CHENG CHEN

Tel:321-305-1613 | Cheng.C@uga.edu | LinkedIn | GitHub | Website | ResearchGate | ORCID

EDUCATION

Ph.D. in Mechanical Engineering July 2022
Dissertation: *Realization of Inter-Model Connections: Linking Requirements and Computer-Aided Design* University of Georgia, Athens, GA

Master of Science in Aerospace Engineering Nov 2016
Thesis: *A Maximum Entropy Approach to Identifying Important Statistical Moments to Best-Represent Spray Distribution Data*
Florida Institute of Technology, Melbourne, FL

Bachelor of Engineering in Mechanical Engineering and Automation May 2012
Central College of BUPT, Beijing, China

RESEARCH EXPERIENCE

University of Georgia – College of Engineering: Limited-Term Instructor (50% Research + 50% Teaching) Athens, GA
Aug 2022 – Present

Research:

- Prepared and submitted 2 grant proposals for National Science Foundation (NSF)
  - *"Enhancement of Artificial Intelligence Learning and Development for Assembly Systems using Synthetic Data Augmentation"*
  - *"Advancing Requirement Management in Engineering Design: Leveraging Large Language Models for Enhanced Systemic Analysis and Innovation"*
- Led the development of two industry-focused project proposals, resulting in collaborative partnerships with Pharma Tech Industries and Kindercore Vinyl
- Managed the publication process for 6 peer-reviewed articles in high-impact journals/conferences and oversaw the creation and delivery of over 20 presentations at major international conferences
- Led and mentored a dynamic interdisciplinary research team, consisting of 6 Ph.D. students, 3 Master's students, and 4 Bachelor's students from diverse engineering disciplines
- Designed and implemented experimental data collection on assembly lines, encompassing thorough data acquisition, validation, and exploratory data analysis
- Participated in key design- and manufacturing-related research discussions at international conferences, contributing to 2 panel discussions and publishing articles in leading academic journals in the field
- Mentored a high-impact capstone project in collaboration with General Motors, focusing on the application of data science techniques for detecting defects in EV battery cells

Teaching and Engagement:

- Designed and delivered an innovative curriculum for ENGR 3140 Thermodynamics and ENGR 2120 Statics, each a 3-credit course, engaging an average of over 50 students per class
- Participated in faculty training focused on Diversity, Equity, and Inclusion (DEI) and student development, both at departmental (Engineering Education Transformations Institute) and university-wide levels (Center for Teaching and Learning)
- Engaged in Faculty Interest Groups, contributing insights to discussions on CURO, including seed grant applications, as well as on topics of leadership and research resource training
- Coordinated and executed 2 educational events, 'Demystifying Graduate School' and 'Balancing Life in Academia,' each drawing over 30 participants and fostering insightful discussions among attendees

Graduate Research Assistant (Advisor: Dr. Beshoy Morkos) Aug 2019 – July 2022

- Worked alongside advisor to lead the charge on the development of a new research lab in design and manufacturing. This included identifying a location, resources, equipment, and infrastructure required
- Published multiple papers (both journal and conference proceedings) while also supporting junior graduate students in learning how to write
- Presented at multiple conferences in front of leading researchers from across the world at ASME International Design Engineering Technical Conference (IDETC) and ASEE's National Conference
- Mentored four junior lab members as they pursued their M.S., provided them with advice concerning work-life balance, expectations, research guidance, and fundamentally taught them how to become researchers

- Served as a paper reviewer for multiple conferences based on areas of design, manufacturing, and design education
- Assisted in writing a program description and program proposal to start a graduate program with an emphasis in design and manufacturing
- Led a *writing week* at the end of the semester where graduate students focused on writing papers
- Supported PI with NSF proposal preparation by reviewing the project description and adding content
- Contributed to the acquisition of industry-funded projects through site visits, problem discovery, client discussions, and proposal writing

Florida Institute of Technology – Dept. of Mechanical & Aerospace Engr. Melbourne, FL
Research Assistant Aug 2018 – Aug 2019

