

Stefano Carpin, PhD

Research Interests

Decision making, planning, multi-robot systems, mobile robotics, grasping.

Professional Experience

- July 2016–today **Professor of Computer Science and Engineering**, *University of California, Merced*, Merced, CA.
- July 2010 – Jun 2016 **Associate Professor of Computer Science and Engineering**, *University of California, Merced*, Merced, CA.
- Jan 2007 – Jun 2010 **Assistant Professor of Computer Science and Engineering**, *University of California, Merced*, Merced, CA.
- Jan 2005 – Dec 2006 **Assistant Professor of Electrical Engineering and Computer Science**, *Jacobs University Bremen*, Bremen (Germany).
- Jan 2003 – Dec 2004 **Research Instructor for Electrical Engineering and Computer Science**, *Jacobs University Bremen*, Bremen (Germany).

Education

- 1999–2003 **PhD, Industrial Electrical Engineering and Computer Science**, *University of Padova*, Padova (Italy).
- 1994–1999 **Laurea (BS/MS), Electrical Engineering and Computer Science**, *University of Padova*, Padova (Italy).

Honors and Awards

- 2018 IEEE Int. Conf. on Automation Science and Engineering (CASE): Best Paper Award
- 2014 Distributed Autonomous Robotic Systems Conference (DARS): Best Paper Award Finalist.
- 2009 1st place in Robocup Virtual Robots Competition (team leader, UC Merced).
- 2008 2nd place in Robocup Virtual Robots Competition (team leader, UC Merced).
- 2006 2nd place in Robocup Virtual Robots Competition (team leader, Jacobs University Bremen).
- 2005 School of Engineering and Science Teaching Award (Jacobs University Bremen).

University Service at UC Merced

- 2006/2007 CSE Search Committee Member (2x).
- 2006/2007 CSE Search Committee Chair.
- 2006/2007 UC Regents Scholarship committee.
- 2007/2008 School of Engineering Resources Committee.
- 2007/2008 CSE Search Committee Member (2x).
- 2007/2008 UC Regents Scholarship committee.
- 2008/2009 EECS Graduate Program Chair.
- 2008/2009 CSE Search Committee Member.
- 2009/2010 EECS Graduate Program Chair.
- 2009/2010 CSE Search Committee Chair.
- 2010/2011 EECS Graduate Program Chair.

2010/2011 Undergraduate Council Committee Member.
 2010/2011 CSE Search Committee Member.
 2011/2012 EECS Graduate Program Chair.
 2011/2012 School of Engineering Academic Personnel Committee.
 2011/2012 Graduate Research Council Committee Member.
 2012/2013 EECS Graduate Program Chair.
 2012/2013 Graduate Research Council Committee Member.
 2013/2014 EECS Graduate Program Chair.
 2015/2016 CSE Search Committee Chair.
 2016/2017 CSE Search Committee Chair.
 2017/2018 Committee on Academic Personnel (CAP) Member.
 2018/2019 Chair of the Department of Computer Science and Engineering.
 2018/2019 Chair of the CSE Undergraduate Committee.
 2018/2019 CSE Search Committee Chair (3x).
 2019/2020 Chair of the Department of Computer Science and Engineering.
 2019/2020 Member of the CSE Undergraduate Committee.
 2019/2020 CSE Search Committee Chair (2x).
 2020/2021 Chair of the Department of Computer Science and Engineering.
 2020/2021 Member of the CSE Undergraduate Committee.
 2020/2021 CSE Search Committee Member.

Teaching

Undergraduate Teaching at UC Merced

CSE015 Discrete Math: Fall 2020.
 CSE100 Algorithm design and analysis: Spring 2007, Spring 2008, Fall 2008.
 CSE180 Introduction to Robotics: Spring 2007, Fall 2009, Spring 2011, Spring 2013, Spring 2014, Spring 2015, Spring 2016, Spring 2017, Spring 2018, Spring 2019.

Graduate Teaching at UC Merced

EECS265 Computational Geometry: Fall 2012, Fall 2016.
 EECS270 Robot Algorithms: Fall 2007, Fall 2011, Fall 2013, Fall 2017.
 EECS271 Theory of Computation: Fall 2010.
 EECS272 Program Verification and Model Checking: Fall 2014, Fall 2019.
 EECS281 Advanced Topics in Robotics: Fall 2008.

Undergraduate Teaching at Jacobs University Bremen

320111 Natural Science Laboratory – Computer Science 2: Spring 2003, 2004.
 320112 Natural Science Laboratory – Computer Science / Mathematics: Fall 2003.
 320201 Data structures and Algorithms: Fall 2004, Fall 2005, Fall 2006.
 320221 Advanced Computer Science Laboratory 1: Fall 2004.
 320311 Robotics: Spring 2005, Spring 2006.

Graduate Teaching at Jacobs University Bremen

320421 Advanced Robotics: Fall 2004 (half course).
 320472 Intelligent Autonomous Systems: Spring 2005.
 320501 Advanced Algorithms: Fall 2005.
 320472 Topics in algorithms: Spring 2006.

Mentoring and Supervision

Current PhD Students

- Aug 18 - today Lorenzo Booth
- Aug 18 - today Carlos Diaz Alvarenga
- Jan 21 - today Azin Shamshirgaran
- Aug 21-today Matthew Morozov

Past Postdoctoral Fellows

- Jun 11 - Nov 12 Dr. Nicola Basilico (now associate professor at University of Milan, Italy)

Past PhD Students

- Dec 2009 Andreas Kolling. *Multi-robot pursuit-evasion*. First student to graduate with a PhD degree in EECS from UC Merced.
- Aug 2012 Benjamin Balaguer. *Robots Learning to Manipulate: Real-Time Application-Oriented Algorithms Using Feature-Based and Machine Learning Techniques*.
- Aug 2013 Gorkem Erinc. *Appearance-Based Localization, Mapping, Navigation, and Map Merging for Heterogeneous Robot Teams*.
- Aug 2017 Seyedshams Feyzabadi. *Robot Planning with Constrained Markov Decision Processes*.
- Nov 2017 Shuo Liu. *Bridging the Gap in Grasp Quality Evaluation and Grasp Planning*.
- May 2020 José Luis Susa Rincon *Probabilistic Constrained Decision Making for Robots Exploring, Mapping, and Navigating Indoor Environments*
- July 2021 Thomas C. Thayer *Planning Algorithms for Robots Operating in Vineyards*

Past MS Students

- Sep 2006 Hamed Bastani. *Absolute 3D indoor radio positioning using dynamic roles assignment*.
- Sep 2006 Gorkem Erinc. *Nonholonomic motion planning using genetic algorithms for car-like robots*.
- Sep 2006 Andreas Kolling. *Mutirobot cooperation for surveillance of multiple moving targets - An improved behavioral approach and its formalization*.
- Dec 2012 Derek Burch. *Hierarchical Search with Probabilistic Quadtrees Applied to Single and Multi-Agent Systems*.
- Aug 2018 Andres Torres Garcia. *Path Planning in Vineyards*.
- Dec 2018 Sree Harsha Chitranayakanahalli Sheshappa Reddy

