



Marco Pavone

Associate Professor of Aeronautics and Astronautics and, by courtesy, of Electrical Engineering and of Computer Science

CONTACT INFORMATION

- **Administrator**

Renee Quiroz - Administrative Associate

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Tel (650) 723-2867

Bio

BIO

Dr. Marco Pavone is an Assistant Professor of Aeronautics and Astronautics at Stanford University, where he is the Director of the Autonomous Systems Laboratory and Co-Director of the Center for Automotive Research at Stanford. Before joining Stanford, he was a Research Technologist within the Robotics Section at the NASA Jet Propulsion Laboratory. He received a Ph.D. degree in Aeronautics and Astronautics from the Massachusetts Institute of Technology in 2010. His main research interests are in the development of methodologies for the analysis, design, and control of autonomous systems, with an emphasis on self-driving cars, autonomous aerospace vehicles, and future mobility systems. He is a recipient of several awards, including a Presidential Early Career Award for Scientists and Engineers from President Barack Obama, an ONR Young Investigator Award, an NSF CAREER Award, and a NASA Early Career Faculty Award. He was identified by the American Society for Engineering Education (ASEE) as one of America's 20 most highly promising investigators under the age of 40. His work has been recognized with best paper nominations or awards at the International Conference on Intelligent Transportation Systems, at the Field and Service Robotics Conference, at the Robotics: Science and Systems Conference, and at NASA symposia.

ACADEMIC APPOINTMENTS

- Associate Professor, Aeronautics and Astronautics
- Associate Professor (By courtesy), Electrical Engineering
- Associate Professor (By courtesy), Computer Science
- Faculty Affiliate, Institute for Human-Centered Artificial Intelligence (HAI)
- Member, Institute for Computational and Mathematical Engineering (ICME)

HONORS AND AWARDS

- PECASE Award, White House (2017)
- YIP Award, ONR (2017)
- CAREER Award, NSF (2015)
- Frontiers of Engineering Program, National Academy of Engineering (2013)
- Early Career Faculty award, NASA (2012)

- Hellman Faculty Scholar Award, Hellman Fellows Fund (2012)
- NIAC Fellow, NASA (2011)

PROGRAM AFFILIATIONS

- Center for Automotive Research at Stanford (CARS)
- Stanford SystemX Alliance

PROFESSIONAL EDUCATION

- Ph.D., MIT , Aeronautics and Astronautics (2010)

Teaching

COURSES

2021-22

- Principles of Robot Autonomy II: AA 174B, AA 274B, CS 237B, EE 260B (Win)
- Robotics and Autonomous Systems Seminar: AA 289, CS 529 (Win, Spr)

2020-21

- Principles of Robot Autonomy I: AA 174A, AA 274A, CS 237A, EE 260A (Aut)
- Principles of Robot Autonomy II: AA 174B, AA 274B, CS 237B, EE 260B (Win)

2019-20

- Optimal and Learning-based Control: AA 203 (Spr)
- Principles of Robot Autonomy I: AA 174A, AA 274A, CS 237A, EE 260A (Aut)
- Principles of Robot Autonomy II: AA 174B, AA 274B, CS 237B, EE 260B (Win)
- Robotics and Autonomous Systems Seminar: AA 289, CS 529 (Aut, Win)

2018-19

- Introduction to Aeronautics and Astronautics: AA 100 (Aut)
- Optimal and Learning-based Control: AA 203 (Spr)
- Principles of Robotic Autonomy: AA 274 (Win)
- Robotics and Autonomous Systems Seminar: AA 289 (Aut, Win, Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Tushar Goel, Tommaso Guffanti, Andrew McClellan, Chelsea Sidrane, Patrick Washington

Postdoctoral Faculty Sponsor

Karthik Gopalakrishnan, Kaidi Yang

Doctoral Dissertation Advisor (AC)

Somrita Banerjee, Robin Brown, Andrew Bylard, Abhishek Cauligi, Robert Dyro, Amine Elhafsi, Lucas Fuentes Valenzuela, Boris Ivanovic, Devansh Jalota, Thomas Lew, Rachel Luo, Spencer Richards, Stephanie Schneider, Apoorva Sharma, Matthew Tsao

Orals Evaluator

Andrew McClellan

Master's Program Advisor

Gary Dai, May Ling Har, Ryan Loper, Daniel Morton, Mason Murray-Cooper, Megan Ochalek, Nitin Ongole, Mikie Reed, Pranay Samala, Stephanie Schneider, Manasi Sharma, Inbal Shlesinger, Chelsea Sidrane, Tyler Weiss, Thomas White

Doctoral (Program)

