

# Austin Coursey

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## Summary

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Fourth year Computer Science Ph.D. student at Vanderbilt University aiming to graduate in Spring 2026. Interested in developing and applying machine learning solutions to solve problems in real-world complex systems. Research interests include reinforcement learning, prognostics, anomaly detection, and continual learning. Currently researching the intersection of safe and continual reinforcement learning as part of my NSF Graduate Research Fellowship.

## Education

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- PhD**    **Vanderbilt University**, Computer Science Nashville, TN  
Aug 2022 – present
- Member of the Modeling and Analysis of Complex Systems (MACS) lab under Professor Gautam Biswas at the Institute for Software Integrated Systems.
- BS**    **Murray State University**, Computer Science and Mathematics Murray, KY  
Aug 2018 – May 2022
- Undergraduate Thesis - Data-driven Models for Remaining Useful Life Estimation of Aircraft Engines and Hard Disk Drives
  - 4.0 GPA
  - Honors Degree and Summa Cum Laude
  - Outstanding Senior in Computer Science x2 and Mathematics
  - Multiple leadership positions include President of Association for Computing Machinery and Vice President of Association of Information Technology Professionals

## Experience

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- Siemens**, Research Intern Princeton, NJ  
June 2025 – present
- Researching autonomous multi-agent cyber defense using RL and LLM coordination.
- Vanderbilt University**, NSF Graduate Research Fellow Nashville, TN  
Aug 2024 – present
- Researching the intersection of safe and continual reinforcement learning. Funded by National Science Foundation.
- Vanderbilt University**, Graduate Research Assistant Nashville, TN  
Jan 2023 – Aug 2024
- Graduate RA in the Modeling and Analysis of Complex Systems lab in the Institute for Software Integrated Systems at Vanderbilt University. Worked at a NASA-funded unmanned aerial vehicle (UAV) system-wide safety project. Developed a reinforcement learning controller to counteract wind and fault disturbances to maintain safety.
- Vanderbilt University**, Graduate Teaching Assistant Nashville, TN  
Aug 2022 – Dec 2022
- Graduate TA for five sections of Vanderbilt University's CS 2212 (Discrete Structures) course. Held office hours for dozens of students, graded homework and exams, and assisted professors with various tasks such as running class for the day.
- Carnegie Mellon University**, Undergraduate Researcher Pittsburgh, PA  
June 2021 – Aug 2021
- Summer researcher at Carnegie Mellon University's Research Experience for Undergraduates in Software Engineering (REUSE) program. Evaluated the quality of machine learning model documentation in the form of model cards, a standard proposed by Google. Designed a study to determine the effectiveness of a novel tool that autogenerates model cards for Jupyter Notebooks. Presented findings at a poster session at the end of the summer. Paper published in CHI.
- United Systems and Software**, Software Development Intern Benton, KY  
June 2020 – June 2021
- Performed full-stack website development using Angular (TypeScript, CSS, and HTML), C# .NET, and SQL. Developed a web portal for utility customers across

Kentucky and some surrounding states to pay their bills and participated in Agile, team-based development.

**Land Between the Lakes National Recreation Area**, Webmaster Intern

Golden Pond, KY  
Aug 2019 – Aug 2022

- Developed and maintained a website with over 129,000 monthly page visits. Created over 50 individual web pages using WordPress, HTML, and CSS.

## Funding, Awards, and Honors










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<b>Lacy-Fischer Interdisciplinary Research Grant (\$7500)</b>	2025
<b>National Science Foundation Graduate Research Fellow</b>	2024
<b>Best Reviewer Award - KDD 2024</b>	2024
<b>Murray State University Outstanding Senior Computer Science Senior (x2)</b>	2021-2022
<b>Murray State University Outstanding Mathematics Senior</b>	2022

