

RESEARCH INTERESTS	Using tools from statistical learning theory to address problems arising from model uncertainty in robotics and control theory; collision detection methods for motion planning that can handle uncertainty of obstacles in the environment; safe simultaneous learning and control for robots; safe model predictive control under uncertainty; fast approximate Bayesian inference methods; sampling-based motion planning methods.	
EDUCATION	Ph.D. Mechanical Science and Engineering Advanced Controls Research Laboratory <i>Advisor: Naira Hovakimyan</i> <i>University of Illinois at Urbana-Champaign, Urbana, IL.</i>	Jan 2017 - present
	M.S. Aerospace Engineering <i>University of Illinois at Urbana-Champaign, Urbana, IL.</i>	Aug 2014 - Dec 2016
	B.Tech. Mechanical Engineering <i>VIT University, Vellore, India.</i>	July 2010 - May 2014
EMPLOYMENT	Facebook Reality Labs , Redmond, WA. <i>Advisors: Douglas Lanman, Nick Colonnese</i> <i>Research Intern</i>	May 2018 - Aug 2018
	Paracosm/Occipital , Gainesville, FL. <i>Mentors: Jack Morrison, Quinn Martin</i> <i>Robotics Perception Intern</i>	May 2017 - Jul 2017
	Qualcomm Research , Philadelphia, PA. <i>Advisor: Matthew Turpin</i> <i>Research Intern</i>	May 2016 - Aug 2016
TECHNICAL SUMMARY	<p>Proficiency of programming languages (from most to least comfortable): Julia, C++, C, Python, Simulink. Extensive experience with robotics development on quadrotors and ground robots - typically this would involve a C++/C firmware stack, ROS/LCM communication middleware, and a Julia/Python/Simulink layer that handles the high-level decision making. The following are some of the open-source packages published on Github:</p> <ul style="list-style-type: none">• CurveProximityQueries.jl: A Julia package that implements methods to compute proximity queries between parameteric curves or convex bodies in 2/3D.• ConvexBodyProximityQueries.jl: A Julia package that implements methods to compute proximity queries between convex bodies in 2/3D.• cf-firmware: A firmware fork of the original Crazyflie repository that additionally implements geometric control, path following for trajectories, and handles control for attached manipulators.	

PUBLICATIONS

Andrew Patterson, **Arun Lakshmanan**, and Naira Hovakimyan.

Intent-aware probabilistic trajectory estimation for collision prediction with uncertainty quantification. In *IEEE Conference on Decision and Control 2019*, Dec 2019. <https://arxiv.org/pdf/1904.02765.pdf>

Arun Lakshmanan, Andrew Patterson, Venanzio Cichella, and Naira Hovakimyan. Proximity queries for absolutely continuous curves. In *Proceedings of Robotics: Science and Systems*, June 2019.

<http://www.roboticsproceedings.org/rss15/p42.pdf>

Robert M Jones, Donglie Sun, Gabriel B Haberfeld, **Arun Lakshmanan**, Thiago Marinho, and Naira Hovakimyan.

Design and control of a small aerial manipulator for indoor environments. In *AIAA Information Systems-AIAA Infotech@ Aerospace*, Jan 2017.

<https://arc.aiaa.org/doi/10.2514/6.2017-1374>

Arun Lakshmanan.

Piecewise Bézier curve trajectory generation and control for quadrotors. *Master's Thesis, University of Illinois at Urbana-Champaign*, Dec 2016.

<https://www.ideals.illinois.edu/handle/2142/95352>

Thiago Marinho, Christopher Widdowson, Amy Oetting, **Arun Lakshmanan**, Hang Cui, Naira Hovakimyan, Ranxiao Frances Wang, Alex Kirlik, Amy Lavers, and Dušan Stipanović.

Carebots: Prolonged elderly independence using small mobile robots. In *Mechanical Engineering, ASME*, Sep 2016. <https://asmedigitalcollection.asme.org/memagazineselect/article-pdf/138/09/S8/6359956/me-2016-sep5.pdf>

Thiago Marinho, **Arun Lakshmanan**, Venanzio Cichella, Christopher Widdowson, Hang Cui, Robert M Jones, Bentic Sebastian, and Camille Goudeseune.

VR study of human-multicopter interaction in a residential setting. In *2016 IEEE Virtual Reality (VR)*, Mar 2016. <https://ieeexplore.ieee.org/document/7504790>