- Jin, S., Ye, K. and Bi, H. (2020) "Microenvironments for self-assembly of islet organoids from stem cells differentiation," US10767164B2
- Freeman, S., Ramos, R., Chando, P.A., Zhou, L., Reeser, K., Jin, S., Soman, P., and Ye, K. (2019) "A bioink blend for rotatory 3D bioprinting tissue engineered small-diameter vascular constructor," Acta Biomaterialia, 95, 152-164
- Jin, S., Veetil, J., Garrett, R., Ye, K. (2011) "Construction of a panel of glucose indicator proteins for continuous glucose monitoring," Biosensors and Bioelectronics, 26, 3427-3431



Electrical and Computer Engineering







Emrah Akyol

ASSOCIATE PROFESSOR

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AREAS OF EXPERTISE

- The intersection of game theory, distributed systems and cyber-physical systems, with a focus on security and control aspects
- Knowledge in theoretical foundations and practical applications in areas such as critical infrastructure, industrial control systems and smart technologies

KEY RESEARCH

- Game theory
- Communications
- Control
- Networks
- Information processing
- Socio-cyber-physical systems

SIGNIFICANT PUBLICATIONS/PATENTS

- A. Anand and E. Akyol, “Channel-Optimized Strategic Quantization,” in IEEE Journal on Selected Areas in Communications, 2025
- A. Anand and E. Akyol, “Strategic Quantization with Quadratic Distortion Measures,” Annual Allerton Conference on Communication, Control, and Computing, Urbana, IL, USA, 2024
- X. Zhang, E. Akyol and Z. Ertem, “Polarization Game over Social Networks,” IEEE International Conference on Communications, Denver, CO, USA, 2024
- A. Anand, E. Akyol, “On the Impact of Bounded Rationality in Strategic Data Gathering,” IFAC-PapersOnLine, 2024
- M. Sayin, E. Akyol, T. Başar. Hierarchical multistage Gaussian signaling games in noncooperative communication and control systems. IFAC Automatica, 107, 9-20, 2019

Indranil Bhattacharya

PROFESSOR AND DEPARTMENT CHAIR, ELECTRICAL AND COMPUTER ENGINEERING

EDUCATION: PhD in Electrical Engineering, Florida State University
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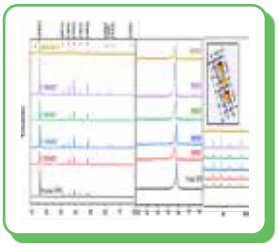
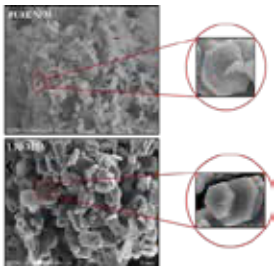
AREAS OF EXPERTISE

- Sodium-ion battery and lithium-ion battery
- Dynamic wireless charging of electric vehicles
- Battery management
- III-V semiconductors



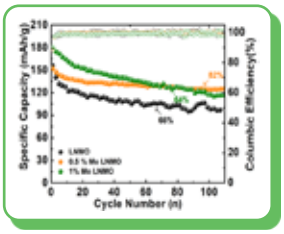
KEY RESEARCH

- Synthesis, atomic analysis, material characterization and electrochemical analysis of novel sodium and lithium-ion battery cathodes
- Developing sensor-based battery management system to ensure safety through combinations of cell balancing, voltage and current monitoring, temperature management, state-of-charge and state-of-health estimation
- Understanding III-V multijunction semiconductors, lattice and electrical matching for high-efficiency and cost-effective photovoltaic, electronic and optical devices
- Developing novel inductive coil structures and introducing metamaterials for efficient and fast dynamic charging of electric vehicles



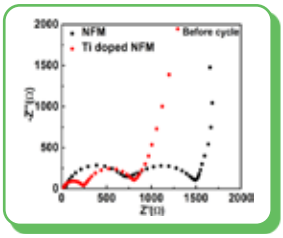
POTENTIAL APPLICATIONS

- Energy Storage: Grid-level energy storage and portable electronics
- Electric Vehicle and Automotive Industry: Dynamic charging of EVs, battery management of EVs, onboard charging
- Semiconductor Industry: Heterojunction devices, wide-bandgap semiconductor materials, optical devices
- Solar Cells: Multijunction solar cells and perovskite solar cells



SIGNIFICANT PUBLICATIONS/PATENTS

- "Equivalent Circuit Modeling and Experimental Analysis of Low Frequency Metamaterial for Efficient Wireless Power Transfer," IEEE Access, vol. 10, pp. 87962-87973, 2022.
- "Evaluation of Electrochemical Performance and Redox Activity of Fe in Ti doped Layered P2-$Na_{0.67}Mn_{0.5}Fe_{0.5}O_2$ Cathode for Sodium Ion Batteries," Electrochimica Acta, 2021.
- "Atomic-Scale Mechanisms of Enhanced Electrochemical Properties of Mo-Doped Co-Free Layered Oxide Cathodes for Lithium-ion Batteries," ACS Energy Letters, 2019, doi: 10.1021/acsenergylett.9b01830.
- "Experimental Evaluation of Layered DD Coil Structure in a Wireless Power Transfer System," IEEE Transactions on Electromagnetic Compatibility, vol. 62, no. 4, pp. 1477-1484, Aug. 2020, doi: 10.1109/TEMC.2020.3002694.

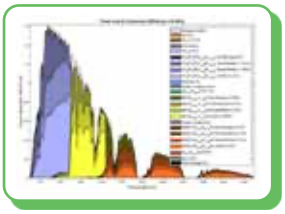


MAJOR PROJECTS/FUNDING

- 2024-29: National Science Foundation, "NRT-GCR, AI: Immersive Research Traineeship in the Convergence of AI, Energy and Cybersecurity," $3 million. Role: Principal Investigator.
- 2024-26: National Science Foundation, **"**RET Site: Energize Teachers," $600,000. Role: Principal Investigator.
- U.S. Department of Energy, Developing an EV Demonstration Testbed in the Upper Cumberland Region of Tennessee, an Economy Distressed Rural Region," $1.56 million.
- 2024-26: National Science Foundation, Collaborative Research: CyberTraining: Implementation, $300,000.

SIGNIFICANT ACHIEVEMENTS

- 2025: Brown-Henderson Outstanding Engineering Faculty Award. Given to the top researcher in the College of Engineering at Tennessee Tech University.
- 2024: T.S. McCord Engineering Faculty Award, Tennessee Tech. Given to an outstanding engineering faculty member who demonstrates a deep compassion for students through teaching and/or advising.
- 2023: University-wide Outstanding Faculty Award in Teaching, Tennessee Tech. This is the highest award for teaching at the university.
- 2021: Centennial Scholar-Mentor Award, Tennessee Tech. Highest award given to a faculty member who has excelled in research scholarship, mentoring and teaching.



Yu Chen

PROFESSOR

EDUCATION: PhD in Electrical Engineering, University of Southern California (USC)
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AREAS OF EXPERTISE

- Information assurance in the Internet of Physical-Virtual Things (IoPVTs)
- Trust, security and privacy in computer networks
- Advanced sensing technologies in smart environments

KEY RESEARCH

- AI-generated content (AIGC) authentication
- ANCHOR-Grid: Securing smart grid digital twins against deepfake attacks
- Microverse: Task-oriented edge-scale metaverse
- STEPS: The intersection of AI technology and social dynamics

POTENTIAL APPLICATIONS

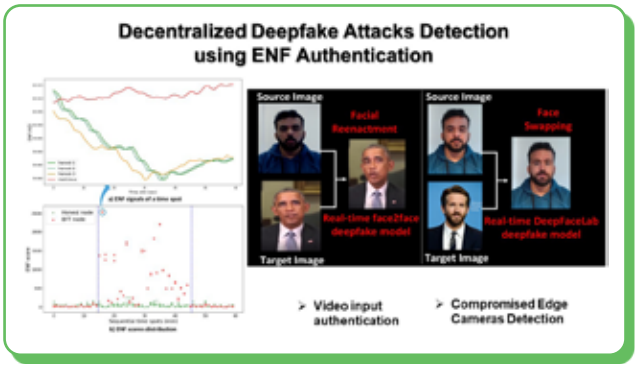
- eHealthcare: Virtual community healthcare for seniors' health and safety monitoring
- Education: Multi-layered metaverse classroom for immersive and inclusive learning
- Security: Full spectrum sensing for critical infrastructure security

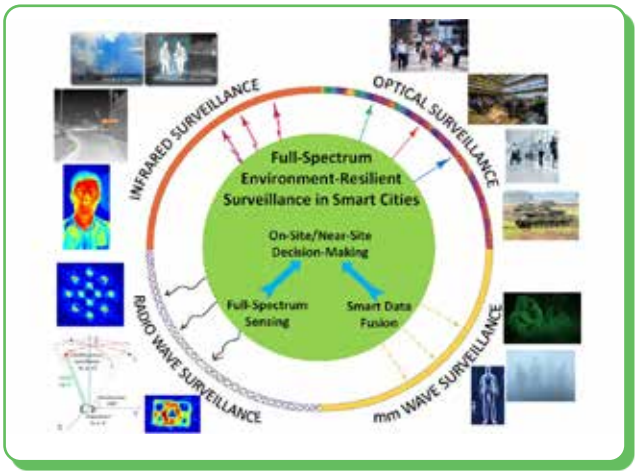
SIGNIFICANT PUBLICATIONS/PATENTS

- Q. Qu, H. Sun, J. Chen, D. Nagothu, and Y. Chen, "Secure Avatars via Environmental Fingerprints for Virtual Health Monitoring Services," IEEE International Conference on Communication (ICC), Montreal, Canada, June 8 — 12, 2025.
- M. Hatami, M. Azimi-Nasab, Y. Chen, J. Mohammadi, E. Ardiles-Cruz, and E. Blasch, "ELOCESS: An ESS Management Framework for Improved Smart Grid Stability and Flexibility," the IEEE Transactions on Consumer Electronics (TCE), December 2024.
- H. Sun and Y. Chen, "A Rapid Response System for Elderly Safety Monitoring Based on Progressive Hierarchical Action Recognition," the IEEE Transactions on Neural Systems and Rehabilitation Engineering (TNSRE), Vol. 32, June 2024.
- D. Nagothu, R. Xu, Y. Chen, E. Blasch, and A. Aved, "DeFakePro: Decentralized DeepFake Attacks Detection using ENF Authentication," the IEEE IT Professional, Vol. 24, Issue 5, pp. 46–52, November 30, 2022

MAJOR PROJECTS/FUNDING

- 2022-27: NSF-SFS — "CyberCorps Scholarship for Service: Expanding and Strengthening the National Cybersecurity Workforce"
- 2021-25: DoD-AFOSR — "Integrated 5G Imaging and Communication Surveillance as an Edge Service"
- 2021-24: NSF-SaTC, "Secure Audio and Video Data from Deepfake Attacks Leveraging Environmental Fingerprints"
- 2020-23: DoD-DURIP, "5G-MiWIS: A Testbed for an Environmental Resilient 5G Millimeter-Wave Imaging Technology based Surveillance System"





SIGNIFICANT ACHIEVEMENTS

- 2024: Fellow of SPIE
- 2019-23: Ranked among the world's top 2% of scientists (by Stanford University)
- 2024: Best Paper Award, IEEE ICNS
- 2020: Best Paper Award, IEEE CIC

Seokheun "Sean" Choi

PROFESSOR

EDUCATION: PhD in Electrical and Computer Engineering, Arizona State University
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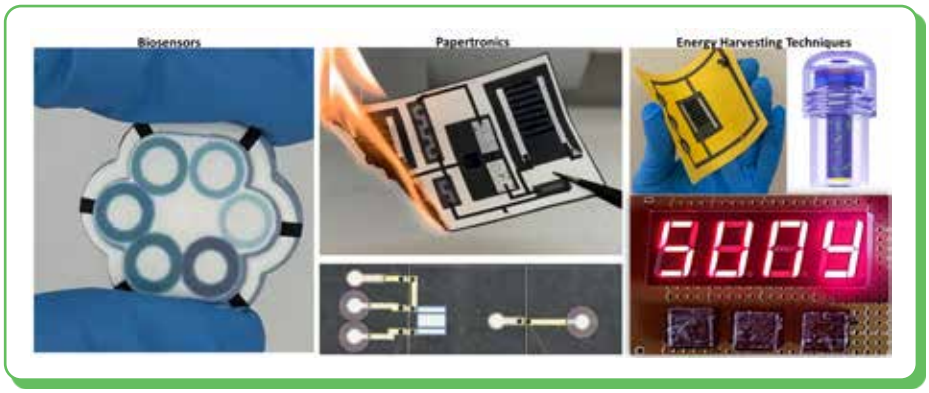
AREAS OF EXPERTISE

- Clean energy and carbon capture techniques
- Biosensors and bioelectronics
- Green electronics
- Engineered living materials

KEY RESEARCH

- Next-generation bacteria-powered biobatteries for sustainable energy
- Biohybrid artificial plants for indoor air purification and renewable energy generation
- Revolutionizing disposable electronics with integrated papertronic technologies
- Real-time monitoring of antibiotic efficacy against drug-resistant biofilms



POTENTIAL APPLICATIONS

- Wearable and implantable medical devices
- Smart buildings and green architecture
- Sustainable electronics
- Personalized medicine and precision antibiotic therapy

SIGNIFICANT PUBLICATIONS/ PATENTS

- M. Rezaie and S. Choi, "Cyanobacterial artificial plants for enhanced indoor carbon capture and utilization," Advanced Sustainable Systems, 8, 2400401, 2024
- Z. Rafiee, A. Elhadad, and S. Choi, "Revolutionizing Papertronics: Advanced Green, Tunable, and Flexible Components and Circuits," Advanced Sustainable Systems, 8, 2400049, 2024
- Y. Gao, A. Elhadad, and S. Choi, "A paper-based wearable moist-electric generator for sustained high-efficiency power output and enhanced moisture capture," Small, 20, 2408182, 2024
- M. Rezaie, Z. Rafiee, and S. Choi, "A biobattery capsule for ingestible electronics in the small intestine: biopower production from intestinal fluids activated germination of exoelectrogenic bacterial endospores," Advanced Energy Materials, 13, 2202581, 2023

MAJOR PROJECTS/FUNDING

- 2024-27: Biobattery-Electronics Integration, National Science Foundation (NSF)
- 2023-26: Integrated Papertronics, National Science Foundation (NSF)
- 2021-25: Antibiotic Susceptibility Testing, National Science Foundation (NSF)
- 2021-25: Biophotovoltaic Panels, Office of Naval Research (ONR)

SIGNIFICANT ACHIEVEMENTS

- 2020: SUNY Chancellor's Award for Excellence in Scholarship and Creative Activities
- 2017: Breakthrough Innovation Award from The New York Academy of Science
- 2019-23: Ranked among the world's top 2% scientists (by Stanford University)
- 2024: Best Paper Award (First Place), Solid-State Sensors Workshop (Ingestible Biobattery)

Scott Craver

ASSOCIATE PROFESSOR

EDUCATION: PhD, Princeton University; BS and MS, Northern Illinois University
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AREAS OF EXPERTISE

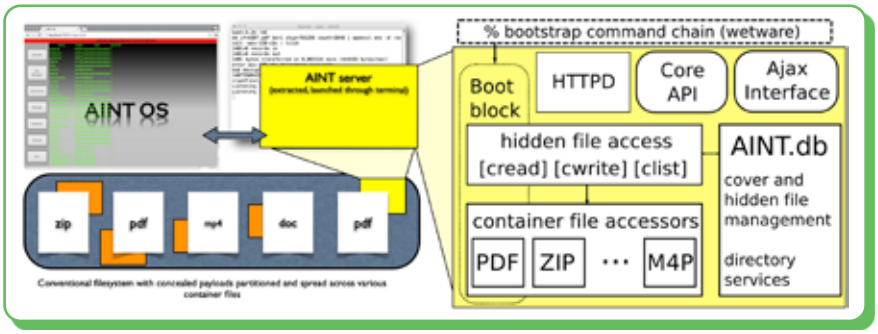
- Information security and cybersecurity
- Multimedia security and digital rights management

KEY RESEARCH

- Information security
- Cryptology
- Steganography
- Watermarking and DRM systems
- Biometric systems
- Security engineering

SIGNIFICANT PUBLICATIONS/ PATENTS

- Applying a Zero-Knowledge Watermarking Protocol to Secure Elections, 2023 — S Craver, N Rosbrook
- A video auditing system for display-based voting machines — Electronic Imaging 34, 1-4, 2022 -SA Craver, G Bal
- Rapid circle detection through fusion of summative statistics of edge components -Electronic Imaging 34, 1-5, 2022 — SA Craver, P Angoy
- Attacks on Speaker Identification Systems Constrained to Speech-to-Text Decoding — Electronic Imaging 28, 1-7, 2016 — AF Baroughi, S Craver, D Douglas
- Ambiguity Attack on the Integrity of a Genuine Picture by Producing Another Picture Immune to Generic Digital Forensic Test — Electronic Imaging 28, 1-3, 2016 — J Yu, E Li, S Craver
- Capacity Limits of Pseudorandom Channels in Deception Problems — IEEE Transactions on Information Forensics and Security 10 (9), 1824-1834 — E Li, S Craver, J Yu



SIGNIFICANT ACHIEVEMENTS

- 2010: Presidential Early Career Award (PECASE)
- 2006: AFOSR Young Investigator Award
- Chancellor's Award for Excellence in Faculty Service
- Chancellor's Award for Excellence in Teaching

Pritam Das

ASSOCIATE PROFESSOR

EDUCATION: BEng in electronics and communication engineering, University of Burdwan, India; MESc and PhD in electrical engineering, University of Western Ontario
EMAIL: pdas@binghamton.edu
WEBSITE: www.binghamton.edu/electrical-computer-engineering/research/das-lab/index.html

AREAS OF EXPERTISE

- Power conversion for various applications ranging from HV grid-connected systems to power supply for AI processors and electrified transportation, solid-state lighting etc.

KEY RESEARCH

- Wide-band gap devices-based integrated power converter topologies and printable high-frequency magnetic components for solid-state transformer
- Energy storage integration in smart grid
- Reliable and high efficiency high-power LED drives for smart commercial lighting
- Electrified transportation
- Single high-frequency stage, high slew rate 48 volts to sub-1 volt point-of-load converters
- Data centers
- Modeling and control of flow batteries

SIGNIFICANT PUBLICATIONS

- S.K. Dube, R. Nair, V. Beaston and P. Das, "A Multilevel Three-Phase Integrated AC-DC Bidirectional Resonant Converter for BESS," in IEEE Journal of Emerging and Selected Topics in Power Electronics, Special Section on Batter Energy Storage Integration doi: 10.1109/JESTPE.2023.3311030.
- B. Khaki, P. Das, "Definition of multi-objective operation optimization of vanadium redox flow and lithium-ion batteries considering levelized cost of energy, fast charging, and energy efficiency based on current density" in Journal of Energy Storage Volume 64, 2022.
- R. Nair, S. K. Dube and P. Das, "Soft-Switched Integrated AC-DC Bidirectional Converter With Natural Grid Harmonic Elimination," in IEEE Transactions on Power Electronics, 2022, doi: 10.1109/TPEL.2022.3199329.
- S. K. Dube, R. Nair and P. Das, "Analysis and Design of an Integrated Bidirectional Three-Phase AC-DC Resonant Converter," in IEEE Transactions on Industrial Electronics, 2022, doi: 10.1109/TIE.2022.3183274.

PATENTS

- High-Frequency Integrated Planar Magnetics for a Bidirectional AC-to-DC CLLC Resonant Converter — K. Yenduri, S. Dube, P. Das (U.S. Patent App. 17/810,579)
- Electrolytic capacitorless, selectively dimmable led driver — P. Das (U.S. Patent 11,013,083)
- Three phase bidirectional ac-dc converter with bipolar voltage fed resonant stages — K. Yenduri, S. Dube, P. Das (U.S. Patent App. 17/079,396)
- Bidirectional AC-DC Converter With Multilevel Power Factor Correction — K. Yenduri, S. Dube, P. Das, B. Chan (U.S. Patent App. 17/449,875)

MAJOR PROJECTS/FUNDING

- Five-year, $537,959 NSF CAREER Award for his research on "Multi-level Bridge Tapped Resonant (MBTR) Solid-State Transformers (SSTs)
- Department of Energy SBIR Phase-1I with MAM Inc., NJ Modular, Scalable, Field Configurable, Intelligent Energy Storage Module with Cell Converter Using Wide Format Prismatic Cells
- Nexperia: Experimental verification of a single-stage half-bridge point of load converter with quasi-peak cycle by cycle current controller for point of load 48 points to sub 1 V conversion with fast slew rate
- Department of Energy SBIR Phase-1I with MAM Inc., NJ Battery Energy Storage System with three-phase grid integrated inverter using 3D-printed magnetics components with nanocrystalline soft magnetic material

Tara P. Dhakal

PROFESSOR

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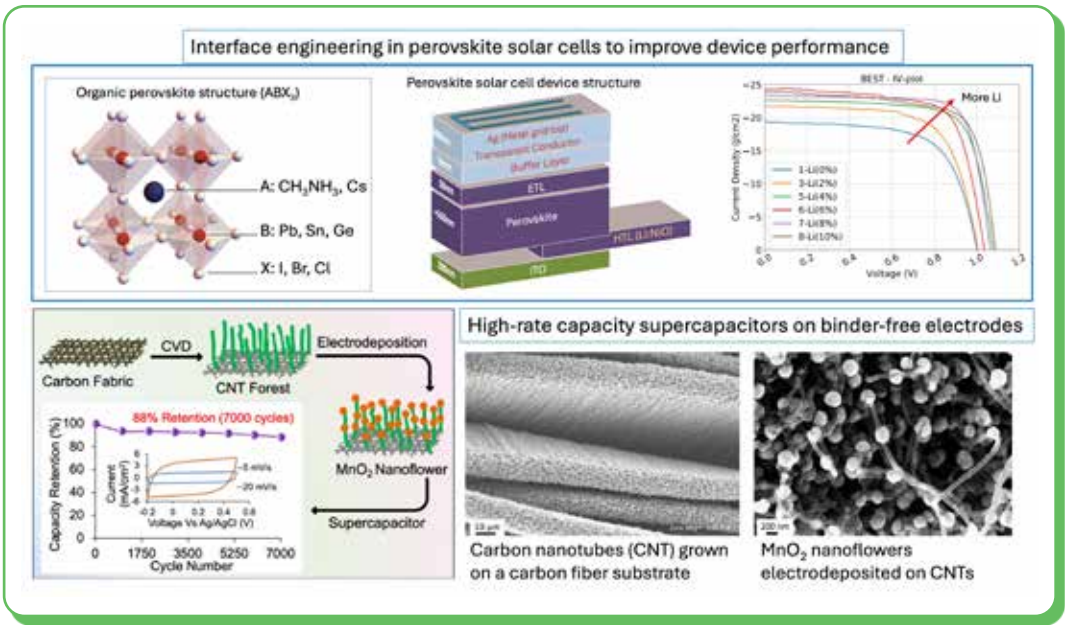
AREAS OF EXPERTISE

- Renewable energy (photovoltaics)
- Energy storage
- Thin film semiconductor devices
- Atomic layer deposition

KEY RESEARCH

- Stability enhancement of perovskite thin film solar cells
- Perovskite solar cell powered hydrogen generation through low-cost catalysts
- Si-anode for high-capacity lithium-ion batteries
- Pseudocapacitive manganese oxide electrode for high energy density supercapacitors



POTENTIAL APPLICATIONS

- Powering through renewable energy generation
- Energy storage (batteries, supercapacitors)
- Semiconductors and microelectronics

SIGNIFICANT PUBLICATIONS/PATENTS

- Zeying Chen and Tara P. Dhakal, "Room Temperature Synthesis of Lead-Free FASnI3 Perovskite Nanocrystals with Improved Stability using SnF2 Additive," Applied Physics Reviews 10, 011404 (2023), doi.org/10.1063/5.0125100
- GS Gudavalli, M Nepal, J Young, M Smeu, Tara P. Dhakal, "Effect of a Ti layer on the growth of binder-free carbon nanotubes on Cu foil and their performance as lithium ion battery anodes," Energy Advances, 2023, DOI: doi.org/10.1039/D3YA00212H
- Pravakar P. Rajbhandari and Tara P. Dhakal, "Low temperature ALD growth optimization of ZnO, TiO2, and Al2O3 to be used as a buffer layer in perovskite solar cells ", Journal of Vacuum Science & Technology A ALD2020, 032406 (2020)
- Improving Performance of Capacitors, US Patent App. 16/369,810, 2019, patents.google.com/patent/US20190304708A1/en

MAJOR PROJECTS/FUNDING

- 2024-26: PI: NYSERDA, Clean Hydrogen Innovation Funding for Research, Development, and Demonstration, "Perovskite Powered Hydrogen Production Using Low-Cost and Earth Abundant Catalysts," $443,502
- 2020-23: PI: NSF PFI-TT: "High Energy Density Nanolaminate Capacitors" $300,000
- 2018-23: PI: NSF CAREER: Toward Twenty Year Lifetime-Hermetic Sealing for Lead-Free Perovskite Solar Cells-final, Submitted July 20, 2017, $500,000

SIGNIFICANT ACHIEVEMENTS

- NSF CAREER award to investigate long-life thin film solar cells
- Developed ALD coated nanolaminate for performance and stability of solar cells, supercapacitors and batteries
- Valedictorian (high school and undergraduate level)

Anwar Elhadad

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Internet of Things (IoT)
- Wireless sensing
- Machine learning

KEY RESEARCH

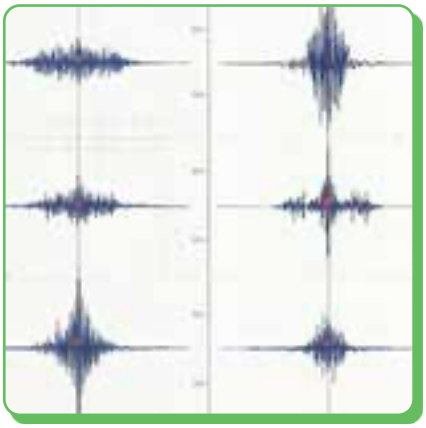
- Deploying low power IoT for virtual mimics for practical applications
- Monitoring human health parameters wirelessly
- Integrating AI and miniaturized system in interdisciplinary applications

POTENTIAL APPLICATIONS

- Education: Intelligent monitoring systems for stress and anxiety
- Healthcare: Non-invasive health monitoring systems
- Agriculture: Virtual replicas of farm which is accessible virtually

SIGNIFICANT PUBLICATIONS/PATENTS

- Elhadad, A. and Choi, S., 2023. Powering the internet of things in aquatic environments: Solar energy harvesting through a buoyant bio-solar cell array. Journal of Power Sources, 581, p.233501.
- Elhadad, A., Sullivan, T., Wshah, S. and Xia, T., 2020, October. Machine learning for respiratory detection via UWB radar sensor. In 2020 IEEE International Symposium on Circuits and Systems (ISCAS) (pp. 1-5). IEEE.



Jessica Fridrich

SUNY DISTINGUISHED PROFESSOR

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AREAS OF EXPERTISE

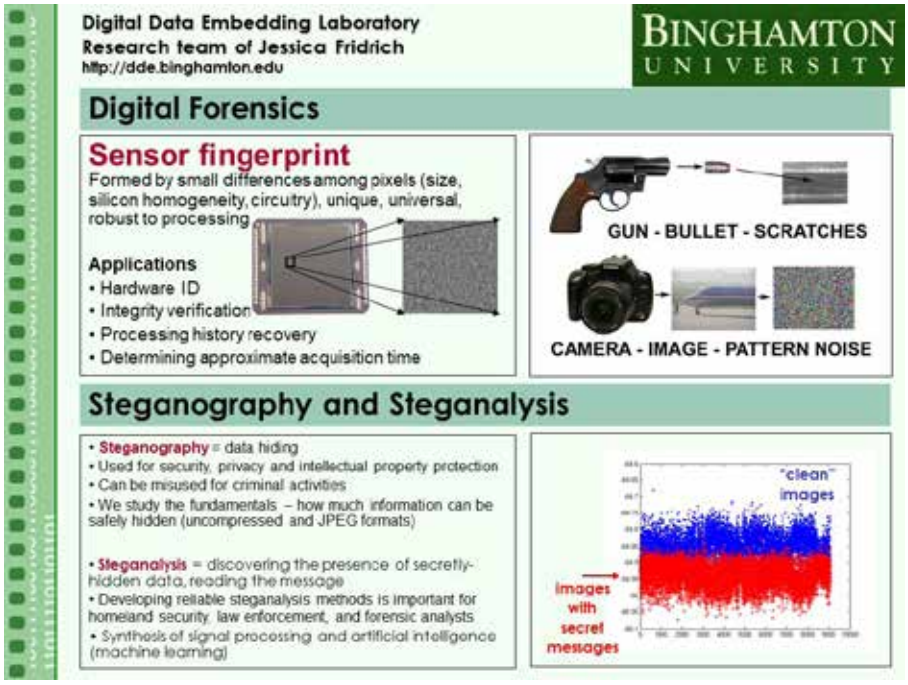
- Steganography
- Digital forensics
- Security

KEY RESEARCH

- Sensor fingerprint
- Steganography
- Learning from deep learning

POTENTIAL APPLICATIONS

- Forensics
- Security analysis
- Covert communication



SIGNIFICANT PUBLICATIONS/ PATENTS

- 7 U.S. patents and 233 publications, H index 94, 48,253 citations
- J Fridrich, J Kodovsky, Rich models for steganalysis of digital images, IEEE Transactions on information Forensics and Security 7 (3), 868-882, 2012, 2267 citations
- J Lukas, J Fridrich, M Goljan, Digital camera identification from sensor pattern noise, IEEE Transactions on Information Forensics and Security 1 (2), 205-214, 1637 citations
- J Kodovsky, J Fridrich, V Holub, Ensemble classifiers for steganalysis of digital media, IEEE Transactions on information forensics and security 7 (2), 432-444, 1341 citations

MAJOR PROJECTS/FUNDING

- Funding from U.S. Air Force, AFOSR, NSF, and a few big SBIR projects, 26 research grants — total over $13 million
- 2012-17: Rich Cover Models for Steganalysis of Digital Media, sponsored by AFOSR, $1,854,000
- 2002-05: New Generation Approach to Digital Security: Steganography, Steganalysis, and Authentication of Digital Data, sponsored by the US Air Force Research Laboratory, Rome, NY. $1,960,000
- 2016-20: New Generation of Image Processing History and manipulation Detection Techniques With Vectorized Context-Aware Descriptors, sponsored by DARPA, $1,251,000

SIGNIFICANT ACHIEVEMENTS

- Designed a digital forensic method for identifying a specific imaging device from sensor fingerprint (used by FBI and law enforcement, the only digital forensic method approved for use in a court of law)
- Introduced rich digital media models for steganalysis of digital images
- Designed deep learning detectors
- Ranked in top 0.02% of scientists by Stanford University

David Klotzkin

ASSOCIATE PROFESSOR

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AREAS OF EXPERTISE

- Optoelectronics and semiconductor lasers
- Optical coatings
- Optical sensing

KEY RESEARCH

- Development of high-power Lidar lasers and lasers for silicon photonics
- Fluorescent optical oxygen sensing
- Medical sensing
- Design and fabrication of optical coatings using genetic optimization

POTENTIAL APPLICATIONS

- Lidar for autonomous vehicles
- In-water continuous monitoring of oxygen concentration
- Home health care
- Solar cell coatings

SIGNIFICANT PUBLICATIONS/PATENTS

- "Optoelectronic light source," 11226082, David Klotzkin, Alan Lenef, Xin Wen, in collaboration with OSRAM-Sylvania
- "Optoelectronic semiconductor light source and Bragg mirror," 10808893, David Klotzkin, Alan Lenef, Xin Wen, in collaboration with OSRAM-Sylvania
- "Integrated Angle of Arrival Sensing and Duplex Communication with Cats-Eye Multiple Quantum Well Modulating Retroreflector," 8379286, David J. Klotzkin,Peter G. Goetz,William S. Rabinovich, Mike S. Ferraro, in collaboration with Naval Research Laboratory
- "Simultaneous, single-detector fluorescence detection of multiple analytes with frequency-specific lock-in detection," 8729502, D. Klotzkin

MAJOR PROJECTS/FUNDING

- 2022-present: Optimization of semiconductor lasers for Lidar applications, Best Epitaxial

SIGNIFICANT ACHIEVEMENTS

- 2014 and 2023: Air Force Research Lab Senior Faculty Fellow
- 2013 and 2020: Textbook author — Introduction to Semiconductor Lasers in Communications: An Applied Approach, Springer-Verlag, New York, New York.
- 2016: Chancellors Award for Excellence in Teaching
- 2006-07: Naval Research Lab Senior Faculty Fellow
- 1999: Winner, Paul Rappaport Award, for Best Paper published in an Electron Devices Society journal

Xiaohua “Edward” Li

ASSOCIATE PROFESSOR

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AREAS OF EXPERTISE

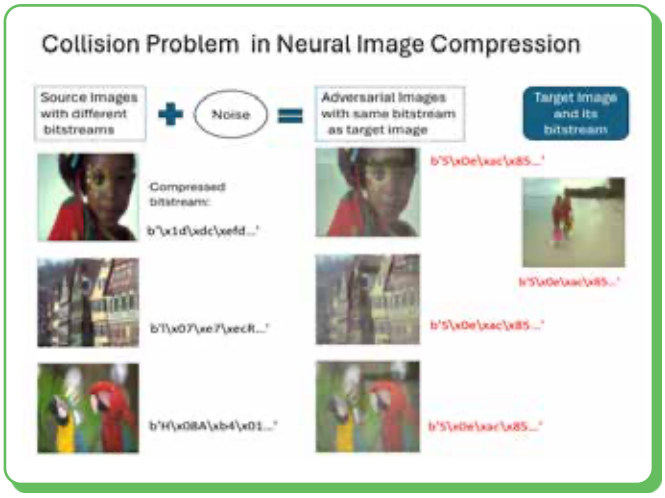
- Signal processing
- Wireless communications
- Radar imaging
- Machine learning and deep learning

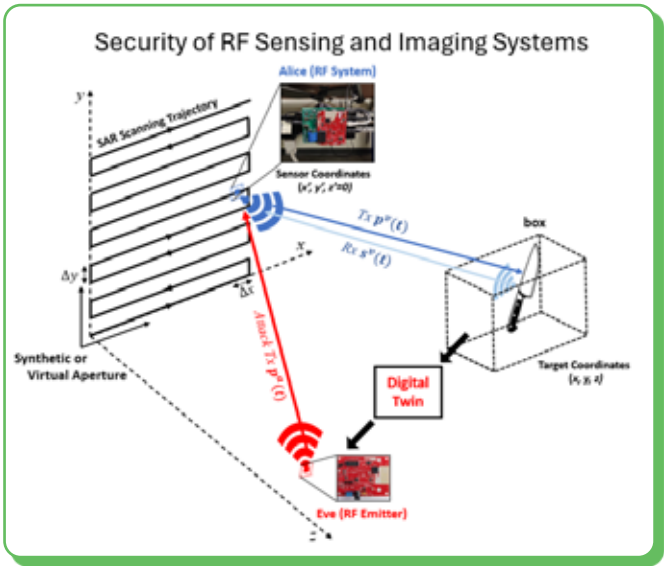
KEY RESEARCH

- Signal processing in communications and wireless networks
- Adversarial machine learning
- Millimeter wave communications and imaging
- Deep neural networks and spiking neural networks

SIGNIFICANT PUBLICATIONS/PATENTS

- A Spike Learning System for Event-driven Object Recognition - arXiv preprint arXiv:2101.088505, 2021 - S Zhou, W Wang, X Li, Z Jin
- HODET: Hybrid object detection and tracking using mmWave radar and visual sensors,Sensors and Systems for Space Applications XIII 11422, 11422015, 2020 - JS Cyr, J Vanderpool, Y Chen, X Li
- Temporal-Coded Deep Spiking Neural Network with Easy Training and Robust Performance, arXiv preprint arXiv:1909.10837 - S Zhou, X Li, Y Chen, ST Chandrasekaran, A Sanyal
- Image Captioning with Integrated Bottom-Up and Multi-level Residual Top-Down Attention for Game Scene Understanding, arXiv preprint arXiv:1906.06632reprint arXiv:1909.10837 - J Zheng, S Krishnamurthy, R Chen, MH Chen, Z Ge, X Li





Yukui Luo

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

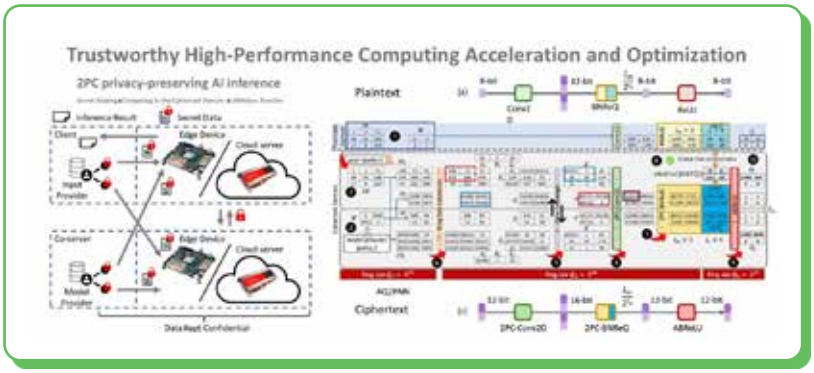
- Privacy-preserving cloud computing
- Security for virtualization technologies
- Resilient edge AI

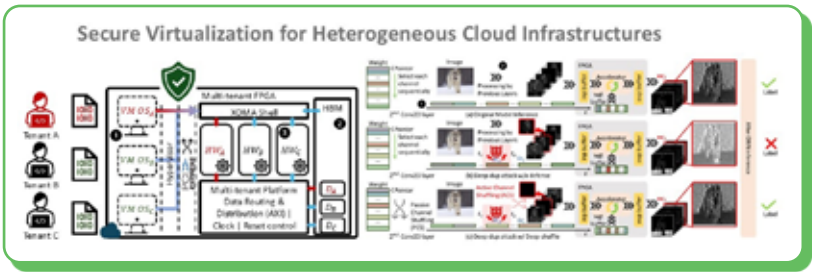
KEY RESEARCH

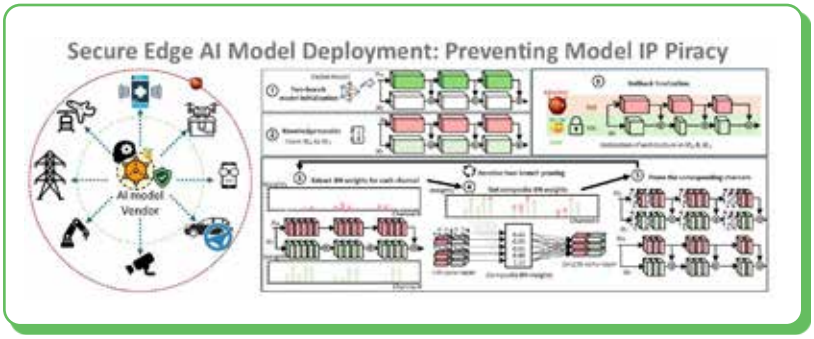
- Trustworthy high-performance computing (HPC) acceleration and optimization
- Secure virtualization for heterogeneous cloud infrastructures
- Secure edge AI model deployment: preventing model IP piracy

POTENTIAL APPLICATIONS

- Addressing data silo issues and enabling privacy-preserving data computing. Target industries: e-healthcare, transportation networks and electric power systems
- Heterogeneous Supercomputing Cloud: Secure sharing of cloud computing power
- Business: Helping enterprises secure edge AI and protect other IP-related data/models
- Education: Enabling privacy-preserving data interaction and collaboration in a multi-dimensional holographic classroom







SIGNIFICANT PUBLICATIONS/PATENTS

- Liu, Z., Zhou, T., Luo, Y. and Xu, X. "TBNet: A Neural Architectural Defense Framework Facilitating DNN Model Protection in Trusted Execution Environments," IEEE/ACM Design Automation Conference (DAC), 2024.
- Luo, Y., Rakin, A.S., Fan, D., Xu, X. "DeepShuffle: A Lightweight Defense Framework against Adversarial Fault Injection Attacks on Deep Neural Networks in Multi-Tenant Cloud-FPGA," IEEE Symposium on Security and Privacy (S&P) (Oakland), 2024.
- Gongye, C., Luo, Y., Xu, X., Fei, Y. "Side-Channel-Assisted Reverse-Engineering of Encrypted DNN Hardware Accelerator IP and Attack Surface Exploration," IEEE Symposium on Security and Privacy (S&P) (Oakland), 2024.
- Luo, Y., Xu, N., Peng, H., Wang, C., Duan S., Mahmood, K., Wen, W., Ding, C., Xu, X. "AQ2PNN: Enabling Two-party Privacy-Preserving Deep Neural Network Inference with Adaptive Quantization," IEEE/ACM International Symposium on Microarchitecture (MICRO), 2023.
- Luo, Y., Rakin, A.S., Xu, X. Fan, D. "Deep-Dup: An Adversarial Weight Duplication Attack Framework to Crush Deep Neural Network in Multi-Tenant FPGA," USENIX Security Symposium, 2021.
- Luo, Y., Chang, A., Samsung Electronics Co., Ltd., 2024. "U.S. Patent No. US11994938B2: Systems and methods for detecting intra-chip communication errors in a reconfigurable hardware system."

SIGNIFICANT ACHIEVEMENTS

- FCCM '22 Travel Grants for Students
- HOST '20 Travel Grants for Students
- CSAW '20 Embedded Security Challenge 3rd Place U.S.-Canada

Zixiao Ma

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Power and energy systems
- Inverter-based resources
- Control theory
- Machine learning

KEY RESEARCH

- Enhancing the reliability and resilience of renewable energy systems through advanced control methods
- Developing data-driven high-fidelity dynamic models for power system analysis and control
- Exploring AI-driven approaches for power system stability, security, and resilience with physical explainability

POTENTIAL APPLICATIONS

- Bulk grid: Integration of renewable energy resources, resilience enhancement
- Microgrid: Stable and secure operation of islanded microgrids, black start with renewables
- Cyber-physical systems: Ensuring safety and cybersecurity in multi-agent energy systems

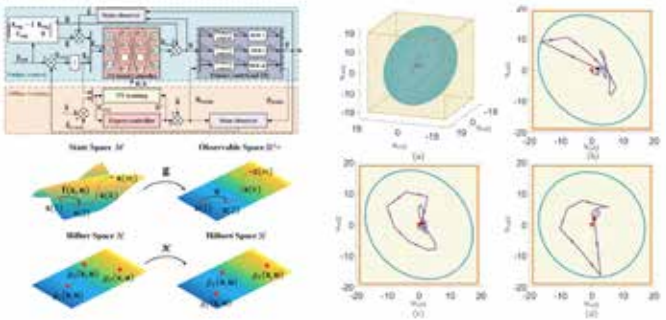
SIGNIFICANT PUBLICATIONS/PATENTS

- Z. Ma, Z. Wang, Y. Yuan, and T. Hong, “Singular Perturbation-based Large-Signal Order Reduction of Microgrids for Stability and Accuracy Synthesis with Control,” IEEE Transactions on Smart Grid, vol. 15, no. 4, pp. 3361-3374, 2024.
- Z. Ma, Q. Zhang, and Z. Wang, “Safe and Stable Secondary Voltage Control of Microgrids based on Explicit Neural Networks,” IEEE Transactions on Smart Grid, vol. 14, no. 5, pp. 3375-3387, 2023.
- Z. Ma, Z. Wang, and Rui Cheng, “Analytical Large-Signal Modeling of Inverter-based Microgrids with Koopman Operator Theory for Autonomous Control,” IEEE Transactions on Smart Grid, vol. 15, no. 2, pp. 1376-1387, 2023. Z. Ma, B. Cui, Z. Wang, and D. Zhao, “Parameter Reduction of Composite Load Model using Active Subspace Method,” IEEE Transactions on Power Systems, vol. 36, no. 6, pp. 5441-5452, 2021.

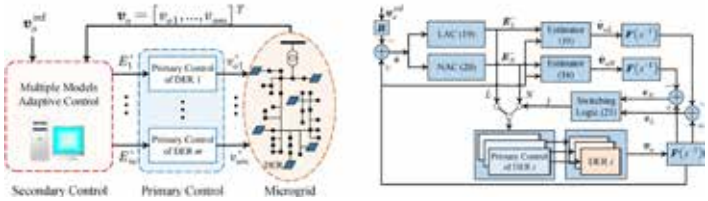
SIGNIFICANT ACHIEVEMENTS

- 2024: Section Co-Lead of IEEE Standard P3102, IEEE Conservation Voltage Reduction (CVR) Task Force
- 2024: IEEE Power and Energy Society General Meeting Best Paper Award
- 2024: Rising Stars in Cyber-Physical Systems, University of Virginia
- 2023: Distinguished Postdoctoral Fellowship, University of Washington

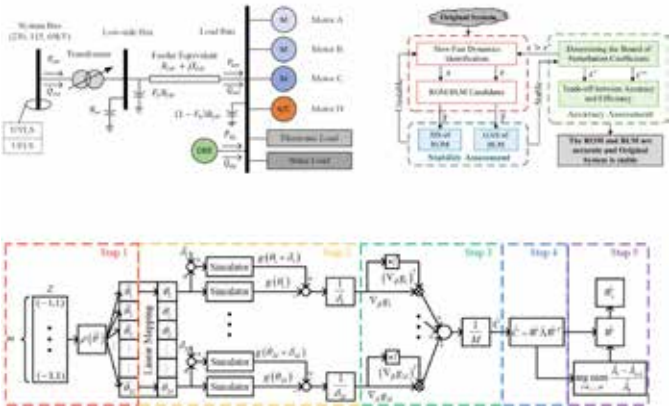
Safe Imitation Learning Control for Inverter-based Microgrids in EMT Timescale.



Data-Driven Secondary Control of Microgrids using Multiple Models Adaptive Control and Neural Networks.



WECC Composite Load Modeling: Order Reduction, Parameter reduction and Parameter Identification.



Vladimir Nikulin

ASSOCIATE PROFESSOR

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AREAS OF EXPERTISE

- Advanced optical technologies with a focus on free-space laser communication and holographic sensing systems

KEY RESEARCH

- Free-space laser communication
- Quantum communication
- Optical sensors
- Holographic analysis and measurements
- Electric drives
- Energy systems

SIGNIFICANT PUBLICATIONS/PATENTS

- Experimental testbed for free-space quantum communication links with polarization entanglement, Quantum Communications and Quantum Imaging XXII 13148, 23-32 — 2024- V Nikulin, V Bedi, PA Ricci, JW Heinig, EC Sheridan, CA Mathers
- Design of Technology for Secure File Storage Based on Hybrid Cryptography Methods: Short Overview, 2024 IEEE 4th International Conference on Smart Information Systems, 2024 — GA Abitova, AS Manap, K Kulniyaziva, V Nikulin
- Analyzing beam profile, intensity fluctuations, and beam wander with varying weather conditions on a free-space 1550 nm optical communication link, Free-Space Laser Communications XXXVI 12877, 397-410, 2024 — V Bedi, V Nikulin, G Anand, PA Ricci, CA Mathers, JW Heini
- Experimental characterization of entanglement characteristics in free-space quantum communication links, Quantum Communications and Quantum Imaging XXI 12692, 77-84, 2023- V Nikulin, V Bedi, KA Soderberg, P Alsing, LA Wessing, PA Ricci
- Investigating timing jitter on a free-space high-bandwidth data communication link with seasonal weather variations, Laser Communication and Propagation through the Atmosphere and Oceans XII, 2023 — V Bedi, V Nikulin, KA Soderberg, LA Wessing, PA Ricci, D Islam, WF Lipe
- Experimental study on the effects of turbulence induced scintillations on a practical free-space communication link at high bandwidth, Laser Communication and Propagation through the Atmosphere and Oceans XI, 2022 — V Bedi, V Nikulin, KA Soderberg, JE Malowicki, PA Ricci, CA Mathers

Jungwook “Jay” Paek

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Human organ-on-a-chip and organoid
- Tissue engineering
- Neural engineering
- BioMEMs and soft robotics

KEY RESEARCH

- Investigating the effects of polymorphic amyloid fibril conformation on neurodegenerative disease progression
- Probing the biomechanics of obstructive lung diseases using a microengineered model of human lungs
- Development of Biological Artificial Intelligence (BAI) system using in vitro neuron cultures-on-electronics

POTENTIAL APPLICATIONS

- Health Science: Pathophysiology of neurodegenerative disorders and obstructive lung diseases, disease modeling
- Neuroscience: Platform technology for studying cognitive processes in neuroscience
- Business: Drug screening platforms, personalized medicine solutions, transplantation therapeutics, health science research platforms

SIGNIFICANT PUBLICATIONS/PATENTS

- J Paek et al. (2019) “Microphysiological engineering of self-assembled and perfusable microvascular beds for the production of vascularized three-dimensional human microtissues,” ACS Nano, 13(7), 7627-7643
- J Paek et al. (2021) “Soft robotic constrictor for in vitro modeling of dynamic tissue compression,” Scientific Reports, 11, 16478
- E Park & J Paek et al. (2022) “Geometric engineering of organoid culture for enhanced organogenesis in a dish,” Nature Methods, 19, 1449–1460

MAJOR PROJECTS/FUNDING

- NIH R21 “Investigating the interplay between polymorphic α-syn fibril conformation and cell-dependent pathology” (total $414,191, Binghamton portion $223,932)

SIGNIFICANT ACHIEVEMENTS

- 2024: BMES conference presentation — “Microengineering of human vascularized brain tissue for modeling Lewy pathology in Parkinson’s Disease and related Synucleinopathies”

Ramesh Pokharel

ASSOCIATE PROFESSOR

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AREAS OF EXPERTISE

- Radio frequency integrated circuits
- RF front ends for microwave/millimeter-wave/THz
- Wireless charging of biomedical implants
- Antennas

KEY RESEARCH

- Development of low-power beamformer IC
- Developing RF front ends and phase array antennas for 5G/6G
- Wireless charging systems of biomedical implants such as pacemakers
- Exploring the application of AI/ML in high-frequency integrated circuits design

POTENTIAL APPLICATIONS

- 5G/6G Wireless Communication Systems,
- Medical Implants and Wearable Sensors

SIGNIFICANT PUBLICATIONS/PATENTS

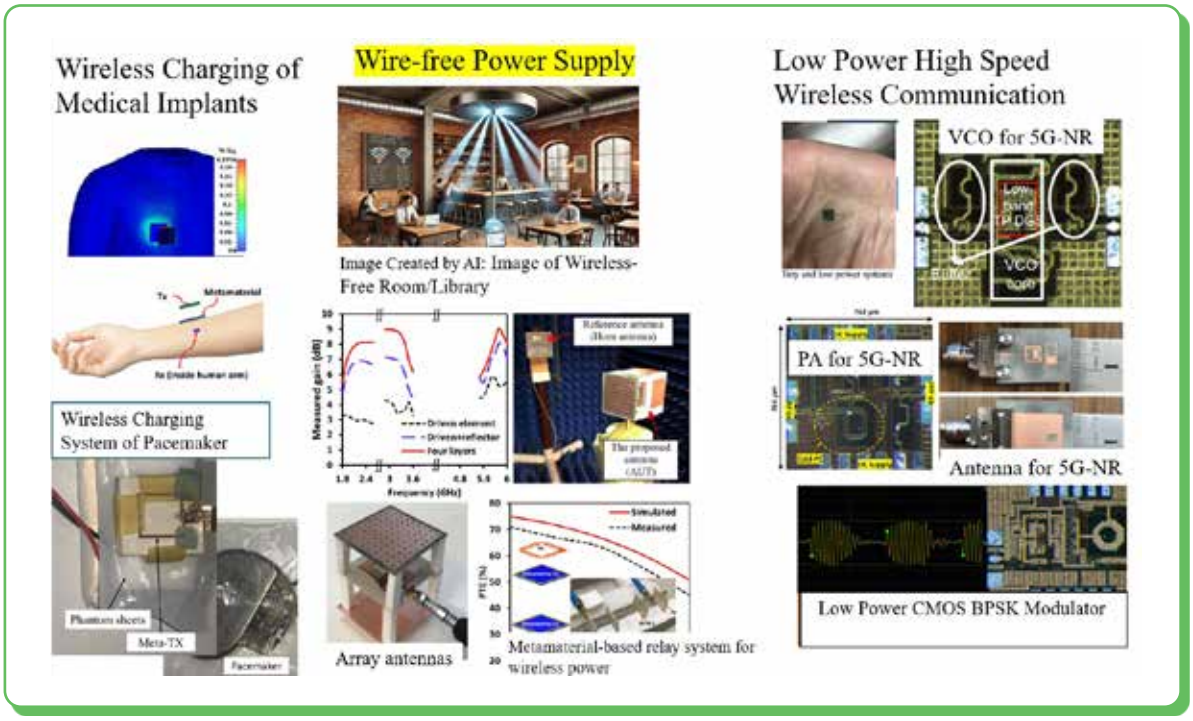
- R K. Pokharel et al, "Wireless power transfer system rigid to tissue characteristics using metamaterial inspired geometry for biomedical implant applications," Scientific Reports, 11 (1), pp. 1-10 (2021) 11:5868.
- R.K. Pokharel et al, "Capacitive Feedbacked Cold-Phase Compensator Analog Pre-Distorter and PAE Enhancer for 5G-NR K-Band CMOS PAs," IEEE Transactions on Circuits and Systems I: Regular Papers, vol. 69, no. 12, pp. 4969-4980, Dec. 2022.
- R. K. Pokharel et al, "Energy Harvesting Rectenna Using High-gain Triple-band Antenna for Powering Internet-of-Things (IoT) Devices in a Smart Office," IEEE Trans. on Instrumentation and Measurement, vol. 72, pp. 2001312, 2023

MAJOR PROJECTS/FUNDING

- NY State Startup

SIGNIFICANT ACHIEVEMENTS

- 2025: IEEE Senior Member



Douglas Summerville

SUNY DISTINGUISHED TEACHING PROFESSOR

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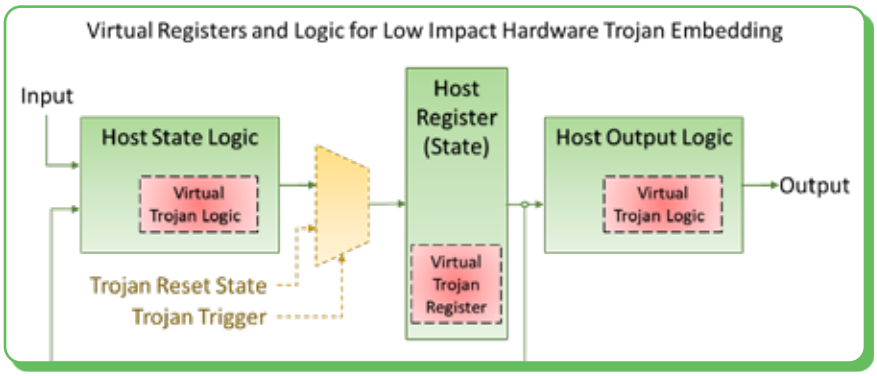
AREAS OF EXPERTISE

- Hardware security
- Embedded systems
- Side-channel analysis

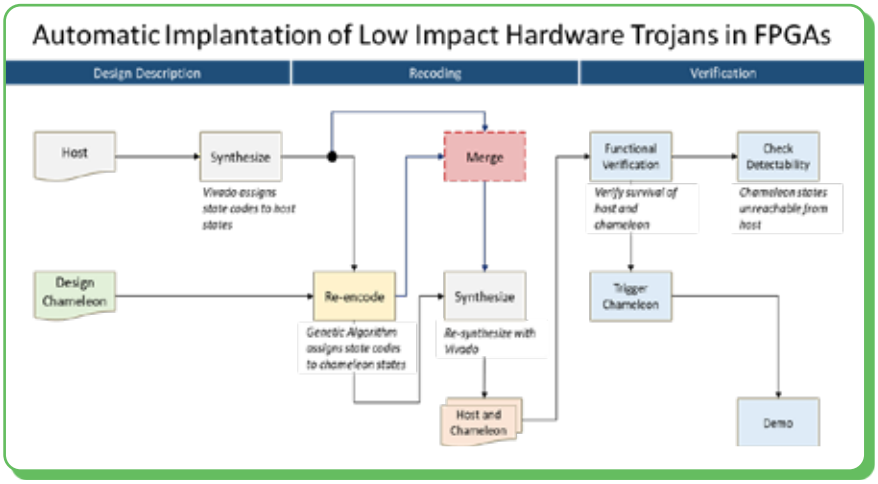
KEY RESEARCH

- Methods to detect and prevent embedding malicious functionality within digital circuits
- Automated network protocol reverse-engineering
- Lightweight anomaly detection in IoT networks
- Side-channel analysis for secure embedded systems



POTENTIAL APPLICATIONS

- Lightweight monitoring for security of embedded hardware
- Automated reverse-engineering of embedded systems and networks
- Creating tamper-evident and tamper-reactive digital circuits



SIGNIFICANT PUBLICATIONS/ PATENTS

- K. Pintong and D. H. Summerville, "Towards reducing costs of side channel analysis for real-time algorithm detection," In. IEEE Intl Conference on Physical Assurance and Inspection of Electronics (PAINE 2024).
- K. Temkin and D. H. Summerville. "An Algorithmic Method for the Implantation of Detection-Resistant Covert Hardware Trojans". In: Proc. of the 11th Annual Cyber and Information Security Research (CISR) Conference. 2016.
- P. T. Watrobski and D. H. Summerville. "De-encapsulation of network packets for network protocol reverse engineering". In: IEEE Military Communications Conference, MILCOM 2016
- D. H. Summerville, K. M. Zach, and Y. Chen. "Ultra-Lightweight Deep Packet Anomaly Detection for Internet of Things Devices". In: Proc. of the 34th IEEE International Performance Computing and Communications Conference. 2015.

MAJOR PROJECTS/FUNDING

- 2019-21: FPGA Assurance- Tamper Detection- Chameleon Circuits. Lockheed Martin (Air Force Research Lab)
- 2019-21: Safeguards Against Hidden Effects and Anomalous Trojans in Hardware (SHEATH). Assured Information Security (DARPA)
- 2015: Feasibility Study of Flexible Ultra-Lightweight Anomaly Detection for Resource Constrained Embedded Systems. NYS Cyber Research Institute

SIGNIFICANT ACHIEVEMENTS

- Best Paper Awards: IEEE PAINE '24, IEEE LCN-WNS '08, IEEE IAW '06
- 2012: SUNY Chancellor's Award for Excellence in Teaching
- 2010: Binghamton University Council/Foundation Award for Service to the University
- 2007: SUNY Chancellor's Award for Excellence in Faculty Service

Jianming Wen

ASSOCIATE PROFESSOR

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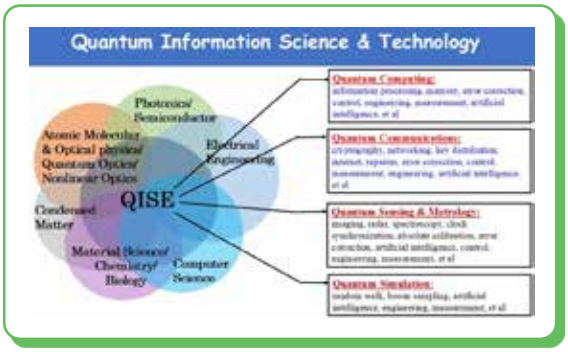
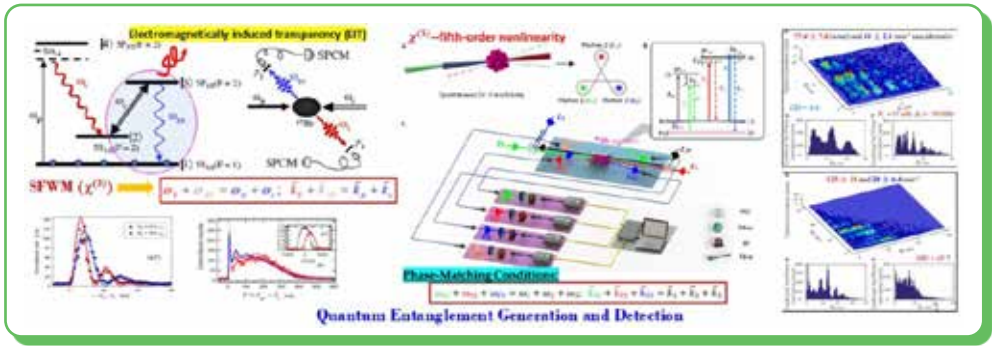
AREAS OF EXPERTISE

- Quantum information science and technology
- Integrated photonics
- Optical imaging, sensing and spectroscopy
- Atomic molecular and optical physics



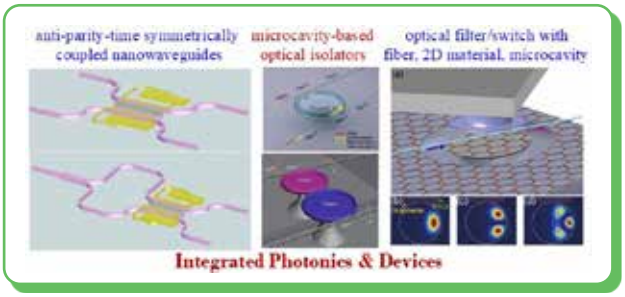
KEY RESEARCH

- Developing integrated photonic platforms for classical and quantum applications in information processing, computing, networking, communications, sensing
- Advancing high-resolution optical imaging and sensing techniques for studying nanoscale and biological systems
- Utilizing laser-cooled atoms to explore quantum foundations and quantum information science and technology
- Exploring novel nonlinear optical effects and quantum light-matter interactions in engineered systems for quantum applications



POTENTIAL APPLICATIONS

- Next-generation quantum technologies
- Nanophotonics and devices
- Superresolution imaging and supersensitive sensing



SIGNIFICANT PUBLICATIONS/PATENTS

- K. Li, J. Wen, Y. Cai, S. V. Ghamsari, C. Li, F. Li, Z. Zhang, Y. Zhang, and M. Xiao, "Direct generation of time-energy-entangled W triphotons in atomic vapor," Science Advances 10, eado3199 (2024).
- P.-R. Han, F. Wu, X.-J. Huang, H. Wu, C.-L. Zou, W. Yi, M. Zhang, H. Li, K. Xu, D. Zheng, H. Fan, J. Wen, Z.-B. Yang, and S.-B. Zheng, "Exceptional entanglement phenomena: non-Hermiticity meeting nonclassicality," Physical Review Letters 131, 260201 (2023).
- S. Hua, J. Wen, X. Jiang, Q. Hua, L. Jiang, and M. Xiao, "Demonstration of a chip-based optical isolator with parametric amplification," Nature Communications 7, 13657 (2016).
- L. Chang, X. Jiang, S. Hua, C. Yang, J. Wen, L. Jiang, G. Li, G. Wang, and M. Xiao, "Parity-time symmetry and variable optical isolation in active-passive-coupled microresonators," Nature Photonics 8, 524-529 (2014).

