

Ram Padmanabhan

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EDUCATION

University of Illinois Urbana-Champaign
Ph.D. Electrical and Computer Engineering

Advisor: Melkior Ornik

Thesis: *Resource-Aware System Design and Resilience Quantification*

Urbana, IL, USA
August 2023 — Present

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

Ann Arbor, MI, USA
August 2021 — April 2023

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

Bengaluru, India
August 2017 — June 2021

PUBLICATIONS

Preprints and Submitted Material:

- [1] **R. Padmanabhan**, M. Fowler, K. Huff, M. Neubauer, and M. Ornik, “[A Vision for STEM Higher Education in the Face of AI](#),” *EdArXiv: Nzdz53_v1*, May 2026.
- [2] R. Das*, **R. Padmanabhan***, M. Ornik, and P. Jagtap, “[Energetic Resilience under Temporal Logic Specifications](#),” *arXiv:2604.14203 [eess.SY]*, Apr. 2026.
- [3] **R. Padmanabhan** and M. Ornik, “[Ignore Drift, Embrace Simplicity: Constrained Nonlinear Control through Driftless Approximation](#),” *arXiv:2509.06188 [math.OC]*, Sep. 2025.

Journal Articles:

- [4] **R. Padmanabhan** and M. Ornik, “[Approximate Energetic Resilience of Nonlinear Systems under Partial Loss of Control Authority](#),” *Automatica*, 187, May 2026.
- [5] **R. Padmanabhan**, A. Aspeel, N. Ozay, and M. Ornik, “[Mode-Prefix-Based Control of Switched Linear Systems with Applications to Fault Tolerance](#),” *IEEE Control Systems Letters*, 9, pp. 1784–1789, Jul. 2025 (presented at *64th IEEE Conference on Decision and Control (CDC)*, Dec. 2025).
- [6] **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.
- [7] **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, Apr. 2024.
- [8] **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.
- [9] **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:

- [10] **R. Padmanabhan** and M. Ornik, “Finite-time Reachability for Constrained, Partially Uncontrolled Nonlinear Systems,” in *65th IEEE Conference on Decision and Control (CDC)*, Honolulu, HI, USA, Dec. 2026.

- [11] G. Puthumanai^{*}, **R. Padmanabhan^{*}**, J. Fuentes, N. Cruz, P. Padrao, R. Hernandez, H. Jiang, W. Schafer, L. Bobadilla, and M. Ornik, “Online Learning of Deceptive Policies under Intermittent Observation,” in *2025 IEEE/RSJ International Conference on Intelligent Robots & Systems (IROS)*, Pittsburgh, PA, USA, Sep. 2026.
- [12] S. A. Dinkar, **R. Padmanabhan**, A. Clarke, P.-O. Gutman, and M. Ornik, “Analysis of the Unscented Transform Controller for Systems with Bounded Nonlinearities,” in *5th Modeling, Estimation and Control Conference (MECC)*, Pittsburgh, PA, USA, Oct. 2025.
- [13] **R. Padmanabhan** and M. Ornik, “Energetic Resilience of Linear Driftless Systems,” in *11th IFAC Symposium on Robust Control Design (ROCOND)*, Porto, Portugal, Jul. 2025.
(Selected as Finalist, IFAC Young Author Award.)
- [14] **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.
- [15] **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.
- [16] 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 (MLSP)*, Gold Coast, Queensland, Australia, Oct. 2021.
- [17] **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.
- [18] **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
Finalist, IFAC Young Author Award	July 2025
Graduate College Mentoring Certificate	May 2025
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, and received the Graduate College Mentoring Certificate.	
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 Teaching Assistant, University of Illinois Urbana-Champaign	Urbana, IL, USA
<i>AE 498 ARO — Advanced Review of Basic Mathematics (Special “Online-only” Section)</i>	January — May 2026
Held office hours and constructed problems for homeworks and exams.	
Graduate Student Instructor, University of Michigan	Ann Arbor, MI, USA

EECS 460 — Control System Analysis and Design

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

EECS 301 — Probabilistic Methods in Engineering

August — December 2022

Held two discussion sessions each week, with teaching evaluations among the University's highest.

SERVICE

Session Chair

Robotics and Control Session, [2026 Coordinated Science Laboratory Student Conference](#)

Peer Reviewer

Journals: *Automatica*; *IEEE Control Systems Letters*; *IEEE Robotics and Automation Letters*; *IEEE Transactions on Automatic Control*; *IEEE Transactions on Control Systems Technology*; *IEEE Transactions on Industrial Electronics*; *IEEE Transactions on Systems, Man and Cybernetics*; *Journal of the Franklin Institute*; *Nonlinear Analysis: Hybrid Systems*.

Conferences: *American Control Conference* (2025), *IEEE Conference on Decision and Control* (2024, 2025, 2026), *IFAC Symposium on Robust Control Design* (2025), *Learning for Dynamics & Control Conference* (2026), *Modeling, Estimation and Control Conference* (2025).

Member

IEEE Control Systems Society Technical Committee on Robust and Complex Systems

EXPERIENCE

Research Intern, Indian Institute of Technology, Bombay

Mumbai, India

Systems and Control Engineering

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

Control and Digital Electronics Group

June — July 2019

Studied the properties of the Linear and Ensemble Kalman Filter, applied to a one- and three-dimensional motion estimation problem.

OTHER TALKS & POSTERS

Posters:

12th Midwest Workshop on Control and Game Theory

Purdue University

West Lafayette, IN, USA

Energetic Resilience under Temporal Logic Specifications

April 2026

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

Talks:

Indian Institute of Science

Bengaluru, India

CORAL Talk Series, Robert Bosch Centre for Cyber-Physical Systems

Resilient Nonlinear Control under Adversarial Effects

June 2026

University of California, Berkeley [Online]

Berkeley, CA, USA

Prof. Murat Arcaç Research Group

Analysis of Gradient Descent with Varying Step Sizes using IQCs

February 2023

PES University

Bengaluru, India

Research at ECE (R@ECE) Colloquium

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