Katherine Driggs-Campbell

Assistant Professor
Dept. of Electrical and Computer Engineering | Coordinated Science Laboratory
University of Illinois at Urbana-Champaign

Contact Info

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Academic Appointments

Assistant Professor – 2019 to present

Department of Electrical and Computer Engineering
Affiliate Appointment in Department of Computer Science
Coordinated Science Laboratory
University of Illinois at Urbana-Champaign

Postdoctoral Research Scholar – June 2017 to Dec. 2018

Department of Aeronautics and Astronautics
Stanford University

Education

University of California, Berkeley, Berkeley, California

Advisor: Professor Ruzena Bajcsy
Ph.D., Electrical Engineering and Computer Sciences – May 2017
Thesis: *Tools for Trustworthy Autonomy: Robust Predictions, Intuitive Control, and Optimized Interaction*
M.S., Electrical Engineering and Computer Sciences – May 2015
Thesis: *Experimental Design for Human-in-the-Loop Driving Simulations*

Arizona State University, Tempe, AZ

B.S.E., Electrical Engineering with Honors - May 2012
Summa Cum Laude
Outstanding Graduating Senior in Electrical Engineering

Journal Publications

The (*) indicates that the author was a graduate student supervised by Katie Driggs-Campbell at the time of the publication. The (°) indicates that the author was an undergraduate student supervised by Katie Driggs-Campbell at the time of publication.

1. **Proactive Anomaly Detection for Robot Navigation with Multi-Sensor Fusion.**
   T. Ji*, A. Narenthiran Sivakumar, G. Chowdhary, *K. Driggs-Campbell.* IEEE Robotics and Automation Letters (RA-L), 2022.
2. **Learning Sparse Interaction Graphs of Partially Observed Pedestrians for Trajectory Prediction.**
   Z. Huang*, R. Li°, K. Shin°, *K. Driggs-Campbell.* IEEE Robotics and Automation Letters (RA-L), 2021.
3. **Long-term Pedestrian Trajectory Prediction using Mutable Intention Filter and Warp LSTM.**
   Z. Huang*, A. Hasan*, K. Shin°, R. Li°, *K. Driggs-Campbell*. IEEE Robotics and Automation Letters (RA-L), 2020.
4. **Finding Diverse Failure Scenarios in Autonomous Systems Using Adaptive Stress Testing.**
   P. Du*, *K. Driggs-Campbell*. SAE Intl. Journal of Connected and Automated Vehicles, 2019.

5. **Combining Planning and Deep Reinforcement Learning in Tactical Decision-Making for Autonomous Driving.**
   C.J. Hoel, *K. Driggs-Campbell*, K. Wolff, L. Laine, M.J. Kochenderfer. IEEE Transactions on Intelligent Vehicles, 2019.
6. **Robust, Informative Human-in-the-Loop Predictions via Empirical Reachable Sets.**
   K. Driggs-Campbell, R. Dong, R. Bajcsy. IEEE Transactions on Intelligent Vehicles, June 2018.
7. **Integrating Intuitive Driver Models in Autonomous Planning for Interactive Maneuvers.**
   K. Driggs-Campbell, V. Govindarajan, R. Bajcsy. IEEE Transactions on Intelligent Transportation Systems: Special Issue on Applications and Systems for Collaborative Driving, Oct. 2017.
8. **Semi-Autonomous Vehicular Control Using Driver Modeling.**
   V. Shia, Y. Gao, R. Vasudevan, *K. Driggs-Campbell,* T. Lin, F. Borrelli, R. Bajcsy. IEEE Transactions on Intelligent Transportation Systems, June 2014.
9. **Wireless Hybrid Chemical Sensor for Detection of Environmental Volatile Organic Compounds.**
   C. Chen, F. Tsow, *K. Driggs-Campbell,* R. Iglesias, E. Forzani, N. Tao. IEEE Sensors Journal, May 2013.
10. **A new sensor for the assessment of personal exposure to volatile organic compounds.**
    K. Driggs-Campbell, C. Chen, I. Negi, N. Tao, F. Tsow, E. Forzani. Atmospheric Environment, 2012.

Peer Reviewed Conference Publications

The (*) indicates that the author was a graduate student supervised by Katie Driggs-Campbell at the time of the publication. The (^{o}) indicates that the author was an undergraduate student supervised by Katie Driggs-Campbell at the time of publication. The ($^{+}$) indicates equal contribution.