Past Undergraduate Students

Joshua Ta (Summer 2021), Saishrithik Sareddy (Spring 2021, Summer 2021) Christine Breckenridge (Summer 2018, Summer 2019 USDA/NIFA RAPID undergraduate researcher), Jonathan Garache (Summer 2018 USDA/NIFA RAPID undergraduate researcher), Edgar Mejia (Fall 2017/Spring 2018, SSI fellow), Nikolai Norona (Fall 2017/Spring 2018, SSI fellow), Troy Trinkle (Swarmathon 2018 team), Jonathan Garache (Swarmathon 2018 team), Jose Manuel Gonzalez (Swarmathon 2018 team), Javier Cuara (Swarmathon 2018 team), Vardhan Solanki (Swarmathon 2018 team), Manuel Meraz (Spring 2017 Swarmathon team leader; Spring 2018 Swarmathon team leader), Jose Manuel Gonzalez Hermosillo (Swarmathon 2017 team; Swarmathon 2018 team; Summer 2017 USDA/NIFA RAPID undergraduate researcher), Jesus Sergio Gonzalez Castellon (Swarmathon 2017 team), Navvaran Mann (Swarmathon 2017 team), James Nho (Swarmathon 2017 team), Jesus Salcedo (Swarmathon 2017 team; Swarmathon 2018 team), Carlos Diaz (Swarmathon 2017 team, Summer 2017 USDA project), Victor Garcia Gonzales (Summer 2016), Thomas Thayer, (Summer 2015-Summer 2016), Connor Reinen (Summer 2014–Summer 2015), Michael Fortes (Summer 2015), Owen Kidd (Summer 2014), Luis Silva (Summer 2014),

Hongrong Huang (Summer 2013), Kento Locatelli (Summer 2013, Fall 2013), Robert Reekes (Summer 2013, Fall 2013), Daniel Winkler (Summer 2013), Vinay Kumar, Indian Institute of Technology Rajasthan (Summer 2012), Paul Baker (ME UC Merced, Summer 2011), Jessica De Silva (CSU Stanislaus Ronald E. McNair Scholars program - Summer 2011), Mark Bailey (UC Merced AGEP program - Summer 2010, Spring 2011), Grant Vousden-Dishington (UC Irvine Leads program - Summer 2010), Edward Smith (Spring 2010), Derek Burch (Fall 2008-Fall 2009), Roger Sloan (Spring 2009-Fall 2009), Marc Hendrikse (Summer 2009), Jaime Mendez (Summer 2009), Erik Lam (Summer 2007).

Editorial Boards

Jul 2015 - Dec 2018 IEEE Robotics and Automation Letters: Associate Editor.
Jan 2015 - Dec 2018 IEEE Transactions on Automation Science and Engineering: Associate Editor.
May 2010 - May 2014 IEEE Transactions on Robotics: Associate Editor.

Conferences Organization

ICRA IEEE International Conference on Robotics and Automation. Associate Editor: 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019.
IROS IEEE/RSJ International Conference on Intelligent Robots and Systems. Associate Editor: 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019.
CASE IEEE Conference on Automation Science and Engineering. Associate Editor: 2017, 2018, 2019, 2020, 2021.
DARS Distributed Autonomous Robotic Systems. Program Committee Member: 2008, 2014, 2016, 2018, 2021.
RSS Robotics Science and Systems Conference. Program Committee Member: 2012, 2013, 2014, 2015, 2016, 2017.
ICUAS International Conference on Unmanned Aerial Systems. Program Committee Member: 2015.
PERMIS International Conference on Performance Measurements for Intelligent Systems. Program Committee Member: 2006, 2007, 2009.
SIMPAN International Conference on Simulation, Modeling and Programming for Autonomous Robots. Program Co-chair (2008), Program Committee Member (2016).
AAMAS International Joint Conference on Autonomous Agents and Multiagent Systems. Program Committee Member: 2006, 2007, 2008, 2011, 2012, 2013.
ROMOCO IEEE Workshop on Robot Motion and Control . Program Committee Member: 2005, 2007, 2009, 2011, 2013, 2017.
Robocup Symposium International Conference on the Robocup Federation. Program Committee Member: 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014.

Reviews for International Journals

IEEE Trans. on Robotics; IEEE Trans. on Automation Science and Engineering; IEEE Robotics and Automation Letters; IEEE Robotics and Automation Magazine; IEEE Transactions on Mechatronics; IEEE Journal on Selected Areas of Communications; IEEE Trans. on Parallel and Distributed Systems; IEEE Transactions on Systems, Man, and Cybernetics–Part A: Systems and Humans; IEEE Trans. on Control Systems Technology; ACM Transactions on Multimedia Computing, Communications and Applications; ACM Transactions on Sensor Networks; Autonomous Robots; Robotica; Robotics and Autonomous Systems; International Journal of Robotics and Automation; Journal of Computing and Information Technology; Journal of Information Science and Engineering.

Reviews for International Conferences

Workshop on Algorithmic Foundations of Robotics (WAFR); IEEE Int. Conf. on Robotics and Automation (ICRA); IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS); IEEE Conf. on Decision and Control (CDC); American Control Conference (ACC); IEEE Int. Conf. on Robotics and Biomimetics (ROBIO); IEEE Int. Conf. on Automation Science and Automation (CASE); IEEE/ASME Int. Conf. on Advanced Intelligent Mechatronics; IEEE Int. Symposium on Assembly and Task Planning (ISATP); IEEE Workshop on Robot Motion and Control (RoMoCo); American Association for Artificial Intelligence Conference (AAAI); European Conference on Artificial Intelligence (ECAI); European workshop on advanced mobile robots; IASTED International Conference on Artificial Intelligence and Applications; Intelligent Autonomous Systems Conf. (IAS); Performance Metrics for Intelligent Systems workshop (PERMIS). IFAC Workshop on Multivehicle Systems.

Organization of Workshops, Tutorials, and Competitions

- 2004 Co-organizer of the workshop “*Rescue Robotics: from robocup to real world applications*” at IROS (Sendai, Japan).
- 2006 Co-organizer of the tutorial “*USARSim/MOAST: highly realistic simulation and control for multi robot systems*” at ICRA (Orlando, FL).
- 2006 Co-organizer of the tutorial “*USARSim/MOAST*” at AAAI (Boston, MA).
- 2006 RoboCup Rescue Simulation League: technical committee member.
- 2007 - 2009 RoboCup Federation: Robocup Rescue Simulation Executive Committee Member.
- 2009 Co-organizer of the workshop “*Robots, Games, and Research: Success stories in USARSim*” at IROS (St. Louis, MO).
- 2014 Co-organizer of the workshop “*Constrained decision-making in robotics: models, algorithms, and applications*” at RSS (Berkeley, CA).
- 2015 Guest editor of a special issue for the Autonomous Robots journal on “*Constrained decision-making in robotics: models, algorithms, and applications.*”

Invited Talks

- May 6, 2003 *Algorithmic Motion Planning: from robotics to proteins.* Zentrum für Interdisziplinäre Forschung. Bielefeld University, Germany.
- Jul 28, 2003 *Multi-robot motion planning.* ECAI summer school “Advanced course on Artificial Intelligence”. International University of Bremen, Germany.
- Dec 22, 2003 *Urban Search and Rescue: the IUB Perspective.* Department of Information Engineering. The University of Padova, Italy.
- Nov 1, 2005 *USARSim.* 2nd International Rescue Robotics Camp, Rome, Italy.
- Nov 2, 2006 *USARSim: open issues and future development.* 3rd International Rescue Robotics Camp, Rome, Italy.
- Feb 4, 2008 *Urban search and rescue: from robotics to computer games.* University of California, Santa Cruz.
- Mar 20, 2008 *A robot in every home: when?* University of Padova, Workshop for the 20 years of the Department of Information Engineering
- May 16, 2008 *Microsurgical: challenges and opportunities for robotics.* CITRIS SCHEME II Meeting, University of California at Davis Medical Center, Sacramento.
- Jun 15, 2009 *Cooperative Intruder Detection by Multiple Robots with Limited Range Sensing.* University of California, Santa Barbara.

