

STEPHEN L. SMITH – CURRICULUM VITAE

1 PERSONAL DATA

Full Name: Stephen Leslie Smith
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EDUCATION

2005 – 2009 **PhD** in Mechanical Engineering, University of California, Santa Barbara, CA
Dissertation: Task Allocation and Vehicle Routing in Dynamic Environments
Advisor: Francesco Bullo

2003 – 2005 **MASc** in Electrical and Computer Engineering, University of Toronto, Toronto, ON
Dissertation: Strategies for Rendezvous and Formation Stabilization of Multi-Agent Systems
Advisors: Mireille Broucke and Bruce Francis

1999 – 2003 **BASc** in Engineering Physics, Queen's University, Kingston, ON

ACADEMIC APPOINTMENTS

July 2022 – Present **Full Professor** with tenure
Department of Electrical and Computer Engineering
University of Waterloo, Waterloo, ON

July 2016 – June 2022 **Associate Professor** with tenure
Department of Electrical and Computer Engineering
University of Waterloo, Waterloo, ON

Mar 2011 – June 2016 **Assistant Professor**
Department of Electrical and Computer Engineering
University of Waterloo, Waterloo, ON

Sept 2009 – Mar 2011 **Postdoctoral Associate**
Computer Science & Artificial Intelligence Laboratory
Massachusetts Institute of Technology, Cambridge, MA
Advisor: Daniela Rus

SABBATICAL APPOINTMENTS

Sept 2014 – Dec 2014 **Visiting Assistant Professor**
Department of Mechanical Engineering
University of California, Santa Barbara, CA

2 AWARDS AND RECOGNITIONS

RESEARCH AWARDS

- 2020 – 2023 **Faculty Affiliate**, Vector Institute, Toronto
(*one of 72 affiliates across Ontario*)
- 2017 – 2027 **NSERC Tier II Canada Research Chair** in Autonomous Systems
(*One of 74 Chairs at the University of Waterloo*)
- 2016 – 2019 **NSERC Discovery Accelerator Supplement**
(*125 recipients among 3,000 applicants in Canada*)
- 2016 – 2021 **Early Researcher Award**, Ministry of Research and Innovation
(*Highly-competitive funding to early career researchers at Ontario institutions*)

BEST PAPER AWARDS

- 2021 **Best Poster Award**, ACM International Conference on Human-Agent Interaction 2021
(as PhD research advisor)
(*two awards among 40+ papers that were presented as posters at conference*)
- 2020 **Best Paper Award**, Application Category, Unmanned Systems
(*one award for papers that appeared in journal in 2017-2018*)
- 2007, 2008, 2013 **Best Presentation in Session**, American Control Conference
(*one award in each session of six papers at the conference.*)
- 2007 **Best Student Paper Award Finalist**, IEEE Conf. on Decision and Control
(*4 finalists in ~ 1000 papers*)

INVITED KEYNOTE/PLENARY TALKS

- 2023 **Plenary speaker** at 2023 IEEE Intelligent Vehicles Symposium
Anchorage, Alaska, Jun 4-7, 2023
(*flagship and largest conference on intelligent vehicles*)
- 2023 **Keynote speaker** at 2023 7th International Conf. on Robotics, Control and Automation
Taizhou, China, Jan 5-7, 2023
(*5 keynote speakers at international conference*)
- 2021 **Keynote speaker** at 5th International Conference on Automation, Control and Robots,
Nanning China, Sept 25-27, 2021
(*5 keynote speakers at international conference*)
- 2014 **Keynote speaker** at SEMTE Controls Symposium at Arizona State University
(*4 keynote speakers at invited symposium*)

UNIVERSITY AWARDS

- 2019 **Outstanding Performance Award**, University of Waterloo
(*1 of 23 recipients in the Faculty of Engineering*)
- 2016 **Outstanding Performance Award**, University of Waterloo
(*1 of 22 recipients in the Faculty of Engineering*)
- 2015 Nominated for **Engineering Research Excellence Awards**, University of Waterloo
(*1 nominee at assistant professor level in ECE*)

SERVICE AWARDS

2014 **Best Reviewer** for Robotics: Science and Systems Conference
(3 awards among 286 reviewers. RSS is one of the premier robotics conferences)

ACADEMIC EXCELLENCE AWARDS

2005 – 2007 **NSERC Canada Graduate Scholarship**
(National award, Declined to study at UCSB)

2003 – 2005 **NSERC PGS A Graduate Scholarship**
(National Award, held while studying at University of Toronto)

2003 – 2005 **Canadian Space Agency NSERC Supplement**
(National Award, held while studying at University of Toronto)

2003 – 2004 **Gordon M. MacNabb Scholarship**
(National Award, held while studying at University of Toronto)

2002 – 2003 **Carl Reinhardt Scholarship**, Queen’s University

2002 – 2003 **NSERC Undergraduate Student Research Award**
(Research Assistant at Sudbury Neutrino Observatory.
Advisor won 2015 Nobel Prize in Physics.)

2000 – 2003 **Queen’s University Dean’s Award Scholarship**

2001 – 2002 **Alexander MacPhail Scholarship**, Queen’s University

3 RESEARCH AND SCHOLARSHIP

3.1 PUBLICATION CONVENTIONS AND VENUES

Quantitative Summary : My research has been cited over 4,500 times, with nearly 600 citations in 2022. The following table summarizes my Citation Metrics from Google Scholar as of April 15, 2023. Source: https://scholar.google.ca/citations?user=_gfwCNwAAAAJ&hl=en.

	All years	Since 2018
Citations	4773	2811
h-index	34	27
i10-index	68	58

3.2 PUBLICATIONS

Note: In the list of publications, graduate students are in bold and marked with (*) and postdocs are in bold and marked with (**).

ARTICLES IN REFEREED JOURNALS

- [J1] **A. Dahiya***, A. M. Aroyo, K. Dautenhahn, and S. L. Smith. “A Survey of Multi-Agent Human-Robot Interaction Systems”. In: *Robotics and Autonomous Systems* 161 (2023), p. 104335.
- [J2] **T. Sadeghi***, **B. Gilhuly***, **A. Sadeghi***, M. Delbosc, and S. L. Smith. “Predictive Dead Reckoning for Online Peer-to-Peer Games”. In: *IEEE Transactions on Games* (2023). To Appear (12 pages).
- [J3] **A. Downie***, B. Gharesifard, and S. L. Smith. “Submodular Maximization with Limited Function Access”. In: *IEEE Transactions on Automatic Control* (2023). To Appear (13 pages).

- [J4] **M. Ramesh***, F. Imeson, B. Fidan, and S. L. Smith. “Optimal Partitioning of Non-Convex Environments for Minimum Turn Coverage Planning”. In: *IEEE Robotics and Automation Letters* 7 (4 2022), pp. 9731–9738.
- [J5] **A. Sadeghi***, A. B. Asghar, and S. L. Smith. “Distributed Multi-Robot Coverage Control of Non-convex Environments with Guarantees”. In: *IEEE Transactions on Control of Network Systems* (2023). To Appear (12 pages).
- [J6] **A. Dahiya***, **N. Akbarzadeh***, A. Mahajan, and S. L. Smith. “Scalable Operator Allocation for Multi-Robot Assistance: A Restless Bandit Approach”. In: *IEEE Transactions on Control of Network Systems* 9 (3 2022), pp. 1397–1408.
- [J7] **N. Wilde****, **A. Sadeghi****, and S. L. Smith. “Learning Submodular Objectives for Team Environmental Monitoring”. In: *IEEE Robotics and Automation Letters* 7 (2 2022), pp. 960–967.
- [J8] **P. Carreno****, S. L. Smith, and D. Kulis. “Joint Estimation of Expertise and Reward Preferences From Human Demonstrations”. In: *IEEE Transactions on Robotics* 39 (1 2023), pp. 681–698.
- [J9] **R. De Iaco***, S. L. Smith, and K. Czarnecki. “Universally Safe Swerve Maneuvers for Autonomous Driving”. In: *IEEE Open Journal of Intelligent Transportation Systems* 2 (2022), pp. 482–494.
- [J10] **A. Botros*** and S. L. Smith. “Tunable Trajectory Planner Using G3 Curves”. In: *IEEE Transactions on Intelligent Vehicles* 7 (2 2022), pp. 273–285.
- [J11] **F. Tsang***, **T. Walker***, **R MacDonald***, **A. Sadeghi****, and S. L. Smith. “LAMP: Learning a Motion Policy to Repeatedly Navigate in an Uncertain Environment”. In: *IEEE Transactions on Robotics* 38 (3 2022), pp. 1638–1652.
- [J12] **A. Sadeghi**** and S. L. Smith. “Re-Balancing Self-Interested Drivers in Ride-Sharing Networks to Improve Customer Wait-Time”. In: *IEEE Transactions on the Control of Network Systems* (2023). To Appear (12 pages).
- [J13] **N. Wilde***, **A. Blidaru***, S. L. Smith, and D. Kulis. “Improving User Specifications for Robot Behavior through Active Preference Learning: Framework and Evaluation”. In: *International Journal of Robotics Research* 39.6 (2020), pp. 651–667.
- [J14] **N. Wilde***, D. Kulis, and S. L. Smith. “Bayesian Active Learning for Collaborative Task Specification using Equivalence Regions”. In: *IEEE Robotics and Automation Letters* 4.2 (2019), pp. 1691–1698.
- [J15] **F. Imeson*** and S. L. Smith. “An SMT-Based Approach to Motion Planning for Multiple Robots with Complex Constraints”. In: *IEEE Transactions on Robotics* 35.3 (2019), pp. 669–684.
- [J16] **R. A. MacDonald*** and S. L. Smith. “Active Sensing for Motion Planning in Uncertain Environments via Mutual Information Policies”. In: *International Journal of Robotics Research* 38.2-3 (2019), pp. 146–161.
- [J17] **G. D’Urso***, S. L. Smith, R. Mettu, T. Oksanen, and R. Fitch. “Multi-Vehicle Refill Scheduling with Queueing”. In: *Computers and Electronics in Agriculture* 144 (2018), pp. 44–57.
- [J18] B. Gharesifard and S. L. Smith. “Distributed Submodular Maximization with Limited Information,” in: *IEEE Transactions on the Control of Network Systems* 5.4 (2018), pp. 1635–1645.
- [J19] S. L. Smith and **F. Imeson***. “GLNS: An Effective Large Neighborhood Search Heuristic for the Generalized Traveling Salesman Problem”. In: *Computers & Operations Research* 87 (Nov. 2017), pp. 1–19.
- [J20] **A. Sadeghi*** and S. L. Smith. “Decentralized Large Neighborhood Search for Task Allocation in Heterogeneous Systems”. In: *Unmanned Systems* 5 (2 2017), pp. 1–17.
- [J21] **A. B. Asghar***, **S. T. Jawaid***, and S. L. Smith. “A Complete Greedy Algorithm for Infinite-Horizon Sensor Scheduling”. In: *Automatica* 81 (2017), pp. 335–341.
- [J22] **N. Mathew***, S. L. Smith, and S. L. Waslander. “Planning Paths for Package Delivery in Heterogeneous Multi-Robot Teams”. In: *IEEE Transactions on Automation Science and Engineering* 12.4 (2015), pp. 1298–1308.