## Publications

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<b>(23) Data-Driven Fault Detection and Isolation Enhanced with System Structural Relationships</b>	Sept 2025
Austin Coursey, Abel Diaz-Gonzalez, Marcos Quinones-Grueiro, Gautam Biswas (To appear) International Conference on Principles of Diagnosis and Resilient Systems - DX 2025	
<b>(22) A Data-driven Particle Filter Approach for System-Level Prediction of Remaining Useful Life</b>	Sept 2025
Abel Diaz-Gonzalez, Austin Coursey, Marcos Quinones-Grueiro, Gautam Biswas (To appear) International Conference on Principles of Diagnosis and Resilient Systems - DX 2025	
<b>(21) Safe to Fly? Real-Time Flight Mission Feasibility Assessment for Drone Package Delivery Operations</b>	Sept 2025
Abenezer Taye, Austin Coursey, Marcos Quinones-Grueiro, Chao Hu, Gautam Biswas, Peng Wei (To appear) International Conference on Principles of Diagnosis and Resilient Systems - DX 2025	
<b>(20) Analysis of the Efficiency of Traffic Control Algorithms on the Vanderbilt Campus</b>	June 2025
Peter Long, Zhiyao Zhang, Austin Coursey, Marcos Quinones-Grueiro, Gautam Biswas Vanderbilt Young Scientist Journal	
<b>(19) On the Design of Safe Continual RL Methods for Control of Nonlinear Systems</b>	June 2025
Austin Coursey, Marcos Quinones-Grueiro, Gautam Biswas European Control Conference - ECC 2025 <a href="https://arxiv.org/abs/10.48550/arXiv.2502.15922">10.48550/arXiv.2502.15922</a> <a href="#">↗</a>	
<b>(18) Real-Time Freeway Traffic Anomalous Event Detection System via Radar Detector Sensors</b>	May 2025
Austin Coursey, Junyi Ji, Zhiyao Zhang, William Barbour, Marcos Quinones-Grueiro, Tyler Derr, Gautam Biswas, Daniel B Work ACM/IEEE International Conference on Cyber-Physical Systems - ICCPS 2025 <a href="https://arxiv.org/abs/10.1145/3716550.3725156">10.1145/3716550.3725156</a> <a href="#">↗</a>	
<b>(17) FT-AED: Benchmark Dataset for Early Freeway Traffic Anomalous Event Detection</b>	Dec 2024
Austin Coursey, Junyi Ji, Marcos Quinones-Grueiro, William Barbour, Yuhang Zhang, Tyler Derr, Gautam Biswas, Daniel B Work	

- (16) Quantifying the Sim-To-Real Gap in UAV Disturbance Rejection** Oct 2024  
Austin Coursey, Marcos Quinones-Grueiro, Gautam Biswas  
International Conference on Principles of Diagnosis and Resilient Systems - DX 2024  
[10.4230/OASfcs.DX.2024.16](https://oasfcs.dxs.org/2024/16) 
- (15) Data-Driven RUL Prediction Using Performance Metrics** Oct 2024  
Abel Diaz-Gonzalez, Austin Coursey, Marcos Quinones-Grueiro, Chetan S. Kulkarni, Gautam Biswas  
International Conference on Principles of Diagnosis and Resilient Systems - DX 2024  
[10.4230/OASfcs.DX.2024.21](https://oasfcs.dxs.org/2024/21) 
- (14) An Experimental Framework for Evaluating the Safety and Robustness of UAV Controllers** Aug 2024  
Austin Coursey, Marcos Quinones-Grueiro, Gautam Biswas  
AIAA Aviation Forum 2024  
[10.2514/6.2024-4548](https://arc.aiaa.org/article/10.2514/6.2024-4548) 
- (13) Hybrid control framework of uavs under varying wind and payload conditions** July 2024  
Austin Coursey, Marcos Quinones-Grueiro, Gautam Biswas  
American Control Conference - ACC 2024  
[10.23919/ACC60939.2024.10645000](https://acc.confex.com/acc/2024/paper/10645000/) 
- (12) Determining the temporal factors of survival associated with brain and nervous system cancer patients: A hybrid machine learning methodology** July 2024  
Gopal Nath, Austin Coursey, Joseph Ekong, Elham Rastegari, Saptarshi Sengupta, Asli Z Dag, Dursun Delen  
International Journal of Healthcare Management  
[10.1080/20479700.2023.2196101](https://www.ij-hcm.com/article/10.1080/20479700.2023.2196101) 
- (11) R Code Authorship Attribution using the ASAP Tool** July 2024  
Austin Coursey, Matthew Tennyson, Vlad Krotov  
Journal of the Midwest Association for Information Systems  
[10.17705/3jmwa.000090](https://www.jmwa.org/article/10.17705/3jmwa.000090) 
- (10) Time-Series Few Shot Anomaly Detection for HVAC Systems** June 2024  
Yuxin Huang, Austin Coursey, Marcos Quinones-Grueiro, Gautam Biswas  
IFAC Symposium on Fault Detection, Supervision and Safety for Technical Processes - Safe Process 2024  
[10.1016/j.ifacol.2024.07.255](https://www.ifacol.org/2024/07/255) 
- (9) Comparison of Transfer Learning Techniques for Building Energy Forecasting** June 2024  
Shansita Das Sharma, Austin Coursey, Marcos Quinones-Grueiro, Gautam Biswas  
IFAC Symposium on Fault Detection, Supervision and Safety for Technical Processes - Safe Process 2024  
[10.1016/j.ifacol.2024.07.214](https://www.ifacol.org/2024/07/214) 
- (8) A Flexible Data-Driven Prognostics Model Using System Performance Metrics** June 2024  
Abel Diaz-Gonzalez, Austin Coursey, Marcos Quinones-Grueiro, Gautam Biswas  
IFAC Symposium on Fault Detection, Supervision and Safety for Technical Processes - Safe Process 2024  
[10.1016/j.ifacol.2024.07.221](https://www.ifacol.org/2024/07/221) 
- (7) An interactive web-based tool for predicting and exploring brain cancer survivability** Nov 2023  
Gopal Nath, Austin Coursey, Yang Li, Srikanth Prabhu, Harish Garg, Shaymal C Halder, Saptarshi Sengupta

