

Staff Research Scientist and research lead with 15+ years in AI, formal methods, and robotics, building on a foundation in controls and dynamical systems, currently developing human-centered AI for safe, real-time shared autonomy. I lead cross-disciplinary teams and initiatives that turn research into deployed, human-in-the-loop systems, and publish this work at top venues in robotics and ML.

Research Impact: 2,200+ citations • *h*-index 24 • *i10*-index 50 • 11 granted U.S. patents • 40+ peer-reviewed publications

Research Interests: Human-AI Collaboration, Reinforcement Learning, Game Theory, Sequential Decision Making, Formal Methods, Control and Dynamical Systems, Robotics

EDUCATION

Ph.D., Mechanical and Aerospace Engineering <i>Cornell University</i> , Ithaca, NY	2015 — 2017
• Advisor: Prof. Hadas Kress-Gazit • Graduate Minors: Computer Science, Computational Science and Engineering	
M.S., Mechanical and Aerospace Engineering <i>Cornell University</i> , Ithaca, NY	2011 — 2014
B.S. / M.S., Mechanical Engineering (Magna Cum Laude) <i>Virginia Polytechnic Institute and State University (Virginia Tech)</i> , Blacksburg, VA	1997 — 2003

TECHNICAL EXPERIENCE

Staff Research Scientist & Research Lead / Shared Decision-Making Project <i>Toyota Research Institute</i>	05-2022 — Present Cambridge, MA
- Set the research vision and led a core team of 2–3 researchers (scaling to 4–6 with rotating engineering and design staff) developing model-based RL to assist humans in time-critical, high-speed shared-control settings; served as point-person on project reviews and prepared high-level presentations for leadership. - Delivered a Dreamer-based shared-control system deployed on a real-time, human-in-the-loop simulator, demonstrated live with human drivers and published at CoRL 2024 (<i>Dreaming to Assist</i>); hardened the system to publication quality and readiness for human-subjects studies and executive demonstrations. - Directed the build-out of the end-to-end training and evaluation pipeline (CARLA-based), and curated a driving dataset from 60 study participants; led two internal human-subjects studies spanning high-speed racing and urban driving domains, converging with the team on procedures and quantitative/qualitative metrics. - Point-person for designing, building, and executing demonstrations across both simulation and real test vehicles; extended the system to a VR-based driving rig and to TRI's <i>Global Research Innovation Platform (GRIP)</i> drivable test bench, enabling pilot studies and live demonstrations, including on-track sessions at Thunderhill Raceway. - Produced demonstration and outreach materials showcasing the technology, prioritizing faithful presentation of the underlying system over post-production effects.	
Research Scientist / RL Models for Human Teaming and AV Testing <i>Toyota Research Institute</i>	07-2017 — 05-2022 Cambridge, MA
- Co-launched and helped lead a multi-disciplinary initiative spanning ML, HCI, and Behavioral Science, training RL models of personalized driver interaction to support human-AI teaming in driving. - Developed and deployed data-driven, generative agent behavior models for simulation-based AV testing, advancing agent interpretability and test coverage; results published across ICRA, IROS, ITSC, and RA-L. - Contributed motion planning and control algorithms as a developer to the open-source <i>Drake toolkit</i>.	
Graduate Research Assistant / Formal Methods in Robotics <i>Cornell University</i>	08-2011 — 02-2017 Ithaca, NY
Goal: Correct-by-construction synthesis of controllers for robots with nonlinear dynamics through application of formal methods and optimization. - Developed a planning scheme blending temporal logic and sums-of-squares optimization. - Demonstrated approaches on mobile and humanoid platforms. - Authored 7 publications and workshop papers.	
Lead Engineer / Flight Controls <i>Impact Technologies</i>	07-2008 — 08-2011 Brighton, NY
- Contributed to development of algorithms for applications in flight control, in-flight fault diagnosis and submarine navigation. - Wrote grants, with four Phase 1 and two Phase 2 Small Business Innovation Research (SBIR) grants awarded as Principal Investigator totaling \$1.8M for DoD- and NASA-sponsored research.	

Research Scientist / Model Predictive Control for Aircraft

NASA Glenn Research Center

07-2003 — 07-2008

Cleveland, OH

- Served as co-lead developer for C-MAPSS, a software simulation for aircraft engines, now in wide use by researchers and practitioners in academia, industry and government.
- Investigated control algorithms for in-flight aircraft control reconfiguration during emergencies.

