

# Ali Reza Pedram

---

CONTACT INFORMATION	Walker Department of Mechanical Engineering University of Texas at Austin, Austin TX 78712 Linkedin: <a href="#">Ali Reza Pedram</a>	Phone: +1 240-302-0809 Email: <a href="mailto:apedram@utexas.edu">apedram@utexas.edu</a> Google Scholar: <a href="#">Ali Reza Pedarm</a>
EDUCATION	PhD, Dynamic Systems and Control, <b>Mechanical Engineering</b> , in progress Graduate Portfolio in <b>Robotics</b> <b>The University of Texas at Austin</b> GPA: <b>3.96/4.0</b>  MSc, <b>Mechanical Engineering</b> , July 2017 <b>Sharif University of Technology</b> , Tehran, Iran GPA: <b>3.96/4.0</b>  BSc, <b>Mechanical Engineering</b> and <b>Applied Physics</b> (dual degree), July 2015 <b>Sharif University of Technology</b> , Tehran, Iran GPA: <b>3.93/4.00</b>	
RESEARCH INTERESTS	<ul style="list-style-type: none"><li>• <b>Robotics and Motion Planning</b></li><li>• <b>Optimal Stochastic Control and Networked Control Systems</b></li><li>• <b>Information Theory, Estimation Theory, and Privacy in Dynamic Systems</b></li><li>• <b>Optimization and Machine Learning</b></li><li>• <b>Reinforcement Learning</b></li><li>• <b>Game Theory and Team Theory</b></li></ul>	
DOCTORAL DISSERTATION	<b>Information-Theoretic Control, Path Planning, and Learning</b> Advisors: Prof. Takashi Tanaka and Prof. Luis Sentis (June 2018 - Present) <ul style="list-style-type: none"><li>• <b>Rationally Inattentive (RI) Path Planning:</b> I introduced a platform to incorporate the expected perception cost in the path planning algorithm and proposed a new algorithm called RI-RRT*.</li><li>• <b>Visual Attention for Vision-based Autonomous Navigation:</b> I design an algorithm for task-dependent (top-down) attention allocation for vision-based autonomous navigation.</li><li>• <b>Privacy in Cloud-based Control of Dynamic Systems:</b> I devise a tractable algorithm for imposing privacy, both differential privacy and information-theoretic privacy, in cloud-based control schemes.</li><li>• <b>System Identification and Learning:</b> I proposed a new information-theoretic method to analyze the identification of linear systems and provide the fundamental bounds for the achievable learning rate.</li><li>• <b>Mean-Field Traffic Routing Games:</b> I devised a tax mechanism for multi-team road traffic games which mitigates the congestion and eliminates the necessity of commutations between vehicles.</li><li>• <b>Optimal Control of Communication Channels:</b> I derived a convex formulation for the control of the communication channels with memory.</li></ul>	
MASTER'S THESIS	<b>Batch Fabrication, Test, and Control of Neutrally-buoyant Magnetic Microrobots</b> Advisors: Prof. Metin Sitti and Prof. Hossein Nejat (September 2016 - June 2017) <ul style="list-style-type: none"><li>• I proposed and implemented a method for batch fabrication of buoyant magnetic microrobots. I developed an LQR-based optimal controller for buoyant magnetic microrobots in coil excitation setup.</li></ul>	
RELEVANT COURSES	<ul style="list-style-type: none"><li>• <b>Control/Systems:</b> Digital Control, Estimation Theory, Stochastic Estimation/Control, Nonlinear and Optimal Control, Multi-variable and Robust Control, Networked Control Systems and Information Theory, Fuzzy Control, Linear System Theory and Control</li><li>• <b>Optimization/Machine Learning:</b> Convex Optimization, Large Scale Optimization for Learning, Stochastic Process I, Reinforcement Learning, Cyber-Physical Intelligent Systems</li><li>• <b>Mechatronics/Robotics:</b> Robot Mechanism Design, Advanced Mechatronics and Lab, Advanced Robotics and Lab, Algorithms for Sensor-Based Robotics, Advanced Dynamics</li></ul>	