1. **Traversing Supervisor Problem: An Approximately Optimal Approach to Multi-Robot Assistance**
   T. Ji*, R. Dong, *K. Driggs-Campbell.* Robotics: Science and Systems (RSS), 2022.
2. **Learning to Navigate Intersections with Unsupervised Driver Trait Inference.**
   S. Liu*, P. Chang*, H. Chen*, N. Chakraborty*, *K. Driggs-Campbell.* IEEE International Conference on Robotics and Automation (ICRA), 2022.
3. **Off Environment Evaluation Using Convex Risk Minimization.**
   P. Katdare*, S. Liu*, *K. Driggs-Campbell.* IEEE International Conference on Robotics and Automation (ICRA), 2022.
4. **Meta-path Analysis on Spatio-Temporal Graphs for Pedestrian Trajectory Prediction.**
   A. Hasan*, P. Sriram^{o}, *K. Driggs-Campbell.* IEEE International Conference on Robotics and Automation (ICRA), 2022.
5. **Multi-Agent Variational Occlusion Inference Using People as Sensors.**
   M. Itkina, Y.J. Mun*, *K. Driggs-Campbell,* M.J. Kochenderfer. IEEE International Conference on Robotics and Automation (ICRA), 2022.
6. **Decentralized Structural-RNN for Robot Crowd Navigation with Deep Reinforcement Learning.**
   S. Liu^{*+}, P. Chang^{*+}, W. Liang*, N. Chakraborty^{o}, *K. Driggs-Campbell.* IEEE International Conference on Robotics and Automation (ICRA), 2021.
7. **Adaptive Failure Search Using Critical States from Domain Experts.**
   P. Du*, *K. Driggs-Campbell.* IEEE International Conference on Robotics and Automation (ICRA), 2021.
8. **Multi-Modal Anomaly Detection for Unstructured and Uncertain Environments.**
   T. Ji*, S.T. Vuppala, G. Chowdhary, *K. Driggs-Campbell*. Conference on Robot Learning (CoRL), 2020.
9. **Robot Sound Interpretation: Combining Sight and Sound in Learning-Based Control.**
   P. Chang*, S. Liu*, H. Chen^{o}, *K. Driggs-Campbell*. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020.

10. **Online Monitoring for Safe Pedestrian-Vehicle Interactions.**
    P. Du*, Z. Huang*, T. Ji*, T. Liu, K. Xu*, Q. Gao, H. Sibai, *K. Driggs-Campbell,* S. Mitra. IEEE International Conference on Intelligent Transportation Systems (ITSC), 2020.
11. **Monte-Carlo Tree Search for Policy Optimization.**
    X. Ma, *K. Driggs-Campbell*, Z. Zhang, M.J. Kochenderfer. International Joint Conference on Artificial Intelligence (IJCAI), 2019.
12. **Adaptive Stress Testing with Reward Augmentation for Autonomous Vehicle Validation.**
    A. Corso[+], P. Du[+]*, *K. Driggs-Campbell*, M.J. Kochenderfer. IEEE Intelligent Transportation Systems Conference (ITSC), 2019.
13. **Dynamic Environment Prediction in Urban Scenes using Recurrent Representation Learning.**
    M. Itkina, *K. Driggs-Campbell*, M.J. Kochenderfer. IEEE Intelligent Transportation Systems Conference (ITSC), 2019.
14. **EnsembleDAgger: A Bayesian Approach to Safe Imitation Learning.**
    K. Menda, *K. Driggs-Campbell,* M.J. Kochenderfer. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2019.
15. **Simulating Emergent Properties of Human Driving Behavior Using Multi-Agent Reward Augmented Imitation Learning.**
    R. Bhattacharyya, D. Phillips, C. Liu, J. Gupta, *K. Driggs-Campbell,* M.J. Kochenderfer. IEEE International Conference on Robotics and Automation (ICRA), 2019.
16. **HG-DAgger: Interactive Imitation Learning with Human Experts.**
    M. Kelly, C. Sidrane, *K. Driggs-Campbell,* M.J. Kochenderfer. IEEE International Conference on Robotics and Automation (ICRA), 2019.
17. **Affective Driver State Monitoring for Personalized, Adaptive ADAS.**
    V. Govindarajan, *K. Driggs-Campbell,* R. Bajcsy. IEEE International Conference on Intelligent Transportation Systems (ITSC), 2018.
18. **People as Sensors: Imputing Maps from Human Actions.**
    O. Afolabi[+], *K. Driggs-Campbell[+],* R. Dong, M.J. Kochenderfer, S.S. Sastry. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2018.
19. **Improved Robustness and Safety for Autonomous Vehicle Control with Adversarial Reinforcement Learning.**
    X. Ma, *K. Driggs-Campbell,* M.J. Kochenderfer. IEEE Intelligent Vehicle Symposium, 2018.
20. **Data-Driven Reachability Analysis for Human-in-the-Loop Systems.**
    V. Govindarajan, *K. Driggs-Campbell,* R. Bajcsy. IEEE Conference on Decision and Control, 2017.
21. **Optimizing Interaction Between Humans and Autonomy via Information Constraints on Interface Design.**
    T. Rezvani, *K. Driggs-Campbell,* R. Bajcsy. IEEE International Conference on Intelligent Transportation Systems (ITSC), 2017.
22. **Probabilistic driver modeling: Characterizing human behavior for semiautonomous vehicles.**
    K. Driggs-Campbell, V. Shia, R. Bajcsy. Chapter 5 of Vehicle Systems and Driver Modelling: DSP, Human-To-vehicle Interfaces, Driver Behavior, and Safety. Walter de Gruyter GmbH & Co KG, 2017.
23. **Towards Trustworthy Automation: User Interfaces that Convey Internal and External Awareness.**
    T. Rezvani, *K. Driggs-Campbell,* D. Sadigh, S.S. Sastry, S. Seshia, R. Bajcsy. IEEE International Conference on Intelligent Transportation Systems (ITSC), 2016.
24. **Communicating Intent on the Road Through Human-Inspired Control Schemes.**

