

Ram Padmanabhan

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EDUCATION

University of Illinois Urbana-Champaign
Ph.D. Electrical and Computer Engineering
Advisor: Prof. Melkior Ornik

Urbana, IL, USA
August 2023 — Present

University of Michigan
M.S. Electrical and Computer Engineering
Advisor: Prof. Peter Seiler

Ann Arbor, MI, USA
August 2021 — April 2023

PES University
B. Tech Electronics and Communication Engineering
Advisors: Prof. Rajini Makam and Prof. Koshy George
Capstone Project: *Adaptive Iterative Learning Control*

Bengaluru, India
August 2017 — June 2021

PUBLICATIONS

Preprints and Submitted Material:

- [1] **R. Padmanabhan**, A. Aspeel, N. Ozay, and M. Ornik, “[Mode-Prefix-Based Control of Switched Linear Systems with Applications to Fault Tolerance](#),” *arXiv:2505.13105* [math.OC], May 2025.
- [2] S. A. Dinkar, **R. Padmanabhan**, A. Clarke, P.-O. Gutman, and M. Ornik, “[Analysis of the Unscented Transform Controller for Systems with Bounded Nonlinearities](#),” *arXiv:2504.08579* [eess.SY], Apr. 2025.
- [3] **R. Padmanabhan** and M. Ornik, “[Approximate Energetic Resilience of Nonlinear Systems under Partial Loss of Control Authority](#),” *arXiv:2502.07603* [math.OC], Feb. 2025.

Journal Articles:

- [4] **R. Padmanabhan** and P. Seiler, “[Analysis of Gradient Descent with Varying Step Sizes using Integral Quadratic Constraints](#),” *IEEE Transactions on Automatic Control*, 70(1), pp. 587–594, Jan. 2025.
- [5] **R. Padmanabhan**, R. Makam, and K. George, “[Multiple Estimation Models for Discrete-time Adaptive Iterative Learning Control](#),” *International Journal of Systems Science*, 55(10), pp. 2154–2171, 2024.
- [6] **R. Padmanabhan**, M. Shetty, and T. S. Chandar, “[Discrete Robust Control of Robot Manipulators using an Uncertainty and Disturbance Estimator](#),” *Journal of Dynamic Systems, Measurement and Control*, 145(5): 051022, May 2023.
- [7] **R. Padmanabhan**, M. Shetty, and T. S. Chandar, “[Discrete-Time Design and Applications of Uncertainty and Disturbance Estimator](#),” *International Journal of Robust and Nonlinear Control*, 31(10), pp. 4994–5015, Jul. 2021.

Conference Papers:

- [8] **R. Padmanabhan** and M. Ornik, “Energetic Resilience of Linear Driftless Systems,” in *11th IFAC Symposium on Robust Control Design (ROCOND)*, Porto, Portugal, Jul. 2024.
- [9] **R. Padmanabhan**, C. Bakker, S. A. Dinkar, and M. Ornik, “[How Much Reserve Fuel: Quantifying the Maximal Energy Cost of System Disturbances](#),” in *63rd IEEE Conference on Decision and Control (CDC)*, Milan, Italy, Dec. 2024.

- [10] **R. Padmanabhan**, M. Bhushan, K. K. Hebbar, R. Makam, and K. George, “[Second-Level Adaptation and Optimization for Multiple Model Adaptive Iterative Learning Control](#),” in *Seventh Indian Control Conference (ICC)*, Mumbai, India, Dec. 2021, pp. 289–294.
- [11] S. Damodaran, **R. Padmanabhan**, R. Maahin, and S. Gurugopinath, “[A Copula-Driven Unsupervised Learning Framework for Anomaly Detection with Multivariate Heterogeneous Data](#),” in *IEEE 31st International Workshop on Machine Learning for Signal Processing*, Gold Coast, Queensland, Australia, Oct. 2021.
- [12] **R. Padmanabhan**, M. Bhushan, K. K. Hebbar, R. Makam, and K. George, “[A Novel Strategy with Multiple Models to Improve Performance of Adaptive Iterative Learning Control](#),” in *IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT)*, Bengaluru, India, Jul. 2021.
- [13] **R. Padmanabhan**, S. Damodaran, V. N. Batra, and S. Gurugopinath, “[A Convolutional Neural Network Architecture for Camera Model Identification with Small Datasets](#),” in *IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT)*, Bengaluru, India, Jul. 2020.

AWARDS AND FELLOWSHIPS

Joan and Lalit Bahl Fellowship	August 2025 — May 2026
Joan and Lalit Bahl Fellowship	August 2024 — May 2025
Prof. CNR Rao Merit Scholarship	August 2017 — May 2020
Prof. MRD Merit Scholarship	August 2017 — May 2020

MENTORING

Undergraduate Research Apprenticeship Program (URAP)	August 2024 — May 2025
Mentored an undergraduate student at UIUC on the use of the particle filter for three-dimensional robot localization.	
Promoting Undergraduate Research in Engineering (PURE)	August — December 2023
Mentored a group of three undergraduates at UIUC in investigating the performance of different nonlinear Kalman filters on the problem of battery state-of-charge estimation. (One student subsequently joined our primary research group.)	

TEACHING

Graduate Student Instructor, University of Michigan	Ann Arbor, MI, USA
<i>EECS 460 — Control System Analysis and Design</i>	January — April 2023
Held two discussion sessions each week, with teaching evaluations among the University’s highest.	
Graduate Student Instructor, University of Michigan	Ann Arbor, MI, USA
<i>EECS 301 — Probabilistic Methods in Engineering</i>	August — December 2022
Held two discussion sessions each week, with teaching evaluations among the University’s highest.	

EXPERIENCE

Research Intern, Indian Institute of Technology, Bombay	Mumbai, India
<i>Systems and Control Engineering</i>	December 2020 — May 2021
Used feedback linearization to achieve an upwind climb in gliding unmanned aerial vehicles with various wind gradient models, avoiding heavy computations from optimal control formulations.	
Research Intern, Indian Space Research Organization	Bengaluru, India
<i>Control and Digital Electronics Group</i>	June — July 2019
Studied the properties of the Linear and Ensemble Kalman Filter, applied to a one- and three-dimensional motion estimation problem.	

PEER REVIEWER

Automatica, IEEE Control Systems Letters, IEEE Transactions on Industrial Electronics, IEEE Transactions on Systems, Man and Cybernetics, Modeling, Estimation and Control Conference (2025), IFAC Symposium on Robust Control Design (2025), American Control Conference (2025), IEEE Conference on Decision and Control (2024, 2025).

OTHER PRESENTATIONS & POSTERS

Posters:

11th Midwest Workshop on Control and Game Theory

University of Illinois Urbana-Champaign

Urbana, IL, USA

Mode-Prefix-Based Control of Switched Linear Systems with Applications to Fault Tolerance

April 2025

10th Midwest Workshop on Control and Game Theory

Northwestern University

Evanston, IL, USA

How Much Reserve Fuel: Quantifying the Maximal Energy Cost of System Disturbances

April 2024

Presentations:

University of California, Berkeley

Berkeley, CA, USA

Analysis of Gradient Descent with Varying Step Sizes using IQCs [Online]

February 2023

Research at ECE (R@ECE) Colloquium

PES University

Bengaluru, India

Discrete-Time Design and Applications of Uncertainty and Disturbance Estimator

April 2021

MEMBERSHIPS

Graduate Student Member: IEEE; IEEE Control Systems Society; IEEE Signal Processing Society