John Alora, Fadhil Ginting, Alana Sanchez

Postdoctoral Research Mentor

Shreyas Kousik

Publications

PUBLICATIONS

- **Control Barrier Functions for Cyber-Physical Systems and Applications to NMPC** *IEEE ROBOTICS AND AUTOMATION LETTERS*
Schilliger, J., Lew, T., Richards, S. M., Hanggi, S., Pavone, M., Onder, C.
2021; 6 (4): 8623-8630
- **An Asymptotically-Optimal Sampling-Based Algorithm for Bi-directional Motion Planning.** *Proceedings of the ... IEEE/RSJ International Conference on Intelligent Robots and Systems. IEEE/RSJ International Conference on Intelligent Robots and Systems*
Starek, J. A., Gomez, J. V., Schmerling, E. n., Janson, L. n., Moreno, L. n., Pavone, M. n.
; 2015: 2072–78
- **Network offloading policies for cloud robotics: a learning-based approach** *AUTONOMOUS ROBOTS*
Chinchali, S., Sharma, A., Harrison, J., Elhafsi, A., Kang, D., Pergament, E., Cidon, E., Katti, S., Pavone, M.
2021
- **On Local Computation for Network-Structured Convex Optimization in Multiagent Systems** *IEEE TRANSACTIONS ON CONTROL OF NETWORK SYSTEMS*
Brown, R., Rossi, F., Solovey, K., Tsao, M., Wolf, M. T., Pavone, M.
2021; 8 (2): 542-554
- **Multimodal Deep Generative Models for Trajectory Prediction: A Conditional Variational Autoencoder Approach** *IEEE ROBOTICS AND AUTOMATION LETTERS*
Ivanovic, B., Leung, K., Schmerling, E., Pavone, M.
2021; 6 (2): 295–302
- **Soft Tensegrity Systems for Planetary Landing and Exploration**
Garanger, K., Krajewski, M., del Valle, I., Raheja, U., Rimoli, J. J., Rath, M., Pavone, M., Vansusante, P. J., Roberts, A. D.
AMER SOC CIVIL ENGINEERS.2021: 841-854
- **Adaptive-Control-Oriented Meta-Learning for Nonlinear Systems**
Richards, S. M., Azizan, N., Slotine, J., Pavone, M., Shell, D. A., Toussaint, M., Hsieh, M. A.
RSS FOUNDATION-ROBOTICS SCIENCE & SYSTEMS FOUNDATION.2021
- **Lyapunov-stable neural-network control**
Dai, H., Landry, B., Yang, L., Pavone, M., Tedrake, R., Shell, D. A., Toussaint, M., Hsieh, M. A.
RSS FOUNDATION-ROBOTICS SCIENCE & SYSTEMS FOUNDATION.2021
- **Co-Design of Communication and Machine Inference for Cloud Robotics**
Nakanoya, M., Chinchali, S., Anemogiannis, A., Datta, A., Katti, S., Pavone, M., Shell, D. A., Toussaint, M., Hsieh, M. A.
RSS FOUNDATION-ROBOTICS SCIENCE & SYSTEMS FOUNDATION.2021
- **On the Interaction between Autonomous Mobility on Demand Systems and Power Distribution Networks --- An Optimal Power Flow Approach** *IEEE Transactions on Control of Network Systems*
Estandia, A., Schiffer, M., Rossi, F., Luke, J., Kara, E. C., Rajagopal, R., Pavone, M.
2021
- **Intermodal Autonomous Mobility-on-Demand** *IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS*
Salazar, M., Lanzetti, N., Rossi, F., Schiffer, M., Pavone, M.

2020; 21 (9): 3946–60

- **Learning stabilizable nonlinear dynamics with contraction-based regularization** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
Singh, S., Richards, S. M., Sindhvani, V., Slotine, J. E., Pavone, M.
2020
- **On infusing reachability-based safety assurance within planning frameworks for human-robot vehicle interactions** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
Leung, K., Schmerling, E., Zhang, M., Chen, M., Talbot, J., Gerdes, J., Pavone, M.
2020
- **Collision-Inclusive Trajectory Optimization for Free-Flying Spacecraft** *JOURNAL OF GUIDANCE CONTROL AND DYNAMICS*
Mote, M., Egerstedt, M., Feron, E., Bylard, A., Pavone, M.
2020; 43 (7): 1247–58
- **On the Interaction Between Autonomous Mobility-on-Demand Systems and the Power Network: Models and Coordination Algorithms** *IEEE TRANSACTIONS ON CONTROL OF NETWORK SYSTEMS*
Rossi, F., Iglesias, R., Alizadeh, M., Pavone, M.
2020; 7 (1): 384–97
- **A Vehicle Coordination and Charge Scheduling Algorithm for Electric Autonomous Mobility-on-Demand Systems**
Boewing, F., Schiffer, M., Salazar, M., Pavone, M., IEEE
IEEE.2020: 248–55
- **On Infusing Reachability-Based Safety Assurance Within Probabilistic Planning Frameworks for Human-Robot Vehicle Interactions**
Leung, K., Schmerling, E., Chen, M., Talbot, J., Gerdes, J., Pavone, M., Xiao, J., Kroger, T., Khatib, O.
SPRINGER INTERNATIONAL PUBLISHING AG.2020: 561-574
- **Shapeshifter: A Multi-Agent, Multi-Modal Robotic Platform for Exploration of Titan**
Tagliabue, A., Schneider, S., Pavone, M., Agha-mohammadi, A., IEEE
IEEE.2020
- **Learning-based Warm-Starting for Fast Sequential Convex Programming and Trajectory Optimization**
Banerjee, S., Lew, T., Bonalli, R., Alfaadhel, A., Alomar, I., Shageer, H. M., Pavone, M., IEEE
IEEE.2020
- **On the Co-Design of AV-Enabled Mobility Systems**
Zardini, G., Lanzetti, N., Salazar, M., Censi, A., Frazzoli, E., Pavone, M., IEEE
IEEE.2020
- **Congestion-aware Routing and Rebalancing of Autonomous Mobility-on-Demand Systems in Mixed Traffic**
Wollenstein-Betech, S., Houshmand, A., Salazar, M., Pavone, M., Cassandra, C. G., Paschalidis, I., IEEE
IEEE.2020
- **Interpretable Policies from Formally-Specified Temporal Properties**
DeCastro, J., Leung, K., Arechiga, N., Pavone, M., IEEE
IEEE.2020
- **Stochastic Motion Planning for Hopping Rovers on Small Solar System Bodies**
Hockman, B., Pavone, M., Amato, N. M., Hager, G., Thomas, S., TorresTorriti, M.
SPRINGER INTERNATIONAL PUBLISHING AG.2020: 877–93
- **How Should a Robot Assess Risk? Towards an Axiomatic Theory of Risk in Robotics**
Majumdar, A., Pavone, M., Amato, N. M., Hager, G., Thomas, S., TorresTorriti, M.
SPRINGER INTERNATIONAL PUBLISHING AG.2020: 75–84
- **Multi-objective Optimal Control for Proactive Decision Making with Temporal Logic Models**
Chinchali, S. P., Livingston, S. C., Pavone, M., Amato, N. M., Hager, G., Thomas, S., TorresTorriti, M.
SPRINGER INTERNATIONAL PUBLISHING AG.2020: 127–44
- **Perception-Aware Motion Planning via Multiobjective Search on GPUs**