K. Driggs-Campbell, R. Bajcsy. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2016.

25. **Comparing Generalized Models of Driver Intent in Dynamic Environments.**
    K. Driggs-Campbell, R. Bajcsy. IEEE Intelligent Vehicles Symposium, 2016.
26. **Identifying Modes of Intent from Driver Behaviors in Dynamic Environments.**
    K. Driggs-Campbell, R. Bajcsy. IEEE International Conference on Intelligent Transportation Systems (ITSC), 2015.
27. **Improving Human-In-The-Loop Decision Making in Multi-Mode Driver Assistance Systems Using Hidden Mode Stochastic Switched Systems.**
    C. Lam, A. Yang, *K. Driggs-Campbell,* R. Bajcsy, S.S. Sastry. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2015.
28. **Improved Driver Modeling for Human-in-the-Loop Vehicular Control.**
    K. Driggs-Campbell, V. Shia, R. Bajcsy. IEEE International Conference on Robotics and Automation (ICRA), 2015.
29. **Data-driven probabilistic modeling and verification of human driver behavior.**
    D. Sadigh, *K. Driggs-Campbell,* A. Puggelli, W. Li, V. Shia, R. Bajcsy, A. Sangiovanni-Vincentelli, S.S. Sastry, S. Seshia. Formal Verification and Modeling in Human-Machine Systems–AAAI Spring Symposium, 2014.

Conference Posters, Workshop Papers, and Technical Reports

1. **AutoPreview: A Framework for Autopilot Behavior Understanding.**
   Y.Shen*, N. Wijayaratne°, P. Du*, S.J. Jiang°, *K. Driggs-Campbell*. ACM CHI Conference on Conference on Human Factors in Computing Systems: Late-Breaking Work, 2021.
2. **Building Mental Models through Preview of Robot Behaviors.**
   Y. Shen*, N. Wijayaratne°, *K. Driggs-Campbell*. HRI Workshop: The Road to a successful HRI: AI, Trust and ethicS (TRAITS), 2021.
3. **Variational Occlusion Inference Using People as Sensors.**
   M. Itkina, Y. Mun*, *K. Driggs-Campbell,* M.J. Kochenderfer. NeurIPS Workshop: Women in Machine Learning (WiML), 2020.
4. **Safe Crowd Navigation in the Presence of Occlusion.**
   Y. Mun*, M. Itkina, *K. Driggs-Campbell.* NeurIPS Workshop: Women in Machine Learning (WiML), 2020.
5. **Multi-Modal Anomaly Detection for Unstructured and Uncertain Environments.**
   T. Ji*, S.T. Vuppala, G. Chowdhary, *K. Driggs-Campbell*. International Conference on Digital Technologies for Sustainable Crop Production (DIGICROP), 2020.
6. **Evaluation of Autonomous Vehicle Policies Using Adaptive Search.**
   P. Du*, *K. Driggs-Campbell*. IROS Workshop on Benchmarking Progress in Autonomous Driving, 2020.
7. **Levels of Autonomy for Field Robots.**
   G. Chowdhary, C. Soman, *K. Driggs-Campbell.* White Paper, 2020. Available at https://www.earthsense.co/news/2020/7/24/levels-of-autonomy-for-field-robots
8. **Using Affective Measurements of Pedestrian Gait to Improve Autonomous Vehicle Performance in Mixed Driver Settings.**
   K. Driggs-Campbell, A. LaViers. IROS Workshop: Machines with Emotions: Affect Modeling, Evaluation, and Challenges in Intelligent Cars, 2019.
9. **Occupancy Grid Prediction in Cluttered, Dynamic Environments.**