RESEARCH LEADERSHIP AND MENTORSHIP

Research Lead, Shared Decision-Making project, Toyota Research Institute.

2022 — Present

Set research direction, organized team efforts, and served as point-person on project reviews; led a core team of 2-3 (scaling to 4-6 with rotating staff).

Initiative Co-Lead, cross-disciplinary program spanning ML, HCI, and Behavioral Science for human-AI teaming in driving, Toyota Research Institute.

2017 — 2022

Project Lead, Princeton University collaboration (final year).

2025

Guided the project through completion and its follow-on proposal; helped launch a successor project on uncertainty-aware autonomy with Prof. Andrea Bajcsy.

Research Mentorship. Actively mentored interns and junior researchers this year, several of whom reached peer-reviewed publication, including Toshiaki Hori (language/action value alignment), Kin Man Lee (project scoping through paper-track results), and Sophie Hsu (language timing for shared control); cumulatively mentored 10+ interns and junior researchers. Currently mentoring intern projects extending shared-autonomy methods to robot-arm manipulation (YAM arms) and world models for shared autonomy (RoboMimic). Also provided technical guidance to graduate students on learning-based control-barrier-function research toward a CDC submission.

Proposal Development. Shepherded six research proposals from initial PI outreach through ideation and writing.

Principal Investigator, four Phase I and two Phase II SBIR grants (\$1.8M total) for DoD- and NASA-sponsored research. 2008 — 2011

PUBLICATIONS

Journal Publications

X. Li, **J. DeCastro**, C. I. Vasile, S. Karaman, D. Rus. Learning an Interpretable Logic Monitor for Risk-Aware and Socially-Compliant Trajectory Planning. *The International Journal of Robotics Research*, 2025.

E. Sumner, **J. DeCastro**, et. al. Personalizing Driver Safety Interfaces via Driver Cognitive Factors Inference. *Nature Scientific Reports*, 14(1):18058, 2024.

C. Mavrogiannis, **J. DeCastro**, S. S. Srinivasa, Abstracting Road Traffic via Topological Braids: Applications to Traffic Flow Analysis and Distributed Control. *The International Journal of Robotics Research*, 43(9):1299-1321, 2024.

R. Karagulle, N. Aréchiga, N., **J. DeCastro**, N. Ozay. A Safe Preference Learning Approach for Personalization With Applications to Autonomous Vehicles. *IEEE Robotics and Automation Letters*, 9(5):4226-4233, 2024.

X. Huang, S. McGill, **J. DeCastro**, L. Fletcher, J. Leonard, B. Williams, G. Rosman. CARPAL: Confidence-Aware Intent Recognition for Parallel Autonomy. *Robotics and Automation Letters*. 6(3):4433-4440, 2021.

X. Li, G. Rosman, I. Gilitschenski, C. I. Vasile, **J. DeCastro**, S. Karaman, D. Rus. Vehicle Trajectory Prediction using Generative Adversarial Network With Temporal Logic Syntax Tree Features. *Robotics and Automation Letters*. 6(2):3459-3466, 2021.

X. Huang, S. McGill, **J. DeCastro**, L. Fletcher, J. Leonard, B. Williams, G. Rosman. DiversityGAN: Diversity-Aware Vehicle Motion Prediction via Latent Semantic Sampling. *Robotics and Automation Letters*. 5(4):5089-5096, 2020.

J. Alonso-Mora, **J. DeCastro**, V. Raman, D. Rus and H. Kress-Gazit. Reactive Mission and Motion Planning while Avoiding Dynamic Obstacles. *Autonomous Robots*, 42(4):801-824, 2018.

J. DeCastro, R. Ehlers, M. Rungger, A. Balkan, and H. Kress-Gazit. Automated Generation of Dynamics-Based Runtime Certificates for High-Level Control. *Discrete Event Dynamic Systems Special Issue on Formal Methods in Control*, 27(2):371-405, 2017.

J. DeCastro and H. Kress-Gazit. Synthesis of Nonlinear Continuous Controllers for Verifiably-Correct High-Level, Reactive Behaviors. *International Journal of Robotics Research*, 34(3):378-394, 2015.

doi:10.1177/0278364914557736

X. Zhang, L. Tang and **J. DeCastro**. Robust Fault Diagnosis of Aircraft Engines: A Nonlinear Adaptive Estimation-Based Approach. *IEEE Trans. on Control Systems Technology*, 21(3):861–868, 2013. doi:10.1109/TCST.2012.2187057.