- May 3, 2010 *Solving Pursuit-evasion Problems with Graph-Clear: an Overview*. IEEE International Conference on Robotics and Automation, Workshop on *Search and Pursuit/Evasion in the Physical World: Efficiency, Scalability, and Guarantees*, Anchorage, AK.
- Sep 8, 2010 *Robotics for emergency response*. CITRIS SCHEME III Meeting, University of California at Davis Medical Center, Sacramento.
- Jul 28, 2011 *Bayesian Search with Probabilistic Quadrees*. Naval Postgraduate School, Monterey.
- Apr 24, 2014 *Robotic search: theory and practice*. University of California, Los Angeles.
- Aug 8, 2014 *Rapid multirobot deployment*. University of Pennsylvania, Philadelphia.
- Nov 6, 2014 *Trading safety versus performance: robust rapid deployment of robotic swarms*. Seoul National University, South Korea.
- Mar 8, 2015 *Introduction to mobile robotics*. Interdisciplinary College 2015 Spring School (6 hours mini course), Germany.
- Mar 23, 2015 *Rapid deployment of heterogeneous robot teams: abstractions, algorithms and experimentation*. Army Research Lab, Baltimore.
- May 22, 2015 *Fast algorithms for grasp quality evaluation*. University of California, Santa Cruz.
- Oct 23, 2015 *High-speed robot deployment*. University of California, Berkeley (BARS 2015).
- Nov 24, 2015 *Rapid multirobot deployment: models, algorithms, and risk aversion*. United Technologies Research Center, Berkeley, CA.
- Dec 4, 2015 *Heterogeneous Multirobot Systems*. Army Research Lab, Adelphi, MD.
- Mar 2, 2016 *Autonomous Navigation Under the Canopy*. CITRIS AgTech Fair, Merced, CA.
- May 2, 2016 *Rapid multirobot deployment*. Naval Postgraduate School, Monterey, CA (CRUSER Colloquium).
- Jun 1, 2016 *Risk Aversion in Finite Markov Decision Processes Using Total Cost Criteria and Average Value at Risk*. Army Research Lab, Adelphi, MD.
- Aug 16, 2016 *Risk aware multi robot planning*. Workshop on "Heterogeneity, Diversity and Resilience in Multi-Robot Systems", Arlington, VA.
- Oct 24, 2016 *From distributed robotics to cloud robotics*. Symposium of the Center for Research in Open Source Software, Santa Cruz, CA.
- Dec 13, 2016 *Simulate or not?* IEEE International Conference on Simulation, Modeling, and Programming for Autonomous Robots, Workshop on *Simulation in Robot Programming*, San Francisco, CA.
- Feb 7, 2017 *Balancing risk and performance in robot planning algorithms* University of California, Davis, CA.
- May 29, 2017 *How to run reproducible visual grasping experiments* IEEE International Conference on Robotics and Automation, Workshop on *Reproducible Research in Robotics: Current Status and Road Ahead*, Singapore.
- Jun 15, 2017 *Risk Aware Multi-Objective Planning For Mobile Robotics* University of California, Santa Cruz, CA.
- May 21, 2018 *(Repeatable) Semantic Topological Exploration* IEEE International Conference on Robotics and Automation, Workshop on *Reproducible Research in Robotics: Current Status and Road Ahead*, Brisbane, Australia.
- July 6, 2018 *RAPID: Robot Assisted Precision Irrigation Delivery*, University of Parma, Italy.
- October 4, 2018 *RAPID: Robot Assisted Precision Irrigation Delivery*, Silicon Valley Forum: Technology and Innovation in Agriculture, Santa Clara, CA.
- November 12, 2018 *RAPID: Robot Assisted Precision Irrigation Delivery*, Keynote Talk at the Annual IEEE Conference on Technology for Sustainability, Long Beach, CA.

- May 23, 2019 *R-Paper: Time Constrained Exploration Using Toposemantic Models*, IEEE International Conference on Robotics and Automation, Workshop on *Reproducible Research in Robotics: Current Status and Road Ahead*, Montreal, Canada.
- May 30, 2019 *RAPID: Robot Assisted Precision Irrigation Delivery*, Bosch LLC Research Center, Santa Clara, CA.
- July 16, 2019 *RAPID: Robot Assisted Precision Irrigation Delivery*, University of Perugia, Italy.
- August 6, 2019 *Risk Aware Multi-Objective Planning For Mobile Robotics*, Waymo, Mountain View, CA.
- Sept 18, 2020 *RAPID: Robot Assisted Precision Irrigation Delivery*, Missouri University of Science and Technology, MO.
- Feb 2, 2021 *Time-Constrained Exploration Using Toposemantic Spatial Models: A Reproducible Approach to Measurable Robotics*, Performance Evaluation and Benchmarking in Robotics, Online Symposium.
- March 9, 2021 *Robotics Research in AgTech at UC Merced*, NASA, Kennedy Space Center.
- May 27, 2021 *RAPID: Robot Assisted Precision Irrigation Delivery*, University of California, Santa Cruz, CA.
- May 31, 2021 *Our R-article: Issues, opportunities and lessons learned*, IEEE ICRA 2021 Workshop "Towards Reproducibility and Objective Performance Evaluation in Robotics and AI".
- October 1, 2021 *A Reproducible experiment in mobile robotics*, IEEE/RSJ IROS2021 Workshop "Reproducible Research, Performance Evaluation and Benchmarking in Intelligent Robotics: State of the Art".

Research Funding

- Microsoft Research *Integrating Urban Search and Rescue into Microsoft Robotics Studio Simulator*, \$39,455, July 2007–June 2008, PI.
- CITRIS *Robotic and Virtual Assistive Agents for Establishing the Center on Autonomous and Interactive Systems at UC Merced*, \$150,000, July 2007–June 2008, Co-PI (50% effort, PI: Marcelo Kallmann).
- General Motors *Stochastic analysis of distributed architectures*, \$23,000, September 2007–December 2007, PI.
- CITRIS *Mobile Sensor Networks for Independent Living and Safety at Home*, \$75,000, April 2008–March 2009, Co-PI (50% effort, PI: Songhwai Oh).
- NSF *MRI: Acquisition of robotic hardware for humanoid research in cognitive science and engineering*, \$476,500, , September 2008–August 2011, PI (Co-PIs: Kallmann, Matlock, Newsam, Noelle).
- NSF *REU Supplement*, \$16,000, PI, Summer 2009.
- CITRIS *Virtual reality technologies for robotic aided first response*, \$45,000, PI, April 2010–December 2011.
- DARPA *Synapse Phase 2*, \$299,000, March 2011–November 2012, PI (Co-PI: Chris Kello).
- ONR *Hierarchical Search with Heterogeneous UAVs*, \$54,000, PI, May 2011–December 2011.
- NIST *Grasping and Simulation for Next-Generation Manufacturing Robots*, \$584,198, PI, August 2012–August 2016.
- CITRIS *Towards Semantic Spatial Awareness: Robust Text Spotting for Assistive Technology Applications*, \$50,000, Co-PI (PI: Roberto Manduchi, UC Santa Cruz), August 2012–December 2013.
- Army Research Lab *Rapid deployment strategies* (supplement to MAST CTA), \$95,000, PI, September 2013–January 2015.

