

Sasha M. McKee

Detailed CV (Aug 2026)

Dept. of Mechanical Engineering and Robotics Center, University of Utah

(801) 860-9355 • sasha.mckee@utah.edu • Salt Lake City, UT

Education

- Doctor of Philosophy, Expected May 2027, Scheduling private defense Fall 2026
 - Mechanical Engineering (Robotics & Control), University of Utah, Salt Lake City, UT.
- Bachelor of Science, June 2021
 - Mechanical Engineering (Robotics & Control), University of Utah, Salt Lake City, UT.

Expertise and Research Interests

My research focuses on the modeling, control, and autonomous robotic systems, emphasizing safety, reliability, and adaptive behavior in complex environments. I integrate principles from control theory and artificial intelligence to detect and mitigate anomalies in autonomous vehicles, while developing data-driven, information-theoretic methods to improve system performance and robustness, with prior experience in an industrial robotics position.

Professional Experience

May 2021 – Present	Graduate Research Assistant , University of Utah, Salt Lake City, UT Conducting research in robotics and control, focusing on autonomous vehicle modeling, optimal control, and information-theoretic anomaly detection.
2022 – Present	Teaching Assistant , University of Utah, Salt Lake City, UT Assisted in courses on dynamics, controls, and robotics; mentored undergraduate students on project-based learning and MATLAB/ROS integration.
July 2020 – May 2021	NSF Research Experience for Undergraduates (REU) , University of Utah, Salt Lake City, UT Designed and developed haptic manipulators for mixed-reality systems, including detailed mechanical design, CAD modeling, and Unity-based virtual integration. Supported human-subject studies linking real and virtual object interaction.
July 2019 – October 2020	Mechanical Engineer Associate , Sarcos Robotics, Salt Lake City, UT Industry position in robotics: Designed and tested exoskeleton evaluation systems following NIST standards. Conducted motor, clutch, and safety testing using LabNet and authored encoder qualification procedures.

Professional Society Membership

1. IEEE, Student Member, 2024–present.
2. ASME, Student Member, 2023–present.

Publications

1. S. M. McKee, O. S. Haddadin, and K. K. Leang, “Feedforward mutual-information anomaly detection: Application to autonomous vehicles,” *ASME Journal of Autonomous Vehicles and Systems*, 2(4):1–8, 2024.
2. N. R. Olsen, S. M. McKee, O. S. Haddadin, S. M. Lyon, J. E. Campbell, and K. K. Leang, “Information-

Theoretic Bayesian Inference for Multi-Agent Localization and Tracking of a Radio Frequency Target With Unknown Waveform,” *ASME Journal of Dynamic Systems, Measurement, and Control*, Nov. 2024; 146(6):061104.

3. N. R. Olsen, S. M. McKee, O. S. Haddadin, S. Lyon, J. Campbell, and K. K. Leang, “Information-Based Mobile Sensor Network Localization and Tracking of an Uncooperative Target,” *IEEE Proc. in Military Communications Conference (MILCOM)*, Rockville, MD, USA, 2022, pp. 490–495.
4. S. M. McKee, O. S. Haddadin, and K. K. Leang, “Context-aware Multivariate Information-based Spatio-temporal Anomaly Detection for Autonomous Cyber-physical Systems,” *IEEE Transactions on Intelligent Vehicles*, Under review.
5. S. M. McKee, O. S. Haddadin, and K. K. Leang, “Minimizing Anomalous Behavior in Autonomous Vehicles through Optimal Control.” *IEEE Transactions on Control Systems Technology*, 50% complete, submission Aug. 2026.

Conference and Poster Presentations

1. S. M. McKee, O. S. Haddadin, and K. K. Leang, “Information-based Anomaly Detection Technique for Autonomous Agents,” *American Control Conference (ACC)*, Toronto, Canada, 2024.
2. J. M. Anderson, S. M. McKee, K. K. Leang, “Estimation and Control: Practical Applications of Machine Learning for Feedback Systems,” Presented in Tutorial Session: “A Tutorial on Easy Learning, Adaptation in Feedback Systems, *Modeling, Estimation, and Control Conference (MECC)*, Chicago, IL, October 28-30, 2024.
3. S. M. McKee, O. S. Haddadin, and K. K. Leang, “Information-based Mobile Sensor Behavior Classification for Anomaly Detection,” *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, Seattle, WA, USA, 2023.
4. C. K. Lapins, S. M. McKee, J. M. Anderson, K. K. Leang, “Real-Time Control of Mobile Robotic Systems through the Robot Operating System (ROS)(I),” Presented in Tutorial Session: “A Tutorial on Real-Time Computing Issues for Control,” *American Control Conference (ACC)*, San Diego, CA, 2023.