- [J23] **S. T. Jawaid*** and S. L. Smith. “Submodularity and Greedy Algorithms in Sensor Scheduling for Linear Dynamical Systems”. In: *Automatica* 61 (2015), pp. 282–288.
- [J24] **N. Mathew***, S. L. Smith, and S. L. Waslander. “Multi-robot Rendezvous Planning for Recharging in Persistent Tasks”. In: *IEEE Transactions on Robotics* 31.1 (2015), pp. 128–142.
- [J25] **S. T. Jawaid*** and S. L. Smith. “Informative Path Planning as a Maximum Traveling Salesman Problem with Submodular Rewards”. In: *Discrete Applied Mathematics* 186 (2015), pp. 112–127.
- [J26] X. C. Ding, S. L. Smith, C. Belta, and D. Rus. “Optimal Control of Markov Decision Processes with Linear Temporal Logic Constraints”. In: *IEEE Transactions on Automatic Control* 59.5 (2014), pp. 1244–1257.
- [J27] **S. Alamdari***, **E. Fata***, and S. L. Smith. “Persistent Monitoring in Discrete Environments: Minimizing the Maximum Weighted Latency Between Observations”. In: *International Journal of Robotics Research* 33.1 (2014), pp. 138–154.
- [J28] S. D. Bopardikar, S. L. Smith, and F. Bullo. “On Dynamic Vehicle Routing with Time Constraints”. In: *IEEE Transactions on Robotics* 30.6 (2014), pp. 1524–1532.
- [J29] **A. Ulusoy***, S. L. Smith, X. C. Ding, C. Belta, and D. Rus. “Optimality and Robustness in Multi-Robot Path Planning with Temporal Logic Constraints”. In: *International Journal of Robotics Research* 32.8 (2013), pp. 889–911.
- [J30] M. Pavone, S. L. Smith, E. Frazzoli, and D. Rus. “Robotic Load Balancing for Mobility-on-Demand Systems”. In: *International Journal of Robotics Research* 31.7 (2012), pp. 839–854.
- [J31] S. L. Smith, M. Schwager, and D. Rus. “Persistent Robotic Tasks: Monitoring and Sweeping in Changing Environments”. In: *IEEE Transactions on Robotics* 28.2 (2012), pp. 410–426.
- [J32] S. L. Smith, **J. Tůmová***, C. Belta, and D. Rus. “Optimal Path Planning for Surveillance with Temporal Logic Constraints”. In: *International Journal of Robotics Research* 30.14 (2011), pp. 1695–1708.
- [J33] R. N. Smith, M. Schwager, S. L. Smith, D. Rus, and G. S. Sukhatme. “Persistent Ocean Monitoring with Underwater Gliders: Adapting Sampling Resolution”. In: *Journal of Field Robotics* 28.5 (2011), pp. 714–741.
- [J34] S. D. Bopardikar, S. L. Smith, and F. Bullo. “On Vehicle Placement to Intercept Moving Targets”. In: *Automatica* 47.9 (2011), pp. 2067–2074.
- [J35] F. Bullo, E. Frazzoli, M. Pavone, K. Savla, and S. L. Smith. “Dynamic Vehicle Routing for Robotic Systems”. In: *Proceedings of the IEEE* 99.9 (2011), pp. 1482–1504.
- [J36] S. D. Bopardikar, S. L. Smith, F. Bullo, and J. P. Hespanha. “Dynamic Vehicle Routing for Translating Demands: Stability Analysis and Receding-Horizon Policies”. In: *IEEE Transactions on Automatic Control* 55.11 (2010), pp. 2554–2569.
- [J37] S. L. Smith, M. Pavone, F. Bullo, and E. Frazzoli. “Dynamic Vehicle Routing with Priority Classes of Stochastic Demands”. In: *SIAM Journal on Control and Optimization* 48.5 (2010), pp. 3224–3245.
- [J38] S. L. Smith and F. Bullo. “The Dynamic Team Forming Problem: Throughput and Delay for Unbiased Policies”. In: *Systems & Control Letters* 58.10-11 (2009), pp. 709–715.
- [J39] S. L. Smith and F. Bullo. “Monotonic Target Assignment for Robotic Networks”. In: *IEEE Transactions on Automatic Control* 54.9 (2009), pp. 2042–2057.
- [J40] S. L. Smith, M. E. Broucke, and B. A. Francis. “Curve Shortening and the Rendezvous Problem for Mobile Autonomous Robots”. In: *IEEE Transactions on Automatic Control* 52.6 (2007), pp. 1154–1159.
- [J41] S. L. Smith, M. E. Broucke, and B. A. Francis. “A Hierarchical Cyclic Pursuit Scheme for Vehicle Networks”. In: *Automatica* 41.6 (2005), pp. 1045–1053.