- CITRIS *Combined Remote/Mobile Sensing Platform for Precision Agriculture in California's High Value Crops* \$60,000, PI (Co-PI: David Smart, UC Davis), April 2015-April 2016.
- Army Research Lab *Rapid deployment of heterogeneous robot teams: abstractions, algorithms and experimentation.* MAST CTA, \$234,123, PI, January 2015-December 2017.
- NSF *MRI: Acquisition of robotic tools for studying brain, behavior and embodied cognition,* \$182,206, September 2016–August 2019, Co-PI (PIs: Balasubramaniam; Co-PI: Spivey).
- NSF *NRT-DESE Intelligent Adaptive Systems: Training computational and data-analytic skills for academia and industry,* \$2,999,991, September 2016-August 2021, Co-PI (PI: Balasubramaniam; Co-PIs: Kello, Sindi).
- USDA *NRI: RAPID: Robot Assisted Precision Irrigation Delivery,* \$961,275 , December 2016–November 2021, PI (Co-PIs: Ken Goldberg, UC Berkeley; Stavros Vougioukas, UC Davis).
- CITRIS *Persistent Autonomous Monitoring for Early Detection and Prediction of Wildfires.* \$60,000, Co-PI (PI: Katia Obraczka, UC Santa Cruz), May 2018-May 2019.
- NSF *Engineering Research Center for the Internet of Things for Precision Agriculture (IoT4Ag),* \$26,000,000, September 2020-August 2025, Investigator (PI: Cherie Kagan; Co-PIs: Sue Bidstrup-Allen, David Arnold, David Cappelleri, Catherine Keske).
- USDA *NRI: Mobile Robotic Lab for In-Situ Sampling and Measurement,* \$1,000,000 , December 2020–November 2024, PI (Co-PIs: Josh Viers, UC Merced; Konstantinos Karydis, Amit Roy-Chowdhury, UC Riverside).
- NSF *STARTUP-SJV: STEM Teachers Alliance for Regional Tech thinking through Underrepresented Professional development in the San Joaquin Valley,* \$299,999, January 2021–December 2022, Co-PI (PI: Angelo Kyrilov; Co-PIs: Chelsea Arnold).
- UC MRPI *LACA - Labor and Automation in California Agriculture ,* \$3,100,000, January 2021–December 2023, Investigator (PI: Thomas Harmon).

Publications

Books

- [B1] S. Carpin, I. Noda, E. Pagello, M. Reggiani, and O. von Stryk and, editors. *Simulation, Modeling, and Programming for autonomous robots*, volume 5325 of *Lectures Notes in Artificial Intelligence (LNAI)*. Springer, 2008.

International Journals

- [J1] S. Carpin, C. Ferrari, and E. Pagello. Map focus: A way to reconcile reactivity and deliberation in multirobot systems. *Robotics and Autonomous Systems*, 41(4):245–255, 2002.
- [J2] S. Carpin and G. Pillonetto. Motion planning using adaptive random walks. *IEEE Transactions on Robotics*, 21(1):129–136, 2005.
- [J3] S. Carpin, A. Birk, and V. Jucikas. On map merging. *Robotics and autonomous systems*, 53(1):1–14, 2005.
- [J4] A. Birk and S. Carpin. Rescue robotics: a crucial milestone on the road to autonomous systems. *Advanced robotics*, 5(20):595–605, 2006.
- [J5] A. Birk and S. Carpin. Merging occupancy grids from multiple robots. *Proceedings of the IEEE*, 94(7):1384–1397, 2006.
- [J6] S. Carpin. Randomized motion planning – a tutorial. *International Journal of Robotics and Automation*, 21(3):184–196, 2006.
- [J7] C. Mirolo, S. Carpin, and E. Pagello. Incremental convex minimization to detect collision of convex polyhedra. *IEEE Transactions on robotics*, 23(3):403–415, 2007.

- [J8] A. Kolling and S. Carpin. Cooperative observation of multiple moving targets: an algorithm and its formalization. *International Journal of Robotics Research*, 26(9):935–953, 2007.
- [J9] S. Balakirsky, S. Carpin, A. Kleiner, M. Lewis, A. Visser, J. Wang, and V.A. Ziparo. Towards heterogeneous robot teams for disaster mitigation: Results and performance metrics from robocup rescue. *Journal of Field Robotics*, 24(11-12):943–967, 2007.
- [J10] S. Carpin. Fast and accurate map merging for multi-robot systems. *Autonomous Robots*, 25(3):305–316, 2008.
- [J11] S. Carpin, M. Kallmann, and E. Pagello. The challenge of motion planning for humanoid robots playing soccer. *International Journal of Humanoid Robotics*, 5(3):481–499, 2008.
- [J12] S. Carpin and E. Pagello. An experimental study of distributed robot coordination. *Robotics and Autonomous Systems*, 57(2):129–133, 2009.
- [J13] B. Balaguer, S. Balakirsky, S. Carpin, and A. Visser. Evaluating maps produced by urban search and rescue robots: Lessons learned from robocup. *Autonomous Robots*, 27(4):449–464, 2009.
- [J14] A. Kolling and S. Carpin. Pursuit-evasion on trees by robot teams. *IEEE Transactions on Robotics*, 26(1):32–47, 2010.
- [J15] B. Balaguer and S. Carpin. A learning method to determine how to approach an unknown object to be grasped. *International Journal of Humanoid Robotics*, 8(3):579–606, 2011.
- [J16] G. Pillonetto, G. Erinc, and S. Carpin. Online estimation of covariance parameters using extended kalman filtering and application to robot localization. *Advanced robotics*, 26(18):2169–2188, 2012.
- [J17] S. Carpin, N. Basilico, D. Burch, T.H. Chung, and M. Kölsch. Variable resolution search with quadrotors: theory and practice. *Journal of Field Robotics*, 30(5):685–701, 2013.
- [J18] G. Erinc and S. Carpin. Anytime merging of appearance-based maps. *Autonomous Robots*, 36(3):241–256, 2014.
- [J19] Y-L. Chow, M. Pavone, B.M. Sadler, and S. Carpin. Trading safety versus performance: Rapid deployment of robotic swarms with robust performance constraints. *ASME Journal of Dynamical Systems, Measurements and Control*, 137(3):031005, 2015.
- [J20] B. Balaguer, G. Erinc, and S. Carpin. Real-time wifi localization of heterogeneous robot teams using an online random forest. *Autonomous Robots*, 39(2):155–167, 2015.
- [J21] M. Pavone and S. Carpin. Guest editorial: Special issue on constrained decision-making in robotics. *Autonomous Robots*, 39(4):465–467, 2015.
- [J22] J. Falco, K. Van Wyk, S. Liu, and S. Carpin. Grasping the performance: Facilitating replicable performance measures via benchmarking and standardized methodologies. *Robotics and Automation Magazine*, 22(4):125–136, 2015.
- [J23] S. Liu and S. Carpin. Partial convex hull algorithms for efficient grasp quality evaluation. *Robotics and Autonomous Systems*, 86:57–69, 2016.
- [J24] S. Feyzabadi and S. Carpin. Planning using hierarchical constrained markov decision processes. *Autonomous Robots*, 41(8):1589–1607, 2017.
- [J25] J. L. Susa Rincon, P. Tokekar, V. Kumar, and S. Carpin. Rapid deployment of mobile robots under temporal, performance, perception, and resource constraints. *IEEE Robotics and Automation Letters*, 2(4):2016–2023, 2017.