MAJOR PROJECTS/FUNDING

- DOE, "Hybrid optical quantum networks with discrete polarizations and continuous quadrature variables" ($1,200,000)
- NSF, "EFRI NewLaw: CMOS-compatible electrically controlled nonreciprocal light propagation with 2D materials" ($2,000,000)
- NSF, "ExpandQISE: Track 1: Harnessing anti-Hermiticity and symmetries to probe exceptional entanglement transition and supersensitive quantum sensing" ($796,083)
- NIH, "Bioengineering research and interdisciplinary training—Esteemed (BRITE)" ($1,300,000)

SIGNIFICANT ACHIEVEMENTS

- 2021: KSU Outstanding Research and Creative Activity Award
- Outstanding Reviewer Awards from APS, Optica, IOP

N. Eva Wu

PROFESSOR

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AREAS OF EXPERTISE

- Modeling and control of dynamics systems
- Reliability of controlled dynamic systems
- Signal processing

KEY RESEARCH

- Fault diagnosis and fault-tolerant control of large-scale dynamic systems
- Optimal sensing and control device placement in controlled networks
- Supervisory control of time- and event-driven processes for resilience

POTENTIAL APPLICATIONS

- Electric energy and power systems
- Modern networks (computer, communication, distributed software)
- Epidemiological processes

SIGNIFICANT PUBLICATIONS/PATENTS

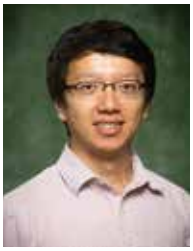
- N.E. Wu, M. Sarailoo, and M. Salman, Transmission fault diagnosis with sensor-localized filter-models for complexity reduction, IEEE Transactions on Smart Grid, vol.9, pp.6939-6950, 2018.
- N.E. Wu, Coverage in fault-tolerant control, Automatica, vol.40, pp.537-548, 2004.
- H. Chen, N.E. Wu, and Z. Wu, A method of high resolution and high SNR data acquisition for probing using pulse compression, US Patent #5426618, 1995.

MAJOR PROJECTS/FUNDING

- Served as a PI/co-PI for research projects funded by NSF, AFOSR, AFRL, NASA, NIH, NYSERDA, Lockheed Martin and General Electric

Ziang "John" Zhang

ASSOCIATE PROFESSOR



EDUCATION: PhD in Electrical Engineering, North Carolina State University
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AREAS OF EXPERTISE

- Power systems Stability
- Renewable energy integration
- Energy storage system

KEY RESEARCH

- Stability analysis of power systems with inverter-based resources
- Energy market with high penetration of renewable and storage resources
- Energy storage system planning and operation

POTENTIAL APPLICATIONS

- Power systems planning
- Power systems operation

SIGNIFICANT PUBLICATIONS/PATENTS

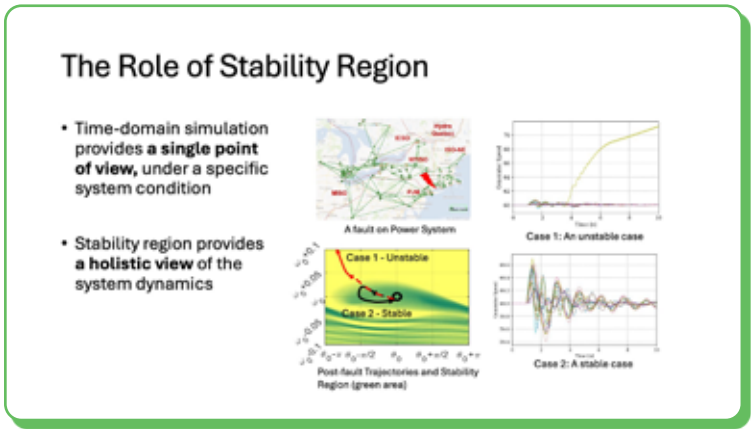
- Z. Ding, X. Huang, Z. Liu, and Z. Zhang, "A Two-Level Scheduling Algorithm for Battery Systems and Load Tap Changers Coordination in Distribution Networks," in IEEE Transactions on Power Delivery, vol. 37, no. 4, pp. 3027-3037, Aug. 2022.
- Y. Mao and Z. Zhang, "Asymptotic Frequency Synchronization of Kuramoto Model by Step Force," in IEEE Transactions on Systems, Man, and Cybernetics: Systems, vol. 50, no. 8, pp. 2768-2778, Aug. 2020.
- Z. Liu, X. He, Z. Ding, and Z. Zhang, "A Basin Stability Based Metric for Ranking the Transient Stability of Generators," in IEEE Transactions on Industrial Informatics, vol. 15, no. 3, pp. 1450-1459, March 2019.

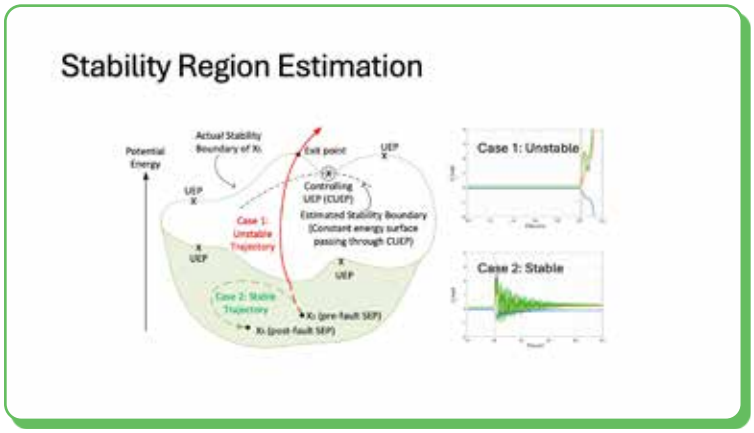
MAJOR PROJECTS/FUNDING

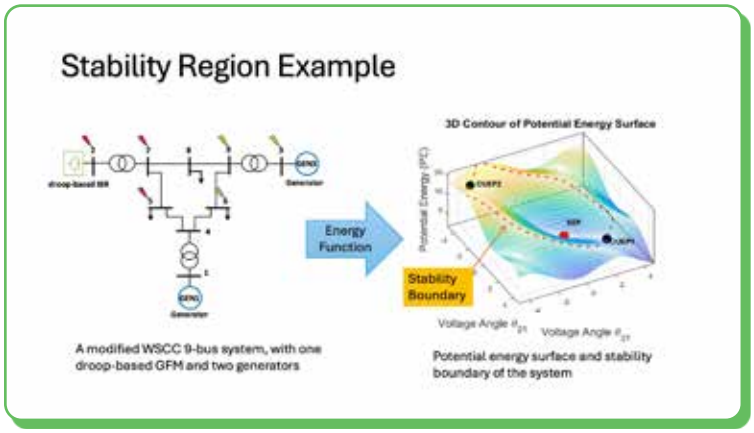
- 2024-26: Development of High IBR Penetration New York Power System Models for Operators, New York State Energy Research and Development Authority (NYSERDA)
- 2023-26: GOALI:ASCENT:Online Stability Assessment, Flexibility, and Enhancement of IBR-dominated Power Systems, National Science Foundation (NSF)
- 2021-24: Asynchronous Distributed and Adaptive Parameter Tuning (ADAPT) for Hybrid PV Plants, Department of Energy (DOE)

SIGNIFICANT ACHIEVEMENTS

- 2024: Dean's Research Award, Thomas J. Watson College of Engineering and Applied Science, Binghamton University
- 2023: Large Grant Award, The Research Foundation for The State University of New York
- 2023: IEEE PES Prize Paper Award
- 2017: IEEE PES GM Best Paper Award

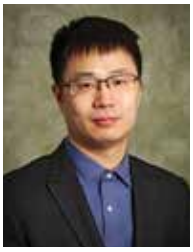






Wenfeng Zhao

ASSISTANT PROFESSOR



EDUCATION: PhD in Electrical and Computer Engineering, National University of Singapore
EMAIL: wzhao@binghamton.edu
WEBSITE: sites.google.com/binghamton.edu/wzhao

AREAS OF EXPERTISE

- Digital and analog integrated circuits
- Neural engineering and neurotechnology
- AI hardware
- Cryptographic hardware and AI security

KEY RESEARCH

- Mixed-signal compute-in-memory (CIM)
- Large-scale wireless neural recording
- Algorithm-hardware codesign of deep learning accelerators
- Fully homomorphic encryption hardware accelerator

POTENTIAL APPLICATIONS

- Next-generation data-intensive computing
- Neurotechnology for neurological disease treatment
- Intelligent edge sensing, computing, and decision making
- Privacy-preserving machine learning

SIGNIFICANT PUBLICATIONS/PATENTS

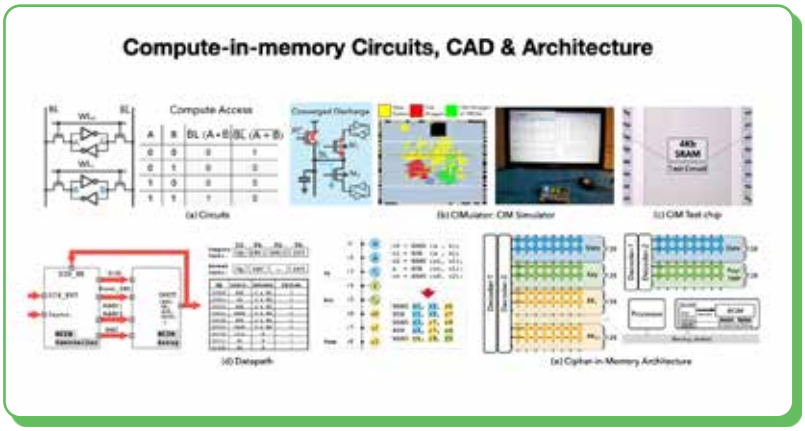
- Y. Zhang, O. Al Kailani, B. Zhou, and W. Zhao, "AdderNet 2.0: optimal fpga acceleration of addernet with activation-oriented quantization and fused bias removal-based memory optimization," IEEE Transactions on Circuits and Systems I: Regular Papers, in press, 2025.
- Dervay, and W. Zhao, "BCIM: constant-time and high-throughput block-cipher-in-memory with massively-parallel bit-serial execution," IEEE Transactions on Emerging Topics in Computing, in press, 2025.
- J. Zhai, W. Zhao, Biao Sun, "Compression of respiratory sound signals via TranscoderQ-VAE," in IEEE Biomedical Circuits and Systems Conference (BioCAS), 2024, pp. 1-5.
- Y. Zhang, J. Xu, M. Hu, and W. Zhao, "Exploiting a blink of measurement saturation towards hardware-efficient compressed sensing encoder design," in Circuits and Systems (ISCAS), 2022 IEEE International Symposium on, 2022, pp. 4183 — 4187.

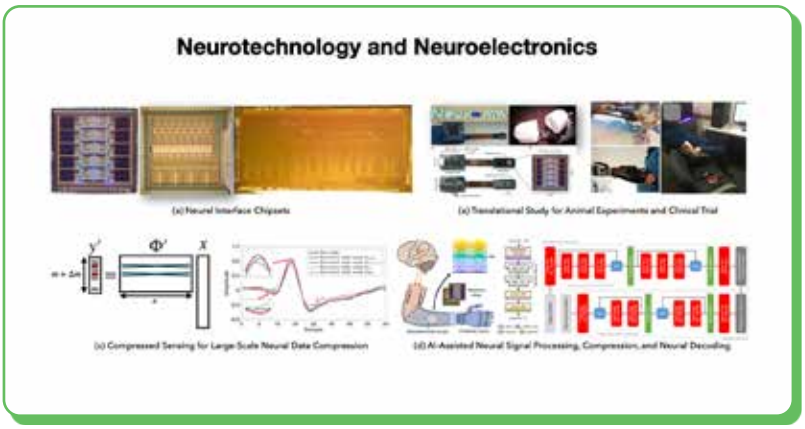
MAJOR PROJECTS/FUNDING

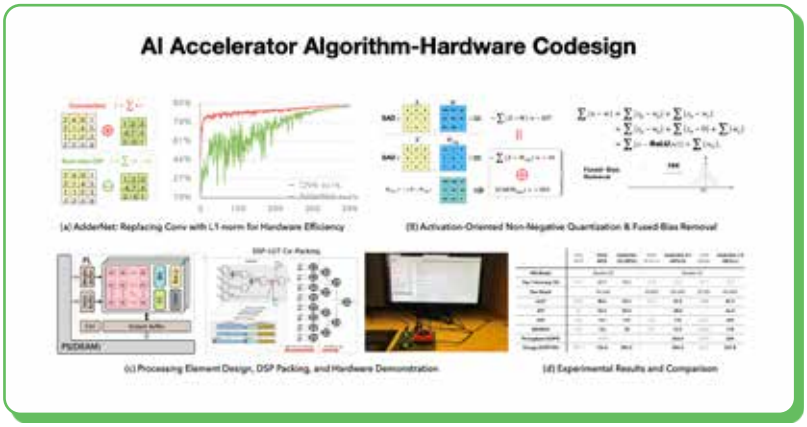
- 2024-26: USDA, "ML-Enabled Produce Quality Monitoring for Supply Chain Management"
- 2024-25: IEEC, "AdderNet Deployment and Acceleration on Microcontroller"
- 2024-25: TAE, "Dual Optimization of Efficiency and Security of Modern Deep Learning"

SIGNIFICANT ACHIEVEMENTS

- 2019: Mistletoe Research Fellowship

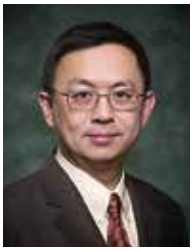






Ning Zhou

ASSOCIATE PROFESSOR



EDUCATION: PhD in Electrical Engineering, University of Wyoming
EMAIL: ningzhou@binghamton.edu
WEBSITE: ningzhou.sunycreate.cloud

AREAS OF EXPERTISE

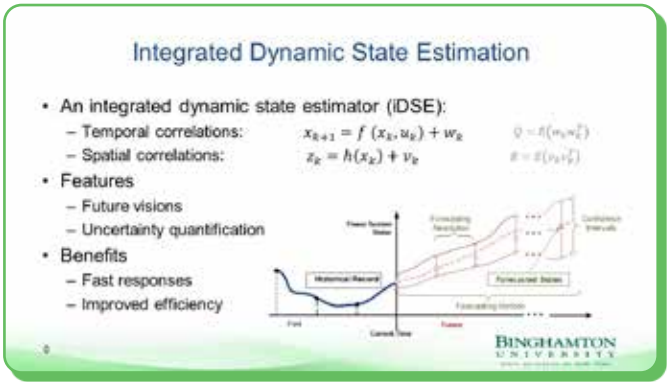
- Power system dynamic stability and control
- Phasor measurement unit (PMU) applications
- Renewable energy integration
- Power system state estimation

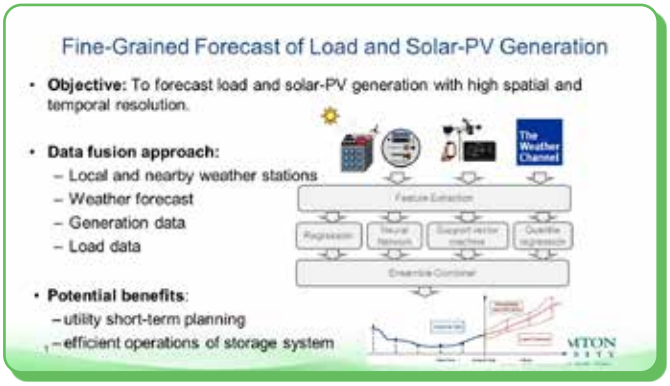
KEY RESEARCH

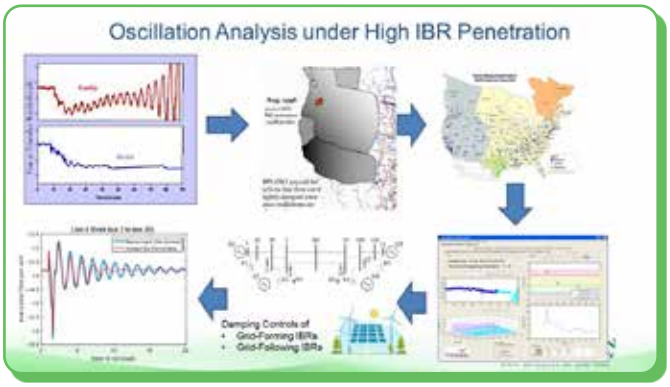
- Control strategy development for inverter-based resources
- Integrated dynamic state estimation for power systems
- Analysis of wide-area oscillations

POTENTIAL APPLICATIONS

- Power system operation and control
- Grid reliability and stability enhancement
- Renewable energy forecasting and integration
- Wide-area monitoring and control using PMUs







SIGNIFICANT PUBLICATIONS/PATENTS

- Yuting Chen, Ning Zhou, Ziang Zhang, "Quantifying Uncertainty in State Estimation: The MoK-FoBS Method via Interval Analysis," IEEE Access, vol. 13, pp. 10805-10819, 2025
- Tawsif Ahmad, Ning Zhou, Ziang Zhang, Wenyuan Tang, "Enhancing Probabilistic Solar PV Forecasting: Integrating the NB-DST Method with Deterministic Models," Energies. May 2024; 17(10):2392.
- Shahrokh Akhlaghi, Ning Zhou, Zhenyu Huang, "Adaptive adjustment of noise covariance in Kalman filter for dynamic state estimation," 2017 IEEE Power & Energy Society General Meeting, Chicago, IL, USA, 2017.
- Ning Zhou, John Pierre, Dan Trudnowski, Ross Guttromson, "Robust RLS Methods for On-line Estimation of Power System Electromechanical Modes," IEEE Transactions on Power Systems, vol. 22, no.3, pp.1240-1249, Aug 2007. (Technical Committee Prize Paper Award from the IEEE/PES Power System Dynamic Performance Committee in 2009)

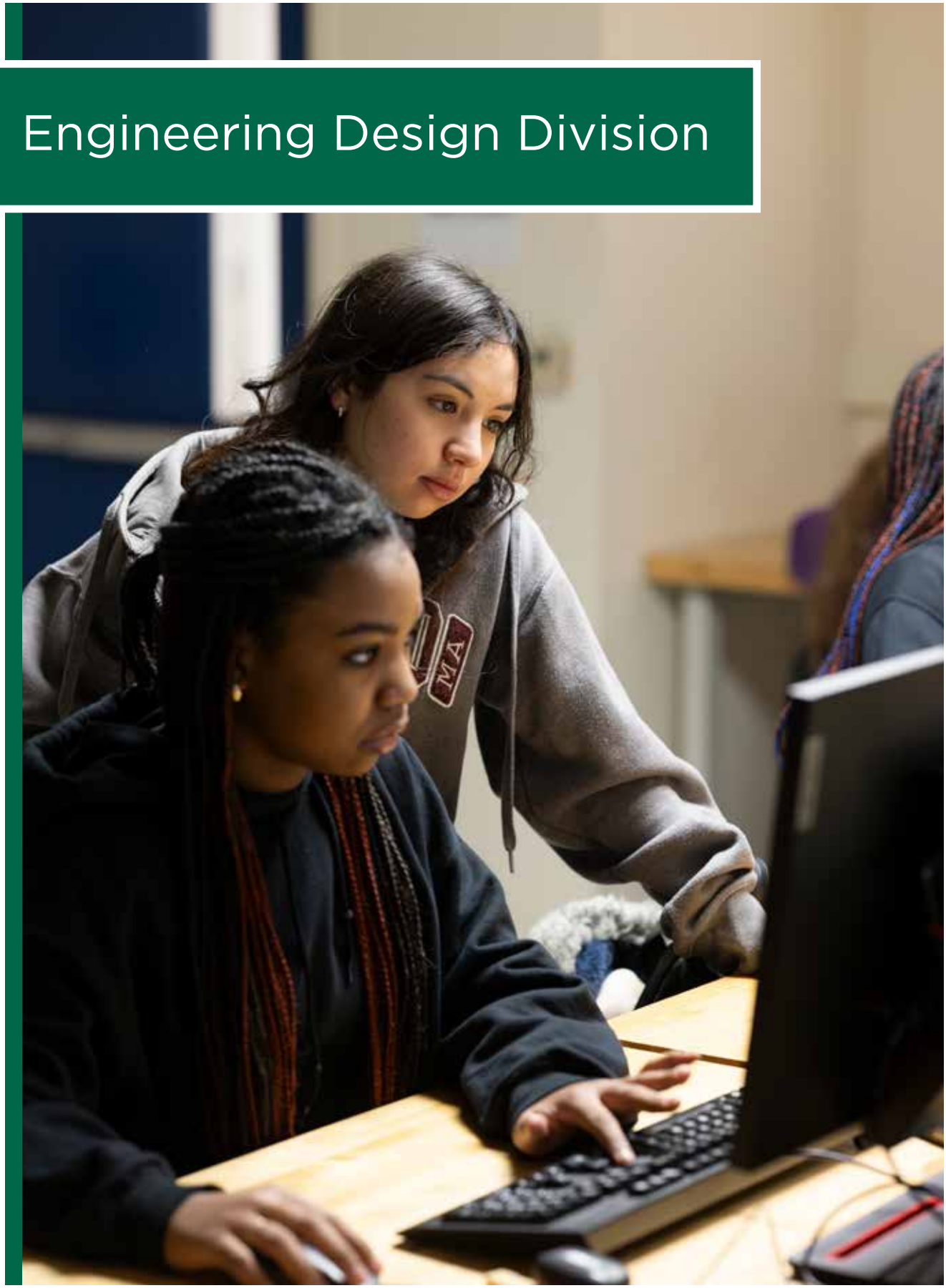
MAJOR PROJECTS/FUNDING

- 2019-25: PI — "CAREER: Integrated Dynamic State Estimation for Monitoring Power Systems under High Uncertainty and Variation," National Science Foundation (NSF)
- 2021-24: Co-PI — "Asynchronous Distributed and Adaptive Parameter Tuning (ADAPT) for Hybrid PV Plants," Department of Energy (DOE)
- 2023-25: PI — "Control Strategy Development for Inverter-Based Resources to Improve Oscillation Modes," DOE through Pacific Northwest National Laboratory (PNNL)
- 2024-26: Co-PI — "Development of High IBR Penetration New York Power System Models for Operators," NYSERDA

SIGNIFICANT ACHIEVEMENTS

- 2019: NSF CAREER Award for contributions to power system state estimation
- 2019-23: Ranked among the world's top 2% scientists (by Stanford University)
- Four Best Conference Paper Awards (multiple years) at IEEE PES General Meetings
- 2009: Technical Committee Prize Paper Award, from the IEEE/PES Power System Dynamic Performance Committee. Only one paper is selected from over 100 eligible transactions papers by the committee.

Engineering Design Division

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Whack-a-Mole

Sidi “Allen” Deng

RESEARCH ASSISTANT PROFESSOR

EDUCATION: PhD in Industrial Engineering, Purdue University
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WEBSITE: sidideng.github.io/academia

AREAS OF EXPERTISE

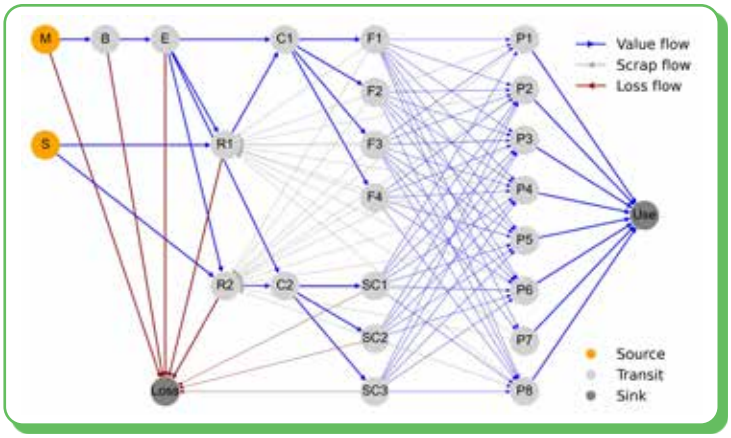
- Simulation modeling and analysis
- Complex systems modeling and analysis
- Applied statistics
- Physics-informed machine learning

KEY RESEARCH

- Industrial ecology and lifecycle engineering
- Geospatially informed network modeling and simulation of supply chains
- Integrating digital twins, statistical learning and control theory

POTENTIAL APPLICATIONS

- Material and energy supply chains: sustainability and resilience
- Energy-efficient manufacturing, industrial decarbonization and clean-energy transition
- Waste management, reverse logistics and circular economy



SIGNIFICANT PUBLICATIONS/PATENTS

- Deng, S., Xiao, Z., Zhang, W., Noble, A., Das, S., Yih, Y., & Sutherland, J.W., “Economic Analysis of Precious Metal Recovery from Electronic Waste Through Gas-Assisted Microflow Extraction,” Resources, Conservation and Recycling, 190, 2022, p. 106810. doi.org/10.1016/j.resconrec.2022.106810.
- Deng, S., Kpodzro, E., Maani, T., Li, Z., Huang, A., Yih, Y., Zhao, F., & Sutherland, J. W., “Planning a Circular Economy System for Electric Vehicles Using Network Simulation,” Journal of Manufacturing Systems, 63, 2022, pp. 95-106. doi.org/10.1016/j.jmsy.2022.03.003.
- Deng, S., Prodius, D., Nlebedim, I.C., Huang, A., Yih, Y., & Sutherland, J. W., “A Dynamic Price Model Based on Supply and Demand with Application to Techno-Economic Assessments of Rare Earth Element Recovery Technologies,” Sustainable Production and Consumption, 27, 2021, pp. 1718-1727. doi.org/10.1016/j.spc.2021.04.013.
- LSM TEA Full® (2021 Python) Computer Software. ©2021 by Purdue Research Foundation, West Lafayette, IN. Federal Copyright Application Case Nos: 1-10310238912,1-10310238971,1-10310239030

MAJOR PROJECTS/FUNDING

- 2023-25: Opportunities and Costs in the Transition to Low Carbon U.S. Metals Industries, the Climate Imperative Foundation
- 2023-24: Evaluating the Circularity of Product Life Cycles Using Manufacturing-relevant Indicators and Preliminary Industry Data, NIST
- 2022-23: Development, Deployment, and Evaluation of Instructional Modules for Current and Future Practitioners of Model-based Systems Engineering, NSF
- 2018-23: CMI 4.3.13 Optimizing the Economic Performance of CMI Technologies, the Critical Materials Innovation (CMI) Hub

SIGNIFICANT ACHIEVEMENTS

- 2024: Rackham Postdoc Conference Award, University of Michigan Postdoctoral Association
- 2023: Outstanding Research Award, College of Engineering, Purdue University
- 2023: Leo Award for Best Paper at the CIRP Conferences on Life Cycle Engineering

Koenraad Gieskes

LECTURER AND ASSISTANT DIRECTOR

EDUCATION: BS and MS in Mechanical Engineering, Binghamton University
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AREAS OF EXPERTISE

- Engineering education
- Broadening participation
- Inclusive design

KEY RESEARCH

- Equity in engineering and education
- AI in education
- Accommodations in higher education

POTENTIAL APPLICATIONS

- Increased participation rates in STEM
- Better understanding of the use of AI by students

MAJOR PROJECTS/FUNDING

- 2020-25 Science and Technology Entry Program (STEP), Co-PI with Carmen Jones ($1,240,284)
- 2022-27 Upward Bound Math and Science, Co-PI with Carmen Jones (~$300,000 annually)

SIGNIFICANT ACHIEVEMENTS

- Tau Beta Pi – Eminent Engineer
- Watson College Recognition Award for Outstanding Faculty Service
- SUNY Chancellor's Award for Excellence in Teaching

Melissa Simonik

LECTURER AND ENGINEERING COMMUNICATIONS COORDINATOR

EDUCATION: PhD in Mechanical Engineering, Binghamton University; MEng in Biomedical Engineering, Cornell University; BS in Mechanical Engineering, Union College
EMAIL: msimonik@binghamton.edu
WEBSITE: www.binghamton.edu/engineering-design/people/profile.html?id=msimonik

AREAS OF EXPERTISE

- Orthopedic biomechanics
- Engineering education
- Sports surface-footwear mechanics

KEY RESEARCH

- Investigating and testing orthopedic implant designs and configurations
- Developing an undergraduate peer-mentorship program
- Exploring the footwear-playing surface interface in sports

POTENTIAL APPLICATIONS

- Healthcare: Orthopedic implant design and testing, patient outcomes and post-surgical recovery
- Education: Peer-mentorship, student academic and professional development support, inclusive pedagogy
- Sports: Data-driven footwear and surface design, sports injury reduction

SIGNIFICANT PUBLICATIONS/PATENTS

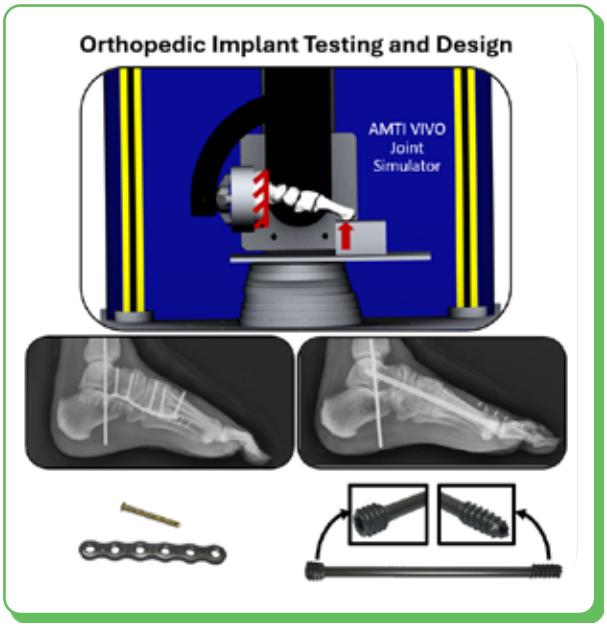
- Simonik, M, Pitarresi, J.M., Willing, R. (2022). Analysis of Intramedullary Beam Designs Using Customized Finite Element Models for Medial Column Arthrodesis of the Foot. The Journal of Foot & Ankle Surgery, 61(3): 508-519. doi.org/10.1053/j.jfas.2021.10.002.
- Simonik, M, Wilczek, J., LaPorta, G., Willing, R. (2018). Biomechanical Comparison of Intramedullary Beaming and Plantar Plating Methods for Stabilizing the Medial Column of the Foot: An In Vitro Study. The Journal of Foot and Ankle Surgery, 57(6), 1073-1079. doi.org/10.1053/j.jfas.2018.03.043
- Mansfield, M. & Bucinell, R.B. (2016). Effects of Playing Surface and Shoe Type on ACL Tears in Soccer Players. American Journal of Engineering and Applied Sciences, 9(4): 1150-1157. doi: 103844/ajeassp.2016.1150.1157.

MAJOR PROJECTS/FUNDING

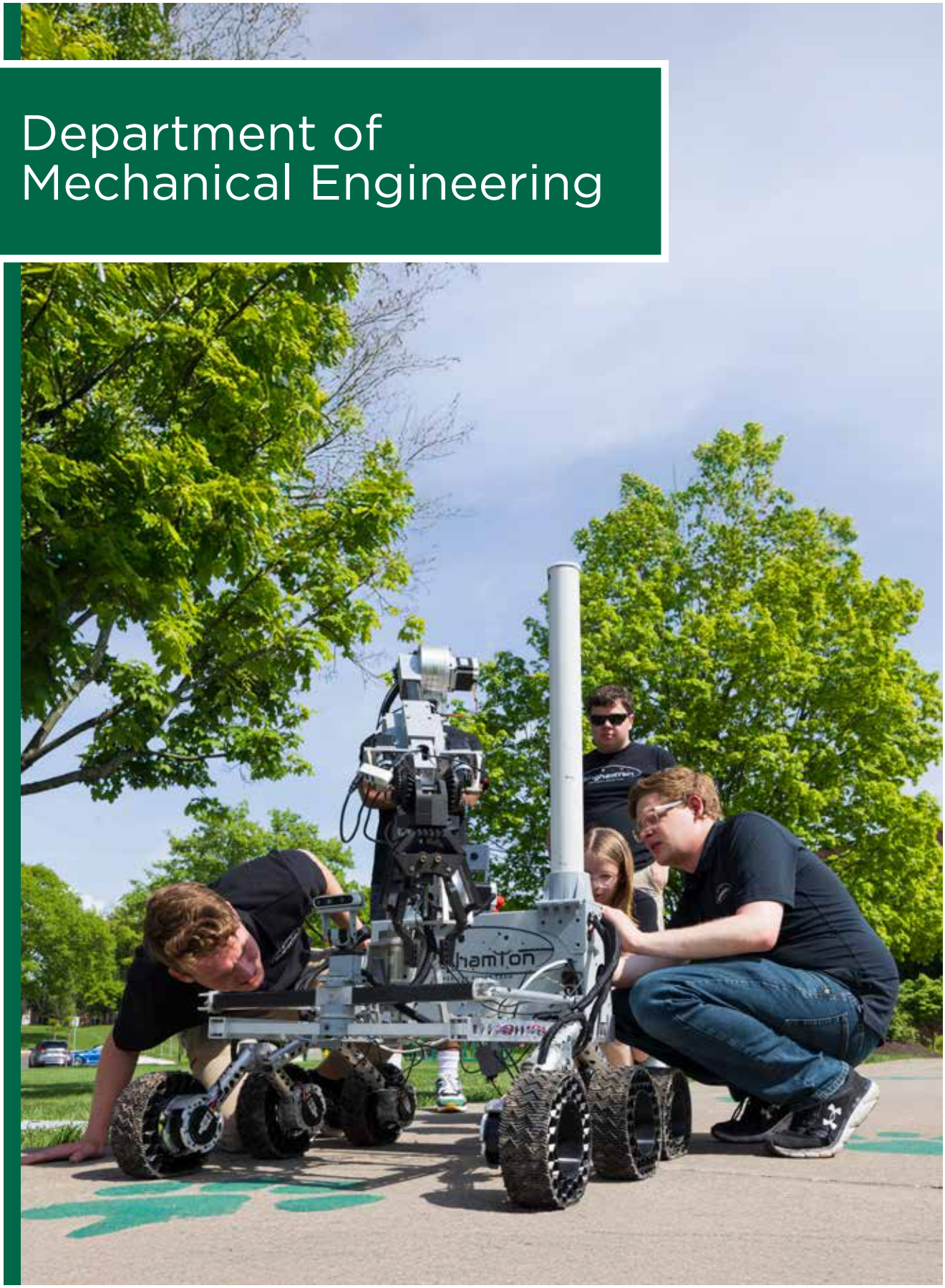
- 2025-present: “Investigating the load distribution of existing and experimental Total Knee Replacement (TKR) configurations” in partnership with Guthrie
- 2016-20: “Biomechanical Comparison of Intramedullary Beaming and Plantar Plating Methods for Stabilizing the Medial Column of the Foot,” in partnership with LaPorta & Associates
- 2013-14: “Traction Enhancing Products Affect Maximum Torque at the Shoe-Floor Interface: A potential increased risk of ACL injury,” in partnership with Albany Medical College

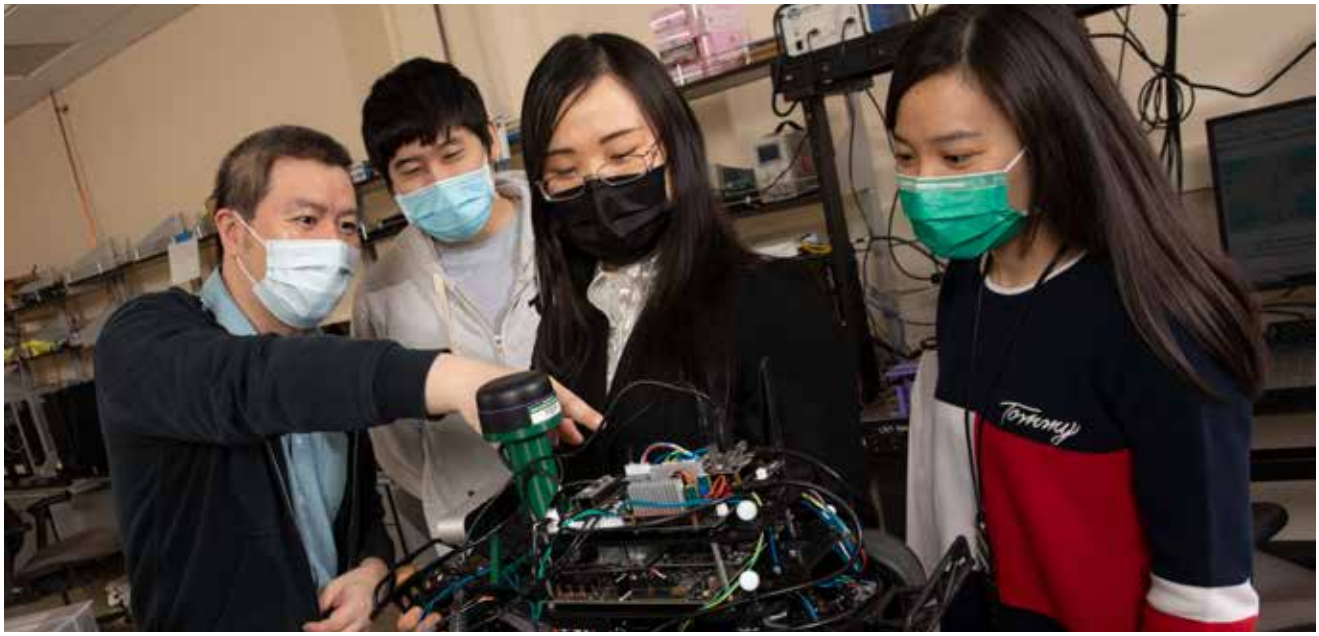
SIGNIFICANT ACHIEVEMENTS

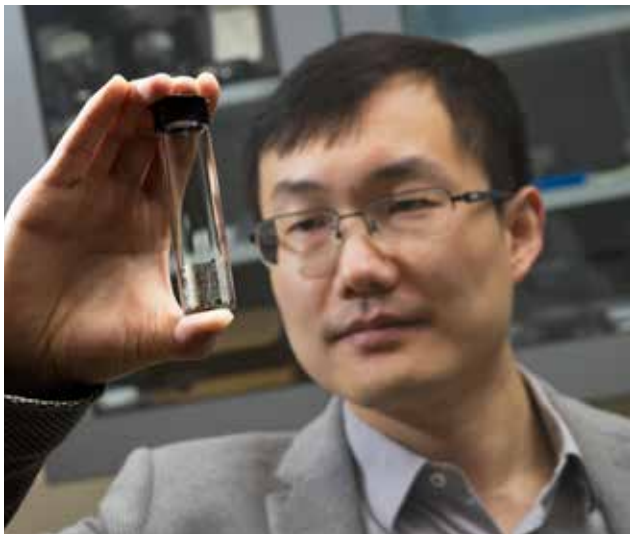
- 2018: Career Champion
- 2014: General Electric Energy Steinmetz Award
- 2012: Berkley Davis Mechanical Engineer Book Prize

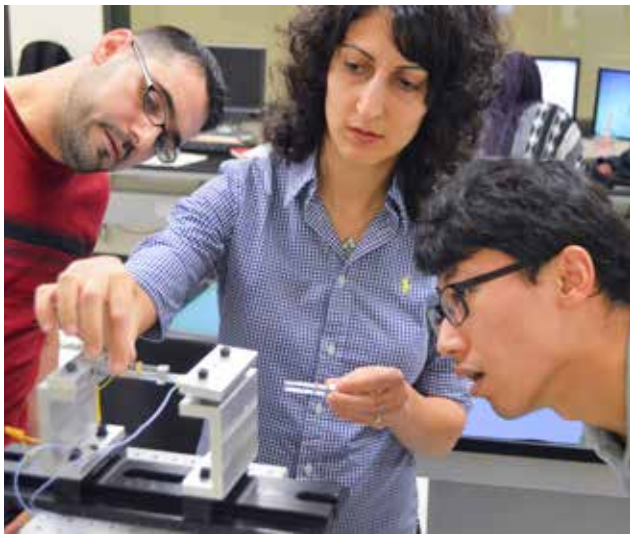


Department of Mechanical Engineering









Paul R. Chiarot

PROFESSOR AND DEPARTMENT CHAIR

EDUCATION: PhD in Mechanical Engineering, University of Toronto
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WEBSITE: sites.google.com/binghamton.edu/mmfl

AREAS OF EXPERTISE

- Electrospray deposition
- Microfluidics
- Thin film materials
- Low Reynolds number transport

KEY RESEARCH

- Advanced manufacturing using electrospray deposition
- Customized synthetic asymmetric vesicles built using high-throughput microfluidics
- Interfacial transport of colloidal materials
- Fluid transport and the brain

POTENTIAL APPLICATIONS

- Thin films for electronics manufacturing and packaging; electronics reliability
- Deposition of metallic, semiconducting, and polymeric materials
- Microfluidic-based bioinstrumentation
- Microfluidic devices for health care

SIGNIFICANT PUBLICATIONS/PATENTS

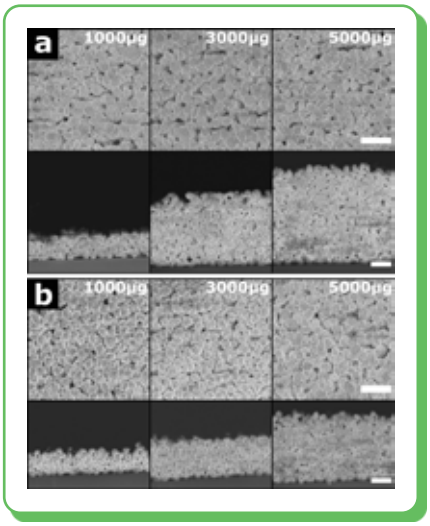
- B. Kingsley, D. Schaffer, and P. Chiarot (2024) “Electrospray Deposition of Physical Unclonable Functions for Drug Anti-counterfeiting”. Scientific Reports. Volume 14, 13256.
- B. Kingsley and P. Chiarot (2023) “Polyimide Films Manufactured Using Partially Wet Electrospray Deposition”. ACS Applied Polymer Materials. Volume 5, Issue 3, pp. 1797-1809.
- B. Kingsley, E. Pawliczak, T. Hurley, and P. Chiarot (2021) “Electrospray Printing of Polyimide Films Using Passive Material Focusing”. ACS Applied Polymer Materials. Volume 3, Issue 12, pp. 6274-6284.
- S. Maktabi, N. Malmstadt, J. Schertzer, and P. Chiarot (2021) “An Integrated Microfluidic Platform to Fabricate Single-Micrometer Asymmetric Giant Unilamellar Vesicles (GUVs) Using Dielectrophoretic Separation of Microemulsions”. Biomicrofluidics. Volume 15, Issue 2, 024112.

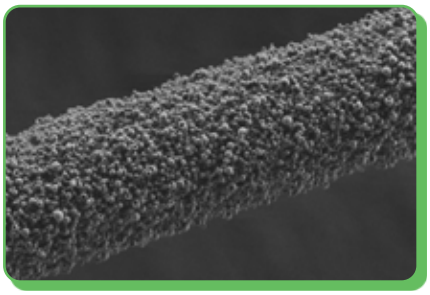
MAJOR PROJECTS/FUNDING

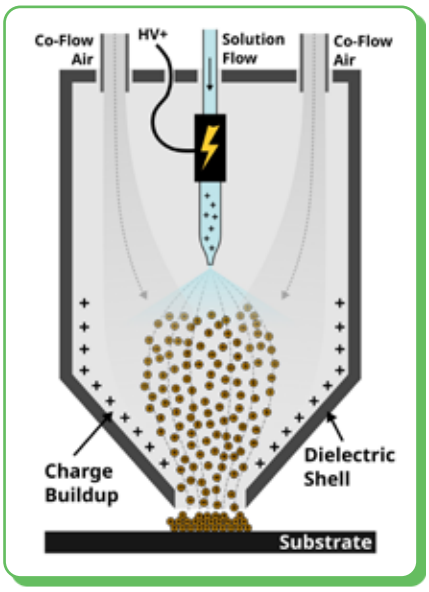
- National Science Foundation
- Semiconductor Research Corporation

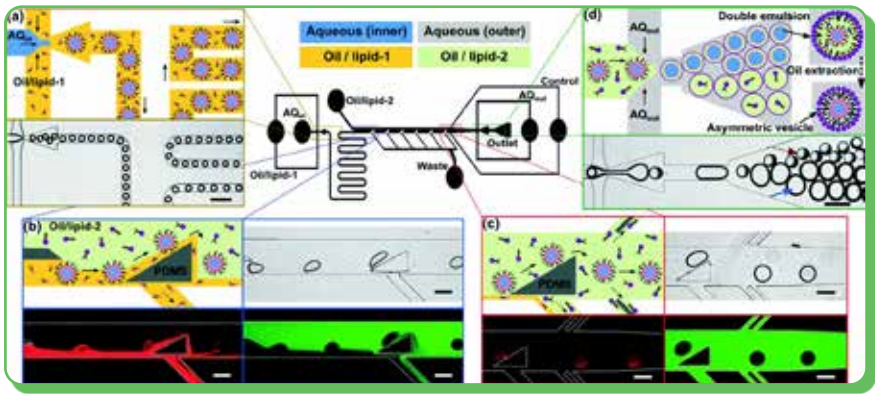
SIGNIFICANT ACHIEVEMENTS

- NSF CAREER Award
- SUNY Chancellor’s Award for Excellence in Scholarship and Creative Activities









Junghyun Cho

PROFESSOR

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WEBSITE: www.binghamton.edu/mechanical-engineering/people/profile.html?id=jcho

AREAS OF EXPERTISE

- Microstructure design, developments and characterization
- Mechanical behavior and testing
- Processing of ceramics
- New alloy design and developments

KEY RESEARCH

- 3D interconnection/joining in advanced semiconductor packaging
- Nanostructured ceramic coatings for photocatalytic and antibacterial surfaces
- Alloy design and developments of solders and solder alternatives for electronic assembly
- Conformal coatings for tin whisker mitigation

POTENTIAL APPLICATIONS

- 3D ultrahigh-density interconnects in artificial intelligence (AI) chips
- Self-cleaning, antimicrobial surfaces
- Self-powered air/water filtration systems
- Protection of microelectronic components and circuit boards

SIGNIFICANT PUBLICATIONS/PATENTS

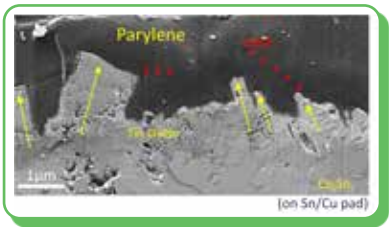
- P. Sivakumar, K. O'Donnell, and J. Cho, "Effect of Bismuth and Nickel on the Microstructure Evolution of Sn-Ag-Cu (SAC) – Based Solders," Materials Today Communications, 26, 101787 (2021) (DOI: 10.1016/j.mtcomm.2020.101787)
- J. Cho, "Low Temperature, Nanostructured Ceramic Coatings" patent issued on November 10, 2020 (U.S. Patent No: 10,828,400 B2) (patents.google.com/patent/US10828400B2/en)
- T. Tao, I.-T. Bae, K.B. Woodruff, K. Sauer, and J. Cho, "Hydrothermally-Grown Nanostructured Anatase TiO2 Coatings Tailored for Photocatalytic and Antibacterial Properties," Ceramics International, 45 [17] 23216-23224 (2019) (DOI: 10.1016/j.ceramint.2019.08.017)
- S. Maganty, M.P.C. Roma, S.J. Meschter, D. Starkey, M. Gomez, D.G. Edwards, A. Ekin, K. Elsken, and J. Cho, "Enhanced Mechanical Properties of Polyurethane Coatings through Nanosilica Addition," Progress in Organic Coatings, 90, 243-251 (2016). (DOI: 10.1016/j.porgcoat.2015.10.016)

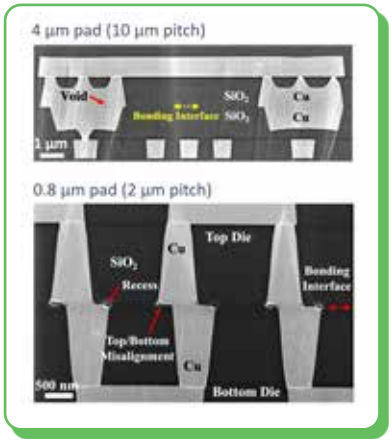
MAJOR PROJECTS/FUNDING

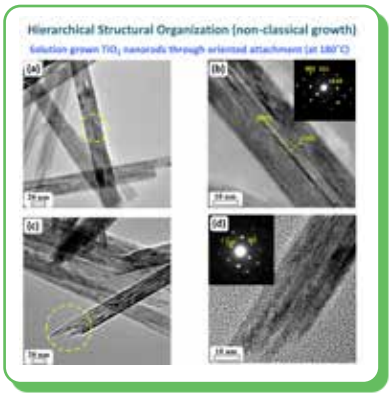
- SUNY/IBM AI Research Alliance Program: "Mechanistic Understanding of the Cu/Oxide Hybrid Bonding"
- US DOE / Honeywell: "Conformal Coating Tin Whiskers"
- Analog Devices: "Materials Characterization in Electronic Packages"
- NASA / N2 Biomedical: "Testing and Evaluation of Nano-Scale ZnO"

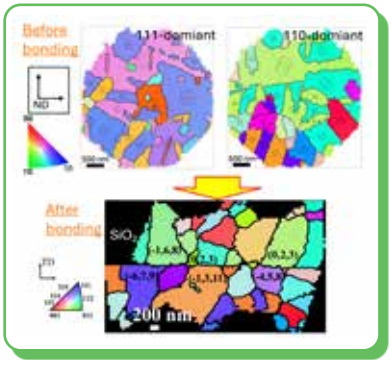
SIGNIFICANT ACHIEVEMENTS

- Developed cost-effective, energy-efficient ceramic coating processes using soft chemistry for self-cleaning surfaces
- Assessed and optimized commercially available polymer resins for use in conformal coatings to mitigate tin whiskers
- Gained insights into Cu-Cu bonding mechanisms during hybrid bonding for 3D chip integration









Cosan “Joe-Sean” Daskiran

ASSISTANT PROFESSOR

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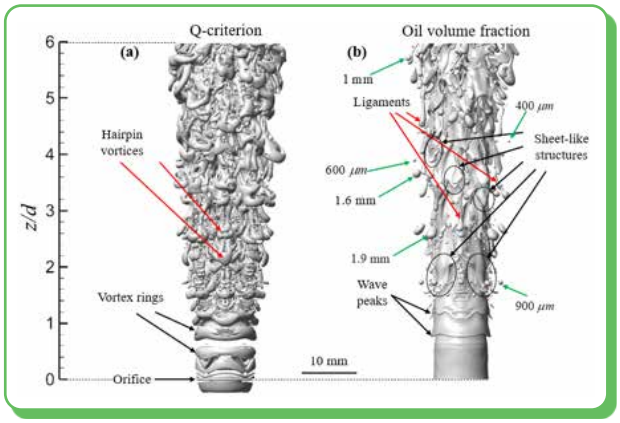
AREAS OF EXPERTISE

- Computational fluid dynamics (CFD)
- Multiphase flows
- Turbulent flow
- Renewable energy

KEY RESEARCH

- Reducing energy usage of desalination system through centrifugal reverse osmosis
- Exploring the impact of bodies in the wake of tidal turbines on turbine performance
- Developing breakage and coalescence models for bubbles in turbulent flows

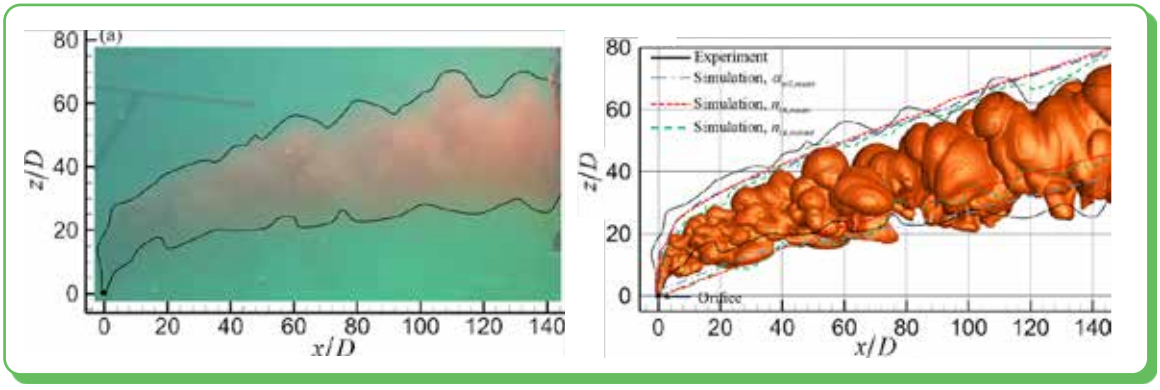


SIGNIFICANT PUBLICATIONS/PATENTS

- Daskiran, C. and Usta, M., 2024. Off-Grid Tidal Turbine-Driven Centrifugal Reverse Osmosis System, And Applications Thereof. Non-provisional U.S. Patent Application No. 18/900,088. Filed September 27, 2024
- Daskiran, C., Cui, F., Boufadel, M. C., Liu, R., Zhao, L., Ozgokmen, T., Socolofsky, S. A. and Lee, K., 2022. Computational and experimental study of an oil jet in crossflow: Coupling population balance model with multifluid large eddy simulation. Journal of Fluid Mechanics, 932, A15. doi:10.1017/jfm.2021.1002
- Daskiran, C., Liu, R., Lee, K., Katz, J. and Boufadel, M.C., 2022. Estimation of overall droplet size distribution from a local droplet size distribution for a jet in crossflow: Experiment and multiphase large eddy simulations. International Journal of Multiphase Flow, 156, p.104205.
- Daskiran, C., Xue, X., Cui, F., Katz, J. and Boufadel, M. C., 2022. Impact of a jet orifice on the hydrodynamics and the oil droplet size distribution. International Journal of Multiphase Flow, 147, p.103921.
- Daskiran, C., Cui, F., Boufadel, M.C., Socolofsky, S.A., Katz, J., Zhao, L., Ozgokmen, T., Robinson, B. and King, T., 2021. Transport of oil droplets from a jet in crossflow: Dispersion coefficients and Vortex trapping. Ocean Modelling, 158, p.101736.

MAJOR PROJECTS/FUNDING

- 2024-27: Off-grid tidal turbine-driven centrifugal reverse osmosis system, funded by DOE with award number of DE-EE0010984, award amount of $607,819 (no cost share)



Yuyang Gu

ASSISTANT PROFESSOR

EDUCATION: PhD in Mechanical Engineering and Materials Science, Duke University
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AREAS OF EXPERTISE

- Acoustics
- Ultrasound imaging
- Biomedicine

KEY RESEARCH

- Acoustic tweezers for particle manipulation
- Acoustofluidics for sample processing and disease diagnosis
- Ultrasound elasticity imaging for disease diagnosis and therapy

POTENTIAL APPLICATIONS

- Disease diagnosis
- Additive manufacturing
- Drug delivery

SIGNIFICANT PUBLICATIONS/PATENTS

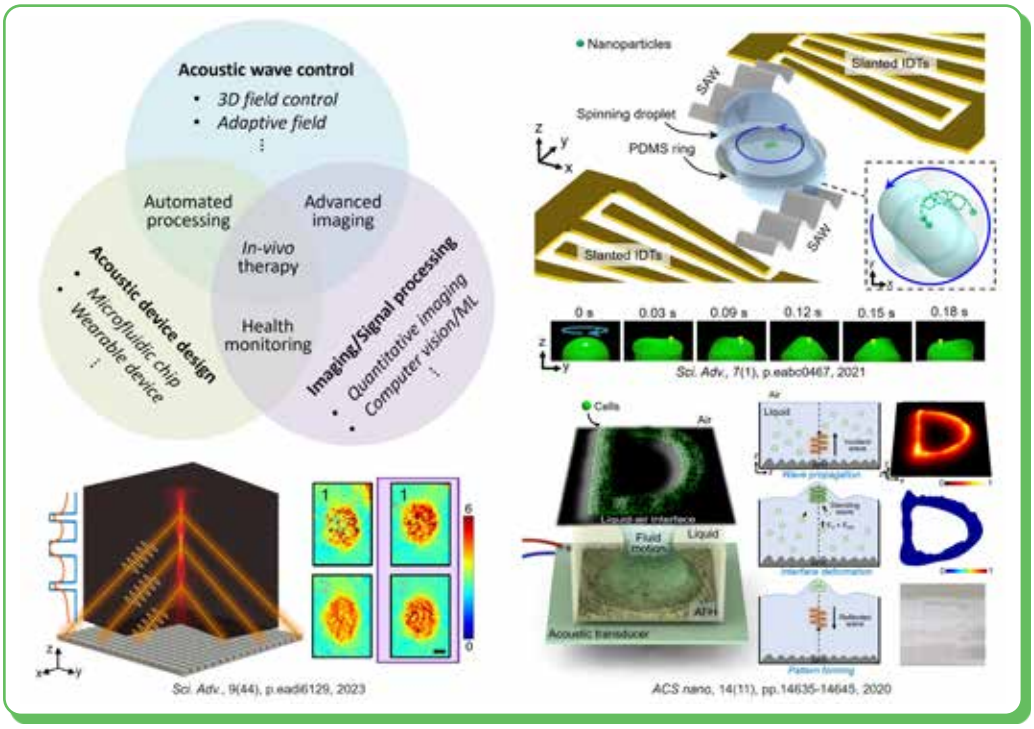
- Gu, Y. et al. (2023) “Acoustic diffraction–resistant adaptive profile technology (ADAPT) for elasticity imaging.” Science Advances, 9(44), eadi6129.
- Gu, Y. et al. (2021) “Acoustofluidic centrifuge for nanoparticle enrichment and separation.” Science Advances, 7(1), eabc0467.
- Gu, Y. et al. (2020) “Acoustofluidic holography for micro-to nanoscale particle manipulation.” ACS Nano, 14(11), 14635.

MAJOR PROJECTS/FUNDING:

- Development of Acoustic Diffraction-resistant Adaptive Profile Technology (ADAPT) for Improved Shear Wave Elastography, NIH, NIBIB, U01, under resubmission.
- Development of 3D Elasticity Mapping Using Ultrasound for Enhanced Understanding of ECM-Centric Mechanobiology, NIH, NIGMS, R35, under review.

SIGNIFICANT ACHIEVEMENTS:

- 2024: NSF Travel Grant, IMECE



Pong-Yu "Peter" Huang

ASSOCIATE PROFESSOR; DIRECTOR, ENGINEERING DESIGN DIVISION

EDUCATION: PhD in Engineering, Brown University
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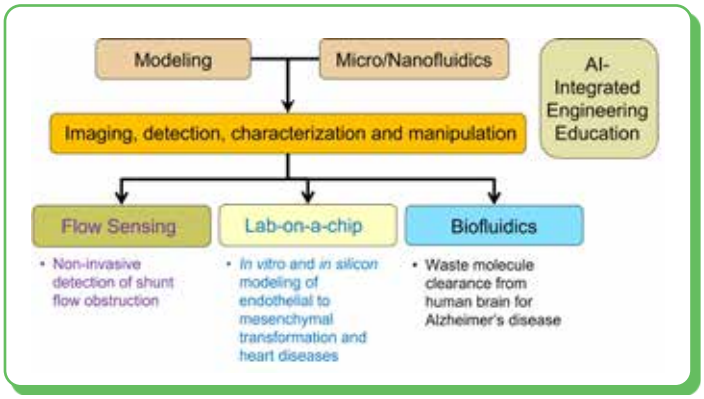
AREAS OF EXPERTISE

- Fluid mechanics
- Heat and mass transport
- Flow visualization and sensing
- Multiscale simulations

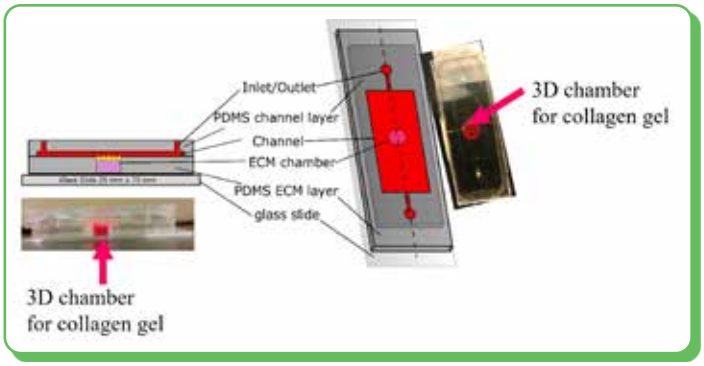
KEY RESEARCH

- Multiscale computational modeling of aortic valve disease development
- Intramural periarterial drainage of beta-amyloid during Alzheimer's disease development
- Shunt flow blockage sensor
- AI-integrated pedagogy and assessment



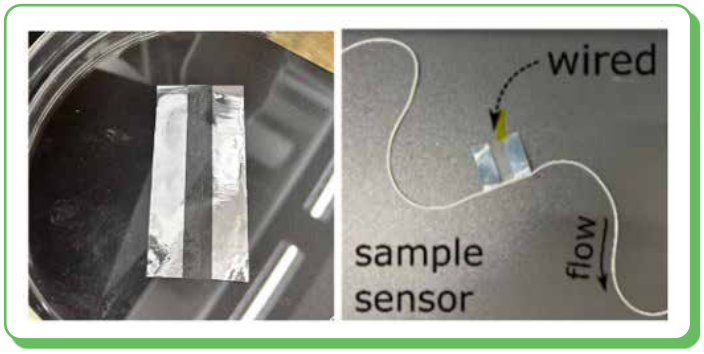
POTENTIAL APPLICATIONS

- Healthcare: Understanding of pathological development, diagnostics, sensing devices, drug development
- Education: AI-integrated engineering education
- Industry: Flow control, thermal management



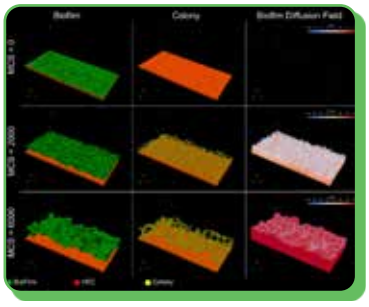
SIGNIFICANT PUBLICATIONS/PATENTS

- K. Joshi, A. Diaz, K. O'Keeffe, J. D. Schaffer, P. Chiarot, and P. Huang (2024) "Flow in Temporally and Spatially Varying Porous Media: A Model for Transport of Interstitial Fluid in the Brain". Journal of Mathematical Biology, 88(6), 69.
- J. Azimi-Boulali, G. J. Mahler, B. T. Murray, and P. Huang (2023) "Multiscale Computational Modeling of Aortic Valve Calcification". Biomechanics and Modeling in Mechanobiology, 23, 581-599.
- L. Boston, P. Huang, and P. Chiarot (2022) "Effect of Nozzle Orientation in Electrospray Cooling". Applied Thermal Engineering, 210, 118360.
- M. Coloma, J. D. Schaffer, P. Huang, and P.R. Chiarot (2019) "Boundary Waves in a Microfluidic Device as a Model for Intramural Periarterial Drainage". Biomicrofluidics, 13, 024103.