Ichter, B., Landry, B., Schmerling, E., Pavone, M., Amato, N. M., Hager, G., Thomas, S., TorresTorriti, M.
SPRINGER INTERNATIONAL PUBLISHING AG.2020: 895–912

- **ADAPT: Zero-Shot Adaptive Policy Transfer for Stochastic Dynamical Systems**
Harrison, J., Garg, A., Ivanovic, B., Zhu, Y., Savarese, S., Li Fei-Fei, Pavone, M., Amato, N. M., Hager, G., Thomas, S., TorresTorriti, M.
SPRINGER INTERNATIONAL PUBLISHING AG.2020: 437–53
- **Joint Design and Control of Electric Vehicle Propulsion Systems**
Verbruggen, F., Salazar, M., Pavone, M., Hofman, T., IEEE
IEEE.2020: 1725–31
- **Chance-Constrained Sequential Convex Programming for Robust Trajectory Optimization**
Lew, T., Bonalli, R., Pavone, M., IEEE
IEEE.2020: 1871–78
- **A Simple and Efficient Tube-based Robust Output Feedback Model Predictive Control Scheme**
Lorenzetti, J., Pavone, M., IEEE
IEEE.2020: 1775–82
- **Exploiting Locality and Structure for Distributed Optimization in Multi-Agent Systems**
Brown, R., Rossi, F., Solovey, K., Wolf, M. T., Pavone, M., IEEE
IEEE.2020: 440–47
- **Multi-objective optimal control for proactive decision making with temporal logic models** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
Chinchali, S. P., Livingston, S. C., Chen, M., Pavone, M.
2019
- **A Framework for Time-Consistent, Risk-Sensitive Model Predictive Control: Theory and Algorithms** *IEEE TRANSACTIONS ON AUTOMATIC CONTROL*
Singh, S., Chow, Y., Majumdar, A., Pavone, M.
2019; 64 (7): 2905–12
- **Robot Motion Planning in Learned Latent Spaces** *IEEE ROBOTICS AND AUTOMATION LETTERS*
Ichter, B., Pavone, M.
2019; 4 (3): 2407–14
- **A real-time framework for kinodynamic planning in dynamic environments with application to quadrotor obstacle avoidance** *ROBOTICS AND AUTONOMOUS SYSTEMS*
Allen, R. E., Pavone, M.
2019; 115: 174–93
- **A BCMP network approach to modeling and controlling autonomous mobility-on-demand systems** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
Iglesias, R., Rossi, F., Zhang, R., Pavone, M.
2019; 38 (2-3): 357–74
- **Backpropagation for Parametric STL**
Leung, K., Arechiga, N., Pavone, M., IEEE
IEEE.2019: 185–92
- **A Risk-Sensitive Finite-Time Reachability Approach for Safety of Stochastic Dynamic Systems**
Chapman, M. P., Lacotte, J., Tamar, A., Lee, D., Smith, K. M., Cheng, V., Fisac, J. F., Jha, S., Pavone, M., Tomlin, C. J., IEEE
IEEE.2019: 2958-2963
- **Optimal Routing and Energy Management Strategies for Plug-in Hybrid Electric Vehicles**
Salazar, M., Houshmand, A., Cassandras, C. G., Pavone, M., IEEE
IEEE.2019: 733–39
- **A Model Predictive Control Scheme for Intermodal Autonomous Mobility-on-Demand**
Zraggen, J., Tsao, M., Salazar, M., Schiffer, M., Pavone, M., IEEE
IEEE.2019: 1953–60