- [J26] A. Kolling, A. Kleiner, and S. Carpin. Coordinated search with multiple robots arranged in line formations. *IEEE Transactions on Robotics*, 34(2):459–473, 2018.
- [J27] S. Carpin and J.L. Susa Rincon. Time constrained exploration using toposemantic spatial models: a reproducible approach. *Robotics and Automation Magazine*, 26(3):78–87, 2019.
- [J28] T. Thayer, S. Vougioukas, K. Goldberg, and S. Carpin. Multi-robot routing algorithms for robots operating in vineyards. *IEEE Transactions on Automation Science and Engineering*, 17(3):1184–1194, 2020.
- [J29] X. Chen, C.Ruiz, S. Zheng, L. Gao, A. Purohit, S. Carpin, and P. Zhang. H-drunkwalk: Collaborative and adaptive navigation for heterogeneous mav swarm. *ACM Transactions on Sensor Networks*, 16(2):1–27, 2020.
- [J30] X. Kan, T. Thayer, S. Carpin, and K. Karydis. Task planning on stochastic aisle graphs for precision agriculture. *IEEE Robotics and Automation Letters*, 6(2):3287 – 3294, 2021.
- [J31] T. Thayer and S. Carpin. An adaptive method for the stochastic orienteering problem. *IEEE Robotics and Automation Letters*, 6(2):4185–4192, 2021.
- [J32] F. Betti Sorbelli, S. Carpin, F. Coró, S.K. Das, A. Navarra, and C.M. Pinotti. Speeding up routing schedules on aisle-graphs with single access. *IEEE Transactions on Robotics*, (to appear).
- [International Conferences](#)
- [C1] E. Pagello, C. Ferrari, S. Carpin, P. Patuelli, R. Polesel, R. Rosati, and A. Speranzon. Planning multi-robot systems actions for robotics entertainment. In E. Pagello et al., editor, *Intelligent Autonomous Systems (IAS6)*, pages 139–147. IOS Press, 2000.
- [C2] S. Carpin, C. Ferrari, and E. Pagello. A framework for distributed simulation of multirobot systems: the vlab experience. In J. Barhen L.E. Parker, G. Bekey, editor, *Distributed Autonomous Robotic Systems 4*, pages 45–54. Springer, 2000.
- [C3] S. Carpin and E. Pagello. A distributed algorithm for multi-robot motion planning. In *Proceedings of the fourth European Conference on Advanced Mobile Robots*, pages 207–214, 2001.
- [C4] S. Carpin and E. Pagello. Exploiting multi-robot geometry for efficient randomized motion planning. In M. Gini et al., editor, *Intelligent Autonomous Systems 7 (IAS7)*, pages 54–62. IOS Press, 2002.
- [C5] S. Carpin and L.E. Parker. Cooperative leader following in a distributed multi-robot system. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 2994–3001, 2002.
- [C6] S. Carpin and L.E. Parker. Cooperative motion coordination adminst dynamic obstacles. In T. Fukuda H. Asama, T. Arai, T. Fukuda T. HasegavaH. Asama, T. Arai, and T. Hasegava, editors, *Distributed Autonomous Systems 5*, pages 145–154. Springer, 2002.
- [C7] S. Carpin and G. Pillonetto. Robot motion planning using adaptive random walks. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 3809–3814, 2003.
- [C8] H. Kenn, S. Carpin, M. Pfingsthorn, B. Liebold, I. Hapes, C. Ciocov, and A. Birk. Fast-robotics: a rapid-prototyping framework for intelligent mobile robotics. In *Proceedings of the International Conference on Artificial Intelligence and Applications*, pages 76–81, 2003.

- [C9] S. Carpin and G. Pillonetto. Learning sampling distributions for randomized motion planning: role of history size. In *Proceedings of the International Conference on Artificial Intelligence and Applications*, pages 58–63, 2003.
- [C10] S. Carpin and G. Pillonetto. Centralized multi-robot motion planning: a random walks based approach. In F. Groen, N. Amato, A. Bonarini, E. Yoshida, and B. Krose, editors, *Intelligent Autonomous Systems (IAS8)*, pages 610–617. IOS press, 2004.
- [C11] S. Carpin and A. Birk. Stochastic map merging in rescue environments. In D. Nardi, M. Riedmiller, C. Sammut, and J. Santos-Victor, editors, *RoboCup 2004: Robot Soccer World Cup VIII*, volume 3276 of *LNAI*, pages 483–490. Springer, 2005.
- [C12] S. Carpin. Correlated samples for fast exploration of configuration spaces. In *Artificial Intelligence Applications*, pages 202–206, 2005.
- [C13] S. Carpin and G. Pillonetto. Merging the adaptive random walks planner with the randomized potential field planner. In *Proceedings of the IEEE International Workshop on Robot Motion and Control*, pages 151–156. Springer, 2005.
- [C14] J. Wang, M. Lewis, M. Koes, and S. Carpin. Validating usarsim for use in hri research. In *Proceedings of the 49th meeting of the Human Factors and Ergonomics Society*, pages 457–461, 2005.
- [C15] S. Carpin and E. Pagello. An experimental study of distributed robot coordination. In T. Arai, R. Pfeifer, T. Balch, and H. Yokoi, editors, *Intelligent Autonomous Systems (IAS9)*, pages 199–206. IOS Press, 2006.
- [C16] S. Carpin, J. Wang, M. Lewis, A. Birk, and A. Jacoff. High fidelity tools for rescue robotics: results and perspectives. In *Robocup 2005: Robot Soccer World Cup IX*, LNCS, pages 301–311, 2006.
- [C17] A. Kolling and S. Carpin. Multirobot cooperation for surveillance of multiple moving targets - a new behavioral approach. In *Proceeding of the IEEE International Conference on Robotics and Automation*, pages 1311–1316, 2006.
- [C18] S. Carpin, C. Mirolo, and E. Pagello. A performance comparison of three algorithms for proximity queries relative to convex polyhedra. In *Proceeding of the IEEE International Conference on Robotics and Automation*, pages 3023–3028, 2006.
- [C19] S. Carpin, T. Stoyanov, Y. Nevatia, M. Lewis, and J. Wang. Quantitative assessments of usarsim accuracy. In *Proceedings of the Performance Metrics for Intelligent Systems Workshop*, pages 111–118, 2006.
- [C20] S. Balakirsky, C. Scrapper, S. Carpin, and M. Lewis. USARSim: providing a framework for multi-robot performance evaluation. In *Proceedings of the Performance Metrics for Intelligent Systems Workshop*, pages 98–102, 2006.
- [C21] S. Carpin, M. Lewis, J. Wang, S. Balakirsky, and C. Scrapper. Bridging the gap between simulation and reality in urban search and rescue. In *Robocup 2006: Robot Soccer World Cup X*, number 4434 in LNCS, pages 1–12. Springer, 2007.
- [C22] S. Balakirsky, C. Scrapper, S. Carpin, and M. Lewis. USARSim: A robocup virtual urban search and rescue competition. In *SPIE Unmanned Systems Technology IX, Defense and Security Symposium*, volume 6551, 2007.
- [C23] G. Erinc and S. Carpin. A genetic algorithm for nonholonomic motion planning. In *Proceedings of the IEEE Conference on Robotics and Automation*, pages 1843–1849, 2007.