M. Itkina, *K. Driggs-Campbell,* M.J. Kochenderfer. NeurIPS Workshop: Women in Machine Learning (WiML), 2018.

10. **Human-Centered Approach to Autonomy: Driver Modeling for Smart Vehicles.**
    K. Driggs-Campbell, V. Govindarajan, R. Bajcsy. IROS Workshop: Perspectives on Analysis and Design of Human-Centered Robotics, 2016.
11. **Decisions for Autonomous Vehicles: Integrating Sensors, Communication, and Control.**
    K. Driggs-Campbell, V. Shia, R. Bajcsy. ACM International Conference on High Confidence Networked Systems (HiCoNS) at CPS Week, 2014.
12. **Experimental Design for Human-in-the-Loop Driving Simulations.**
    K. Driggs-Campbell, G. Bellegarda, V. Shia, S. S. Sastry, R. Bajcsy. Technical Report – Available on arXiv:1401.5039, 2014.
13. **Probabilistic driver models for semiautonomous vehicles.**
    K. Driggs-Campbell, V. Shia, R. Vasudevan, F. Borrelli, R. Bajcsy. Digital Signal Processing for In-Vehicle Systems, 2013.
14. **Measurement of TVOC and BC with a lab-on-a-cell phone and sensor technology for personal exposure assessment.**
    J.M. Delgado-Saborit, B. Macias, R. Harrison, *K. Driggs-Campbell,* C. Chen, F. Tsow, E. Forzani, N. Tao. X2012 – International Conference on the Science of Exposure Assessment, 2012.

Works Under Review

- **Improving the Feasibility of Moment-Based Safety Analysis for Stochastic Dynamics.**
  P. Du*, *K. Driggs-Campbell,* R. Dong, 2022.
- **Hierarchical Intention Tracking for Robust Human-Robot Collaboration in Industrial Assembly Tasks.**
  Z. Huang*, Y.J. Mun*, X. Li, Y. Xie, N. Zhong, W. Liang*, J. Geng, T. Chen, *K. Driggs-Campbell.* 2022.
- **Model Learning and Predictive Control for Autonomous Obstacle Reduction via Bulldozing.**
  J. Wagner*, *K. Driggs-Campbell,* A. Soylemezoglu. 2022.
- **World in Motion: Geometry-based Video Prediction with Visual Odometry Prediction and View Synthesis.**
  W. Liang*, N. Chakraborty*, P. Sriram*, Y. Fang, Z. Huang*, P. Chang*, S. Liu*, *K. Driggs-Campbell.* 2022.
- **Socially Aware Robot Crowd Navigation with Interaction Graphs and Human Trajectory Prediction.**
  S. Liu*, P. Chang*, Z. Huang*, N. Chakraborty*, W. Liang*, J. Geng, *K. Driggs-Campbell.* 2022.
- **Occlusion-Aware Crowd Navigation Using People as Sensors.**
  Y.J. Mun*, M. Itkina, S. Liu*, *K. Driggs-Campbell.* 2022.
- **Learning Visual-Audio Representations for Voice-Controlled Robots.**
  P. Chang*, S. Liu*, *K. Driggs-Campbell.* 2022.
- **AST Toolbox: An Adaptive Stress Testing Framework.**
  M. Koren[+], X. Ma[+], A. Corso, M.J. Kochenderfer, R. Moss, P. Du*, *K. Driggs-Campbell.* 2020.
  Available on GitHub: https://github.com/sisl/AdaptiveStressTestingToolbox
- **Modeling and Prediction of Human Driver Behavior: A Survey.**
  K. Brown, *K. Driggs-Campbell,* M.J. Kochenderfer. Available on arXiv, 2020.
- **To Explain or Not to Explain: A Study on the Necessity of Explanations in Autonomous Driving.**
  Y. Shen*, SJ Jiang[o], Y. Chen[o], E. Yang[o], X. Jin[o], Y. Fan[o], *K. Driggs Campbell*. Available on arXiv, 2020.

- **Robust Model Predictive Control with Recursive State Estimation under Set-Membership Uncertainty.**
  T. Ji*, J. Geng, *K. Driggs-Campbell.* 2021.

Invited Talks & Panels

- **Inference and Prediction for Safe Interaction**
  - 4th Workshop on Long-term Human Motion Prediction (ICRA), May 2022
- **Human-Centered Autonomy: From Fluid Interaction to Intuitive Design**
  - Northwestern University Data Analytics Exchange, May 2022
- **Two Tough Navigation Problems: Robot Planning and Career Paths**
  - Keynote at Illinois Scholars Undergraduate Research Banquet, April 2022
- **Robust Navigation for Agricultural Robots via Anomaly Detection**
  - PhenoRob Seminar Series, Unversity of Bonne, April 2022
- **Hey, I'm Walkin' Here! (how to help robots safely navigate among us)**
  - Illinois Saturday Engineering for Everyone, March 2022
- **Introducing CyMaN: A Joint Effort in Resilient Manufacturing and Collaborative Workspaces**
  - ZJU-UIUC Research Forum (Engineering+), Jan. 2022
- **Fantastic Failures and Where to Find them:Considering Safety as a Function of Structure**
  - NeurIPS Workshop on Machine Learning for Autonomous Driving (ml4AD), Dec. 2021
  - MIT Robotics Seminar, Oct. 2021
- **Inference, Prediction, and Representations for Safe Navigation**
  - ICSR Workshop on Safe Human-Robot Interaction: Sensing, Modeling, and Learning, 2021
- **Uncovering Structure in Human-Robot Systems**
  - CSL Future of Computing Syposium, 2021
- **Hey, I'm Walkin' Here! Inferring human behaviors from observations**
  - CIRCLES Workshop on Traffic and Autonomy, 2021
- **Building Trustworthy Autonomy in Critical Scenarios**
  - Keynote: CHI Workshop on Towards Explainable and Trustworthy Autonomous Physical Systems, May 2021
- **Predictive Methods for Safe Vehicle-Pedestrian Interaction**
  - Invited Talk: UC Berkeley Semiautonomous Seminar, Jan. 2021
  - Invited Talk: IEEE Intelligent Vehicle Symposium Workshop - From Benchmarking Behavior Prediction to Socially Compatible Behavior Generation in Autonomous Driving, Nov. 2020
- **Inference and Prediction Insights for Safe Vehicle-Pedestrian Interaction**
  - Invited Talk: IPAM Workshop on Safe Operation of Connected and Autonomous Vehicle Fleets, Oct. 2020
- **Fantastic Failures and Where to Find Them**
  - Plenary Talk at c3.ai Safe Autonomy Workshop, December 2020
  - Keynote on Autonomy: Runtime Verification, October 2020
  - Invited Talk: Robotics: Science and Systems Workshop - Robust autonomy: Safe robot learning and control in uncertain real-world environments, July 2020
- **Tutorial on Designing Trustworthy Driver Assistance Systems**
  - Invited Lecture: Autonomous Vehicles and Transportation Long Program, Sept. 2020