- **Perception-Constrained Robot Manipulator Planning for Satellite Servicing**
Zahroof, T., Bylard, A., Shageer, H., Pavone, M., IEEE
IEEE.2019
- **The Trajectron: Probabilistic Multi-Agent Trajectory Modeling With Dynamic Spatiotemporal Graphs**
Ivanovic, B., Pavone, M., IEEE
IEEE COMPUTER SOC.2019: 2375–84
- **Reduced Order Model Predictive Control For Setpoint Tracking**
Lorenzetti, J., Landry, B., Singh, S., Pavone, M., IEEE
IEEE.2019: 299–306
- **A Congestion-aware Routing Scheme for Autonomous Mobility-on-Demand Systems**
Salazar, M., Tsao, M., Aguiar, I., Schiffer, M., Pavone, M., IEEE
IEEE.2019: 3040–46
- **Risk-Sensitive Generative Adversarial Imitation Learning**
Lacotte, J., Ghavamzadeh, M., Chow, Y., Pavone, M., Chaudhuri, K., Sugiyama, M.
MICROTOME PUBLISHING.2019
- **Trajectory Optimization on Manifolds: A Theoretically-Guaranteed Embedded Sequential Convex Programming Approach**
Bonalli, R., Bylard, A., Cauligi, A., Lew, T., Pavone, M., Bicchi, A., KressGazit, H., Hutchinson, S.
MIT PRESS.2019
- **A Differentiable Augmented Lagrangian Method for Bilevel Nonlinear Optimization**
Landry, B., Manchester, Z., Pavone, M., Bicchi, A., KressGazit, H., Hutchinson, S.
MIT PRESS.2019
- **Network Offloading Policies for Cloud Robotics: a Learning-based Approach**
Chinchali, S., Sharma, A., Harrison, J., Elhafsi, A., Kang, D., Pergament, E., Cidon, E., Katti, S., Pavone, M., Bicchi, A., KressGazit, H., Hutchinson, S.
MIT PRESS.2019
- **High-Dimensional Optimization in Adaptive Random Subspaces**
Lacotte, J., Pilanci, M., Pavone, M., Wallach, H., Larochelle, H., Beygelzimer, A., d'Alche-Buc, F., Fox, E., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2019
- **BaRC: Backward Reachability Curriculum for Robotic Reinforcement Learning**
Ivanovic, B., Harrison, J., Sharma, A., Chen, M., Pavone, M., IEEE, Howard, A., Althoefer, K., Arai, F., Arrichiello, F., Caputo, B., Castellanos, J., Hauser, K., et al
IEEE.2019: 15–21
- **Model Predictive Control of Ride-sharing Autonomous Mobility-on-Demand Systems**
Tsao, M., Milojevic, D., Ruch, C., Salazar, M., Frazzoli, E., Pavone, M., IEEE, Howard, A., Althoefer, K., Arai, F., Arrichiello, F., Caputo, B., Castellanos, J., et al
IEEE.2019: 6665–71
- **GuSTO: Guaranteed Sequential Trajectory Optimization via Sequential Convex Programming**
Bonalli, R., Cauligi, A., Bylard, A., Pavone, M., IEEE, Howard, A., Althoefer, K., Arai, F., Arrichiello, F., Caputo, B., Castellanos, J., Hauser, K., Isler, Kim, et al
IEEE.2019: 6741–47
- **Beyond The Force: Using Quadcopters to Appropriate Objects and the Environment for Haptics in Virtual Reality**
Abtahi, P., Landry, B., Yang, J., Pavone, M., Follmer, S., Landay, J. A., Assoc Comp Machinery
ASSOC COMPUTING MACHINERY.2019
- **Risk-sensitive inverse reinforcement learning via semi- and non-parametric methods** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
Singh, S., Lacotte, J., Majumdar, A., Pavone, M.
2018; 37 (13-14): 1713–40
- **Routing autonomous vehicles in congested transportation networks: structural properties and coordination algorithms**
Rossi, F., Zhang, R., Hindy, Y., Pavone, M.
SPRINGER.2018: 1427–42

- **The Team Surviving Orienteers problem: routing teams of robots in uncertain environments with survival constraints** *AUTONOMOUS ROBOTS*
Jorgensen, S., Chen, R. H., Milam, M. B., Pavone, M.
2018; 42 (4): 927–52
- **Deterministic sampling-based motion planning: Optimality, complexity, and performance** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
Janson, L., Ichter, B., Pavone, M.
2018; 37 (1): 46–61
- **On the interaction between Autonomous Mobility-on-Demand systems and the power network: models and coordination algorithms**
Rossi, F., Iglesias, R., Alizadeh, M., Pavone, M., KressGazit, H., Srinivasa, S., Howard, T., Atanasov, N.
MIT PRESS.2018
- **Safe Motion Planning in Unknown Environments: Optimality Benchmarks and Tractable Policies**
Janson, L., Hu, T., Pavone, M., KressGazit, H., Srinivasa, S., Howard, T., Atanasov, N.
MIT PRESS.2018
- **Cellular Network Traffic Scheduling with Deep Reinforcement Learning**
Chinchali, S., Hu, P., Chu, T., Sharma, M., Bansal, M., Misra, R., Pavone, M., Katti, S., AAAI
ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2018: 766–74
- **Reach-Avoid Games Via Mixed-Integer Second-Order Cone Programming**
Lorenzetti, J., Chen, M., Landry, B., Pavone, M., IEEE
IEEE.2018: 4409–16
- **Stochastic Model Predictive Control for Autonomous Mobility on Demand**
Tsao, M., Iglesias, R., Pavone, M., IEEE
IEEE.2018: 3941–48
- **Cooperative Object Transport in 3D with Multiple Quadrotors using No Peer Communication**
Wang, Z., Singh, S., Pavone, M., Schwager, M., IEEE
IEEE COMPUTER SOC.2018: 1064–71
- **Learning Sampling Distributions for Robot Motion Planning**
Ichter, B., Harrison, J., Pavone, M., IEEE
IEEE COMPUTER SOC.2018: 7087–94
- **Multimodal Probabilistic Model-Based Planning for Human-Robot Interaction**
Schmerling, E., Leung, K., Vollprecht, W., Pavone, M., IEEE
IEEE COMPUTER SOC.2018: 3399–3406
- **Data-Driven Model Predictive Control of Autonomous Mobility-on-Demand Systems**
Iglesias, R., Rossi, F., Wang, K., Hallac, D., Leskovec, J., Pavone, M., IEEE
IEEE COMPUTER SOC.2018: 6019–25
- **Reach-Avoid Problems via Sum-of-Squares Optimization and Dynamic Programming**
Landry, B., Chen, M., Hemley, S., Pavone, M., Kosecka, J., Maciejewski, A. A., Okamura, A., Bicchi, A., Stachniss, C., Song, D. Z., Lee, D. H., Chaumette, F., Ding, et al
IEEE.2018: 4325–32
- **Generative Modeling of Multimodal Multi-Human Behavior**
Ivanovic, B., Schmerling, E., Leung, K., Pavone, M., Kosecka, J., Maciejewski, A. A., Okamura, A., Bicchi, A., Stachniss, C., Song, D. Z., Lee, D. H., Chaumette, F., Ding, et al
IEEE.2018: 3088–95
- **Gravimetric Localization on the Surface of Small Bodies**
Hockman, B., Reid, R. G., Nesnas, I. D., Pavone, M., IEEE
IEEE.2018
- **Deterministic Sampling-Based Motion Planning: Optimality, Complexity, and Performance**
Janson, L., Ichter, B., Pavone, M., Bicchi, A., Burgard, W.