J. DeCastro. Rate-Based Model Predictive Control of Turbofan Engine Clearance. *AIAA Journal of Propulsion and Power*. 23(4): 804–813, 2007. doi:10.2514/1.25846

AIAA NOS Best Young Professional Paper

Refereed Conference Publications

T. Hori, **J. DeCastro**, D. Gopinath, A. Balachandran, G. Rosman. Learning to Plan, Planning to Learn: Adaptive Hierarchical RL-MPC for Sample-Efficient Decision Making. *Learning for Dynamics & Control Conference (L4DC)*, 2026.

Y. C. Hsu, **J. DeCastro**, A. Silva, G. Rosman. Timing the Message: Language-Based Notifications for Time-Critical Assistive Settings. *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2026.

D. Gopinath, X. Cui, **J. DeCastro**, E. Sumner, J. Costa, H. Yasuda, A. Morgan, L. Dees, S. Chau, J. Leonard, T. Chen, G. Rosman, A. Balachandran. Computational Teaching for Driving via Multi-Task Imitation Learning. *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 7019–7027, 2025.

D. D. Oh, J. Lidard, H. Hu, H. Sinhar, E. Lazarski, D. Gopinath, E. Sumner, **J. DeCastro**, G. Rosman, N. Leonard, J. F. Fisac. Safety with Agency: Human-Centered Safety Filter with Application to AI-Assisted Motorsports. *Robotics: Science and Systems (RSS)*, 2025.

X. Hu, L. Dees, D. Gopinath, A. Silva, **J. DeCastro**, G. Rosman, E. Sumner. Enhancing Trust Repair in Driving: The Role of AI Emotional Expression and Perceived Control. *IEEE 28th International Conference on Intelligent Transportation Systems (ITSC)*, 2025.

H. Hu, **J. DeCastro**, D. Gopinath, G. Rosman, N. E. Leonard, J. Fisac. Think Deep and Fast: Learning Neural Nonlinear Opinion Dynamics from Inverse Dynamic Games for Split-Second Interactions. *IEEE International Conference on Robotics and Automation (ICRA)*, 2025.

S. Banerjee, D. Cornelisse, D. Gopinath, E. Sumner, **J. DeCastro**, G. Rosman, et al. Estimating Cognitive Biases with Attention-Aware Inverse Planning. *Advances in Neural Information Processing Systems (NeurIPS)*, 38:14524–14550, 2024.

J. DeCastro, A. Silva, D. Gopinath, E. Sumner, T. Balch, L. Dees, G. Rosman. Dreaming to Assist: Learning to Align with Human Objectives for Shared Control in High-Speed Racing. *8th Conference on Robot Learning (CoRL)*, 2024.

R. Karagulle, N. Ozay, N. Arechiga, **J. DeCastro**, A. Best. Incorporating Logic in Online Preference Learning for Safe Personalization of Autonomous Vehicles. In *Proceedings of the 27th ACM International Conference on Hybrid Systems: Computation and Control* (pp. 1–11), 2024.

J. Lidard, H. Hu, A. Hancock, Z. Zhang, A. Gimó Contreras, V. Modi, **J. DeCastro**, D. Gopinath, G. Rosman, N. Leonard, M. Santos, J. Fernández Fisac. Blending Data-Driven Priors in Dynamic Games. *Robotics: Science and Systems (RSS)*, 2024.

J. Lidard, O. So, Y. Zhang, **J. DeCastro**, X. Cui, X. Huang, G. Rosman. (2023). NashFormer: Leveraging Local Nash Equilibria for Semantically Diverse Trajectory Prediction. *arXiv preprint arXiv:2305.17600*.

R. Karagulle, N. Aréchiga, **J. DeCastro**, and N. Ozay. Classification of Driving Behaviors using STL Formulas: A Comparative Study. *Formal Modeling and Analysis of Timed Systems: 20th International Conference, FORMATS 2022, Warsaw, Poland, September 13–15, 2022*.

D. Li, M. L. Shehab, Z. Liu, N. Aréchiga, **J. DeCastro**, and N. Ozay. Outlier-Robust Inverse Reinforcement Learning and Reward-based Detection of Anomalous Driving Behaviors. *25th International Conference on Intelligent Transportation Systems (ITSC)*, Macau, China, October 08–12 2022.

C. Mavrogiannis, **J. DeCastro**, and S. S. Srinivasa. Implicit Multiagent Coordination at Uncontrolled Intersections via Topological Braids. *Fifteenth Workshop on the Algorithmic Foundations of Robotics (WAFR)*, June 22–24, 2022.