- **Tutorial on Model Considerations for Behavior Estimation and Prediction**
  - Invited Lecture: Autonomous Vehicles and Transportation Long Program, Sept. 2020
- **Trustworthy Autonomy: Robust Decision-Making and Adaptive Validation**
  - Invited Talk: Sci-Tech Innovative Frontiers Forum | STIFF Lecture Series, April 2020
- **Trustworthy Autonomy: Behavior Prediction and Validation**
  - Invited Talk: Autonomous Systems Design at Design, Automation, and Test in Europe (DATE), March 2020
  - Guest Lecture: BioDesign Institute at Arizona State University, Feb. 2020
  - Invited Talk: IPAM workshop on Autonomous Vehicles, March 2019
- **Perspectives and Open Problems in Human-Robot Interaction**
  - Invited Panelist: CRA CCC Assured Autonomy Workshop: Panel for Human Interactions, Feb. 2020
  - Invited Talk and Participant: US Robotics Roadmap, Sept. 2019
- **Towards Robust Autonomy: Adversarial Learning and Adaptive Validation**
  - Invited Talk: UC Berkeley ITS Seminar, Nov. 2019
  - Invited Talk: IEEE ITSC Workshop on Decision-making for Self-driving Cars in Dynamic and Complex Environments, Oct. 2019
  - Invited Talk: Samsung Innovation Center, Aug. 2019
- **Panel on *Humans in network transportation systems***
  - Invited Panelist: NSF Workshop on Control for Networked Transportation Systems (CNTS) at ACC, July 2019
- **Robust, Informative Behavior Predictions for Trustworthy Autonomy**
  - Invited Talk: IEEE Intelligent Vehicle Symposium: Workshop on Prediction and Decision-Making for Socially Interactive Autonomous Driving, June 2019
- **Open Problems for Robotics and Cyber-Human Systems**
  - Invited Participant: Dagstuhl Seminar 19071 on Specification Formalisms for Modern CPS, Feb. 2019
- **State of the Art in Driver Modeling**
  - Invited Talk: Samsung Strategy and Innovation Center, Nov. 2018
- **Deep Learning and Validation for Automated Driving Systems**
  - Invited Talk: Waymo, July 2018
  - Invited Talk: SAE Innovations in Mobility, May 2018
- **Lecture on Combinatorial Optimization**
  - Guest Lecture: AA222: Algorithms for Optimization, May 2017
- **Trustworthy Autonomy: Algorithms for Human-Robot Systems**
  - Invited Talk: Department of Electrical Engineering Systems, USC, April 2018
  - Invited Talk: Department of Electrical and Computer Engineering, UIUC, March 2018
  - Invited Talk: Department of Electrical and Computer Engineering, UCSB, Feb. 2018
- **Human-Centered Autonomy: Uncovering Structure in Multi-Agent Systems**
  - Invited Talk: Department of Mechanical Engineering, McGill, March 2018
  - Invited Talk: Department of Mechanical Engineering, University of Michigan, March 2018
- **What are the Main Practical Safety Issues with AI Products?**
  - Invited Panelist: Re*Work Deep Learning Summit Panel, Jan. 2018