SPRINGER INTERNATIONAL PUBLISHING AG.2018: 507–25

- **Monte Carlo Motion Planning for Robot Trajectory Optimization Under Uncertainty**
Janson, L., Schmerling, E., Pavone, M., Bicchi, A., Burgard, W.
SPRINGER INTERNATIONAL PUBLISHING AG.2018: 343–61
- **Risk-Constrained Reinforcement Learning with Percentile Risk Criteria** *JOURNAL OF MACHINE LEARNING RESEARCH*
Chow, Y., Ghavamzadeh, M., Janson, L., Pavone, M.
2018; 18
- **Fast, Safe, Propellant-Efficient Spacecraft Motion Planning Under Clohessy-Wiltshire-Hill Dynamics** *JOURNAL OF GUIDANCE CONTROL AND DYNAMICS*
Starek, J. A., Schmerling, E., Maher, G. D., Barbee, B. W., Pavone, M.
2017; 40 (2): 418-438
- **Design, Control, and Experimentation of Internally-Actuated Rovers for the Exploration of Low-gravity Planetary Bodies** *JOURNAL OF FIELD ROBOTICS*
Hockman, B. J., Frick, A., Reid, R. G., Nesnas, I. A., Pavone, M.
2017; 34 (1): 5-24
- **The Team Surviving Orienteers Problem: Routing Robots in Uncertain Environments with Survival Constraints**
Jorgensen, S., Chen, R. H., Milam, M. B., Pavone, M., IEEE
IEEE.2017: 227-234
- **Group Marching Tree: Sampling-Based Approximately Optimal Motion Planning on GPUs**
Ichter, B., Schmerling, E., Pavone, M., IEEE
IEEE.2017: 219-226
- **Robust Capture and Deorbit of Rocket Body Debris Using Controllable Dry Adhesion**
Bylard, A., MacPherson, R., Hockman, B., Cutkosky, M. R., Pavone, M., IEEE
IEEE.2017
- **Evaluating Trajectory Collision Probability through Adaptive Importance Sampling for Safe Motion Planning**
Schmerling, E., Pavone, M., Amato, N., Srinivasa, S., Ayanian, N., Kuindersma, S.
MIT PRESS.2017
- **Risk-sensitive Inverse Reinforcement Learning via Coherent Risk Models**
Majumdar, A., Singh, S., Mandlekar, A., Pavone, M., Amato, N., Srinivasa, S., Ayanian, N., Kuindersma, S.
MIT PRESS.2017
- **Low Cost, High Endurance, Altitude-Controlled Latex Balloon for Near-Space Research (ValBal)**
Sushko, A., Tedjarati, A., Creus-Costa, J., Maldonado, S., Marshland, K., Pavone, M., IEEE
IEEE.2017
- **Experimental Methods for Mobility and Surface Operations of Microgravity Robots**
Hockman, B., Reid, R. G., Nesnas, I. D., Pavone, M., Kulic, D., Nakamura, Y., Khatib, O., Venture, G.
SPRINGER INTERNATIONAL PUBLISHING AG.2017: 752–63
- **Extreme Engineering: Extreme Autonomy in Space and Air, on Land, and Under Water**
Jackson, D., Pavone, M., Natl Acad Engn
NATL ACADEMIES PRESS.2017: 31–32
- **The Matroid Team Surviving Orienteers Problem: Constrained Routing of Heterogeneous Teams with Risky Traversal**
Jorgensen, S., Chen, R. H., Milam, M. B., Pavone, M., Bicchi, A., Okamura, A.
IEEE.2017: 5622–29
- **The Risk-Sensitive Coverage Problem: Multi-Robot Routing Under Uncertainty with Service Level and Survival Constraints**
Jorgensen, S., Chen, R. H., Milam, M. B., Pavone, M., IEEE
IEEE.2017
- **Flying Smartphones: When Portable Computing Sprouts Wings** *IEEE PERSASIVE COMPUTING*