ARTICLES IN REFEREED CONFERENCE PROCEEDINGS

- [C1] **A. Downie***, B. Ghahesifard, and S. L. Smith. “Optimistic Greedy Strategies for Partially Known Submodular Functions”. In: *IEEE Conf. on Decision and Control (CDC)*. Cancun, MX, Dec. 2022.
- [C2] **A. Downie***, B. Ghahesifard, and S. L. Smith. “A Programming Approach for Worst-case Studies in Distributed Submodular Maximization”. In: *IEEE Conf. on Decision and Control (CDC)*. Cancun, MX, Dec. 2022.
- [C3] **C. Wang***, Y. Meng, S. L. Smith, and J. Liu. “Data-Driven Learning of Safety-Critical Control with Stochastic Control Barrier Functions”. In: *IEEE Conf. on Decision and Control (CDC)*. Cancun, MX, Dec. 2022.
- [C4] **F. Wang***, C. Nielsen, and S. L. Smith. “A Pursuit Evasion Approach for Avoiding an Inattentive Human in the Presence of a Static Obstacle”. In: *IEEE Conf. on Decision and Control (CDC)*. Cancun, MX, Dec. 2022.
- [C5] **R. Li***, J. Simpson-Porco, and S. L. Smith. “Data-Driven Model Predictive Control for Linear Time-Periodic Systems”. In: *IEEE Conf. on Decision and Control (CDC)*. Cancun, MX, Dec. 2022.
- [C6] **S. Dutta***, **N. Wilde****, and S. L. Smith. “Informative Path Planning in Random Fields via Mixed Integer Programming”. In: *IEEE Conf. on Decision and Control (CDC)*. Cancun, MX, Dec. 2022.
- [C7] **Y. Cai***, **A. Dahiya***, **N. Wilde****, and S. L. Smith. “Scheduling Operator Assistance for Shared Autonomy in Multi-Robot Teams”. In: *IEEE Conf. on Decision and Control (CDC)*. Cancun, MX, Dec. 2022.
- [C8] **S. Dutta***, **N. Wilde****, and S. L. Smith. “An Improved Greedy Algorithm for Subset Selection in Linear Estimation”. In: *European Control Conference*. London, UK, July 2022.
- [C9] **B. Gilhuly**, **A. Sadeghi**, P. Yademellat, K. Rezaee, and S. L. Smith. “Looking for Trouble: Informative Planning for Safe Trajectories with Occlusions”. In: *IEEE Int. Conf. on Robotics and Automation (ICRA)*. Philadelphia, PA, May 2022.
- [C10] **A. Noormohammadi-Asl***, A. Ayub, S. L. Smith, and K. Dautenhahn. “Task Selection and Planning in Human-Robot Collaborative Processes: To Be a Leader or a Follower?”. In: *IEEE Int. Conf. on Robot and Human Interactive Communication (RO-MAN)*. Naples, Italy, Sept. 2022.
- [C11] **A. Botros****, **N. Wilde****, **A. Sadeghi****, J. Alonso-Mora, and S. L. Smith. “Error-Bounded Approximation of Pareto Fronts in Robot Planning Problems”. In: *Workshop on Algorithmic Foundations of Robotics (WAFR)*. College Park, MD, June 2022.
- [C12] **N. Wilde****, E. Biyik, D. Sadigh, and S. L. Smith. “Learning Reward Functions from Scale Feedback”. In: *Conference on Robot Learning*. London, UK and Virtual, Nov. 2021.
- [C13] **A. Noormohammadi Asl***, **A. Dahiya**, A. M Aroyo, S. L. Smith, and K. Dautenhahn. “The Effect of Robot Decision Making on Human Perception of a Robot in a Collaborative Task - A Remote Study”. In: *ACM International Conference on Human-Agent Interaction*. Nagoya, Japan (Virtual), Nov. 2021.
- [C14] **C. Wang***, **Y. Li****, **Y. Meng***, S. L. Smith, and J. Liu. “Learning Control Barrier Functions with High Relative Degree for Safety-Critical Control”. In: *European Control Conference*. Rotterdam, Netherlands, June 2021.
- [C15] **N. Wilde***, D. Kulic, and S. L. Smith. “Active Preference Learning using Maximum Regret”. In: *IEEE/RSJ Int. Conf. on Intelligent Robots & Systems (IROS)*. las Vegas, NV, Oct. 2020.
- [C16] **B. Gilhuly*** and S. L. Smith. “Aerial Coverage Planning for Areas Hidden from the View of a Moving Ground Vehicle”. In: *IEEE Conference on Automation Science and Engineering (CASE)*. Hong Kong, Aug. 2020.
- [C17] **N. Wilde***, **A. Botros***, and S. L. Smith. “Learning Control Sets for Lattice Planners from User Preferences”. In: *Workshop on Algorithmic Foundations of Robotics (WAFR)*. Oulu, Finland, June 2020.

- [C18] **A. Sadeghi***, **A. B. Asghar***, and S. L. Smith. “Approximation Algorithms for Distributed Multi-Robot Coverage in Non-Convex Environments”. In: *Workshop on Algorithmic Foundations of Robotics (WAFR)*. Oulu, Finland, June 2020.
- [C19] **R. De Iaco***, S. L. Smith, and K. Czarnecki. “Safe Swerve Maneuvers for Autonomous Driving”. In: *IEEE Intelligent Vehicles Symposium (IV)*. Las Vegas, NV, Oct. 2020.
- [C20] **N. Wilde***, D. Kulis, and S. L. Smith. “Learning User Preferences from Corrections on State Lattices”. In: *IEEE Int. Conf. on Robotics and Automation (ICRA)*. Paris, France, June 2020.
- [C21] **A. Sadeghi*** and S. L. Smith. “On Re-Balancing Self-Interested Agents in Ride-Sourcing Transportation Networks”. In: *IEEE Conf. on Decision and Control (CDC)*. Nice, France, Dec. 2019, pp. 5119–5125.
- [C22] **B. Gilhuly*** and S. L. Smith. “Robotic Coverage for Continuous Mapping Ahead of a Moving Vehicle”. In: *IEEE Conf. on Decision and Control (CDC)*. Nice, France, Dec. 2019, pp. 8224–8229.
- [C23] **A. Botros*** and S. L. Smith. “Computing a Minimal Set of t-Spanning Motion Primitives for Lattice Planners”. In: *IEEE/RSJ Int. Conf. on Intelligent Robots & Systems (IROS)*. Macau, China, Nov. 2019, pp. 2328–2335.
- [C24] **P. Carreno-Medrano****, **A. Dahiya***, S. L. Smith, and D. Kulis. “Incremental Estimation of Users’ Expertise Level”. In: *IEEE Int. Conf. on Robot and Human Interactive Communication (RO-MAN)*. New Delhi, India, Oct. 2019.
- [C25] **A. Sadeghi***, **A. B. Asghar***, and S. L. Smith. “On Minimum Time Multi-Robot Planning with Guarantees on the Total Collected Reward”. In: *IEEE International Symposium on Multi-Robot and Multi-Agent Systems*. New Brunswick, NJ, Aug. 2019.
- [C26] **R. De Iaco***, S. L. Smith, and K. Czarnecki. “Learning a Lattice Planner Control Set for Autonomous Vehicles”. In: *IEEE Intelligent Vehicles Symposium (IV)*. Paris, France, June 2019, pp. 549–556.
- [C27] **A. B. Asghar***, S. L. Smith, and S. Sundaram. “Multi-Robot Routing for Persistent Monitoring with Latency Constraints”. In: *American Control Conference (ACC)*. Philadelphia, PA, July 2019, pp. 2620–2625.
- [C28] **F. Tsang***, **R. A. MacDonald***, and S. L. Smith. “Learning Motion Planning Policies in Uncertain Environments through Repeated Task Executions”. In: *IEEE Int. Conf. on Robotics and Automation (ICRA)*. Montreal, QC, May 2019, pp. 8–14.
- [C29] **A. Sadeghi*** and S. L. Smith. “Coverage Control for Multiple Event Types with Heterogeneous Robots”. In: *IEEE Int. Conf. on Robotics and Automation (ICRA)*. Montreal, QC, May 2019, pp. 3377–3383.
- [C30] **A.B. Asghar*** and S. L. Smith. “A Patrolling Game for Adversaries with Limited Observation Time”. In: *IEEE Conf. on Decision and Control (CDC)*. Miami, FL, Dec. 2018, pp. 3305–3310.
- [C31] **A. Blidaru***, S. L. Smith, and D. Kulis. “Assessing User Specifications for Robot Task Planning”. In: *IEEE Int. Conf. on Robot and Human Interactive Communication (RO-MAN)*. Nanjing and Tai’an, China, Aug. 2018, pp. 72–79.
- [C32] **N. Wilde***, D. Kulis, and S. L. Smith. “Learning User Preferences in Robot Motion Planning through Interaction”. In: *IEEE Int. Conf. on Robotics and Automation (ICRA)*. Brisbane, Australia, May 2018, pp. 619–626.
- [C33] **A. Sadeghi*** and S. L. Smith. “Re-Deployment Algorithms for Multiple Service Robots to Optimize Task Response”. In: *IEEE Int. Conf. on Robotics and Automation (ICRA)*. Brisbane, Australia, May 2018, pp. 2356–2363.
- [C34] **F. Imeson*** and S. L. Smith. “Clustering in Discrete Path Planning for Approximating Minimum Length Paths”. In: *American Control Conference (ACC)*. Seattle, WA, May 2017, pp. 2968–2973.
- [C35] **A. Sadeghi*** and S. L. Smith. “On Efficient Computation of Shortest Dubins Paths Through Three Consecutive Points”. In: *IEEE Conf. on Decision and Control (CDC)*. Las Vegas, NV, Dec. 2016, pp. 6010–6015.