- Worked alongside advisor (PI: Beshoy Morkos) on NSF funded research on requirement change propagation. Moved to UGA (see above) with PI to continue Ph.D. studies

Graduate Student Aug 2013 – Dec 2016
(Advisor: Dr. Mark Archambault)

- Studied the effect of fourth-order moments to calculate droplet probability density functions using the Maximum Entropy Formulism
- Developed and optimized an existing C research code with the implemented Message Passing Interface (MPI)
- Performed error and frequency analysis to identify the most important fourth order moments
- Investigated best representation of experimental spray data using high-frequency moments with their corresponding lower moment combinations to reduce the heavy computational cost
- Worked as a grading assistant for MAE 3161 Fluid Mechanics (Dr. Paavo Sepri), MAE 3191 Engineering Thermodynamics 1 (Dr. Ju Zhang), MAE 3162 Compressible Flow (Dr. Hamid Hefazi), MAE 2201 Aerospace Fundamental (Dr. Rusovici Razvan and Dr. Wilde Markus), MAE 4263 Rockets and Mission Analysis (Dr. Daniel Kirk)

INDUSTRIAL PROJECTS EXPERIENCE

University of Georgia Athens, GA
UGA Wells Fargo Data Science Competition Mar 2021

- Implemented exploratory data analysis, feature selection, and classification using Logistic Regression, Random Forest, and XGBoost
- Completed a comprehensive 15-page report and developed an accompanying 12-page presentation slide

Florida Institute of Technology Melbourne, FL
Alstom Mesh Network Exploration Project Sept 2018 –Mar 2019

Advisor: Dr. Beshoy Morkos

- Investigated of different type of COM for PTC within the mesh network such as the type of sensors, radio technology/communication methods
- Developed a physical, scaled prototype that demonstrates the ability of the wireless mesh network mitigate the challenges associated with the current state of the art

---

PROPOSALS:

Funded Research Project:

Advancing Pharma Tech's Production Process Through Smart Manufacturing, Pharma Tech Industries Inc., Beshoy Morkos (PI), Cheng Chen (Co-PI), $150,000, Dec 2023 – Present.

Pending Proposal:

Enhancement of Artificial Intelligence Learning and Development for Assembly Systems using Synthetic Data Augmentation, NSF MSI, Faculty Associate, $200,000, 2024-2025

PUBLICATIONS:

Journal Publications (4 published/accepted, 3 submitted, 5 in preparation)

Published/Accepted:

1. **Chen, C.**, & Morkos, B. (2023). Exploring topic modelling for generalising design requirements in complex design. Journal of Engineering Design, 1-19. https://doi.org/10.1080/09544828.2023.2268850

2. Mullis, J., **Chen, C.**, Morkos, B, and Ferguson, S. (2023). Efficacy of Deep Neural Networks in Natural Language Processing for Classifying Requirements by Origin and Functionality: An Application of BERT in System Requirement. ASME. J. Mech. Des. https://doi.org/10.1115/1.4063764
3. Htet Hein, P., Kames E., **Chen, C.**, Morkos, B., (2022). Reasoning support for predicting requirement change volatility using complex network metrics, Journal of Engineering Design (2022): 1-27. https://doi.org/10.1080/09544828.2022.2154051
4. Htet Hein, P., Kames E., **Chen, C.**, Morkos, B., (2021). Employing Machine Learning Techniques to Assess Requirement Change Volatility, Research in Engineering Design, 32(2), 245-269, DOI: 10.1007/s00163-020-00353-6

Submitted:

1. Yorston, C., **Chen, C.**, Camelio, J., 2023, Optimizing Industrial Data Collection with Interactive Testbed: A Siemens MindSphere Case Study, Journal of Engineering Manufacture
2. Buggineni, V., **Chen, C.**, Camelio, J., 2023, Synthetic Data Generation in Advanced Manufacturing: Opportunities and Applications, Frontiers In Manufacturing Technology
3. Htet Hein, P., **Chen, C.**, Kames E., Morkos, B., 2023, A Network Interference Approach to Analyzing Change Propagation in Requirements, Journal of Computing and Information Science in Engineering