-
- Allen, R., Pavone, M., Schwager, M.
2016; 15 (3): 83-88
- **Control of robotic mobility-on-demand systems: A queueing-theoretical perspective** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
Zhang, R., Pavone, M.
2016; 35 (1-3): 186-203
 - **Free-Flyer Acquisition of Spinning Objects with Gecko-Inspired Adhesives**
Estrada, M. A., Hockman, B., Bylard, A., Hawkes, E. W., Cutkosky, M. R., Pavone, M., Okamura, A., Menciassi, A., Ude, A., Burschka, D., Lee, D., Arrichiello, F., Liu, et al
IEEE.2016: 4907-4913
 - **Model Predictive Control of Autonomous Mobility-on-Demand Systems**
Zhang, R., Rossi, F., Pavone, M., Okamura, A., Menciassi, A., Ude, A., Burschka, D., Lee, D., Arrichiello, F., Liu, H., Moon, H., Neira, J., Sycara, et al
IEEE.2016: 1382-1389
 - **Simultaneous Model Identification and Task Satisfaction in the Presence of Temporal Logic Constraints**
Chinchali, S. P., Livingston, S. C., Pavone, M., Burdick, J. W., Okamura, A., Menciassi, A., Ude, A., Burschka, D., Lee, D., Arrichiello, F., Liu, H., Moon, H., Neira, et al
IEEE.2016: 3682-3689
 - **Risk Aversion in Finite Markov Decision Processes Using Total Cost Criteria and Average Value at Risk**
Carpin, S., Chow, Y., Pavone, M., Okamura, A., Menciassi, A., Ude, A., Burschka, D., Lee, D., Arrichiello, F., Liu, H., Moon, H., Neira, J., Sycara, et al
IEEE.2016: 335-342
 - **Spacecraft Autonomy Challenges for Next-Generation Space Missions**
Starek, J. A., Acikmese, B., Nesnas, I. A., Pavone, M., Feron, E.
SPRINGER-VERLAG BERLIN.2016: 1-48
 - **Fast Marching Trees: A Fast Marching Sampling-Based Method for Optimal Motion Planning in Many Dimensions**
Janson, L., Pavone, M., Inaba, M., Corke, P.
SPRINGER-VERLAG BERLIN.2016: 667-684
 - **Real-Time, Propellant-Optimized Spacecraft Motion Planning under Clohessy-Wiltshire-Hill Dynamics**
Starek, J. A., Schmerling, E., Maher, G. D., Barbee, B. W., Pavone, M., IEEE
IEEE.2016
 - **Routing Autonomous Vehicles in Congested Transportation Networks: Structural Properties and Coordination Algorithms**
Zhang, R., Rossi, F., Pavone, M., Hsu, D., Amato, N., Berman, S., Jacobs, S.
MIT PRESS.2016
 - **Autonomous Calibration of MEMS Disk Resonating Gyroscope for Improved Sensor Performance**
Flader, I. B., Ahn, C. H., Gerrard, D. D., Ng, E. J., Yang, Y., Hong, V. A., Pavone, M., Kenny, T. W., IEEE
IEEE.2016: 5803-10
 - **Chance-constrained dynamic programming with application to risk-aware robotic space exploration** *AUTONOMOUS ROBOTS*
Ono, M., Pavone, M., Kuwata, Y., Balaram, J.
2015; 39 (4): 555-571
 - **Guest Editorial: Special issue on constrained decision-making in robotics** *AUTONOMOUS ROBOTS*
Pavone, M., Carpin, S.
2015; 39 (4): 465-467
 - **Optimal Sampling-Based Motion Planning under Differential Constraints: the Drift Case with Linear Affine Dynamics.** *Proceedings of the ... IEEE Conference on Decision & Control. IEEE Conference on Decision & Control*
Schmerling, E., Janson, L., Pavone, M.
2015; 2015: 2574-2581
 - **Fast marching tree: A fast marching sampling-based method for optimal motion planning in many dimensions** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
Janson, L., Schmerling, E., Clark, A., Pavone, M.

2015; 34 (7): 883-921

- **Trading Safety Versus Performance: Rapid Deployment of Robotic Swarms With Robust Performance Constraints** *JOURNAL OF DYNAMIC SYSTEMS MEASUREMENT AND CONTROL-TRANSACTIONS OF THE ASME*
Chow, Y., Pavone, M., Sadler, B. M., Carpin, S.
2015; 137 (3)
- **Fast Marching Tree: a Fast Marching Sampling-Based Method for Optimal Motion Planning in Many Dimensions.** *The International journal of robotics research*
Janson, L. n., Schmerling, E. n., Clark, A. n., Pavone, M. n.
2015; 34 (7): 883-921
- **Toward a Real-Time Framework for Solving the Kinodynamic Motion Planning Problem**
Allen, R., Pavone, M., IEEE
IEEE COMPUTER SOC.2015: 928-934
- **Decentralized Algorithms for 3D Symmetric Formations in Robotic Networks - a Contraction Theory Approach**
Singh, S., Schmerling, E., Pavone, M., IEEE
IEEE COMPUTER SOC.2015: 1274-1281
- **A Queueing Network Approach to the Analysis and Control of Mobility-On-Demand Systems**
Zhang, R., Pavone, M., IEEE
IEEE.2015: 4702-4709
- **Models, Algorithms, and Evaluation for Autonomous Mobility-On-Demand Systems**
Zhang, R., Spieser, K., Frazzoli, E., Pavone, M., IEEE
IEEE.2015: 2573-2587
- **A SAMPLING-BASED APPROACH TO SPACECRAFT AUTONOMOUS MANEUVERING WITH SAFETY SPECIFICATIONS**
Starek, J. A., Barbee, B., Pavone, M., Gravseth, I. J.
UNIVELT INC.2015: 725-737
- **A Convex Optimization Approach to Smooth Trajectories for Motion Planning with Car-Like Robots**
Zhu, Z., Schmerling, E., Pavone, M., IEEE
IEEE.2015: 835-842
- **Risk-Sensitive and Robust Decision-Making: a CVaR Optimization Approach**
Chow, Y., Tamar, A., Mannor, S., Pavone, M., Cortes, C., Lawrence, N. D., Lee, D. D., Sugiyama, M., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2015
- **Optimal Sampling-Based Motion Planning under Differential Constraints: the Driftless Case.** *IEEE International Conference on Robotics and Automation : ICRA : [proceedings]. IEEE International Conference on Robotics and Automation*
Schmerling, E. n., Janson, L. n., Pavone, M. n.
2015; 2015: 2368-75
- **A Unifying Framework for Time-Consistent, Risk-Averse Model Predictive Control: Theory and Algorithms**
Chow, Y., L., Pavone, M.
2014
- **A Dynamical Characterization of Internally-Actuated Microgravity Mobility Systems**
Koenig, A. W., Pavone, M., Castillo-Rogez, J. C., Nesnas, I. D., IEEE
IEEE.2014: 6618-6624
- **Rapid Multirobot Deployment with Time Constraints**
Carpin, S., Pavone, M., Sadler, B. M., IEEE
IEEE.2014: 1147-1154
- **Distributed consensus with mixed time/communication bandwidth performance metrics**
Rossi, F., Pavone, M., IEEE
IEEE.2014: 286-293