MAJOR PROJECTS/FUNDING

- S.H. Ho Foundation, "Non-invasive Flow Sensor for Shunt Failure Detection" ($54,160)
- NIH, "Perivascular Transport of Solutes from the Brain" ($419,239)
- NSF, "Mechanobiology of Myofibroblast Behavior in Health and Disease" ($581,663)
- NSF, "Capillary-Assisted Printing of Structured Colloidal Monolayers" ($570,000)

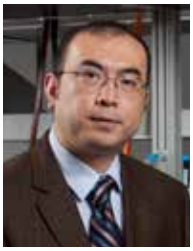


SIGNIFICANT ACHIEVEMENTS

- SUNY Chancellor's Award for Excellence in Teaching
- U.S. Department of State Jefferson Science Fellowship Finalist

Changhong Ke

PROFESSOR



EDUCATION: PhD in Mechanical Engineering, Northwestern University
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AREAS OF EXPERTISE

- Solid mechanics
- Composites
- Advanced/additive manufacturing
- Nanoelectromechanical systems (NEMS)

KEY RESEARCH

- Enhancing the bulk mechanical properties of nanofiber-reinforced nanocomposites
- Exploring the structural and physical/mechanical properties of low-dimensional nanomaterials

POTENTIAL APPLICATIONS

- Lightweight and high-strength structural materials
- Ultrathin electronics materials

SIGNIFICANT PUBLICATIONS/PATENTS

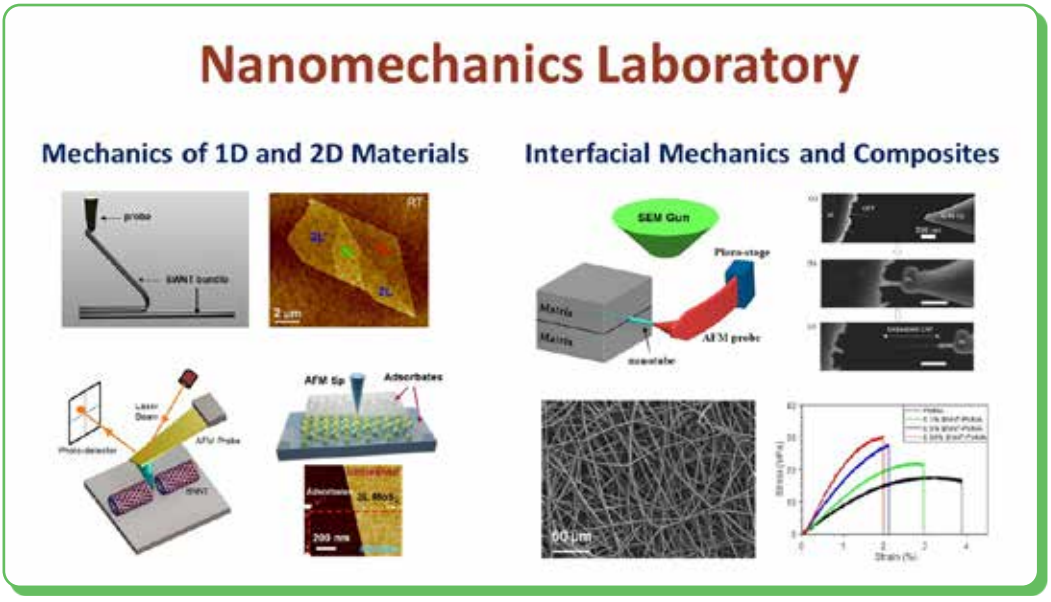
- N. Anjum, D.-L. Wang, F.-L. Gou, C.-H. Ke, "Boron Nitride Nanotubes Toughen Silica Ceramics,"ACS Applied Engineering Materials, Vol.2, pp. 735-746, 2024.
- Y.-C. Jiang, Z.-H. Liu, H.-M. Zhou, A. Sharma, J. Deng, C.-H. Ke, "Physical Adsorption and Oxidation of Ultra-Thin MoS2 Flakes: Insights into Surface Engineering for 2D Electronics and Beyond," Nanotechnology, Vol. 34, pp. 405701, 2023.
- Y.-C. Jiang, S. Sridhar, Z.-H. Liu, D.-L. Wang, H.-M. Zhou, J. Deng, H.B. Chew, C.-H. Ke, "The Interplay of Intra- and Inter-layer Interactions in Bending Rigidity of Ultrathin 2D Materials," Applied Physics Letters, Vol. 122, pp. 153101, 2023.
- Y.-C. Jiang, N. Li, Z.-H. Liu, C.-L. Yi, H.-M. Zhou, C. Park, C.C. Fay, J. Deng, H.B. Chew, C.-H. Ke, "Exceptionally Strong Boron Nitride Nanotube Aluminum Composite Interfaces" Extreme Mechanics Letters, Vol. 59, pp. 101952, 2023.

MAJOR PROJECTS/FUNDING

- NSF, Collaborative Research: Mechanics of Tough and 3D Printable Ceramic Nanocomposites
- NSF, Broadband Tunable Nano-Opto-Electro-Mechanical Resonators for Ultrasensitive Adaptive Sensing
- NSF, Collaborative Research: EAGER: Active Self-Strengthening and Reinforcement of Additively Manufactured Metal Nanocomposites in a Corrosive Environment

SIGNIFICANT ACHIEVEMENTS

- 2012: ICTAM Award, US National Committee on Theoretical and Applied Mechanics
- 2011: AFOSR Young Investigator Program Award



Atul Kelkar

DEAN OF WATSON COLLEGE

EDUCATION: PhD, Mechanical Engineering, Old Dominion University
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AREAS OF EXPERTISE

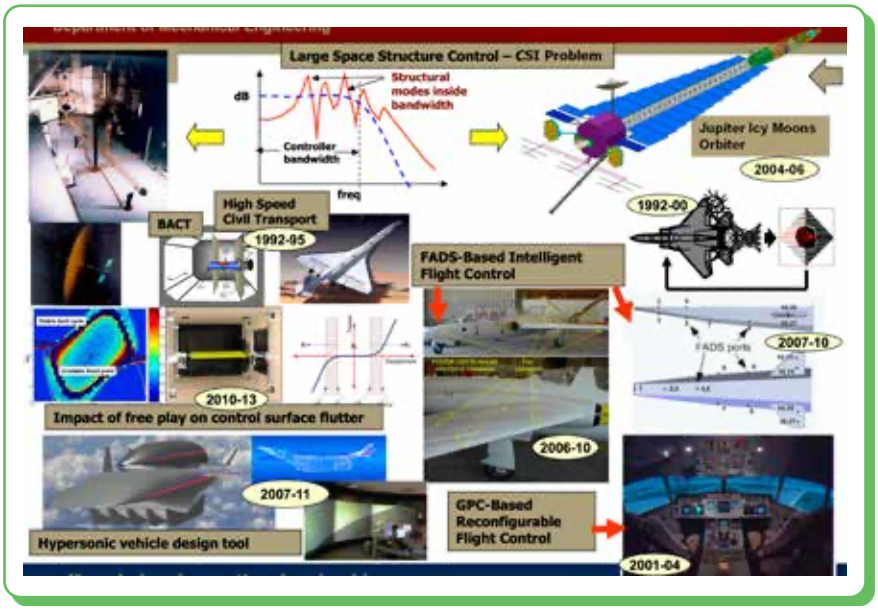
- Dynamic systems and control
- Control-structure integrated design of mechanical and aerospace systems
- Control theory and optimization
- Active control of vibrations and noise
- Energy technologies

KEY RESEARCH

- Robust stability and control of linear and nonlinear dissipative systems
- Modeling and control of flexible aerospace systems
- Active and passive control of vibrations and noise
- Energy technologies

POTENTIAL APPLICATIONS

- Aerospace systems
- Vibration isolation
- Acoustic systems
- Real-time simulation in immersive VR
- Building energy systems



SIGNIFICANT PUBLICATIONS/PATENTS

- A. Kumar, B. Umathe, U. Vaidya, and A. Kelkar, "Identifying lateral stability regions in vehicle dynamics: a Koopman spectral approach," International Journal of Dynamics and Control, 13(40), January 2025.
- A. Kumar, B. Umathe, A. Kelkar, U. Vaidya, "Safe operating limits of vehicle dynamics under parameter uncertainty using koopman spectrum," ASME Letters in Dynamic Systems and Control, 3(2: 021008), April 2023. Winner of the Best Paper Award in MECC 2023
- S.S. Alaviani and A. Kelkar, "Generalized semistability and stochastic semistability for switched nonlinear systems by means of fixed point theory," ASME Letters in Dynamic Systems and Control, 3(3:031011), July 2023.
- Z. Jiang, V. Chinde, A. Kohl, A. Kelkar, S. Sarkar, "Supervisory Control and Distributed Optimization of Building Energy Systems," ASME Journal of Dynamic Systems, Measurement and Controls, Paper No: DS-19-1308 (doi.org/10.1115/1.4047448); Recipient of the 2021 Rudolf Kalman Best Paper Award.
- Y. Xue, A. Kelkar, X. Bai, "Catalytic co-pyrolysis of biomass and polyethylene in a tandem micropyrolyzer," Elsevier Fuel, 252 (15), September 2019

MAJOR PROJECTS/FUNDING

- 2020-21: U.S. Army, "Virtual Prototyping of Autonomy-Enabled Ground Systems"
- 2021-22: NIH, "A Sandbox for Mimetics and Medically Inspired Classroom Engineering (MiMICRE)"
- 2020-22: U.S. Dept. of Education, "SBIR Phase II: An Augmented Reality-based Design Puzzle Sandbox for use in Early Elementary STEM Instruction (NEWTON-AR)"
- 2018-22: NSF, "SBIR Phase II: Engineering Design Instruction Software for implementing Objectives of Next (EDISON) Generation Standards in K-12"
- 2017-19: U.S. Dept. of Education, "Design Environment for Educator-Student Collaboration Allowing Real-Time Engineering-centric, STEM (DESCARTES) Exploration in Middle Grades"

SIGNIFICANT ACHIEVEMENTS

- ASME Fellow
- AIAA Associate Fellow
- IEEE Senior Member
- Co-founder of five technology startups: Vibroacoustics Solutions, Innovative Vibrations Solutions (IVS), VSI Aerospace, Parametric Studio and Innovative Energy Solutions (IES)
- NASA Creativity & Innovation Program Award, 1997.
- Program Director of Program Director at NSF CMMI Division 2016–2019
- National Science Foundation CAREER Award

Hyuna Kwon

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

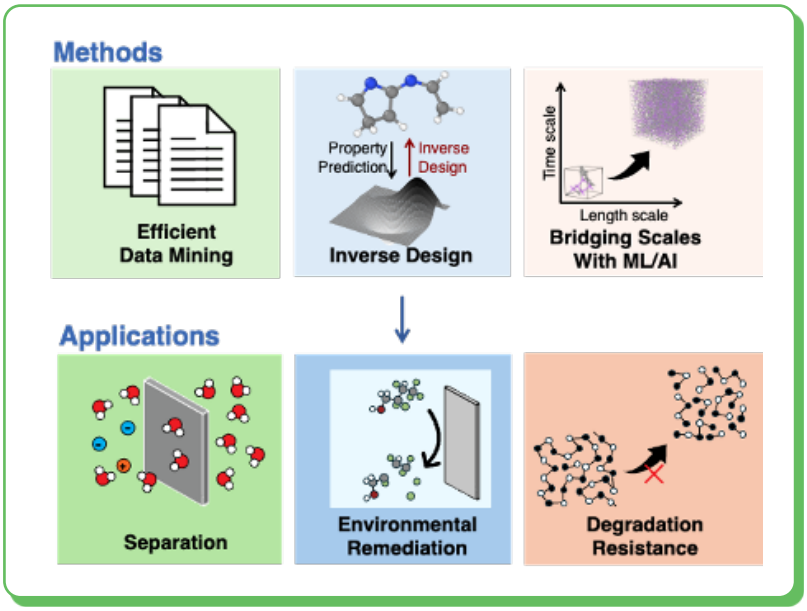
- Computational Chemistry
- Machine Learning for Materials Science
- Surface and Interface Chemistry

KEY RESEARCH

- AI-guided materials discovery and design
- Generative models for spectroscopy and structure interpretation
- Atomistic modeling of chemical and catalytic interfaces

POTENTIAL APPLICATIONS

- Energy storage and conversion
- Environmental remediation and sustainability
- Data-driven screening for functional materials



SIGNIFICANT PUBLICATIONS/PATENTS

- Kwon, H. et al. (2024) "Spectroscopy-guided discovery of three-dimensional structures of disordered materials with diffusion models." Machine Learning: Science and Technology, 5(4), 045037.
- Kwon, H. et al. (2024) "Confinement Effects on Proton Transfer in TiO_2 Nanopores from Machine Learning Potential Molecular Dynamics Simulations." ACS Applied Materials & Interfaces, 16(24), 31687–31695.
- Kwon, H. et al. (2023) "Harnessing Semi-Supervised Machine Learning to Automatically Predict Bioactivities of Per- and Polyfluoroalkyl Substances (PFASs)." Environmental Science & Technology Letters, 10(11), 1017–1022.

Dehao Liu

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Multiscale multiphysics modeling and simulation
- Physics-constrained machine learning
- Optimization and generative design

KEY RESEARCH

- Physics-informed machine learning for tailoring the multidirectional mechanical properties of composite materials
- Enhancing the joining strength of interfaces for multi-material additive manufacturing
- Data-driven design of hierarchical interlocking metasurfaces in multi-material additive manufacturing

POTENTIAL APPLICATIONS

- Materials design for aerospace, nuclear, automotive and biomedical structures
- Fabrication of functional graded materials

SIGNIFICANT PUBLICATIONS/PATENTS

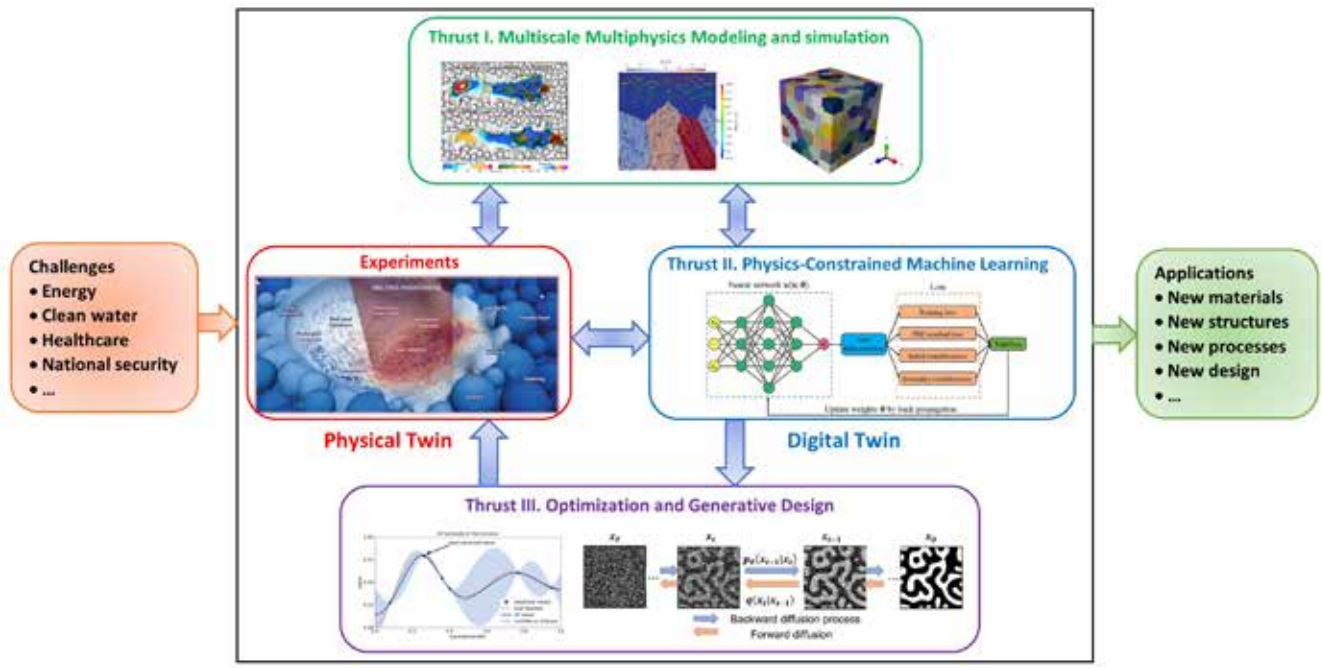
- Liu, D. and Wang, Y. (2019) Mesoscale multi-physics simulation of rapid solidification of Ti-6Al-4V alloy. Additive Manufacturing, 25: 551-562.
- Liu, D. and Wang, Y. (2019) Multi-fidelity physics-constrained neural network and its application in materials modeling. Journal of Mechanical Design, 141(12): 121403.
- Liu, D. and Wang, Y. (2022). Metal additive manufacturing process design based on physics constrained neural networks and multi-objective Bayesian optimization. Manufacturing Letter, 33, 817-827.
- Foroughi, A. H., Liu, D., and Razavi, M. J. (2023). Simultaneous optimization of stiffness, permeability, and surface area in metallic bone scaffolds. International Journal of Engineering Science, 193, 103961.

MAJOR PROJECTS/FUNDING

- NSF CDS&E/Collaborative Research: Physics-Informed Machine Learning for Tailoring the Multidirectional Mechanical Properties of Composite Materials

SIGNIFICANT ACHIEVEMENTS

- 2021: Journal of Computing and Information Science in Engineering (JCISE) Reviewers of the Year Award



Ronald N. Miles

SUNY DISTINGUISHED PROFESSOR

EDUCATION: BS in Electrical Engineering, University of California, Berkeley; MSE and PhD in Mechanical Engineering, University of Washington
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AREAS OF EXPERTISE

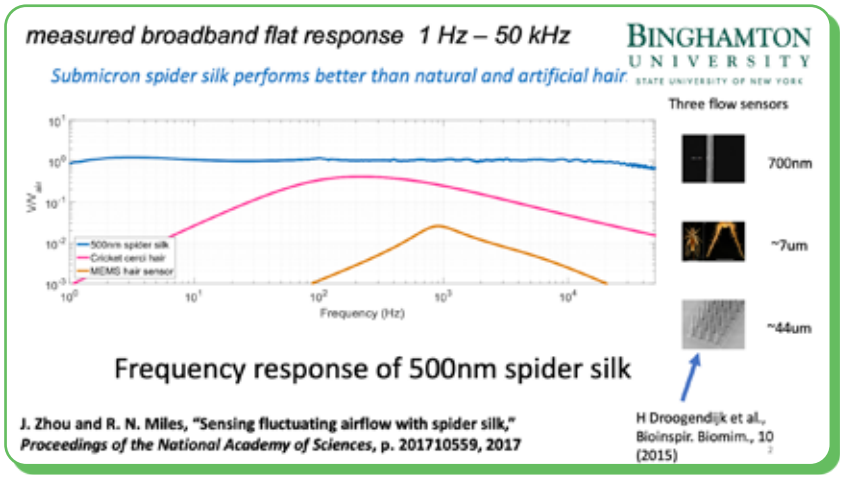
- Acoustics
- Vibrations

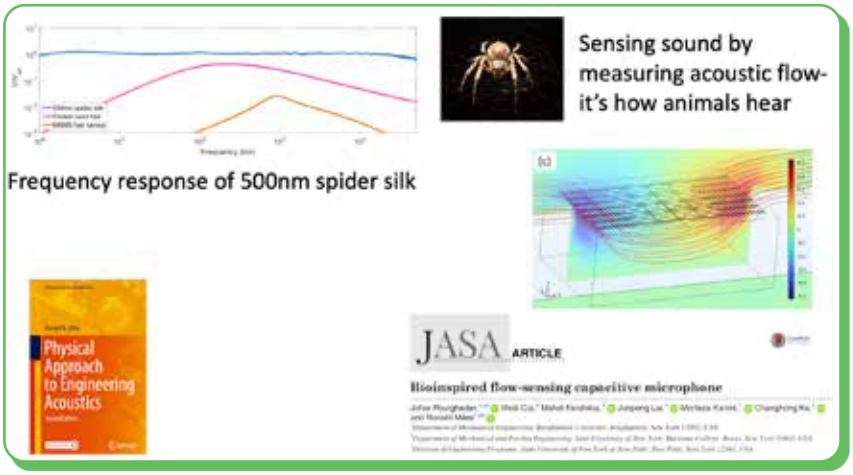
KEY RESEARCH

- Development of methods of measuring sound
- Mechanics of hearing in small animals
- Technology for studying hearing
- Hearing assistive technology

POTENTIAL APPLICATIONS

- MEMS microphones
- Hearing aids
- Noise control





SIGNIFICANT PUBLICATIONS/ PATENTS

- Miles, Ronald N. Physical Approach to Engineering Acoustics 2nd Ed. Springer, 2024
- Zhou, Jian, and Ronald N. Miles. "Sensing fluctuating airflow with spider silk." Proceedings of the National Academy of Sciences (accessed more than 10,000 times) 114.46 (2017): 12120-12125
- Zhou, Jian; Lai, Junpeng; Menda, Gil; Stafstrom, Jay A; Miles, Carol I; Hoy, Ronald R; Miles, Ronald N. "Outsourced hearing in an orb-weaving spider that uses its web as an auditory sensor." Proceedings of the National Academy of Sciences (accessed more than 12,000 times) 119. 14 (2022): e2122789119.
- Lai, Junpeng and Farahikia, Mahdi and Karimi, Morteza and Liu, Zihan and Jiang, Yingchun and Ke, Changhong and Miles, Ronald Effect of size on the thermal noise and acoustic response of viscous-driven microbeams. The Journal of the Acoustical Society of America, 155 (2024): 2561–2576.
- Lai, Junpeng; Liu, Zihan; Karimi, Morteza; Farahikia, Mahdi; Cui, Weili; Pourghader, Johar; Aghazadeh, Sara; Ke, Changhong; Miles, Ronald, "A small cavity for detecting sound-induced flow," The Journal of the Acoustical Society of America, 157 (2025): 29–42.
- US Patent 12253391, "Multielectrode capacitive sensor without pull-in risk"
- US Patent App. 18/754,629, "Diaphragmless viscosity-driven acousitic velocity-sensing microphone"
- US Patent App. 18/570,564, "MEMS microphone"

MAJOR PROJECTS/FUNDING

- 2019-25: NIH Grant 5R01DC017720-05 - Pressure/Velocity Probe for Acoustic Measurements in the Human Ear Canal

SIGNIFICANT ACHIEVEMENTS

- Discovered a new mechanism for directional hearing in the parasitoid fly *(Ormia ochracea)*
- Invented and developed a low-noise MEMS directional microphone based on the hearing of the parasitoid fly *(Ormia ochracea)*
- Discovered the sound-detection ability of spider silk
- Discovered that spiders can hear airborne sound using their web

Bruce Murray

BARTLE PROFESSOR

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WEBSITE: Google Scholar and researchgate.net

AREAS OF EXPERTISE

- Modeling in materials processing
- Data center energy efficiency
- Mechanobiology

KEY RESEARCH

- Data center energy efficiency
- Health concerns for electronic cigarettes
- The effect of shear stress on cell transformations and modeling the growth of solid tumors using continuum transport models

POTENTIAL APPLICATIONS

- Energy: Reducing the energy usage in data centers
- Healthcare: Understanding disease development and possible treatment methodologies

SIGNIFICANT PUBLICATIONS/PATENTS

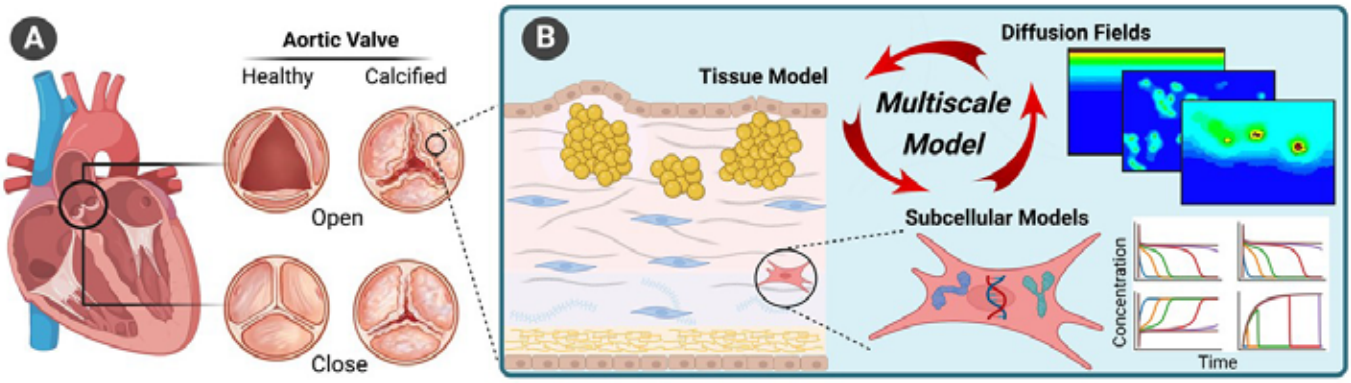
- Javid Azimi-Boulali, Gretchen J. Mahler, Bruce T. Murray and Peter Huang, Multiscale Computational Modeling of Aortic Valve Calcification. Biomechanics and Modeling in Mechanobiology, 23, pp. 581-599, 2024, doi.org/10.1007/s10237-023-01793-4
- S.A.R. Dibaji, S. Guha, A. Arab, B.T. Murray and M.R. Myers (2018). Accuracy of Commercial Electric Nicotine Delivery Systems (ENDS) Temperature Control, PLOS one, November 5. doi.org/10.1371/journal.pone.0206937

MAJOR PROJECTS/FUNDING

- 2019-23: Mechanobiology of Myofibroblast Behavior in Health and Disease, NSF-CMMI, Co-PI (PI G. Mahler)

SIGNIFICANT ACHIEVEMENTS:

- J. Tinsley Oden Faculty Fellowship, University of Texas, Austin
- Visiting Research Faculty, Vellore Institute of Technology, Vellore, India
- Outstanding Paper Award, Emerald Group Publishing



A schematic comparison between a healthy aortic valve and a calcified one, in both opening and closing states. **b** schematic illustration of our multiscale modeling framework, which consists of a tissue scale model, several diffusion fields, and subcellular models. Information is shared among different scales, where cells read cytokine concentrations from diffusion fields, and subcellular models generate responses. The secretion and uptake of cytokines by cells are represented as sources and sinks in the diffusion fields. Tissue scale models implement cell-cell and cell-ECM interactions and processes such as fibrosis and calcification.

Seungbae "SB" Park

SUNY DISTINGUISHED PROFESSOR;
DIRECTOR, INTEGRATED ELECTRONICS ENGINEERING CENTER (IEEC)

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AREAS OF EXPERTISE

- Micro/nanomechanics
- Optomechanics

KEY RESEARCH

- Electronics MEMS packaging
- Reliability
- Computer-aided engineering

SIGNIFICANT PUBLICATIONS/PATENTS

- SB Park, GR Iyer, "The Role of Intermetallics in Electromigration in Solder Pumps for Lead Free Solder Structure and Its Solder Pad Combination," ASME International Mechanical Engineering Congress and Exposition 47071, 271-279
- Z Zhang, Y Li, S Yoon, S Park, D Won, "Ball grid array solder joints thermal profile prediction and recipe optimization with physics-informed neural network," Intl. J. of Adv. Manufacturing Tech. (Under Review) 2024
- C Cai, H Wang, J Yang, P Yin, SB Park, "A Comprehensive Study on Characterization of Residual Stress of Build-Up Layer and Prediction of Chip Warpage, Journal of Electronic Packaging," 146 (2), 2024.
- KA Deo, Y Lai, J Yang, JH Ha, S Park, "Influence of stiffener design on co-packaged optics (CPO) 2.5 D heterogeneous package," IEEE 74th Electronic Components and Technology Conference (ECTC), 1814-1819, 2, 2024.
- Y Lai, X Jiefeng, J Ha, KA Deo, J Yang, S Park, "Bond-line Thickness Prediction for Thermal Interface Material under Usage Conditions," IEEE 74th Electronic Components and Technology Conference (ECTC), 1538-1542, 2, 2024.
- J Ha, KA Deo, J Yang, Y Lai, S Park, "Reliability of Differently Shaped Solder Joints in Chip Resistor Under Drop Impact," IEEE 74th Electronic Components and Technology Conference (ECTC), 1639-1643, 2, 2024.
- P Yin, S Park, B Jacob, A Gowda, "Enhanced foam package design for drop/impact using accurate predictive simulation," IEEE Transactions on Components, Packaging and Manufacturing Technology 13, 2, 2023.

SIGNIFICANT ACHIEVEMENTS

- IEEE Fellow
- ASME Fellow
- Panelist, Yield Learning Conference, IBM Academy of Technology

James M. Pitarresi

SUNY DISTINGUISHED TEACHING PROFESSOR; VICE PROVOST FOR ONLINE AND INNOVATIVE EDUCATION; EXECUTIVE DIRECTOR CENTER FOR LEARNING AND TEACHING; CO-FOUNDER OF INNOVATION LAB

EDUCATION: PhD in Civil Engineering, University at Buffalo
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AREAS OF EXPERTISE

- Computational mechanics
- Education
- Student success
- Innovation

KEY RESEARCH

- Student success

POTENTIAL APPLICATIONS

- Student success efforts for both undergraduate and graduate students
- Innovation and entrepreneurship
- AI use in higher education and society

SIGNIFICANT PUBLICATIONS/PATENTS

- Sausner E, Wentzel C, Pitarresi J. "I know what I need to learn": The intersection of aspirational and navigational capitals for marginalized-identity STEM students. Journal of Engineering Education. 2024 April 14; 113(2):488-508.
- Sausner EB, Pitarresi JM. Tactics and Motives: Representations of aspirational capital among marginalized-identity STEM students. Journal of Women and Minorities in Science and Engineering. 2025 January 21; 31(2):79l
- Hanson, J, Bernal, A., Pitarresi, J., How to Ace Statics, McGraw-Hill, 2022.
- Shames, I.H., and Pitarresi, J.M., Introduction to Solid Mechanics, 3rd ed., Prentice-Hall, 2000.

MAJOR PROJECTS/FUNDING

- 2017-24: Principal Investigator, Institutional Partnership to Create Successful Student Transition in Smart Energy & Materials, NSF Award DUE-1742056, $4,153,852.

SIGNIFICANT ACHIEVEMENTS

- Developed the Binghamton Codes project and related academic program to help liberal arts and humanities students develop fundamental computational literacy and computer coding skills (launched 2019)
- Co-founded (2018) the Innovation Scholars Program to develop the creative confidence and problem-solving skills of undergraduate students
- Developed 10,000-square-foot Innovation Lab

Mir Jalil Razavi

ASSISTANT PROFESSOR

EDUCATION: PhD in Mechanical Engineering, University of Georgia
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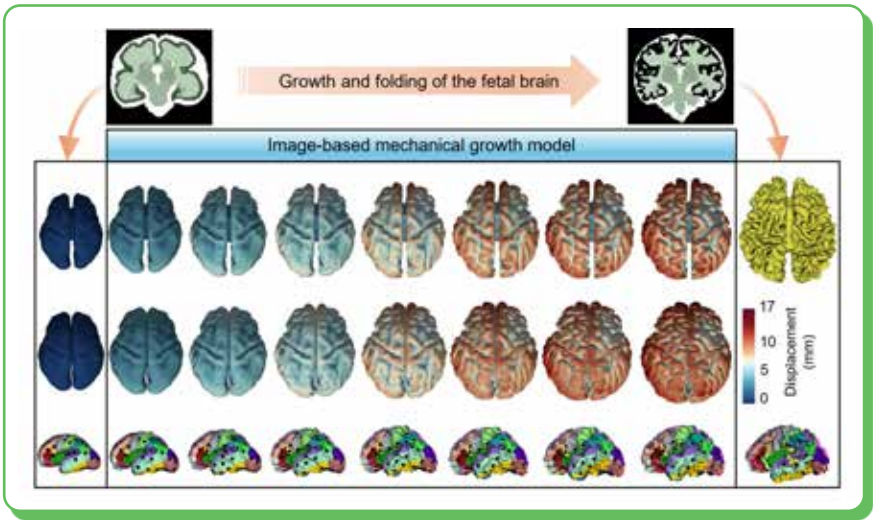
AREAS OF EXPERTISE

- Solid mechanics
- Computational modeling
- Brain mechanics
- Bioscaffolds and advanced materials

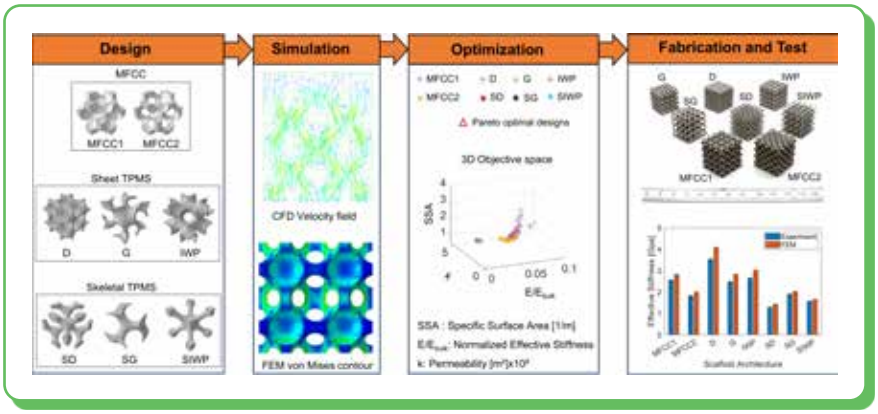
KEY RESEARCH

- Discovering the mechanics of brain folding and development
- Discovering the mechanisms underlying brain connectivity development
- Application of AI in brain mechanics and structural design
- Designing, optimizing, fabricating and testing bioscaffolds and advanced materials



POTENTIAL APPLICATIONS

- Healthcare: Brain disorder diagnosis and prevention
- Healthcare: Patient-specific bone bioscaffold design
- Aerospace and defense: Design of structures with predefined multidirectional properties



SIGNIFICANT PUBLICATIONS/ PATENTS

- Solhtalab, Akbar, Ali H. Foroughi, Lana Pierotich, and Mir Jalil Razavi. "Stress landscape of folding brain serves as a map for axonal pathfinding." Nature Communications 16, no. 1 (2025): 1187.
- Foroughi, Ali H., and Mir Jalil Razavi. "Multi-objective shape optimization of bone scaffolds: Enhancement of mechanical properties and permeability." Acta Biomaterialia 146 (2022): 317-340.
- Chavoshnejad, Poorya, Liangjun Chen, Xiaowei Yu, Jixin Hou, Nicholas Filla, Dajiang Zhu, Tianming Liu, Gang Li, Mir Jalil Razavi, and Xianqiao Wang. "An integrated finite element method and machine learning algorithm for brain morphology prediction." Cerebral Cortex 33, no. 15 (2023): 9354-9366.

MAJOR PROJECTS/FUNDING

- 2021-25: NSF-CMMI — "Mechanics of the Formation of Cortical Folding Patterns in the Developing Human Brain"
- 2024-27: NSF-CDS&E — "Collaborative Research: Physics-Informed Machine Learning for Tailoring the Multidirectional Mechanical Properties of Composite Materials"

SIGNIFICANT ACHIEVEMENTS

- 2018: Research Excellence Award, University of Georgia

Bahgat G. Sammakia

SUNY DISTINGUISHED PROFESSOR; DIRECTOR OF CHIRP AND S3IP

EDUCATION: PhD in Mechanical Engineering, University at Buffalo
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AREAS OF EXPERTISE

- Electronics packaging
- Thermal sciences
- Thermal management of electronics

KEY RESEARCH

- Founding director of S3IP, a New York Center of Excellence dedicated to Small Scale Systems Integration and Packaging since 1993: www.binghamton.edu/s3ip/index.html
- Co-founding director of ES2, an IUCRC NSAF center dedicated to energy optimization in data centers: www.binghamton.edu/es2/
- Co-founding director of CHIRP, an SRC funded center dedicated to research related to heterogeneous integration of electronic systems: www.src.org/program/grc/chirp

POTENTIAL APPLICATIONS

- Electronic systems integration and packaging
- Data centers
- Communications
- Defense
- Autonomous systems
- Health sciences

SIGNIFICANT PUBLICATIONS/ PATENTS

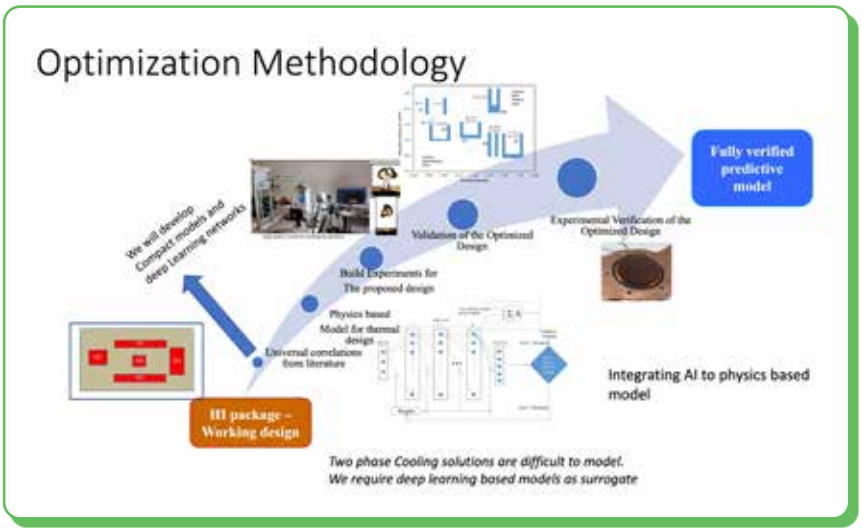
- Over 300 publications in peer-reviewed journals and conference proceedings
- Over 10200 citations h=44, h10 =208
- 26 patents

MAJOR PROJECTS/FUNDING

- 2024-29: NSF-EDU, “Collaborative Research: Developing Intelligent Tutoring Systems for STEM Education”
- 2020-25: DoD-AFOSR, “Developing a Conversational AI Platform for Situational Awareness in Warfighting”
- “Sustainability of Solar-powered Generative AI Cloud,” proposal under preparation.
- 2019-present: “Educating middle-school students in responsible use of generative AI tools,” K-12 Outreach in partnership with Vestal Middle School

SIGNIFICANT ACHIEVEMENTS

- IEEE Fellow
- ASME Fellow
- NAI Fellow
- Heat Transfer Memorial Award 2020
- Several best paper and distinguished paper awards



Scott Schiffres

ASSOCIATE PROFESSOR

EDUCATION: BSE, Princeton University; MEng, Cornell University; PhD, Carnegie Mellon University; Postdoctoral Associate, MIT
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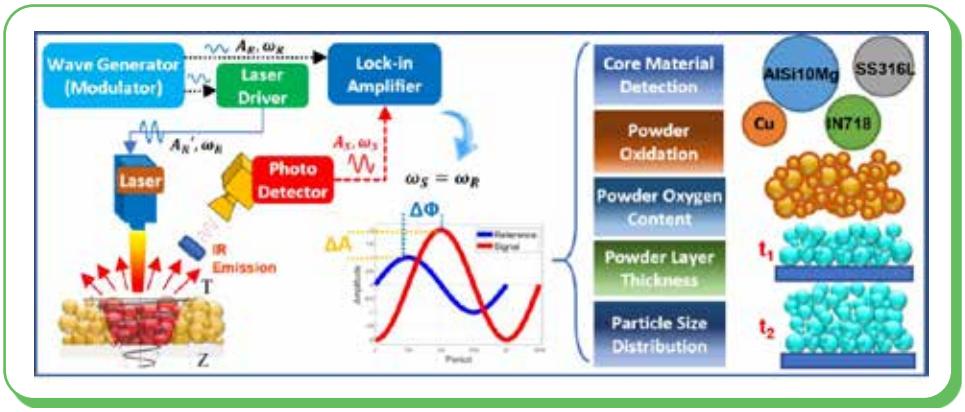
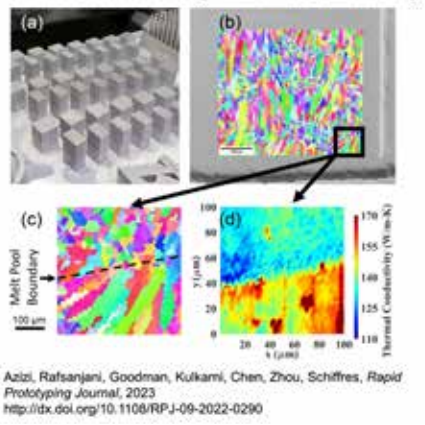
AREAS OF EXPERTISE

- Thermal energy transport
- Additive manufacturing
- Electronics cooling and packaging
- Adsorption technology



KEY RESEARCH

- Improve heat removal from next-generation of AI chips and microprocessors through on-chip printing of cooling structures and the thermal properties of additively manufactured materials
- Improve the printing process by a novel method of thermally interrogating the laser powder bed fusion (L-PBF) printing process called modulated laser thermal interrogation



Azizi, Rafsanjani, Goodman, Kulkarni, Chen, Zhou, Schiffres, *Rapid Prototyping Journal*, 2023
http://dx.doi.org/10.1108/RPJ-09-2022-0290

POTENTIAL APPLICATIONS

- Increase the computational performance and lower energy consumption in high-performance AI data centers
- Improve additive manufacturing quality by early detection of defects in the printing feedstock

SIGNIFICANT PUBLICATIONS/PATENTS

- Invented a novel method to directly print cooling devices onto electronic devices (Issued: US16/537,373; Pending: US20240082920A1, US20240390975A1)
- Conceived an enhanced non-destructive testing method for laser- and electron beam-based metal printing that uses a modulated heat source to thermally interrogate the properties of the metal powder, melt-pool and just printed layer (Issued: 11,654,535, 12,220,874; Pending: 63/633,025
- Additive Manufacturing, "Modulated Laser Thermal Interrogation (MLTI): A Novel In Situ Metal Powder Evaluation Technique for Laser Powder Bed Fusion"

MAJOR PROJECTS/FUNDING

- DOE ARPA-E (Advanced Research Projects Agency-Energy), COOLERCHIPS: Confined Direct Two-Phase Jet Impingement Cooling with Topology Optimized Surface Engineering and Phase Separation, $1.9 million total, Binghamton $774,000, Co-PI, Co-PIs: Tiwei Wei (Purdue), Justin Weibel (Purdue), Bahgat Sammakia, Srikanth Rangarajan, Ryan Enright (Seguente Inc).
- 2024: DOD, SCALE Cornerstone Workforce Development Grant: Electronics Packaging, BU Sub-contract $170,000/year, Site PIs: Bahgat Sammakia, Seungbae Park, Purdue PIs: Peter Bermel, Shubhra Bansal, Amy Marconnet
- 2022: NIST Metal Additive Manufacturing, Novel In-situ Thermal Property Mapping to Study Powder Feedstock Aging and Laser Powder Bed Fusion, $960,000, Lead PI, Co-PIs: Guangwen Zhou, Srikanth Rangarajan
- 2023-25: Universal Area Consortium

SIGNIFICANT ACHIEVEMENTS

- 2025: Consumer Electronics Show Exhibitor at ARPAE Booth
- 2023: ARPAE COOLERCHIPS Award
- 2022: NIST Metal-Based Additive Manufacturing Award
- 2019: NSF CAREER Award in Thermal Transport Processes
- 2017: Technology Innovation Early Career Award, Binghamton S3IP Center

Timothy Singler

PROFESSOR

EDUCATION: BS, MS, PhD, University of Rochester
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WEBSITE: www.binghamton.edu/mechanical-engineering/people/profile.html?id=singler

AREAS OF EXPERTISE

- Interfacial stability
- Wetting phenomena in metal/metal systems and equilibrium capillary surfaces

KEY RESEARCH

- Fluid dynamics
- High-temperature capillarity wetting
- Reactive wetting
- Physics of interfaces
- Functional materials

SIGNIFICANT PUBLICATIONS/PATENTS

- S. Ye et. al, "Oxidation-Induced Oxide Shell Rupture and Phase Separation in Eutectic Gallium–Indium Nanoparticles," ACS Nano 2024 18 (36), 25107-25117
- S.Ye et. al, "Oxidation of Eutectic Gallium-Indium Nanoparticles," Microscopy and Microanalysis, Volume 30, Issue Supplement_1, July 2024
- A. Davoodabadi et. al, "Effect of Calendering Degree and Wetting Temperature on Wettability of Lithium-Ion Battery Electrodes," Elsevier Journal of Energy Storage, Volume 26, December 2019, 101034
- L. Liu et. al, "Inkjet printing controllable polydopamine nanoparticle line array for transparent and flexible touch-sensing application," Advanced Engineering Materials, Volume 22, Issue 4, April 2020, 1901351

Jifu Tan

ASSISTANT PROFESSOR

EDUCATION: PhD in Mechanical Engineering, Lehigh University
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WEBSITE: www.binghamton.edu/mechanical-engineering/people/profile.html?id=jifutan

AREAS OF EXPERTISE

- Multiscale/multiphysics modeling and simulation
- High-performance computing
- Physics-based machine learning
- Transport phenomena
- Data-driven modeling

KEY RESEARCH

- Fluid-structure interactions
- Biological flows
- Clot mechanics

POTENTIAL APPLICATIONS

- Healthcare: Patient-specific blood flow simulation and diagnostics, clot mechanics, mechanobiology, drug delivery
- Design and Optimization: Partial differential equations-based optimization

SIGNIFICANT PUBLICATIONS/PATENTS

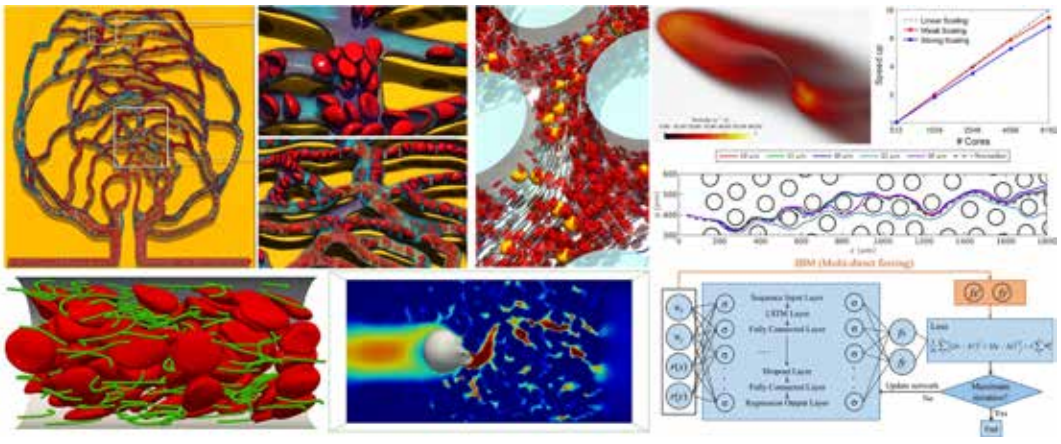
- M. C. Hood, K. Gardner, W. Li, and J. Tan, “Interplay of size, deformability, and device layout on cell transport in microfluidics,” Journal of Physics: Condensed Matter, vol. 36, no. 42, p. 425 106, Jul. 2024.
- D. Fang, L. Guo, M. C. Hughes, and J. Tan, “Dynamic patterns and modeling of early covid-19 transmission by dynamic mode decomposition,” Preventing Chronic Disease, vol. 20, 2023.
- D. Fang and J. Tan, “Immersed boundary-physics informed machine learning approach for fluid–solid coupling,” Ocean Engineering, vol. 263, p. 112 360, 2022
- T. Marrinan, J. Tan, J. A. Insley, A. Kanayinkal, and M. E. Papka, “Interactive virtual reality exploration of large-scale datasets using omnidirectional stereo images,” International Symposium on Visual Computing, pp. 115–128, 2022.
- K. Ostalowski and J. Tan, “Direct simulation of blood flow with heterogeneous cell suspensions in a patient-specific capillary network,” Physics of Fluids, vol. 34, no. 4, 2022
- J. Tan, T. R. Sinno, and S. L. Diamond, “A parallel fluid–solid coupling model using lammps and palabos based on the immersed boundary method,” Journal of computational science, vol. 25, pp. 89–100, 2018.

MAJOR PROJECTS/FUNDING

- 2024-29: NSF CAREER - Multiscale Modeling of Thrombus Formation and its Response to External Loads
- 2023-25: NSF ERI - Integration of Computational Modeling and Machine Learning for Clot Mechanics

SIGNIFICANT ACHIEVEMENTS

- 2024: National Science Foundation CAREER award



Shahrzad “Sherry” Towfighian

PROFESSOR AND DIRECTOR OF GRADUATE STUDIES

EDUCATION: PhD in Mechanical Engineering, University of Waterloo
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WEBSITE: www.binghamton.edu/labs/mems

AREAS OF EXPERTISE

- Micro-electro-mechanical systems (MEMS) sensors and actuators
- Energy harvesting
- Dynamics and vibration

KEY RESEARCH

- Micro triboelectric nanogenerators for self-powered vibration and shock sensing
- Energy harvesting from gait to power load sensors for total knee replacement
- MEMS for high resolution sensors
- MEMS for large stroke actuators and micro-mirrors

POTENTIAL APPLICATIONS

- Biomedical Implants: Joint load monitoring in total knee replacement
- Biomedical Imaging: Real-time imaging for cancer screening
- Safety: Threshold shock and vibration detection
- Consumer Electronics: Self-powered sensors with minimized power consumption

SIGNIFICANT PUBLICATIONS/PATENTS

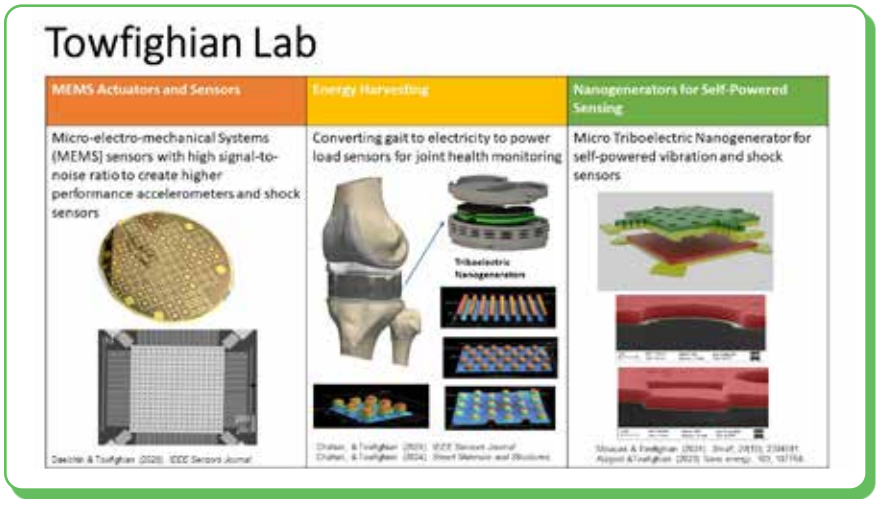
- Towfighian, S. et al (2024). U.S. Patent No. 12,091,313. Washington, DC: U.S. Patent and Trademark Office.
- Mousavi, M., Alzgool, M., Davaji, B., & Towfighian, S. (2024). High Signal-to-Noise Ratio Event-Driven MEMS Motion Sensing. Small, 20(10), 2304591.
- Alzgool, M., Tian, Y., Davaji, B., & Towfighian, S. (2023). Self-powered triboelectric MEMS accelerometer. Nano Energy, 109, 108282.
- Ibrahim, A., Jain, M., Salman, E., Willing, R., & Towfighian, S. (2019). A smart knee implant using triboelectric energy harvesters. Smart materials and Structures, 28(2), 025040.

MAJOR PROJECTS/FUNDING

- NIH-NIAMS, “Self-Powered Load Sensor for Total Knee Replacement Health Monitoring” ($2,326,521)
- NSF-CCSS, “ENG-SEMICON: Merging Electrostatic and Ferroelectric MEMS Actuators to Create Tunable High-Speed Scanners” ($275,000)
- NSF-DCSD, “MEMS High Voltage Triboelectric Levitation: A Generactuator” ($629,338)
- NSF-CCSS, “Repulsive sensors as a new approach to capacitive sensing” ($480,958)

SIGNIFICANT ACHIEVEMENTS

- Creating the smallest high signal-to-noise-ratio micro triboelectric nanogenerator
- Developing a self-powered load sensing system for total knee replacement
- Creating micro-sized devices with larger strokes for pressure sensing, microphones, accelerometers, signal processing and imaging devices



Robert J. Wagner

ASSISTANT PROFESSOR

EDUCATION: PhD in Material Science and Engineering, University of Colorado — Boulder
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WEBSITE: robwags1991.wixsite.com/research

AREAS OF EXPERTISE

- Solid mechanics
- Multiscale computational mechanics
- Soft matter, polymers and active matter

KEY RESEARCH

- Development of novel mesoscale computational models for the predictive mechanical design of polymers
- Investigating molecular design strategies that mitigate the release of micro/nanoplastics
- Multi-material additive manufacturing and interface optimization of polymeric materials

POTENTIAL APPLICATIONS

- Polymer property design and optimization for adhesives, biomaterials, structural fiber-composites, soft robotics
- Biomaterials
- Manufacturing: Multimaterial interface optimization and additive manufacturing of dissimilar soft materials

SIGNIFICANT PUBLICATIONS/PATENTS

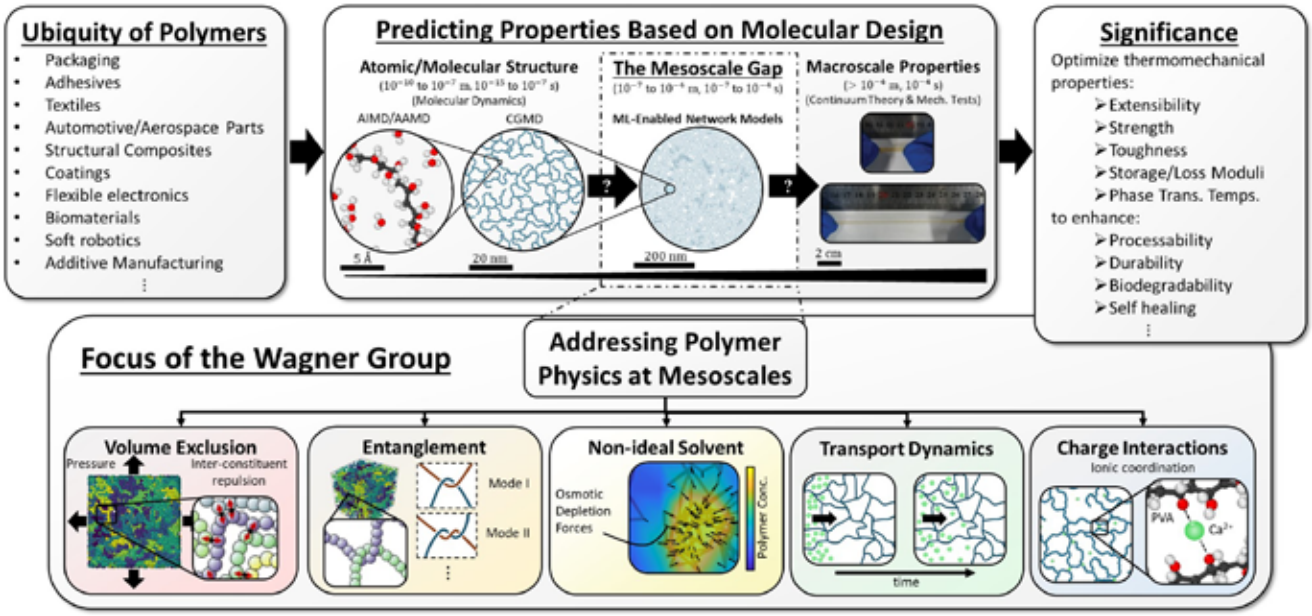
- Wagner, R.J. & Silberstein, M.N. A foundational framework for the mesoscale modeling of dynamic elastomers and gels. JMPS. (2024).
- Wagner, R.J., Lamont, S.C., White, Z.T., Vernerey, F.J. Catch bond kinetics are instrumental to cohesion of fire ant rafts under load. PNAS. (2024).
- Abdelrahman, M., Wagner, R.J., Kalairaj, M.S., Zadan, M., Kim, M.H., et al. Material assembly from collective action of shape-changing polymers. Nature Materials. (2024).
- Wagner, R. J., Dai, J., Su, X., Vernerey, F. J. A mesoscale model for the micromechanical study of gels. JMPS (2022).

MAJOR PROJECTS/FUNDING

- "Mechanical Optimization of Tanglemers through ML-Enabled Mesoscale Modeling," proposal under preparation.
- Collaborative Research: "Mitigating Mechanical Microplastic Release through Tailored Molecular Design," proposal under preparation.
- Collaborative Research: "Physics-Informed Machine Learning for Tailoring the Multidirectional Mechanical Properties of Composite Materials," proposal under preparation

SIGNIFICANT ACHIEVEMENTS

- 2023: NSF Society of Engineering Science Future Faculty Travel Award



Mohammad Younis

PROFESSOR

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AREAS OF EXPERTISE

- Sensors and actuators
- Micro- and nanosystems
- Nonlinear dynamics and vibrations

KEY RESEARCH

- Simple readout methods for chemical and biosensors based on MEMS switches
- Sensors and actuators for helium, hydrogen, carbon mono oxides, acetone
- Nonlinear dynamics of microscale

POTENTIAL APPLICATIONS

- Warning systems for thermal runway of lithium-ion batteries
- Detectors for diabetes through breath analyzers
- Low-cost systems for salmonella and COVID detections

SIGNIFICANT PUBLICATIONS/PATENTS

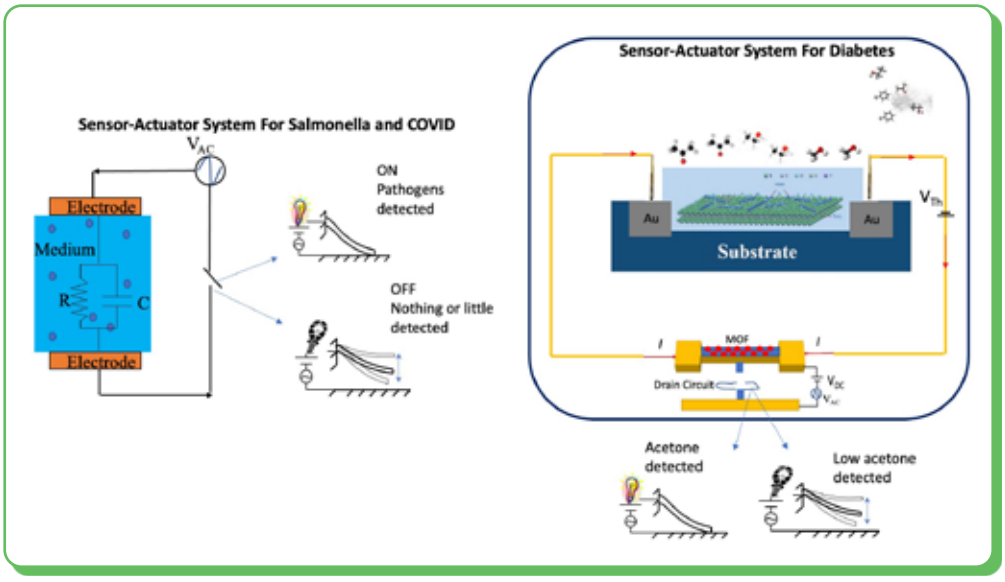
- M. Younis, "MEMS linear and nonlinear statics and dynamics," Springer, New York, 2011.
- S Azizi, H Haddad Khodaparast, H Madinei, MI Younis, G Rezazadeh, "Bifurcation-based dynamics and internal resonance in micro ring resonators for MEMS applications," Nonlinear Dynamics, 1-14, 2025
- N Alcheikh, A Hajjaj, M. Younis, "Wide range highly sensitive pressure sensor based on heated micromachined arch beam," US Patent 11,703,406, 2023
- Q. Xu, R. Alahmdi, L. Wang, R. T. Rocha and M. I. Younis, "A Tunable Micromachined Multithreshold Inertial Switch," in IEEE/ASME Transactions on Mechatronics, vol. 29, no. 2, pp. 1546-1555, April 2024.
- SA Tella, MI Youni, Multifunctional logic device and method, US Patent 12,088,279, 2024

MAJOR PROJECTS/FUNDING

- NSF: "Exploration of the Nonlinear Dynamics of NEMS Carbon Nanotube Resonators"
- NSF CAREER: "Investigations into Nonlinear Phenomena in Electrostatic MEMS and their Potential for Smart Sensors and Actuators"
- NSF: "Microbeams Under Mechanical Shock and Electrostatic Actuation Accounting for the Effects of Circuit Board and Package Motion"

SIGNIFICANT ACHIEVEMENTS

- National Science Foundation CAREER Award
- 2017: Two best papers awards at the ASME-IDETC, Cleveland, USA
- 2012: SUNY Chancellor's Award for Excellence in Scholarship and Creative Activities



Kaiyan Yu

ASSOCIATE PROFESSOR

EDUCATION: PhD in Mechanical and Aerospace Engineering, Rutgers University
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AREAS OF EXPERTISE

- Autonomous robotic systems
- Dynamic systems and controls
- Automation science and engineering

KEY RESEARCH

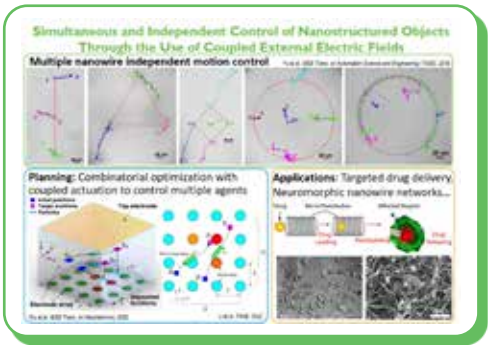
- Smart micro-bio-nano factory: automated nano/micro objects manipulation under external common fields
- Cooperative control and motion planning of multiple autonomous vehicles/robots with aggressive maneuvers
- Complete and optimal control and planning of agricultural, road maintenance, and rehabilitation robot systems

POTENTIAL APPLICATIONS

- Nanotechnology: Nano-robotic assembly, nano-electronic systems, lab-on-a-chip, biomedical systems, targeted drug delivery
- Autonomous Robotics Systems: Self-driving vehicles, agricultural automation, healthcare robotics
- Civil Infrastructure and Field Robots: Construction automation, structural health monitoring, disaster recovery, smart cities.