- [C36] **R. MacDonald*** and S. L. Smith. “Reactive Motion Planning in Uncertain Environments via Mutual Information Policies”. In: *Workshop on Algorithmic Foundations of Robotics (WAFR)*. Berkeley, CA, Dec. 2016, 16 pages.
- [C37] **S. Bochkarev*** and S. L. Smith. “On Minimizing Turns in Robot Coverage Path Planning”. In: *IEEE Conference on Automation Science and Engineering*. Fort Worth, TX, Aug. 2016, pp. 986–991.
- [C38] B. Ghahsifard and S. L. Smith. “On Distributed Submodular Maximization with Limited Information”. In: *American Control Conference (ACC)*. Boston, MA, July 2016, pp. 1048–1053.
- [C39] **A. B. Asghar*** and S. L. Smith. “Stochastic Patrolling Strategies in Adversarial Settings”. In: *American Control Conference (ACC)*. Boston, MA, July 2016, pp. 6435–6440.
- [C40] **F. Imeson*** and S. L. Smith. “Multi-Robot Task Planning and Sequencing using the SAT-TSP Language”. In: *IEEE Int. Conf. on Robotics and Automation (ICRA)*. Seattle, WA, May 2015, pp. 5397–5402.
- [C41] **A. B. Asghar*** and S. L. Smith. “Robot Monitoring for the Detection and Confirmation of Stochastic Events”. In: *IEEE Conf. on Decision and Control (CDC)*. Los Angeles, CA, Dec. 2014, pp. 408–413.
- [C42] **N. Mathew***, S. L. Waslander, and S. L. Smith. “Optimal Path Planning in Cooperative Heterogeneous Multi-robot Delivery Systems”. In: *Workshop on Algorithmic Foundations of Robotics (WAFR)*. Istanbul, Turkey, Aug. 2014, 16 pages.
- [C43] **S. T. Jawaid*** and S. L. Smith. “A Complete Algorithm for the Infinite Horizon Sensor Scheduling Problem”. In: *American Control Conference (ACC)*. Portland, OR, June 2014, pp. 437–442.
- [C44] **S. T. Jawaid*** and S. L. Smith. “On the Submodularity of Sensor Scheduling for Estimation of Linear Dynamical Systems”. In: *American Control Conference (ACC)*. Portland, OR, June 2014, pp. 4139–4144.
- [C45] **P. J. McCarthy***, C. Neilsen, and S. L. Smith. “Cardinality Constrained Robust Optimization Applied to a Class of Interval Observers”. In: *American Control Conference (ACC)*. Portland, OR, June 2014, pp. 5337–5342.
- [C46] **F. Imeson*** and S. L. Smith. “A Language For Robot Path Planning in Discrete Environments: The TSP with Boolean Satisfiability Constraints”. In: *IEEE Int. Conf. on Robotics and Automation (ICRA)*. Hong Kong, China, May 2014, pp. 5772–5777.
- [C47] S. L. Smith, M. Pavone, M. Schwager, E. Frazzoli, and D. Rus. “Rebalancing the Rebalancers: Optimally Routing Vehicles and Drivers in Mobility-on-Demand Systems”. In: *American Control Conference (ACC)*. Washington, DC, June 2013, pp. 2368–2373.
- [C48] **P. J. McCarthy***, C. Neilsen, and S. L. Smith. “A Nonlinear Impulsive Observer for Diesel Engine Emissions Reduction”. In: *American Control Conference (ACC)*. Washington, DC, June 2013, pp. 1065–1070.
- [C49] **N. Mathew***, S. L. Smith, and S. L. Waslander. “A Graph-Based Approach to Multi-Robot Rendezvous for Recharging in Persistent Tasks”. In: *IEEE Int. Conf. on Robotics and Automation (ICRA)*. Karlsruhe, Germany, May 2013, pp. 3482–3487.
- [C50] **S. T. Jawaid*** and S. L. Smith. “The Maximum Traveling Salesman Problem with Submodular Rewards”. In: *American Control Conference (ACC)*. Washington, DC, June 2013, pp. 4003–4008.
- [C51] **E. Fata***, S. Sundaram, and S. L. Smith. “Distributed Dominating Sets on Grids”. In: *American Control Conference (ACC)*. Washington, DC, June 2013, pp. 211–216.
- [C52] **A. Ulusoy***, S. L. Smith, and C. Belta. “Optimal Multi-Robot Path Planning with LTL Constraints: Guaranteeing Correctness Through Synchronization”. In: *Int. Symp. on Distributed Autonomous Robotic Systems*. Baltimore, MD, Nov. 2012, 14 pages.
- [C53] **B. J. Julian***, S. L. Smith, and D. Rus. “Distributed Approximation of Joint Measurement Distributions Using Mixtures of Gaussians”. In: *Robotics: Science and Systems (RSS)*. Sydney, Australia, July 2012, 8 pages.

- [C54] **S. Alamdari***, **E. Fata***, and S. L. Smith. “Min-Max Latency Walks: Approximation Algorithms for Monitoring Vertex-Weighted Graphs”. In: *Workshop on Algorithmic Foundations of Robotics (WAFR)*. Cambridge, MA, June 2012, 16 pages.
- [C55] **A. Ulusoy***, S. L. Smith, X. C. Ding, and C. Belta. “Robust Multi-Robot Optimal Path Planning with Temporal Logic Constraints”. In: *IEEE Int. Conf. on Robotics and Automation (ICRA)*. St. Paul, MN, May 2012, pp. 4693–4698.
- [C56] **A. Ulusoy***, S. L. Smith, X. C. Ding, C. Belta, and D. Rus. “Optimal Multi-Robot Path Planning with Temporal Logic Constraints”. In: *IEEE/RSJ Int. Conf. on Intelligent Robots & Systems (IROS)*. San Francisco, CA, Sept. 2011, pp. 3087–3092.
- [C57] **D. E. Soltero***, S. L. Smith, and D. Rus. “Collision Avoidance in Trajectory Tracking for Multi-Robot Persistent Tasks”. In: *IEEE/RSJ Int. Conf. on Intelligent Robots & Systems (IROS)*. San Francisco, CA, Sept. 2011, pp. 3645–3652.
- [C58] X. C. Ding, S. L. Smith, C. Belta, and D. Rus. “MDP Optimal Control under Temporal Logic Constraints”. In: *IEEE Conf. on Decision and Control (CDC)*. Orlando, FL, Dec. 2011, pp. 532–538.
- [C59] M. Pavone, S. L. Smith, E. Frazzoli, and D. Rus. “Load Balancing for Mobility-on-Demand Systems”. In: *Robotics: Science and Systems (RSS)*. Los Angeles, CA, June 2011, 8 pages.
- [C60] X. C. Ding, S. L. Smith, C. Belta, and D. Rus. “LTL Control in Uncertain Environments with Probabilistic Satisfaction Guarantees”. In: *IFAC World Congress*. Electronic proceedings. Milan, Italy, Aug. 2011, 8 pages. DOI: 10.3182/20110828-6-IT-1002.02287.
- [C61] S. L. Smith, M. Schwager, and D. Rus. “Persistent Monitoring of Dynamic Environments using a Robot with Limited Range Sensing”. In: *IEEE Int. Conf. on Robotics and Automation (ICRA)*. Shanghai, China, May 2011, pp. 5448–5455.
- [C62] R. N. Smith, M. Schwager, S. L. Smith, D. Rus, and G. S. Sukhatme. “Persistent Ocean Monitoring with Underwater Gliders: Towards Accurate Reconstruction of Dynamic Ocean Processes”. In: *IEEE Int. Conf. on Robotics and Automation (ICRA)*. Shanghai, China, May 2011, pp. 1517–1524.
- [C63] S. L. Smith and D. Rus. “Multi-Robot Monitoring in Dynamic Environments with Guaranteed Currency of Observations”. In: *IEEE Conf. on Decision and Control (CDC)*. Atlanta, GA, Dec. 2010, pp. 514–521.
- [C64] S. L. Smith, **J. Tümová***, C. Belta, and D. Rus. “Optimal Path Planning under Temporal Constraints”. In: *IEEE/RSJ Int. Conf. on Intelligent Robots & Systems (IROS)*. Taipei, Taiwan, Oct. 2010, pp. 3288–3293.
- [C65] S. D. Bopardikar, S. L. Smith, and F. Bullo. “Vehicle Placement to Intercept Moving Targets”. In: *American Control Conference (ACC)*. Baltimore, MD, June 2010, pp. 5538–5543.
- [C66] S. L. Smith, S. D. Bopardikar, and F. Bullo. “A Dynamic Boundary Guarding Problem with Translating Targets”. In: *IEEE Conf. on Decision and Control (CDC)*. Shanghai, China, Dec. 2009, pp. 8543–8548.
- [C67] M. Pavone, S. L. Smith, F. Bullo, and E. Frazzoli. “Dynamic multi-vehicle routing with multiple classes of demands”. In: *American Control Conference (ACC)*. St. Louis, MO, June 2009, pp. 604–609.
- [C68] S. L. Smith, S. D. Bopardikar, F. Bullo, and J. P. Hespanha. “Dynamic vehicle routing with moving demands – Part II: High speed demands or low arrival rates”. In: *American Control Conference (ACC)*. St. Louis, MO, June 2009, pp. 1466–1471.
- [C69] S. D. Bopardikar, S. L. Smith, F. Bullo, and J. P. Hespanha. “Dynamic vehicle routing with moving demands – Part I: Low speed demands and high arrival rates”. In: *American Control Conference (ACC)*. St. Louis, MO, June 2009, pp. 1454–1459.
- [C70] S. L. Smith, M. Pavone, F. Bullo, and E. Frazzoli. “Dynamic Vehicle Routing with Heterogeneous Demands”. In: *IEEE Conf. on Decision and Control (CDC)*. Cancun, Mexico, Dec. 2008, pp. 1206–1211.
- [C71] S. L. Smith and F. Bullo. “Dynamic Multi-Agent Team Forming: Asymptotic Results on Throughput Versus Delay”. In: *American Control Conference (ACC)*. Seattle, WA, June 2008, pp. 1406–1411.

