

Stefano Carpin, PhD

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Research Interests

Multi-robot systems, planning, decision making, 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.

Teaching

Undergraduate Teaching at UC Merced

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.

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.
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.
320561 Motion planning: Fall 2006.

Mentoring and Supervision

Current PhD Students

Aug 14 - today José Luis Susa Rincon
Aug 16 - today Thomas Thayer
Aug 18 - today Lorenzo Booth
Aug 18 - today Carlos Diaz Alvarenga

Current MS Students

Sree Harsha Chitranayakanahalli Sheshappa Reddy

Current Undergraduate Students

Christine Brekenridge

Past Postdoctoral Fellows

Jun 11 - Nov 12 Dr. Nicola Basilico (now assistant 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*.

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*.

Past Undergraduate Students

Christine Breckenridge (Summer 2018 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 Herмосillo (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

- Jan 2015 - present IEEE Transactions on Automation Science and Engineering: Associate Editor.
Jul 2015 - present IEEE Robotics and Automation Letters: 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.
IROS IEEE/RSJ International Conference on Intelligent Robots and Systems. Associate Editor: 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018.
CASE IEEE Conference on Automation Science and Engineering. Associate Editor: 2017, 2018.
DARS Distributed Autonomous Robotic Systems. Program Committee Member: 2008, 2014, 2016, 2018.
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 (AIM); IEEE Int. Symposium on Assembly and Task Planning (ISATP); IEEE Workshop on Robot Motion and Control (RoMoCo); Intelligent Autonomous Systems Conf. (IAS); Performance Metrics for Intelligent Systems workshop (PERMIS).

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.

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: Songhwei 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, 12/1/2016–11/31/2019, PI (Co-PI: 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.

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. Miolo, 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.
- [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. Pflingsthorn, B. Liebald, 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.
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