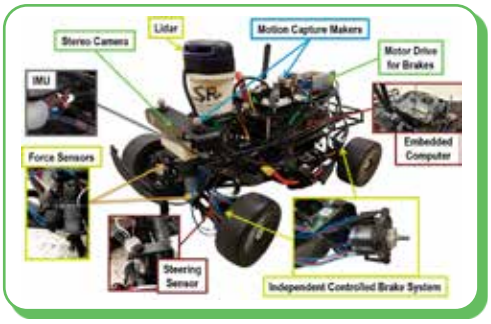
SIGNIFICANT PUBLICATIONS/PATENTS

- K. Yu (2022). "Electrophoresis-based manipulation of micro- and nanoparticles in fluid suspensions," In Field-Driven Micro and Nanorobots for Biology and Medicine, Y. Sun, X. Wang, and J. Yu (Ed.), Springer Nature, Switzerland, pp 133-164.
- V. Veeraraghavan, K. Hunte, J. Yi, and K. Yu (2024). "Complete and near-optimal robotic crack coverage and filling in civil infrastructure". IEEE Trans. on Robotics, vol. 40, pp. 2850-2867.
- J. Song, J. Wu, and K. Yu (2024). "Learning-based auto-focus and 3D pose identification of moving micro-and nanowires in fluid suspensions". IEEE Trans. on Automation Science and Engineering, vol. 21, no. 3, pp. 2321-2334.
- J. Wu, X. Li, and K. Yu (2020). "Electrophoresis-based adaptive manipulation of nanowires in fluid suspension". IEEE Trans. on Mechatronics, vol. 25, no. 2, pp 638-649.



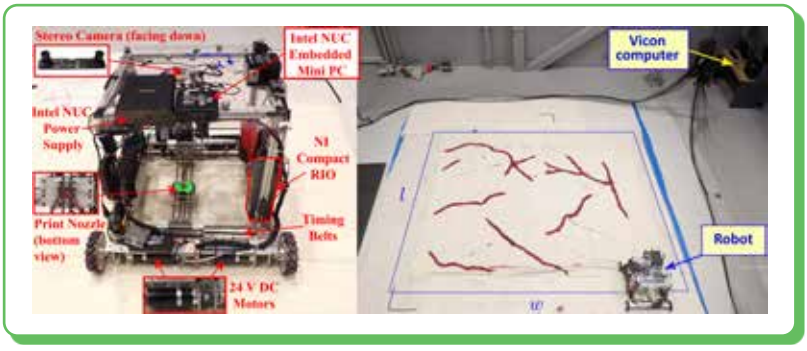
MAJOR PROJECTS/FUNDING

- 2022-27: NSF-ENG, "CAREER: Simultaneous and Independent Control of Nanostructured Objects Through the Use of Coupled External Electric Fields"
- 2024-25: SUNY-IBM AI Research Alliance, "Ray-FL-FDA: Ray-empowered Federated Learning of Functional Data Analysis"
- 2020-23: SUNY, "Hybrid Memristive Neural Network for Neuromorphic Computing with Automated Manipulation of Nanowires"
- NSF-CISE & ENG, "CPS: Medium: UAV-Legged Robot Teams for Minimally Invasive Disease Detection and Treatment in Large Dense Agricultural Fields," pending



SIGNIFICANT ACHIEVEMENTS

- 2025: Watson College Recognition Award for Distinguished Educator
- 2024: ME 428 has been selected as one of the "25 Coolest Classes You Can Take at Binghamton"
- 2023: Services for Students with Disabilities Student Recognition Recipient, Binghamton University
- 2022: National Science Foundation CAREER Award
- 2022: Best Student Paper Award, IEEE International Conference on Automation Science and Engineering
- 2016: NSF Doctoral Consortium Award, IEEE Conference on Automation Science and Engineering



Pu Zhang

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AREAS OF EXPERTISE

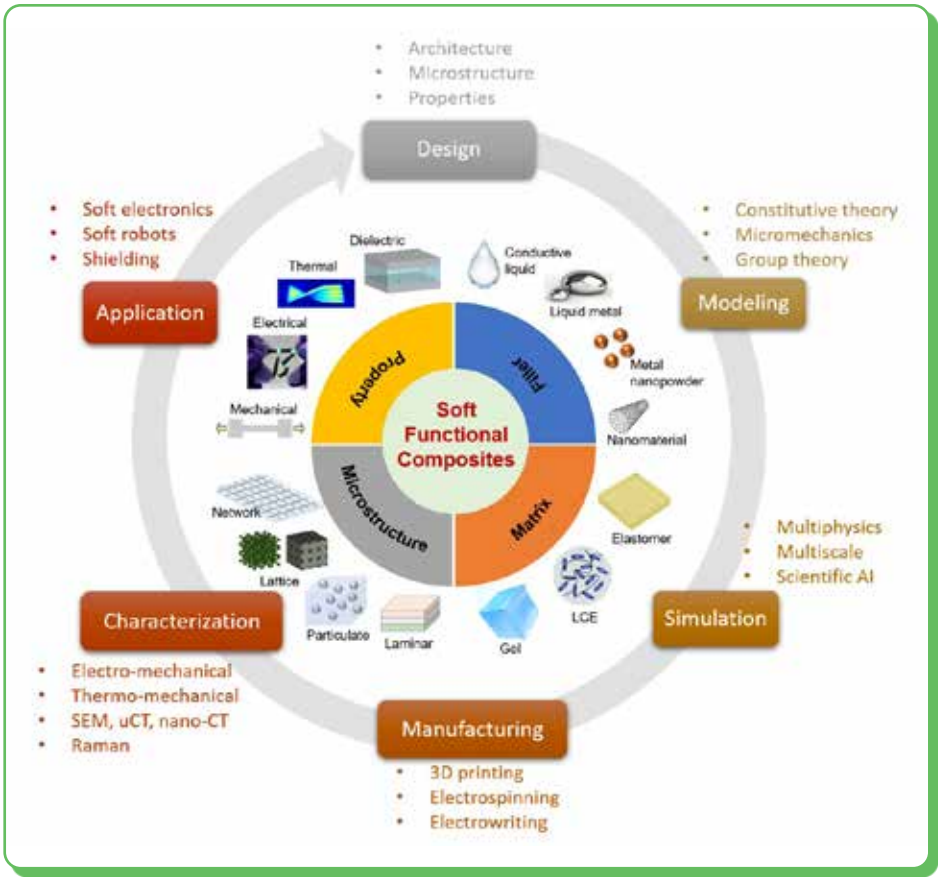
- Composite and architected material
- Solid mechanics
- Multiscale and multiphysics simulation
- Additive manufacturing

KEY RESEARCH

- Develop soft conductive composites for electronics usage
- Multiphysics modeling and simulation for soft functional materials
- Employ symbolic AI for constitutive modeling of materials

POTENTIAL APPLICATIONS

- Soft electronics and robotics
- Lightweight materials in engineering
- Engineering software



SIGNIFICANT PUBLICATIONS/PATENTS

- QK Nguyen, P Zhang. "Modeling electromechanical behaviors of soft conductive composites embedded with liquid metal fibers". Mechanics of Materials, 2024, 190: 104920
- J Ma, Z Liu, QK Nguyen, P Zhang. "Lightweight soft conductive composites embedded with liquid metal fiber networks". Advanced Functional Materials, 2023, 2308128
- F Deng, QK Nguyen, P Zhang. "Multifunctional liquid metal lattice materials through hybrid design and manufacturing". Additive Manufacturing, 2020, 33

MAJOR PROJECTS/FUNDING

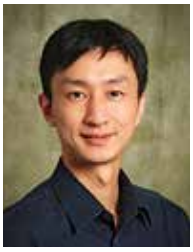
- 2023-25: DOE SBIR -"Polymer-based conformal space radiation shield with thermal management manufactured by five-axis 3D printing platform"
- 2023-26: NSF — "CDS&E/Collaborative Research: A symbolic artificial intelligence framework for discovering physically interpretable constitutive laws of soft functional composites"
- 2022-27: NSF — "CAREER: Electro-mechanical behaviors of soft conductive composites embedded with liquid metal fiber networks"

SIGNIFICANT ACHIEVEMENTS

- 2024: Watson Early-Stage Distinguished Research Award
- 2022: NSF CAREER Award

Jingzhou “Frank” Zhao

ASSISTANT PROFESSOR



EDUCATION: PhD in Mechanical Engineering, University of California — Los Angeles
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AREAS OF EXPERTISE

- Solidification nanomanufacturing processes
- Interfacial transport dynamics and control
- In-situ sensing systems
- High-temperature thermal energy storage materials

KEY RESEARCH

- Continuous casting of glass-coated microparticles
- Thermal drawing of composite textile fibers
- Efficient embedded sensing of a spatio-temporally sparse heat source

POTENTIAL APPLICATIONS

- Wearable supercapacitors
- Thermal energy storage
- Droplet-based additive manufacturing

SIGNIFICANT PUBLICATIONS/PATENTS

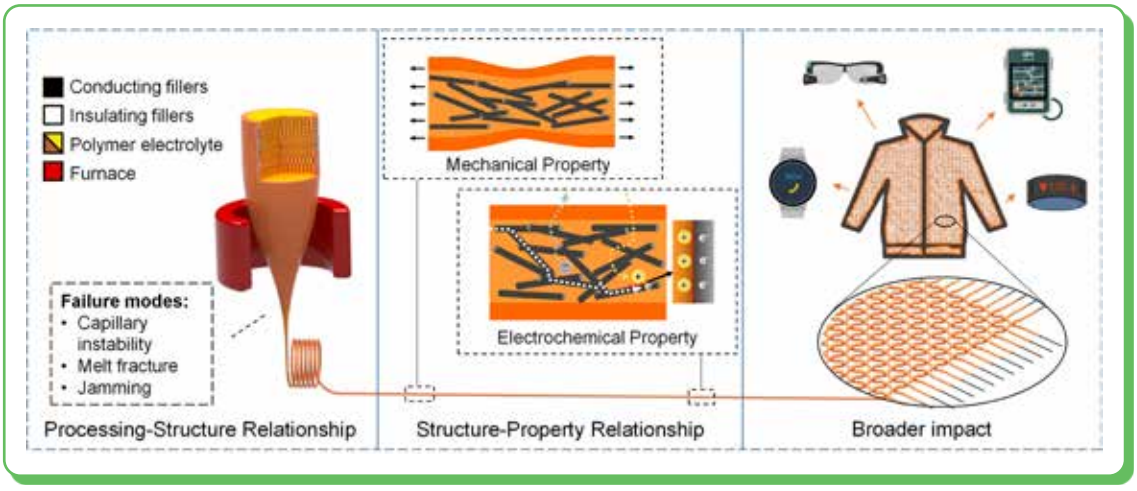
- Teymoory, P., Zhao, J. and Shen, C., 2023. “How Practical Are Fiber Supercapacitors for Wearable Energy Storage Applications?,” Micromachines, 14(6), p.1249.
- Benner, J.Z., Shannon, R.C., Wu, W., Shen, L., Metsack, A.P. and Zhao, J., 2022. “The effect of micro-encapsulation on thermal characteristics of metallic phase change materials,” Applied Thermal Engineering, p.118055.
- Zhao, J., Li, X., 2018, “A long wavelength model of continuous metal microwires production by thermal fiber drawing from a preform,” Journal of Micro and Nano- Manufacturing, 6(1), p. 011003
- Zhao, J., Ye., F., 2019, “Where ThermoMesh meets ThermoNet: A machine learning based sensor for heat source localization and peak temperature estimation,” Sensors and Actuators A: Physical, 292, pp. 30-38.
- Jingzhou Zhao, Yuri Gulak, Max Martel, Apparatus and method for production and encapsulation of small particles and thin wires, International Patent Application No. PCT/US2019/053176, national phase entered in European Union, Israel, India, Canada, China, Japan, and Australia., March 2021

MAJOR PROJECTS/FUNDING

- 2020: Zhao, J., Chauhang, V., Benner, J., “Machine Learning Accelerated Process Development for Scalable Manufacturing of Silica-based Glass Encapsulated Phase Change Materials Using Flow Mold Casting,” DOE, AMO, EERE, $710,535
- 2022: Zhao, J., “Collaborative Research: Thermal Drawing of Composite Textile Fibers for Wearable Supercapacitors,” NSF, CMMI, AM, $239,022

SIGNIFICANT ACHIEVEMENTS

- 2024: Career Champion, Fleishman Career Center, Binghamton University



Guangwen Zhou

SUNY DISTINGUISHED PROFESSOR

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AREAS OF EXPERTISE

- Interdisciplinary research in understanding materials interactions with harsh synthesis, manufacturing and service environments
- Investigating atomistic mechanisms of surface and interface phenomena (e.g., oxidation, corrosion, passivation, thin film and crystal growth, catalysis)
- Correlating atomic and nanoscopic measurements with materials applications in catalysis, energy storage and storage, advanced manufacturing, and environmental sustainability
- Advancing dynamic in-situ and operando electron microscopy and X-ray spectroscopy approaches for materials research
- Materials modeling and simulations: density-functional theory, kinetic Monte Carlo

KEY RESEARCH

- Dynamic behavior of materials under harsh synthesis, manufacturing and service environments
- High-temperature oxidation of advanced alloys
- Corrosion and passivation of metallic materials

POTENTIAL APPLICATIONS

- Energy conversion and storage
- Catalysis
- Environmental sustainability
- Advanced synthesis and manufacturing

SIGNIFICANT PUBLICATIONS/PATENTS

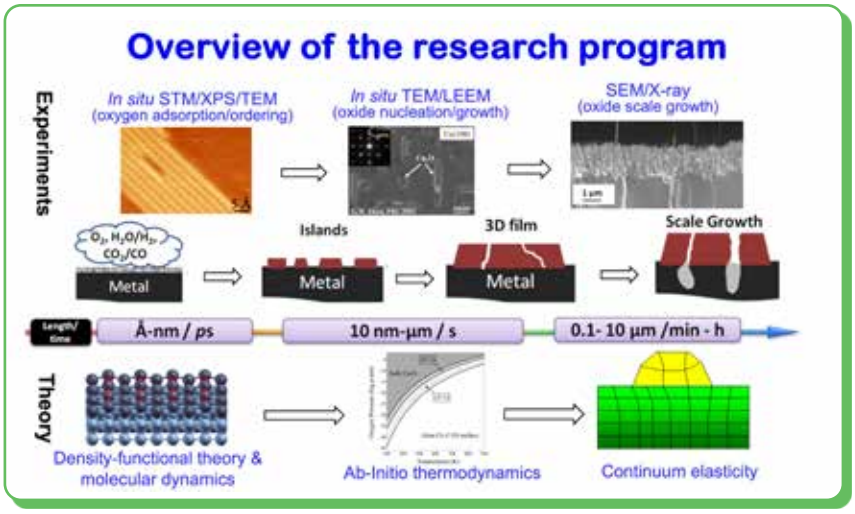
- X.B. Chen, W. Shan, D. Wu, S.B. Patel, N. Cai, C. Li, S. Ye, Z. Liu, S. Hwang, D.N. Zakharov, J.A. Boscoboinik, G. Wang, G.W. Zhou, "Atomic mechanisms of water-vapor induced surface passivation," Science Advances 9, eadh5565 (2023)
- Y.G. Zhu, J.Y. Wang, S.B. Patel, C.R. Li, A. Head, J. A. Boscoboinik, G.W. Zhou, "Tuning the surface reactivity of oxides by peroxide species," Proceeding of the National Academy of Sciences 120 (13), e2215189120 (2023)
- X.H. Sun, D.X. Sun, L.F. Zou, S.D. House, X.B. Chen, M. Li, D.N. Zakharov, J.C. Yang, G.W. Zhou, "Misfit-dislocation induced stop-and-go kinetics of interfacial transformations," Nature 607, 708-713 (2022)
- X.H. Sun, W.H. Zhu, D.X. Wu, C.R. Li, J.Y. Wang, Y.G. Zhu, X.B. Chen, J.A. Boscoboinik, R. Sharma, G.W. Zhou, "Surface-reaction induced structural oscillations in the subsurface," Nature Communications 11, 305 (2020)
- L.F. Zou, C.M. Yang, Y.K. Lei, D. Zakharov, J.M.K. Wiezorek, D. Su, Q.Y. Yin, J. Li, Z.Y. Liu, E.A. Stach, J.C. Yang, L. Qi, G.F. Wang, G.W. Zhou, "Dislocation nucleation facilitated through atomic segregation," Nature Materials 17, 56-63 (2018)

MAJOR PROJECTS/FUNDING

- National Science Foundation, Division of Materials Research (DMR), Metals and Metallic Nanostructures Program, "Atomistic mechanisms and dynamics of hydrogen-based reduction of iron ores," NSF-DMR 2303712
- Department of Energy, Basic Energy Science Office, Division of Materials Science and Engineering, Synthesis and Processing Science Program, "In situ visualization and theoretical modeling of early stages of oxidation of metals and alloys," DOE BES DE-SC0001135

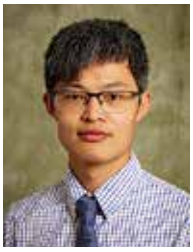
SIGNIFICANT ACHIEVEMENTS

- Journal publications: 265
- Total funding: $23 million (Zhou's share: about $10 million)
- 2025: Fellow, Microscopy Society of America



Jian Zhou

ASSISTANT PROFESSOR



EDUCATION: PhD in Mechanical Engineering, Binghamton University
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AREAS OF EXPERTISE

- NEMS and nanomechanics
- Acoustics and vibration

KEY RESEARCH

- Nano-opto-electro-mechanical systems
- Nanomechanics of thin materials
- Bioinspired nanophone

POTENTIAL APPLICATIONS

- Health diagnostics and implantable neuroprostheses
- Precision sensing for positioning, navigation and timing
- Ultrafast manipulation and imaging

SIGNIFICANT PUBLICATIONS/PATENTS

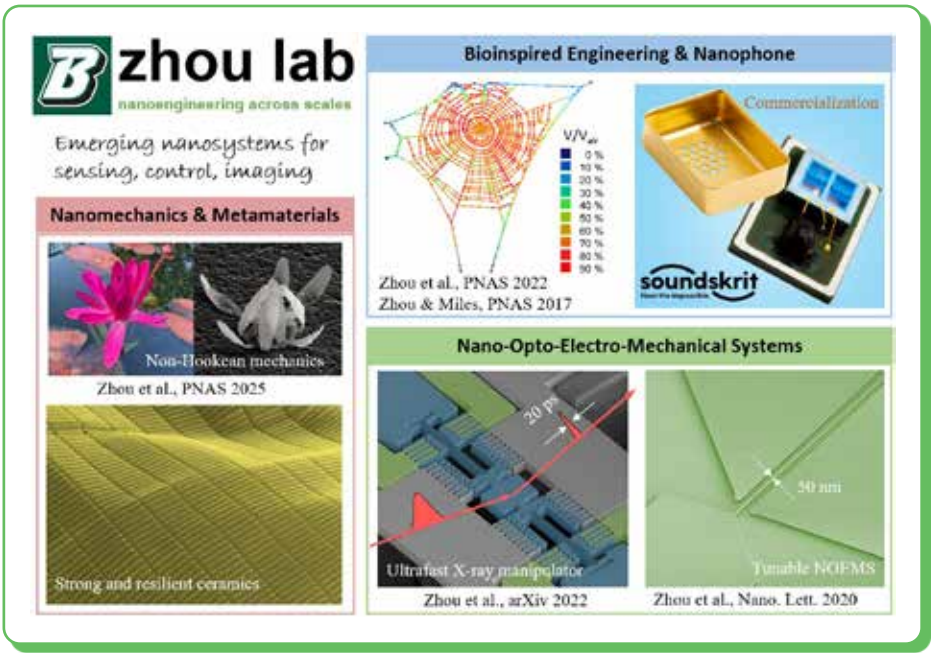
- Zhou, J., Huang, R., Moldovan, N., Stan, L., Wen, J., Jin, D., Nelson, D. R., Košmrlj, A., Czaplewski, D. A., & López, D. (2025). Rippled metamaterials with scale-dependent tailorable elasticity. PNAS. (In Press).
- Zhou, J., Lai, J., Menda, G., Stafstrom, J.A., Miles, C.I., Hoy, R.R., & Miles, R.N. (2022). Outsourced hearing in an orb-weaving spider that uses its web as an auditory sensor. PNAS, 119.
- Zhou, J., Moldovan, N., Stan, L., Cai, H., Czaplewski, D.A., & López, D. (2020). Approaching the strain-free limit in ultrathin nanomechanical resonators. Nano Letters, 20.
- Zhou, J., & Miles, R.N. (2017). Sensing fluctuating airflow with spider silk. PNAS, 114.

MAJOR PROJECTS/FUNDING

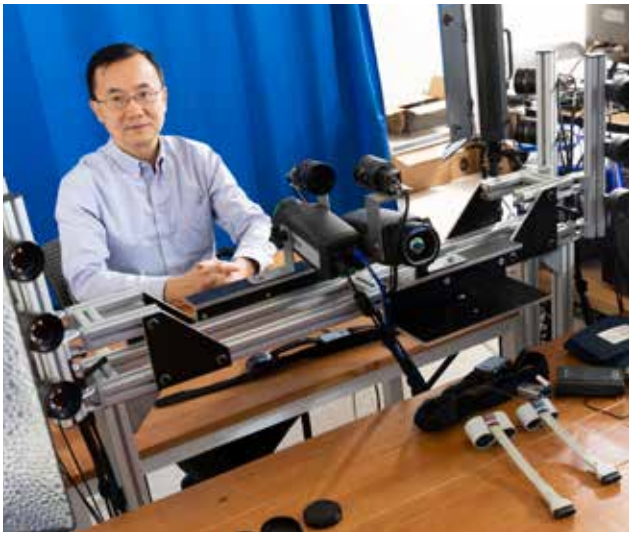
- 2024-27: Zhou, J. & Ke, C. Broadband Tunable Nano-Opto-Electro-Mechanical Resonators for Ultrasensitive Adaptive Sensing, National Science Foundation (NSF)

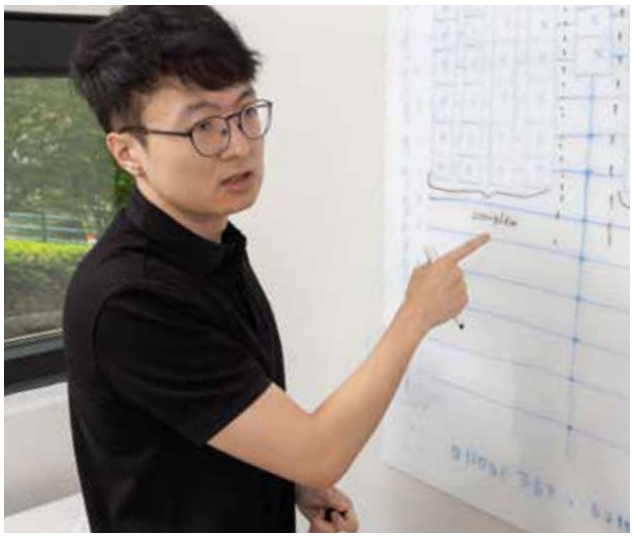
SIGNIFICANT ACHIEVEMENTS

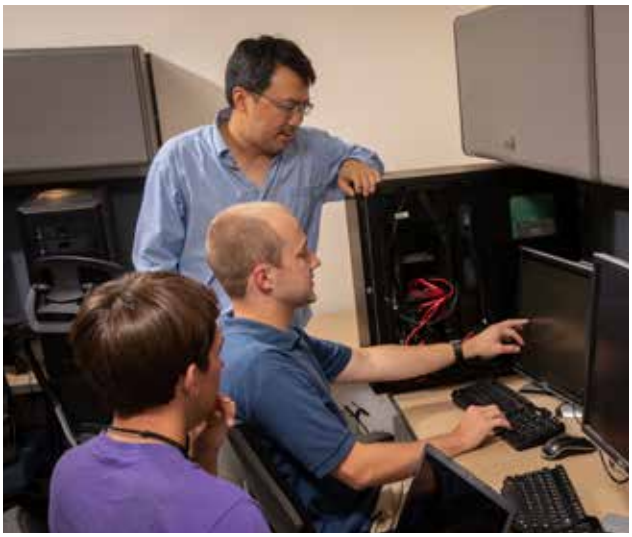
- Research has been recognized globally by prestigious journals and media outlets, including Nature Physics, PNAS, Scientific American, The New York Times, The Washington Post and BBC
- Dissertation work on bioinspired flow microphone has been commercialized by Soundskrit



School of Computing







Eric Atkinson

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Programming languages and runtimes
- Program analysis
- Formal methods

KEY RESEARCH

- Abstract interpretation of probabilistic programming languages
- Probabilistic program analysis for side-channel leakage
- Programming language tools for reliable AI systems

POTENTIAL APPLICATIONS

- Robotics: Reliable perception systems
- Security: Quantitative side-channel leakage protection
- AI: Enhanced reliability for AI-enabled systems

SIGNIFICANT PUBLICATIONS/PATENTS

- Ellie Cheng, Eric Atkinson, Guillaume Baudart, Louis Mandel, Michael Carbin. “Inference Plans for Hybrid Particle Filtering.” POPL 2025
- Eric Atkinson, Guillaume Baudart, Louis Mandel, Charles Yuan, Michael Carbin. “Semi-symbolic Inference for Efficient Streaming Probabilistic Programming.” OOPSLA 2023
- Eric Atkinson, Michael Carbin. “Programming and Reasoning with Partial Observability.” OOPSLA 2020

MAJOR PROJECTS/FUNDING

- 2023-24: Amazon, Inference Plans for Hybrid Particle Filtering
- Monitors for machine-learning enabled systems, proposal under preparation
- Abstract Interpretation for Probabilistic Programming, proposal under preparation

Jeremy Blackburn

ASSOCIATE PROFESSOR

EDUCATION: PhD in Computer Science, University of South Florida
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AREAS OF EXPERTISE

- Data collection
- Safety/security
- Social media

KEY RESEARCH

- Understanding the use of AI in policy decisions
- Detecting and mitigating online extremists
- Applications of multimodal AI to analyze video podcasts

POTENTIAL APPLICATIONS

- Data collection and analysis pipelines answer questions related to cybersafety/security with applications to social media platforms
- Use of AI in policy has potential applications for policymakers to provide tools that can help analyze and understand the impact of policy wording when it comes to enforcement of that policy (e.g., Terms of Service) by AI systems

SIGNIFICANT PUBLICATIONS/PATENTS

- Wai Man Si, Michael Backes, Jeremy Blackburn, Emiliano De Cristofaro, Gianluca Stringhini, Savvas Zannettou, and Yang Zhang. 2022. “Why So Toxic? Measuring and Triggering Toxic Behavior in Open-Domain Chatbots.” In Proceedings of the 2022 ACM SIGSAC Conference on Computer and Communications Security (CCS ‘22). Association for Computing Machinery, New York, NY, USA, 2659–2673. doi.org/10.1145/3548606.3560599
- Hine, G., Onaolapo, J., De Cristofaro, E., Kourtellis, N., Leontiadis, I., Samaras, R., Stringhini, G., & Blackburn, J. (2017). “Kek, Cucks, and God Emperor Trump: A Measurement Study of 4chan’s Politically Incorrect Forum and Its Effects on the Web.” Proceedings of the International AAAI Conference on Web and Social Media, 11(1), 92-101. doi.org/10.1609/icwsm.v11i1.14893
- Balci, U., Patel, J., Balci, B., & Blackburn, J. “Podcast Outcasts: Understanding Rumble’s Podcast Dynamics.” ACL NLP for Digital Humanities (To Appear)

MAJOR PROJECTS/FUNDING

- 2024-25: Secunda Family Foundation — Large Language Models and Antisemitism on Social Media (PI). Amount: $85,000.
- 2023-27: NSF Collaborative Research — SaTC: TTP: Medium: iDRAMA.cloud: A Platform for Measuring and Understanding Information Manipulation (PI). Amount: $674,999.
- 2021-26: NSF CAREER — Towards a Data-driven Understanding of Online Sentiment (PI). Amount: $517,484.

SIGNIFICANT ACHIEVEMENTS

- 2023: Best Paper, ACM WebSci
- 2022: Best Paper Honorable Mention, ACM CCS
- 2021: Impact Recognition Award, ACM CSCW
- 2020: Honorable Mention, AAAI ICWSM

Jayson Boubin

ASSISTANT PROFESSOR

EDUCATION: PhD in Computer Science, Ohio State University
EMAIL: jboubin@binghamton.edu
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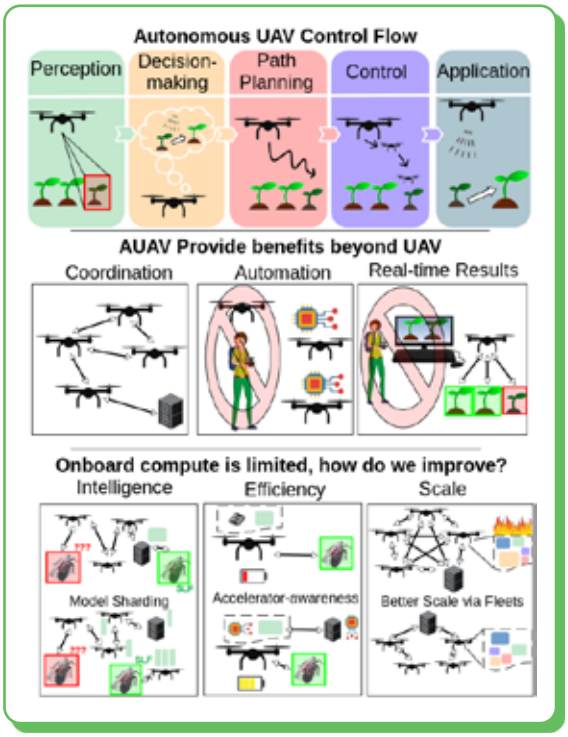
AREAS OF EXPERTISE

- Unmanned aerial vehicles
- Robotics
- Computer systems
- Autonomy

KEY RESEARCH

- Real-time hyperspectral processing for small UAV
- Autonomous UAV for spotted lanternfly detection and mitigation
- UAV-UGV teaming for agricultural disease inspection
- Intelligence plane infrastructure for 5G and 6G

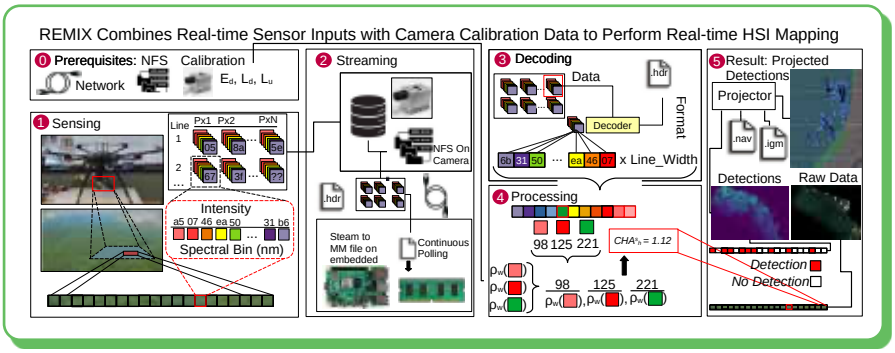


POTENTIAL APPLICATIONS

- Precision agriculture
- Remote sensing in ecology
- Humanitarian demining
- UAV swarm autonomy

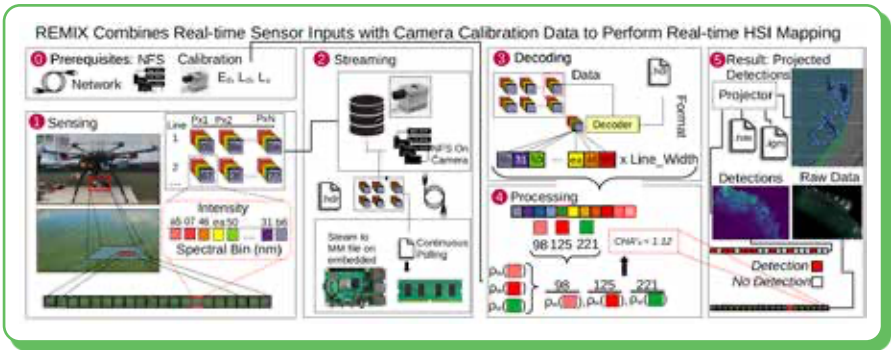
SIGNIFICANT PUBLICATIONS/PATENTS

- Aniruddha Rakshit, Salil Reddy, Rajiv Ramnath, Anish Arora Jayson Boubin, “Righteous: Automatic Right-sizing for Complex Edge Deployments,” IEEE/ACM Symposium on Edge Computing (SEC) 2024
- Jayson Boubin, Codi Burley, Peida Han, Bowen Li, Barry Porter, Christopher Stewart, “MARbLE: Multi-Agent Reinforcement Learning at the Edge for Digital Agriculture,” IEEE/ACM Symposium on Edge Computing (SEC) 2022
- Ming-Der Yang, Jayson Boubin (Corresponding), Hui-Ping Tsai, Hsin-Huang Tseng, Yu-Chun Hsu, Christopher Stewart, “Adaptive Autonomous UAV Scouting for Rice Lodging Assessment Using Edge Computing with Deep Learning,” EDANet Computers and Electronics in Agriculture 2020
- Jayson Boubin, Naveen T.R Babu, Christopher Stewart, John Chumley, Shiqi Zhang, “Managing Edge Resources for Fully Autonomous Aerial Systems,” IEEE/ACM Symposium on Edge Computing (SEC) 2019



MAJOR PROJECTS/FUNDING

- Real-time Hyperspectral Anomaly Detection with Small Autonomous UAVs, AFRL Mid-Atlantic Hub, $300,000



SIGNIFICANT ACHIEVEMENTS

- 2019: NSF Graduate Research Fellowship

Patrick H. Chen

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Machine learning
- Natural language processing
- Fast searching

KEY RESEARCH

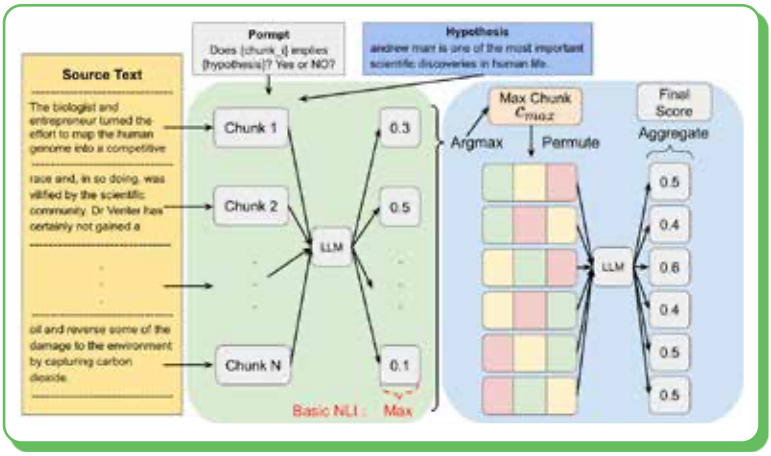
- Enhancing the trustworthiness of text summarization algorithms
- Efficient machine learning inference
- Continual learning on sequential dataset input stream
- Black box hard label model adversarial attack

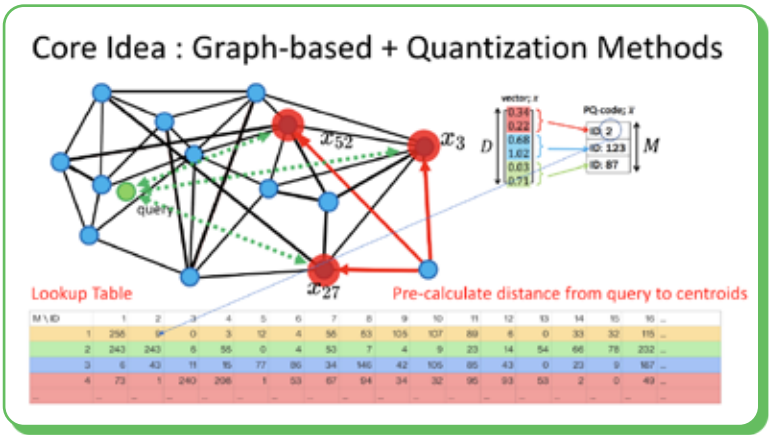
POTENTIAL APPLICATIONS

- Healthcare: On-device medical diagnosis
- Business: Customer-service chatbots

SIGNIFICANT PUBLICATIONS/PATENTS

- P. H. Chen, H. F. Yu, I. S. Dhillon, C. J. Hsieh. "DRONE: Data-aware Low-rank Compression for Large NLP Models," Neural Information Processing Systems (NeurIPS), 2021.
- P. H. Chen, W. Wei, C. J. Hsieh, B. Dai. "Overcoming Catastrophic Forgetting by Bayesian Generative Regularization," Conference of Machine Learning (ICML), 2021.
- M. Cheng, S. Singh, P. H. Chen, P. Y. Chen, S. Liu, C. J. Hsieh. "Sign-OPT: A Query-Efficient Hard-label Adversarial Attack," Proceedings of the International Conference on Learning Representations (ICLR), 2020.





Kenneth Chiu

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AREAS OF EXPERTISE

- High-performance computing
- Artificial intelligence for materials
- Artificial intelligence for science

KEY RESEARCH

- MultiGPU graph neural networks
- Artificial intelligence for molecular property prediction and retrosynthesis
- Artificial intelligence for imaging and remote sensing
- Artificial intelligence for stability analysis of nonlinear dynamic systems

POTENTIAL APPLICATIONS

- Drug discovery
- Materials design for energetics and energy applications
- Live-cell bioimaging using stimulated Raman scattering
- Power grid stability and fault recovery

SIGNIFICANT PUBLICATIONS/PATENTS

- Philip Dexter, Yu David Liu, Kenneth Chiu. “The essence of online data processing.” Proc. ACM Program. Lang. 6(OOPSLA2): 899-928 (2022)
- Shehtab Zaman, Tim Moon, Tom Benson, Sam Adé Jacobs, Kenneth Chiu, Brian Van Essen. “Parallelizing Graph Neural Networks via Matrix Compaction for Edge-Conditioned Networks.” CCGRID 2022: 386-395
- Shehtab Zaman, Ethan Ferguson, Cécile Pereira, Denis Akhiyarov, Mauricio Araya-Polo, Kenneth Chiu. “ParticleGrid: Enabling Deep Learning using 3D Representation of Materials.” e-Science 2022: 378-388
- Ali Eker, David Timmerman, Barry Williams, Kenneth Chiu, Dmitry Ponomarev. “GVT-Guided Demand-Driven Scheduling in Parallel Discrete Event Simulation.” ICPP 2021: 22:1-22:10

MAJOR PROJECTS/FUNDING

- 2023-26: Department of Energy $425,000 Foundation-Learning Artificial Intelligence for Synthesis Knowledge
- 2025: TotalEnergies $444,408 Performance Measurement, Analysis, and Tuning of Seismic and Machine Learning Workloads
- 2023-26: AFRL $300,000 Autonomous UAVs for Real-Time Hyperspectral Phenomena Detection

Weiying Dai

ASSOCIATE PROFESSOR

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AREAS OF EXPERTISE

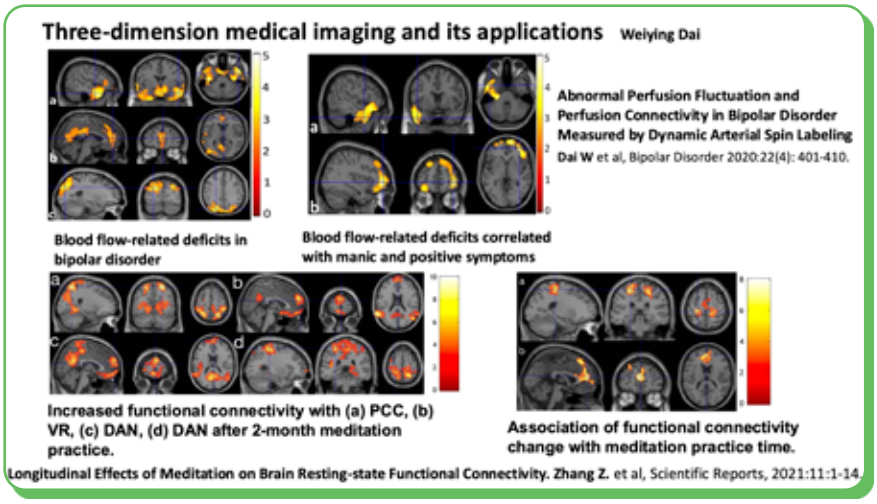
- Biomedical image processing
- Pattern recognition
- Computer vision
- Machine learning

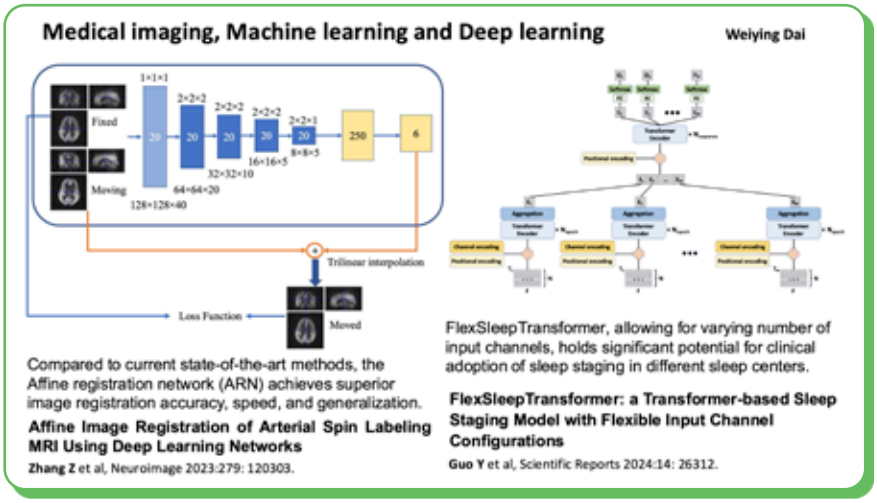
KEY RESEARCH

- Developing computational methods to extract age-related brain patterns
- Identifying imaging biomarkers for schizophrenia and diabetes
- Investigating the formation mechanism of brain folding patterns
- Exploring the potential of AI for image registration and reconstruction
- Developing automatic AI-based methods for sleep staging

POTENTIAL APPLICATIONS

- Healthcare: Medical diagnosis/ prognosis, drug discovery, patient treatment
- Business: Wearable devices for emotion monitoring, heart monitoring and sleep staging





SIGNIFICANT PUBLICATIONS/ PATENTS:

- Y. Guo*, M. Nowakowski, W. Dai, 2024. "FlexSleepTransformer: a transformer-based sleep staging model with flexible input channel configurations," Scientific Reports 14: 26312.
- J. Barrett*, H. Meng*, Z. Zhang*, S. Chen*, L. Zhao, D. C. Alsop, X. Qiao, W. Dai, 2024. "Improving spectral clustering method for accurate detection of brain resting-state networks," NeuroImage 299: 120811.
- Z. Zhang*, E. Riley, S. Chen*, L. Zhao, A. K. Anderson, E. DeRosa, W. Dai, 2025. "Age and gender-related patterns of arterial transit time and cerebral blood flow in healthy adults," NeuroImage 309: 121098.

MAJOR PROJECTS/FUNDING:

- 2021-25: NSF-CMMI, Mechanics of the Formation of Cortical Folding Patterns in the Developing Human Brain
- 2022-25: NIH-R21, Functional MRI in Schizophrenia
- 2020-25: NIH-R01, Basal Forebrain connections to the heart and mind in healthy aging

SIGNIFICANT ACHIEVEMENTS:

- 2011: ISMRM Junior Fellow

Zeyu Ding

ASSISTANT PROFESSOR

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WEBSITE: zeyuding.com

AREAS OF EXPERTISE

- Data privacy
- Formal methods
- Machine learning

KEY RESEARCH

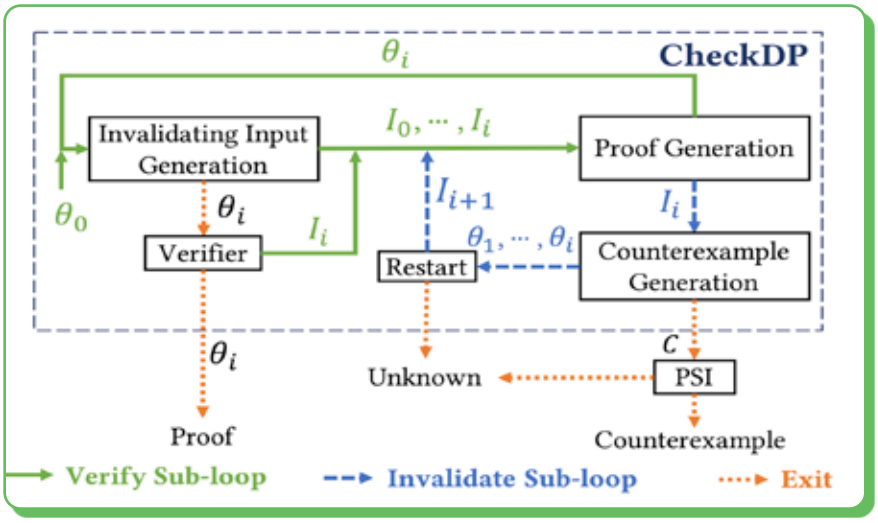
- Privacy-preserving database querying systems
- Privacy-preserving machine learning
- Synthetic data generation

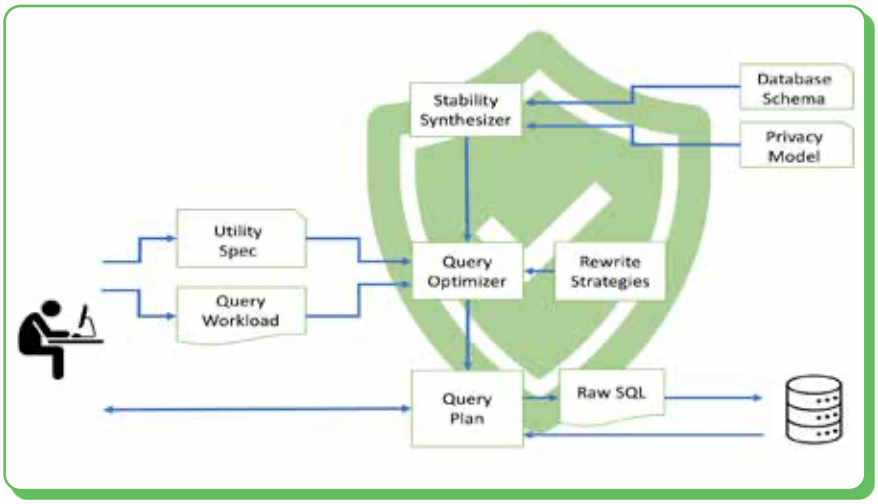
POTENTIAL APPLICATIONS

- AI systems involving confidential or sensitive individual information
- Dissemination of sensitive information
- Provable privacy and security guarantees with formal verification

SIGNIFICANT PUBLICATIONS/ PATENTS

- Zeyu Ding, Yuxin Wang, Guanhong Wang, Danfeng Zhang and Daniel Kifer, "Detecting Violations of Differential Privacy," Proc. of ACM Conference on Computer and Communications Security (CCS), 2018
- Yuxin Wang, Zeyu Ding, Yingtai Xiao, Daniel Kifer and Danfeng Zhang, "DPGen: Automated Program Synthesis for Differential Privacy," Proc. of ACM Conference on Computer and Communications Security (CCS), 2021
- Zeyu Ding, Yuxin Wang, Yingtai Xiao, Guanhong Wang, Danfeng Zhang and Daniel Kifer, "Free Gap Estimates from the Exponential Mechanism, Sparse Vector, Noisy Max and Related Algorithms," The International Journal on Very Large Data Bases, 2022





MAJOR PROJECTS/FUNDING

- 2024-28: NSF Award #2317233 — Collaborative Research:SaTC:CORE:Medium: Differentially Private SQL with flexible privacy modeling, machine-checked system design and accuracy optimization. $1,200,000 (Ding's share: $335,584)

SIGNIFICANT ACHIEVEMENTS

- 2018: CCS Outstanding Paper Award
- 2019: Caspar Bowden PET Award, Runner-Up
- 2020: CCS Best Paper Award, Runner-Up
- 2021: CCS Best Paper Award, Runner-Up

Kanad Ghose

SUNY DISTINGUISHED PROFESSOR AND SITE DIRECTOR OF CENTER FOR ENERGY-SMART ELECTRONIC SYSTEMS

EDUCATION: BTech, MTech, University of Calcutta; MS, PhD, Iowa State University
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AREAS OF EXPERTISE

- Energy-aware systems at all scales
- Processor architectures, including hardware security
- Heterogeneously-integrated systems
- Cyber-physical systems

KEY RESEARCH

- Tagged secure architecture and systems
- Predictive control of data centers for energy-efficiency
- Chiplet-based architectures and systems
- Chiplet-based LLM systems

SIGNIFICANT PUBLICATIONS/PATENTS

- R.T. Gollapudi, G. Yuksek, D. Demicco, M. Cole, G. Kothari, R. Kulkarni, X. Zhang, K. Ghose, A. Prakash, Z. Umrigar, "Control flow and pointer integrity enforcement in a secure tagged architecture," Proc. IEEE 44-th Symposium on Security and Privacy (S&P), 2023, pp. 2974-2989.
- G. Kothari and K. Ghose, "Thermally-Aware Multicore Chiplet Stacking," Proc. IEEE/ACM International Conference on Computer-Aided Design, ICCAD 2023, pp. 1-9.
- G. Refai-Ahmed, V.V. Zhirnov, S.B. Park, A.S. Helmy, B. Sammakia, K. Ghose, et. al., "New Roadmap for Microelectronics: Charting the Semiconductor Industry's Path Over the Next 5, 10, and 20 Years," 2024 IEEE 26th Electronics Packaging Technology Conference (EPTC).
- SR Hussain, P McDaniel, A Gandhi, K Ghose, K Gopalan, et al. "Verifiable Sustainability in Data Centers," IEEE Security & Privacy, 2024.
- G. Kothari and K. Ghose, "Addressing Thermal Throttling in HBM," to appear, Proc. IEEE/ACM International Conference on Computer-Aided Design, ICCAD 2025.
- K. Ghose, "Energy aware processing load distribution system and method," U.S. Patent 12,189,449, 2025.

MAJOR PROJECTS/FUNDING

- 2018-2022. Funding for 3-phases of DARPA Secure Architecture Prototyping Project as Co-PI.
- NSF, Collaborative Research: CNS Core: Large: Systems and Verifiable Metrics for Sustainable Data Centers
- 2011-2026. Funding from NSF and Industry-University Collaborative Research Center (IUCRC) for Center of Energy-Smart Electronic Systems (ES2) as Co-PI

SIGNIFICANT ACHIEVEMENTS

- Fellow, National Academy of Inventors
- IBM and Intel Faculty Awards
- Founding Executive Committee Member, SRC SMART USA Institute
- Roadmap Chapter Co-Chair, Chapter on Digital Processing and Contributor, SRC Roadmap on Microelectronics and Advanced Packaging Technology (MAPT)
- Technical Working Group and Chapter Chair, IEEE Heterogeneous Integration Roadmap (HIR)

Kartik Gopalan

PROFESSOR AND INTERIM ASSOCIATE DEAN FOR RESEARCH CORPORATE ENGAGEMENT AND ENTREPRENEURSHIP

EDUCATION: PhD in Computer Science, Stony Brook University
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WEBSITE: www.binghamton.edu/computer-science/people/profile.html?id=kartik

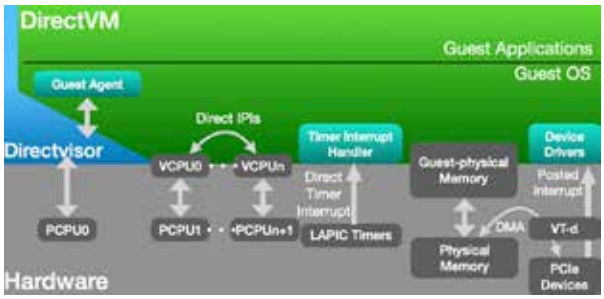
AREAS OF EXPERTISE
- Virtualization and cloud computing
- Confidential computing and cybersecurity
- Networks and distributed systems

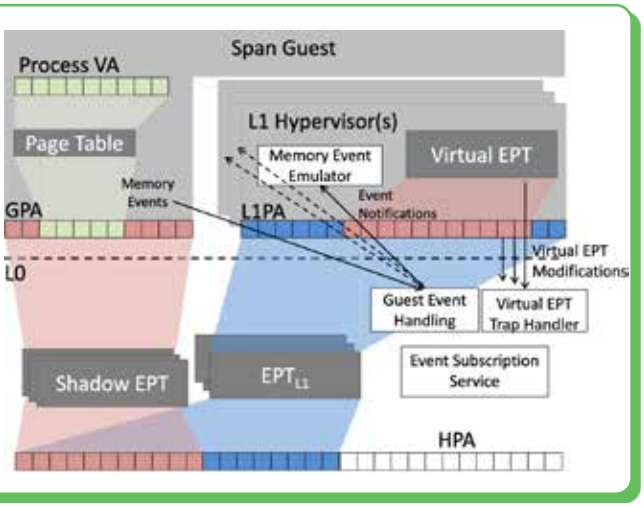
KEY RESEARCH
- Confidential virtual machines – improving performance, manageability, and isolation
- Live migration of virtual machines and containers
- Sustainability/carbon-aware resource management in hypervisors and operating systems

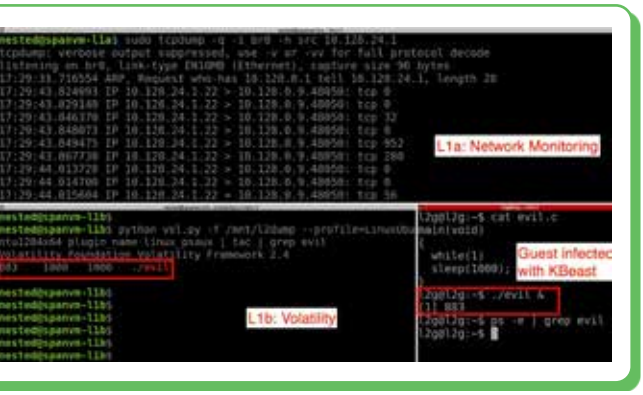
POTENTIAL APPLICATIONS
- Stronger security, privacy and manageability of confidential applications in cloud
- Agile workload migration and placement for edge-cloud platforms
- Verifiable sustainability in cloud computing data centers

SIGNIFICANT PUBLICATIONS/PATENTS
- K. Gopalan et. al., "Systems and methods for live update of operating systems and hypervisors within virtualization systems," US Patent 12,093,713, 2024
- K. Gopalan, "Multi-hypervisor virtual machines that run on multiple co-located hypervisors" – U.S. Patent App. 18/387,053, 2024
- SR Hussain, et. al., "Verifiable Sustainability in Data Centers," IEEE Security & Privacy, 2024
- M Yan and K Gopalan, "Performance Overheads of Confidential Virtual Machines," MASCOTS, 2023
- M.R. Hines, U. Deshpande, and K. Gopalan, "Post-copy live migration of virtual machines" ACM SIGOPS Operating Systems Review, 43 (3), 14-26, 2009

MAJOR PROJECTS/FUNDING
- 2022-27: NSF-CyberCorps Scholarship for Service (SFS), Binghamton University Scholarship for Service: Expanding and Strengthening the National Cybersecurity Workforce
- 2015-19: NSF-CNS, Multi-hypervisor Virtual Machines – Enabling an Ecosystem of Hypervisor-level Services in the Cloud
- 2009-14: NSF-CNS, CAREER: Resource Coordination Techniques for Performance-aware Cluster Resource Virtualization
- 2013-17: NSF-CNS, Towards High-Performance, Robust, and Secure Live Migration of Virtual Machines







SIGNIFICANT ACHIEVEMENTS
- 2023: SUNY Chancellor's Award for Excellence in Faculty Service
- 2020 and 2019: Editorial Excellence and Eminence Award, IEEE Transactions on Cloud Computing
- 2017: Watson School Recognition Award for Outstanding Research Achievement
- 2009: National Science Foundation CAREER Award

Madhusudhan Govindaraju

PROFESSOR AND VICE PROVOST FOR INTERNATIONAL EDUCATION AND GLOBAL AFFAIRS

EDUCATION: PhD in Computer Science, Indiana University
EMAIL: mgovinda@binghamton.edu
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AREAS OF EXPERTISE
- Cloud computing
- Big data technologies
- Distributed systems

KEY RESEARCH
- Resource fairness in multi-tenant frameworks
- Scheduling in cloud environments

POTENTIAL APPLICATIONS
- Commercial Clouds: Resource utilization
- Scientific Applications: Science portals

SIGNIFICANT PUBLICATIONS/PATENTS
- Exploring the Potential of using Power as a First Class Parameter for Resource Allocation in Apache Mesos Managed Clouds — in proceedings of the 13th IEEE/ACM International Conference on Utility and Cloud Computing (UCC 2020)
- Exploring Enhanced Dominant Resource Fairness Using Linear Programming Calculated Weights — in proceedings of the 13th IEEE/ACM International Conference on Utility and Cloud Computing (UCC 2024)

MAJOR PROJECTS/FUNDING:
- 2017-22: Co-PI — SI2-SSE: Expanding the Scope of Materials Modeling with EPW Software — $500,000

SIGNIFICANT ACHIEVEMENTS:
- 2017: Chancellor's Award for Excellence in Faculty Service
- 2015 and 2016: IBM Faculty Award
- 2009: Chancellor's Award for Excellence in Teaching

Nancy Guo

PROFESSOR OF EMPIRE INNOVATION

EDUCATION: PhD in Computer and Information Science, West Virginia University
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WEBSITE: www.binghamton.edu/computer-science/people/profile.html?id=nguo1

AREAS OF EXPERTISE

- Artificial intelligence
- Machine learning
- Bioinformatics

KEY RESEARCH

- Graph-based machine learning
- AI-based biomarker and drug discovery
- Computational genomics

POTENTIAL APPLICATIONS

- Personalized cancer diagnosis and prognosis
- Drug discovery and repositioning
- Nanotoxicity assessment

SIGNIFICANT PUBLICATIONS/PATENTS

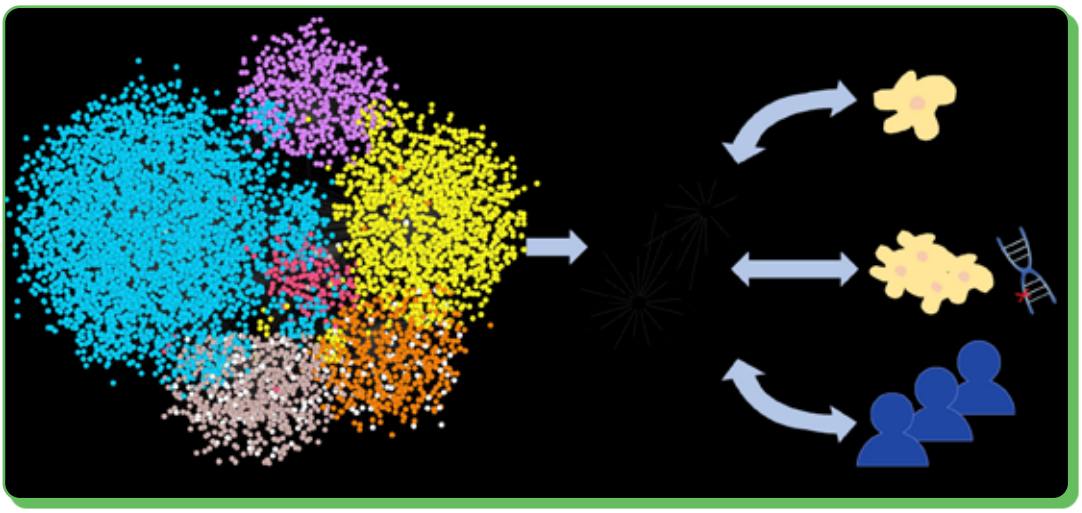
- Guo NL*, Dowlati A, Raese RA, Dong C, Chen G, Beer DG, Shaffer J, Singh S, Bokhary U, Liu L, Howington J, Hensing T, and Qian Y. "A predictive 7-gene assay and prognostic protein biomarkers for non-small cell lung cancer." EBioMedicine. 2018 Jun;32:102-110. doi: 10.1016/j.ebiom.2018.05.025. Epub 2018 Jun 1. PMID: 29861409
- "Gene Expression Signature of Genomic Instability in Breast Cancer," Ried T, Habermann J, Guo NL, Auer G, European Patent 09792535.8, Canadian Patent 02737382, 2017.
- "Gene signature for diagnosis and prognosis of breast cancer and ovarian cancer," Guo NL. US Non-Provisional Patent 8030060B2, Oct. 4, 2011

MAJOR PROJECTS/FUNDING

- 2023-26: NSF 2234456 — PFI-RP: Precision diagnostics for personalized cancer care: development of new drugs and selection of treatment ($549,996)

SIGNIFICANT ACHIEVEMENTS

- Experienced in leading foundation AI-based multidisciplinary research as PI of two NIH R01s and two NSF grants
- Obtained more than $46.3 million in federal funding as PI/PD to develop technology and infrastructure to advance precision medicine
- 62 peer-reviewed journal publications with more than 4,140 citations
- Generated 14 patents on cancer drugs and molecular diagnostic assays with FDA "Novel Technology" status
- Software products have more than 54,389 visits
- Chair of grant review panels of lung cancer research for the DOD and NCI



William Hallahan

ASSISTANT PROFESSOR

EDUCATION: PBA in Mathematics and Computer Science, College of the Holy Cross; PhD in Computer Science, Yale University
EMAIL: whallahan@binghamton.edu
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AREAS OF EXPERTISE

- Specializes in developing advanced program verification techniques and tools, with a focus on symbolic execution and automated error diagnosis/repair
- Counterfactual verification tool development
- Symbolic execution for modular verification
- Network program verification
- Verification tool development

KEY RESEARCH

- Formal methods
- Functional languages
- Networks

Dali Ismail

ASSISTANT PROFESSOR

EDUCATION: PhD in Computer Science, Wayne State University
EMAIL: dismail@binghamton.edu
WEBSITE: www.dali-ismail.com

AREAS OF EXPERTISE

- Wireless networks
- Internet of Things
- Real-time systems

KEY RESEARCH

- Developing a low-power wide-area networking technology
- Designing a collision recovery approach for wireless sensor networks
- Enabling real-time communication over LoRa technology
- Cough source detection and localization

POTENTIAL APPLICATIONS

- Agriculture: Precision agriculture
- Healthcare: Real-time disease spread control, pandemic/epidemic simulation
- Military: Critical communication
- Business: Low-cost connectivity

SIGNIFICANT PUBLICATIONS/PATENTS

- Fahmida, S., Jain, A., Modekurthy, V. P., Ismail, D., & Saifullah, A. (2024). “RTPL: A Real-Time Communication Protocol for LoRa Network. ACM Transactions on Embedded Computing Systems,” 24(1), 1-31.
- Ismail, D., & Saifullah, A. (2021). “Mobility in low-power wide-area network over white spaces.” In EWSN’21: Proceedings of the 2021 International Conference on Embedded Wireless Systems and Networks.
- Rahman, M., Ismail, D., Modekurthy, V. P., & Saifullah, A. (2019). “Implementation of lpwan over white spaces for practical deployment.” In Proceedings of the International Conference on Internet of Things Design and Implementation (pp. 178-189).
- Saifullah, A., Rahman, M., Ismail, D., Lu, C., Chandra, R., & Liu, J. (2016). “SNOW: Sensor network over white spaces.” In Proceedings of the 14th ACM Conference on Embedded Network Sensor Systems (pp. 272-285).