- (6) Enhancing Prognostics with Self-Supervised Imputation** Sept 2023  
Austin Coursey, Abel Diaz-Gonzalez, Marcos Quinones-Grueiro, Gautam Biswas  
International Workshop on Principles of Diagnosis - DX'23 - Workshop Paper
- (5) On Learning Data-Driven Models For In-Flight Drone Battery Discharge Estimation From Real Data** June 2023  
Austin Coursey, Marcos Quinones-Grueiro, Gautam Biswas  
IEEE International Conference on Smart Computing - SMARTCOMP 2023  
[10.1109/SMARTCOMP58114.2023.00038](https://doi.org/10.1109/SMARTCOMP58114.2023.00038) 
- (4) Large-scale End-of-Life Prediction of Hard Disks in Distributed Datacenters** June 2023  
Rohan Mohapatra, Austin Coursey, Saptarshi Sengupta  
IEEE International Conference on Smart Computing - SMARTCOMP 2023 - Workshop Paper  
[10.1109/SMARTCOMP58114.2023.00069](https://doi.org/10.1109/SMARTCOMP58114.2023.00069) 
- (3) Aspirations and practice of ml model documentation: Moving the needle with nudging and traceability** Apr 2023  
Avinash Bhat, Austin Coursey (joint primary), Grace Hu, Sixian Li, Nadia Nahar, Shurui Zhou, Christian Kästner, Jin LC Guo  
CHI Conference on Human Factors in Computing Systems - CHI 2023  
[10.1145/3544548.3581518](https://doi.org/10.1145/3544548.3581518) 
- (2) Incorporating a machine learning model into a Web-based administrative decision support tool for predicting workplace absenteeism** June 2022  
Gopal Nath, Yawei Wang, Austin Coursey, Krishna K Saha, Srikanth Prabhu, Saptarshi Sengupta  
Information  
[10.3390/info13070320](https://doi.org/10.3390/info13070320) 
- (1) Remaining useful life estimation of hard disk drives using bidirectional lstm networks** Dec 2021  
Austin Coursey, Gopal Nath, Srikanth Prabhu, Saptarshi Sengupta  
IEEE International Conference on Big Data - Big Data 2024  
[10.1109/BigData52589.2021.9671605](https://doi.org/10.1109/BigData52589.2021.9671605) 


## Under Submission

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- (8) Detection of Compromised UAVs using Graph Machine Learning**
- (7) Distributed consensus for flight plans using hashgraph**
- (6) Networked Simulation for Cybersecurity Evaluation of Small Unmanned Aircraft Systems in Dense Urban Environments**
- (5) A Survey of Security Challenges and Solutions for UAS Traffic Management (UTM) and Small Unmanned Aerial Systems (sUAS)**
- (4) Remote ID Spoofing Attacks and Defenses**
- (3) Analyzing Embodied Learning in Classroom Settings: A Human-in-the-Loop AI Approach for Multimodal Learning Analytics**
- (2) A Large-Scale Benchmark Dataset for Freeway Anomalous Event Detection**
- (1) Combining Reinforcement Learning and Cascade PID Control for UAV Disturbance Rejection**

## Theses

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- (2) (In progress) Toward Detecting and Adapting to Non-Stationary Dynamics in Safety-Constrained Lifelong Reinforcement Learning** May 2026  
Austin Coursey
- (1) Data-driven models for remaining useful life estimation of aircraft engines and hard disk drives** May 2022  
Austin Coursey  
[digitalcommons.murraystate.edu/honorstheses/116](https://digitalcommons.murraystate.edu/honorstheses/116) 

## Conferences and Refereeing

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- AIAA Aviation Forum** July 2024  
• System-Wide Safety session Co-Chair.
- IEEE Conference on Smart Computing** June 2023  
• Student volunteer.

### Refereeing

- Neural Information Processing Systems (NeurIPS 2025)
- Latin American Control Conference (CLCA 2025)
- International Conference on Control and Fault-Tolerant Systems (SysTol 2025)
- Journal of Aerospace Engineering
- ACM Transactions on Cyber-Physical Systems
- International Workshop on Principles of Diagnosis (DX 2024)
- Journal of Aerospace Information Systems (JAIS)
- IEEE Transactions on Industrial Informatics
- ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD 2024) **Best Reviewer Award**
- IFAC Symposium on Fault Detection, Supervision and Safety for Technical Processes (Safe Process 2024)
- American Control Conference (ACC 2023, 2024)
- Expert Systems with Applications