- [C72] S. L. Smith and F. Bullo. “Target Assignment for Robotic Networks: Worst Case and Stochastic Performance in Dense Environments”. In: *IEEE Conf. on Decision and Control (CDC)*. New Orleans, LA, Dec. 2007, pp. 3585–3590.
- [C73] S. L. Smith and F. Bullo. “Target Assignment for Robotic Networks: Asymptotic Performance Under Limited Communication”. In: *American Control Conference (ACC)*. New York, NY, July 2007, pp. 1155–1160.
- [C74] S. L. Smith, M. E. Broucke, and B. A. Francis. “Stabilizing a Multi-Agent System to an Equilateral Polygon Formation”. In: *Mathematical Theory of Networks and Systems*. Kyoto, Japan, July 2006, pp. 2415–2424.
- [C75] S. L. Smith, M. E. Broucke, and B. A. Francis. “Curve shortening and its application to multi-agent systems”. In: *IEEE Conf. on Decision and Control and European Control Conference (CDC-ECC)*. Seville, Spain, Dec. 2005, pp. 2817–2822.

CHAPTERS IN BOOKS

- [BC1] S. L. Smith and F. Bullo. “A Geometric Assignment Problem for Robotic Networks”. In: *Modeling, Estimation and Control: Festschrift in honor of Giorgio Picci on the occasion of his sixty-fifth Birthday*. Ed. by A. Chiuso, A. Ferrante, and S. Pinzoni. Lecture Notes in Control and Information Sciences. Springer, 2007, pp. 271–284.

BOOKS

- [B1] F. Bullo and S. L. Smith. *Lectures on Robotic Planning and Kinematics*. Available at <https://ece.uwaterloo.ca/~sl2smith/book-lrpk/>. Signed Publishing Contract. SIAM: Society for Industrial and Applied Mathematics, 2019, 210 pages.

THESES

- [T1] S. L. Smith. “Strategies for Rendezvous and Formation Stabilization of Multi-Agent Systems”. MA thesis. Department of Electrical Engineering, University of Toronto, Aug. 2005.
- [T2] S. L. Smith. “Task Allocation and Vehicle Routing in Dynamic Environments”. PhD thesis. Department of Mechanical Engineering, University of California at Santa Barbara, Aug. 2009.

PATENTS

- [P1] A. Sadeghi, B. Gilhuly, S. L. Smith, P. Yadmellat, and K. Rezaee. *Systems, Methods, and Media for Occlusion-Aware Motion Planning*. US Patent App. 17/474,751. 2022.
- [P2] Z. Huang, H. Singh, S. Tajeddin, and S. L. Smith. *Method, system and apparatus for generating navigational data*. US Patent 10,823,572. 2020.
- [P3] K. C. Jen, H. Singh, and S. L. Smith. *Fixed segmented lattice planning for a mobile automation apparatus*. US Patent 10,591,918. 2020.

INVITED TALKS

- [IT1] *Learning Unknown Environments for Safe Robot Motion Planning*. 7th International Conf. on Robotics, Control and Automation. Taizhou, China, Jan. 2023.
- [IT2] *Robotics Research at Waterloo*. Network, Interact, Learn STEM Program. Edson, Alberta (remote), Nov. 2022.
- [IT3] *Ubiquitous Services: Intelligence Linking the World*. OPPOHack 2022 Global Innovation Competition. Vancouver, BC (remote), July 2022.

- [IT4] *Dealing with Multiple Objectives*. Workshop on the Algorithmic Foundations of Robotics, Open Problems in Robotics. College Park, MD, June 2022.
- [IT5] *Learning Motion Plans and User Preferences for Robot Autonomy*. ETH Zurich, Autonomy Talks. Zurich, Switzerland (remote), May 2022.
- [IT6] *Learning Motion Plans and User Preferences for Robot Autonomy*. University of Minnesota, Aerospace Engineering and Mechanics Departmental Seminar. Minneapolis, MN (remote), Apr. 2022.
- [IT7] *Towards Safer and Risk-aware Motion Planning and Control for Robotic Systems*. KTH Royal Institute of Technology, Division of Robotics. Stockholm, Sweden (remote), Feb. 2022.
- [IT8] *Challenges in Long-Term Autonomy*. 5th International Conference on Automation, Control and Robots. Taizhou, China, Sept. 2021.
- [IT9] *Challenges in Long-Term Autonomy*. Huawei-Waterloo Workshop on Autonomous Vehicle Navigation. Markham, ON (remote), Nov. 2021.
- [IT10] *Robotics Rebooted Panel Session*. Project Tech Conferences. Waterloo, ON (remote), May 2021.
- [IT11] *Challenges in Long-Term Robot Autonomy*. Amity University Invited Lecture Series. Noida, India (remote), Sept. 2021.
- [IT12] *Autonomous Vehicles: The Hope and Hype of Self-Driving Cars*. University of Waterloo, Alumni Speaker Series. Waterloo, ON (remote), Oct. 2021.
- [IT13] *Robot Motion Planning and Control in Uncertain Environments*. 5th International Conference on Automation, Control and Robots. Nanning, China (remote), Sept. 2021.
- [IT14] *Cloud Robotics Panel*. Cloud InnoWave. Intelligent Cloud Technologies Laboratory of Huawei's Munich Research Center, July 2021.
- [IT15] *Planning Motion and Learning Policies for Long-Term Robot Deployments*. Autonomous Systems Initiative, University of Alberta. Remote, Nov. 2020.
- [IT16] *Challenges and Developments in Counter-UAV Technologies*. IDeAS Workshop, Canadian Armed Forces. Ottawa, Canada, Dec. 2019.
- [IT17] *The Impact of Information on Greedy Agents Performing Distributed Submodular Maximization*. Workshop on Learning, Decision, and Control over Networks. Nice, France, Dec. 2019.
- [IT18] *Specification Decomposition and Formal Behavior Generation in Multi-Robot Systems*. KTH Royal Institute of Technology. Stockholm, Sweden, June 2019.
- [IT19] *Key Insights from the Field of Autonomous Systems*. Chrysalix Collision Days. TU Delft, Netherlands, Nov. 2018.
- [IT20] *Sensor Selection, Scheduling, and Routing for Estimation and Event Detection*. GERAD Seminar Series. Polytechnique Montreal, Canada, Feb. 2017.
- [IT21] *Balancing Expressivity and Efficiency in Robot Path Planning Languages*. Australian Centre for Field Robotics. University of Sydney, Sydney, Australia, Apr. 2016.
- [IT22] *Multi-Robot Task Allocation and Sequencing: Distributed Algorithms for General Tasks*. Workshop on Taxonomies of Interconnected Systems: Asymmetric Interactions in Distributed Robotics. IEEE International Conference on Robotics and Automation, May 2015.
- [IT23] *The Role of Submodularity and Greedy Algorithms in Sensor Scheduling Problems*. SEMTE Controls Symposium. Arizona State University, Tempe, AZ, Dec. 2014.
- [IT24] *The Role of Submodularity and Greedy Algorithms in Sensor Scheduling Problems*. Cymer Center for Control Systems and Dynamics Seminar. University of California San Diego, La Jolla, CA, Nov. 2014.
- [IT25] *Balancing Expressivity and Efficiency in Robot Path Planning Languages*. GRASP Lab Special Seminar. University of Pennsylvania, Philadelphia, PA, Nov. 2014.