Invited to IJRR Special Issue: The Best of WAFR 2022

C. Mavrogiannis, **J. DeCastro**, and S. S. Srinivasa. Analyzing Multiagent Interactions in Traffic Scenes via Topological Braids. *International Conference on Robotics and Automation (ICRA)*, May 23–27, 2022.

X. Li, **J. DeCastro**, C. I. Vasile, S. Karaman, D. Rus. Learning A Risk-Aware Trajectory Planner From Demonstrations Using Logic Monitor. *5th Annual Conference on Robot Learning (CoRL)*, November 8–11, 2021.

B. Araki, X. Li, K. Vodrahalli, **J. DeCastro**, M. Fry, D. Rus. The Logical Options Framework. *Proceedings of the 38th International Conference on Machine Learning (ICML)*, July 18–24, 2021.

- X. Li, G. Rosman, I. Gilitschenski, **J. DeCastro**, C. I. Vasile, S. Karaman, and D. Rus. Differentiable Logic Layer for Rule Guided Trajectory Prediction. *5th Annual Conference on Robot Learning (CoRL)*, November 16–18, 2020.
- S. Shiroshita, S. Maruyama, D. Nishiyama, M. Ynocente Castro, K. Hamzaoui, G. Rosman, **J. DeCastro**, K. -H. Lee, and A. Gaidon. Behaviorally Diverse Traffic Simulation via Reinforcement Learning. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Virtual Conference, October 25–29, 2020.
- J. DeCastro**, K. Leung, N. Aréchiga, and M. Pavone. Interpretable Policies from Formally-Specified Temporal Properties. *Proceedings of the 23rd IEEE International Conference on Intelligent Transportation Systems (ITSC)*, Virtual Conference, September 20–23, 2020.
- D. Nishiyama, M. Ynocente Castro, S. Maruyama, S. Shiroshita, K. Hamzaoui, Y. Ouyang, G. Rosman, **J. DeCastro**, K. -H. Lee, and A. Gaidon. Discovering Avoidable Planner Failures of Autonomous Vehicles using Counterfactual Analysis in Behaviorally Diverse Simulation. *Proceedings of the 23rd IEEE International Conference on Intelligent Transportation Systems (ITSC)*, Virtual Conference, September 20–23, 2020.
- J. DeCastro**, L. Liebenwein, C. I. Vasile, R. Tedrake, S. Karaman and D. Rus. Counterexample-Guided Safety Contracts for Autonomous Driving. *Proceedings of the 13th International Workshop on the Algorithmic Foundations of Robotics (WAFR)*, Mérida, Mexico, December 9–11, 2018.
- L. Liebenwein, W. Schwarting, C. I. Vasile, **J. DeCastro**, J. Alonso-Mora, S. Karaman and D. Rus. Compositional and Contract-based Verification for Autonomous Driving on Road Networks. *International Symposium on Robotics Research (ISRR)*, Puerto Varas, Chile, December 11–14, 2017.
- J. DeCastro** and H. Kress-Gazit. Nonlinear Controller Synthesis and Automatic Workspace Partitioning for Reactive High-Level Behaviors. *Proceedings of the 19th ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, Vienna, Austria, April 12–14, 2016.
- J. DeCastro**, J. Alonso-Mora, V. Raman, D. Rus and H. Kress-Gazit. Collision-Free Reactive Mission and Motion Planning for Multi-Robot Systems. In: *Proceedings of the 17th International Symposium on Robotics Research (ISRR)*, Sestri Levante, Italy, September 12–15, 2015.
- J. DeCastro**, V. Raman and H. Kress-Gazit. Dynamics-Driven Adaptive Abstraction for Reactive High-Level Mission and Motion Planning. In: *Proceedings of the IEEE/RSJ International Conference on Robotics and Automation (ICRA 2015)*, Seattle, WA, USA, May 26–30, 2015.
- J. DeCastro** and H. Kress-Gazit. Guaranteeing Reactive High-Level Behaviors for Robots with Complex Dynamics. In: *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2013)*, Tokyo, Japan, November 3–8, 2013.
- J. DeCastro**, L. Tang, B. Zhang and G. Vachtsevanos. A Safety Verification Approach to Fault-Tolerant Aircraft Supervisory Control. In: *Proceedings of the AIAA Guidance, Navigation, and Control Conference*, Portland, OR, USA, August 8–11, 2011.
- J. DeCastro**, J. S. Litt, and D. K. Frederick. A Modular Aero-Propulsion System Simulation of a Large Commercial Aircraft Engine. In: *Proceedings of the 44th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit*, Hartford, CT USA, July 21–23, 2008.
- Workshop Publications / Technical Reports**
- P. Tambwekar, A. Silva, D. Gopinath, **J. DeCastro**, X. Cui, G. Rosman. On the Strengths and Weaknesses of Data for Open-set Embodied Assistance. arXiv preprint arXiv:2603.04819, 2026.
- D. Gopinath, X. Cui, **J. DeCastro**, A. Balachandran, G. Rosman. Spatio-Temporal Retrieval-based Priors for Adaptive Computational Teaching in Driving. arXiv preprint arXiv:2606.25224, 2026.
- J. Dallas, T. Lew, J. Talbot, **J. DeCastro**, S. Bansal, J. Subosits. Boundary Sampling to Learn Predictive Safety Filters via Pontryagin’s Maximum Principle. arXiv preprint arXiv:2604.13325, 2026.
- A. Shah, **J. DeCastro**, J. Gideon, G. Rosman, S. Seshia, Specification-Guided Data Aggregation for Semantically Aware Imitation Learning. (in review) 2023.
- J. DeCastro**, D. Gopinath, G. Rosman, E. Sumner, S. Hakimi, and S. Stent. Learning Latent Traits for Simulated Cooperative Driving Tasks. *CoRR*, abs/2207.09619, 2022. arXiv:<https://arxiv.org/abs/2207.09619>.
- D. Gopinath, **J. DeCastro**, G. Rosman, E. Sumner, A. Morgan, S. Hakimi, and S. Stent. HMIway-env: A Framework for Simulating Behaviors and Preferences to Support Human-AI Teaming in Driving. *HCIS Workshop at Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, pp. 4342-4350. 2022.