- [C24] C. Mirolo, S. Carpin, and E. Pagello. Exploiting different coherence dimensions to answer proximity queries for convex polyhedra. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 2594–2599, 2007.
- [C25] S. Carpin, M. Lewis, J. Wang, S. Balakirsky, and C. Scrapper. USARSim: a robot simulator for research and education. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 1400–1405, 2007.
- [C26] A. Kolling and S. Carpin. Detecting intruders in complex environments with limited range mobile sensors. In K. Kowzowski, editor, *Robot Motion and Control 2007*, Lecture Notes in Information and Control, pages 417–426. Springer, 2007.
- [C27] J. Wright, S. Carpin, A. Cerpa, G. Gavillan, M. Kallmann, C. Laird, K. Laird, S. Newsam, and D. Noelle. Collaboratory: an open source teaching and learning facility for computer science and engineering education. In *Proceedings of the International Conference on Frontiers in Education: Computer Science and Computer Engineering*, 2007.
- [C28] G. Pillonetto and S. Carpin. Multirobot localization with unknown variance parameters using iterated kalman filter. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 1709–1714, 2007.
- [C29] S. Markov and S. Carpin. A cooperative distributed approach to target motion control in multirobot observation of multiple targets. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 931–936, 2007.
- [C30] A. Kolling and S. Carpin. The GRAPH-CLEAR problem: definition, theoretical properties and its connections to multirobot aided surveillance. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 1003–1008, 2007.
- [C31] S. Balakirsky, C. Scrapper, and S. Carpin. The evolution of performance metrics in the robocup rescue virtual robot competition. In *Proceedings of PerMIS*, pages 91–96, 2007.
- [C32] A. Kolling and S. Carpin. Multi-robot surveillance: an improved algorithm for the GRAPH-CLEAR problem. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 2360–2365, 2008.
- [C33] S. Carpin. Merging maps via Hough transform. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 1878–1883, 2008.
- [C34] G. Erinc, G. Pillonetto, and S. Carpin. Online estimation of variance parameters: experimental results with applications to localization. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 1890–1895, 2008.
- [C35] A. Kolling and S. Carpin. Extracting surveillance graphs from robot maps. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 2323–2328, 2008.
- [C36] B. Balaguer and S. Carpin. Where am I? a simulated GPS sensor for outdoor robotic applications. In S. Carpin, I. Noda, E. Pagello, M. Reggiani, and O. von Stryk, editors, *Proceedings of the first international conference on simulation, modeling, and programming for autonomous robots*, volume 5325 of *Lectures Notes in Artificial Intelligence (LNAI)*, pages 222–233. Springer, 2008.
- [C37] A. Censi and S. Carpin. HSM3D: feature-less global 6DOF scan-matching in the Hough/Radon domain. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 3899–3906, 2009.

- [C38] A. Kolling and S. Carpin. Probabilistic graph clear. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 3508–3514, 2009.
- [C39] S. Carpin and A. Censi. An experimental assessment of the hsm3d algorithm for sparse and colored data. In *Proceedings of the IEEE/RJS International Conference on Intelligent Robots and Systems*, pages 3595–3600, 2009.
- [C40] G. Erinc and S. Carpin. Image-based mapping and navigation with heterogenous robots. In *Proceedings of the 2009 IEEE/RJS International Conference on Intelligent Robots and Systems*, pages 5807–5814, 2008.
- [C41] A. Kolling and S. Carpin. Surveillance strategies for target detection with sweep lines. In *Proceedings of the IEEE/RJS International Conference on Intelligent Robots and Systems*, pages 5821–5827, 2009.
- [C42] B. Balaguer, S. Carpin, S. Balakirsky, and A. Visser. Evaluation of robocup maps. In *Proceedings of PerMIS*, pages 231–236, 2009.
- [C43] S. Balakirsky, S. Carpin, and A. Visser. Evaluating the robocup 2009 virtual robot rescue competition. In *Proceedings of PerMIS*, pages 117–122, 2009.
- [C44] B. Balaguer and S. Carpin. Efficient grasping of novel objects through dimensionality reduction. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 1279–1285, 2010.
- [C45] A. Kolling and S. Carpin. Multi-robot pursuit-evasion without maps. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 3045–3051, 2010.
- [C46] B. Balaguer and S. Carpin. Motion planning for cooperative manipulators folding flexible planar objects. In *Proceedings of the IEEE/RJS International Conference on Intelligent Robots and Systems International Conference on Intelligent Robots and Systems*, pages 3842–3847, 2010.
- [C47] G. Pillonetto, A. Aravkin, and S Carpin. The unconstrained and inequality constrained moving horizon approach to robot localization. In *Proceedings of the IEEE/RJS International Conference on Intelligent Robots and Systems*, pages 3830–3835, 2010.
- [C48] G. Erinc and S. Carpin. Evaluation criteria for appearance-based maps. In *Proceedings of PerMIS*, pages 332–338, 2010.
- [C49] B. Balaguer and S. Carpin. Learning end-effector orientations for novel object grasping tasks. In *Proceedings of 2010 IEEE/RAS International Conference on Humanoid Robots*, pages 302–307, 2010.
- [C50] T.H. Chung and S. Carpin. Multiscale search using probabilistic quadtrees. In *Proceeding of the IEEE International Conference on Robotics and Automation*, pages 2546–2543, 2011.
- [C51] S. Carpin, D.A. Burch, and T.H. Chung. Searching for multiple targets using probabilistic quadtrees. In *Proceedings of the IEEE/RJS International Conference on Intelligent Robots and Systems*, pages 4536–4543, 2011.
- [C52] B. Balaguer and S. Carpin. Combining imitation and reinforcement learning to fold deformable planar objects. In *Proceedings of the IEEE/RJS International Conference on Intelligent Robots and Systems*, pages 1405–1412, 2011.
- [C53] B. Balaguer and S. Carpin. Bimanual regrasping from unimanual machine learning. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 3264–3270, 2012.