SIGNIFICANT ACHIEVEMENTS

- 2023: SIUE CS Outstanding Teaching Award
- 2021: EWSN Best Paper Award Candidate
- 2018: IEEE ICII Best Paper Award
- 2018: ACM/IEEE IoTDI best demo runner-up award
- 2014: Vodafone Wireless Innovation Project finalist

Yincheng Jin

ASSISTANT PROFESSOR

EDUCATION: PhD in Computer Science, University at Buffalo
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WEBSITE: yinchengjin.github.io

AREAS OF EXPERTISE

- Multi-modal sensing
- Mobile health
- Machine learning

KEY RESEARCH

- Human activity recognition and reconstruction
- Health monitoring and digital biomarker detection
- Multi-modal sensing

POTENTIAL APPLICATIONS

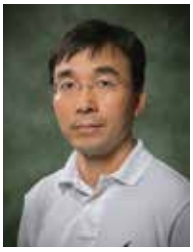
- Build a personalized ASL learning platform by sensing both hand gestures and facial expressions, then analyze the accuracy of these signs
- Explore ear health status using mobile and wearable devices
- Ubiquitous devices for emotion recognition

SIGNIFICANT PUBLICATIONS/PATENTS

- Yincheng Jin*, Yang Gao*, Yanjun Zhu, Wei Wang, Jiyang Li, Seokmin Choi, Zhangyu Li, Jagmohan Chauhan, Anind K Dey, and Zhanpeng Jin, “SonicASL: An Acoustic-based Sign Language Gesture Recognizer Using Earphones,” Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (UbiComp), vol. 5, no. 2, Article 67, 30 pages, June 2021. (* indicates equal contribution)
- Yincheng Jin, Shibo Zhang, Yang Gao, Xuhai Xu, Seokmin Choi, Zhengxiong Li, and Zhanpeng Jin, “SmartASL: “Point-of-Care” Comprehensive ASL Interpreter Using Wearables,” Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (UbiComp), vol. 7, no. 2, Article 60, 21 pages, June, 2023.
- Yincheng Jin, Yang Gao, Xiaotao Guo, Wen Jun, Zhengxiong Li, and Zhanpeng Jin, “EarHealth: An Earphone- based Acoustic Otoscope for Detection of Multiple Ear Diseases in Daily Life,” In Proc. 20th Int’l Conf. on Mobile Systems, Applications, and Services (MobiSys), pp. 397-408, June 2022.

Kyoung-Don Kang

PROFESSOR



EDUCATION: PhD in Computer Science, University of Virginia
EMAIL: kang@binghamton.edu
WEBSITE: www.cs.binghamton.edu/~kang

AREAS OF EXPERTISE

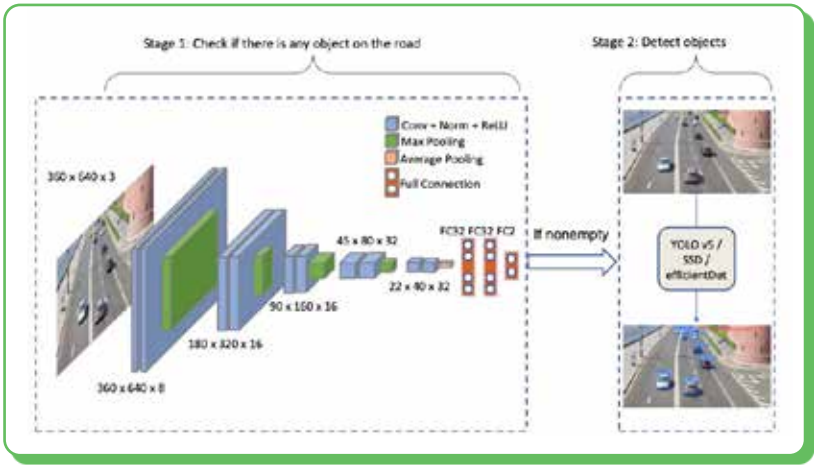
- Real-time data management
- Real-time embedded systems
- IoT (Internet of Things)

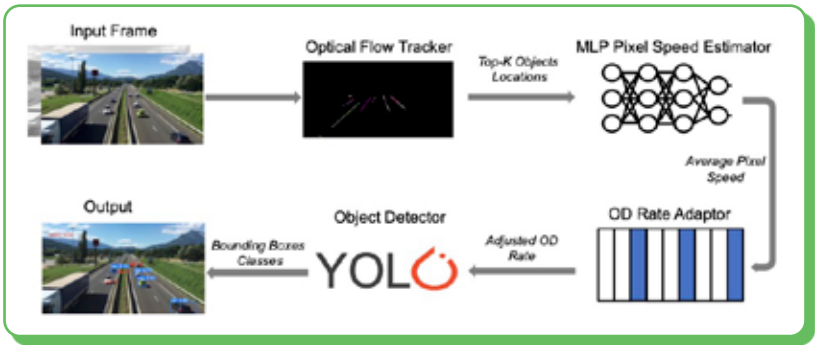
KEY RESEARCH

- Efficient and robust machine learning for emerging real-time applications
- Power-efficient real-time data services

POTENTIAL APPLICATIONS

- Smart transportation/manufacturing
- Extended reality
- Ubiquitous computing





SIGNIFICANT PUBLICATIONS/PATENTS

- Y. Liu, K. D. Kang, "Preprocessing via Deep Learning for Enhancing Real-Time Performance of Object Detection," IEEE 97th Vehicular Technology Conference, Florence, Italy, June 20-23, 2023.
- Di Mu, Mo Sha, Kyoung-Don Kang, and Hyungdae Yi, "Energy-Efficient Radio Selection and Data Partitioning for Real-Time Data Transfer," IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS'19), May 2019. (Best Paper Award Nominee)
- K. D. Kang, "Enhancing Timeliness and Saving Power in Real-Time Databases," Real-Time Systems Journal, Volume 54, Issue 2, pp. 484-513, April, 2018.
- Surveillance server, method of processing data of surveillance server, and surveillance system, US 9584767 B2, KR101964229B1 (Korea), and CN104349135B (China)

MAJOR PROJECTS/FUNDING

- 2023-26: NSF — CSR: Enhancing Timeliness and Power-Efficiency of Real-Time Data Services, $599,084
- 2020-24: NSF — CNS Core: Small: Toward Real-Time Stream Processing in Edge Devices, $500,000
- 2015-18: NSF — CSR: Small: Timely Power-Aware Data Management in Embedded Systems, $450,000
- 2016-17: Koh Young Technology Inc. — "IoT Middleware Framework for Smart Electronics Manufacturing, $49,752
- 2013-14: Samsung Techwin — CSR: Small: Timely Power-Aware Data Management in Embedded Systems, $96,249
- 2011-15: NSF — CSR: Small: Collaborative Research: Systematic Approaches for Real-Time Stream Data Services, $499,938
- 2006-10: NSF — CSR: Small: Collaborative Research: Systematic Approaches for Real-Time Stream Data Services

SIGNIFICANT ACHIEVEMENTS

- 2019: Best Paper Nominee, Di Mu, Mo Sha, Kyoung-Don Kang, and Hyungdae Yi, "Energy-Efficient Radio Selection and Data Partitioning for Real-Time Data Transfer," IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS '19)
- 2012: Best Student Paper Award Candidate, Y. Zhou, K. D. Kang, "A Federated Approach to Increasing the Timely Throughput of Real-Time Data Services," In Proceedings of the 18th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), Beijing, China.
- 2010: Selected as a Best Paper, K. Kapitanova, S. H. Son, and K. D. Kang, "Event Detection in Wireless Sensor Networks — Can Fuzzy Values Be Accurate?," In Proceedings of the EAI International Conference on Ad Hoc Networks (AdHocNets), Victoria, British Columbia, Canada.
- 2008: Best Paper Award Candidate, C. Basaran, K. D. Kang, M. H. Suzer, K. S. Chung, H. R. Lee, K. R. Park, "Bandwidth Consumption Control and Service Differentiation for Video Streaming," In Proceedings of the 17th International Conference on Computer Communications and Networks (ICCCN), St. Thomas U.S. Virgin Islands.

Leslie C. Lander

ASSOCIATE PROFESSOR AND GRADUATE DIRECTOR

EDUCATION: BA, Cambridge University; MSc, PhD, University of Liverpool
EMAIL: lander@binghamton.edu
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AREAS OF EXPERTISE

- Programming languages, with a particular focus on Ada
- Software engineering, including various aspects and paradigms
- Object-oriented programming and design patterns

KEY RESEARCH

- Programming languages
- Programming paradigms
- Formal aspects of software engineering

SIGNIFICANT ACHIEVEMENTS

- 2013-14: Binghamton University Outstanding Graduate Director Award
- 2005-06: Chancellor's Award for Excellence in Faculty Service

Michael Lewis

ASSOCIATE PROFESSOR AND UNDERGRADUATE DIRECTOR

EDUCATION: BS, Duke University; MS, Penn State; PhD, University of Virginia
EMAIL: mlewis@binghamton.edu
WEBSITE: www.binghamton.edu/computer-science/people/profile.html?id=mlewis

AREAS OF EXPERTISE

- A comprehensive understanding of modern distributed computing paradigms and architectures

KEY RESEARCH

- Grid computing
- Cloud computing
- Distributed systems
- Web services

SIGNIFICANT ACHIEVEMENTS

- 2007-08: Chancellor's Award for Excellence in Teaching

Yu “David” Liu

PROFESSOR

EDUCATION: PhD in Computer Science, Johns Hopkins University
EMAIL: davidl@binghamton.edu
WEBSITE: www.cs.binghamton.edu/~davidl

AREAS OF EXPERTISE

- Software systems
- Programming languages and compilers
- Cross-layer optimization

KEY RESEARCH

- Improving the sustainability and energy efficiency of computing systems
- Enhancing the security of software-hardware interface
- Building safe and reliable robotic and AI systems

POTENTIAL APPLICATIONS

- Sustainable data centers and handheld device ecosystems
- Safe unmanned aerial vehicles

SIGNIFICANT PUBLICATIONS/PATENTS

- Joseph Raskind, Timur Babakol, Khaled Mahmoud, Yu David Liu, “Vesta: Power Modeling with Language Runtime Events,” PLDI, 2024.
- Huaxin Tang, John Henry Burns, Alexander Strong, Yu David Liu, “A Compiler Framework for Proactive UAV Regulation Enforcement, “ ICRA, 2024.
- Timur Babakol, Yu David Liu, “Tensor-Aware Energy Accounting,” ICSE, 2024.
- Kerem Ariken, Huaxin Tang, Williams Cen, Yu David Liu, Nael Abu Ghazaleh, Dmitry Ponomarev, “Secure Caches for Compartmentalized Software” (USENIX Security’25)

MAJOR PROJECTS/FUNDING

- NSF, Collaborative Research: SaTC: CORE: Medium: Leakage-free Isolated Execution: Architectures and Security Models
- NSF, Collaborative Research: CNS Core: Large: Systems and Verifiable Metrics for Sustainable Data Centers
- NSF, CNS Core: Small: Language Runtime Support for Energy-Aware Applications

SIGNIFICANT ACHIEVEMENTS

- 2022: Fulbright Scholar, U.S. Department of State
- 2010: NSF CAREER Award

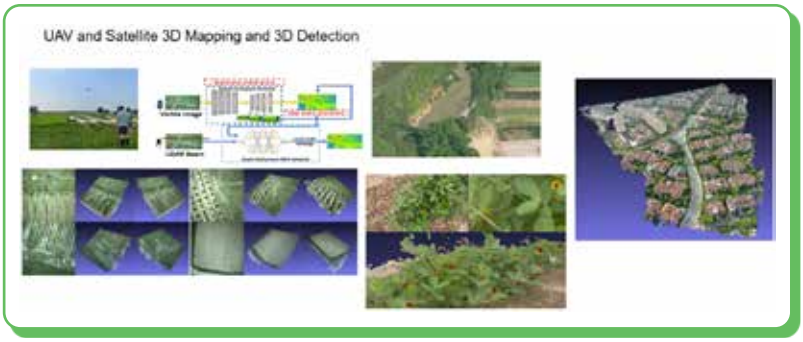
Guoyu Lu

ASSOCIATE PROFESSOR

EDUCATION: PhD, University of Delaware
EMAIL: glu4@binghamton.edu
WEBSITE: www.binghamton.edu/computer-science/people/profile.html?id=glu4

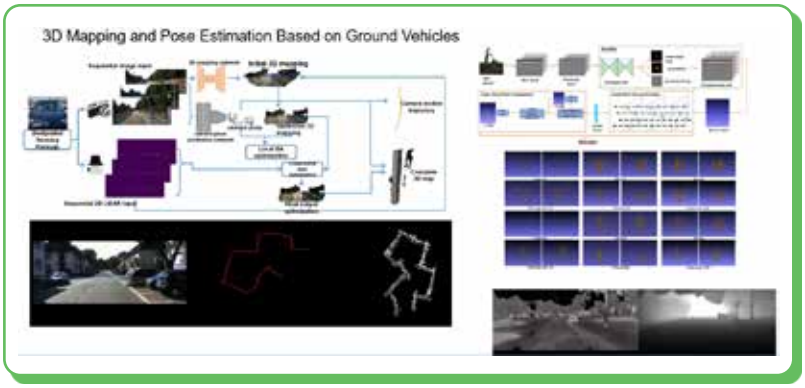
AREAS OF EXPERTISE

- Designing algorithms for robotics
- Perception and vision
- AI for science
- Machine learning
- Digital twin
- Sensing-based infrastructure systems to support scientific explorations



KEY RESEARCH

- Robotics
- Computer vision
- Machine/deep learning



POTENTIAL APPLICATIONS

- Defense
- Mobile computing
- Biology
- Energy
- Medicine

SIGNIFICANT PUBLICATIONS/PATENTS

- Jinchang Zhang, Guoyu Lu, "Vision-Language Embodiment for Monocular Depth Estimation," CVPR 2025
- Guoyu Lu, "Shading Meets Motion: Self-supervised Indoor 3D Reconstruction Via Simultaneous Shape-from-Shading and Structure-from-Motion," CVPR 2025
- Jinchang Zhang, Ningning Xu, Hao Zhang, Guoyu Lu, "Depth Estimation Based on 3D Gaussian Splatting Siamese Defocus," IEEE ICRA, 2025
- Jiakai Lin, Jinchang Zhang, Guoyu Lu, "Keypoint Detection and Description for Raw Bayer Images," IEEE International Conference on Robotics and Automation (ICRA), 2025

MAJOR PROJECTS/FUNDING

- NSF CAREER: From Underground to Space: An AI Infrastructure for Multiscale 3D Crop Modeling and Assessment
- NSF CSSI — Elements: A Deep Neural Network-based Drone (UAS) Sensing System for 3D Crop Structure Assessment

SIGNIFICANT ACHIEVEMENTS

- 2024: NSF CAREER Award
- 2024-27: Scialog Fellow
- 2003: Aharon Katzir Young Investigator Award from International Neural Network Society (INNS)
- 2021: USDA New Investigator Award
- 2021: NSF CRII Award
- 2021: Ford URP Award
- 2019: Tencent Rhino-Bird Young Faculty Award

Patrick H. Madden

ASSOCIATE PROFESSOR; DIRECTOR, MS INFORMATION SYSTEMS PROGRAM

EDUCATION: PhD in Computer Science, UCLA
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WEBSITE: www.cs.binghamton.edu/~pmadden

AREAS OF EXPERTISE

- Combinatorial optimization
- VLSI physical design automation
- Algorithms and data structures

KEY RESEARCH

- Mixed-size circuit placement
- Global routing
- Detail routing
- Machine learning kernel mapping

POTENTIAL APPLICATIONS

- Integrated circuit design
- Hardware acceleration of AI/ML

SIGNIFICANT PUBLICATIONS/ PATENTS

- SUNY-RB-708.1: Systems and Methods for Mixed-Size Placement US 2024-0354481 A1
- Hill Climbing with Trees: Detail Placement for Large Windows (ISPD 2020 doi.org/10.1145/3372780.3375563)
- Mixed Block Placement via Fractional Cut Recursive Bisection (IEEE Trans. CAD, 2005, DOI 10.1109/TCAD.2005.846363)

MAJOR PROJECTS/FUNDING

- Mixed size placement approach
- New combinatorial approach for global routing
- Patient scheduling using a novel dynamic programming approach

SIGNIFICANT ACHIEVEMENTS

- (Past) Chair, ACM SIG Governing Board
- (Past) Chair, ACM Special Interest Group on Design Automation
- SUNY Chancellor's Award for Professional Service

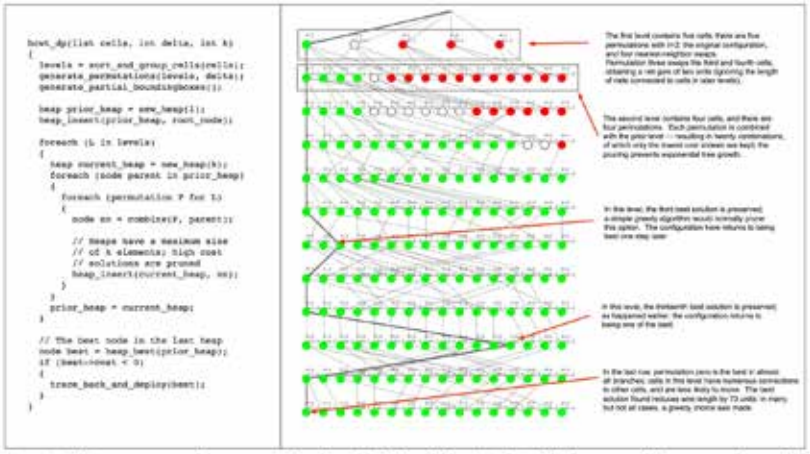
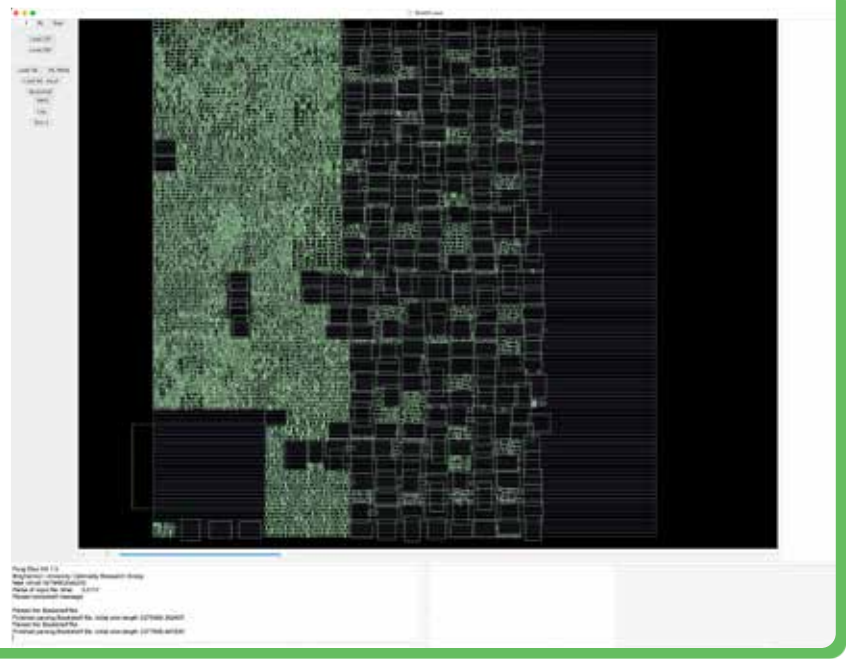


Figure 2: A solution tree generated by our approach, and pseudocode for the heuristic. The detail placement problem spans twelve standard cell rows, with between three and five cells in each row (cell widths vary). $k = 16$; each level of the tree is stored in a heap, with high-cost nodes being pruned, and net length increases or decreases being computed incrementally. Nodes in the tree are green if the incremental cost improves on the original placement, and red if cost increases. White nodes represent no change. The permutation selected for any given level is shown; permutation "0" is the original configuration.



Weiyi Meng

SUNY DISTINGUISHED SERVICE PROFESSOR

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AREAS OF EXPERTISE

- Social media data analytics
- Federated search/metasearch

KEY RESEARCH

- Research selection in federated search
- Entity mention detection in microblog streams

POTENTIAL APPLICATIONS

- Data resource representation and ranking
- Entity detection, event detection and tracking, intelligence analysis

SIGNIFICANT PUBLICATIONS

- Satadisha Saha Bhowmick, Eduard Dragut, and Weiyi Meng. “Boosting Entity Mention Detection for Targetted Twitter Streams with Global Contextual Embedding.” IEEE International Conference on Data Engineering (ICDE), pp.1085-1097, May 2022.
- Satadisha Saha Bhowmick, Eduard Dragut, and Weiyi Meng. “TwiCS: Lightweight Entity Mention Detection in Targeted Twitter Streams.” IEEE Transactions on Knowledge and Data Engineering (TKDE), 35(1):1043-1057, January 2023.
- Satadisha Saha Bhowmick, Eduard Dragut, and Weiyi Meng. “Globally Aware Contextual Embeddings for Named Entity Recognition in Social Media Streams.” IEEE International Conference on Data Engineering (ICDE), pp.1544-1557, April 2023.
- Ulugbek Ergashev, Eduard Dragut, and Weiyi Meng. “Learning to Rank Resources with GNN.” ACM Web Conference (WWW), pp.3247-3256, April 2023.
- Ulugbek Ergashev, Geon Lee, Kijung Shin, Eduard Dragut, and Weiyi Meng. “Resource2Box: Learning to Rank Resources in Distributed Search Using Box Embedding.” IEEE International Conference on Data Mining (ICDM), Abu Dhabi, December 2024.

MAJOR PROJECTS/FUNDING

- 2010-15 and 2016-19: National Institute of Health, Text Mining Pipeline to Accelerate Systematic Reviews in Evidence-Based Medicine
- 2016-20: National Science Foundation, BIGDATA: Streaming Architecture for Continuous Entity Linking in Social Media
- 2005-09: National Science Foundation, Achieving Information Integration of Web Databases Through the Construction of Metasearch Engines

SIGNIFICANT ACHIEVEMENTS

- 2020: University Award for Excellence in International Education, Binghamton University
- 2019: WISE 10+ Years Test-of-Time Best Paper Award
- 2008: Chancellor’s Award for Excellence in Scholarship and Creative Activities, State University of New York

Nitish Kumar Panigrahy

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AREAS OF EXPERTISE

- Distributed quantum computing
- Quantum networking
- Performance modeling

KEY RESEARCH

- Fundamental limits of quantum networks
- Architectures and protocols for modular quantum computing systems
- Efficient scheduling in satellite-based quantum networks

POTENTIAL APPLICATIONS

- Drug discovery
- Atomic clock synchronization
- Secure communication

SIGNIFICANT PUBLICATIONS/PATENTS

- Williams, Nitish K. Panigrahy et. al., “Scalable Scheduling Policies for Quantum Satellite Networks,” IEEE QCE 2024.
- Nitish K. Panigrahy et. al., “On the Capacity Region of a Quantum Switch with Entanglement Purification,” IEEE INFOCOM 2023.
- S. Pouryousef, Nitish K. Panigrahy et. al., “A Quantum Overlay Network for Efficient Entanglement Distribution,” IEEE INFOCOM 2023.
- M. Chehimi, S. Pouryousef, Nitish K. Panigrahy et. al., “Scaling Limits of Quantum Repeater Networks,” IEEE QCE 2023.

MAJOR PROJECTS/FUNDING

- Proposals under submission

SIGNIFICANT ACHIEVEMENTS

- 2023: Best paper award (second place), IEEE Quantum Week
- 2018: Best paper award, Runner-up, IEEE MASCOTS

Dmitry Ponomarev

PROFESSOR, ASSOCIATE DIRECTOR FOR ADMINISTRATION AND UNDERGRADUATE PROGRAMS AND INTERIM SCHOOL DIRECTOR

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AREAS OF EXPERTISE:

- Computer architecture
- Microarchitectural and hardware support for security
- Parallel discrete event simulation

KEY RESEARCH

- Investigating hardware-rooted security vulnerabilities
- Mitigating side-channel attacks on traditional and emerging systems
- Developing hardware support for malware detection
- Developing trusted execution environments

POTENTIAL APPLICATIONS

- Secure mission-critical systems
- Secure and trusted computer hardware

SIGNIFICANT PUBLICATIONS/PATENTS

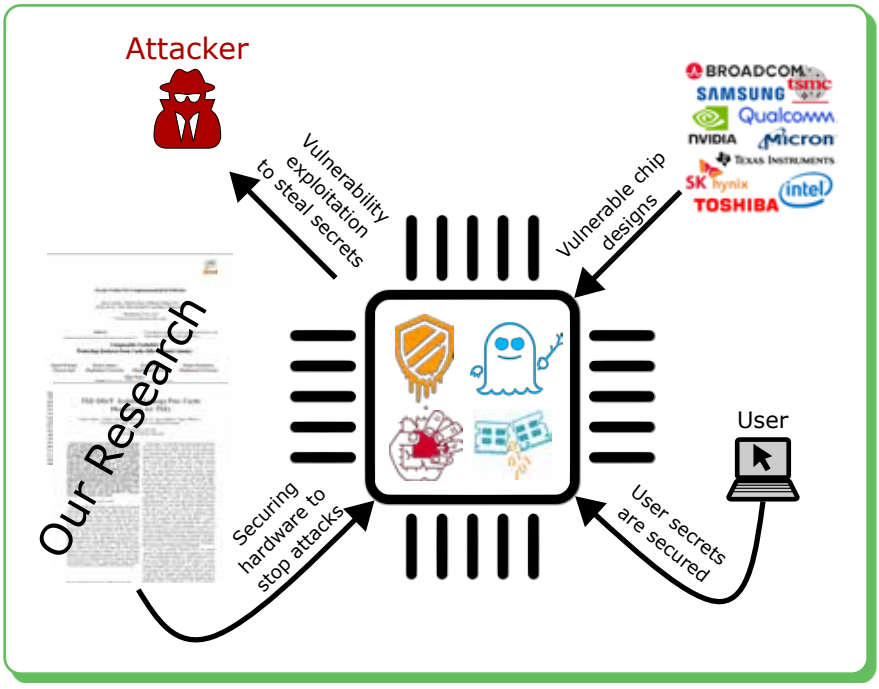
- Kerem Arikan, Huaxin Tang, Willams Zhang Cen, Yu David Liu, Nael Abu-Ghazaleh, Dmitry Ponomarev, "Secure Caches for Compartmentalized Software," USENIX Security Symposium, August 2025.
- Kerem Arikan, Abraham Farrell, Williams Zhang Cen, Jack McMahon, Barry Williams, Yu David Liu, Nael Abu-Ghazaleh, Dmitry Ponomarev, "TEE-ShirT: Scalable Leakage-Free Cache Hierarchies for TEEs," Network and Distributed Systems Security Symposium (NDSS), February 2024.
- Daniel Townley, Kerem Arikan, Yu David Liu, Dmitry Ponomarev, Oguz Eergin, "Composable Cachelets: Protecting Enclaves from Cache Side-Channel Attacks," USENIX Security Symposium, August 2022.

MAJOR PROJECTS/FUNDING

- 2021-25: SATC:CORE:Medium:Collaborative: Leakage-Free Isolated Execution, medium-size proposal funded by NSF SATC. Funded amount (Binghamton's part): $693,608. PI (co-PI David Liu).
- 2021-25: SATC:CORE:Small:Microarchitectural Side-channel Attacks and Defenses in Integrated CPU-GPU Systems, $534,000. PI.
- 2022-27: NSF CyberCorps® Scholarship for Service: Expanding and Strengthening the National Cybersecurity Workforce. $3,520,400. Role: co-PI.

SIGNIFICANT ACHIEVEMENTS

- Developed techniques to protect memory systems from side-channel attacks
- 2018: ASPLOS paper selected as Top Pick in Hardware and Embedded Security
- Several papers nominated as best paper award candidates (DAC'16, PACT'19)



Aravind Prakash

ASSOCIATE PROFESSOR

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AREAS OF EXPERTISE

- Software security
- AI forensics
- Compilers
- Binary analysis

KEY RESEARCH

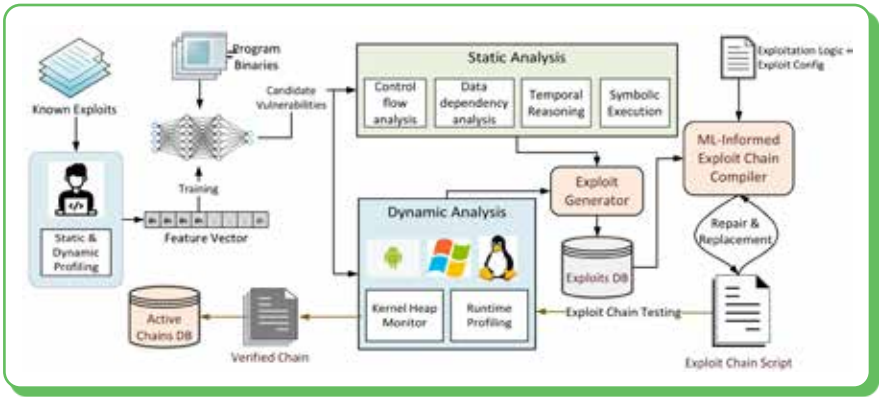
- Examining robustness and resiliency of ML models
- Binary-level security via ABI-centric semantic inference
- Compiler modifications for hardware-software cohesive security

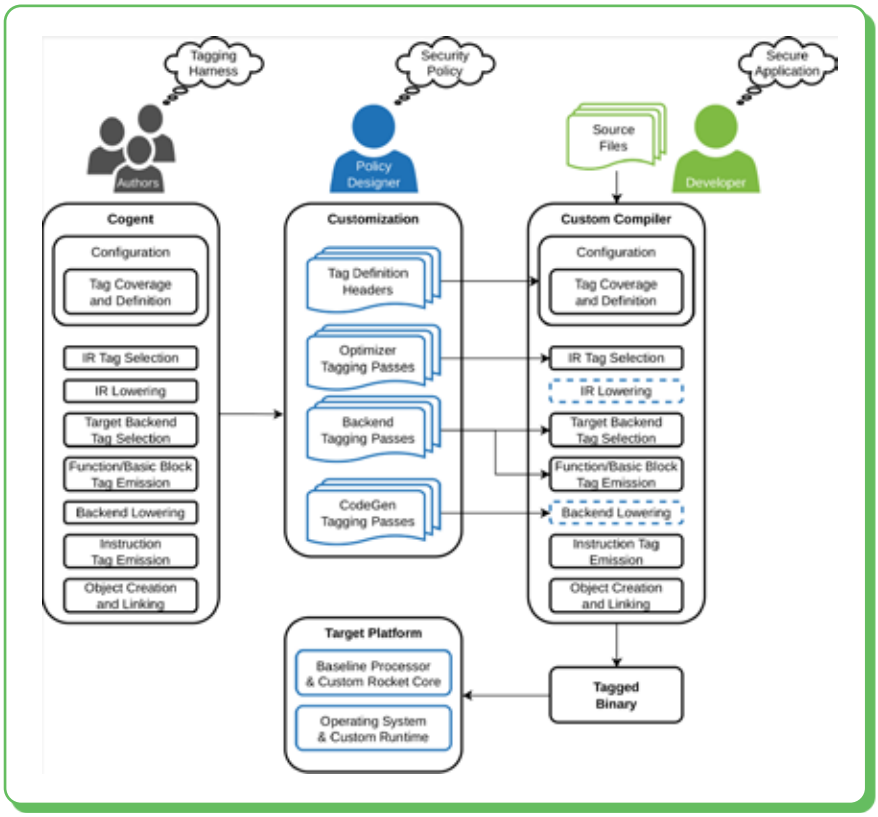
POTENTIAL APPLICATIONS

- DoD: Offensive and defensive systems for cyber warfare
- Business: Malware analysis, end-point security, development of zero-trust architecture.

SIGNIFICANT PUBLICATIONS/ PATENTS

- "Debloating Software through Piece-Wise Compilation and Loading." Anh Quach, Lok Kwong Yan and Aravind Prakash. Proceedings of the 27th Annual Usenix Security Symposium (Security'18).
- "DeClassifier: Class-Inheritance Inference Engine for Optimized C++ Binaries" Rukayat Erinfolami and Aravind Prakash. Proceedings of the 14th ACM ASIA Conference on Computer and Communications Security (AsiaCCS'19).
- "Control Flow and Pointer Integrity Enforcement in a Secure Tagged Architecture" RaviTheja Gollapudi, Gokturk Yuksek, David B Demicco, Matthew Cole, Gaurav N Kothari, Rohit H Kulkarni, Xin Zhang, Kanad Ghose, Aravind Prakash and Zerksis Umrigar. In the proceedings of the 44th IEEE Symposium on Security and Privacy (S&P'23), May 2023





MAJOR PROJECTS/FUNDING

- 2021-26: NSF CAREER — Binary-Level Security via ABI-Centric Semantic Inference
- 2023-27: NSF CyberCorps Scholarship for Service — Expanding and Strengthening the National Cybersecurity Workforce

SIGNIFICANT ACHIEVEMENTS

- 2021: NSF CAREER Award

Adnan Siraj Rakin

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Deep learning
- Security
- Computer vision
- Hardware optimization

KEY RESEARCH

- AI security: exploring security threats in modern AI models and developing protective measures
- Hardware side-channel attack in machine learning: Investigating and mitigating remote side channel attacks on ML applications
- Efficient AI: Software-hardware co-design on AI algorithms and their underlying inference engines

POTENTIAL APPLICATIONS

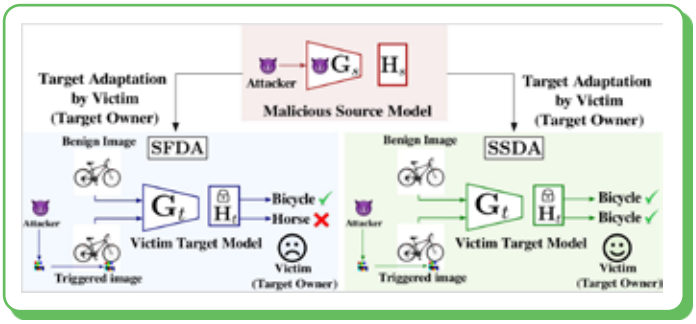
- Resource sharing collaborative AI inference platform
- Autonomous agent-based application, such as self-driving cars and robotics
- Edge devices and sensors with limited resources such as memory and power

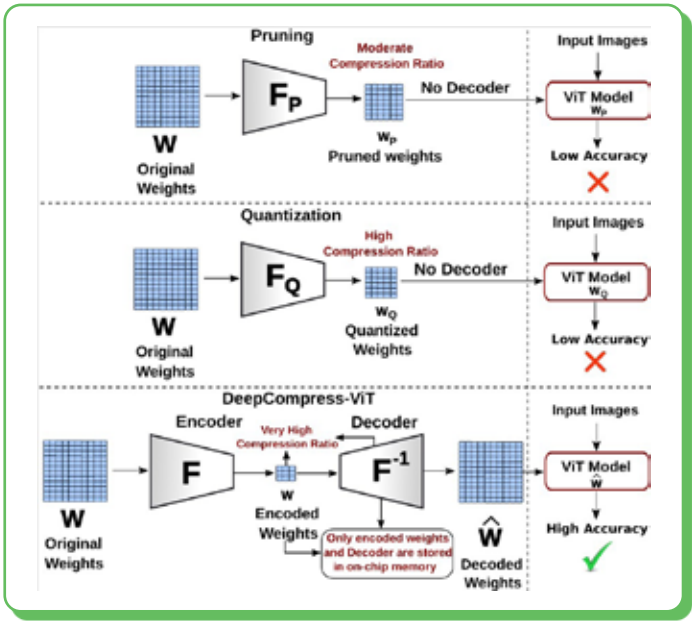
SIGNIFICANT PUBLICATIONS/PATENTS

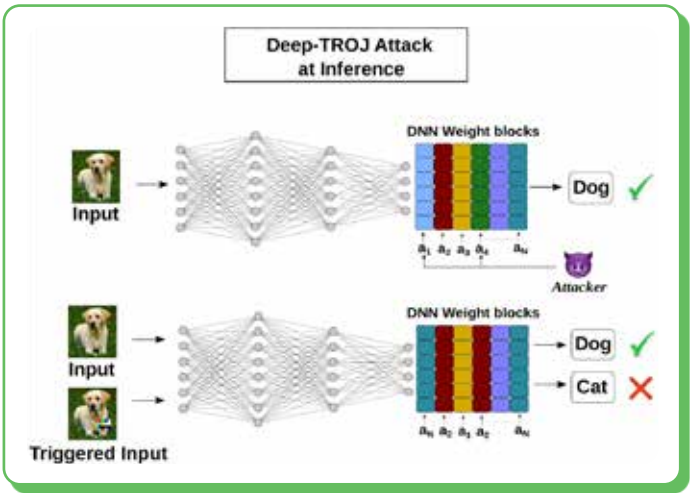
- Ahmed, Sabbir, Ranyang Zhou, Shaahin Angizi, and Adnan Siraj Rakin. “Deep-TROJ: An Inference Stage Trojan Insertion Algorithm through Efficient Weight Replacement Attack.” Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition, pp. 24810-24819. 2024.
- Ahmed, Sabbir, Abdullah Al Arafat, Mamshad Nayeem Rizve, Rahim Hossain, Zhishan Guo, and Adnan Siraj Rakin. “SSDA: Secure Source-Free Domain Adaptation.” Proceedings of the IEEE/CVF International Conference on Computer Vision, pp. 19180-19190. 2023.
- Rakin et. al. “Deepsteal: Advanced model extractions leveraging efficient weight stealing in memories.” 2022 IEEE symposium on security and privacy (SP), pp. 1157-1174. IEEE, 2022.

SIGNIFICANT ACHIEVEMENTS

- 2024: Paper titled “DeepSteal” Recognized as Top Picks in Hardware and Embedded Security
- 2022: Dean’s Dissertation Award for the College of Engineering (Fulton School) at Arizona State University
- 2022-23: Educator of the Year award from the School of Computing at Binghamton University







Monika Roznere

ASSISTANT PROFESSOR

EDUCATION: PhD in Computer Science, Dartmouth College
EMAIL: mroznere@binghamton.edu
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AREAS OF EXPERTISE

- Robotics (marine/field)
- Computer vision
- Artificial intelligence

KEY RESEARCH

- Enabling heterogeneous above-and-underwater robot collaboration
- Developing new underwater sensor setups; sensor fusion
- Enabling autonomy in low-cost underwater robots
- Developing robot systems for non-robotics (interdisciplinary) use

POTENTIAL APPLICATIONS

- Agriculture/fisheries: Monitoring nets, animals, and environment
- Conservation: Marine archaeology, biology, limnology, oceanography
- Infrastructure: Mapping and inspecting man-made infrastructure (dams, ports, ships)
- Exploration: Robot localization and mapping in ill-conditioned marine environments

SIGNIFICANT PUBLICATIONS/PATENTS

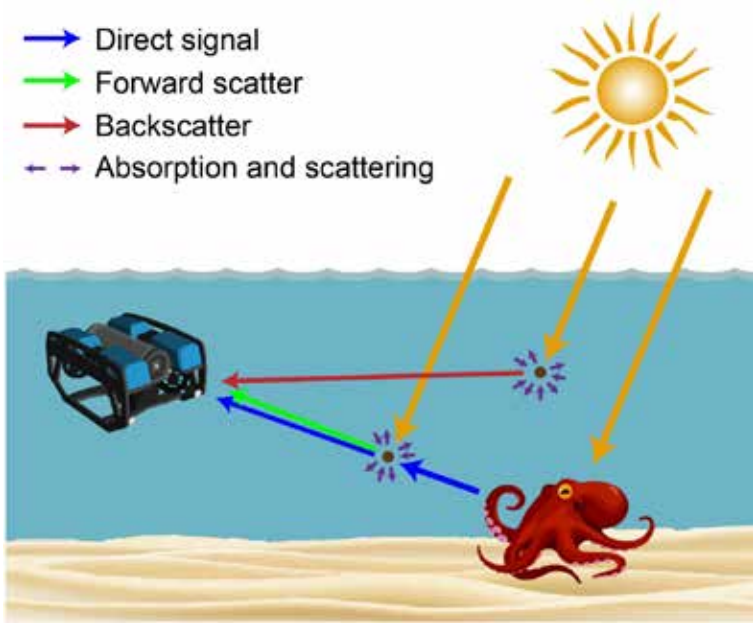
- Roznere, M., & Quattrini Li, A. (2019) "Real-time model-based image color correction for underwater robots." IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).
- Roznere, M., & Quattrini Li, A. (2020) "Underwater monocular image depth estimation using single-beam echosounder." In 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) (pp. 1785-1790). IEEE.
- Roznere, M., Mordohai, P., Rekleitis, I., and Quattrini Li. A. (2023) "3-D reconstruction using monocular camera and lights: Multi-view photometric stereo for non-stationary robots." IEEE International Conference on Robotics and Automation (ICRA).
- Masaba, K., Roznere, M., Jeong, M., & Quattrini Li, A. (2024) "Persistent monitoring of large environments with robot deployment scheduling in between remote sensing cycles." IEEE International Conference on Robotics and Automation (ICRA).

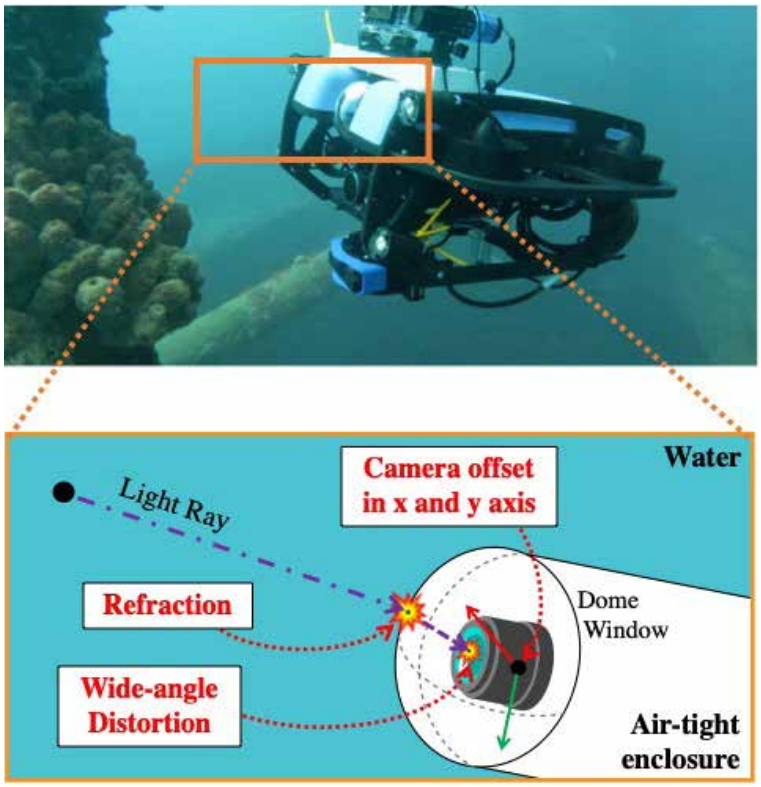
MAJOR PROJECTS/FUNDING

- Targeting NSF, NOAA, ONR, DARPA

SIGNIFICANT ACHIEVEMENTS

- 2023-24: Link Foundation "Active 3D Reconstruction Using Monocular Camera and Lights: A Multi-View Photometric Stereo Based Next-Best-View Planner for Non-Stationary Robots"





Seunghee Shin

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Computer system and architecture
- Hardware security
- Cloud computing

KEY RESEARCH

- Hardware/software co-design for serverless computing
- Investigating security vulnerabilities in modern hardware
- Developing next-generation GPU architecture

POTENTIAL APPLICATIONS

- Secure Computing: Designing hardware architectures with enhanced security features.
- Cloud Computing: Developing a more efficient and optimized cloud computing environment.
- High Performance Computing: Advancing next-generation computing environments optimized for large-scale parallel processing.

SIGNIFICANT PUBLICATIONS/PATENTS

- Qi Pei, Yipeng Wang, Seunghee Shin, “Litmus: Fair Pricing for Serverless Computing,” 2024 ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2024 ASPLOS
- Taehun Kim, Hyeongjin Park, Seokmin Lee, Seunghee Shin, Junbeom Hur, Youngjoo Shin, “DEVIOUS: Device-Driven Side-Channel Attacks on the IOMMU,” 2023 IEEE Symposium on Security and Privacy (IEEE S&P), May 2023

MAJOR PROJECTS/FUNDING

- 2021: NSF CAREER Award ($500,000)
- 2022-26: Hardware/software co-design for serverless computing grant from institute for information communication technology planning and evaluation (IITP), South Korea
- 2019-21: Research on CPU vulnerability detection and validation ($240,000)

Sujoy Sikdar

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Artificial intelligence and machine learning
- Computational social science
- Computational social choice
- Algorithmic game theory

KEY RESEARCH

- Fair, efficient and robust multi-attribute decision-making: AI, mechanisms and humans
- Fair and efficient resource allocation with uncertain preferences: learning with search costs
- Question quality, agenda setting and strategic communication in interviews
- Fair and efficient information retrieval using large language models

POTENTIAL APPLICATIONS

- Education: School choice; course assignment; online and dynamic testing; anti-collusion testing
- Medical: Organ transplant exchanges; assigning resources, personnel or therapies
- Cloud Computing: Allocation and scheduling
- Matching markets: Ridesharing and delivery services, service aggregators, gig economy
- Social good: Assigning interventions for homelessness, distributing food aid, refugee placement
- Organization: Assign resources, tasks and chores; decision support systems
- Cyber or physical security: Policies for deploying scarce resources against adversarial attacks
- Media analysis: Learn user preferences; content moderation and mediation; detect strategic communication, intent, propaganda and agenda setting
- Authoring: Linking and citations

SIGNIFICANT PUBLICATIONS/PATENTS

- "First-Choice Maximality Meets Ex-ante and Ex-post Fairness." Xiaoxi Guo, Sujoy Sikdar, Lirong Xia, Yongzhi Cao, and Hanpin Wang. In Proceedings of the 32nd International Joint Conference on Artificial Intelligence, 2023 (IJCAI-23).
- "Multi-Resource Allocation with Partial Preferences." Haibin Wang, Sujoy Sikdar, Xiaoxo Guo, Lirong Xia, Yongzhi Cao, and Hanpin Wang. Artificial Intelligence. 2023.
- "Size-Relaxed Committee Selection under the Chamberlin-Courant Rule." Tao Xiao, and Sujoy Sikdar. In Proceedings of the 19th International Conference on Autonomous Agents and MultiAgent Systems, 2020 (AAMAS-20).
- "Mechanism Design for Multi-Type Housing Markets with Acceptable Bundles." Sujoy Sikdar, Sibel Adali, and Lirong Xia. In Proceedings of the AAAI Conference on Artificial Intelligence, 2019 (AAAI-19).
- "Optimized collusion prevention for online exams during social distancing." Mengzhou Li, Lei Luo, Sujoy Sikdar, Navid Ibtehaj Nizam, Shan Gao, Hongming Shan, Melanie Kruger, Uwe Kruger, Hisham Mohamed, Lirong Xia, and Ge Wang. npj Science of Learning. 2021.
- "Anti-Malware Sandbox Games." Sujoy Sikdar, Sikai Ruan, Qishen Han, Paween Pitimanaaree, Jeremy Blackthorne, Bulent Yener, and Lirong Xia. In Proceedings of the 21st International Conference on Autonomous Agents and MultiAgent Systems, 2022 (AAMAS-22).

MAJOR PROJECTS/FUNDING

- 2020: Multitype Resource Allocation
- 2020: Fair Division of Indivisible Goods and Chores
- 2017-20: Size-relaxed Committee Selection
- 2023: Question Quality in Interviews

SIGNIFICANT ACHIEVEMENTS

- 2013: Best Paper Award, SocialCom2013
- 2022 and 2023: Distinguished Program Committee Member, IJCAI

Kuang-Ching Wang

PROFESSOR OF EMPIRE INNOVATION

EDUCATION: PhD in Electrical Engineering, University of Wisconsin-Madison, Madison, WI
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AREAS OF EXPERTISE

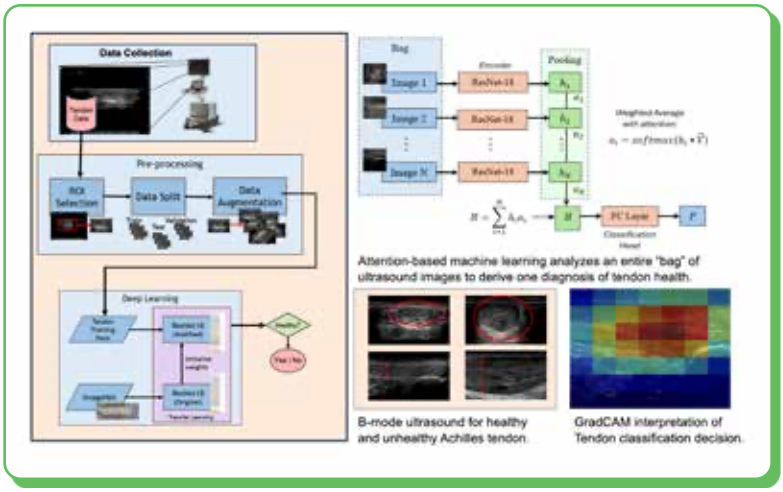
- Next-generation network and computing systems
- AI for healthcare technologies with emphasis on safety and explainability
- Resilient, secure and trustworthy networking and computing
- Data and computing infrastructure and systems for AI applications in diverse domains

KEY RESEARCH

- Future internet
- Software-defined infrastructure
- Big data computing systems
- Cyber-physical systems
- Wireless and sensor networks

POTENTIAL APPLICATIONS

- Trustworthy healthcare data and AI systems
- AI-assisted medical imaging
- Robots and self-driving vehicles



SIGNIFICANT PUBLICATIONS/PATENTS

- Dmitry Duplyakin, et al., "The Design and Operation of CloudLab," 2019 USENIX Annual Technical Conference, pp. 1-14, 2019.
- I. Baldin, Anita Nikolich, James Griffioen, Indermohan Inder S. Monga, K.C. Wang, Tom Lehman, Paul Ruth, "FABRIC: A National-Scale Programmable Experimental Network Infrastructure," in IEEE Internet Computing, vol. 23, no. 6, pp. 38-47, 1 Nov.-Dec. 2019, doi: 10.1109/MIC.2019.2958545.
- Benjamin Formby, Kuang-Ching Wang, and D. Hudson Smith, "Attention-based Multiple Instance Learning for Achilles Tendinopathy Detection in Ultrasound Imaging," 2025 IEEE 22nd International Symposium on Biomedical Imaging, Houston, TX, April 14-17, 2025, pp.1-5.

MAJOR PROJECTS/FUNDING

- National Science Foundation, Mid-Scale RI-1 (M1:IP): FABRIC: Adaptive Programmable Research Infrastructure for Computer Science and Science Applications, NSF 1935966, 2029260, 20330891.
- National Science Foundation, CloudLab: Flexible Scientific Infrastructure to Support Fundamental Advances in Cloud Architectures and Applications, NSF 1419199, 1743363, 2027208, 2431419.

SIGNIFICANT ACHIEVEMENTS

- 2023: University Research, Scholarship and Artistic Achievement Award, Clemson University
- 2021: Faculty Mentoring Award, College of Engineering, Computing and Applied Sciences, Clemson University
- 2017-18: The President's Leadership Institute, Clemson University
- 2018-19: ACC Academic Leadership Network
- 2023-25: Executive director, Clemson STRIDE
- 2022-25: Co-Director, AI Research Institute for Science and Engineering, Clemson University
- 2021: Co-chair for NSF Workshop on Data for AI in Network Systems
- Founder of Watt AI, a university-wide AI education and research bootstrap program, Clemson University
- Senior member of IEEE

Zhaohan Xi

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Large language models (LLMs)
- Clinical AI
- AI security
- Graph learning

KEY RESEARCH

- LLMs as clinical agents
- Threat-hunting copilots
- Trustworthy and responsible LLMs

POTENTIAL APPLICATIONS

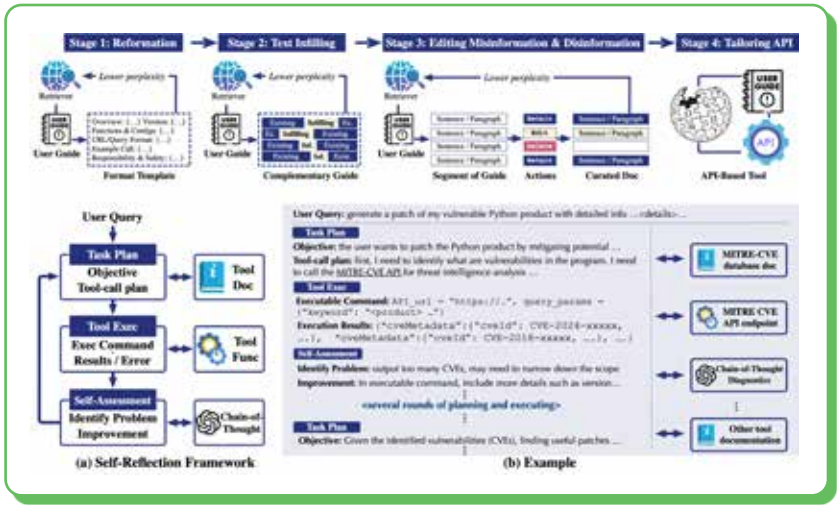
- Cardiological diagnostics
- Digital twin
- Cyber-threat intelligence

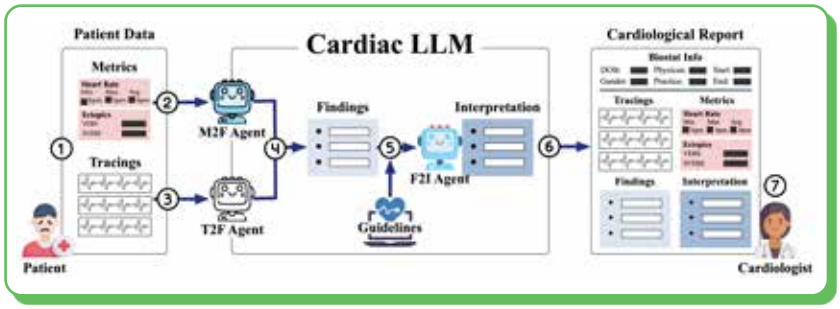
SIGNIFICANT PUBLICATIONS/PATENTS

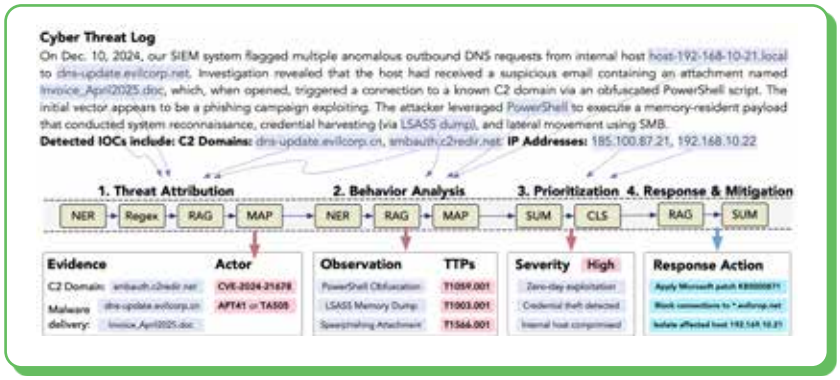
- Xi, Zhaohan, Tianyu Du, Changjiang Li, Ren Pang, Shouling Ji, Jinghui Chen, Fenglong Ma, and Ting Wang. "Defending pre-trained language models as few-shot learners against backdoor attacks." Advances in Neural Information Processing Systems 36 (2023): 32748-32764.
- Xi, Zhaohan, Tianyu Du, Changjiang Li, Ren Pang, Shouling Ji, Xiapu Luo, Xusheng Xiao, Fenglong Ma, and Ting Wang. "On the security risks of knowledge graph reasoning." In 32nd USENIX Security Symposium (USENIX Security 23), pp. 3259-3276. 2023.
- Xi, Zhaohan, Ren Pang, Shouling Ji, and Ting Wang. "Graph backdoor." In 30th USENIX security symposium (USENIX Security 21), pp. 1523-1540. 2021.

MAJOR PROJECTS/FUNDING

- Trustworthy LLM agents
- LLM-powered cyberthreat intelligence
- Generative AI for digital twin







Zhen Xie

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Performance optimization on HPC and AI/DL applications
- Parallel computing on various architectures
- Heterogeneous computing and memory systems
- Scientific machine learning

KEY RESEARCH

- Predicting the performance of deep-learning applications on various AI accelerators and proposing cross-platform optimization framework
- Integrating emerging AI accelerators and programming into computer science education
- Accelerating deep-learning training leveraging various AI accelerators via performance modeling techniques

POTENTIAL APPLICATIONS

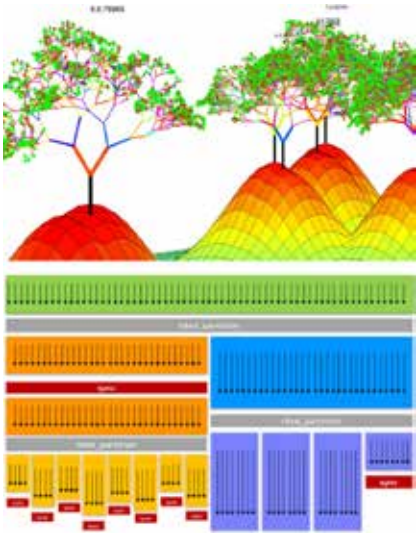
- Computer Science: Proposing cross-platform optimization framework
- Biological Science: Optimizing atlas-level data integration in single-cell genomics using transformer-based reinforcement learning

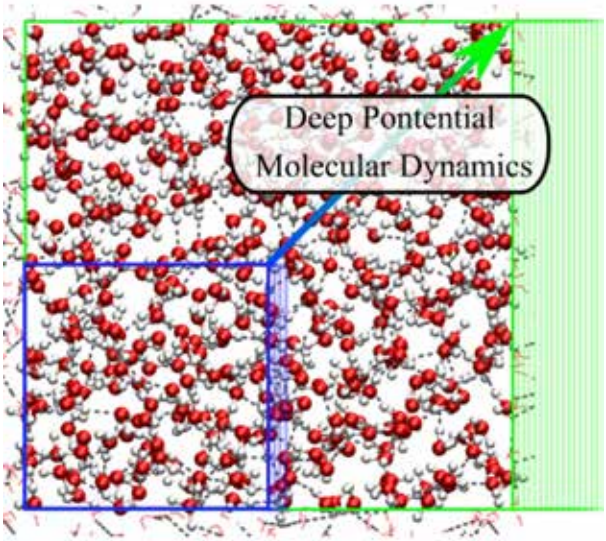
SIGNIFICANT PUBLICATIONS/PATENTS

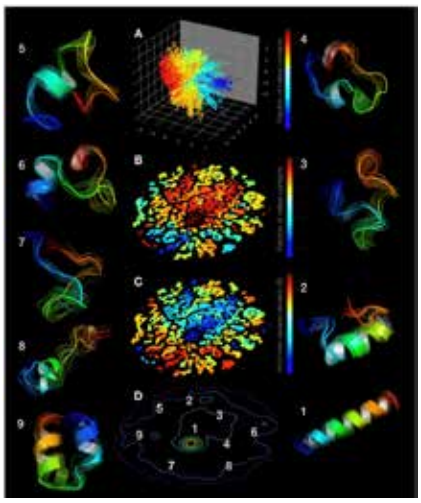
- Zhen Xie, Murali Emani, Xiaodong Yu, Dingwen Tao, Xin He, Pengfei Su, Keren Zhou, Venkatram Vishwanath, “Centimani: Enabling Fast AI Accelerator Selection for DNN Training with a Novel Performance Predictor.” 2024 USENIX Annual Technical Conference.
- Zhen Xie, Siddhisanket Raskar, Murali Emani, and Venkatram Vishwanath, “TrainBF: High-Performance DNN Training Engine using BFloat16 on AI Accelerators.” 29th International European Conference on Parallel and Distributed Computing, 2023.
- Zhen Xie, Jie Liu, Jiajia Li, and Dong Li, “Merchandiser: Data Placement on Heterogeneous Memory for Task-Parallel HPC Applications with Load-Balance Awareness.” 27th ACM SIGPLAN Annual Symposium on Principles and Practice of Parallel Programming (PPoPP), 2023.