- **Towards Trustworthy Autonomy**
  - Invited Talk: SAE Autonomous Vehicle Meetup, Oct. 2017
  - Invited Talk: Re*Work Autonomous Vehicles Summit, March 2017
- **Understanding Driver Behaviors for Safe Interaction**
  - Invited Talk: GRASP Special Seminar, Feb. 2017
- **Driver Modeling for Safe Interaction: A data-driven hybrid systems approach**
  - Invited Talk: Autonomous Systems Lab (ASL), Feb. 2017
  - Invited Talk: Stanford Intelligent Systems Lab (SISL): Automotive Seminar, Jan. 2017
  - Invited Talk: Robotics Seminar, University of Michigan, Jan. 2017
  - Invited Talk: UCLA Vision Lab, Dec. 2016
- **Modeling Driver Behaviors in Semi- and Fully Autonomous Vehicles for Safe Interaction**
  - Invited Talk: Automatic Control Department Seminar at KTH, June 2016
- **Driver Modeling for Smart Vehicles**
  - Invited Talk: PreScan User Group Meeting at the SAE World Congress, April 2015
- **Human Inspired Modeling for Autonomous Systems: Utilizing Sensors, Machine Learning, and Control**
  - Invited Talk: UIUC Coordinated Science Lab Student Conference, Jan. 2015
- **Lab-on-a-Cell Phone for Personal Exposure Assessment**
  - Plenary Speaker: From Exposure to Health Effects: Novel Approaches to Find the Linkage, University of Birmingham, UK, May 2011

Research Experience

Tenure-Track Assistant Professor, Univ. of Illinois at Urbana-Champaign – January 2019 to present

Department of Electrical and Computer Engineering + Coordinated Science Laboratory

- Leading research group that investigates fundamental research into modeling, learning, and decision making for interactive robotic and autonomous systems
- Considering how to design safe and interactive systems with applications in agriculture, manufacturing, autonomous vehicles, and assistive robotics
- Affiliated with the Department of Computer Science and associated with the Illinois Discovery Partners Institute (DPI), Institute for Inclusion, Diversity, Equity, and Access (IDEA), and Center for Digital Agriculture

Research Consultant – Dec. 2018 to June 2019

Samsung Strategy and Innovation Center

- Providing research support and insight to the autonomous driving R&D team, in the fields of human behavioral modeling and learning for autonomous systems

Postdoctoral Research Scholar, Stanford Intelligent Systems Lab – June 2017 to Dec. 2018

Aeronautics and Astronautics Department, Stanford University
Advisor: Prof. Mykel J. Kochenderfer

- Leading an industry sponsored research project to develop autonomous systems that can effectively perceive and interact in complex urban environments

Graduate Student Researcher, UC Berkeley – Aug. 2012 to May 2017

Department of Electrical Engineering and Computer Sciences

- Funded research on modeling, decision making, and control frameworks for human-in-the-loop systems to provide safety guarantees on interaction in smart vehicles

Research Intern, MIT Lincoln Laboratory – June 2015 to Aug. 2015

Supervisor: Timothy J. Dasey, Ph.D.

- Research conducted on human-in-the-loop systems with the Informatics and Decision Support Group, applying Active Perception techniques to surveillance applications

Research and Development Intern, TASER International – June 2011 to Aug. 2011

Supervisor: Michael Gish

- Research conducted for the development of new safety control mechanisms to provide higher safety margins while maintaining the ability to induce Neural Muscular Incapacitation

Undergraduate Researcher, Arizona State University – Nov. 2009 to May 2012

Department of Electrical, Computer, and Energy Engineering + BioDesign Institute
Advisor: Prof. NJ Tao

- Research partially funded by the FURI program and NIH, focusing on wearable bio- and chemical sensor development for epidemiology studies

Technical Employee, COVID Inc. – May 2009 to Aug. 2009

Supervisor: Norm Carson

- Provided technical support, assisted in manufacturing and production, and testing support for various signal processors and audio/visual receivers and transmitters

Teaching Experience

ECE 598: Human-Robot Interaction, U of I at Urbana-Champaign – Fall 2020

New special topics class introducing methods for designing robots that understand people, are easily understood by people, and interact effectively with people

ECE 470: Introduction to Robotics, U of I at Urbana-Champaign – Fall 2019, Spring 2020

(Course director) Re-vamped course to include modern robotics perspectives , covering state estimation, kinematics, decision-making, and motion planning with labs on UR3

ECE 484: Principles of Safe Autonomy, U of I at Urbana-Champaign – Spring 2019, Spring 2021

(Co-taught with Prof. Sayan Mitra) New course that covers the development of a full autonomous system stack that can be deployed on a real-world test vehicle (provided by AutonomouStuff), with an emphasis on safety analysis

EECS 106b: Robotic Manipulation and Interaction, UC Berkeley – Fall 2016

Head TA, with Profs. Ruzena Bajcsy, Shankar Sastry, and Ken Goldberg

EECS 70: Discrete Math and Probability Theory, UC Berkeley– Fall 2015

Head TA, with Prof. Anant Sahai

Organized Workshops and Seminars

Adaptive and Resilient Cyber-Physical Manufacturing – January 4, 2021

Organized workshop to discuss recent research developments in flexible manufacturing networks between researchers at UIUC and ZJU

Road to Safe Autonomy – April 18, 2018

Co-organized workshop that explored different approaches used to validate automated driving systems, with experts from academia, industry, and government