- **On the Fundamental Limitations of Performance for Distributed Decision-Making in Robotic Networks**
Rossi, F., Pavone, M., IEEE
IEEE.2014: 2433-2440
- **A Machine Learning Approach for Real-Time Reachability Analysis** *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*
Allen, R. E., Clark, A. A., Starek, J. A., Pavone, M.
IEEE.2014: 2202-2208
- **A Framework for Time-Consistent, Risk-Averse Model Predictive Control: Theory and Algorithms** *American Control Conference*
Chow, Y., Pavone, M.
IEEE.2014: 4204-4211
- **Toward a Systematic Approach to the Design and Evaluation of Automated Mobility-on-Demand Systems: A Case Study in Singapore** *2nd Annual Workshop on Road Vehicle Automation*
Spieser, K., Treleaven, K., Zhang, R., Frazzoli, E., Morton, D., Pavone, M.
SPRINGER INT PUBLISHING AG.2014: 229-245
- **Asymptotically Optimal Algorithms for One-to-One Pickup and Delivery Problems With Applications to Transportation Systems** *IEEE TRANSACTIONS ON AUTOMATIC CONTROL*
Treleaven, K., Pavone, M., Frazzoli, E.
2013; 58 (9): 2261-2276
- **Spacecraft/Rover Hybrids for the Exploration of Small Solar System Bodies** *IEEE Aerospace Conference*
Pavone, M., Castillo-Rogez, J. C., Nesnas, I. A., Hoffman, J. A., Strange, N. J.
IEEE.2013
- **A Uniform-Grid Discretization Algorithm for Stochastic Optimal Control with Risk Constraints**
Chow, Y., Pavone, M., IEEE
IEEE.2013: 2470-2475
- **Decentralized decision-making on robotic networks with hybrid performance metrics** *51st Annual Allerton Conference on Communication, Control, and Computing*
Rossi, F., Pavone, M.
IEEE.2013: 358-365
- **Internally-Actuated Rovers for All-Access Surface Mobility: Theory and Experimentation** *IEEE International Conference on Robotics and Automation (ICRA)*
Allen, R., Pavone, M., McQuin, C., Nesnas, I. A., Castillo-Rogez, J. C., Tam-Nguyen Nguyen, T. N., Hoffman, J. A.
IEEE.2013: 5481-5488
- **Internally-Actuated Rovers for All-Access Surface Mobility: Theory and Experimentation**
Allen, R., Pavone, M., McQuin, C., Nesnas, I., Castillo, J., Nguyen, T., N.
2013
- **Guidance, Navigation, and Control Technology Assessment for Future Planetary Science Missions.** *Technical Report for Planetary Science Division, Science Mission Directorate, NASA*
Quadrelli, M., McHenry, M., Wilcox, B., Hall, J., Volpe, R., Nesnas, I., Pavone, M.
2013
- **Decentralized decision-making on robotic networks with hybrid performance metrics**
Rossi, F., Pavone, M.
2013
- **A Uniform-grid Discretization Algorithm for Stochastic Optimal Control with Risk Constraints**
Chow, Y., L., Pavone, M.
2013
- **Asymptotically Optimal Algorithms for Pickup and Delivery Problems with Application to Large-Scale Transportation Systems** *IEEE Transactions on Automatic Control*
Treleaven, K., Pavone, M., Frazzoli, E.

2013

- **Rebalancing the Rebalancers: Optimally Routing Vehicles and Drivers in Mobility-on-Demand Systems**
Smith, S., L., Pavone, M., Schwager, M., Frazzol, E., Rus, D.
2013
- **Stochastic Optimal Control With Dynamic, Time-Consistent Risk Constraints**
Chow, Y., L., Pavone, M.
2013
- **Stochastic Optimal Control With Dynamic, Time-Consistent Risk Constraints** *American Control Conference (ACC)*
Chow, Y., Pavone, M.
IEEE.2013: 390–395
- **Rebalancing the Rebalancers: Optimally Routing Vehicles and Drivers in Mobility-on-Demand Systems** *American Control Conference (ACC)*
Smith, S. L., Pavone, M., Schwager, M., Frazzoli, E., Rus, D.
IEEE.2013: 2362–2367
- **Robotic load balancing for mobility-on-demand systems** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
Pavone, M., Smith, S. L., Frazzoli, E., Rus, D.
2012; 31 (7): 839-854
- **Cost Bounds for Pickup and Delivery Problems with Application to Large-Scale Transportation Systems** *American Control Conference (ACC)*
Treleaven, K., Pavone, M., Frazzoli, E.
IEEE COMPUTER SOC.2012: 2120–2127
- **Models and Asymptotically Optimal Algorithms for Pickup and Delivery Problems on Roadmaps**
Treleaven, K., Pavone, M., Frazzoli, E.
2012
- **Observational Strategies for the Exploration of Small Solar System Bodies**
Castillo, M., Pavone, M., Nesnas, I., Hoffman, J.
2012
- **A Risk-Constrained Multi-Stage Decision Making Approach to the Architectural Analysis of Mars Missions**
Kuwata, Y., Pavone, M., Balaram, J.
2012
- **Spacecraft/Rover Hybrids for the Exploration of Small Solar System Bodies.** *Final Report for NASA NIAC 2011 Program.*
Pavone, M., Castillo, J., Hoffman, J., Nesnas, I.
2012
- **A Risk-Constrained Multi-Stage Decision Making Approach to the Architectural Analysis of Planetary Missions** *51st IEEE Annual Conference on Decision and Control (CDC)*
Kuwata, Y., Pavone, M., Balaram, J. (.
IEEE.2012: 2102–2109
- **Models and Efficient Algorithms for Pickup and Delivery Problems on Roadmaps** *51st IEEE Annual Conference on Decision and Control (CDC)*
Treleaven, K., Pavone, M., Frazzoli, E.
IEEE.2012: 5691–5698
- **Dynamic Vehicle Routing for Robotic Systems** *PROCEEDINGS OF THE IEEE*
Bullo, F., Frazzoli, E., Pavone, M., Savla, K., Smith, S. L.
2011; 99 (9): 1482-1504
- **Distributed Algorithms for Environment Partitioning in Mobile Robotic Networks** *IEEE TRANSACTIONS ON AUTOMATIC CONTROL*
Pavone, M., Arsie, A., Frazzoli, E., Bullo, F.
2011; 56 (8): 1834-1848
- **Adaptive and Distributed Algorithms for Vehicle Routing in a Stochastic and Dynamic Environment** *IEEE TRANSACTIONS ON AUTOMATIC CONTROL*
Pavone, M., Frazzoli, E., Bullo, F.