SIGNIFICANT ACHIEVEMENTS

- Awarded two Impact Argonne Awards in recognition of the contributions to AI for science for high-performance computing and enhancement of argonne’s reputation
- 2022: LLM-based COVID variant prediction models (GenSLMs) have been awarded as Gordon Bell Special Prize at SC

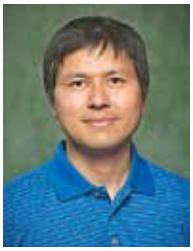






Guanhua Yan

ASSOCIATE PROFESSOR



EDUCATION: PhD in Computer Science, Dartmouth College
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AREAS OF EXPERTISE

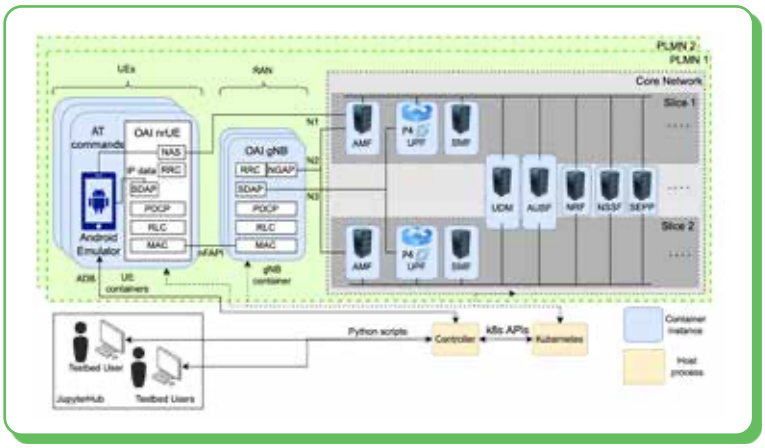
- Cybersecurity
- Networks and distributed systems
- Big data
- Modeling and simulation

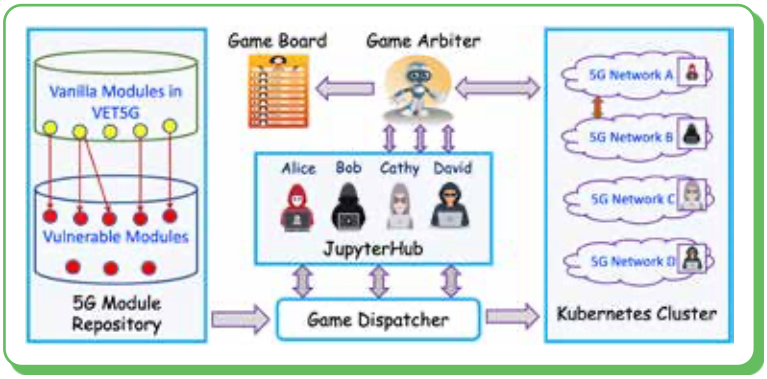
KEY RESEARCH

- NextG network security
- Internet-of-Things (IoT) security
- Malware detection and classification
- Critical infrastructure protection

POTENTIAL APPLICATIONS

- Security and resilience of next-generation communication systems
- Security and resilience of cyber infrastructures
- Security and resilience of IoT-powered critical infrastructures





SIGNIFICANT PUBLICATIONS/PATENTS

- Pacherkar, H. S., & Yan, G. (2024). "PROV5GC: Hardening 5G Core Network Security with Attack Detection and Attribution Based on Provenance Graphs." Proceedings of the 17th ACM Conference on Security and Privacy in Wireless and Mobile Networks.
- Wen, Z., & Yan, G. (2024). "HiP4-UPF: Towards High-Performance Comprehensive 5G User Plane Function on P4 Programmable Switches." Proceedings of the 2024 USENIX Annual Technical Conference.
- Shu, Z., & Yan, G. (2023). "EAGLE: Evasion attacks guided by local explanations against Android malware classification." IEEE Transactions on Dependable and Secure Computing.
- Shu, Z., & Yan, G. (2022). "IoTInfer: Automated blackbox fuzz testing of IoT network protocols guided by finite state machine inference." IEEE Internet of Things Journal, 9(22).

MAJOR PROJECTS/FUNDING

- 2020-25: National Science Foundation — CAREER: Proactive Techniques for Enhancing Security and Resilience of Mobile Communication Infrastructure
- 2023-25: National Science Foundation — EAGER: Building a Capture-The-Flag Platform for 5G Network Security
- 2021-24: SUNY-IBM AI Collaborative Research Alliance — Real-Time Detection of Advanced Malware Attacks with Ensembles of Graph Neural Networks
- 2016-21: National Science Foundation — Small: A Moving Target Approach to Enhancing Machine Learning-Based Malware Defense
- 2017-20: Critical Infrastructure Resilience Institute — LEFT: An LTE-Oriented Emulation-Instrumented Fuzzing Testbed

SIGNIFICANT ACHIEVEMENTS

- 2023: Test-of-Time Award, Web Science Trust
- 2022: Fast Forward Initiative Award, Intel
- 2020: Early Career Faculty Award, National Science Foundation
- 2005: Best Paper Award, 19th Workshop on Parallel and Distributed Simulation

Kaicheng Yang

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Generative AI
- Algorithmic auditing
- Social media analytics

KEY RESEARCH

- Understanding the transformative impact of generative AI on our information ecosystem
- Auditing popular platforms and algorithms for bias and information distortion
- Identifying inauthentic and malicious actors on social media

POTENTIAL APPLICATIONS

- Inform evidence-based policy decisions around AI governance, content moderation standards and platform accountability measures
- Enabling normal users to defend themselves against malicious actors online

SIGNIFICANT PUBLICATIONS/PATENTS

- Yang, K. C., Goel, P., Quintana-Mathé, A., Horgan, L., McCabe, S. D., Grinberg, N., & Lazer, D. (2025). “DomainDemo: a dataset of domain-sharing activities among different demographic groups on Twitter.” Scientific Data, 12(1), 1251.
- DeVerna, M. R., Yan, H. Y., Yang, K. C., & Menczer, F. (2024). “Fact-checking information from large language models can decrease headline discernment.” Proceedings of the National Academy of Sciences, 121(50), e2322823121.
- Yang, K. C., & Menczer, F. (2024). “Anatomy of an AI-powered malicious social botnet.” Journal of Quantitative Description: Digital Media, 4.
- Yang, K., Singh, D., & Menczer, F. (2024). “Characteristics and Prevalence of Fake Social Media Profiles with AI-generated Faces.” Journal of Online Trust and Safety, 2(4).

SIGNIFICANT ACHIEVEMENTS

- 2025: Best paper honorable mention, AAAI ICWSM
- Distinguished PhD dissertation award runner-up, Indiana University
- Rising Scholars 2023, MIT

Ping Yang

PROFESSOR AND ASSOCIATE DIRECTOR FOR RESEARCH AND GRADUATE PROGRAMS; DIRECTOR OF CENTER FOR INFORMATION ASSURANCE AND CYBERSECURITY

EDUCATION: PhD in Computer Science, Stony Brook University
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AREAS OF EXPERTISE

- Information and systems security
- AI-based security
- Trustworthy AI
- Privacy
- STEM education

KEY RESEARCH

- AI-based real-time anomaly detection
- Leveraging large language models for cyber threat detection and analysis
- Enhancing adversarial robustness and security of AI models

POTENTIAL APPLICATIONS

- Advanced threat detection
- Enhancing security of AI models and computer systems
- Improving explainability of AI decisions

SIGNIFICANT PUBLICATIONS/PATENTS

- Recovering a virtual machine after failure of post-copy live migration, US Patent #: 11983079, 2024
- Dinuni Fernando, Jonathan Terner, Ping Yang, and Kartik Gopalan, "V-Recover: Virtual Machine Recovery When Live Migration Fails," IEEE Transactions on Cloud Computing, pp. 3289-3300, 11(3), July-Sept. 2023
- Jerome Dinal Herath, Priti Prabhakar Wakodikar, Ping Yang, and Guanhua Yan, "CFGExplainer: Explaining Graph Neural Network-Based Malware Classification from Control Flow Graphs," 52nd Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), 2022
- Dinuni K Fernando, Ping Yang, and Hui Lu, "SDN-based Order-aware Live Migration of Virtual Machines," IEEE Infocom, 2020

MAJOR PROJECTS/FUNDING

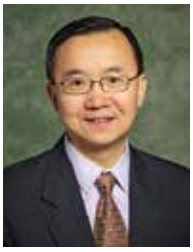
- PI, CyberCorp Scholarship for Service: Expanding and Strengthening the National Cybersecurity Workforce, $3,520,400, National Science Foundation
- PI, CICI: RSARC: Infrastructure Support for Securing Large-Scale Scientific Workflows, $999,999, National Science Foundation
- PI, Binghamton University GenCyber Teacher Camp, $136,615, National Security Agency

SIGNIFICANT ACHIEVEMENTS

- 2024: Thomas J. Watson College of Engineering and Applied Science Distinguished Educator Award
- 2021: SUNY Chancellor's Award for Excellence in Faculty Service
- 2020: Faculty Service Award, Computer Science Department, Binghamton University
- 2020-present: Binghamton University POC, NSA/DHS designated National Center of Academic Excellence in Cyber Research (CAE-R)

Lijun Yin

SUNY DISTINGUISHED PROFESSOR; DIRECTOR OF CENTER FOR IMAGING, ACOUSTICS AND PERCEPTION SCIENCE



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AREAS OF EXPERTISE

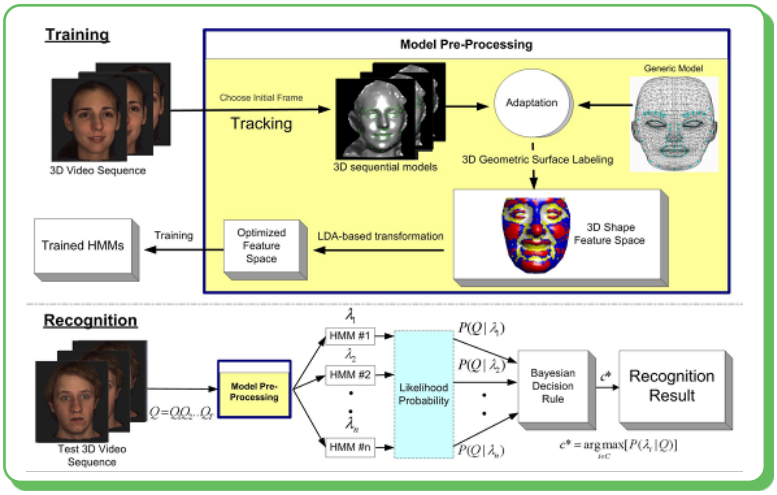
- Computer vision
- Computer graphics
- Human-Computer Interaction
- Biometrics

KEY RESEARCH

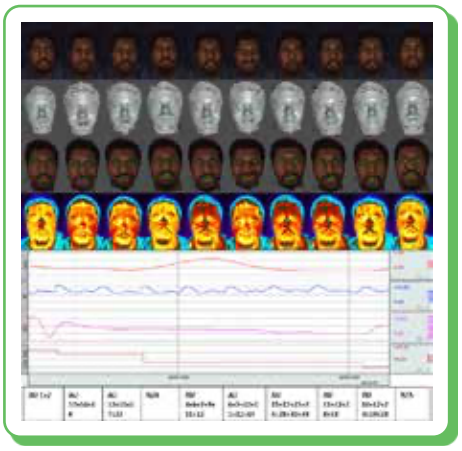
- Facial expression and emotion recognition
- Face recognition
- 3D modeling and synthesis
- Multimodel human behavior database and analysis

POTENTIAL APPLICATIONS

- Biometrics for security
- Human behavior analysis for mental health
- Pain assessment for healthcare
- Emotional AI, computer animation, and education



SIGNIFICANT PUBLICATIONS/PATENTS



- Huiyuan Yang, Umur Ciftci, Lijun Yin, "Facial Expression Recognition by De-expression Residue Learning," IEEE International Conference on Computer Vision and Pattern Recognition (CVPR) 2018
- Umur Ciftci, Ilke Demir, and Lijun Yin, "FakeCatcher: Detection of Synthetic Portrait Videos Using Biological Signals," IEEE Transactions on Pattern Analysis and Machine Intelligence, July 2020. (17 pages) doi: 10.1109/TPAMI.2020.3009287. (US patent #11,687,778 B2 (2023) and #12,106,216 B2 (2024))
- X. Zhang, L. Yin, J. Cohn, S. Canavan, M. Reale, A. Horowitz, P. Liu, and G. Girard, "BP4D-Spontaneous: A high resolution spontaneous 3D dynamic facial expression database," Image and Vision Computing, 32 (2014), pp.692-706 (special issue of The Best of Face and Gesture 2013)
- Xiaotian Li, TaoyueWang, Geran Zhao, Xiang Zhang, Xi Kang, and Lijun Yin, "ReactioNet: Learning High-order Facial Behavior from Universal Stimulus-Reaction by Dyadic Relation Reasoning," IEEE/CVF International Conference on Computer Vision (ICCV), 2023
- Huiyuan Yang, Lijun Yin, Yi Zhou, and Jiuxiang Gu, "Exploiting semantic embedding and visual feature for facial action unit detection," IEEE International Conference on Computer Vision and Pattern Recognition (CVPR'21), 2021

MAJOR PROJECTS/FUNDING

- 2016-22: National Science Foundation, CI-SUSTAIN: Collaborative Research: Extending a Large Multimodal Corpus of Spontaneous Behavior for Automated Emotion Analysis
- 2023-24: IARPA (The Intelligence Advanced Research Projects Activity — BRIAR (Biometric Recognition and Identification at Altitude and Range) via Kitware, Face Recognition Under Occlusion, Various Poses and Illuminations (- part of Distance Observation Enhancement and Recognition System (DOERS))
- 2023-25: Foundation for Anesthesia Education and Research (FAER) via Massachusetts General Hospital/Harvard Medical School, Automatic Analysis of Multi-faceted Multi-modal Data for Healthcare Information Disentanglement for Prediction, Diagnosis and Evaluation
- 2008-10: Air Force Research Laboratory / AFOSR, Real-Time Eye Tracking and Hand Tracking for Human-Computer Interaction

SIGNIFICANT ACHIEVEMENTS

- 2024: IEEE Fellow
- 2024: Test-of-time award, IEEE International Conference on Automatic Face and Gesture Recognition
- 2019: Lois B. DeFleur Faculty Prize for Academic Achievement Award
- 2014: SUNY Chancellor's Award for Excellence in Scholarship and Creative Activities
- 2006: Best Paper Award of IAPR/IEEE International Conference on Pattern Recognition

Yiming Zeng

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Quantum networking
- Quantum computing
- Edge networking

KEY RESEARCH

- Quantum data transmission
- Quantum computing over networks
- Quantum computing algorithm design

POTENTIAL APPLICATIONS

- Reliable and efficient quantum communication
- Efficient distributed quantum computing

SIGNIFICANT PUBLICATIONS/PATENTS

- Zeng, Y., Zhang, J., Liu, J., Liu, Z. and Yang, Y., 2024. “Multi-user Entanglement Routing Design over Quantum Internets.” In 2024 IEEE International Conference on Distributed Computing Systems (ICDCS). IEEE. (The distinguished paper award)
- Zeng, Y., Zhang, J., Liu, J., Liu, Z. and Yang, Y., 2022, May. “Multi-entanglement routing design over quantum networks.” In IEEE INFOCOM 2022-IEEE Conference on Computer Communications (pp. 510-519). IEEE.
- Zeng, Y., Zhang, J., Liu, J., Liu, Z. and Yang, Y., 2023. “Entanglement routing design over quantum networks.” IEEE/ACM Transactions on Networking, 32(1), pp.352-367.

SIGNIFICANT ACHIEVEMENTS

- 2024: Distinguished Paper Award – ICDCS

Shiqi Zhang

ASSOCIATE PROFESSOR

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AREAS OF EXPERTISE

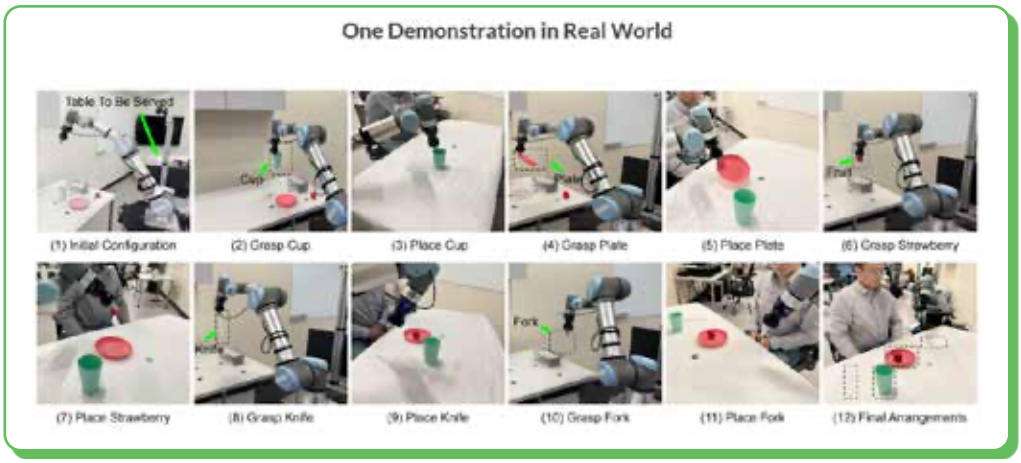
- Robotics
- Artificial Intelligence
- Human-robot interaction
- Machine learning

KEY RESEARCH

- Sequential decision making
- Reasoning under uncertainty
- Human-robot collaboration
- Robot learning

POTENTIAL APPLICATIONS

- Service robots
- Healthcare
- Education
- Defense
- Manufacturing



SIGNIFICANT PUBLICATIONS/PATENTS

- DeFazio, David, Eisuke Hirota, and Shiqi Zhang. "Seeing-Eye Quadruped Navigation with Force Responsive Locomotion Control." Conference on Robot Learning (CoRL). PMLR, 2023.
- Ding, Yan, et al. "Integrating action knowledge and LLMs for task planning and situation handling in open worlds." Autonomous Robots 47.8 (2023): 981-997.
- Zhang, Xiaohan, et al. "Visually grounded task and motion planning for mobile manipulation." 2022 International Conference on Robotics and Automation (ICRA). IEEE, 2022.
- Amiri, Saeid, Mohammad Shokrolah Shirazi, and Shiqi Zhang. "Learning and reasoning for robot sequential decision making under uncertainty." Proceedings of the AAAI Conference on Artificial Intelligence (AAAI). Vol. 34. No. 03. 2020.
- Zhang, Shiqi, Mohan Sridharan, and Jeremy L. Wyatt. "Mixed logical inference and probabilistic planning for robots in unreliable worlds." IEEE Transactions on Robotics 31.3 (2015): 699-713.

MAJOR PROJECTS/FUNDING

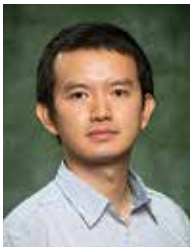
- 2025-26: Guiding Eyes for the Blind — Overhead Obstacle Detection and Avoidance for Robotic Guide Dogs
- 2024-25: National Science Foundation — EAGER: RI: Enabling Natural Language and Decision Making Capabilities of Robotic Guide Dogs
- 2020-21: OPPO Research — Augmented Reality in Human-Robot Interaction
- 2019-24: Ford Motor Company — Human-AI Interaction for Riders of Autonomous Vehicles
- 2019-23: National Science Foundation — NRI: FND: Knowledge-based Robot Sequential Decision Making under Uncertainty

SIGNIFICANT ACHIEVEMENTS

- 2024: Outstanding Associate Editor, IEEE Robotics and Automation Letters
- 2023: Top Cited Article, AI Magazine
- 2018: Best Robotics Paper, International Conference on Autonomous Agents and Multiagent Systems (AAMAS)
- 2012: Paper of Excellence Award, IEEE International Conference on Development and Learning (ICDL)
- Research covered by Spectrum News, CGTN Europe, Popular Science, American National Standards Institute, WIRED, Yahoo News, Vision Ireland, Government Technology, Robotics and Automation Magazine, Futurism, Communications of the ACM, News Atlas and others.

Yifan Zhang

ASSOCIATE PROFESSOR



EDUCATION: PhD in Computer Science, College of William and Mary
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AREAS OF EXPERTISE

- Networked and distributed systems
- Embedded and Internet of Things systems
- Edge computing
- Mobile computing

KEY RESEARCH

- Edge AI systems
- Unikernel and lightweight virtualization
- Android and mobile OS security

POTENTIAL APPLICATIONS

- Energy-efficient AI systems at the edge
- Scalable AI systems in IoT
- Novel embedded system applications

SIGNIFICANT PUBLICATIONS/PATENTS

- Yongshu Bai, Xin Zhang, and Yifan Zhang, "Meunik: Rethinking Virtual Machine Memory Resource Management for Unikernel-based VMs," The 9th ACM/IEEE Symposium on Edge Computing (ACM SEC) (Best Paper Runner-up), Rome, Italy, 2024.
- Pengzhan Hao and Yifan Zhang, "EDDL: A Distributed Deep Learning System for Resource-limited Edge Computing Environment," The 6th ACM/IEEE Symposium on Edge Computing (ACM SEC), San Jose, CA, USA, 2021.
- Xin Zhang and Yifan Zhang, "ReACt: A Resource-centric Access Control System for Web-app Interactions on Android," The ACM Web Conference (ACM WWW), Virtual Edition, 2021.

MAJOR PROJECTS/FUNDING

- 2020-25: NSF — CAREER: Enabling Edge-hosted Private Services via Unikernel-based Lightweight Virtualization, PI, $485,244
- 2016-19: NSF — CRII: CSR NeTS: Enabling Secure and Trusted Device I/Os on Smartphones, PI, $175,000

SIGNIFICANT ACHIEVEMENTS

- 2024: Best Paper Runner-up Award at ACM/IEEE Symposium on Edge Computing (ACM SEC)
- 2015: Honorable Mention Award at ACM International Joint Conference on Pervasive and Ubiquitous Computing (ACM UbiComp)

Yingxue Zhang

ASSISTANT PROFESSOR

EDUCATION: PhD in Data Science, Worcester Polytechnic Institute
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AREAS OF EXPERTISE

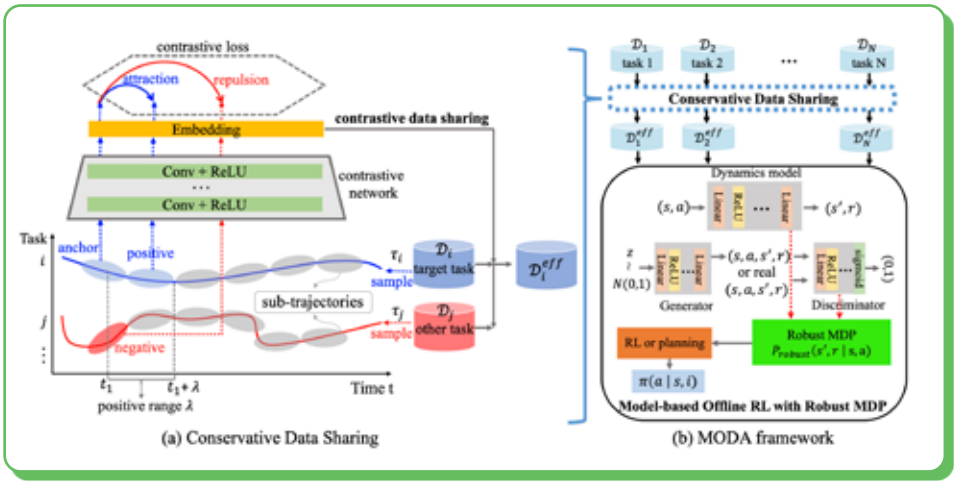
- Artificial intelligence
- Machine learning
- Spatial-temporal data mining

KEY RESEARCH THRUSTS/ PROJECTS

- Human urban decision-making analysis with offline reinforcement learning
- Urban dynamics prediction with deep learning
- Urban data augmentation with large language models

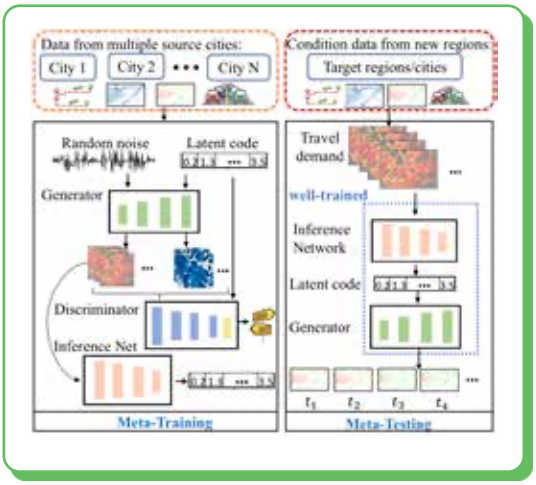
POTENTIAL APPLICATIONS

- Smart cities
- Public safety
- Urban planning



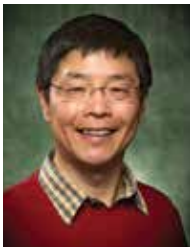
SIGNIFICANT PUBLICATIONS/PATENTS

- Xinbo Zhao, Yingxue Zhang, Xin Zhang, Yu Yang, Yiqun Xie, Yanhua Li, and Jun Luo (2024). "Urban-Focused Multi-Task Offline Reinforcement Learning with Contrastive Data Sharing." The 30th SIGKDD conference on Knowledge Discovery and Data Mining, Barcelona, Spain, Aug. 25–29, 2024
- Yuhang Liu, Yingxue Zhang, Xin Zhang, Yu Yang, Yiqun Xie, Sahar Ghanipoor Machiani, Yanhua Li, and Jun Luo (2024). "Align Along Time and Space: A Graph Latent Diffusion Model for Traffic Dynamics Prediction." IEEE International Conference on Data Mining (ICDM), 9-12 December 2024, Abu Dhabi, UAE.



Zhongfei “Mark” Zhang

PROFESSOR



EDUCATION: PhD in Computer Science, University of Massachusetts — Amherst
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AREAS OF EXPERTISE

- Machine learning
- Data mining and knowledge discovery
- Computer vision and pattern recognition

KEY RESEARCH THRUSTS/PROJECTS

- Learning model compression
- Out-of-distribution learning
- Continual learning

POTENTIAL APPLICATIONS

- Compress large models into light-weight models such as cell phones for many real-world applications (e.g., education, medical diagnosis, and entertainment)
- Healthcare applications where novel samples may be encountered with appropriate confidence assignment
- Cyber-physical systems where periodic updating is required to accommodate novel instances or classes

SIGNIFICANT PUBLICATIONS/PATENTS

- Xiang Deng and Zhongfei Zhang, “Comprehensive Knowledge Distillation with Causal Intervention,” Proc. 35th Conference on Neural Information Processing Systems, (NeurIPS 2021), December, 2021
- Senqi Cao and Zhongfei Zhang, “Deep Hybrid Models for Out-of-Distribution Detection,” Proc. IEEE International Conference on Computer Vision and Pattern Recognition, (CVPR 2022), June, 2022
- Zhongfei (Mark) Zhang and Ruofei Zhang, “Multimedia Data Mining — A systematic Introduction to Concepts and Theory, Taylor and Francis Group/CRC Press, 2008, ISBN: 9781584889663

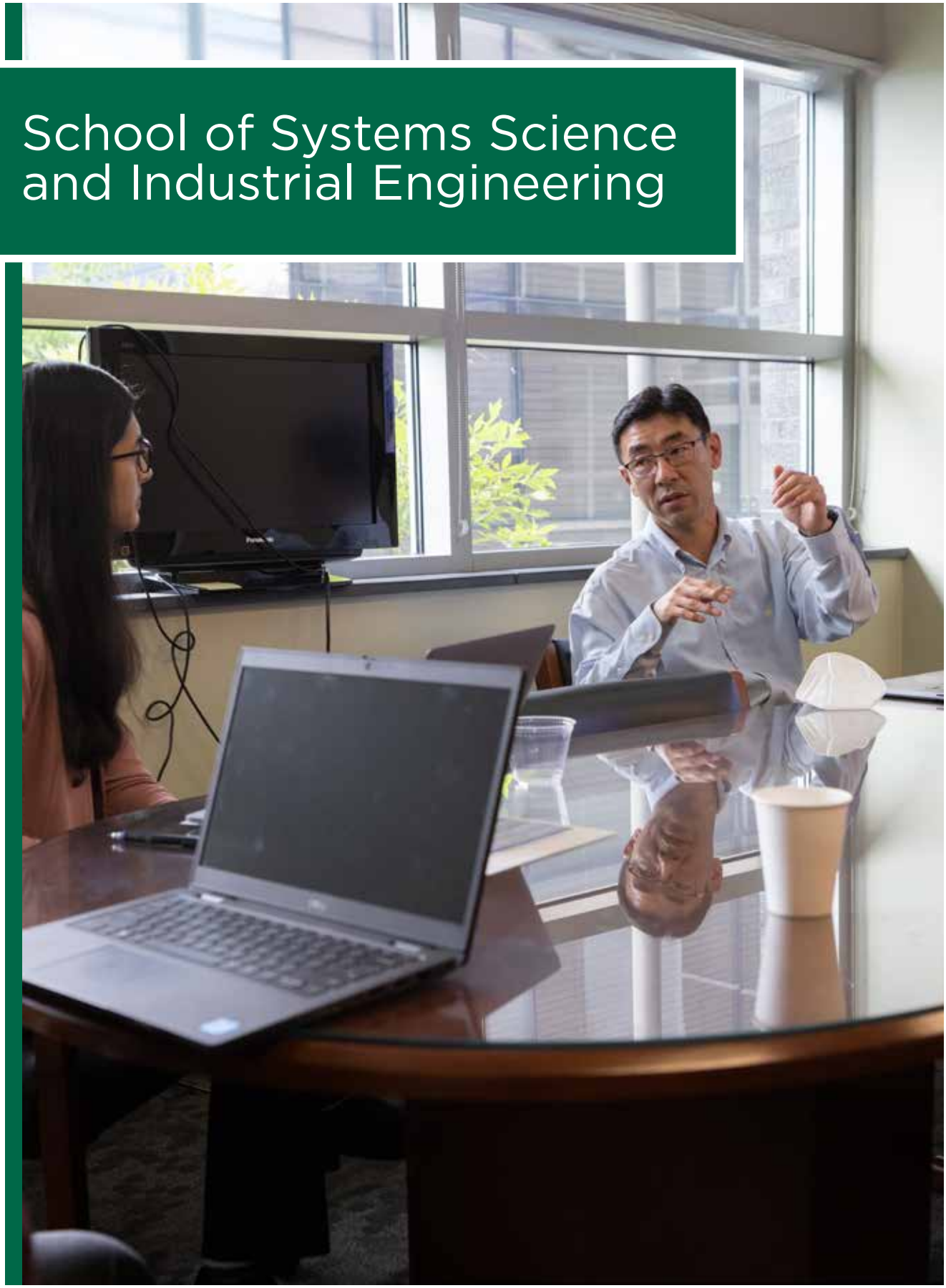
MAJOR PROJECTS/FUNDING

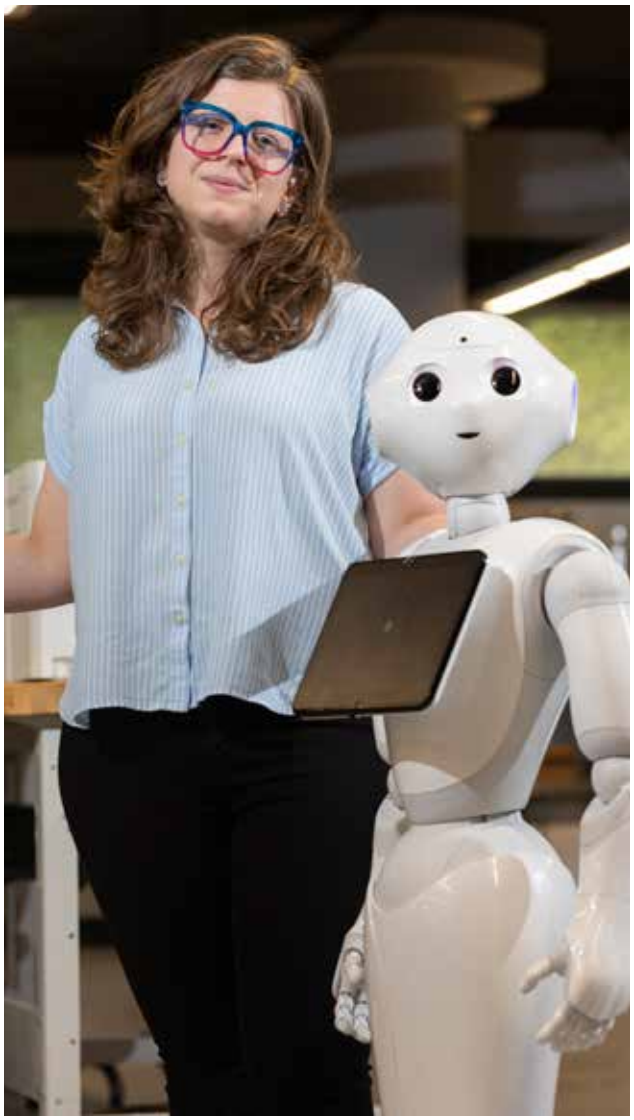
- Continual learning with varying classes and environments
- Learning with compressed models
- Complex data learning

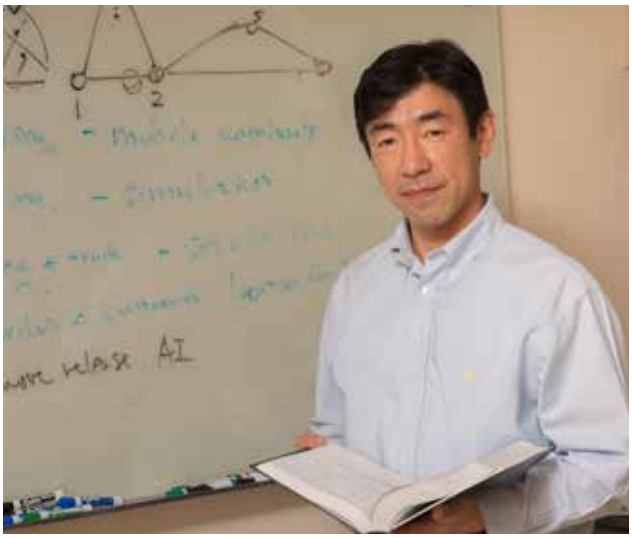
SIGNIFICANT ACHIEVEMENTS

- 2020: IEEE Fellow
- 2021: AAIA Fellow
- 2022: IAPR Fellow
- 2025: NAI Fellow

School of Systems Science and Industrial Engineering







Ankit Bansal

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

- Integer programming
- Stochastic optimization
- Large-Scale optimization

KEY RESEARCH

- Stochastic programming approaches for scheduling anesthesia providers to operating rooms
- Budget allocation models to manage the opioid crisis
- Models and algorithms for family medicine residency scheduling with clinic first objectives

POTENTIAL APPLICATIONS

- Healthcare delivery systems
- Production systems
- Public policy

SIGNIFICANT PUBLICATIONS/PATENTS

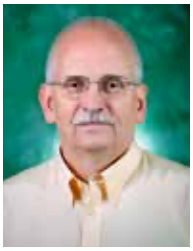
- Bansal, A., Richard, J-P., Berg, B. and Huang, Yu-Li., 2024. A Sequential Follower Refinement Algorithm for Robust Surgery Scheduling, INFORMS Journal on Computing, 36(3), pp. 918-937.
- Bansal, A., Ozaltin, O., Uzsoy, R. and Kempf, K., 2022. Coordination of Manufacturing and Engineering Activities during Product Transitions. Naval Research Logistics, 69(6), pp. 841-855.
- Bansal, A., Berg, B. and Huang, Yu-Li., 2021. Distributionally Robust Optimization Approach for Coordinating Clinical and Surgical Appointments. IISE Transactions, 53(12), pp. 1311-1323.
- Bansal, A., Uzsoy, R. and Kempf, K., 2020. Iterative Combinatorial Auctions for Managing Product Transitions in Semiconductor Manufacturing. IISE Transactions, 52(4), pp. 413-431.

MAJOR PROJECTS/FUNDING

- 2023-26: D-ISN/Collaborative Research: Disrupting West Virginia's Opioid Crisis: a Multi-disciplinary Approach through Interdiction and Harm Reduction, National Science Foundation, Principal Investigator (PI), $244,008
- 2024-27: Collaborative Research: Models and Algorithms for Family Medicine Residency Scheduling with Clinic First Objectives, National Science Foundation, Principal Investigator (PI), $291,703

Peter Borgesen

PROFESSOR



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AREAS OF EXPERTISE

- Materials science
- Electronics packaging

KEY RESEARCH

- Reliability of electronic interconnects

POTENTIAL APPLICATIONS

- Definition of accelerated test protocols and interpretation of results in electronics manufacturing

SIGNIFICANT PUBLICATIONS/PATENTS

- S. Thekkut, M. Z. Kokash, R. S, Sivasubramony, Y. Kawana, K. Mirpuri, N. Shahane, P. Thompson, C. M. Greene, and P. Borgesen, "Inelastic Deformation of Copper Nanoparticle Based Joints and Bonds," J. Electr. Packag. 144 (2022) 031009-1 to -7
- R. Das, S. Thekkut, R. S. Sivasubramony, T. Alghoul, A. Mahmood, S. Joshi, C. Arroyo, G. Sharma, and P. Borgesen, "Early Transient Creep of Single Crystal SnAgCu Solder Joints," J. Mater. Sci.: Matls in Electr 33 (2022) 13657-13667, doi 10.1007/s10854-022-08300-y
- R. Muralidharan, A. Raj, R. S. Sivasubramony, M. Yadav, M. Alhendi, M. Nilsson, C. Greene, M. D. Poliks, and P. Borgesen, "Effect of Substrate Properties on Isothermal Fatigue of Aerosol Jet Printed Nano-Ag Traces on Flex," J. Mater. Res. 34 (2019) pp. 2903-2910
- P. Borgesen, L. Wentlent , S. Hamasha, S. Khasawneh, S. Shirazi, D. Schmitz, T. Alghoul, C. Greene, and L. Yin, "A Mechanistic Thermal Fatigue Model for SnAgCu Solder Joints," J. Electr. Mater. 47 (2018) pp. 2526-2544 (doi.org/10.1007/s11664-018-6121-0) — Editors Choice (Free Access)

MAJOR PROJECTS/FUNDING

- SERDP — Microstructurally Adaptive Constitutive Relations and Reliability Assessment Protocols for Lead Free Solder" ($1,190,000)
- NSF — Microstructurally Adaptive Constitutive Relations and Reliability Assessment Protocols for Lead Free Solder" ($415,000)
- Universal Instruments — "Electronics Manufacturing and Reliability Research" ($2,287,963)

Sreenath Chalil Madathil

ASSISTANT PROFESSOR

EDUCATION: PhD in Industrial Engineering, Clemson University
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WEBSITE: sreenathcm.com

AREAS OF EXPERTISE

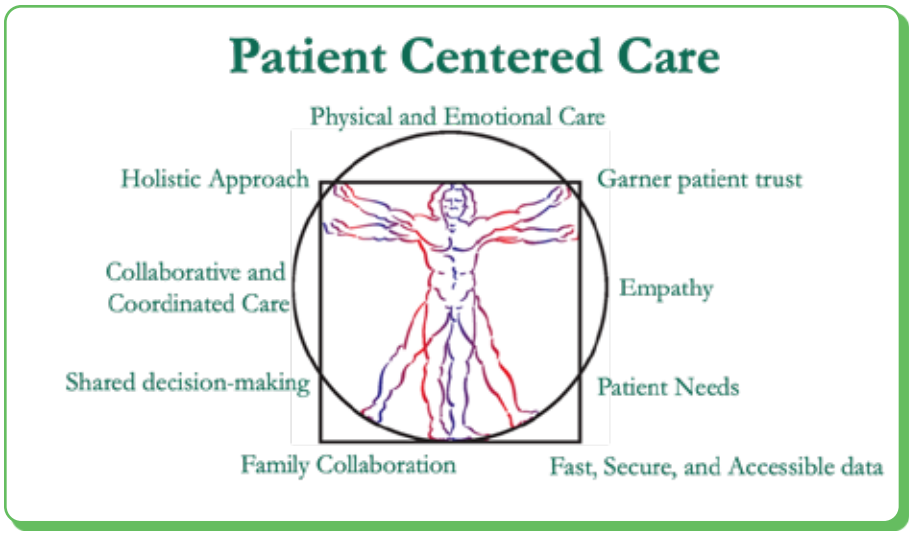
- Data analysis
- Optimization and simulation
- Process improvement
- Machine learning
- Process mining

KEY RESEARCH

- Patient experience
- Healthcare supply chain
- Electronic health records analysis
- Healthcare system-level factor

POTENTIAL APPLICATIONS

- Early-warning signs detection
- Disease prediction
- Enhancing performance metrics such as length of stay, readmission
- Optimizing care pathways
- Layout design based on care pathways



SIGNIFICANT PUBLICATIONS/PATENTS

- Debapriya, B., Chalil Madathil, S., Lopes, A.J., Luna, S., Mukka, S., Evaluation of Maternal Patient Experience Using Natural Language Processing, Applied Sciences, August 2024, doi: 10.3390/app14198762
- Ransikarbum, K., Wattanasaeng, N., Chalil Madathil, S., Analysis of multi-objective vehicle routing problem with flexible time windows: The implication for open innovation dynamics. Journal of Open Innovation Technology, Market, and Complexity, March 2023 doi: 10.1016/j.joitmc.2023.100024.
- Halawa, F, Chalil Madathil, S., Khasawneh, M. T., Multi-objective Unequal Area Pod-structured Healthcare Facility Layout Problem with Daylight Requirements. Computers & Industrial Engineering, September 2021, doi: 10.1016/j.cie.2021.107722.

MAJOR PROJECTS/FUNDING

- 2022: "NSF IUSE: Improving Student Engagement and Training in Healthcare Engineering," Co-PI, (PI: Bill Tseng, Co-PI: Md Fashiar Rahman, Michael Pokojovy, Sreenath Chalil Madathil), National Science Foundation (Total: $300,000.00, Effort: $43,305.00)
- 2023-24: "Support for Supply Chain Operations Performance Improvement and Cost Reduction," PI: K. Srihari, M. T. Khasawneh, Sreenath Chalil Madathil, SUNY Downstate (Total: $324,506.00; Effort: $108,168.67)
- 2023-24: "Performance Improvement Initiatives for Northwell Health Central Region Ambulatory Operations," PI: K. Srihari, M. T. Khasawneh, Sreenath Chalil Madathil, Northwell Health (Total: $69,758.00; Effort: $23,252.00)

SIGNIFICANT ACHIEVEMENTS

- $2.3 million in total external funding
- 15 journal publications and 11 conference proceedings
- Best paper award at the Research, Invention and Innovation Congress in Bangkok, Thailand

Changqing Cheng

ASSOCIATE PROFESSOR

EDUCATION: PhD in Industrial Engineering, Oklahoma State University
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AREAS OF EXPERTISE

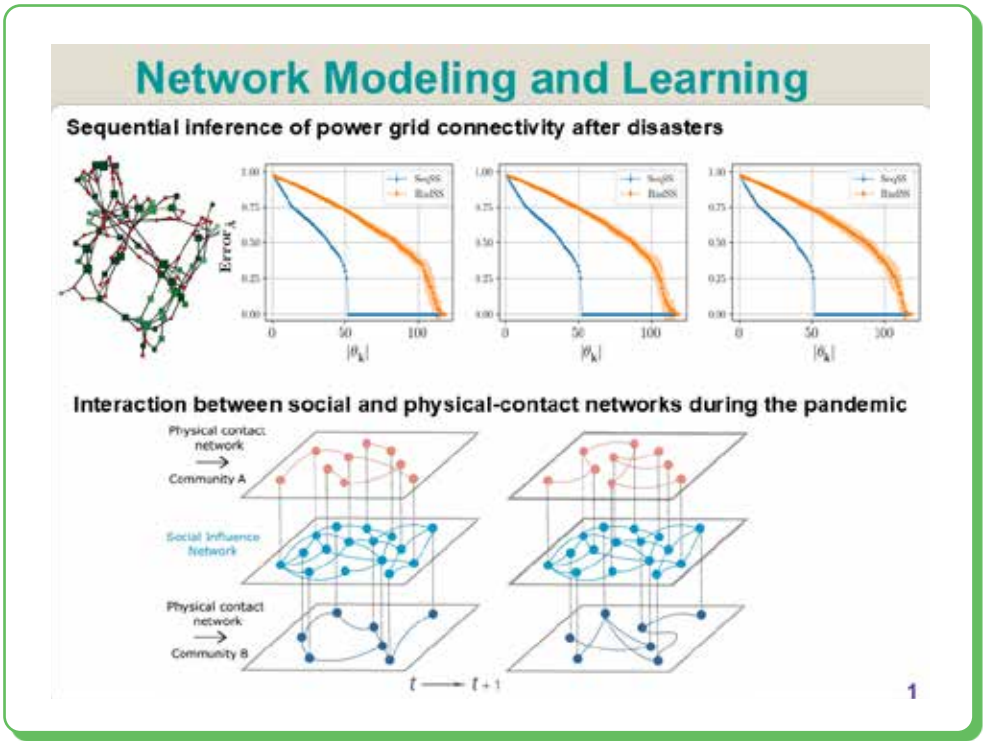
- Statistical learning
- Quality control
- Network reliability

KEY RESEARCH

- Smart sensing and diagnosis in complex systems
- Epidemic modeling
- Network resilience

POTENTIAL APPLICATIONS

- Healthcare: Learning and diagnosis of sleep apnea and cardiovascular diseases
- Manufacturing: Quality control and process optimal design
- Energy networks: Resilience enhancement against extreme events



SIGNIFICANT PUBLICATIONS/PATENTS

- J. Wan, J. Kataoka, J. Sivakumar, E. Peña, Y. Che*, H. Sayama and C. Cheng, "Sparse Bayesian learning for sequential inference of network connectivity from small data," IEEE Transactions on Network Science and Engineering, Vol. 11, 5892-5902, 2024. 10.1109/TNSE.2024.3471852
- Y. Shu, T.G. Smith, S.P. Arunachalam, E.G. Tolkacheva, and C. Cheng, "Image-decomposition-enhanced deep learning for detection of rotor cores in cardiac fibrillation," IEEE Transactions on Biomedical Engineering, Vol. 71, 68-76, 2024. 10.1109/TBME.2023.3292383
- J. Wan*, Y. Che*, Z. Wang, and C. Cheng, "Uncertainty quantification and optimal robust design for machining operations," Journal of Computing and Information Science in Engineering, Vol. 23, 011005, 2023. doi.org/10.1115/1.4055039
- J. Wan*, G. Ichinose, M. Small, H. Sayama, Y. Moreno, and C. Cheng, "Multilayer networks with higher-order interaction reveal the impact of collective behavior on epidemic dynamics," Chaos, Solitons & Fractals, Vol. 164, 112735, 2022 (First Place in 2022 COVID Information Commons Student Paper Challenge). doi.org/10.1016/j.chaos.2022.112735

MAJOR PROJECTS/FUNDING

- 2021-23: National Science Foundation, EAGER International Type II: Sustainable International Collaboration in Spatiotemporal Modeling of Human Mobility and Contagion Dynamics for COVID-19, amount: $300,000, position: PI
- 2020-21: National Science Foundation Subaward from Northeast Big Data Innovation Hub, Nonlinear Dynamics and Machine Learning for Accurate Detection of Early-stage Atrial Fibrillation, amount: $25,000, position: PI

Sung Hoon Chung

ASSOCIATE PROFESSOR

EDUCATION: PhD, Pennsylvania State University
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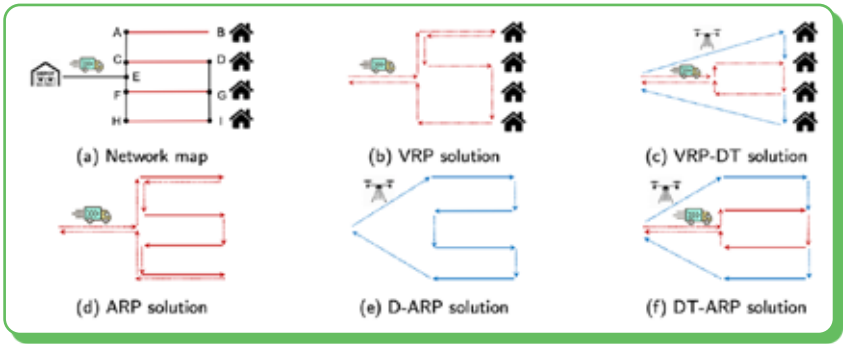
AREAS OF EXPERTISE

- Mathematical optimization under uncertainty with a focus on large-scale, complex systems involving competitive and cooperative multi-agent interactions.
- Research integrates advanced optimization methodologies with game-theoretic principles to address real-world challenges in resource allocation and strategic decision-making

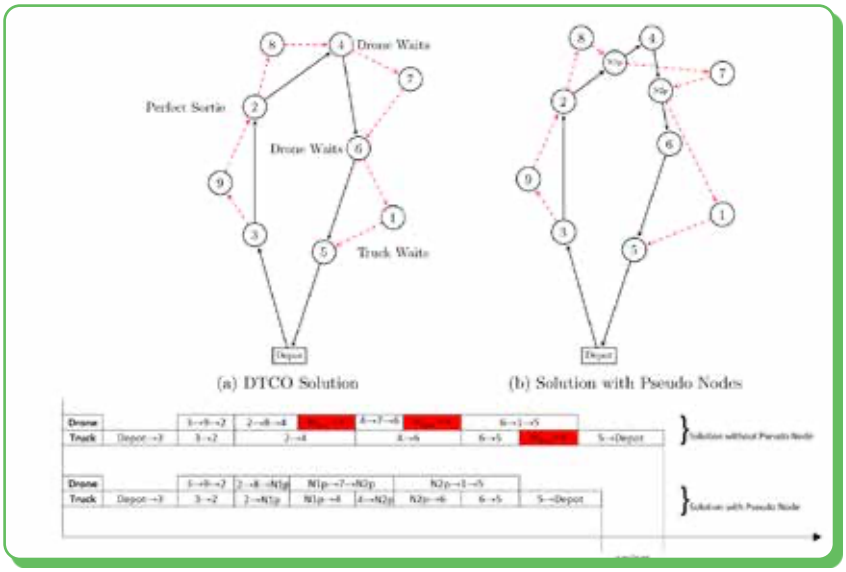


KEY RESEARCH

- Healthcare operations management
- Supply chain management
- Mathematical optimization
- Computational game theory

POTENTIAL APPLICATIONS

- Drone-truck combined operations
- Dynamic wireless charging techniques for continuous electric forklift operations
- Warehouse modeling, operations management and analytics



SIGNIFICANT PUBLICATIONS/ PATENTS

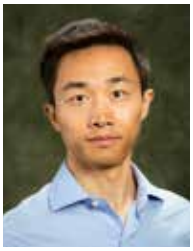
- X Liu, SH Chung, C Kwon, "An adaptive large neighborhood search method for the drone–truck arc routing problem," Computers & Operations Research 176, 106959, 2025
- SH Chung, B Sah, J Lee, "Pseudo node insertion method for synchronization in drone–truck combined operations," Computers & Industrial Engineering 189, 109963, 2024
- Y Li, SH Chung, "Ride-sharing under travel time uncertainty: Robust optimization and clustering approaches," Computers & Industrial Engineering 149, 106601, 2020
- SH Chung, B Sah, J Lee, "Optimization for drone and drone-truck combined operations: A review of the state of the art and future directions," Computers & Operations Research 123, 105004, 2020
- SH Chung, RD Weaver, HW Jeon, "Sustainable management of remanufacturing in dynamic supply chains," Networks and Spatial Economics 20, 703-731, 2020

MAJOR PROJECTS/FUNDING

- NSF: Arc Routing Problems in Combined Drone/Truck Fleets
- SUNY-RF: Using drones to disinfect urban streets and protect the most vulnerable population from the spread of COVID-19
- Materials Handling Institute: Systematic and Integrated Framework for Advancing the Management of Dynamic, Complex, and Interdependent Systems.
- Toyota Material Handling North America University Research Program: Investigating the Potential of Dynamic Wireless Charging Techniques for Continuous Electric Forklift Operations.
- Toyota Material Handling North America University Research Program: Studying Lift Truck Driver Behavior and Warehouse Congestion Using Informatics and Analytics Methods.

Jia Deng

ASSOCIATE PROFESSOR



EDUCATION: PhD in Industrial Engineering, North Carolina State University
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AREAS OF EXPERTISE

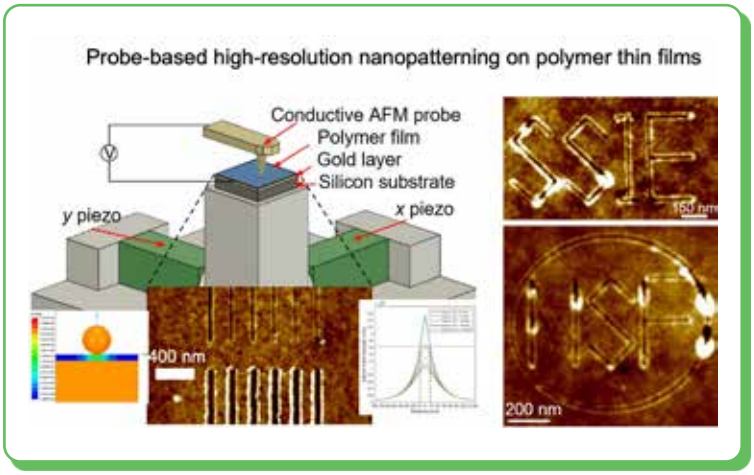
- Advanced manufacturing
- Micro/nanofabrication
- Additive manufacturing

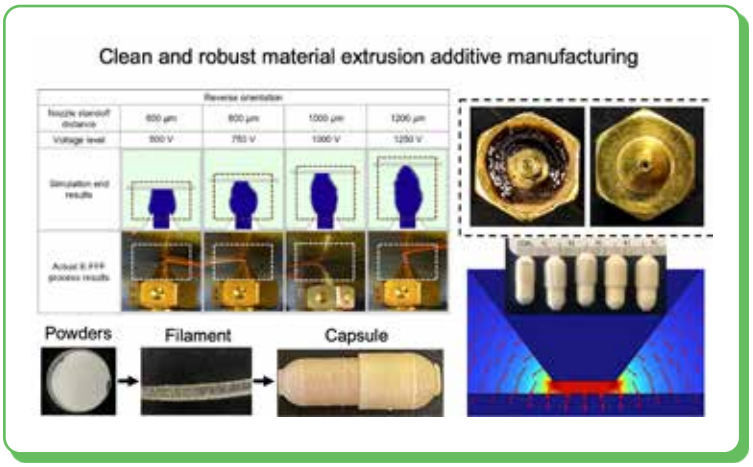
KEY RESEARCH

- Atomic force microscope (AFM)-based nanomanufacturing
- High-resolution and versatile nanopatterning process for advanced materials
- Material extrusion process innovations for clean and robust additive manufacturing

POTENTIAL APPLICATIONS

- Customized nanoelectronic prototypes for various sensing and energy applications
- 3D printing capsule shells for individualized drug delivery with enhanced drug efficacy and safety
- Robust 3D printing that can be applied in a microgravity environment for in-space manufacturing





SIGNIFICANT PUBLICATIONS/PATENTS

- Shantanu G. Gaurkhede, and Jia Deng, "A novel electric field-assisted material extrusion process for clean additive manufacturing," Journal of Manufacturing Processes, vol. 124, p. 856-866, Aug. 2024, doi: 10.1016/j.jmapro.2024.06.021.
- H. Zhou, Y. Jiang, C. Ke, and J. Deng, "Electric-Field and Mechanical Vibration-Assisted Atomic Force Microscope-Based Nanopatterning," Journal of Micro and Nano-Manufacturing, vol. 10, no. 2, p. 021005, Feb. 2023, doi: 10.1115/1.4056731.
- H. Zhou, Y. Jiang, C. M. Dmuchowski, C. Ke, and J. Deng, "Electric-Field-Assisted Contact Mode Atomic Force Microscope-Based Nanolithography with Low Stiffness Conductive Probes," Journal of Micro and Nano-Manufacturing, vol. 10, no. 1, p. 011001, Apr. 2022, doi: 10.1115/1.4054316.
- J. Deng, L. Jiang, B. Si, H. Zhou, J. Dong, and P. Cohen, "AFM-Based nanofabrication and quality inspection of three-dimensional nanotemplates for soft lithography," Journal of Manufacturing Processes, vol. 66, pp. 565–573, Jun. 2021, doi: 10.1016/j.jmapro.2021.04.051.

MAJOR PROJECTS/FUNDING

- 2020-24: Jia Deng (PI) and Changhong Ke (co-PI), Multiple-Energy-Assisted Ultrasharp Probe-Based Nanomanufacturing for High-Resolution and High-Efficiency Nanopatterning, $609,436, NSF — Division of Civil, Mechanical and Manufacturing Innovation (CMMI) — Advanced Manufacturing, CMMI — 2006127
- 2022-23: Krishnaswami Srihari, Daryl Santos, Mohammad Khasawneh, Changqing Cheng, Zimo Wang, and Jia Deng (co-PI), Applied Research in Assembly, Reliability, and Costing for a Global Manufacturer of Electronic Equipment, $686,929, FII USA Inc.
- 2019-20: Jia Deng (Sole PI), Porosity Measurement Innovation for 3D Printed Metal Parts, $13,950, ANSYS Inc.

SIGNIFICANT ACHIEVEMENTS

- 2019 and 2022: Individual Development Awards (IDA), the New York State/United University Professions Joint Labor-Management Committees (NYS/UUP JLMS)
- 2019: Career Champion, Binghamton University

Safa Elkefi

ASSISTANT PROFESSOR

EDUCATION: PhD in Engineering Management and graduate certificate in Healthcare Systems and Data Analytics. Stevens Institute of Technology, N.J.; Masters of Engineering in Industrial Engineering, National Engineering School of Tunis, Tunisia.
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WEBSITE: binghamton.edu/ssie/research/labs/hphactors/

AREAS OF EXPERTISE

- Health informatics
- Human-AI interaction and decision support
- Extended reality in patient care
- Human factors
- Human-centered design
- Population health, equity and community-based interventions
- Healthcare delivery systems engineering
- Cancer prevention and control

KEY RESEARCH

- Decision aids for cancer screening and control and treatment planning
- Immersive VR tools for patient preparedness and survivorship support
- Digital health interventions to boost preventive cancer screening and smoking cessation uptake
- Mixed-methods evaluation of patient-centered technologies

POTENTIAL APPLICATIONS

- Healthcare:
- Personalized decision support, VR-based preparatory modules
- Community-driven digital outreach to underserved populations
- Systems engineering approaches to streamline patient flow and safety and improve clinical operations

SIGNIFICANT PUBLICATIONS/PATENTS

- Elkefi, S, & Wu, P., Feiner, S., Matthews, A., Chen, N. (2025) Role of technology in supporting lung cancer patients before, during and after treatment: a systematic literature review of the benefits and challenges. Nature NPJ Digital Medicine. (In Press).
- Elkefi, S, & Matthews, A. (2024). Lessons learned from the pre-implementation phase of the patient navigation in Federally Qualified Health Centers: one step closer to smoking cessation. Frontiers Public Health. (In Press).
- Lourimi, N, & Elkefi, S. (2024). A Mixed Methods Study on the Feasibility and Design of a Virtual Reality-Based Tool for Stress Management and Relief Among University Students; a case study of students in developing countries. Forging Bridges between Artificial Intelligence and Operations Research: Applications in Healthcare and Supply Chain.(In Press).
- Elkefi, S, & Asan O. (2022). Digital twins for healthcare systems' management: rapid literature review. Journal of Medical Internet Research. 2022;24(8):e37641. doi: 10.2196/37641.
- Elkefi, S, Phillips, E., Groner, l.k., & Matthews, A. (2025) Predictors of up-to-date lung cancer screening among eligible people in the United States: A nationally representative dataset. Clinical Lung Health. doi.org/10.1016/j.cllc.2025.03.005.

MAJOR PROJECTS/FUNDING

- "EveryBreathMatters VR Implementation for Lung Cancer Patient Education." Principal Investigator. Proposal in preparation for NIH,K-01 mechanism.
- "Tailored LLM-Empowered Shared Decision-Making for Patients." Co-Principal Investigator. Proposal in preparation for NIH, R18 mechanism.
- "Evaluation of LLM-Augmented Differential Diagnosis: Workflow, Acceptability, and Safety." Principal Investigator. Proposal in preparation for NIH, R18 mechanism.
- "Multilevel and Spatial Analysis of Behavioral and Environmental Risk Factors for Gastrointestinal Cancers: A Theory-Informed Machine Learning Approach." Co-Principal Investigator. Proposal in preparation for NIH, R21 mechanism.
- 2024-25: "EveryBreatheMatters: A virtual reality intervention to enhance treatment preparedness among lung cancer patients". The Herbert Irving Comprehensive Cancer Center (HICCC). 2024 VELOCITY Cancer Research Pilot Award. Principal Investigator. $80,000.

