

## 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** and M. Ornik, “Ignore Drift, Embrace Simplicity: Constrained Nonlinear Control through Driftless Approximation,” *arXiv:2509.06188* [math.OC], Sep. 2025.
- [2] **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:

- [3] **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)*).
- [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] 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.
- [9] **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.)

- [10] **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.
- [11] **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.
- [12] 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.
- [13] **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.
- [14] **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

<b>Undergraduate Research Apprenticeship Program (URAP)</b>	August 2024 — May 2025
Mentored an undergraduate student at UIUC on the use of the particle filter for three-dimensional robot localization.	
<b>Promoting Undergraduate Research in Engineering (PURE)</b>	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

<b>Graduate Student Instructor, University of Michigan</b>	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.	
<b>Graduate Student Instructor, University of Michigan</b>	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

*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.

## PEER REVIEWER

*Automatica, IEEE Control Systems Letters, IEEE Transactions on Industrial Electronics, IEEE Transactions on Systems, Man and Cybernetics.*

*American Control Conference (2025), IEEE Conference on Decision and Control (2024, 2025), IFAC Symposium on Robust Control Design (2025), Modeling, Estimation and Control Conference (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