- [C54] N. Basilico and S. Carpin. Online patrolling using hierarchical spatial representations. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 2163–2169, 2012.
- [C55] G. Erinc and S. Carpin. Anytime merging of appearance based maps. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 1656–1662, 2012.
- [C56] B. Balaguer, G. Erinc, and S. Carpin. Classification and regression for wifi localization of heterogeneous robot teams in unknown environments. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 3496–3503, 2012.
- [C57] S. Carpin. Distributed coverage while not being covered. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 842–848, 2012.
- [C58] S. Carpin, T.H. Chung, and B. Sadler. Theoretical foundations of high-speed robot team deployment. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 2025–2032, 2013.
- [C59] S.K. Esser, A. Andreopoulos, R. Appuswamy, P. Datta, D. Barch, A. Amir, J. Arthur, A. Cassidy, M. Flickner, P. Merolla, S. Chandra, N. Basilico, S. Carpin, T. Zimmerman, Fr. Zee, R. Alvarez-Icaza, J.A. Kusnitz, T.M. Wong, W.P. Risk, E. McQuinn, T.K. Nayak, R. Singh, and D.S. Modha. Cognitive computing systems: algorithms and applications for networks of neurosynaptic cores. In *Proceedings of the International Conference on Neural Networks*, pages 1–10, 2013.
- [C60] G. Erinc, B. Balaguer, and S. Carpin. Heterogeneous map merging using wifi signals. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 5258–5264, 2013.
- [C61] S. Feyzabadi and S. Carpin. Knowledge and data representation for motion planning in dynamic environments. In J.H. Kim et al., editor, *Robot Intelligence Technology and Applications*, volume 274 of *Advances in Intelligent Systems and Computing*, pages 233–240. Springer, 2014.
- [C62] A. Purohit, P. Zhang, B. Sadler, and S. Carpin. Deployment of swarms of micro-aerial vehicles: from theory to practice. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 5408–5413, 2014.
- [C63] S. Feyzabadi and S. Carpin. Risk aware path planning using hierarchical constrained markov decision processes. In *Proceedings of the IEEE International Conference on Automation Science and Engineering*, pages 297–303, 2014.
- [C64] S. Carpin, M. Pavone, and B.M. Sadler. Rapid multirobot deployment with time constraints. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 1147–1154, 2014.
- [C65] S. Feyzabadi and S. Carpin. HCMDP: a hierarchical solution to constrained markov decision processes. In *Proceeding of the IEEE International Conference on Robotics and automation*, pages 3971–3978, 2015.
- [C66] S. Liu and S. Carpin. Fast grasp quality evaluation with partial convex hull computation. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 4279–4285, 2015.
- [C67] S. Liu and S. Carpin. Global grasp planning using triangular meshes. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 4904–4910, 2015.

- [C68] S. Liu and S. Carpin. A fast algorithm for grasp quality evaluation using the object wrench space. In *Proceedings of the IEEE Conference on Automation Science and Engineering*, pages 558–563, 2015.
- [C69] N. Basilico and S. Carpin. Deploying teams of heterogeneous UAVs in cooperative two-level surveillance missions. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 610–615, 2015.
- [C70] X. Chen, A. Purhoit, C.R. Dominguez, S. Carpin, and P. Zhang. Drunkwalk: collaborative and adaptive planning for navigation of microaerial sensor swarms. In *Proceedings of ACM Sensys*, pages 295–308, 2015.
- [C71] N. Basilico, T.H. Chung, and S. Carpin. Distributed online patrolling with multi-agent teams of sentinels and searchers. In N.-Y. Chong and Y.-J. Cho, editors, *Distributed Autonomous Robotic Systems 12*, volume 112 of *Springer Tracts in Advanced Robotics*, pages 3–16. Springer, 2016.
- [C72] S. Feyzabadi and S. Carpin. Multi-objective planning with multiple high level task specifications. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 5483–5490, 2016.
- [C73] S. Carpin, Y-L. Chow, and M. Pavone. Risk aversion in finite Markov decision processes using total cost criteria and average value at risk. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 335–342, 2016.
- [C74] S. Liu and S. Carpin. Kinematic noise propagation and grasp quality evaluation. In *Proceedings of the IEEE Conference on Automation Science and Engineering*, pages 1177–1183, 2016.
- [C75] D. Gealy, S. McKinkley, M. Guo, L. Miller, S. Vougioukas, J. Viers, S. Carpin, and K. Goldberg. Co-robotic device for autoamated tuning of emitters to enable precision irrigation. In *Proceedings of the IEEE Conference on Automation Science and Engineering*, pages 922–927, 2016.
- [C76] S. Feyzabadi and S. Carpin. A toolbox for multi-objective planning in non-deterministic environments with simulation validation. In *Proceedings of the IEEE International Conference on Simulation, Modeling and Programming of Mobile Robots*, pages 165–272, 2016.
- [C77] S. Liu, Z. Hu, H. Zhang, M. Kwon, Z. Wang, Y. Xu, and S. Carpin. Grasp quality evaluation and planning for objects with negative curvature. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 2223–2229, 2017.
- [C78] T. Thayer, S. Vougioukas, K. Goldberg, and S. Carpin. Routing algorithms for robot assisted precision irrigation. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 2221–2228, 2018.
- [C79] S. Liu and S. Carpin. Grasp quality evaluation with whole arm kinematic noise propagation. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 5575–5581, 2018.
- [C80] R. Berenstein, R. Fox, S. McKinley, S. Carpin, and K. Goldberg. Adjusting indoor drip irrigation emitters with the toyota hsr robot. In *Proceedings of the IEEE International Conference on Robotics and Automation*, pages 2236–2243, 2018.
- [C81] T. Thayer, S. Vougioukas, K. Goldberg, and S. Carpin. Multi-robot routing algorithms for robots operating in vineyards. In *Proceedings of the IEEE Conference on Automation Science and Engineering*, pages 7–14, 2018.

- [C82] D. Tseng, D. Wang, C. Chen, L. Miller, W. Song, J. Viers, S. Vougioukas, S. Carpin, J. Aparicio Ojea, and K. Goldberg. Towards automating precision irrigation: Deep learning to infer local soil moisture conditions from synthetic aerial agricultural images. In *Proceedings of the IEEE Conference on Automation Science and Engineering*, pages 284–291, 2018.
- [C83] J. Banfi, N. Basilico, and S. Carpin. Optimal redeployment of multirobot teams for communication maintenance. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 3757 – 3764, 2018.
- [C84] C. Diaz Alvarenga, N. Basilico, and S. Carpin. Delayed and time-variant patrolling strategies against attackers with local observation capabilities. In *Proceedings of the International Conference on Autonomous Agents and Multiagent Systems*, pages 1928–1930, 2019.
- [C85] T.C. Thayer, S. Vougioukas, K. Goldberg, and S. Carpin. Bi-objective routing for robotic irrigation and sampling in vineyards. In *Proceedings of the IEEE Conference on Automation Science and Engineering*, pages 1481–1488, 2019.
- [C86] M. Wiggert, L. Amladi, R. Berenstein, S. Carpin, J. Viers, S. Vougioukas, and K. Goldberg. RAPID-MOLT: A meso-scale, open-source, low-cost, testbed for robot assisted precision irrigation and delivery. In *Proceedings of the IEEE Conference on Automation Science and Engineering*, pages 1489–1496, 2019.
- [C87] C. Diaz Alvarenga, N. Basilico, and S. Carpin. Delayed and time-variant patrolling strategies against attackers with local observation capabilities. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 4869–4876, 2019.
- [C88] J.L. Susa Rincon and S. Carpin. Map merging of oriented topological semantic maps. In *Proceedings of the International Symposium on Multi-Robot and Multi-Agent Systems*, pages 202–208, 2019.
- [C89] N. Basilico and S. Carpin. Balancing unpredictability and coverage in adversarial patrolling settings. In M. Morales, L. Tapia, G. Sánchez-Ante, and S. Hutchinson, editors, *Algorithmic Foundations of Robotics XIII*, pages 762–777. Springer International Publishing, 2020.
- [C90] C. Diaz Alvarenga, N. Basilico, and S. Carpin. Multirobot patrolling against adaptive opponents with limited information. In *Proceedings of the IEEE Conference on Robotics and Automation*, pages 2486–2492, 2020.
- [C91] F. Betti Sorbelli, S. Carpin, F. Coró, A. Navarra, and C.M. Pinotti. Optimal routing schedules for robots operating in aisle-structures. In *Proceedings of the IEEE Conference on Robotics and Automation*, pages 4927–4933, 2020.
- [C92] T. Thayer and S. Carpin. Solving large-scale stochastic orienteering problems with aggregation. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 2452–2458, 2020.
- [C93] Y. Avigal, A. Deza, W. Wong, S. Oehme, M. Presten, M. Theis, J. Chui, P. Shao, H. Huang, A. Kotani, S. Sharma, M. Luo, S. Carpin, Joshua H. Viers, S. Vougioukas, and K. Goldberg. Learning seed placements and automation policies for polyculture farming with companion plants. In *Proceedings of the IEEE International Conference on Robotics and Automation*, 2021.
- [C94] T. Thayer and S. Carpin. A resolution adaptive algorithm for the stochastic orienteering problem with chance constraints. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 6388–6395, 2021.

