

EDUCATION

University of Cincinnati; Cincinnati, Ohio

- **Doctor of Philosophy** • Fall 2024 (expected) • Mechanical Engineering • GPA 4.00
- **Master of Engineering** • May 2019 • Mechanical Engineering • GPA 4.00
- **Bachelor of Science** • May 2019 • Mechanical Engineering Major • Mathematics Minor • GPA 3.91

INDUSTRY & ACADEMIC EXPERIENCE

Graduate Researcher; Cincinnati, Ohio • May 2019 – Present

• Lab for Intelligent Metrology Systems • Apr. 2023 – Present

• I/UCR Center for Intelligent Maintenance Systems • May 2019 – Mar. 2023

- Directed project with semiconductor industry partner **Applied Materials** to build method for enabling real-time identification of cross-chamber manufacturing anomalies including drafting proposals; leading technical work; delegating tasks to other researchers in order to successfully meet deadlines and fulfill objectives; facilitating discussions with collaborators to disseminate detailed updates and gain feedback

- Completed research development and technical writing for grant proposal to secure multiple years of funding from the National Institute of Standards and Technology (**NIST**); developed sensing techniques, comprehensive test procedures, multi-faceted analysis approaches for prognostics and health management of critical mechanical components on precision linear motion control system test bed; provided instruction and documentation for setup of test bed and experimentation to be run in parallel at **HIWIN**'s international site

- Established analytics platform for fault isolation and quantification on **Mitsubishi Electric** robotic arm

- Designed patented CNC spindle and bearing health monitoring system for **Mazak** to provide enhanced machine status reports to customers; exhibited monitoring technology during *DISCOVER 2019*

- Mentored and managed new students; developed and provided training to industry members; designed and gave lectures and offered small group instruction for industrial AI course

Undergraduate Researcher; Cincinnati, Ohio • May 2017 – Apr. 2019

• I/UCR Center for Intelligent Maintenance Systems

- Participated in ongoing research projects alongside graduate and postdoctoral researchers as part of the National Science Foundation's Research Experiences for Undergraduates (**NSF REU**) program

- Led analytics work in collaboration with University of Cincinnati Department of Athletics/Sports Medicine to track athlete fitness and recovery patterns to reduce burnout and injury risk

Graduate Intern; Itasca, Illinois (remote) • Sep. 2020 – Dec. 2020

• Power Solutions International • Advanced Product Development Group

- Developed MATLAB application for comprehensive engine fault analysis to monitor remote fleet assets, reduce manual processing time, produce organized data structure for future use

RESEARCH HIGHLIGHTS

Technical Skills: MATLAB; Python; LabVIEW

Focus Areas: AI techniques; big data; data preprocessing and visualization; data mining; data analysis; machine learning; statistical modeling; predictive modeling

Applications: industrial areas including rotating machinery, precision linear motion systems, semiconductor manufacturing; healthcare areas including clinical biosignals, wearable performance systems

SELECTED PUBLICATIONS

• **M. Miller**, V. V. Kalaiarasan, A. Suer, X. Jia, J. Moyne, J. Iskandar, F. Li. "Applying Transfer Learning Across Chambers to Improve Model Quality and Reduce Modeling Effort" in *2023 APC-SM Proceedings*. Oct. 2023. Conference Presentation.

• P. Kundu, **M. Miller**, P. Gore, X. Jia, J. Lee. "Detection of inception of preload loss and remaining life prediction for ball screw considering change in dynamics due to worktable position" in *Mechanical Systems and Signal Processing*. Apr. 2023. Journal Paper.

• V. Pandhare, **M. Miller**, G. W. Vogl, J. Lee. "Ball Screw Health Monitoring with Inertial Sensors" in *Transactions on Industrial Informatics*. Sep. 2022. Journal Paper.

AWARDS

Rindsberg Fellowship • \$30,000/year stipend for two years; \$7,750/semester graduate tuition for four semesters • Fall 2019 – Fall 2021

Cincinnatus Excellence Scholarship • Awarded to National Merit Finalists • \$9,225/semester undergraduate tuition for eight semesters • Fall 2014 – Spring 2019

Best Student Paper • Advanced Process Control-Smart Manufacturing (APC-SM) Conference • Austin, TX, USA. Oct. 2023.

3rd Place in Aramis Data Challenge • Prognostics and Health Management in Evolving Environments • ESREL2020 PSAM15 Conference. Nov. 2020.

PATENTS

• S. Siahpour, A. Ainapure, J. O. Taco Lopez, **M. Miller**, T. Kuriyama, K. Wakimoto, S. Tsuruta, T. Nakamura. Conditional Domain Adaptation-Based Anomaly Detection Method: U.S. Provisional Number 63/431,384; Filed Dec. 09, 2022. U.S. Patent Number TBD; Filed Dec. 08, 2023.

• M. Azamfar, V. Pandhare, **M. Miller**, F. Li, P. Li, J. Singh, H. Davari, J. Lee, J. F. Sanders, K. Yamaguchi. Tool Condition Monitoring System: U.S. Patent Number 2022/0187164; Filed Jun. 16, 2022.

• M. Azamfar, V. Pandhare, **M. Miller**, F. Li, P. Li, J. Singh, H. Davari, J. Lee, J. F. Sanders, K. Yamaguchi. Monitoring System for Estimating Useful Life of a Machine Component: U.S. Patent Number 2022/0187798; Filed Jun. 16, 2022.

ADDITIONAL PUBLICATIONS

• Y. Hsu, D. Ji, **M. Miller**, X. Jia, J. Lee. “Intelligent Maintenance of Electric Vehicle Battery Charging Systems and Networks: Challenges and Opportunities” in *International Journal of Prognostics and Health Management*. Feb. 2023. Journal Paper.

• J. Lee, X. Jia, V. Pandhare, **M. Miller**. “Analyzing data obtained via wind farm supervisory control and data acquisition” in *Utility-Scale Wind Turbines and Wind Farms*. Aug. 2021. Book Chapter. ISBN 978-1-83953-100-2.

• V. Pandhare, X. Li, **M. Miller**, X. Jia, J. Lee. “Intelligent Diagnostics of Ball Screw Fault through Indirect Sensing using Deep Domain Adaptation” in *Transactions on Instrumentation and Measurement*. Dec. 2020. Journal Paper.

• F. Zhu, X. Jia, **M. Miller**, X. Li, F. Li, Y. Wang, J. Lee. “Methodology for Important Sensor Screening for Fault Detection and Classification in Semiconductor Manufacturing” in *Transactions on Semiconductor Manufacturing*. Nov. 2020. Journal Paper.

• J. Lee, C. Azamfar, **M. Miller**. “5G and Smart Manufacturing” in *Manufacturing Leadership Journal*. Oct. 2020. Journal Article.

• P. Li, X. Jia, J. Feng, F. Zhu, **M. Miller**, L.-Y. Chen, J. Lee. “A novel scalable method for machine degradation assessment using deep convolutional neural network” in *Measurement*. Sep. 2019. Journal Paper.