In Preparation:

1. **Chen, C.**, Morkos, B., Improving Design Requirements Based on Customer Feedback, Journal of Computing and Information Science in Engineering
2. **Chen, C.**, Morkos, B., Clustering CAD Geometry Models to Design Subassembly, ASME Journal of Mechanical Design
3. **Chen, C.**, Kudyba P., Enhancing Quality Inspection through Advanced Edge Computing Techniques, Journal of Computing and Information Science in Engineering
4. **Chen, C.**, Valdes L., Camelio, J., Proposing a Comprehensive Paper-Making Dataset: An Exploratory Data Analysis Approach, Science of the Total Environment
5. Heydarzade A., **Chen, C.**, Rezaei N., Camelio, J., Correlation-Based Multilayer Multivariable Value Stream Mapping: Integrating Operational, Environmental, and Social, Journal of Manufacturing Systems

Conference Proceedings (6 peer-reviewed conference publications)

1. **Chen, C.,** Carroll, C., & Morkos, B. (2023). From Text to Images: Linking System Requirements to Images Using Joint Embedding. Proceedings of the Design Society, 3, 1985-1994.
2. Mozaffar, F., **Chen, C.**, Morkos, B., & Ma, J. (2023). Development of a Manufacturing Assessment Survey to Promote Entrepreneurial Mindset in Engineering. In 2023 ASEE Annual Conference & Exposition.
3. **Chen, C.,** Wei, S., & Morkos, B. (2023). Bridging the Knowledge Gap Between Design Requirements and CAD-A Joint Embedding Approach. In 2023 ASEE Annual Conference & Exposition.
4. Farid, M., **Chen, C.**, & Morkos, B., et al. Meta-SeL: 3D-model Shape-Net Core Classification using Meta-Semantic Learning, Computer Science, Computer Engineering, Computer Engineering, & Applied Computing (CSCE 2022)
5. **Chen, C.**, Mullis, J., & Morkos, B. (2021). A Topic Modeling Approach to Study Design Requirements. In *International Design Engineering Technical Conferences and Computers and Information in Engineering Conference* (Vol. 85383, p. V03AT03A021). American Society of Mechanical Engineers.
6. **Chen, C.**, Olajoyegbe, T. O., & Morkos, B. (2020). The Imminent Educational Paradigm Shift: How Artificial Intelligence Will Reframe how we Educate the Next Generation of Engineering Designers. In *2020 ASEE Virtual Annual Conference Content Access*.

TEACHING EXPERIENCE: *UNIVERSITY OF GEORGIA*

ENGR 2120 Engineering Statics	Fall 2022
ENGR 3140 Engineering Thermodynamics	Spring, Fall 2023, Spring 2024

GUEST LECTURE:

GITAM School of Business Hyderabad – Intro to NLP: Topic Modeling	Fall 2022
CSCI 1360 - Informatics and Data Analytics	Spring 2022
ENGR 6900/MCHE 4900 - Design Methodologies and Advanced Manufacturing	Spring 2022
ENGR 6990/MCHE 4900 - Advanced Vehicle Manufacturing	Fall 2021

PEDAGOGICAL AND PROFESSIONAL TRAINING: *UNIVERSITY OF GEORGIA*

edX- An Introduction to Evidence-Based Undergraduate STEM Teaching

Advancing Learning Through Evidence-Based STEM Teaching

Leadership Development: Reflection on Leadership

Certificate in Diversity and Inclusion (CDI): Countering Unconscious Bias

Preparing for the Job Market: The Diversity Statement Workshop

How Learning Works: Engaging Students with Active Learning Workshop

Preparing for the Job Market: The Teaching Statement Workshop

Certificate in Academic Advising (CAA)

RESEARCH SERVICE:

Systems Engineering Information Knowledge Management (SEIKM) Technical Committee

Role: Student Committee Member 2021 - 2022

- Provide input on the strategic plans and activities relating to student sections
- Organize publicity and events for SEKIM