- [C95] T. Thayer and S. Carpin. A fast algorithm for stochastic orienteering with chance constraints. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 7398–7945, 2021.
- [International Workshops and Symposia](#)
- [W1] S. Carpin, C. Ferrari, F. Montesello, E. Pagello, and P. Patuelli. Scalable deliberative procedures for efficient multi-robot coordination. In *Workshop on Balancing Reactivity and Social Deliberation in Multi-Agent Systems*, pages 66–76. European Conference on Artificial Intelligence, 2000.
- [W2] A. Birk, H. Kenn, S. Carpin, and M. Pflingsthor. Toward autonomous rescue robots. In *Workshop on Synthetic Simulation and Robotics to Mitigate Earthquake Disasters*. Robocup, 2003.
- [W3] S. Carpin, V. Jucikas, and A. Birk. Multi-robot mapping for rescue robotics. In *IEEE International Workshop on Safety, Security and Rescue Robotics*, 2004.
- [W4] A. Birk and S. Carpin. Rescue robotics at the international university of bremen (IUB): an integrative approach. In *Workshop on Urban Search and Rescue: from Robocup to real world applications*. IEEE/RSJ International Conference on Intelligent Robots and Systems, 2004.
- [W5] A. Birk, S. Carpin, W. Chonnaparamutt, V. Jucikas, H. Bastani, I. Delchev, I. Krivulev, S. Lee, S. Markov, and A. Pfeil. The IUB 2005 rescue robot team. In *Robocup 2005: Robot Soccer World Cup IX*, LNCS. Springer, 2006.
- [W6] M. Mahmudi, S. Markov, Y. Nevatia, R. Rathnam, T. Stoyanov, and S. Carpin. VirtualIUB - development of a team of autonomous agents for the virtual robots competition. In *Workshop on Synthetic Simulation and Robotics to Mitigate Earthquake Disasters*. Robocup, 2006.
- [W7] S. Carpin S. Balakirsky, M. Lewis. The virtual robots competition: vision and short term roadmap. In *Workshop on Synthetic Simulation and Robotics to Mitigate Earthquake Disasters*. Robocup, 2006.
- [W8] S. Carpin and E. Pagello. The challenge of motion planning for humanoid robots playing soccer. In *Workshop on Humanoids Soccer*. IEEE Conference on Humanoids, 2006.
- [W9] S. Balakirsky, C. Scrapper, B. Balaguer, A. Farinelli, and S. Carpin. Virtual robots: progresses and outlook. In *Workshop on Synthetic Simulation and Robotics to Mitigate Earthquake Disasters*. Robocup, 2007.
- [W10] B. Balaguer, S. Carpin, and S. Balakirsky. Towards quantitative comparisons of robot algorithms: Experiences with slam in simulation and real world systems. In *Workshop on Performance Evaluation and Benchmarking for Intelligent Robots and Systems*. IEEE/RSJ International Conference on Intelligent Robots and Systems, 2007.
- [W11] B. Balaguer and S. Carpin. UC mercenary team description paper: Robocup 2008 virtual robot rescue simulation league. In *Robocup 2009: Robot Soccer World Cup XII*, 2008.
- [W12] B. Balaguer, S. Balakirsky, S. Carpin, M. Lewis, and C. Scrapper. USARSim: a validated simulator for research in robotics and automation. In *Proceedings of the IROS Workshop "Robot simulators: available software, scientific applications and future trends*, 2008.
- [W13] B. Balaguer, D. Burch, R. Sloan, and S. Carpin. UC Merced team description paper: Robocup 2009 virtual robot rescue simulation competition. In *Robocup 2009: Robot Soccer World Cup XIII*, 2009.

- [W14] M. Lewis, S. Carpin, and S. Balakirsky. Virtual robots robocuprescue competition: Contributions to infrastructure and science. In *Workshop on Competitions in Artificial Intelligence and Robotics*. International Joint Conference on Artificial Intelligence, 2009.
- [W15] A. Kolling and S. Carpin. Solving pursuit-evasion problems with graph-clear: an overview. In *Workshop on Search and Pursuit/Evasion in the Physical World*. IEEE International Conference on Robotics and Automation, 2010.
- [W16] B. Balaguer and S. Carpin. Human-inspired grasping of novel objects through imitation learning. In *Workshop on Autonomous Grasping*. IEEE International Conference on Robotics and Automation, 2011.
- [W17] B. Balaguer and S. Carpin. An hybrid approach for robots learning folding tasks. In *Workshop on New Developments in Imitation Learning*. IEEE International Conference on Machine Learning, 2011.
- [W18] T.H. Chung and S. Carpin. Multi target search using probabilistic quadtrees. In *INFORMS*, 2011.
- [W19] A. Purohit, S. Carpin, and P. Zhang. Adaptive planning for deployment of micro-aerial sensor swarms. In *Workshop on Robotic Sensor Networks*. CPS Week, 2014.
- [W20] S. Feyzabadi and S. Carpin. Motion planning with safety constraints and high-level task specifications. In *Workshop on Planning, Control, and Sensing for Safe Human-Robot Interaction*. IEEE International Conference on Robotics and Automation, 2015.

Book Chapters

- [BC1] S. Carpin, C. Ferrari, E. Pagello, and P. Patuelli. Bridging deliberation and reactivity in cooperative multi-robot systems through map focus. In E. Pagello M. Hannebauer, J. Wendler, editor, *Balancing Reactivity and Social Deliberation in Multi-Agent Systems*, volume 2103 of *Lectures Notes in Artificial Intelligence*, pages 35–52. Springer, 2001.
- [BC2] S. Carpin. Algorithmic motion planning: the randomized approach. In R. Ahlswede et al., editor, *Information transfer and combinatorics*, volume 4123 of *Lecture Notes in Computer Science*, pages 725–753. Springer, 2006.
- [BC3] S. Balakirsky, S. Carpin, G. Dimitoglou, and B. Balaguer. From simulation to real robots with predictable results: Methods and examples. In R. Madhavan, E. Tunstel, and E. Messina, editors, *Performance Evaluation and Benchmarking of Intelligent Systems*, pages 113–137. Springer, 2009.
- [BC4] S. Carpin, K. Goldberg, S. Vougioukas, R. Berenstein, and J. Viers. Use of intelligent/autonomous systems in crop irrigation. In J. Billingsley, editor, *Robotics and automation for improving agriculture*, pages 137–159. BSD Publishing, 2019.

Technical Reports

- [T1] A. Kolling and S. Carpin. An improved algorithm for the GRAPH-CLEAR problem. Technical Report 3, University of California, Merced, 2007.
- [T2] A. Kolling and S. Carpin. On weighted edge searching. Technical Report 1, University of California, Merced, 2009.
- [T3] S. Carpin, S. Liu, J. Falco, and K. VanVyck. Multi-fingered robotic grasping: a primer. Technical report, arXiv:1607.006620v1, 2016.