Women in Intelligent Transportation Systems Event at IV2017 – June 12, 2017

Co-organized first WITS event at the Intelligent Vehicle Symposium to celebrate women in the field of transportation and engage in a discussion about the state of the community

IROS2016: Perspectives on the Design and Analysis of Human-Centered Robotics – Oct. 10, 2016

Co-organized workshop that aims to promote discussion from different perspectives to align research efforts by highlighting some of the key existing technical methods for introducing autonomous robots into the human domain

Sexual Violence and Sexual Harassment (SVSH) Orientation – Aug. 31 and Sept. 6, 2016

To improve the department and the campus community, I co-hosted a university sponsored workshop on SVSH that was required for all incoming graduate students
This seminar has been repeated at UIUC within various departments

DREAM Seminar – Fall 2015 to Spring 2017

Co-organized seminar that invites speakers from around the country to discuss the design of robotics, embedded systems, analysis, and modeling

Berkeley-Stanford Meetup for Women in CS and EE – April 4, 2015

Organized and hosted on behalf of WICSE, this annual research meeting aims to increase awareness of research in EE & CS and to strengthen the ties between graduate women at Berkeley and Stanford

Leadership, Community Outreach, Diversity Efforts

Illinois IDEAS Institute

Active member – 2020 to present

Women in Computer Science and Electrical Engineering (WICSE)

Co-President – Summer 2014 to Summer 2015
Outreach Coordinator – Summer 2013 to Summer 2014

Electrical Engineering Graduate Student Association (EEGSA)

Faculty Interview Coordinator – Fall 2015 to Summer 2016
Co-President – Fall 2013 to Summer 2014
Visit Day Coordinator – Spring 2013 and 2014
GA Delegate – Fall 2012 to Spring 2013

Girls in Engineering at Berkeley

Developed an origami robotics module for NSF sponsored summer camp that aims to expose girls to science and engineering at a young age

Sponsored Research Projects

- **Perception Beyond Sensors**
  - Sub-award: $20,000 / 2 years, 2019-2020
  - Supported by Ford Foundation / Stanford University
  - PI: Mykel Kochenderfer, Co-I: Katie Driggs-Campbell
- **Human-Robot Collaboration: Interactive Manipulation for Industrial Robotics**
  - $3,471,472 / 3 years, 2020-2023
  - Supported by Foxconn Interconnect Technology Ltd and C-NICE
  - PI: Katie Driggs-Campbell, Co-I: Tim Bretl and Nancy Amato
- **UIUC/ZJU Joint Research Center on Flexible Manufacturing: Adaptive, Resilient Cyber Manufacturing Networks (CyMaN)**
  - $1,500,000 / 5 years, 2020-2025
  - Supported by Zhejiang University - University of Illinois at Urbana-Champaign Institute
  - Lead: Katie Driggs-Campbell, Co-Lead: Placid Ferreira, Members: Klara Nahrstedt, Bill King, Xin Chen, Srinivasa Salapaka, Chenhui Shao
- **Member of AI Institute: Artificial Intelligence for Future Agricultural Resilience, Management, and Sustainability (AIFARMS)**
  - $59,000 / member / 5 years, 2020-2025
  - Supported by NIFA / USDA
  - Lead: Vikram Adve

- **NRI 2.0: Increasing the Level of Autonomy for Agricultural Robots Through Effective Interaction and Programming Paradigms**
  - $1,047,874 / 4 years, 2020-2024
  - Supported by NIFA / USDA
  - PI: Katie Driggs-Campbell, Co-I: Roy Dong, Girish Chowdhary, Sayan Mitra, Sasa Misailaovic
- **Exploring Communication between Drivers and Intelligent Vehicles**
  - $108,000 / 1.5 years, 2020-2022
  - Supported by State Farm
  - PI: Katie Driggs-Campbell
- **NSF CAREER: Uncovering Structure in Human-Robot Systems for Trajectory Prediction and Crowd Navigation**
  - $ 500,236.00 / 5 years, 2022-2026
  - Supported by NSF
  - PI: Katie Driggs-Campbell

Advising & University Service

Committees

- Coordinated Science Lab Policy and Planning Committee, 2021-present
- Grainger College of Engineering Diversity Committee Member, 2020-present
- Dept. of ECE Broadening Participation Committee, 2021-present
- Dept. of ECE Curriculum Committee, 2019-present
- Center for Autonomy Operations Committee, 2019-present
- Illinois Robotics Education Subcommittee Member, 2019-present

Masters Theses

1. Eric Liang (ECE, UIUC, 2022): Geometry-based Video Prediction with Visual Odometry Prediction and View Synthesis.
   Placement: Tesla.
2. Zhenyi Tang (CS, UIUC, 2020): Robust Imitation Learning from Observation
   Placement: Nvidia.
3. Ke Xu (CS, UIUC, 2020): Autonomous Vehicles that Understand Road Agents: Detection, Tracking, and Behavior Prediction
   Placement: USC CS PhD Program.
4. James Keiller (ECE, UIUC, 2019): Localization for Teams of Autonomous Ground Vehicles. Co-advised with William Norris.
   Placement: Komatsu Mining.