PROFESSIONAL POSITIONS	<ul style="list-style-type: none"> <li>• <b>Graduate Research Assistant</b>, UT Austin (2018 – Present)</li> <li>• <b>Teaching Assistant</b>, Mechatronics Lab, UT Austin (2017 – 2018)</li> <li>• <b>Guest Researcher</b>, Max Plank Institute of Physical Intelligence, Stuttgart, Germany (2016 – 2017)</li> <li>• <b>Teaching Assistant</b>, Automatic Control, Sharif University of Technology (2015 – 2016)</li> <li>• <b>Journal Reviewer</b>, IEEE Transaction on Automatic Control, Automatica (2019 – Present)</li> <li>• <b>Conference Reviewer</b>, CDC 19, ACC 20, ECC 20, IROS 20, ACC 21, ECC21 (2019 – Present)</li> </ul>
AWARDS AND ACHIEVEMENTS	<ul style="list-style-type: none"> <li>• <b>Iranian National Elite Foundation Scholarship</b> (2015 – 2016)</li> <li>• <b>Merit-based admission to the MSc program as an outstanding undergraduate student</b>, Sharif University of Technology (2014)</li> <li>• <b>Ranked 169th out of 150,000 applicants</b>, Nation-wide University Entrance Exam, Iran (2010)</li> </ul>
SOFTWARE	C++, Python, MATLAB/Simulink, ROS, SolidWorks, Comsol Multiphysics
PEER-REVIEWED JOURNAL PUBLICATIONS	<ul style="list-style-type: none"> <li>• <b>AR. Pedram</b>, R. Funada, T. Tanaka, “Gaussian Belief Space Path Planning for Minimum Sensing Navigation”, <b>conditionally accepted in IEEE Transactions on Robotics</b></li> <li>• H. Jung, <b>AR. Pedram</b>, T. Cuvelier, T. Tanaka, “Optimized Data Rate Allocation for Dynamic Sensor Fusion over Resource Constrained Communication Networks”, <b>International Journal of Robust and Nonlinear Control(2022)</b></li> <li>• T. Tanaka, E. Nekouei, <b>AR. Pedram</b>, KH. Johansson, “Linearly Solvable Mean-Field Traffic Routing Games”, <b>IEEE Transactions on Automatic Control (2020)</b></li> <li>• <b>AR. Pedram</b>, H. Nejat Pishkenari, M. Sitti, “Optimal Controller Design for 3D Manipulation of Buoyant Magnetic Microrobots via Constrained LQR Approach”, <b>Journal of Micro-Bio Robotics</b>, 15(2): 105-117</li> <li>• <b>AR. Pedram</b>, H. Nejat Pishkenari, “Smart Micro/Nano-robotic Systems for Gene Delivery”, <b>Current Gene Therapy</b>, 17(2): 73-79</li> </ul>
PEER-REVIEWED CONFERENCE PROCEEDINGS	<ul style="list-style-type: none"> <li>• <b>AR. Pedram</b>, T. Tanaka, “Smoothing Algorithm for Minimum Sensing Path Plans in Gaussian Belief Space”, <b>submitted to 2023 Annual American Control Conference (ACC)</b></li> <li>• <b>AR. Pedram</b>, R. Funada, T. Tanaka, “Dynamic Allocation of Visual Attention for Vision-based Autonomous Navigation under Data Rate Constraints”, <b>2021 IEEE Conference on Decision and Control (CDC)</b></li> <li>• <b>AR. Pedram</b>, J. Stefan, R. Funada, T. Tanaka, “Rationally Inattentive Path-Planning via RRT*”, <b>2021 Annual American Control Conference (ACC)</b></li> <li>• <b>AR. Pedram</b>, T. Tanaka, “Online Parameter Identification of Linear Dynamical Systems through the Lens of Feedback Channel Coding Theory”, <b>2020 Annual American Control Conference (ACC)</b></li> <li>• <b>AR. Pedram</b>, T. Tanaka, “Linearly-Solvable Mean-Field Approximation for Multi-Team Road Traffic Games”, <b>2019 IEEE Conference on Decision and Control (CDC)</b></li> <li>• <b>AR. Pedram</b>, T. Tanaka, M. Hale, “Bidirectional Information Flow and the Roles of Privacy Masks in Cloud-Based Control”, <b>2019 IEEE Information Theory Workshop (ITW)</b></li> <li>• <b>AR. Pedram</b>, T. Tanaka, “Some Results on the Computation of Feedback Capacity of Gaussian Channels with Memory”, <b>2018 56th Annual Allerton Conference on Communication, Control, and Computing (Allerton)</b>, pp. 919-926. IEEE, 2018</li> </ul>
WORKSHOPS, SYMPOSIA, AND POSTER SESSIONS	<ul style="list-style-type: none"> <li>• 8th Midwest Workshop on Control and Game Theory (MWCGT), April 2019 at Washington University in St. Louis, MO, USA</li> <li>• 3rd Summer School on Cognitive Robotics, July 2019 at University of Southern California (USC), CA, USA</li> </ul>