C. Mavrogiannis, **J. DeCastro**, and S. S. Srinivasa. Implicit Multi-Agent Coordination at Unsignalized Intersections via Topological Inference. *CoRR*, abs/2109.07060, 2021. arXiv:<https://arxiv.org/abs/2109.07060>.

D. Jackson, **J. DeCastro**, S. Kong, D. Koutentakis, A. Leong Feng Ping, A. Solar-Lezama, M. Wang and X. Zhang. Certified Control for Self-Driving Cars. *4th Workshop on the Design and Analysis of Robust Systems (DARS)*, New York, NY, USA, 2019.

N. Aréchiga, **J. DeCastro**, S. Kong and K. Leung. Better AI through Logical Scaffolding. *2nd Workshop on Formal Methods for ML-Enabled Autonomous Systems (FoMLAS)*, New York, NY, USA, 2019. arXiv:<https://arxiv.org/abs/1909.06965>.

J. DeCastro, R. Ehlers, M. Rungger, A. Balkan, P. Tabuada, and H. Kress-Gazit. Dynamics-Based Reactive Synthesis and Automated Revisions for High-Level Robot Control. *CoRR*, abs/1410.6375, 2014. arXiv:<http://arxiv.org/abs/1410.6375>.

J. DeCastro. Mission Possible: Guaranteeing Reactive Missions for Complex Robots. In: *ICRA 2015 Ph.D. Forum*, Seattle, WA, USA, May 26, 2015.

INVITED TALKS

From Co-Play to Co-Driving: Partner-Coupled Planning in Time-Critical Human-Autonomy Teams, *Leveraging Behavioral Models in Human-Autonomy Teams: From Theory to Applied Socio-Technical Systems* at IROS 2026, Pittsburgh, PA, September 2026.

Planning Through the Partner: Joint World Models of Physics and Intent under Imperfect Observation, *Planning and Control with Imperfect Sensors and Perception* at RSS 2026, Sydney, Australia, July 2026. **Role:** Speaker and Panelist.

Shared Decision Making: Partner-Aware Planning When Interactive Human Data is Scarce, *Learning for Dynamics & Control Conference (L4DC)*, University of Southern California, 2026. **Role:** Industry Spotlight Speaker.

Toward Verifiable Human Interaction, *Formal Verification of Control Systems with Neural Network Components* at ACC 2025, Denver, CO, July 2025. **Role:** Invited Keynote Speaker.

Correctness, Safety, and Alignment in Human-Centric Applications, *AI and Formal Methods Join Forces for Reliable Autonomy*, August 2024.