- [IT26] *Robot Path Planning and Recharging in Persistent Monitoring Operations*. Aeronautics and Astronautics Seminar. Stanford University, Stanford, CA, Apr. 2014.
- [IT27] *Greedy Algorithms and Submodularity in Sensor Scheduling Problems*. Sixth Biennial Meeting on Systems and Control. University of Waterloo, Waterloo, ON, May 2014.
- [IT28] *Validation of Mobility-on-Demand Rebalancing on Real World Data*. Workshop on Vehicle Autonomy in Urban Transportation Systems. IEEE Conference on Robotics and Automation, Karlsruhe, Germany, May 2013.
- [IT29] *Optimizing Motion for Robotic Monitoring and Information Gathering*. Applied Mathematics Control Seminar. University of Waterloo, Waterloo, ON, Nov. 2012.
- [IT30] *Optimizing Motion for Robotic Monitoring and Information Gathering*. CISE Seminar Series. Boston University, Boston, MA, Sept. 2012.
- [IT31] *Challenges and Autonomy for Mobility-On-Demand Systems*. Workshop on Autonomy for Urban Transportation. National University of Singapore, Singapore, Aug. 2012.
- [IT32] *Planning with Temporal Constraints*. SMARTS Review Meeting. MIT, Cambridge, MA, Dec. 2011.
- [IT33] *Optimizing Robotic Motion for Complex and Dynamic Tasks*. Mechanical Engineering Seminar Series. University of California, Santa Barbara CA, Oct. 2011.
- [IT34] *Persistent Tasks for Robots in Changing Environments*. Workshop on 3D Exploration, Mapping, and Surveillance with Aerial Robots. Robotics: Science and Systems, Los Angeles, CA, July 2011.
- [IT35] *Robots on-demand: Optimizing Motion for Dynamic and Complex Tasks*. ECE Seminar Series. University of Toronto, Toronto ON, Mar. 2011.
- [IT36] *Adaptive Coverage in Challenging Environments*. ANTIDOTE Review Meeting. University of Southern California, Los Angeles, CA, Aug. 2010.
- [IT37] *Communication Constrained Task Allocation For Robotic Networks*. Theory of Distributed Systems Group. MIT, Cambridge, MA, Mar. 2010.
- [IT38] *Task Allocation and Vehicle Routing in Dynamic Environments*. Mechanical Engineering Seminar Series. University of Michigan, Ann Arbor, MI, Mar. 2010.
- [IT39] *Task Allocation and Vehicle Routing in Dynamic Environments*. Australian Centre for Field Robotics. University of Sydney, Sydney, Australia, Jan. 2010.
- [IT40] *Autonomous Task Allocation and Vehicle Routing in Dynamic Environments*. Computer Science & Artificial Intelligence Lab. MIT, Cambridge, MA, July 2009.
- [IT41] *Autonomous Task Allocation and Vehicle Routing in Dynamic Environments*. Mechanical and Aerospace Engineering Seminar. Princeton University, Princeton, NJ, July 2009.
- [IT42] *Autonomous Task Allocation and Vehicle Routing in Dynamic Environments*. Electrical Engineering Seminar. Yale University, New Haven, CT, July 2009.
- [IT43] *Autonomous Task Allocation and Vehicle Routing in Dynamic Environments*. Aeronautical and Astronautical Engineering Seminar. MIT, Cambridge, MA, Apr. 2009.
- [IT44] *Static and Dynamic Trajet Assignment*. SWARM Review Meeting. University of Pennsylvania, Philadelphia, PA, July 2008.
- [IT45] *A Geometric Assignment Problem for Robotic Networks*. Southern California Nonlinear Control Workshop. University of California, Los Angeles, CA, June 2007.

MEDIA COVERAGE

- [M1] Imprint. *Introducing UWs Canada Research Chairs*. Nov. 2017. URL: <http://uwimprint.ca/article/introducing-uws-canada-research-chairs/>.

- [M2] Waterloo Engineering News Office. *Funding will help team develop plug-and-play robots*. Aug. 2016. URL: <https://uwaterloo.ca/engineering/news/funding-will-help-team-develop-plug-and-play-robots>.
- [M3] MIT News Office. *New algorithm finds best routes for one-way car sharing*. June 2013. URL: <http://web.mit.edu/newsoffice/2013/algorithm-finds-best-routes-for-one-way-car-sharing-0624.html>.
- [M4] MIT News Office. *Speeding swarms of sensor robots*. May 2011. URL: <http://web.mit.edu/newsoffice/2011/robot-algorithm-0503.html>.

4 TEACHING ACTIVITIES

4.1 GRADUATE STUDENT AND POSTDOC SUPERVISION

CURRENT PHD STUDENTS

- 2020 – present **Barry Gilhuly**
Research topic: Active perception and planning in dynamic environments
Awards: NSERC Postgraduate Scholarship Doctoral (PGS D)
 Faculty of Engineering Advanced Manufacturing Fellowship
- 2020 – present **Ruiqi Li**
Co-supervisor: Prof. John Simpson
Research topic: Data-driven control for uncertain systems
- 2020 – present **Megnath Ramesh**
Co-supervisor: Prof. Baris Fidan
Research topic: Motion planning for cleaning dynamic environments
Awards: Queen Elizabeth II Graduate Scholarship (QEII-GSST)
- 2019 – present **Ali Noormohammadi Asl**
Co-supervisor: Prof. Kerstin Dautenhahn
Research topic: Human-robot collaborative assembly and co-bots
- 2019 – present **Shamak Dutta**
Research topic: Adaptive robot sampling and mapping for agriculture
- 2018 – present **Abhinav Dahiya**
Research topic: Decision support systems for tele-operation of robot teams
- 2016 – present **Chuanzheng Wang**
Co-supervisor: Prof. Jun Liu
Research topic: Deep learning in control of stochastic and uncertain systems

CURRENT MASc STUDENTS

- 2022 – present **Ahmed Hamouda**
Co-supervisor: Prof. Baris Fidan
Research topic: Safe path planning and coordination in off-road environments
- 2022 – present **Jack Dai**
Co-supervisor: Prof. Yash Pant
Research topic: Risk-aware motion planning with complex specifications
- 2021 – present **Anni Yue**
Research topic: Robot optimization for high-density warehouse storage

- 2021 – present **Rodrigue De Schaetzen**
Research topic: Autonomous navigation in icy waters
- 2020 – present **Yifan Cai**
Research topic: Mixed-initiative systems with one supervisor and multiple robots

FORMER POSTDOCTORAL RESEARCHERS

- 2022 – 2023 **Alexander Botros**
Research area: Motion planning and trajectory planning for autonomous driving
Currently: Chief Executive Officer, Veerio Robotics, Canada
- 2021 – 2023 **Armin Sadeghi**
Research area: Informative planning for autonomous driving
Currently: Senior Software Engineer, Humanitas Solutions, Montreal, QC
- 2020 – 2021 **Nils Wilde**
Research area: Active preference learning for human-robot interaction
Currently: Postdoc at Delft University of Technology, Netherlands
- 2017 – 2019 **Pamela Carreno Medrano**
Research area: Human-robot collaboration for joint assembly tasks
Currently: Postdoc at Monash University, Melbourne, Australia

GRADUATED PHD STUDENTS

- 2017 – 2021 **Alexander Botros**
Thesis: Lattice-Based Motion Planning with Optimal Motion Primitives
Currently: Chief Executive Officer, Veerio Robotics, Canada.
- 2016 – 2020 **Nils Wilde**
Co-supervisor: Prof. Dana Kulic
Thesis: Specifying User Preferences for Autonomous Robots through Interactive Learning
Currently: Postdoc at University of Waterloo.
Next: Postdoc at Delft University of Technology, Netherlands.
- 2016 – 2020 **Armin Sadeghi**
Thesis: Multi-robot Coverage and Redeployment Algorithms
Currently: Postdoc at University of Waterloo.
- 2016 – 2020 **Ahmad Bilal Asghar**
Thesis: Multi-Robot Path Planning for Persistent Monitoring in Stochastic and Adversarial Environments
Currently: Postdoc at University of Maryland.
- 2013 – 2018 **Frank Imeson**
Thesis: Robotic Path Planning for High-Level Tasks in Discrete Environments
Currently: Senior Software Developer at Avidbots Corp. in Waterloo, ON.
- 2015 – 2016 **Haotian Zhang**
Co-supervisor: Prof. Shreyas Sundaram
Thesis: Estimation and Control of Dynamical Systems with Applications to Multi-Processor Systems
Currently: Senior Research Engineer at Samsung AI Center in Toronto, ON
- 2010 – 2013 **Alphan Ulusoy** (co-advised at MIT)
Main advisor: Calin Belta.

Thesis: Optimal Temporal Logic Control of Autonomous Vehicles
Currently: Senior Engineer, The Math Works

2009 – 2011

Jana Tumova (co-advised at MIT)

Main advisor: Calin Belta.

Thesis: Formal Methods for Robot Path Planning from Temporal Logic Specifications

Currently: Assistant Professor at KTH, Stockholm Sweden

GRADUATED MASc STUDENTS

2019 – 2022

Jean-Luc Bastarache

Co-supervisor: Prof. Chris Nielsen

Thesis: On Legible and Predictable Robot Navigation in Multi-Agent Environments

Awards: Ontario Graduate Scholarship (OGS).

018 – present

Olzhas Adiyatov

Co-supervisor: Prof. Baris Fidan

Thesis: Path Planning Framework for Unmanned Ground Vehicles on Uneven Terrain

Currently: Software Engineer at Christie Digital, Kitchener, ON

2019 – 2022

Andrew Downie

Thesis: Submodular Maximization Subject to Information Constraints

Awards: Ontario Graduate Scholarship (OGS);

Richard and Elizabeth Madter Graduate Entrance Scholarship

Currently: AI Engineer at RBC Capital Markets, in Toronto

2018 – 2021

Frank Wang

Co-supervisor: Prof. Chris Nielsen

Thesis: A Pursuit Evasion Game Approach to Obstacle Avoidance

Awards: Faculty of Engineering Advanced Manufacturing Fellowship

Currently: Embedded Software Engineer at Ciena, in Toronto

2018 – 2021

Tristan Walker

Thesis: “Dead Reckoning for Distributed Network Online Games”

Currently: Autonomy Engineer at Swap Robotics, Waterloo, ON

2018 – 2020

Barry Gilhuly

Thesis: Coverage Path Planning for a Moving Vehicle

Awards: NSERC – Alexander Graham Bell Canada Graduate Scholarship (CGS M)

Currently: PhD Student at University of Waterloo

2017 – 2020

Florence Tsang

Thesis: Learning a Motion Policy to Navigate Environments with Structured Uncertainty

Awards: Richard and Elizabeth Madter Graduate Entrance Scholarship

Currently: Software Engineer at Avidbots, Waterloo, ON.