ASME JMD, JED, IDETC, MSEC, and ASEE Peer Review Specialist 2019 – Present

- Provide written, unbiased, and constructive feedback based on the intellectual merit of the work

Mentoring Experience

- Current Mentees:
  - Tomas Arturo Letelier, Ph.D. student, digital twin, 2022 – present
  - John Bradley Frericks, Ph.D. student, AI trust in robotics, 2022 – present
  - Ayoub Heydarzade, Ph.D. student, optimization of assembly processes, 2022 – present
  - Niloofar Rezaei, Ph.D. student, psychological analysis in assembly line environments, 2022 – present
  - Cristian Garcia-Ponce, Ph.D. student, LLM in manufacturing, 2023 – present
  - Marcus Antonio Dibattista, Ph.D. student, air quality measurements in a production environment, 2023 – present
  - Cody Loren Carroll, M.S. student, create image synthesis from design requirement, 2022 – present
  - Brennen Barksdale Sanders, B.S. student, GM Capstone: ML in Battery Cell Manufacturing, 2023 - present
  - Arjun Matthew Smith, B.S. student, GM Capstone: ML in Battery Cell Manufacturing, 2023 - present
  - Haden Keith Crawford, B.S. student, GM Capstone: ML in Battery Cell Manufacturing, 2023 - present
  - Kristy Anne Maliakal, B.S. student, GM Capstone: ML in Battery Cell Manufacturing, 2023 - present
- Past Mentees:
  - Cole Jacob Yorston, M.S. student, predictive maintenance for rotating machinery, Spring 2023
  - Vishnupriya Buggineni, M.S. student, synthetic data generation, Spring 2023

HONORS, ACTIVITIES, AND SERVICE

Awards

- EETI Travel Fellowship ($3125) 2023
- EETI Travel Fellowship ($1445) 2022
- Received an honorable mention in the Wells Fargo data science competition 2021
- ASME CIE Design Poster Award 2020
- Third-Class Scholarship for Outstanding Academic Performance - Central College of BUPT 2011 2012

Professional Associations

- Society of Manufacturing Engineers 2023 – Present
- Alpha Alpha Alpha Honor Society 2022 – Present
- The Design Research Society, DRS 2019 – Present
- American Society of Engineering Education, ASEE 2019 – Present
- UGA Engineering Education Transformation Institute, EETI 2019 – Present
- National Postdoctoral Association 2019 – Present
- American Society of Mechanical Engineers, ASME 2018 – Present
- National Center for Faculty Development & Diversity 2017 – Present
- The American Institute of Aeronautics and Astronautics, AIAA 2014 – 2015

Certificates

- Protecting Youth Training 2023-2025
- USG Code of Conduct 2023-2025

- Arch Ready Professionalism Certificate 2021
- Question. Persuade. Refer., QPR Gatekeeper Certificate (NBCC Provider #5889) 2021
- AutoCAD Senior Application Engineering Certificate 2011
- Crystal Digital Technology Training Certificate 2009 – 2011
- UGA's Non-Discrimination and Anti-Harassment and USG's Sexual Misconduct Policies 2023-2025

SKILLS AND QUALIFICATIONS

Modelling & Simulation Tools:		**Languages:**	**Programming:**	**Toolkit:**
▪ AutoDesk AutoCAD	▪ MagicDraw	▪ Mandarin	▪ C/C++	▪ MPI
▪ AutoDesk Fusion360	▪ Solid Works	▪ English	▪ Python	▪ CUDA APT
▪ AutoDesk Inventor	▪ Astah SysMl		▪ Linux	▪ OpenCL
▪ MATLAB Simulink			▪ LaTeX	▪ OpenMP
			▪ HTML	▪ NumPy
			▪ JavaScript	▪ Pandas
			▪ R Studio	▪ Keras
				▪ Scikit-learn
				▪ TensorFlow
				▪ PyTorch
				▪ Heroku