Learning Descriptions of Risky Human Behavior using Temporal Logics, *Safe and Reliable Robot Autonomy under Uncertainty* at ICRA 2022, May 2022. **Host:** Glen Chou.

Formally-Specifiable Agent Behavior Models for Autonomous Vehicle Test Generation, *Automation and Test in Europe Conference (DATE 2020)*, March 2020. **Hosts:** Prof. Jyotirmoy Deshmukh and Nikos Aréchiga.

Simulation and Verification for Autonomous Vehicles in Traffic Scenarios, *NSF ExCAPE Annual Meeting*, U. Penn, June 2017. **Host:** Prof. Rajeev Alur.

Guaranteeing Reactive Missions for Complex Robots, *Invited Seminar Speaker*, NASA Jet Propulsion Laboratory, December 2015.

Guaranteeing Reactive Missions for Complex Robots, *Invited Seminar Speaker*, MIT Lincoln Laboratory, November 2015.

Generalized Collision-Free Reactive Mission and Motion Planning for Multi-Robot Systems, *NSF ExCAPE Annual Meeting*, MIT, June 2015. **Host:** Prof. Armando Solar-Lezama.

Abstractions and Revisions for Synthesis for Nonlinear Robots, *NSF ExCAPE Annual Meeting*, U. C. Berkeley, March 2014. **Host:** Prof. Sanjit Seshia.

Reactive High-Level Robot Controller Synthesis: Optimality, Environment, and Dynamics, *NSF ExCAPE Robotics Workshop*, Rice University, November 2013. **Host:** Prof. Lydia Kavraki.

PATENTS GRANTED

J. DeCastro, S.H. Kong, N. Aréchiga, F. Permenter, D. Park. Wearable exoskeleton, US Patent 11,918,535.

D. Jackson, **J. DeCastro**, S.H. Kong, N.A. Gonzalez, D. Koutentakis, F. Ping, A. Leong, M. Wang, X. Zhang. Certified control for self-driving cars, US Patent 11,745,732.

S.H. Kong, **J. DeCastro**, N. Aréchiga, F. Permenter. Personalized notification system for mobility as a service, US Patent 11,543,258.

N. Aréchiga, S.H. Kong, **J. DeCastro**, F. Permenter, D. Park. Predictive impairment monitor system and method, US Patent 11,518,408.

N. Aréchiga, S.H. Kong, **J. DeCastro**, F. Permenter, D. Park. Predictive parking due to weather, US Patent 11,479,239.

(585) 425-7184
Cambridge, MA
jonathan.a.decastro@gmail.com

Jonathan DeCastro

Staff Research Scientist

jadecastro.github.io
jadecastro
jonathan-decastro-b8748715
Google Scholar

N. Aréchiga, K.Y. Leung, S.H. Kong, **J. DeCastro**, F. Permenter. Simulation-based technique to synthesize controllers that satisfy signal temporal logic specifications, US Patent 11,256,611.

N. Aréchiga, S.H. Kong, **J. DeCastro**, S. Behere, D. Park. System and method for detecting errors and improving reliability of perception systems using logical scaffolds, US Patent 11,157,756.

S.H. Kong, **J. DeCastro**, N. Aréchiga, F. Permenter. Actively adapting to driving environments based on human interactions, US Patent 11,072,342.

G. Rosman, **J. DeCastro**, N. Aréchiga, J. Leonard, L. Fletcher, D. Stonier. Systems and methods for agent tracking, US Patent 10,882,522.

J. DeCastro, F. Permenter, S. Kong, N. Aréchiga. Systems and methods for improving situational awareness of a user, US Patent 10,621,858.

SERVICE AND OUTREACH

Invited Participant, “AI and Formal Methods Join Forces for Reliable Autonomy”, Dagstuhl Seminar 24361 2024

Panelist, “AI is All Around Us: A High School Symposium”, Museum of Science, Boston 2022

Panelist, “Navigating a World with AI Science and Society: A High School Symposium”, Museum of Science, Boston, attended by 750 high school students from 24 states and 6 countries 2022

Workshop Co-Organizer, “Transforming Specifications into Robot Programs: A Survey of Formal Methods Tools for Non-Experts” 2021

Workshop Organizer, “Command Your Own Robot” 2014, 2015

Ph.D. Thesis Committee Member, Ruya Karagulle, University of Michigan 2025 — 2026

Ph.D. Thesis Committee Member, Abolfazl (Abel) Karimi, University of North Carolina 2022 — 2024