2017 – 2019

Ryan De Iaco

Co-supervisor: Prof. Krzysztof Czarnecki

Thesis: “Motion Planning and Safety for Autonomous Driving”

Awards: NSERC – Alexander Graham Bell Canada Graduate Scholarship (CGS M)

Ontario Graduate Scholarship (OGS)

Currently: Software Engineer at Waymo in Mountain View, CA.

2017 – 2019

Alexandru Blidaru

Co-supervisor: Prof. Dana Kulic

Thesis: “Assessing User Specifications of Robot Behaviour for Material Transport Tasks”

Currently: QA Developer, Apple Inc., Cupertino CA.

2015 – 2017

Ryan Andrew MacDonald

Thesis: “Robotic Motion Planning in Uncertain Environments via Active Sensing”

Awards: NSERC – Alexander Graham Bell Canada Graduate Scholarship (CGS M)
Ontario Graduate Scholarship (OGS)

Currently: Senior Embedded System Developer, Team Lead at GEOTAB in Waterloo, ON.

2015 – 2017

Stanislav Bochkarev

Thesis: Minimizing Turns in Single and Multi Robot Coverage Path Planning

Awards: NSERC – Alexander Graham Bell Canada Graduate Scholarship (CGS M)

Currently: Senior Software Developer at Darwin AI in Waterloo, ON

2014 – 2016

Armin Sadeghi

Thesis: Distributed Task Allocation and Task Sequencing for Robots with Motion Constraints

Currently: PhD then Postdoc at Waterloo

2013 – 2015

Ahmad Bilal Asghar

Thesis: Robot Patrolling for Stochastic and Adversarial Events

Currently: PhD at Waterloo then Postdoc at Toronto

2012 – 2014

Neil Matthew

Co-supervisor: Prof. Steven Waslander (MME)

Thesis: Discrete Path Planning Strategies for Coverage and Multi-Robot Rendezvous

Currently: Co-founder and CEO, Placemote, Waterloo, ON and Mountain View, CA

2011 – 2013

Syed Talha Jawaid

Thesis: Informative Path Planning and Sensor Scheduling for Persistent Monitoring Tasks

Awards: NSERC – Alexander Graham Bell Canada Graduate Scholarship (CGS M)

Currently: Software Engineer at National Instruments, Austin, TX

2012 – 2013

Elaheh Fata

Thesis: On Two Combinatorial Optimization Problems in Graphs: Grid Domination and Robustness

Currently: Assistant Professor of Management Analytics, Queen’s University

Previously: PhD Student at MIT

2012 – 2013

Philip McCarthy

Thesis: Cardinality Constrained Robust Optimization Applied to a Class of Interval Observers

Currently: Postdoctoral Researcher at University of Toronto

Previously: PhD Student at University of Waterloo

2010 – 2011

Daniel Soltero (co-advised at MIT)

Thesis: Informative Paths for Persistent Sensing in Unknown Environments

Currently: Software QA Engineering Manager at Apple Inc. in Redwood City, CA

4.2 OTHER STUDENT SUPERVISION

UNDERGRADUATE RESEARCH SUPERVISION

Spring 2022

Ansar Khan, “Perception for autonomous navigation in crowds”

Currently: Software Engineer at Kodiak Robotics

2020 - 2021

Neil Brubacher, “Human-Robot Interfaces for Interactive Motion Planning”

Currently: Master’s student at Waterloo

2016 – 2017	Yingzi Zhang, “Machine learning for adaptive robot motion” <i>Currently:</i> Undergraduate student at Waterloo
Fall 2016	Alexandru Blidaru, “Human-robot interaction in motion planning” <i>Currently:</i> QA Developer, Apple Inc., Cupertino CA.
Spring 2016	Shamak Dutta, “Generalized traveling salesman with overlapping sets” <i>Currently:</i> PhD Student at Waterloo
Fall 2015	Edward Wang, “Benchmarking for the generalized traveling salesman” <i>Currently:</i> Software Engineer at Collective Health in San Francisco, CA
2014 – 2015	Jamie Waugh, “Optimization for mobility-on-demand systems” <i>Currently:</i> Researcher, Boston Children’s Hospital, Boston, MA
2013 – 2014	Sebastian Schweigert, “Simulating public transportation wait-times” <i>Currently:</i> Controls Engineer at Verb Surgical in Mountain View, CA
Fall 2013	Andrew Perkins, “Urban mobility simulation environment”
Spring 2013	Zhaowei Wang, “Rebalancing policies with real-world data” <i>Currently:</i> Senior Camera System Design Engineer at Apple in Sunnyvale, CA
2012 – 2013	Danson Evan Garcia, “Rebalancing for in urban mobility”
Fall 2012	Joao Pedro Battistella Nadas, “Monitoring robotic network” <i>Currently:</i> Analyst at GVT Telecom
Spring 2012	Mohammadreza Memarian, “Multi-agent robotic testbed” <i>Currently:</i> Embedded Software Engineer at Evertz in Burlington, ON
Spring 2012	Zhixu Han, “Docking strategies for robotic coverage” <i>Currently:</i> Software Engineer at ITG, Toronto

CO-OP STUDENT SUPERVISION

2020	Neil Brubacher (Waterloo Co-op) “User interface development for human-robot interaction”
2015	Oluwasefunmi Osinaike (E-Coop) “Time management assistant”
2013	Ali Ali Mahmoud (E-Coop) “Automating factory systems”
2013	Han Xu (Waterloo Co-op) “Test Instances for carshare commuting”
2013	Jordan Longstaff (Waterloo Co-op) “Interface design for ride-sharing”
2012	Ross McCandless (UCEP) “Data analysis for future transportation”

CAPSTONE DESIGN PROJECT SUPERVISION

2021 – present	MME: Robotic Dog Companion
2021 – present	ECE: Codenames AI
2021 – present	ECE: Gautocos (Automated Compost Sorter)
2021 – present	ECE: Arrows: Indoor robot mapper
2018 – 2019	ECE: Tennis Ball Collecting Robot
2017 – 2018	ECE: Nurse Joy – Hospital robot assistant
2017 – 2018	ECE: Drone Emergency Recovery System
2017 – 2018	ECE: Autonomous Service Cart
2016 – 2017	ECE: Pursuit – The Self-Following Smart Suitcase
2016 – 2017	ECE: LowCast – crowdsourced software app for podcasts
2014 – 2015	ECE: Improved Touch Surface Projection System
2013 – 2014	ECE: Leg Motion Monitoring System

2013 – 2014	ECE: The Robotic Arm Project
2011 – 2013	ECE: Reduced Footprint Mobility System (Telus Best Presentation Award)
2011 – 2013	ECE: Distributed Robotics System
2011 – 2013	ECE: Motion Controlled Quad-copter
2011 – 2012	ECE: Cooperative Control Vehicular System

VISITING MASTER’S STUDENT SUPERVISION

2021 – Present	Justin Lee (Visiting MAsC) “Planning with movable obstacles” <i>Currently: Visiting from École centrale de Nantes, France</i>
2016	Michael Zechmair (Visiting MAsC) “Monte-Carlo Tree Search for Motion Planning” <i>Currently: PhD Student at TU Munich</i>

5 SERVICE

DEPARTMENTAL SEARCH COMMITTEES

2021	Member of DACA for tenure-track position in Control Systems <ul style="list-style-type: none"> • Search for two positions with over 180 applications. • Stepped down due to conflict of interest with short-listed candidate
2020	Chair of DACA for tenure-track position in Cyber-Physical Systems <ul style="list-style-type: none"> • Received approximately 130 applicants. • Successfully hired a candidate starting July 2021
2019-2020	Member of DACA for tenure-track position in Computer Hardware <ul style="list-style-type: none"> • Received approximately 80 applicants. • Conducted interviews until search was cancelled due to COVID-19 pandemic.
2019-2020	Member of DACA for tenure-track position in Cyber-Physical Systems <ul style="list-style-type: none"> • Received approximately 100 applicants. • Conducted interviews until search was cancelled due to COVID-19 pandemic.
2016-2020	Member of DACA for tenure-track position in Software Engineering <ul style="list-style-type: none"> • Served on DACA for four consecutive years. • Made a successful hire in 2017. • In 2018 and 2019 no successful hire was made. • In 2020, conducted several interviews before search was cancelled due to COVID-19.
2019	Member of Committee for Tier II Canada Research Chair ECE <ul style="list-style-type: none"> • Drafted ad, and reviewed internal applicants from ECE.
2018	Member of Committee for Tier I Canada Research Chair in ECE <ul style="list-style-type: none"> • Drafted ad, and reviewed internal applicants from ECE.