SIGNIFICANT ACHIEVEMENTS

- 2023: Outstanding Dissertation Award, School of Systems and Enterprises
- 2023: Paul Kaplan Award, Stevens Institute of Technology
- 2022: Fabrycky-Blanchard Award, School of Systems and Enterprises
- 2021: National Ergonomics Month 2021 Contest Winner, Human Factors and Ergonomics Society
- 2017 to present: Female Talent in Leadership and Management Skills Development Program, ECONOWIN/GIZ Germany

Melissa Zeynep Ertem

ASSISTANT PROFESSOR

EDUCATION: PhD, Texas A&M University, College Station, TX
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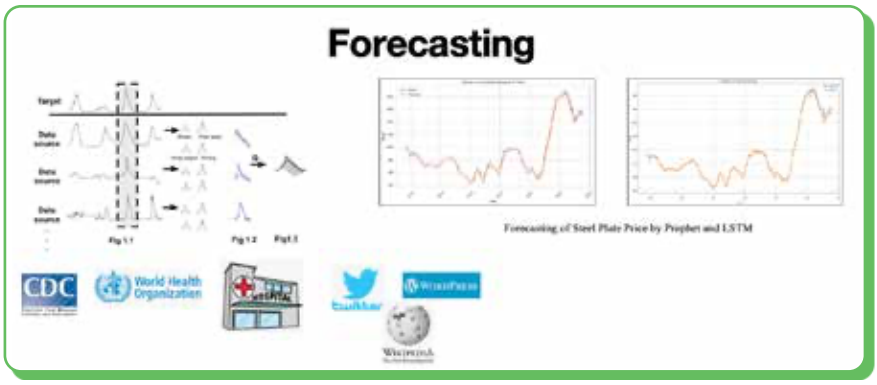
WEBSITE: www.binghamton.edu/labs/datart

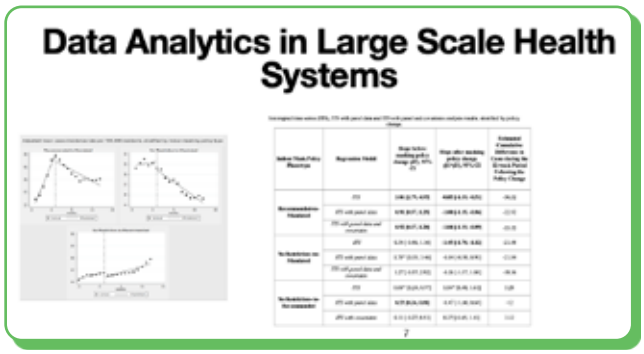
AREAS OF EXPERTISE

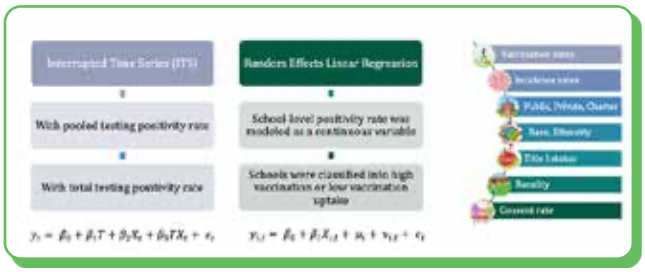
- Data analytics in healthcare systems
- Epidemic disease modelling
- Network optimization
- Discrete optimization
- Social networks
- Health systems optimization

KEY RESEARCH

- Optimization and modelling
- Decision support systems
- Infectious disease modelling
- Public health optimization
- Social networks
- Machine learning on public health
- Network optimization







SIGNIFICANT PUBLICATIONS/PATENTS

- "The impact of school opening model on SARS-CoV-2 community incidence and mortality." Ertem, Z., Schechter-Perkins, E.M., Oster, E. et al. 2021 (Nature Medicine)
- "A Decision Analytic Approach for Social Distancing Policies During COVID-19 Pandemic." Ertem, Z., Araz, O.M., Cruz-Aponte, M. 2021 Decision Support Systems (2021): 113630
- "Identifying climatological interactions in global influenza across temperate and tropical regions." Du, Z*., Ertem, Z.*, Li, Z., Tan, X., Zhao X., Bai, Y., Tian X. 2020 International Conference on Mobile Wireless Middleware, Operating Systems, and Applications (pp. 98-103). Springer
- "Inter-urban interactions of mobility via cellular position tracking in the southeast Songliao Basin, Northeast China." Du, Z., Yang, Y., Ertem, Z., Gao, C., Huang, L., Huang, Q., Bai, Y. 2019. Under publication Scientific Data
- "Scientific insights into Physarum-based modelling: Comment on 'Does being multi-headed make you better at solving problems? A survey of Physarum-based models and computations'" by C. Gao et al. Du, Z., Cai, Q., Ertem, Z., Bai, Y. Physics of Life Reviews, January 2019
- "On the Multi-source Influenza Forecasting: A Bayesian Approach." Ertem, Z., Raymond, D., Meyers, L.A., PLOS Computational Biology, September 2018
- "The Maximum Independent Union of Cliques Problem: Complexity and Exact Approaches." Ertem, Z., Lykhovyd, E., Wang, Y., Butenko, S. Journal of Global Optimization, July 2018
- "Scale Reduction Techniques for Computing Maximum Induced Bi-cliques." Shahinpour, S., Shirvani, S., Ertem, Z., Butenko, S., Algorithms, October 2017
- "Detecting Large Cohesive Subgroups with High Clustering Coefficients." Ertem, Z., Veremyev, A., Butenko, S. Social Networks, July 2016
- "Demographic Breakdown of Twitter Users: An analysis based on names." Oktay, H., Firat, A., Ertem, Z. Proceedings of the Sixth ASE International Conference on Social Computing May 2014, Stanford, Calif.

MAJOR PROJECTS/FUNDING

- 2016-19: Department of Defense Defense Threat Reduction Agency (DTRA) Surety BioEvent App. ($3 Million) — Role was senior researcher

SIGNIFICANT ACHIEVEMENTS

- Over 45 peer-reviewed publications/book chapters

Carlos Gershenson-García

PROFESSOR OF EMPIRE INNOVATION

EDUCATION: PhD in Sciences, Vrije Universiteit Brussel, Belgium; MSc in Evolutionary and Adaptive Systems, University of Sussex, U.K.; BEng in Computer Engineering, Fundación Arturo Rosenblueth, Mexico.
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AREAS OF EXPERTISE

- Complex systems
- Artificial life
- Artificial intelligence
- Healthcare

KEY RESEARCH

- Limits of science
- AI in healthcare
- Designing self-organizing systems

POTENTIAL APPLICATIONS

- Healthcare systems
- Urbanism
- Organizations

SIGNIFICANT PUBLICATIONS/PATENTS

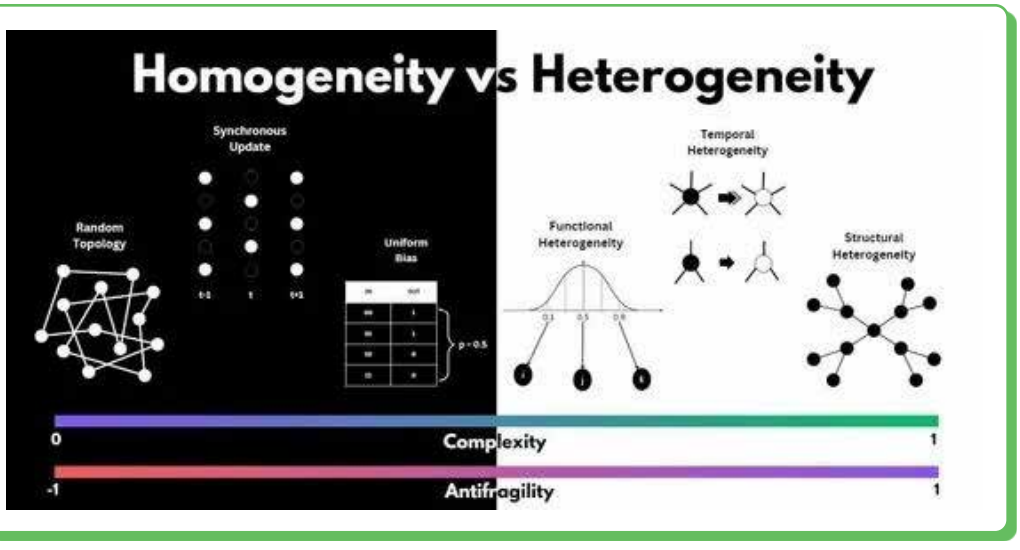
- Gershenson, C. (2005). Self-organizing traffic lights. Complex Systems, 16(1), 29–53. complex-systems.com/pdf/16-1-2.pdf
- Gershenson, C., & Helbing, D. (2015). When slower is faster. Complexity, 21(2), 9–15. doi.org/10.1002/cplx.21736
- Iñiguez, G., Pineda, C., Gershenson, C., & Barabási, A.-L. (2022). Dynamics of ranking. Nature Communications, 13(1), 1646. doi.org/10.1038/s41467-022-29256-x
- Sánchez-Puig, F., Zapata, O., Pineda, O. K., Iñiguez, G., & Gershenson, C. (2023). Heterogeneity extends criticality. Frontiers in Complex Systems, 1. doi.org/10.3389/fcpxs.2023.1111486

MAJOR PROJECTS/FUNDING

- "Tax evasion," Mexican Revenue Service ($100,000+)
- "Health and disease: information technologies and non-invasive biomarkers for early warnings". UNAM ($200,000)
- Classified project, Mexican government. ($4.2 million)
- "National Laboratory of Complexity Sciences" CONACYT ($325,000)

SIGNIFICANT ACHIEVEMENTS

- President of the Complex Systems Society
- Editor-in-Chief, Complexity Digest
- Board of Advisors Member, Scientific American



Christopher M. Greene

ASSOCIATE PROFESSOR

EDUCATION: PhD, Binghamton University
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WEBSITE: www.binghamton.edu/ssie/people/profile.html?id=cgreene

AREAS OF EXPERTISE

- Cobotics/Industry 4.0 and 5.0
- Electronics and digital manufacturing
- Inclusive excellence in STEM education

KEY RESEARCH

- Precision and accuracy comparison of human vs. cobot in assembly
- Integration of cobotics in electronics manufacturing
- Conformal coating and thermal fatigue reliability

POTENTIAL APPLICATIONS

- Manufacturing: Automated inspection, cobot-based heatsink attach, thermal process analysis
- Electronics: High-density interconnect testing, hybrid solder evaluation
- Education: Systems-based decision-making in collaborative robotics and Industry 4.0/5.0

SIGNIFICANT PUBLICATIONS

- Abbas, A., Greene, C.M., et al. “Impact of Conformal Coating on Solder Joints.” IEEE Transactions on Components, Packaging and Manufacturing Technology, 2020.
- Subash, Silpa & Greene, C.M., “Collaborative Robot Selection Using Analytical Hierarchy Process (AHP),” International Journal of Rapid Manufacturing; Volume 8 Issue 4, 2019, Pages 326-344

MAJOR PROJECTS/FUNDING

- SMART Modular Technologies: Quality and Reliability Process Analyses for Electronics Assemblies ($68,248)
- Lockheed Martin: Additive Manufacturing for Electronics ($73,500)

Saad Hamasha

PROFESSOR

EDUCATION: PhD, Binghamton University; MS and BS, Jordan University of Science and Technology
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AREAS OF EXPERTISE

- Knowledge in electronics manufacturing processes, with a focus on quality control and reliability; expertise extends to solder materials, which are crucial in electronics manufacturing

KEY RESEARCH

- Electronics manufacturing
- Solder materials
- Reliability and quality engineering

SIGNIFICANT PUBLICATIONS/PATENTS

- Interpretable data-driven framework for life prediction of homogenous lead-free solder joints in ball grid array packages, Q Qasaimeh, J Liu, DF Silva, A Qasaimeh, JL Evans, S Hamasha, Journal of Intelligent Manufacturing, 1-19, 2025
- The impact of Bi content on the coarsening kinetics of IMC particles and creep deformation under thermal cycling, MEA Belhadi, S Hamasha, A Alahmer, R Zhao, BC Prorok, S Alavi, Journal of electronic materials 53 (1), 380-393, 2024
- Temperature and Flexural Endurances of Aluminum-Doped Zinc Oxide Thin Films on Flexible Polyethylene Terephthalate Substrates: Pathways to Enhanced Flexibility and Conductivity. MM Hamasha, S Hamasha, K Alzoubi, MS Obeidat, R Massadeh, Coatings 14 (12), 1527, 2024
- The Electrical and Mechanical Behaviors of Copper Thin Films Deposited on Polyethylene Terephthalate Under Tensile Stress, A Alkhazali, S Hamasha, MM Hamasha, H Khaled, M Etier, R Massadeh, Coatings 14 (12), 1511, 2024
- The impact of paste alloy, paste volume, and surface finish on solder joint, A Alakayleh, A Alahmer, Microelectronics Reliability 160, 115457, 2024

Kimberly Harry

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

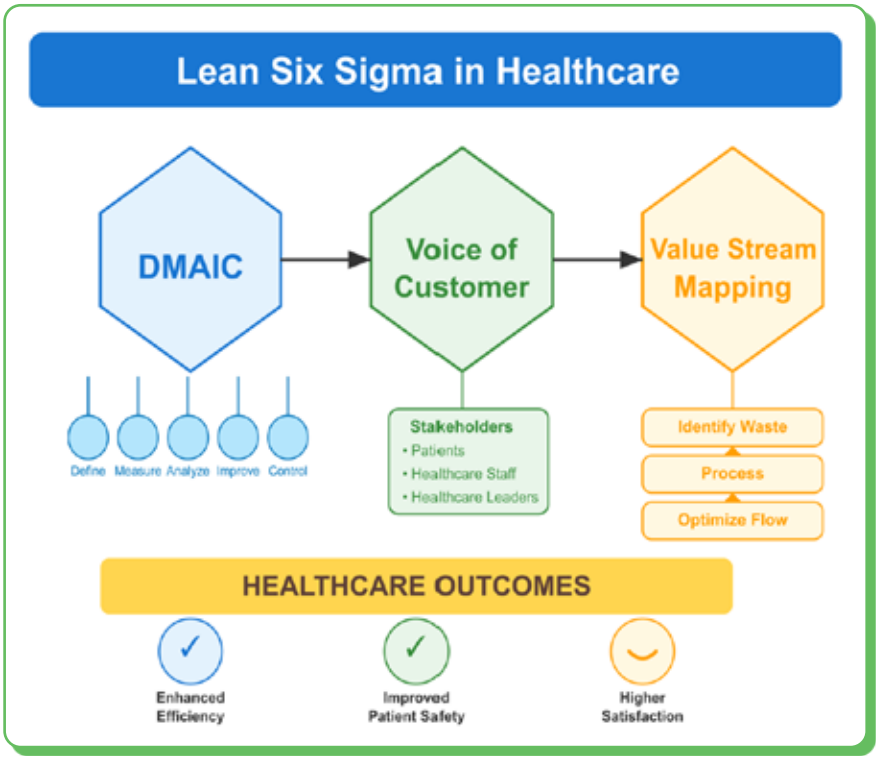
- Healthcare continuous improvement
- Healthcare systems engineering
- Performance measurement
- Quality engineering
- Health equity promotion

KEY RESEARCH

- Improving quality of life outcomes for veterans in nursing homes
- Addressing vaccine hesitancy in at-risk urban communities
- Improving maternal healthcare outcomes through equitable healthcare access

POTENTIAL APPLICATIONS

- Education: Healthcare evidence-based learning
- Healthcare: Quality of life, patient-centered outcomes, equitable healthcare
- Business: Regulatory compliance, quality assurance, benchmark standards



SIGNIFICANT PUBLICATIONS

- Harry, K. D., Van Aken, E. M., & Glover, W. J. (2025). A Systematic Literature Review and Meta-Synthesis Evaluation of the Critical Success Factors for Kaizen Events in Hospitals. Engineering Management Journal, 1–23. doi.org/10.1080/10429247.2025.2504790
- Harry, K. D., Van Aken, E. M., Glover, W. J. (2025). An exploration of Kaizen events in hospitals using a systematic literature review and bibliometric analysis. Management Decision. doi.org/10.1108/MD-11-2024-2578
- Samara, M. N., & Harry, K. D. (2025). Leveraging Kaizen with Process Mining in Healthcare Settings: A Conceptual Framework for Data-Driven Continuous Improvement. Healthcare, 13(8), 941. doi.org/10.3390/healthcare13080941

MAJOR PROJECTS/FUNDING

- 2024: Binghamton University Presidential Diversity Research Grant, “Improving Health and Social Outcomes through Equitable Access to Healthcare” ($7,500)

Mohammad T. Khasawneh

SUNY DISTINGUISHED PROFESSOR; DIRECTOR, SCHOOL OF SYSTEMS SCIENCE AND INDUSTRIAL ENGINEERING; DIRECTOR, WATSON INSTITUTE FOR SYSTEMS EXCELLENCE (WISE)

EDUCATION: PhD in Industrial Engineering, Clemson University
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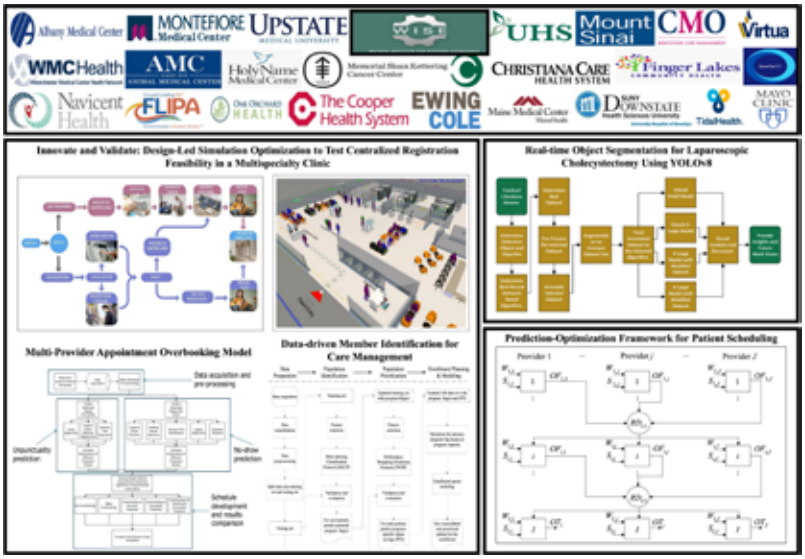
AREAS OF EXPERTISE

- Healthcare delivery systems engineering
- Modeling, optimization and continuous process improvement with emphasis on operational excellence

KEY RESEARCH

- AI and Machine Learning in Healthcare: Developing predictive models for disease diagnosis, patient triage and hospital optimization
- Healthcare Systems Engineering: Modeling, simulation and optimization to enhance patient flow and operational excellence
- Human Factors and Digital Human Modeling: Enhancing human performance in complex systems



POTENTIAL APPLICATIONS

- Healthcare: AI-driven decision support for patient care, predictive analytics for disease diagnosis and operational improvements in hospital systems
- Supply Chain and Logistics: Smart inventory management, predictive demand forecasting and automated replenishment
- Manufacturing and Industry 4.0: Process optimization, predictive maintenance and IoT-enabled smart manufacturing
- Business and Finance: AI-driven risk assessment, workflow automation and business intelligence for performance improvement

SIGNIFICANT PUBLICATIONS/PATENTS

- Tashtoush, A., Wang, Y., Khasawneh, M.T., Hader, A., Shazeeb, M., Lindsay, C., "Real-Time Object Segmentation for Laparoscopic Cholecystectomy Using YOLOv8," Neural Computing and Applications, December 2024: doi.org/10.1007/s00521-024-10713-1
- Olatunde, O., Khasawneh, M.T., Yoon, H., "Multiclass Classification of Alzheimer's Disease Prodromal Stages Using Sequential Feature Embeddings and Regularized Multikernel Support Vector Machine," NeuroImage, 304, November 2024: doi.org/10.1016/j.neuroimage.2024.120929
- Abu Lekham, L., Hey, E., Canario, J., Rivas, Y., Felice, A., Mantegna, T., Wang, Y., Khasawneh, M.T., "A Pre-Defined Rule-Based Multi-Factor Risk Stratification is Associated with Improved Outcomes at a Rural Primary Care Practice," Family & Community Health, May 2024: doi.org/10.1097/FCH.0000000000000405

MAJOR PROJECTS/FUNDING

- 2025: "Continuation of Systems Integration Engineering and Hardware Validation Testing Research and Development Support: Project I," $151,266
- 2025-26: "Advanced Data Analytics and Performance Improvement Support for Holy Name Medical Center," $134,074.00
- 2024: "Pharmacy Automation Solution Validation and Design Principal Development for System Improvement," $174,931
- 2024-25: "Enhancing Manufacturing, Assembly, Reliability, and Supply Chain Management for Large-scale Electronics Manufacturing Industry," $778,350

SIGNIFICANT ACHIEVEMENTS

- 2020-23: SUNY Chancellor's Award for Excellence in Scholarship and Creative Activities
- 2020-present: Institute of Industrial and Systems Engineering (IISE) Fellow
- 2019-present: Diplomate Status, Society for Health Systems (SHS)
- 2015-16: University Award for Excellence in International Education
- 2013-15: University Award for Outstanding Graduate Director
- 2010-11: SUNY Chancellor's Award for Excellence in Teaching

Sara Kohtz

ASSISTANT PROFESSOR

EDUCATION: PhD in Industrial Engineering, University of Illinois at Urbana-Champaign
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AREAS OF EXPERTISE

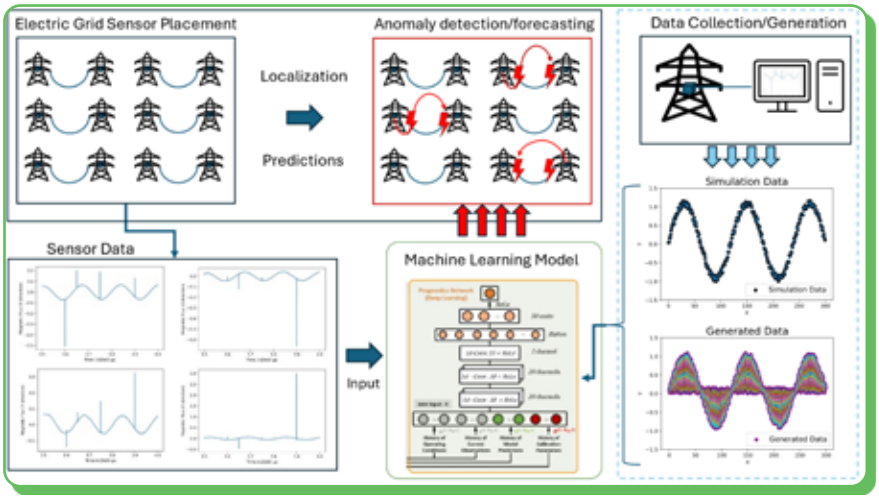
- Machine learning
- Data science
- Energy systems

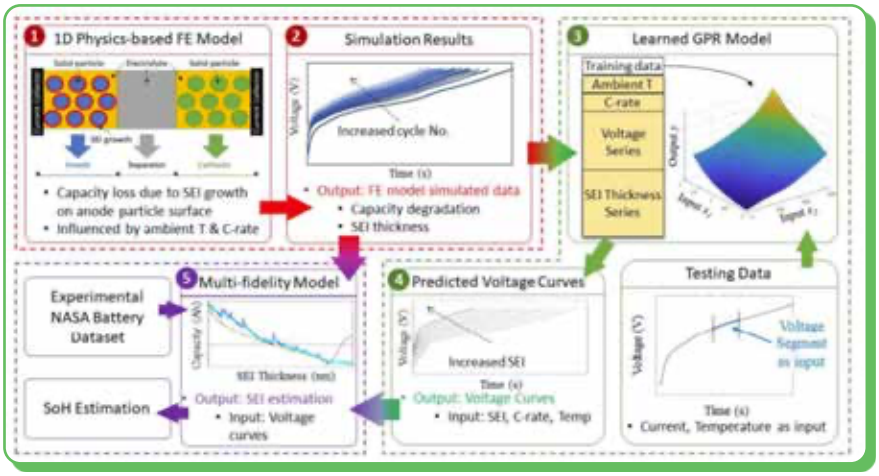
KEY RESEARCH

- Resilient optimal sensor placement
- Data selection and proxy models for complex machine learning models
- Generative AI for missing data and optimal system design
- Real-time prognostics using AI and signals processing

POTENTIAL APPLICATIONS

- Energy: Predicting the remaining useful life of lithium-ion batteries
- Energy: Battery-pack module design for optimal power and energy efficiency
- Earth Science: Development of ensemble learning and generative AI techniques for identifying orphaned wells
- Electrical Engineering: Detecting and localizing partial discharge within high-power energy systems, including industrial electric motors and power grids



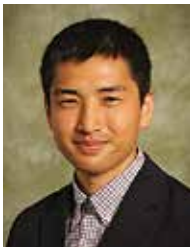


SIGNIFICANT PUBLICATIONS/ PATENTS

- Kohtz S. et al. (2022), "Physics-informed machine learning model for battery state of health prognostics using partial charging segments," Mechanical Systems and Signal Processing, Volume 172, 2022, 109002, ISSN 0888-3270, doi.org/10.1016/j.ymssp.2022.109002
- Kohtz S. et al. (2024), "Optimal sensor placement for permanent magnet synchronous motor condition monitoring using a digital twin-assisted fault diagnosis approach." Reliability Engineering and System Safety, Volume 242, 109714, ISSN 0951-8320, doi.org/10.1016/j.ress.2023.109714
- Kohtz S. et al. (2025) Patent No. 63/685,607: "Partial Discharge Localization and Detection using Non-Invasive Hall-effect Sensors"

Sadamori Kojaku

ASSISTANT PROFESSOR



EDUCATION: PhD in Computer Science at Hokkaido University
EMAIL: skojaku@binghamton.edu
WEBSITE: skojaku.github.io

AREAS OF EXPERTISE

- Complex systems
- Network science
- Computational social sciences
- Science of science
- Representation learning

KEY RESEARCH

- Developing computational tools to analyze complex data
- Investigating the dynamics of complex systems
- Applying network science to understand social phenomena
- Advancing representation learning techniques for scientific analysis

POTENTIAL APPLICATIONS

- Enhancing data analysis in social sciences
- Improving understanding of complex networks in various fields
- Developing tools for better decision-making in complex systems
- Advancing methodologies in computational social science research

SIGNIFICANT PUBLICATIONS/PATENTS

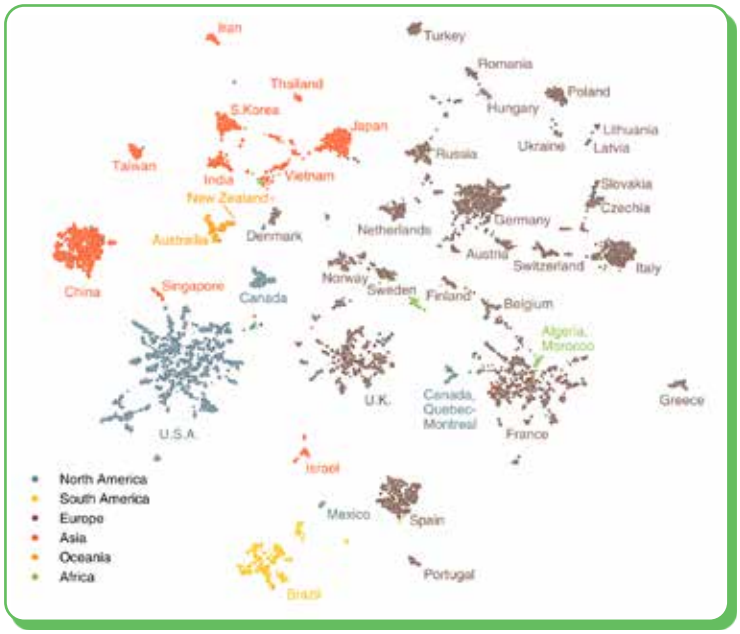
- Kojaku S., et al. “Network Community Detection via Neural Embeddings.” Nature Communications.
- Kojaku S., et al. “Residual2vec: Debiasing Graph Embeddings with Random Graphs.” NeurIPS.
- Murray D., Yoon J., Kojaku S., et al. “Unsupervised Embedding of Trajectories Captures the Latent Structure of Mobility.” Proceedings of the National Academy of Sciences (PNAS).

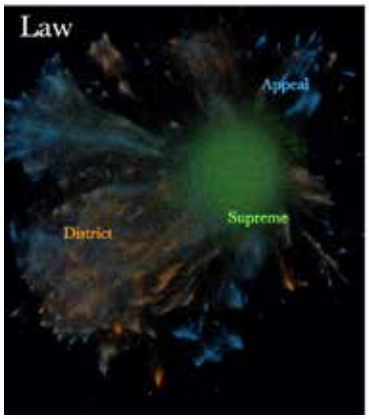
SIGNIFICANT ACHIEVEMENTS

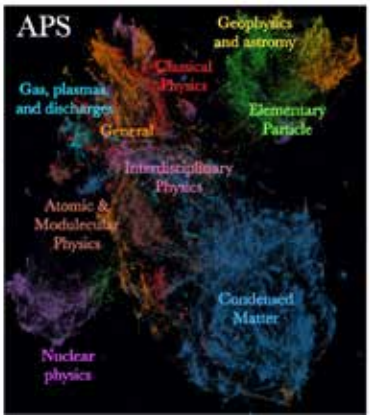
- 2024: Outstanding Faculty Award from Students with Disabilities, Binghamton University
- 2017: Best Contribution on Financial Networks Award, International School and Conference on Network Science (NetSci-X)
- 2015: Dean Award, Graduate School of Information Science and Technology, Hokkaido University
- 2013: Best Student Award, The World Congress on Engineering

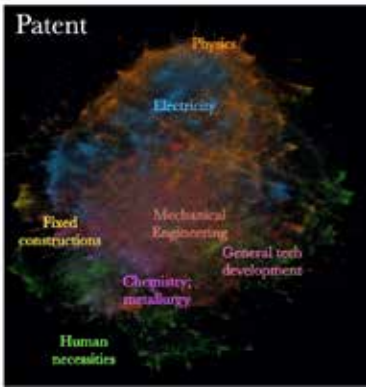
MAJOR PROJECTS/FUNDING:

- 2020: PI Sadamori Kojaku, Co-PI Giulio Cimini. Project: Correlation-based reconstruction of financial networks for systemic risk control. Funded by JSPS Bilateral Exchange Program. 8,000,000 JPY.









Sarah S. Lam

PROFESSOR

EDUCATION: PhD in Industrial Engineering, University of Pittsburgh
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WEBSITE: bingdev.binghamton.edu/sarahlam

AREAS OF EXPERTISE

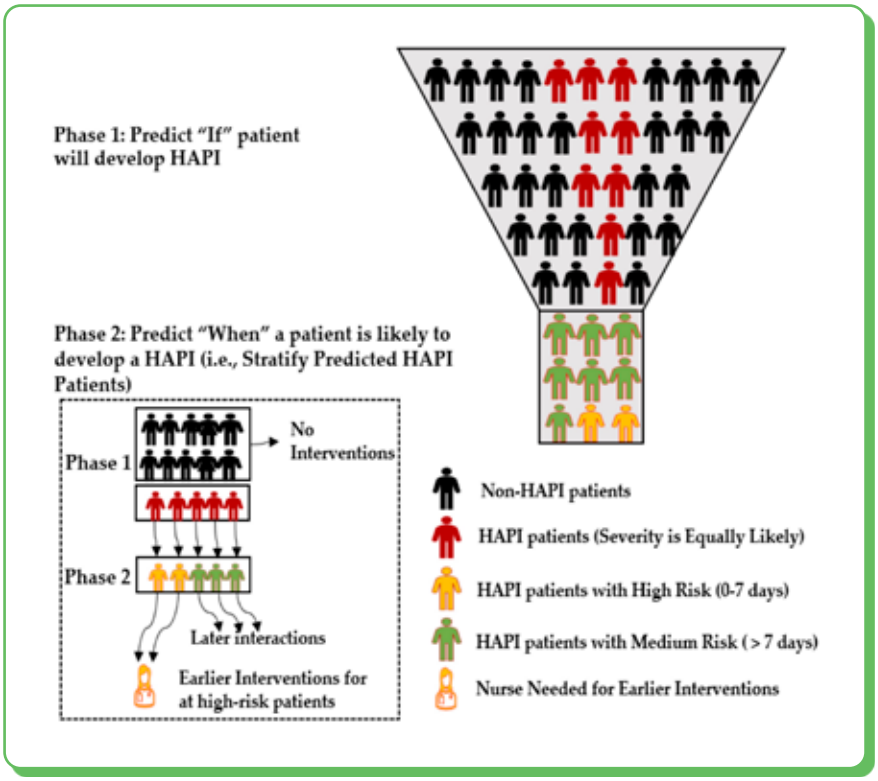
- Neural networks
- Evolutionary optimization
- Machine learning
- System modeling, simulation and optimization

KEY RESEARCH

- Advanced analytics for strategic decision-making in healthcare systems
- Redesign of processes/workflows in healthcare systems
- Predictive analytics and modeling for enterprise systems

POTENTIAL APPLICATIONS

- Healthcare systems
- Enterprise systems
- Business systems



SIGNIFICANT PUBLICATIONS/ PATENTS

- Nazila Bazrafshan, Mohammadsadegh Mikaeili, Sarah S. Lam, and Joshua Bosire, "Manpower Scheduling of Hospital Call Center: A Multi-Objective Multi-Stage Optimization Approach," IISE Transactions on Healthcare Systems Engineering, Special Issue on Digital Health, Vol. 13, Issue 3, 205-214, 2023, doi.org/10.1080/24725579.2023.2202424.
- Ahmed Gailan Qasem and Sarah S. Lam, "Prediction of Wart Treatment Response Using a Hybrid GA-Ensemble Learning Approach," Expert Systems with Applications, Vol. 221, 1 July 2023, 119737, doi.org/10.1016/j.eswa.2023.119737.
- Odai Y. Dweekat, Sarah S. Lam, and Lindsay McGrath, "An Integrated System of Braden Scale and Random Forest Using Real-Time Diagnoses to Predict When Hospital-Acquired Pressure Injuries (Bedsores) Occur," International Journal of Environmental Research and Public Health, Vol. 20, No. 6, 4911, 2023, doi.org/10.3390/ijerph20064911.

MAJOR PROJECTS/FUNDING

- 2017-26: Christiana Care Health System - Organizational Excellence Support, PI (with M. Khasawneh and K. Srihari), $506,940
- 2018-25: Cooper University Health Care - Healthcare Analytics for Strategic Decision-Making, PI (with M. Khasawneh and K. Srihari), $588,091
- 2008-19: IBM Corp. - Business Analytics, Systems Modeling, and Optimization for Server Manufacturing, PI (with Krishnaswami Srihari), $1,243,361

SIGNIFICANT ACHIEVEMENTS

- External research grants ($5.44 million)
- Software grants ($5.09 million)
- SUNY Chancellor's Award for Excellence in Teaching

Shuxia “Susan” Lu

PROFESSOR

EDUCATION: PhD in Industrial Engineering, Texas Tech University
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AREAS OF EXPERTISE

- Reliability
- Multivariate data analysis
- Machine learning

KEY RESEARCH

- Development of point-of-care breath sensor for early detection of lung cancer
- Nanomanufacturing flexible chemical sensors
- Solar cell and fuel cell durability study

POTENTIAL APPLICATIONS

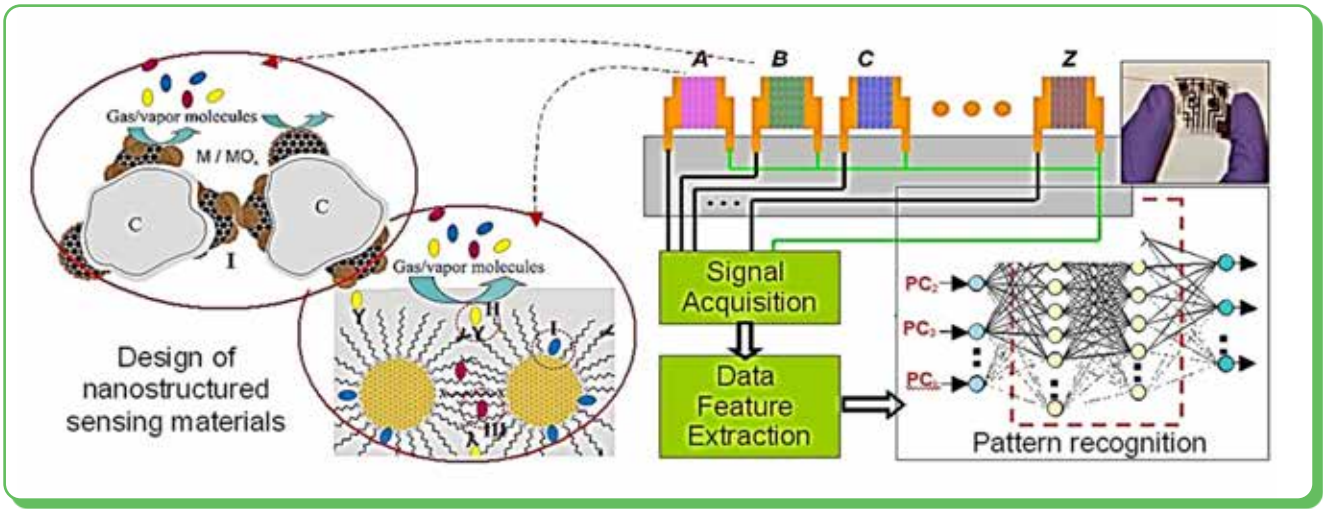
- Early detection of lung cancer
- Glucose minoring for diabetic patients
- Development of solar cell with high efficiency and durability

SIGNIFICANT PUBLICATIONS/PATENTS

- C.J. Zhong, S. Lu, G. Shang, S. Yan, J. Luo, D. Dinh, Portable Air Sampling System for Detecting Volatile Organic Compounds, US Patent 2025/0003909
- D. Dinh, G. Shang, S. Yan, J. Luo, A. Huang, L. Yang, S. Lu, C.J. Zhong, A Wireless Sensor Array System Coupled with Data Analysis Methodologies towards Remote Monitoring of Human Breaths, IEEE Sensors Journal, V23:14, 16042 -16050, 2023.
- K Alzoubi, AS Alkhazali, G Choi, MM Hamasha, S. Lu, T. D, S.Albahri, J. DeFranco, S. Lu, C. Westgate, Comparisons of the Thermal Stability of Poly (3, 4-Ethylenedioxythiophene)(PEDOT) and ITO on Flexible Substrates, IEEE Transactions on Components, Packaging and Manufacturing Technology, Vol 8: (10), 1259 – 1265, 2020.

MAJOR PROJECTS/FUNDING

- Development of Portable Sensor Array Systems for Monitoring Air Contaminants in Cockpit, DOD
- Nanomanufacturing Flexible Chemical Sensors: Collaborative Investigation of Nanotructural Properties in Relation to Device Flexibility, NSF
- Nanostructured Bimetallic, Trimetallic and Core-Shell Fuel-Cell Catalysts with Controlled Size, Composition, and Morphology, NSF



Xiaotu Ma

ASSISTANT PROFESSOR

EDUCATION: PhD in Materials Science and Engineering, Worcester Polytechnic Institute
EMAIL: xiaotuma@binghamton.edu
WEBSITE: www.binghamton.edu/ssie/people/profile.html?id=xiaotuma

AREAS OF EXPERTISE

- Battery recycling
- Advanced energy storage materials
- Advanced battery manufacturing
- Sustainability

KEY RESEARCH

- Revolutionary dry electrode extrusion process for sustainable and efficient battery manufacturing
- Advanced research techniques for precious metals recovery process optimization for battery recycling industry rapid material discovery of water-soluble ionic conductors for aqueous recyclable solid-state batteries
- Recycling solar panels

POTENTIAL APPLICATIONS

- Business: Low-cost, high efficiency and low environmental impacts manufacturing industries
- Products: High energy density, high safety and affordable batteries
- Environment: Batteries recycling company for environmental pollution and waste reduction

SIGNIFICANT PUBLICATIONS/PATENTS

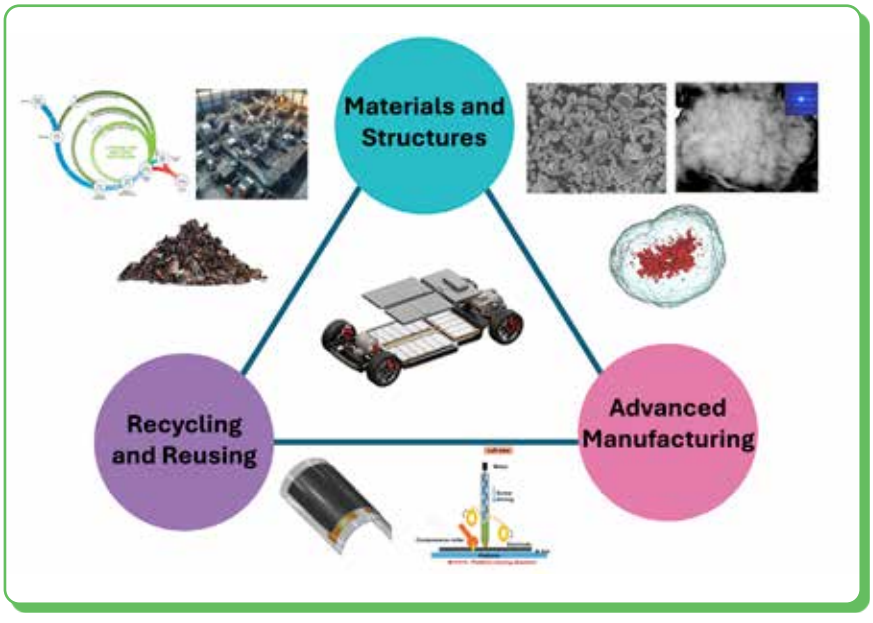
- Ma, X., (2025), "Evolution of Li-ion Battery Recycling for Sustainable Future," Nature Reviews Clean Technology, 1, 75-94.
- Ma, X., (2021) "Recycled Cathode Materials Enabled Superior Performance for Lithium-Ion Batteries," Joule, 5(11), 2955-2970.
- Ma, X., (2022) "Mixed cathode upcycling.," US20240079580A1

MAJOR PROJECTS/FUNDING

- Upstate New York Energy Storage Engine, Revolutionary Dry Electrode Extrusion Process for Sustainable and Efficient Battery Manufacturing
- Bridge Green Upcycling Corp., NENY Voucher Program, Advanced Research Techniques for Precious Metals Recovery Process Optimization for Battery Recycling Industry

SIGNIFICANT ACHIEVEMENTS

- 2021: Chinese Government Award for Outstanding Self-financed Students Abroad



Nagendra N. Nagarur

PROFESSOR

EDUCATION: MS, Wichita State University; PhD, Virginia Polytechnic Institute and State University
EMAIL: nnagarur@binghamton.edu
WEBSITE: www.binghamton.edu/ssie/people/profile.html?id=nnagarur

AREAS OF EXPERTISE

- Multidisciplinary expertise in optimizing systems
- Ensuring component reliability
- Maintaining high-quality standards within supply chains and electronics manufacturing

KEY RESEARCH

- Supply chain modeling
- Reliability of microelectronic components
- Quality control

SIGNIFICANT PUBLICATIONS/PATENTS

- "Exact and Heuristic Optimization Algorithms for Auto-Rack Loading Problem," A Vishwanathan, B Narayanan, N Nagarur, Industrial and Systems Engineering Review 10 (1), 55-73, Major Projects/Funding
- "Production Planning and Emergency Inventory for Demand Surge in Health Supply Chains for Pandemics like COVID-19," A Khaswaneh, N Nagarur, Industrial and Systems Engineering Review 9 (1), 32-46,
- "Manufacturing Plant Location Selection: A Case Study with Resilient Strategy Using AHP," X Zhang, Y Zong, R Das, S Joshi, A Alzu'Bi, N Nagarur, Proceedings of the 10th Annual World Conference of the Society for Industrial and Systems Engineering
- "Supply chain design under disruptions considering risk mitigation strategies for robustness and resiliency," AR Johnson, ME Johnson, N Nagarur, International Journal of Logistics Systems and Management 38 (1), 1-29

Fuda Ning

ASSISTANT PROFESSOR

EDUCATION: PhD, Texas Tech University
EMAIL: fning@binghamton.edu
WEBSITE: fning.weebly.com

AREAS OF EXPERTISE

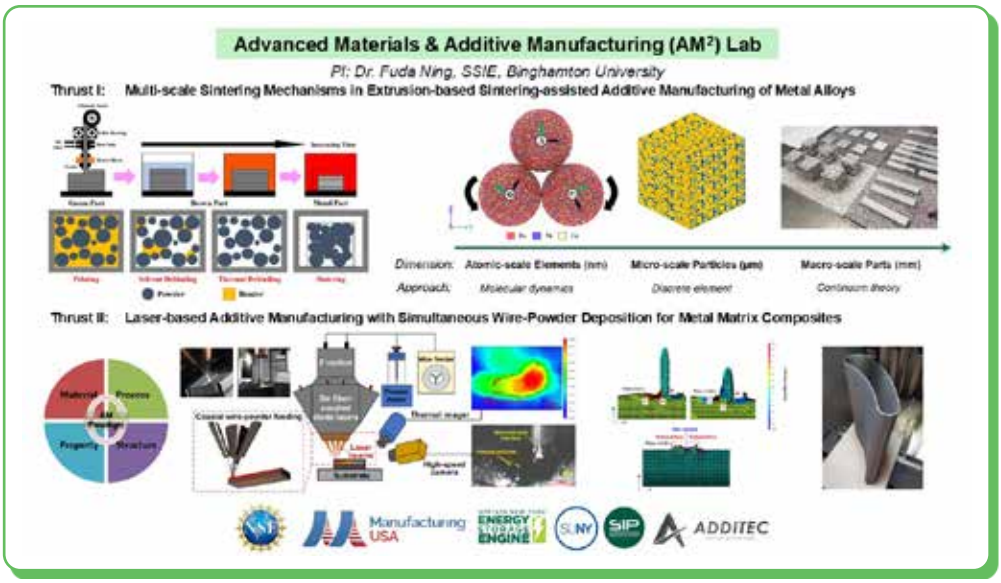
- Additive manufacturing
- Process innovation and development
- Energy-matter interactions

KEY RESEARCH

- Extrusion-sintering additive manufacturing of metal alloys
- Direct energy deposition of composite materials

POTENTIAL APPLICATIONS

- High-temperature alloys and ceramics in aerospace and energy industries
- Lightweight carbon fiber composite components
- Next generation battery manufacturing



SIGNIFICANT PUBLICATIONS/PATENTS

- Zhou, Y., Jiang, D., Al-Akailah, A., and Ning, F., 2024. Understanding the Formation of Laser-Induced Melt Pools with both Wire and Powder Feeding in Directed Energy Deposition, Additive Manufacturing, 89, 104312-104322.
- Wang, F., You, S., Jiang, D., Yuan, X., Fu, R., and Ning, F., 2023. Microstructure Evolution, Phase Formation, Corrosion, and Mechanical Properties of Stainless Steel Fabricated by Extrusion-Based Sintering-Assisted Additive Manufacturing. Additive Manufacturing, 75, 103746-103759.
- Wang, F., You, S., Jiang, D., and Ning, F., 2022. Study on sintering mechanism for extrusion-based additive manufacturing of stainless steel through molecular dynamics simulation. Additive Manufacturing, 58, 102991-103003.

MAJOR PROJECTS/FUNDING:

- 2025-30: NSF CMMI - "CAREER: A Novel Approach for Tungsten Alloy Additive Manufacturing Enabled by Rolling-Assisted Extrusion, Binder Removal, and Hybrid-Phase Sintering," $599,342.
- 2023-25: NSF CMMI - "Mechanistic Understanding of Multi-scale Sintering Behavior Influenced by Anisotropic Particle and Pore Distributions in Extrusion-based Metal Additive Manufacturing," $495,963, PI Ning, co-PI Borgesen
- 2025: NSF Upstate New York Energy Storage Engine R&D Grant - "Revolutionary Dry Electrode Extrusion Process for Sustainable and Efficient Battery Manufacturing," $196,201, PI Ning, co-PI Ma
- 2022-23: Sanmina Corp., "Research in Materials, Manufacturing, Assembly, Quality, and Automation in Electronics Manufacturing and Packaging," $605,034, PI Srihari, co-PI Ning

SIGNIFICANT ACHIEVEMENTS:

- 2025: NSF CAREER award
- 2024: Early-Stage Distinguished Research Award - Watson College, Binghamton University
- 2021 to present: Stanford University top 2% global researchers list

Mina Ostovari

ASSISTANT PROFESSOR

EDUCATION: PhD in Industrial Engineering, Purdue University
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AREAS OF EXPERTISE

- Health informatics
- Network science
- Statistical/machine learning
- mHealth/wearable technology
- Health systems modeling and optimization

KEY RESEARCH

- Real-Time Symptom Monitoring: Development and evaluation of remote-sensing platforms to collect and analyze multimodal data (patient symptoms, physiological data, etc.) for improving personalized symptom management for patients with advanced cancer
- Symptom Network Modeling: Leveraging network analysis to model dynamic symptom relationships to inform just-in-time interventions
- Healthcare Provider Network Analysis: Investigating the impact of provider collaboration networks on patient outcomes in chronic disease care (for example, diabetes), with implications for improving care coordination and team-based care

POTENTIAL APPLICATIONS

- Personalized Healthcare: Enhancing symptom prediction, triage and care recommendations
- Health Policy: Informing equitable resource allocation and digital health infrastructure development
- Healthcare Access and Quality: Addressing structural disparities in access to digital tools and healthcare services
- Implementation Science and Translation: Bridging the gap between engineering innovation and real-world clinical practice

SIGNIFICANT PUBLICATIONS/PATENTS

- Ostovari M, Crimp N, Ratcliffe S, LeBaron V. (2025). “Examining concordance of patient and caregiver self-reported cancer symptoms: An analytical approach using remote health monitoring system data.” Journal of American Medical Informatics Association (JAMIA) Open (in Press).
- Ostovari M, Zhang Z, Patel V, & Jurkovitz C. (2023). “Telemedicine and health disparities: Association between the area deprivation index and primary care telemedicine utilization during the COVID-19 pandemic.” Journal of Clinical and Translational Science, 7(1), E168. doi:10.1017/cts.2023.580
- Ostovari M, & Yu D. (2019). “Impact of care provider network characteristics on patient outcomes: Usage of social network analysis and a multiscale community detection.” PLOS one, 14(9), e0222016. doi.org/10.1371/journal.pone.0222016
- Ostovari M, Steele-Morris C J, Griffin P M, & Yu D. (2019). “Data-driven modeling of diabetes care teams using social network analysis.” Journal of the American Medical Informatics Association: JAMIA, 26(10), 911–919. doi.org/10.1093/jamia/ocz022

MAJOR PROJECTS/FUNDING

- 2021-22: Delaware Clinical and Translational Research (DE-CTR) Program Pilot Grant, Assessment of provider collaboration impact on outcomes and access to care for patients with diabetes, Principal Investigator ($127,984)
- 2019-20: DE-CTR, Mentored Research Development Award, Patient access to care and impact on health outcomes: Usage of medical data, machine learning, and social network analysis, principal investigator ($12,329)

SIGNIFICANT ACHIEVEMENTS:

- 2025: Rath Public Service Focused Research Award, University of Virginia ($3,000)
- 2023: University of Delaware Data Science + AI Summer Hackathon, Best Real-World Impact Award (team lead and mentor)

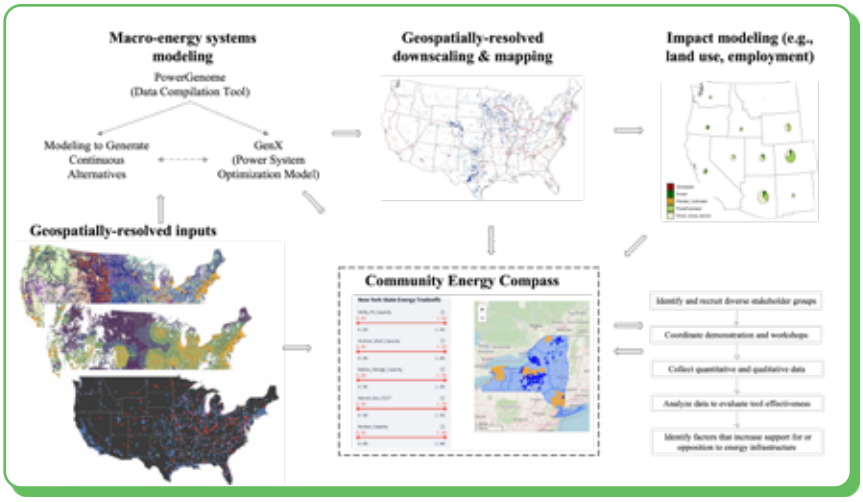
Neha Patankar

ASSISTANT PROFESSOR

EDUCATION: PhD in Operations Research, North Carolina State University
EMAIL: npatankar@binghamton.edu
WEBSITE: www.binghamton.edu/ssie/people/profile.html?id=npatankar

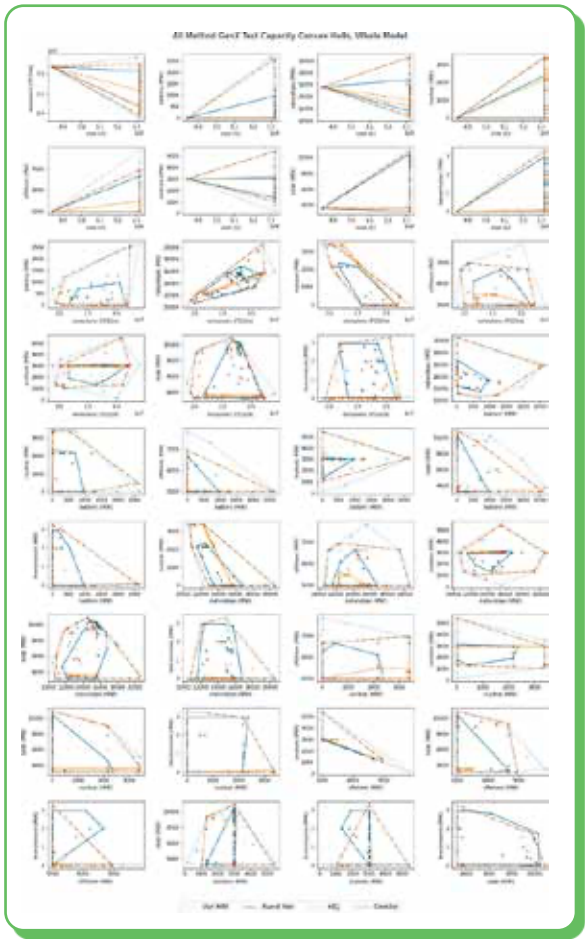
AREAS OF EXPERTISE

- Optimization and modeling
- Decision-making in complex systems
- Robust energy transition
- Power system planning
- Uncertainty quantification



KEY RESEARCH

- Building optimization tools to consider various parametric and structural uncertainties in energy system models to assist sustainable transition of the energy system
- Incorporate inherent biases in decision making into the energy and power system modeling tools and study the impact of biases on sustainable development goals
- Develop methodologies to improve the computational performance of real-world energy and power system models



POTENTIAL APPLICATIONS

- Computational performance: Improving the computational performance of power system models while considering structural uncertainty
- Tradeoffs in developing large scale renewables: Exploring sustainable renewable development scenarios under land-use constraints
- Decarbonizing strategies: Decarbonizing the power system under technical and cost-related uncertainty

SIGNIFICANT PUBLICATIONS/PATENTS

- Patankar, N., Bassett, X, Schivley, G., Leslie, E., Jenkins, J. (2023). Land use tradeoffs in the decarbonization of electricity generation in the American West. Energy and Climate Change, 4, 100107.
- Patankar, N., Eshraghi, H., de Queiroz, A. R., & DeCarolis, J. F. (2022). Using robust optimization to inform US deep decarbonization planning. Energy Strategy Reviews, 42, 100892.
- Xu, Q., Ricks, W., Manocha, A., Patankar, N., & Jenkins, J. D. (2024). System-level impacts of voluntary carbon-free electricity procurement strategies. Joule.
- Bistline, J., Blanford, G., Brown, M., Burtraw, D., Domeshek, M., Patankar, N. & Zhao, A. (2023). Emissions and energy impacts of the Inflation Reduction Act. Science, 380(6652), 1324-1327.

MAJOR PROJECTS/FUNDING

- Cornell-Atkinson Center, “Optimizing Climate-Resilient Energy Systems: Integrating Advanced Power System Modeling with Community-Based Insights.” ($128,000 — Patankar’s share: $73,530)
- Ava Community Energy, “Addressing stochasticity in power system models” ($135,000 — Patankar’s share: $75,000)
- Sonoma Clean Power, “Incorporating uncertainty into California’s generation and transmission planning process” ($325,000 — Patankar’s share: $29,146)
- Avangrid, “Prototype hydrogen fueling station on campus” ($26,723)

Mark D. Poliks

SUNY DISTINGUISHED PROFESSOR; PROFESSOR OF EMPIRE INNOVATION; DIRECTOR, CENTER FOR ADVANCED MICROELECTRONICS MANUFACTURING (CAMM)

EDUCATION: PhD in Materials Science and Engineering, University of Connecticut; Postdoctoral Fellow, Washington University, St. Louis
EMAIL: mpoliks@binghamton.edu
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AREAS OF EXPERTISE

- Electronics packaging technologies
- Flexible hybrid electronics
- Materials and additive processing

KEY RESEARCH

- Highly stretchable electronics and soft robotic sensory devices
- High temperature, RF and power printed interconnects
- Medical devices
- Printed electrochemical sensors
- Thermal and photonic sintering

POTENTIAL APPLICATIONS

- Additive fabrication of electronics packaging
- Industrial sensors for high temperature applications
- Medical monitoring, diagnostic devices and microfluidic sensors
- Printed RF devices

SIGNIFICANT PUBLICATIONS/PATENTS

- U. S. Somarathna; Behnam Garakani; Darshana L. Weerawarne; Mohammed Alhendi; Mark D. Poliks; Matthew Misner, "Reliability of Screen-Printed Water-Based Carbon Resistors for Sustainable Wearable Sensors," in IEEE Sensors Journal, vol. 25, no. 4, pp. 6449-6463, 15 Feb.15, 2025, doi: 10.1109/JSEN.2024.3525055.
- Khuje, S.; Alshatnawi, F.; Smilgies, D.; Alhendi, M.; Islam, A.; Armstrong, J.; Yu, J.; Poliks, M.; Ren, S. "Additive Manufacturing of High-Temperature Hybrid Electronics via Molecular-Decomposed Metals." Advanced Functional Materials 2024, 34 (4), 2311085.
- Lynch, C.; Adeyeye, A.; Abbara, E. M.; Umar, A.; Alhendi, M.; Minnella, C.; Iannotti, J.; Stoffel, N.; Poliks, M.; Tentzeris, M. M. "5G-enabled, battery-less smart skins for self-monitoring megastructures and digital twin applications." Scientific Reports 2024, 14 (1), 10002.
- Alhendi, M.; Alshatnawi, F.; Abbara, E. M.; Sivasubramony, R.; Khinda, G.; Umar, A. I.; Borgesen, P.; Poliks, M. D.; Shaddock, D.; Hoel, C. "Printed electronics for extreme high temperature environments." Additive Manufacturing 2022, 54, 102709
- Khan, Y.; Garg, M.; Gui, Q.; Schadt, M.; Gaikwad, A.; Han, D.; Yamamoto, N. A. D.; Hart, P.; Welte, R.; Wilson, W.; Czarnecki, S.; Poliks, M.; Jin, Z.; Ghose, K.; Egitto, F.; Turner, J.; Arias, A. C. "Flexible Hybrid Electronics: Direct Interfacing of Soft and Hard Electronics for Wearable Health Monitoring." Advanced Functional Materials 2016, 26, 8764-8775. doi:10.1002/adfm.201603763

MAJOR PROJECTS/FUNDING

- CAMM, a New York State Center of Advanced Technology
- New York Node of NextFlex, a DoD-funded Manufacturing USA Institute
- Received over $40 million in federal and N.Y. funding

SIGNIFICANT ACHIEVEMENTS

- 2019: General Chair, IEEE EPS Electronics Components and Technology Conference
- Elected member, Board of Governors, IEEE Electronics Packaging Society
- Fellow, NextFlex Manufacturing USA
- Member, Governing Council, NextFlex Manufacturing USA
- SUNY Chancellor's Award for Excellence in Research
- Member, Cornell NanoScale Facility advisory board

Srikanth Rangarajan

ASSISTANT PROFESSOR

EDUCATION: PhD in Mechanical Engineering from Indian Institute of Technology Madras
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AREAS OF EXPERTISE

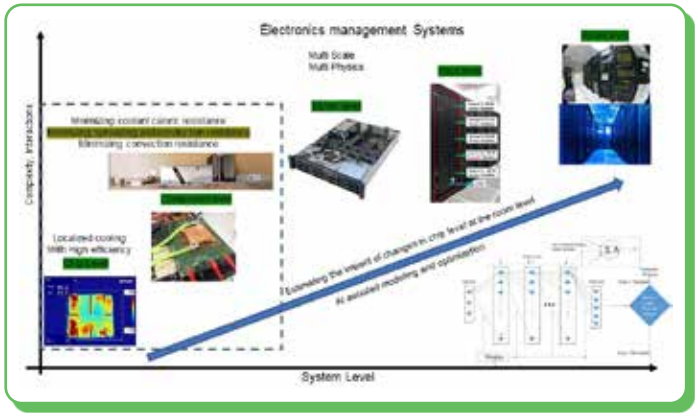
- Heat transfer
- Energy storage
- Digital twinning of electronics and battery systems
- Machine learning based modeling of heat transfer and fluid flow

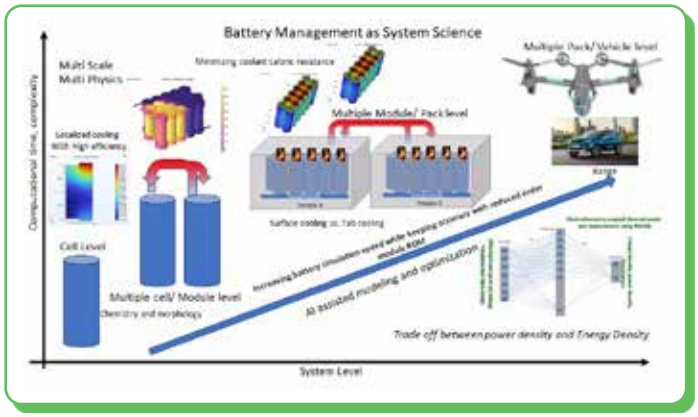
KEY RESEARCH

- Developing AI models for predicting performance of Boiling heat transfer
- Battery thermal modeling and thermal runaway propagation for aircraft application
- Hybrid Bonding of next generation of electronics systems
- Phase change material based thermal management solutions for electronics systems

POTENTIAL APPLICATIONS

- Improving battery safety and reliability in various applications
- Improving understanding of complex heat transfer physics
- Advanced packaging of next generation of electronic systems





SIGNIFICANT PUBLICATIONS/PATENTS

- Balaji, Chakravarthy, and Srikanth Rangarajan. "Thermal Energy Storage-Pathway To Energy-Efficient Electronics And Battery Systems." International Heat Transfer Conference Digital Library. Begel House Inc., 2023.
- Rangarajan, Srikanth, Leila Choobineh, and Bahgat Sammakia. "Supervised Machine-Learning Approach for the Optimal Arrangement of Active Hotspots in 3-D Integrated Circuits." IEEE Transactions on Components, Packaging and Manufacturing Technology 11, no. 10 (2021): 1724-1733.
- Rangarajan, Srikanth, Scott N. Schiffres, and Bahgat Sammakia. "Scaling Limits, Challenges, and Opportunities in Embedded Cooling." Embedded Cooling of Electronic Devices: Conduction, Evaporation, and Single-and Two-Phase Convection (2024): 381-416.