Postdoctoral Associates

1. Junyi Geng, 2020-2021. Co-advised with T. Bretl and N. Amato.
   Placement: Penn State.
2. Tan Chen, 2021-2022. Co-advised with T. Bretl and N. Amato.
   Placement: Michigan Tech.

Undergraduate Theses

1. Zhaoxu Deng (ECE, UIUC, 2021): Vehicle-Pedestrian Interaction in Partially Observable Environments

2. Kazuki Shin (ECE, UIUC, 2021): Interpretable Multi-Pedestrian Trajectory Prediction using SocialGAN and SocialGCNN
3. Abhi Kamboj (ECE, UIUC, 2021): The Optimal Audio Interface for Teleoperation on an Autonomous Farm
4. Neeloy Chakraborty (ECE, UIUC, 2021): Hierarchical Self-Imitation Learning in Single-Agent Sparse Reward Environments
5. Rui Liu (CS, UIUC, 2020): Turtlebot Anomaly Detection
6. Shanduojiao Jiang (CS, UIUC, 2020): In-Vehicle Communication Strategies
7. Xinyi Guo (ECE, UIUC, 2020): How Humor Affects Trust in Human-Robot Interaction

Doctoral Dissertation Committees

1. Yifan Zhu (CS, UIUC, expected 2022). Thesis Advisor: Kris Hauser.
2. Chiao Hsieh (CS, UIUC, expected 2022). Thesis Advisor: Sayan Mitra.
3. Xiaobai Ma (Aero/Astro, Stanford, 2021): Deep Reinforcement Learning Methods for Autonomous Driving Safety and Interactivity. Thesis Advisor: Mykel J. Kochenderfer.
4. David Hanley (ECE, UIUC, 2021): Empirical Investigation of Magnetic Indoor Positioning Systems and the Development of Evaluation Methods. Thesis advisor: Tim Bretl.
5. Jonathan Hoff (ECE, UIUC, 2020): Trajectory Optimization and Data-Driven Modeling for Robotic Bat Flapping Flight. Thesis advisor: Seth Hutchinson.

Awards and Fellowships

NSF CAREER Award – 2022
Teacher's Rated as Excellent by Students – 2020
Rising Stars in EECS – 2017
Demetri Angelakos Memorial Achievement Award – 2016
EECS Department Chair's Special Award, UC Berkeley – 2014
EECS Department Chair's Special Award, UC Berkeley – 2013
EECS Department Fellowship, UC Berkeley – 2013
Gary and Diane Tooker Scholarship for Engineering – 2011 to 2012
Craig and Barbara Barrett Engineering Scholarship – 2010 to 2011
Nellie "Jean" Randle Scholarship – Fall 2010 to Spring 2011
Gary and Diane Tooker Scholarship for Engineering – 2009 to 2010
Society of American Military Engineers Scholarship – 2008 to 2012
Provost Scholarship, Arizona State University – 2008 to 2012

Professional Activities

Invited Reviewer

Conferences: IEEE International Conference on Robotics and Automation, IEEE/RSJ Conference on Robotics and Systems, Robotics: Science and Systems, Conference on Robot Learning, Workshop on Algorithmic Foundations of Robotics,
IEEE Intelligent Vehicle Symposium, IEEE Intelligent Transportation Systems Conference,
IEEE American Control Conference, IEEE Conference on Decision and Control
Journals: IEEE Transaction on Human-Robot Interaction, IEEE Transactions on Robotics, IEEE Transactions on Intelligent Vehicles, IEEE Transactions on Intelligent Transportation Systems, IEEE Robotics and Automation Letters, Springer Autonomous Robotics, IEEE Transactions on Human-Machine Systems, IEEE Transactions on Control Systems Technology

Professional Services: Session Chair, Associate Editor, and/or Advisory/Program Committee

Runtime Verification (RV), Program Committee (2020)

IEEE Intelligent Vehicle Symposium (IV), Program Co-Chair (2020)
IEEE Intelligent Vehicle Symposium (IV), Associate Editor (2019,2021)
IEEE International Conference on Robotics and Automation (ICRA), Associate Editor (2019 - 2022)
IEEE International Conference on Robotics and Automation (ICRA), Session Chair (2019 - 2022)
IEEE International Conference on Intelligent Robotics and Systems (IROS), Associate Editor (2019 - 2022)
IEEE International Conference on Intelligent Robotics and Systems (IROS), Session Chair (2020)
IEEE Intelligent Transportation Systems Conference (ITCS), Session Chair (2017,2018,2019)
Autonomous Agents and Multi-Agent Systems (PC), Robotics: Science and Systems, Program Committee (2019)

Technical Memberships

SAE Member; ACM Member; IEEE Member: Robotics and Automation Society, Intelligent Transportation Systems Society