DEPARTMENT AND FACULTY COMMITTEES

2020-Present	Instructor for ECE200B, ECE300A, etc. series <ul style="list-style-type: none"> • Following a class through, starting with 200B, through to 400B • 12 scheduled 1-hour meetings that can be used or cancelled as needed.
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2016 – 2020	Electrical and Computer Engineering Research Committee <ul style="list-style-type: none"> • Duties include identifying potential candidates for awards, and distinguished lectures
2017 – 2018	NSERC Canada Excellence Research Chair Committee <ul style="list-style-type: none"> • Proposal title: “Human-Centred Robotics and Machine Intelligence” • Defined scope and wrote parts of research plan for successful Phase 1 application. Identified potential candidates. • Interviewed Phase two Candidates in 2018 and provided feedback
2017 – 2019	Designated PhD Thesis Examination Chair Pool <ul style="list-style-type: none"> • Chaired 5-6 PhD Thesis defences per year for two years.
2017	SE380: Introduction to Feedback Control, redesign committee <ul style="list-style-type: none"> • Reviewed course curriculum to improve alignment with SE.
2017	Hiring Committee for Research Finance Coordinator <ul style="list-style-type: none"> • Interviewed four internal candidates.
2017	Faculty Representative at NSERC National Robotics Strategy Planning <ul style="list-style-type: none"> • Attended workshop in Vancouver, BC.
2014 – 2016	Engineering Faculty Council Member <ul style="list-style-type: none"> • Attended monthly EFC meetings.
2011 – 2015	Graduate Scholarships Committee, ECE <ul style="list-style-type: none"> • Reviewed OGS and NSERC applications within department
2012 – 2014	Graduate Research Seminars Committee, ECE <ul style="list-style-type: none"> • Coordinate and attend weekly talks. • Work with the graduate students to arrange speakers for each term.

OTHER UNIVERSITY SERVICE

2014, 2016	Mentor for ExpecTations Workshop
2012, 2013, 2016	ECE 499: Engineering Project, Course Coordinator
2013	Capstone Design Project Judge, Mechanical and Mechatronics
2011 – 2013	Capstone Design Project Judge, Electrical and Computer Eng.

6 PROFESSIONAL ACTIVITIES

SOCIETY MEMBERSHIPS

2014 – present	Member and P.Eng. , Professional Engineers Ontario,
2005 – present	Senior Member , Institute of Electrical and Electronics Engineers (IEEE), Senior Member as of May 2015
2005 – present	Member , Control Systems Society (CSS),
2005 – present	Member , Robotics and Automation Society (RAS),

EDITORIAL POSITIONS

2021 – present	Associate Editor , IEEE Transaction on Robotics <ul style="list-style-type: none"> • 2021 Impact Factor of 6.835 • Handle approximately 20 papers per year
2020 – present	Associate Editor , IEEE Open Journal on Control Systems <ul style="list-style-type: none"> • New journal launched in 2020 • Part of inaugural editorial board

- 2017 – 2022 **Associate Editor**, IEEE Transaction on Control of Network Systems
- 2020 Impact Factor of 3.467
 - Handle approximately 20 papers per year
- 2021 – 2022 **Area Chair**, IEEE Multi-Robot Systems Conference (MRS)
- 2015 – 2020 **Associate Editor**, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- 2014 – 2020 **Associate Editor**, IEEE International Conference on Robotics and Automation (ICRA)
- 2013 – 2018 **Associate Editor**, IEEE Control Systems Society Conference Editorial Board
- Serve as AE for two largest annual control conferences:
- IEEE American Control Conference (ACC)
 - IEEE Conference on Decision and Control (CDC)

CONFERENCE ORGANIZATION

- 2024 **Local Arrangements Chair**, American Control Conference (ACC)
- One of the flagship conference in control
 - Will be held in Toronto, Canada
- 2021 **Co-General Chair**, IEEE Int. Conf. on Robot and Human Interactive Communication (RO-MAN)
- 34th edition of IEEE sponsored international robotics conference
 - Over 300 paper submissions for 2021 conference
 - Approximately 400 attendees per year
 - Co-organized successful bid to host conference in Canada
 - Originally to be held in Vancouver, BC, but location has been moved to remote
- 2012 **Symposium Chair**, Canadian Conference on Electrical and Computer Engineering
- Co-organized the robotics track for the 2012 conference

TECHNICAL PROGRAM COMMITTEE MEMBER

- 2012 – 2022 **Program Committee Member**, Robotics: Science & Systems Conference (RSS)
- 2012 – 2022 **Program Committee Member**, Workshop on the Algorithmic Foundations of Robotics (WAFR)
- 2014 – 2022 **Program Committee Member**, International Symposium on Distributed Autonomous Robotic Systems (DARS)
- 2017 **Program Committee Member**, ACM Symposium On Applied Computing, Intelligent Robotics and Multi-Agent Systems
- 2016 **Program Committee Member**, IEEE International Conference on Simulation, Modeling, and Programming for Autonomous Robots (SIMPAN)
- 2012 – 2014 **Program Committee Member**, Conference on Computer and Robot Vision (CRV)

CONFERENCE WORKSHOPS ORGANIZED

- 2011 “Dynamic Vehicle Routing for Robotic Systems” 2011 Robotics: Science & Systems
- 2010 “Dynamic Vehicle Routing for Robotic Systems” 2010 American Control Conference

CHAIR OF CONFERENCE SESSION

2019	“Networks,” <i>IEEE Conference on Decision and Control</i> , Miami, FL
2017	“Autonomous Robots I,” <i>American Control Conference</i> , Seattle, WA
2016	“Autonomous Robots II,” <i>IEEE Conference on Decision and Control</i> , Las Vegas, NV
2016	“Agent-based Systems II,” <i>American Control Conference</i> , Boston, MA
2016	“Autonomous Systems I,” <i>American Control Conference</i> , Boston, MA
2014	“Optimization I,” <i>IEEE Conference on Decision and Control</i> , Los Angeles, CA
2014	“Kalman Filtering,” <i>American Control Conference</i> , Portland, OR
2014	“Estimation I,” <i>American Control Conference</i> , Portland, OR
2013	“Optimization I,” <i>American Control Conference</i> , Washington, DC
2012	“Oral Session 7”, <i>WAFR</i> , Cambridge, MA
2011	“Multirobot Coordination & Robots,” <i>IEEE/RSJ IROS</i> , San Francisco, CA
2010	“Navigation IV,” <i>IEEE/RSJ IROS</i> , Taipei, Taiwan

REVIEW OF RESEARCH GRANTS

2021	NSERC Discovery Grants Program, two applications
2020	MITACS Accelerate Research Internship Program, two applications
2020	NSERC Discovery Grants Program, two applications
2019	Canada Foundation for Innovation, John R. Evans Leaders Fund
2019	NSERC Collaborative Research and Development Grant.
2019	Netherlands Organization for Scientific Research, Top Sector Water & Maritime.
2018	MITACS Accelerate Research Internship Program.
2018	University of California, Los Angeles Institute for Transportation Studies.
2017	Israel Science Foundation, Research Grants.
2017	Quebec Research Fund, New University Researcher Startup Program.
2017	Canada Foundation for Innovation, John R. Evans Leaders Fund.
2016	Czech Research Foundation, Cybernetics and Information Processing.
2016	MITACS Accelerate Research Internship Program.
2016	NSERC Applied Research and Development Grant.
2014	MITACS Accelerate Internship Program.
2013 – 2014	Canada Foundation for Innovation, Leaders Opportunity Fund.
2013	Qatar National Research Fund, National Priorities Program.

REVIEW PANELS FOR RESEARCH GRANTS

2019	NSERC New Frontiers in Research Fund. <ul style="list-style-type: none">• multi-disciplinary panel in Ottawa
2018	US National Science Foundation, National Robotics Initiative. <ul style="list-style-type: none">• Two-day panel in Alexandria, Virginia
2012	US National Science Foundation, Cyber-Physical Systems Program. <ul style="list-style-type: none">• Two-day panel in Alexandria, Virginia

CONSULTING AND TECHNOLOGY TRANSFER

Please also see Patents, which have been listed above under the “Research and Scholarship” section as part of my list of publications.

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| 2021 – Present | Lead Autonomy Advisor , Swap Robotics, Waterloo ON <ul style="list-style-type: none">• Startup working on autonomous and semi-autonomous snow clearing• Advising on motion planning and autonomy |
| 2017 – 2019 | Consultant in Robotics and Autonomy <ul style="list-style-type: none">• Consultant for several multi-national companies• Developed architecture for core motion planning algorithms |
| 2013 – 2017 | Senior Research Advisor , RideCo, Waterloo, ON <ul style="list-style-type: none">• RideCo provides door-to-door shared rides for urban transportation• Company raised \$2.5 million in seed funding 2014 – 2017• Developed the core routing and scheduling optimization |