

# Steven Carr

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Postdoctoral researcher at the Oden Institute for Computational Engineering and Sciences within the University of Texas at Austin. My research focus is on the intersection of control and learning in autonomous systems. Looking for exciting opportunities in how to apply emerging artificial intelligence research to ensured decision-making for autonomous systems.

## Education

**The University of Texas at Austin** 2016 – 2022

*Doctor of Philosophy (Aerospace Engineering) - Task-Aware Planning and Learning in Partially Observable Environments*

*Subject Areas: Autonomous Systems, Artificial Intelligence, Robotics, Formal Methods, Reinforcement Learning*

*Master of Science Engineering (Aerospace Engineering) | Coursework: Convex Optimization, Game Theory, Optimal Control*

**The University of Sydney** 2010 – 2014

*Bachelor of Engineering (Aeronautical Space)/ Bachelor of Science (Advanced Mathematics/Physics) Honours I*

*Coursework: Aircraft Systems, Aircraft Design, Astrophysics, Mathematics (Advanced) | Graduated with Distinction*

## Recent Academic Papers

Safe Reinforcement Learning via Shielding for POMDPs. arXiv preprint arXiv:2204.00755 2022

Task-aware Verifiable RNN-based Policies for Partially Observable Markov Decision Processes. JAIR 72: 819-847. 2021

Decentralized Classification with Assume-Guarantee Planning. Intelligent Robots and Systems (IROS). 2021

Safe Policies for Factored Partially Observable Stochastic Games. Robotics: Science and Systems (RSS). 2021

## Professional Experience

**Oden Institute for Computational Engineering and Sciences - Postdoctoral Fellow** 2022-2023

◇ Coordinated research teams on emerging applications in autonomy with an emphasis on assured reinforcement learning.

◇ Collaborated and consulted with technical experts from academia, industry and government including NASA and DARPA.

**The University of Texas at Austin - Graduate Research Assistant** 2016-2022

◇ Published and presented academic research papers on topics in machine learning, controls and robotics.

◇ Validated theoretical results on hardware and high fidelity simulation using Python and Robotic Operating System (ROS).

**Skygrid - Applied Research Intern** 2018

◇ Designed and implemented an information sharing algorithm for a team of UAV agents to provably converge to a consensus.

◇ Modified a D\* algorithm to build a scalable multi-agent path planning solution for air traffic management.

**The University of Texas at Austin - Teaching Assistant for ASE 361K/361L Aircraft Design I/II** 2016-2018

◇ Taught a systems engineering-based approach for designing, building, flight testing a UAV to meet mission requirements.

◇ Lectured undergraduate students on UAV control systems and implementing a ground control/autopilot using Ardupilot Mission Planner with specific instruction on tuning for hardware-in-the-loop controllers.

**Department of Defence (Australia) - Technology Analyst** 2015-2016

◇ Utilized engineering, physics and mathematical skills to create technical assessments for government decision-makers.

◇ Collaborated with Five Eyes Defense partners to produce concept documents for future defense capabilities.

**Australian Centre for Field Robotics (ACFR) - Optimization Researcher** 2014-2015

◇ Explored path planning for multiple robotic agents in a stochastic environment, using optimization methods.

◇ Participated in a team environment to develop a simulation process for UAVs using Python.

**Silicon Controls - Systems Engineer (2013-2014) and Hardware Tester (2011-2013)** 2011-2014

◇ Applied Bayesian statistics principles to extract significant information from large data sets using SQL.

◇ Implemented a new field operation for faulty units based upon the company framework.

## Skills & Interests

**Technical Skills** Python, C++, Tensorflow, Excel, LaTeX, Robotic Operating System (ROS), Carla Simulator, Unity

**Software Libraries** Formal Methods (PRISM, storm) | Learning (Pytorch, OpenAI Gym) | Optimization (Gurobi, CVX)

**Have used before** Node.js. JavaScript, FORTRAN95, Solidworks CAD, Altium, SQL, Mission Planner

**Personal Interests** Basketball, Soccer, Tennis, Travel.

## References

**Ufuk Topcu** Associate Professor, Department of Aerospace Engineering and Engineering Mechanics, UT Austin [utopcu@utexas.edu]

**Nils Jansen** Associate Professor, Department of Software Science (SWS), Radboud University Nijmegen [n.jansen@science.ru.nl]