2011; 56 (6): 1259-1274

- **An Asymptotically Optimal Algorithm for Pickup and Delivery Problems** *50th IEEE Conference of Decision and Control (CDC)/European Control Conference (ECC)*
Treleven, K., Pavone, M., Frazzoli, E.
IEEE.2011: 584–590
- **Load Balancing for Mobility-on-Demand Systems**
Pavone, M., Smith, S. L., Frazzoli, E., Rus, D.
2011
- **Distributed Control of Spacecraft Formations via Cyclic Pursuit: Theory and Experiments** *JOURNAL OF GUIDANCE CONTROL AND DYNAMICS*
Ramirez-Riberos, J. L., Pavone, M., Frazzoli, E., Mille, D. W.
2010; 33 (5): 1655-1669
- **DYNAMIC VEHICLE ROUTING WITH PRIORITY CLASSES OF STOCHASTIC DEMANDS** *SIAM JOURNAL ON CONTROL AND OPTIMIZATION*
Smith, S. L., Pavone, M., Bullo, F., Frazzoli, E.
2010; 48 (5): 3224-3245
- **Fundamental Performance Limits and Efficient Policies for Transportation-On-Demand Systems**
Pavone, M., Treleven, K., Frazzoli, E.
2010
- **Dynamic Vehicle Routing with Stochastic Time Constraints** *IEEE International Conference on Robotics and Automation (ICRA)*
Pavone, M., Frazzoli, E.
IEEE.2010: 1460–1467
- **Fundamental Performance Limits and Efficient Policies for Transportation-On-Demand Systems** *49th IEEE Conference on Decision and Control (CDC)*
Pavone, M., Treleven, K., Frazzoli, E.
IEEE.2010: 5622–5629
- **A Stochastic and Dynamic Vehicle Routing Problem with Time Windows and Customer Impatience** *1st International Conference on Robot Communication and Coordination (ROBOCOMM 2007)*
Pavone, M., Bisnik, N., Frazzoli, E., Isler, V.
SPRINGER.2009: 350–64
- **Sharing the Load Mobile Robotic Networks in Dynamic Environments** *IEEE ROBOTICS & AUTOMATION MAGAZINE*
Pavone, M., Savla, K., Frazzoli, E.
2009; 16 (2): 52-61
- **Equitable Partitioning Policies for Robotic Networks** *IEEE International Conference on Robotics and Automation*
Pavone, M., Arsie, A., Frazzoli, E., Bullo, F.
IEEE.2009: 3979–3984
- **Sharing the load** *IEEE Robotics & Automation Magazine*
Pavone, M., Savla, K., Frazzoli, E.
2009; 16 (2): 52-61
- **Distributed Control of Spacecraft Formation via Cyclic Pursuit: Theory and Experiments** *American Control Conference 2009*
Ramirez, J. L., Pavone, M., Frazzoli, E., Miller, D. W.
IEEE.2009: 4811–4817
- **Dynamic Multi-Vehicle Routing with Multiple Classes of Demands** *American Control Conference 2009*
Pavone, M., Smith, S. L., Bullo, F., Frazzoli, E.
IEEE.2009: 604–609
- **Distributed Policies for Equitable Partitioning: Theory and Applications** *47th IEEE Conference on Decision and Control*
Pavone, M., Frazzoli, E., Bullo, F.
IEEE.2008: 4191–4197
- **Dynamic vehicle routing with heterogeneous demands**

Smith, S., L., Pavone, M., Bullo, F., Frazzoli, E.
2008

- **Decentralized policies for geometric pattern formation and path coverage** *JOURNAL OF DYNAMIC SYSTEMS MEASUREMENT AND CONTROL-TRANSACTIONS OF THE ASME*
Pavone, M., Frazzoli, E.
2007; 129 (5): 633-643
- **Decentralized policies for geometric pattern formation** *26th American Control Conference*
Pavone, M., Frazzoli, E.
IEEE.2007: 5823-5828
- **Decentralized algorithms for stochastic and dynamic vehicle routing with general demand distribution**
Pavone, M., Frazzoli, E., Bullo, F.
2007
- **Decentralized Vehicle Routing in a Stochastic and Dynamic Environment with Customer Impatience**
Pavone, M., N., B., Frazzoli, E., Isler, V.
2007
- **Climbing Obstacle in Bio-robots via CNN and Adaptive Attitude Control** *International Journal of Circuit Theory and Applications*
Pavone, M., Arena, P., Fortuna, L., Frasca, M., Patanè, L.
2006; 34 (1): 109-125
- **An innovative mechanical and control architecture for a biomimetic hexapod for planetary exploration** *Space Technology*
Pavone, M., Arena, P., Patanè, L.
2006; 26 (1-2): 13-24
- **Realization of a CNN-Driven Cockroach-Inspired Robot**
Arena, P., Fortuna, L., Frasca, M., Patanè, L.
2006
- **Towards autonomous adaptive behavior in a bio-inspired CNN-controlled robot**
Arena, P., Fortuna, L., Frasca, M., Patanè, L., Pavone, M.
2006
- **An innovative mechanical and control architecture for a biomimetic hexapod for planetary exploration**
Pavone, M., Arena, P., Patanè, L.
2005
- **Climbing Obstacles via Bio-Inspired CNN-CPG and Adaptive Attitude Control**
Arena, P., Fortuna, L., Frasca, M., Patanè, L., Pavone, M.
2005