Proposal Writing Experience

1. “CPS-FR: Information, Haptics, and AI for Detection, Classification, and Awareness of Anomalous Behavior in Autonomous Cyber-Physical Systems”, Total Budget: \$999,933, Proposal Submitted to the National Science Foundation in August 2025 (Under review). Helped Ph.D. advisor Prof. Kam Leang write sections of the proposal, including technical research plan related to anomaly detection, created figures, and helped develop project budget. Investigators: K. K. Leang (PI), E. Battaglia (Co-PI), and D. Brown (Co-PI).
2. “NSF Convergence Accelerator Track L: Infotaxis SENSing and Source-term Estimation (iSENSE) of Chemical Gas”, Total Budget: \$700,000, Proposal Submitted to the National Science Foundation in August 2023 (Not funded). Helped Ph.D. advisor Prof. Kam Leang write sections of the proposal, including a technical research plan related to estimation and motion planning, created figures, and helped develop the project budget. Investigators: K. K. Leang (PI), G. Clayton (Co-PI), and A. Kuntz (Co-PI).
3. “NSF Graduate Research Fellowship Program (GRFP): Autonomous Swarms of Mobile Sensors for Climate-Change Research: Multi-modal Sampling of Soil, Water, and Air for Environmental Studies,” Total budget \$100,000, Proposal submitted to the National Science Foundation in October 2021 (Not funded). Wrote a research plan for a dissertation considering the environmental and broader impacts.

Teaching Experience

Teaching Assistant

1. **ME EN 3230 Dynamic Systems and Control Summer 2026** (21 students): Grader
2. **ME EN 3230 Mechatronics Spring 2024** (111 students): Supported a lab-intensive robotics and mechatronics course through hands-on instruction, mentoring, and technical assistance. Guided students in integrating sensors, actuators, and microcontrollers for robotic systems; provided feedback on design projects; and helped debug hardware and control code to ensure successful prototype demonstrations.
3. **ME EN 6200 Classical Control Fall 2024** (66 students): Assisted graduate and undergraduate students in applying control theory to real-world robotic and electromechanical systems. Held office hours, supported MATLAB-based controller design, graded assignments and exams, and provided individualized mentorship to strengthen understanding of system stability and feedback design.
4. **ME EN 6205 System Dynamics Fall 2024** (28 students): Facilitated instruction in dynamic system modeling and simulation for robotics and mechatronic applications. Assisted recitation sessions, graded assignments, and supported students in building state-space and energy-based models.
5. **ME EN 3230 Mechatronics Fall 2022** (79 students): Provided hands-on instruction and mentoring in a robotics-focused mechatronics laboratory, assisting students with sensor integration, microcontroller programming, data acquisition, and actuator control. Supported weekly labs and design-project milestones, helped students troubleshoot hardware and embedded-system issues, and guided teams as they developed functional robotic systems for the end-of-semester competition mimicking Overcooked so the mobile robots need to deliver meals (colored blocks) to tables.

Guest Lectures

1. **ME EN 5205/6205 System Dynamics Fall 2024**, integrating state space system models for simulation, October 15, 2024.
2. **ME EN 5200/6200 Classical Control Fall 2024**, Root Locus design understanding how the poles of a system change as a gain is varied, November 3, 2024.

Mentoring Experience

Graduate Students

1. Kelton McGrath, Project title: "Remote and Austere Conditions (RAC)," develop delivery drone launched from vehicle to delivery emergency medicine, 2025 - Present, Ph. D. candidate.
2. Mikael Mrotek, Project title: "Ergodic Exploration and Sequential Monte Carlo Method for Avalanche Victim Search," balancing exploration versus exploitation of an avalanche beacon receiver, 2024 - Present, Ph.D. candidate.
3. Jakon Allred, Project title: "Close-proximity Flight Control," estimating in-flight close-proximity effects to allow close formation control of quadrotors, 2024 - 2025, M.S. student.
4. Jacob Anderson, Project title: "Simultaneous State and Parameter Estimation of Inductively-Coupled Buried Sensors for Soil Moisture Monitoring in Precision Agriculture," assisted in the development of a model to estimate the moisture throughout an agricultural field, 2022 - present, Ph.D. candidate.

Undergraduate Students

1. Heston Grant Project title: "Design of aircraft frame using CNC," 2025 - Present.
2. Ian Goodell, Project title: "Remote and Austere Conditions (RAC)," developed a delivery drone launched from a vehicle to deliver emergency medicine, 2025 - Present.

Service Activities

Professional and Community Service

Conference Organization

1. Committee, “Student Networking Event”, American Control Conference (ACC), Toronto, Canada, July 8 - 12, 2024. Supported event logistics and facilitated student–professional round-table discussions to enhance engagement within the control systems community.
2. Program Chair Assistant, American Control Conference (ACC), Toronto, Canada, July 8 - 12, 2024.
3. Finance Chair Assistant, 2023 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM), Seattle, WA, U.S.A., June 28-30, 2023.

Reviewer/Editorial Service for Peer Articles

Active reviewer (starting year)

1. IEEE/ASME Transactions on Mechatronics, 2022,
2. ASME Letters in Dynamics Systems, and Control, 2023,
3. Mechatronics Journal (Elsevier), 2023.

Conference reviews

1. 2025 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM), Hangzhou, China, July 14-18, 2025
2. 2024 Modeling, Estimation, and Control Conference (MECC), Chicago, U.S.A., October 27-30 2024,
3. American Control Conference (ACC), Toronto, Canada, July 8-12, 2024.

Outreach-Related (*e.g.* K-12)

1. Introduction into robotics and AI for high school students from NLC Youth Delegation (November 21, 2025).
2. State-of-the-art robotics for chemical sensing and avalanche victim finding for middle and high school students participating in an after-school program (April 23, 2025)
3. The future of robotics for the Utah School for the Deaf and Blind (June 5, 2024).
4. Using quadcopters for chemical sensing for middle and high school students participating in an after-school program (November 29, 2023).