MAJOR PROJECTS/FUNDING

- 2023-26: Semiconductor Research Corporation - Experimental Characterization of Thermal Shadowing Effect for Single and Two-Phase Immersion Cooling, $150,000
- 2022-24: National Institute of Standards and Technology - In-situ Thermal Property Acquisition in Laser Powder Bed Fusion for Property Reconstruction, $957,706
- 2020-23: Applied Materials - Design, Develop and Demonstrate a True 3D Packaging, $150,000
- 2023-26: ARPA-E - Direct Two-phase Cooling Solutions with Low-cost Surface Engineering and Phase Separation Techniques using Additive Manufacturing, $1,881,315.33

SIGNIFICANT ACHIEVEMENTS

- 2023: Received certificate of appreciation for an invited talk/presentation on battery thermal management co-authored with Nobel Laureate Stanley Whittingham at International Microelectronics Assembly & Packaging Society Symposium held at Boston, Mass.
- 2023: Doctoral dissertation invited and presented as a keynote talk at the 17th International Heat Transfer Conference (Heat Transfer Olympics), Cape Town, South Africa.
- 2023: Defined a new non-dimensional number termed a "spreading number" and published the results in the book "Embedded Cooling of Electronics"
- 2023: Invited Panelist, Battery Thermal Management, International Heat Transfer Conference 17, Cape Town
- 2023: Invited Panelist, IEEE Heterogeneous Integration Roadmap, ECTC 2023, Orlando, Fla.

Luis M. Rocha

GEORGE J. KLIR PROFESSOR OF SYSTEMS SCIENCE

EDUCATION: PhD in Systems Science and Computer Science, Binghamton University; MEng in Systems and Control Engineering, Instituto Superior Técnico, Lisbon, Portugal; BEng in Mechanical Engineering, Instituto Superior Técnico, Lisbon, Portugal
EMAIL: rocha@binghamton.edu
WEBSITE: casci.binghamton.edu/casci.php

AREAS OF EXPERTISE

- Complex networks and systems
- Computational and systems biology
- Computational intelligence

KEY RESEARCH

- Complex networks and systems
- Computational and systems biology
- Computational intelligence
- Biomedical informatics

SIGNIFICANT PUBLICATIONS/PATENTS

- R.B. Correia, J.C. Rozum, L. Cross, J.Felag, M. Gallant, Z. Guo, B.W. Herr II, A. Min, J. Sanchez-Valle, D.S. Rocha, A. Valencia, X. Wang, and K.Börner, W.R.Miller, and L.M. Rocha. [2025]. "myAURA: Personalized health library for epilepsy management via knowledge graph sparsification and visualization". Journal of the American Medical Informatics Association, ocaf012. DOI: 10.1093/jamia/ocaf012. Preprint also available: arXiv:2405.05229.
- M. De Domenico, L. Allegri, G. Caldarelli, V. d'Andrea, B. Di Camillo, L.M. Rocha, J. Rozum, R. Sbarbati, F. Zambelli [2025]. "Challenges and opportunities for digital twins in precision medicine: a complex systems perspective." npj Digital Medicine 8, 37. DOI: 10.1038/s41746-024-01402-3. Preprint also available: arXiv:2405.09649.
- Challa, D. Hao, J.C. Rozum, and L.M. Rocha.[2024]. "The Effect of Noise on the Density Classification Task for Various Cellular Automata Rules". ALIFE 2024: Proceedings of the 2024 Artificial Life Conference. MIT Press. pp. 83. DOI: 10.1162/isal_a_00823.

MAJOR PROJECTS/FUNDING

- 2025-30: Horizon Europe Framework Programme, European Union, 101186558 — CBeRa, Strategic Integration of Complex Networks and Systems for Advancing Biomedical Research. PI, Universidade Católica Portuguesa, €2.5 million
- 2023-26: Fundação para a Ciência e Tecnologia, Portugal, 2022.09122.PTDC, Redundancy effects on spread and control in network dynamics: applications in computational biomedicine. PI, Instituto Gulbenkian de Ciencia, €250,000
- 2017-23: National Science Foundation, Research Traineeship Program, NSF1735095: Interdisciplinary Training in Complex Networks and Systems. PI, $2,997,000

SIGNIFICANT ACHIEVEMENTS

- 2025: Lois B. DeFleur Academic Prize
- 2024: Complexity Thoughts. AI, Cybernetics, and Complexity: unpacking the 2024 Nobel Prizes
- 2024: Magazine Digest for eLife. How to build a sperm cell
- 2023: The New Scientist. "Life may be less chaotic than we thought, say physicists"
- 2023: The Atlantic: "The Calendar of Human Fertility Is Changing"
- 2022: Coverage of Epilepsy & Behavior paper - National Geographic, CNN Portugal, Observador, RTP, Jornal Online, etc.

Narmada Sambaturu

ASSISTANT PROFESSOR

EDUCATION: PhD in Mathematical Biology, Indian Institute of Science, Bangalore, India
EMAIL: nsambaturu@binghamton.edu
WEBSITE: narmadasambaturu.github.io

AREAS OF EXPERTISE

- Multi-scale and data-driven modeling of infectious diseases
- Mathematical modeling
- Immune system

KEY RESEARCH

- Modeling pathogen evolution
- Systems biology of host-pathogen interaction and disease progression
- Epidemiological modeling, including the effect of human behavior

POTENTIAL APPLICATIONS

- Improved treatments
- Novel biomarkers
- Informing public health policies for epidemic control

SIGNIFICANT PUBLICATIONS/PATENTS

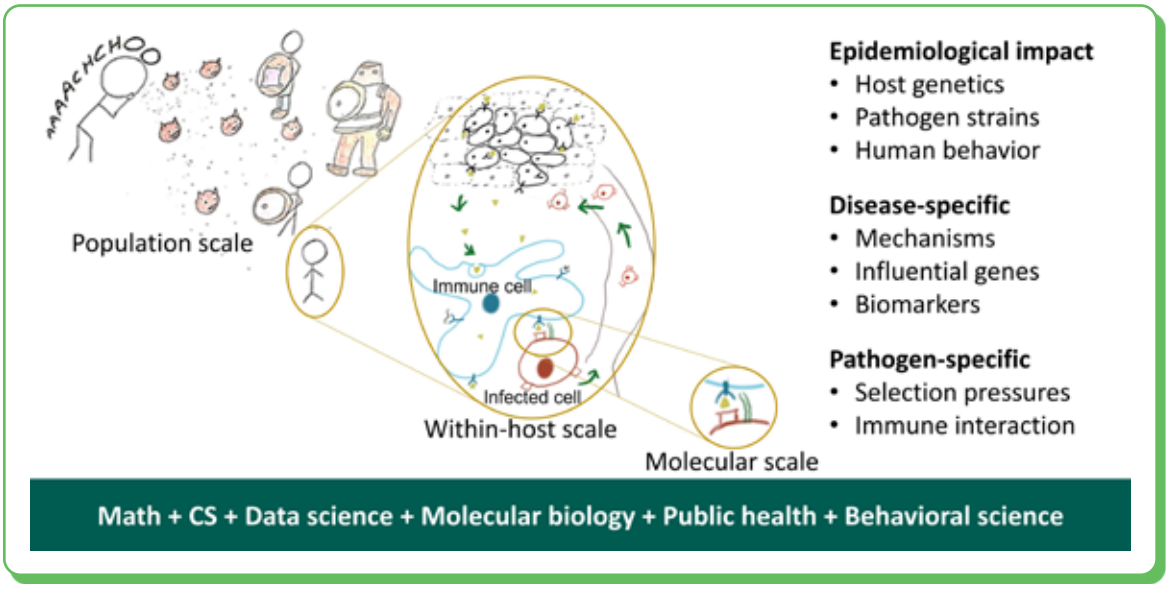
- Fray, Emily J., et al. (2023). "Antiretroviral therapy reveals triphasic decay of intact SIV genomes and persistence of ancestral variants." Cell host & microbe 31.3: 356-372.
- Sambaturu, Narmada, et al. (2018). "Role of genetic heterogeneity in determining the epidemiological severity of H1N1 influenza." PLoS computational biology 14.3: e1006069.
- Sambaturu, Narmada, et al. (2021). "PathExt: a general framework for path-based mining of omics-integrated biological networks." Bioinformatics 37.9: 1254-1262.

MAJOR PROJECTS/FUNDING

- 2021-23: Los Alamos National Laboratory LDRD (Laboratory Directed Research and Development), Director's Postdoctoral Fellowship, "Within- and between-host scale integration to model human immunodeficiency virus (HIV) transmission"

SIGNIFICANT ACHIEVEMENTS

- Developed model which resolved seemingly contradictory observations in the establishment of the HIV reservoir
- Developed method for mining multi-omics data which was applied to create a diagnostic biomarker for tuberculosis
- Developed method to integrate host immune responses into epidemic model, improving predictions



Daryl L. Santos

SUNY DISTINGUISHED SERVICE PROFESSOR

EDUCATION: PhD in Industrial Engineering, University of Houston
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WEBSITE: www.binghamton.edu/ssie/people/profile.html?id=santos

AREAS OF EXPERTISE

- Production scheduling and control
- Statistical process control
- Quality assurance
- Engineering optimization

KEY RESEARCH

- Product development
- Product and process optimization
- Reliability assessment

POTENTIAL APPLICATIONS

- Manufacturing: Most manufacturing types including, but not limited to, electronics packaging, automotive and job shop environments
- Service Industries: Healthcare, food production and others

SIGNIFICANT PUBLICATIONS/PATENTS

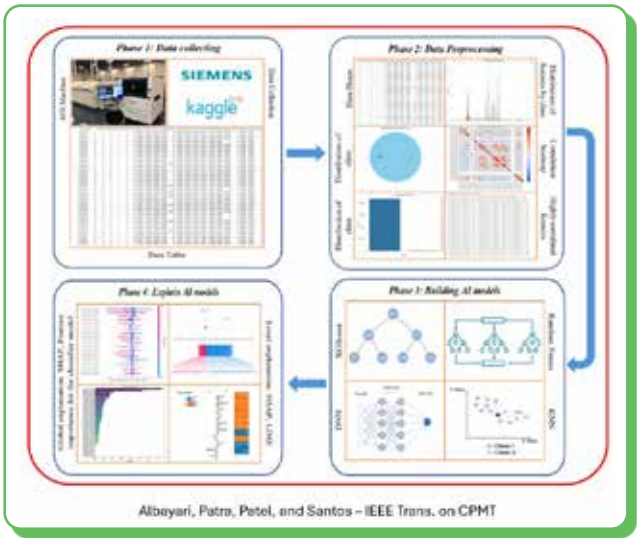
- Kolli, S.S.R., Lam, S., Santos, D., and Chang, D., "Designing a Resilience Logistics Network Using Metaheuristics," Proceedings of the IISE Annual Conference & Expo 2024, Montreal, May 2024.
- Santos, D., "A Mathematical Model for In-Person Office Assignment During COVID-19," Industrial and Systems Engineering Review, 9(1), 68-74, 2021.
- Iyer, R. and D.L. Santos, "Experimental Analysis of a Novel Piezoelectric Jetting System for Nanograms Deposition in Electronic Assemblies," Journal of Electronic Packaging, Vol. 139, 2017.

MAJOR PROJECTS/FUNDING

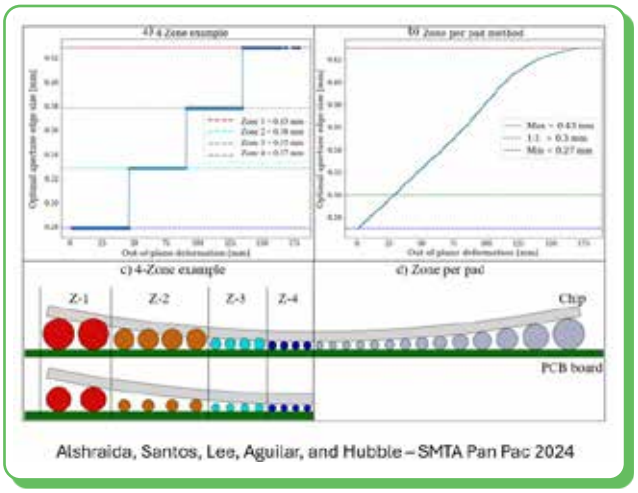
- 1994-2025: Industry-university research funding - multiple sponsors – $4 million
- 2015-25: NYS/ESD- IEEC CAT (Center for Advanced Technology) – 10-year renewal — approximately $10 million
- 2008-11: NSF - NUE: Nanotechnology for Manufacturing Flexible Electronics, Santos as co-PI, (Howard Wang as lead PI); Approx. $200,000
- 2002-06: GOALI – The Effect of Changing to Pb Free Solders on Manufacturing Processes: Evolution of Solder Joint Microstructure, Sponsor: National Science Foundation; Investigators: E. Cotts (Physics), D.L. Santos, and P. Borgesen (Universal Instruments Corp.); Approx. $388,000

SIGNIFICANT ACHIEVEMENTS

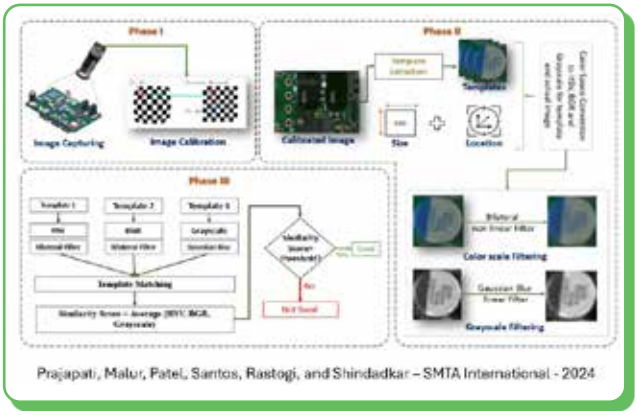
- SUNY Distinguished Service Professor
- SUNY Chancellor's Award for Excellence in Scholarship and Creative Activities
- SUNY Chancellor's Award for Excellence in Teaching
- Multiple Best Conference Paper Awards
- American Society for Quality (ASQ) – Binghamton Section – Paul A. Robert Award



Albayari, Patra, Patel, and Santos – IEEE Trans. on CPMT



Alshraida, Santos, Lee, Aguilar, and Hubble – SMTA Pan Pac 2024



Prajapati, Malur, Patel, Santos, Rastogi, and Shindadkar – SMTA International - 2024

Hiroki Sayama

SUNY DISTINGUISHED PROFESSOR AND EXECUTIVE ASSISTANT DEAN FOR GRADUATE STUDIES

EDUCATION: DSc in Information Science, University of Tokyo
EMAIL: sayama@binghamton.edu
WEBSITE: bingdev.binghamton.edu/sayama

AREAS OF EXPERTISE

- Complex systems and network science
- Artificial life and evolutionary systems
- Computational social science
- Complex systems education

KEY RESEARCH

- Studying state-topology coevolution in adaptive networks and its applications to human social dynamics
- Artificial life, cellular automata, swarm systems and open-ended evolution
- Collective human decision making, team behaviors and organizational dynamics

POTENTIAL APPLICATIONS

- Public health: Modeling, simulation and analysis of human collective behaviors
- Business: Organizational design and management
- Art and entertainment: Automated content generation without convergence

SIGNIFICANT PUBLICATIONS/PATENTS

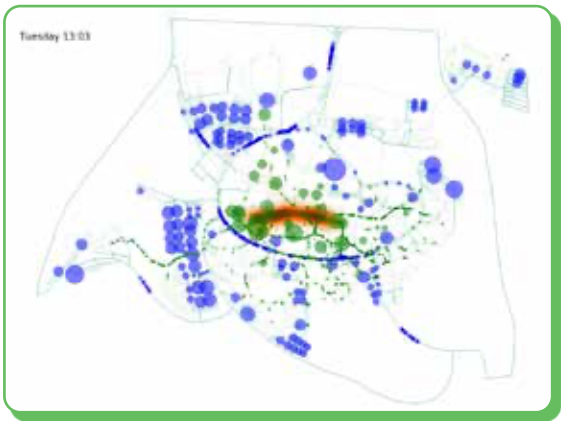
- Cao, Y., Dong, Y., Kim, M., MacLaren, N. G., Pandey, S., Dionne, S. D., Yammarino, F. J., & Sayama, H. (2025). Effects of network connectivity and functional diversity distribution on human collective ideation. npj Complexity, 2(1), 2.
- Sayama, H. (2025). Swarm systems as a platform for open-ended evolutionary dynamics. Philosophical Transactions A, 383(2289), 20240143.
- Sayama, H. (2015). Introduction to the modeling and analysis of complex systems. Open SUNY Textbooks.
- Sayama, H., Pestov, I., Schmidt, J., Bush, B. J., Wong, C., Yamanoi, J., & Gross, T. (2013). Modeling complex systems with adaptive networks. Computers & Mathematics with Applications, 65(10), 1645-1664.

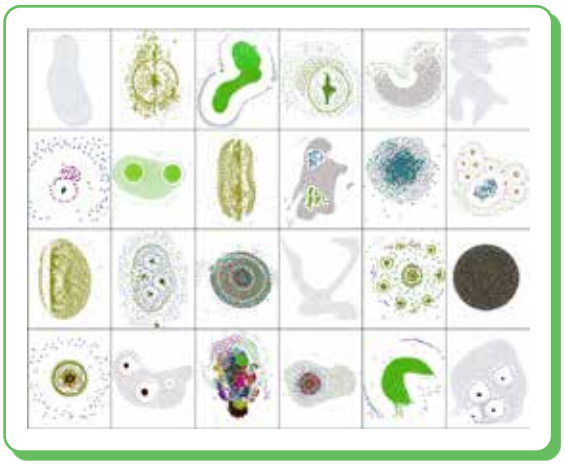
MAJOR PROJECTS/FUNDING

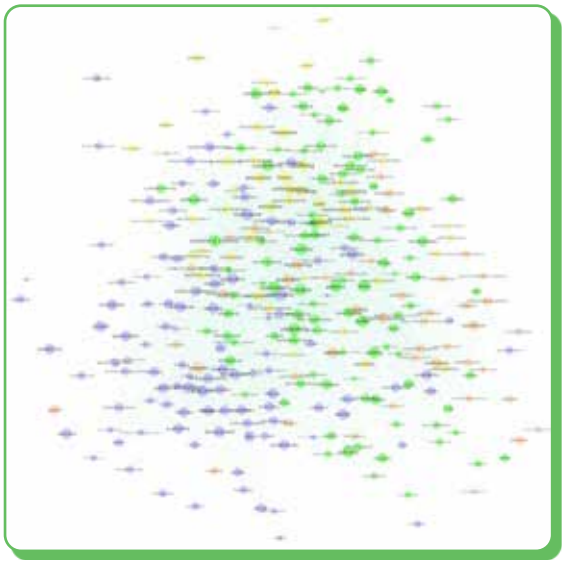
- NSF-SoO “Diversity, network structure, and the effectiveness of collective design and innovation” ($441,000)
- NSF-IIS “Robustness and adaptation in morphogenetic collective systems” ($376,567)
- JSPS “Automatic derivation of dynamical models from temporal network data using a graph rewriting system” ($119,000)
- JSPS “How does diversity of individuals affect the structure of society?: A constructive approach using adaptive networks” ($84,000)

SIGNIFICANT ACHIEVEMENTS

- 2016: Lois B. DeFleur Faculty Prize for Academic Achievement
- 2018: ISAL Outstanding Paper of the Decade (2003-13) Award
- 2016: SUNY Chancellor’s Award for Excellence in Teaching
- 2022: SUNY Chancellor’s Award for Excellence in Faculty Service







Chao Shi

ASSISTANT PROFESSOR

EDUCATION: PhD, Pennsylvania State University; BS, Wuhan University, China
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AREAS OF EXPERTISE

- Areas of visual behavior
- Autonomous driving
- Healthcare
- Performance prediction
- Situation awareness
- Cognitive and mathematical modeling

KEY RESEARCH

- Human factors
- Human-computer interaction
- Situation awareness
- Visual behavior and cognition
- Virtual reality, depression and AI
- Multi-robot system
- Autonomous driving in healthcare

SIGNIFICANT PUBLICATIONS/PATENTS

- "The influence of project-based learning on engineering students' academic and career motivation," Y Deng, C Shi — Journal of Applied Research in Higher Education 2024
- "A Comparison Of Clinical, Motor, Cognitive and Driving Performance Among Young Adults Following MTBI," C Shi, V Lugade, F Islam, I Turner, N Pulakos, S Hunter, B Kammerman, Medicine & Science In Sports & Exercise 56 (10), 986-986 2024
- "A systematic review of the Metaverse in formal education," C Shi, JY Park, Journal of Applied Research in Higher Education 2024
- "The Effect of the Metaverse Environment and Task Difficulty on Emotional Response and Cognitive Workload," F Islam, Z Bright, M Cheng, C Shi, Proceedings of the International Symposium on Human Factors and Ergonomics …2024
- "Investigating the effects of age, task load, task complexity and input device on monitoring performance for smart manufacturing in the oil refining industry," C Shi, L Rothrock, Ergonomics 67 (1), 102-110 2024

Krishnaswami Srihari

SUNY DISTINGUISHED PROFESSOR

EDUCATION: BS, University of Madras; MS, PhD, Virginia Polytechnic Institute and State University
EMAIL: srihari@binghamton.edu
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AREAS OF EXPERTISE

- Diverse aspects of electronics packaging and manufacturing, along with a combination of technical skills in electronics and a deep understanding of healthcare systems, making them well-suited for roles that bridge technology and healthcare delivery

KEY RESEARCH

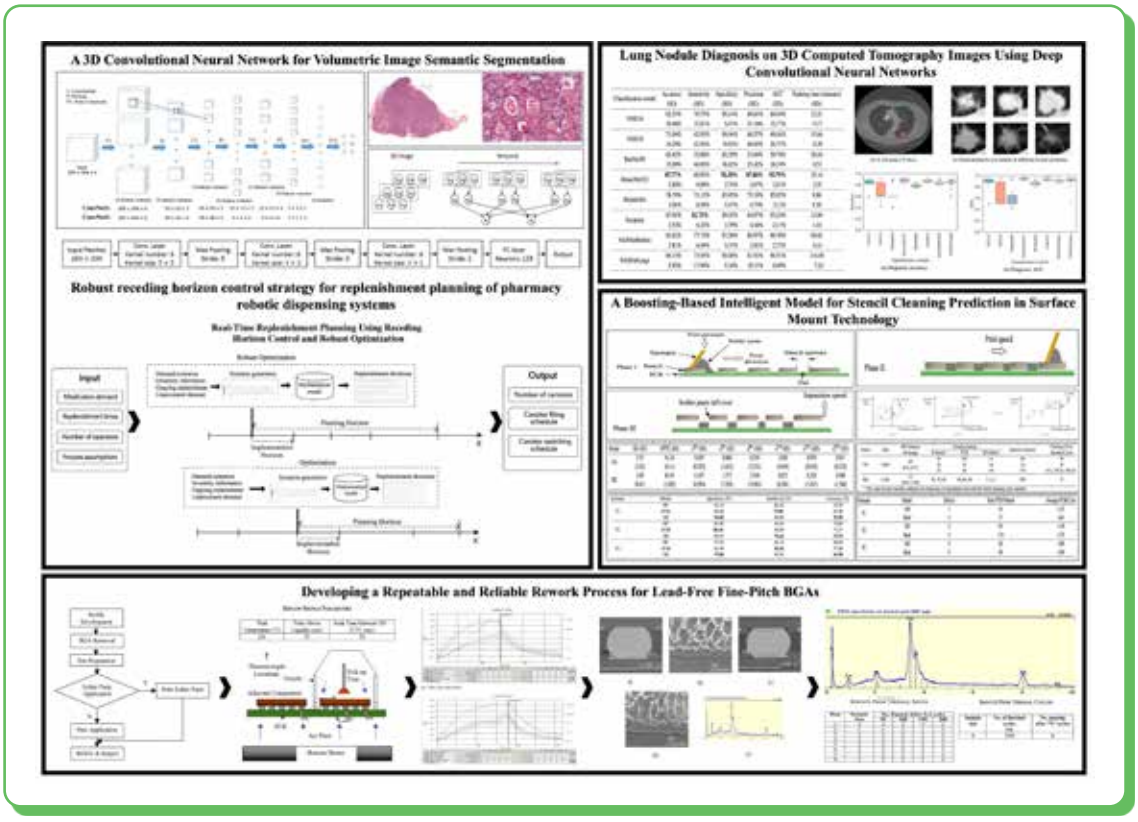
- Electronic packaging and electronics manufacturing
- Health care delivery
- Health systems

SIGNIFICANT PUBLICATIONS/PATENTS

- Machine Learning-Based Advanced Predictive Models for Analyzing Passive Component Shifts in Surface Mount Technology KC Kode — 2024
- Novel Frictionless DIMMs Connector Suitable for Testing and Automation, R Muralidharan — 2024
- Influence of SMT Process Parameters on Voids Mitigation for Quad Flat No-Lead (QFN) Packages, KR Ramisetti — 2024
- The Effect of Grain Size Distribution on the Defect Generation Mechanism of 0201 Passives S Patra, C Greene, D Santos
- Process Parameter Optimization and Barrel-Fill Prediction for Selective Wave Soldering in High-Density Printed Circuit Boards H Mistry — 2024
- Effect of Humidity and Nozzle Cleanliness on SMT Mounting Success Rate KK Kode — 2024

SIGNIFICANT ACHIEVEMENTS

- Chancellor's Award for Excellence in Scholarship and Creative Activities
- University Award for Excellence in International Education
- APLU's Michael P. Malone International Leadership Award



Seiichi Takamatsu

PROFESSOR

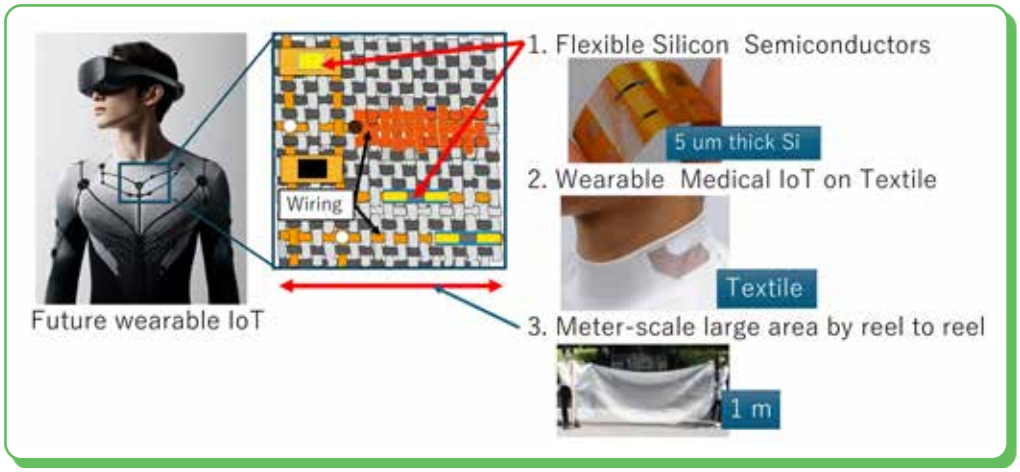
EDUCATION: PhD in Mechano-Informatic, University of Tokyo 2009
EMAIL: stakamatsu@binghamton.edu
WEBSITE: www.binghamton.edu/ssie/people/profile.html?id=stakamatsu

AREAS OF EXPERTISE

- Hybrid electronics
- Electronic textile
- Advanced packaging
- Microelectromechanical systems

KEY RESEARCH

- Development of wearable ultrasound diagnostic machine
- Metric scale large-area sensors and actuators
- Room temperature direct bonding method for silicon and film
- Development of flexible semiconductor devices



POTENTIAL APPLICATIONS

- Healthcare: smart wear for vital data collection and ultrasound diagnosis
- Electronics Packaging: high density electronic interconnection by direct bonding
- Automotive: Driver monitoring with sensor integrated car interior
- VR/AR: Smart wear with motion capture and haptic feedback

SIGNIFICANT PUBLICATIONS/PATENTS

- S. Sato,et. al., “Polyurethane Foam Embedded Pressure Sensor Array With 3-D Printed Structure and Thin MEMS Strain Gauge for Car Seat,” EEE Sensors Journal, vol. 24, no. 24, pp. 40595-40602, December 2024
- T. Noda, et. al., “Textile-based shape-conformable and breathable ultrasound imaging probe,” Communications materials, vol. 5, article no 144, 2985, August 2024.
- S. Takamatsu, et. al., “Flexible no-drift data glove using ultrathin silicon for the metaverse,” Device, January 2025

MAJOR PROJECTS/FUNDING

- Research and development of cyber-physical system car seats for ultra-comfortable interiors, Principal Investigator, Ministry of Economy (NEDO), $106,738
- 2018-22: Cyber Physical System for Big Data and AI-based Interaction, Co-Principal Investigator with the members of human interaction platform technology consortium, Cabinet Office, $10,678,008 (Effort $253,872)
- 2019-21: Development of tactile device 3D integrated smart wear for enabling wearable VR skills training, Principal Investigator, Ministry of Education, $100,497 (Effort $100,497)

SIGNIFICANT ACHIEVEMENTS

- 2017: Distinguished Research fellow, University of Tokyo
- 2024-26: Executive board member of Japanese Society for Electronics Packaging
- 2019-present: Editorial board member of Scientific Reports
- 2016-24: Editorial board member of IEEJ Journal of Sensors and Transducers

Stephanie Tulk Jesso

ASSISTANT PROFESSOR

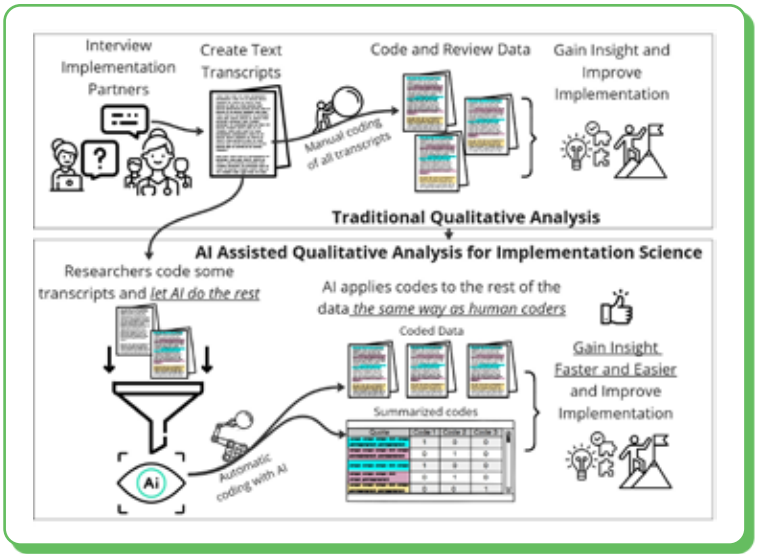
EDUCATION: PhD and MA in Human Factors and Applied Cognition, Psychology, George Mason University
EMAIL: stulkjesso@binghamton.edu
WEBSITE: www.binghamton.edu/ssie/research/labs/hcmt/about.html

AREAS OF EXPERTISE

- Human factors
- Human-centered design
- Human-AI interaction and human-robot interaction
- Cognitive modeling

KEY RESEARCH

- Using human-centered design to develop more effective high-tech innovations across various healthcare contexts
- Improving robot functionality within complex healthcare environments through applications of cognitive principles
- Establishing physiological diagnostic criteria for the recognition of burnout to improve worker protections
- Promoting responsible AI usage in academic and STEM contexts



POTENTIAL APPLICATIONS

- Healthcare: Fall prevention, improved efficiency and worker satisfaction, patient care
- Workforce: Empowering nurses as innovators, development of legal protections for worker burnout as an occupational injury
- Education: Improving AI competency, development of tools to prevent AI-enabled plagiarism

SIGNIFICANT PUBLICATIONS/PATENTS

- Babalola, G. T., Gaston, J. M., Trombetta, J., & Tulk Jesso, S. (2024). A systematic review of collaborative robots for nurses: where are we now, and where is the evidence? Frontiers in Robotics and AI, 11, 1398140.
- Rafferty, H., Cretaro, C., Arfanis, N., Moore, A., Pong, D. & Tulk Jesso, S. (2024). Towards human-centered AI and robotics to reduce hospital falls: finding opportunities to enhance patient-nurse interactions during toileting. Frontiers in Robotics and AI, 11, 1295679.
- Wang, X., Abubaker, S., Babalola, G., Tulk Jesso, S. (2024). Co-Designing an AI Chatbot to Improve Patient Experience in the Hospital: A human-centered design case study of a collaboration between a hospital, a university, and ChatGPT. CHI 2024
- Tulk Jesso, S., Greene, C., Zhang, S., Booth, A., DiFabio, M., Babalola, G., Adegbemijo, A., & Sarkar, S. (2024) On the potential for human-centered, cognitively inspired AI to bridge the gap between optimism and reality for autonomous robotics in healthcare: a respectful critique. 2024 HFES International Symposium on Human Factors and Ergonomics in Health Care, Robotics Summit

MAJOR PROJECTS/FUNDING

- "Leveraging Longitudinal Genomics, Psychosocial, and Environmental Data to Systemically Address Nurse Burnout," submitted to NIH, NINR and under review
- "CAREER: Human-congruent AI in context: Crafting shared mind-machine representation through worker collaboration," proposal in preparation for resubmission
- "Desirable Collaborative Robots for Nurses: Using Human-Centered Design methods to develop novel logistical support for nurses in real-world healthcare environments," proposal in preparation for submission

SIGNIFICANT ACHIEVEMENTS

- Co-founding the Nursing, Engineering and Applied Research Collaborative
- Successfully established collaborative teams across three hospital systems
- 2024: Completion of I-Corps regional course

Yong Wang

ASSOCIATE PROFESSOR, ASSOCIATE DIRECTOR

EDUCATION: PhD in Industrial Engineering and Operations Research, University of Illinois; PhD, MS and BS in Energy and Power Engineering, Huazhong University of Science and Technology, Wuhan, Hubei, China
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AREAS OF EXPERTISE

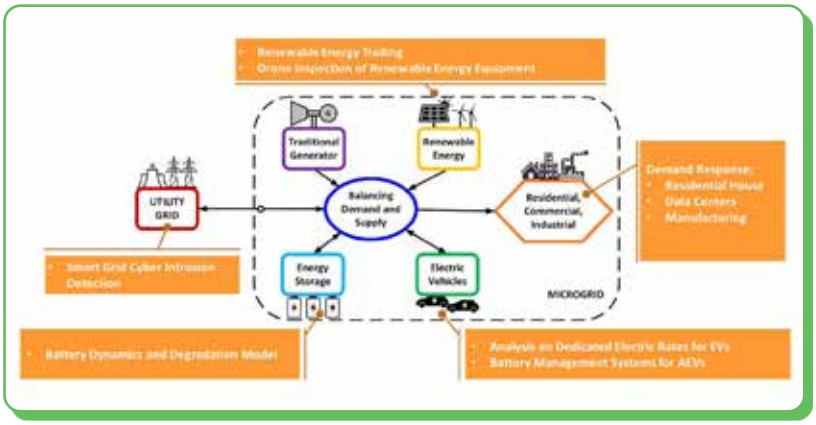
- Operations research
- Data science
- Artificial intelligence

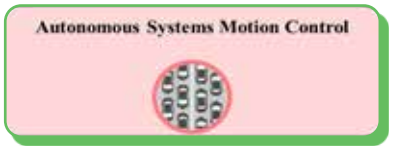
KEY RESEARCH

- Autonomous vehicles
- Drones and applications
- Energy storage systems
- Warehouse management
- Healthcare systems optimization

POTENTIAL APPLICATIONS

- Autonomous systems
- Energy systems
- Manufacturing systems
- Healthcare systems





SIGNIFICANT PUBLICATIONS/PATENTS

- Tashtoush, A., Wang, Y., Khasawneh, M.T., Hader, A., Shazeeb, M.S., Lindsay, C,J. (2024). "Real-time object segmentation for laparoscopic cholecystectomy using YOLOv8". Neural Computing and Applications, In Press.
- El Baz, H., Wang, Y., Yoon, S.W., Jin, Y. (2024). "Optimization of AGV sorting systems in pharmaceutical distribution: A two-stage package assignment and simulation approach." International Journal of Advanced Manufacturing Technology, 134, 2439-2457.
- Nimri, W., Wang, Y., Zhang, Z., Deng, C., Sellstrom, K. (2023). "Data-driven approaches and model-based methods for detecting and locating leaks in water distribution systems: A literature review." Neural Computing and Applications, 35, 11611–11623.
- Yaeesh, O., Nimri, S., Wang, Y., Chen, S., Kinter, K., Renodin-Mead, D., Khasawneh, M.T. (2025). "Integrating machine learning models and explainable AI to predict DTaP vaccine demand in rural primary care." Neural Computing and Applications, In Press.
- Mahyoub, M., Wang, Y., Khasawneh, M.T. (2025). "GPT-4o in radiology: In-context learning-based automatic generation of radiology impressions." Natural Language Processing Journal, 11, 100145.
- Bhat, V.S., Wang, Y. (2025). "Revisiting the control systems of autonomous vehicles in the agricultural sector: A systematic literature review." IEEE Access, 3, 54686-54721.

MAJOR PROJECTS/FUNDING

- 2022-25: Bennett Distribution Services, Warehouse operations management and analytics research and development. Y. Wang, PI (with M. Khasawneh and S.W. Yoon), $342,239
- 2020-22: NYS Empire State Development, Smart cities innovation partnership project: deployment of advanced water meters in New York State. Y. Wang, PI, (Co-PIs: C. Deng and Z. Zhang), $453,210 (NYSESD: $200,000, Cost-Share: $253,210)
- 2019-25: Montefiore Medical Center, Process analysis and performance excellence for integrated delivery care systems. Y. Wang, PI (with M.T. Khasawneh and K. Srihari), $341,512
- 2025-27: US EPA, Green solar technology to power the future. Y. Wang, Co-PI (with S. Lu and T. Dhakal, PI: Yuxin Wang), $254,737
- 2021-25: GE Renewable Energy, Battery performance degradation prediction and market bidding optimization using machine learning and stochastic optimization. Y. Wang, PI (with M.T. Khasawneh/K.Srihari), $258,374

SIGNIFICANT ACHIEVEMENTS

- $4.8 million in total external funding
- 50+ journal papers and 60+ conference papers
- Extensive services to SSIE
- SUNY Chancellor's Award for Excellence in Teaching

Yuxin Wang

ASSISTANT PROFESSOR

EDUCATION: PhD in Civil and Environmental Engineering, Carnegie Mellon University
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AREAS OF EXPERTISE

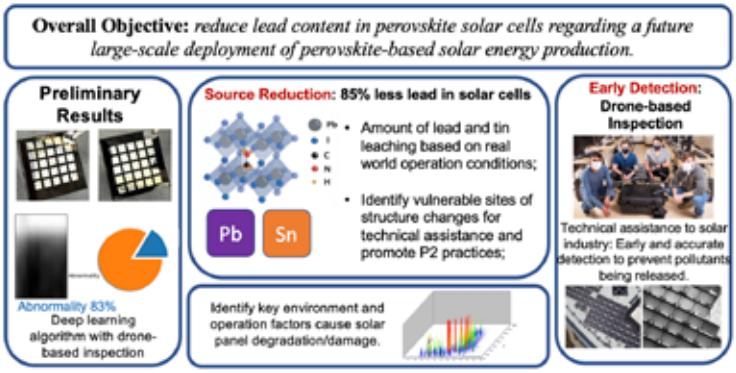
- Energy systems and environmental impacts
- Risk assessment of environmental contaminants, such as per- and polyfluoroalkyl substances (PFAS)
- Water-energy nexus

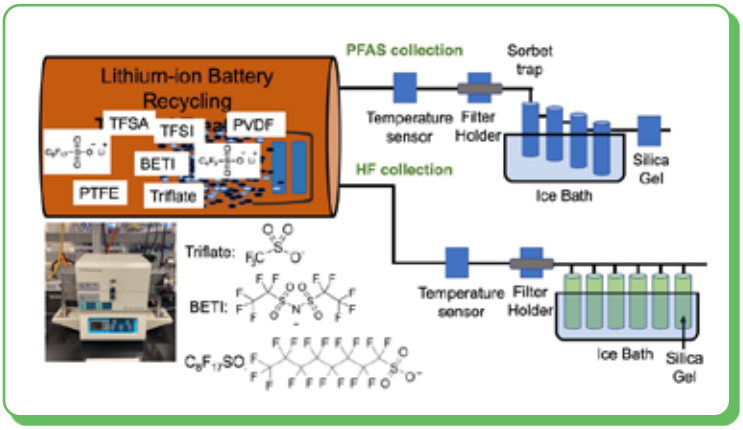
KEY RESEARCH

- Lithium-ion battery recycling and PFAS emissions
- Low-lead perovskites solar cells to power the future
- PFAS and microplastics distribution, accumulation, and interaction in river and lake
- PFAS profile in lake foams and water

POTENTIAL APPLICATIONS

- Industry: Solar energy sector, energy storage sector, solar panel and battery recycling industries
- Government: Support policy decision-making





SIGNIFICANT PUBLICATIONS/PATENTS

- Y. Wang, K. Good, (2024) "Per-and polyfluoroalkyl substances (PFAS) and microplastics air-water interaction and deposition." Science of the Total Environment, 954, 176247
- Y. Wang, G. Longendyke, S. Katel, (2022) "Per- and polyfluoroalkyl substances (PFAS) fate and destruction mechanisms during thermal treatment: a comprehensive review." Environmental Science: Processes & Impacts, 24, 196-208
- Y. Wang, A. Lyn, D. Latino, K. Fenner, D. Helbling, (2018) "Evaluating the environmental parameters that determine aerobic biodegradation half-lives of pesticides in soil with a multivariable approach." Chemosphere, 209: 430-438
- Y. Wang, M. Small, J. VanBriesen, (2016) "Assessing the risk associated with increasing bromide in drinking water sources in the Monongahela River, Pennsylvania." ASCE Journal of Environmental Engineering, 143(3), 04016089

MAJOR PROJECTS/FUNDING

- U.S. Environmental Protection Agency, Yuxin Wang (Lead PI), Tara Dhakal, Susan Lu, Yong Wang, Reducing Toxics in the Power Sector Through Technology Improvements, $254,737
- U.S. Geological Survey and New York State Water Resources Institute, Yuxin Wang (Lead PI), Kelly Good (University of Villanova), Occurrence, Interaction, and Distribution of Microplastics and PFAS in the Mohawk River, $70,000
- Reagents of Change: Green Chemistry and Safer Chemicals in Products and Industry, New York State Pollution Prevention Institute Student and Faculty Research Program, Yuxin Wang (Lead PI), Tara Dhakal, Low-lead perovskite solar technology for a clean, green, and sustainable energy futures, $40,000
- New York State Pollution Prevention Institute R&D, Yuxin Wang (Lead PI), Hao Liu, and Jessica Hua, Develop effective thermal practice and adsorption method to eliminate perfluorinated substances emission during battery recycling processes, $126,000

SIGNIFICANT ACHIEVEMENTS

- Harter Family Mentoring Award, Harpur College, Binghamton University
- Career Champion Award, Binghamton University
- Center for Civic Engagement, Community Engaged Teaching Award
- NSF/American Society for Engineering Education (ASEE) Small Business Postdoctoral Research (SBIR) Diversity Postdoctoral Fellowship

Zimo Wang

ASSISTANT PROFESSOR

EDUCATION: PhD in Industrial Engineering, Texas A&M University
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AREAS OF EXPERTISE

- Statistical/machine learning
- Smart manufacturing
- Advanced manufacturing processes
- Material characterization
- Diagnosis and quality assurance

KEY RESEARCH

- Sensor-based monitoring for advanced manufacturing
- AI/machine learning for sustainable material discovery and manufacturing
- Nonstationarity and intermittency analytics for dynamic systems

POTENTIAL APPLICATIONS

- Nanofabrication for front-end of semiconductor manufacturing
- In-process monitoring and quality assurance for assembly, testing and packaging (ATP) of back-end semiconductor processes

SIGNIFICANT PUBLICATIONS/PATENTS

- X.Wang, M. Alshoul, H. Zhou, J. Deng, Z. Wang, “Study of the system instability impacts on surface characteristics for vibration-assisted AFM-based nanomachining.” Journal of Manufacturing Processes, 2024, 117: 213-223.
- Q. Ma, Y. Hao, Z. Wang, S. Bukkapatnam, “Effect of Microstructure on the Machinability of Natural Fiber Reinforced Plastic Composites: A Novel Explainable Machine Learning (XML) Approach,” ASME Journal of Manufacturing, Science, and Engineering, 2024, 146(3): 031003.
- Q. Ma, Z. Wang, “A Recurrent Gated Unit-based Mixture Kriging Machine Bayesian Filtering Approach for Long-term Prediction of Dynamic Intermittency,” IISE Transactions, 2023: 1-16.

MAJOR PROJECTS/FUNDING

- 2024-25: SUNY-IBM Alliance Research proposal, Advanced smart sensing and analytics scheme for rapid incipient anomaly diagnosis, reliability study, and causality analysis for underfill warpage of flip-chip packaging processes, Z. Wang, PI, Funded: $100,000

Daehan Won

ASSOCIATE PROFESSOR

EDUCATION: PhD, University of Washington; MS, Korean Advanced Institute of Science and Technology (KAIST); BS, Korean Advanced Institute of Science and Technology (KAIST)
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AREAS OF EXPERTISE

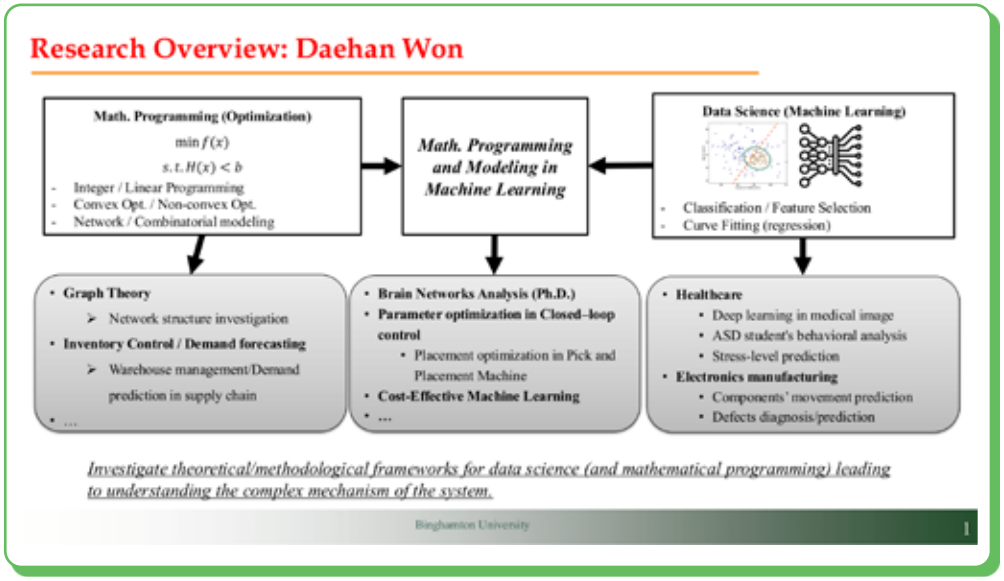
- Data Science / Artificial Intelligence
- Operations Research / Optimization
- Healthcare / Smart Manufacturing

KEY RESEARCH

- Algorithmic advancement in AI/ML
- Computer-aided disease diagnosis for healthcare
- Smart manufacturing platforms in electronics manufacturing systems

POTENTIAL APPLICATIONS

- Healthcare systems
- Electronics manufacturing (PCB and Semiconductor)
- AI applications for neurodivergent populations



SIGNIFICANT PUBLICATIONS/PATENTS

- D. Won, H. Manzour, and W. A. Chaovalitwongse. Convex optimization for group feature selection in networked data. *INFORMS Journal on Computing*, 32(1):182–198, 2020
- H. Wang, D. Won, and S. W. Yoon. An adaptive neural architecture optimization model for retinal disorder diagnosis on 3D medical images. *Applied Soft Computing*, 111:107686, 2021
- M. Jarbou, J. Gillis, R. Romanczyk, and D. Won. Deep learning-based school attendance prediction for autistic students. *Scientific Reports*, 12(1):1–11, 2022
- J. He, Y. Cen, S. Alelaumi, and D. Won. An AI-based pick-and-place process control for assembly quality enhancement in surface mount technology. *IEEE Transactions on Components, Packaging and Manufacturing Technology*, 12(10):1702–1711, 2022
- J. Kataoka, A. Farrag, Y. Lai, S. Park, Y. Jin, and D. Won. ReflowNet: ConvLSTM-based direct reflow oven recipe optimization framework. *Journal of Intelligent Manufacturing*, pages 1–15, 2024

MAJOR PROJECTS/FUNDING

- AI-Driven Smart Surface Mount Technology Solutions (Sponsor: Koh Young Technology Inc, Funding: $1.3 M),
- Artificial Intelligence-Guided Electrospray Deposition of Polymeric Films (Sponsor: NSF, Funding: $517K)
- Epifluidics for Stress Monitoring (Sponsor: NBMC, Funding: $400K)

SIGNIFICANT ACHIEVEMENTS

- Watson College Recognition Award for Outstanding Research, 2023
- Co-organizer, FAIM 2025 (and an editor for the conference proceeding; Lecture Notes in Mechanical Engineering, Springer)
- Special Issue Editor, Impact of Deep Learning in Biomedical Engineering (Journal Diagnostics)

Congyu (Peter) Wu

ASSISTANT PROFESSOR

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AREAS OF EXPERTISE

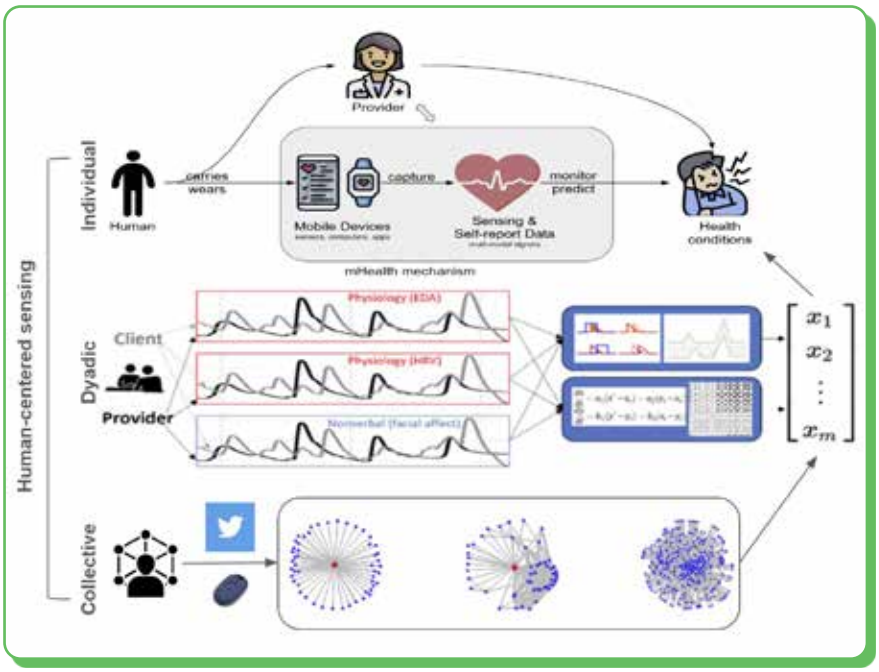
- Mobile and wearable sensing
- Social network analysis
- Text mining
- Machine learning
- Data analytics

KEY RESEARCH

- Human-centered sensing
- Multimodal interaction
- Computational social science

POTENTIAL APPLICATIONS

- Personalized healthcare
- Public health
- Education
- Sociology



SIGNIFICANT PUBLICATIONS/ PATENTS

- Wang, Z., Hassan, N., LeBaron, V., Flickinger, T., Ling, D., Edwards, J., Wu, C., Boukhechba, M., Barnes, L. (2024). "CommSense: A Wearable Sensing Computational Framework for Evaluating Patient-Clinician Interactions." Proceedings of the ACM on Human-Computer Interaction, 8, CSCW2: 1-31.
- Wu, C., Barczyk, A., Craddock, C., Thomaz, E., Harari, G., Shumake, J., Beevers, D., Gosling, S. & Schnyer, D. (2021). "Improving Prediction of Real-Time Loneliness and Companionship Type Using Geosocial Features of Personal Smartphone Data." Smart Health, 100180.
- Wu, C., Fritz, H., Bastami S., Maestre J. P., Thomaz E., Julien C., Castelli D., de Barbaro, K., Bearman, S. K., Harari G., Craddock C., Kinney, K., Gosling, S., Schnyer, D., and Nagy, Z. (2021). "Multi-Modal Data Collection for Measuring Health and Behavior of Large-Scale Participant Cohorts." GigaScience, 10(6), giab044.

MAJOR PROJECTS/FUNDING

- 2023-28: NIH Research Project Grant (R01) FEASible: Sensing Factors of Environment, Activity and Sleep to Validate Metabolic Health Burden Among Latina Women. Co-I with PI at University of Texas at Austin. Total amount $3,350,031; portion responsible $291,571.
- 2025-27: The SCORE Project for Advancing Research on Religion and Cooperation (SPARRC), a Longitudinal Observational Study of Religion and Cooperation in Bangladesh, Dominica, Fiji and The Gambia: Developing New Methods to Improve Causal Inference. Co-I with PI at Baylor University Anthropology, other co-I at Binghamton University Anthropology. Total amount $150,000; portion responsible $47,000.

SIGNIFICANT ACHIEVEMENTS

- $3.3 million in total external funding, portion responsible $300,000
- 22 peer-reviewed publications (11 journal, 11 conference)

Sangwon Yoon

PROFESSOR

EDUCATION: PhD in Industrial Engineering, Purdue University, West Lafayette
EMAIL: yoons@binghamton.edu
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AREAS OF EXPERTISE

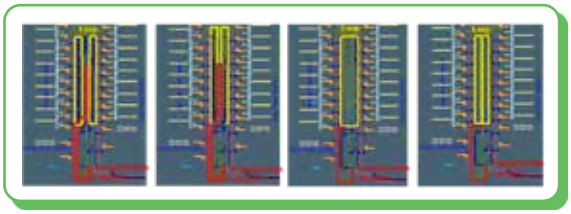
- Decentralized decision modeling
- Real-time control in smart manufacturing
- Large-scale data mining optimization

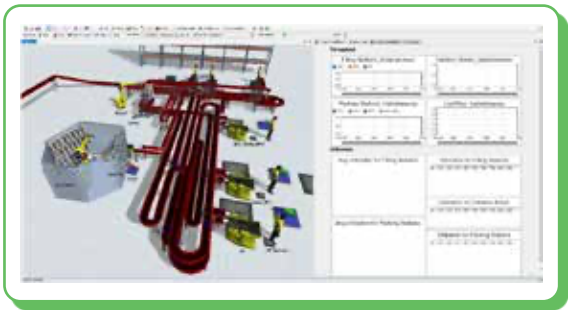
KEY RESEARCH

- AI-driven smart SMT solutions
- Systems integration engineering and hardware validation testing research and development support
- Para-DEVS: Paratemporal simulation with uncertainty quantification

POTENTIAL APPLICATIONS:

- Supply chain
- Warehousing
- Production and manufacturing
- Data center





SIGNIFICANT PUBLICATIONS/PATENTS

- Huang, C-Y and Yoon, S. W. (2023), "Systems Collaboration and Integration: See Past and Future Research through the PRISM Center," Springer.
- Cao, N., Kim, J., Farrag, A., Won, D., and Yoon, S.W., (2025), "Sim2Joint: Dynamic hybrid model for solder joint prediction across Sim2Real," Robotics and Computer-Integrated Manufacturing, Vol. 93, pp. 102926.
- Cao, N., Farrag, A., Won, D., Yoon, S.W., Jin, Y. (2024), "XSCAN: Explainable solder joint defect probability prediction through solder paste printing status with imbalanced data," Journal of Manufacturing Systems, Vol. 77, pp. 212-227.
- Gupta, R., Cao, N., Yoon, S.W., and Jin, Y., Won, D., (2024), "A dual-tree complex wavelet transform simulation model for improved noise modeling and prediction of real-time stencil-printing process," IEEE Transactions on Components, Packaging, and Manufacturing Technology, Vol. 14, No. 10., pp. 1872-1880.
- Farrag, A., Kataoka, J., Yoon, S.W., Won, D., Jin, Y. (2024), "SRP-PINN: A physics-informed neural network model for simulating thermal profile of soldering reflow process," IEEE Transactions on Components, Packaging, and Manufacturing Technology, Vol. 14, No. 6., pp. 1098-1105.
- Lee, I.*, Yoon, S.W., and Won, D. "A mixed integer linear programming support vector machine for cost-effective group feature selection: Brand-Cut-and-Price Approach," European Journal of Operational Research, Vol. 299, No. 3, pp. 1055-1068.

MAJOR PROJECTS/FUNDING

- 2025-26: "AI Driven Smart SMT Solutions," Co-PI (with S.B. Park and D. Won), Koh Young Technology Inc., $250,000.
- 2024-25: "Support Kennedy Valve in Electronic Information System Implementation and Power Coating Process Improvement (AMD 2)," Co-PI (with M. Khasawneh, Y. Wang, and Z. Wang), Kennedy Valve, $209,905.
- 2024-25: "Systems Integration Engineering and Hardware Validation Testing Research and Development Support" Co-PI (with K. Srihari, and M. Khasawneh), Meta, $302,532.
- 2024-25: "Para-DEVS: Paratemporal Simulation with Uncertainty Quantification" PI (with K. Srihari, and M. Khasawneh), STTR Phase II Subaward from Missile Defense Agency with RTSync, $417,657.37.
- 2023-24: "Model Level Integrated Architecture for Collaborative Development (CAMLI)" PI (with K. Srihari and M. Khasawneh), RTSync, $169,974.

SIGNIFICANT ACHIEVEMENTS

- 2018-19: SUNY Chancellor's Award for Excellence in Scholarship and Creative Activities
- 2015-19: Member, Scientific Committee for the International Conference on Flexible Automation and Intelligent Manufacturing
- 2019-21: Reviewer, NSF Graduate Research Fellowship Program (GRFP)
- 2022 & 2024: IISE Outstanding Regional Faculty Advisor

Yingge Zhou

ASSISTANT PROFESSOR

EDUCATION: PhD in Industrial Engineering, Texas Tech University
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WEBSITE: www.binghamton.edu/ssie/people/profile.html?id=yzhou

AREAS OF EXPERTISE

- Advanced manufacturing
- Tissue engineering
- Biomedical fabrication

KEY RESEARCH

- Micro- and nanofabrication of biomimetic scaffolds
- Microcarrier fabrication for lung disease drug delivery
- 3D-printed sacrificial molds for cell-embedded hydrogels

POTENTIAL APPLICATIONS

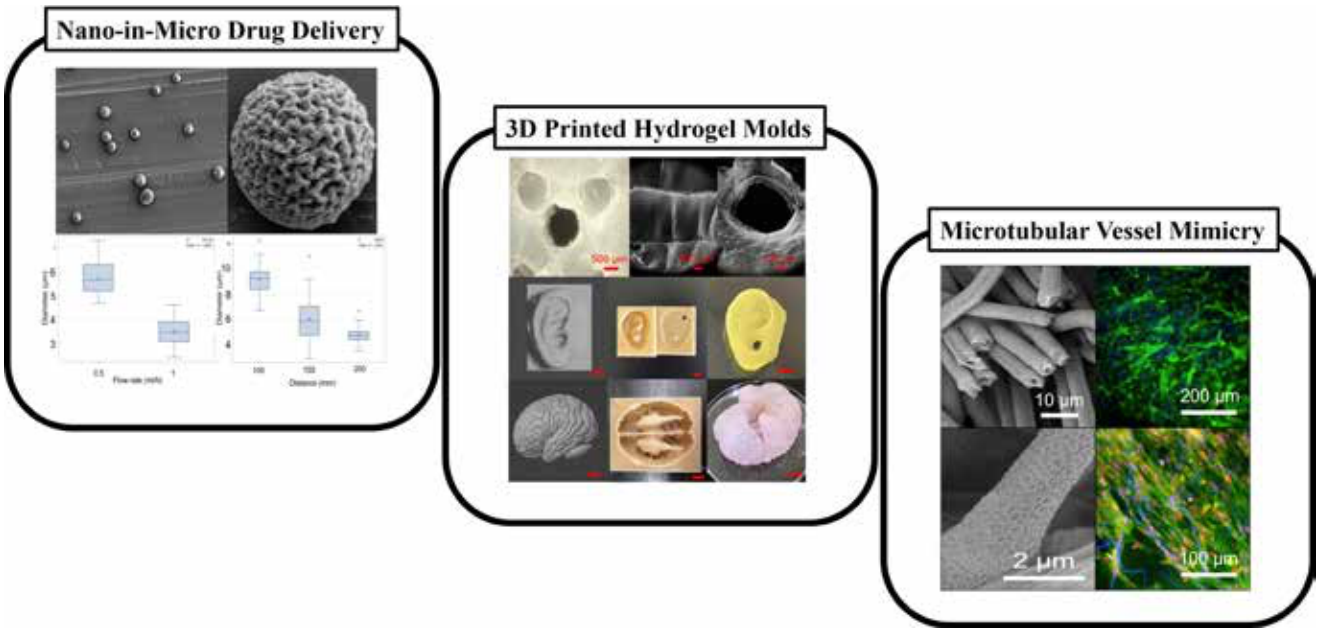
- Tissue repair and regenerative medicine
- Non-invasive and sustainable drug delivery
- Composite polymeric materials development

SIGNIFICANT PUBLICATIONS/PATENTS

- Wang, C., Farrag, A., Jin, Y., Zhou, Y.* (2024). “Sodium Alginate Hydrogel Scaffolds with Internal Channels Using 3D-Printed Polyvinyl Alcohol (PVA) Sacrificial Molds.” Journal of Materials Science. 1-15.
- Chen, Y., Wang, L., Wang, Y. & Zhou, Y.*(2023). “Microtube Embedded Hydrogel Bioprinting for Capillary Vascularization of Tissue Engineered Scaffolds.” Biotechnology and Bioengineering. 120(12), 3592-3601.
- Zhou, Y., Qavi, I., & Tan, G. Z.* (2021). “Effects of Solution Viscosity on Poly (l-Lactic Acid) Porous Microtubes Fabricated by Core–Sheath Electrospinning.” Journal of Micro-and Nano Manufacturing, 9(2), 021006.
- Tan, G. Z.*, & Zhou, Y. (2018). “Tunable 3D Nanofiber Architecture of Polycaprolactone by Divergence Electrospinning for Potential Tissue Engineering Applications.” Nano-micro letters, 10(4), 73.

MAJOR PROJECTS/FUNDING

- Watson-Upstate Pilot Research Grant — Core-Shell Microparticles with Surface Nanopores and Dissolvable Core for Intrapulmonary Drug Delivery



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BINGHAMTON UNIVERSITY

THOMAS J. WATSON
COLLEGE OF ENGINEERING
AND APPLIED SCIENCE