

# Iman Nodozi

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## PROFESSIONAL SUMMARY

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Researcher in Control Systems and Machine Learning with a PhD in Electrical and Computer Engineering. Extensive experience in developing and applying advanced algorithms in control systems, stochastic optimization, and machine learning. Published award-winning research in top-tier journals and conferences. Proven ability to lead independent research and collaborate effectively across academia and industry. Seeking to further my research career in the areas of stochastic control, and learning.

## RESEARCH FOCUS

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### Broad area

Dynamical systems control, machine learning, and optimization

### Theory Focus

Data-driven modeling for control, optimization, and machine learning, Stochastic uncertainty propagation, Wasserstein barycenter, Data distribution, Density control, Statistics, PINN, MPC, and LMI.

## TECHNICAL SKILLS

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- **Control Theory:** Linear Control, Nonlinear Control, Robust Control, Stochastic Optimal Control, PID Control, LQR, Adaptive Control, MPC, GNC.
- **Estimation Theory:** Kalman Filter
- **Programming Languages:** Python, MATLAB, Simulink, C++, TestStand, LabVIEW.
- **Data Analysis and Machine Learning:** Wasserstein Barycenter, Data Distribution, Statistical Analysis, Mean Field Learning, and Wasserstein GAN.
- **Deep Learning Frameworks:** TensorFlow, PyTorch, Keras, DeepXDE.
- **Libraries & Tools:** NumPy, PYMC3, Pandas

## EDUCATION

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### University of California, Santa Cruz

*Ph.D. in Electrical and Computer Engineering*

Santa Cruz, CA

Sep 2019 – Jun 2024

- **Ph.D. Dissertation:** "Measure-valued Proximal Recursions for Learning and Control."

### University of California, Santa Cruz

*M.Sc. in Electrical Engineering*

Santa Cruz, CA

Sep 2019 – Jun 2021

### Imam Khomeini International University (IKIU)

*M.Sc. in Electrical Engineering*

Iran

Sep 2013 – Jun 2016

- **M.Sc. Thesis:** "Nonlinear Hybrid Systems Control via Linear Matrix Inequalities."

### Hamedan University of Technology

*B.Sc. in Electrical Engineering*

Iran

Sep 2008 – Jun 2013

## EXPERIENCE

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### Senior Applications Engineer, Power Management Division

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Feb '24 – Now

San Jose, CA

- Develop and implement automated test systems for data collection and validation of AC and DC datasheet parameters for power management devices using TestStand, LabVIEW, and Python. Successfully replaced third-party software, significantly enhancing testing efficiency. Achieved a 100% reduction in test data analysis time.

### Graduate Student Researcher (PhD)

*UC Santa Cruz*

Sep '19 – Jun '24

Santa Cruz, California

- Stochastic Control and Optimization
  - Developed an AI optimization framework using physics-informed neural networks (PINN) for efficient and precise material engineering processes. Joint work between UCSC and UC Berkeley
  - 🏆 2024 Hugo Schuck American Automatic Control Council's Best Paper Award
- Proximal Algorithms for Stochastic Learning.
  - Developed a novel distributed Wasserstein ADMM algorithm for measure-valued optimization, with applications in generative AI and data distribution tasks.
- Guidance, Navigation, and Control (GNC) Systems.
  - Applied Optimal Mass Transpose framework to optimize satellite trajectory planning, enhancing the precision and robustness of GNC systems under uncertainty.
- Controlled Mean Field Models
  - Developed a controlled mean-field model for precise manipulation of chiplet populations in dielectric liquids using electric fields, demonstrating predictable and effective control. Joint work between UCSC and Palo Alto Research Center (PARC), now part of SRI International.

## Academic Experience

UCSC

Santa Cruz, California

- Guest Instructor for Fundamentals of Robot Kinematics and Dynamics, Spring 2024.
- Guest Instructor for Nonlinear Control Theory, Spring 2022.
- Teaching Assistant for Signals and Systems, Spring 2021.
- Teaching Assistant for Analog Electronics, Winter 2020.
- Teaching Assistant for Robot Automation, Fall 2020.
- Supervisor and Mentor for Charlie Yan (Electrical and Computer Engineering)
  - M.Sc. Thesis: "Neural Schrödinger Bridge with Sinkhorn Losses"

## Reviewer Service

Conference

- Conference on Neural Information Processing Systems (NeurIPS), 2022, 2023.
- American Control Conference (ACC), 2022, 2023, 2024.
- IEEE Conference on Decision and Control (CDC), 2022, 2023, 2024.
- International Conference on Machine Learning (ICML), 2022, 2023.
- Mathematical Theory of Networks and Systems (MTNS), 2022, 2024.

Journal

- Nonlinear Analysis: Hybrid Systems.
- IEEE Transactions on Control Systems Technology (TCST).
- Systems and Control Letters.
- Automatica.
- The IEEE Control Systems Letters (L-CSS).

## Electrical Engineer

Sep '16 – Mar '18

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- Developed software for robotic automation, enhancing operational efficiency.
- Led the reconstruction and automation of Aluminum die-cast machines.

## AWARDS

- 🏆 2024 American Automatic Control Council's O. Hugo Schuck Best Paper Award
- 🏆 Graduate Dean's Travel Grant, UCSC, July 2024
- 🏆 Dissertation Year Fellowship, Baskin School of Engineering 2023-2024
- 🏆 Regents Fellowships, University of California, Santa Cruz, 2019-2020.

## SELECTED PUBLICATIONS

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Alexis Teter, **Iman Nodozi**, and Abhishek Halder. "Solution of the Probabilistic Lambert's Problem: Optimal Transport Approach." Online paper: [here](#).

Alexis Teter, **Iman Nodozi**, and Abhishek Halder. "Proximal Mean Field Learning in Shallow Neural Networks." Transactions on Machine Learning Research, Online paper: [here](#).

Alexis Teter, **Iman Nodozi**, and Abhishek Halder. "Solution of the Probabilistic Lambert Problem: Connections with Optimal Mass Transport, Schrödinger Bridge, and Reaction-Diffusion PDEs." Online paper: [here](#).

**Iman Nodozi**, and Abhishek Halder. "Wasserstein Consensus ADMM." Online paper: [here](#).

**Iman Nodozi**, Charlie Yan, Mira Khare, Abhishek Halder, and Ali Mesbah. "Neural Schrödinger Bridge with Sinkhorn Losses: Application to Data-driven Minimum Effort Control of Colloidal Self-assembly." IEEE Transactions on Control Systems Technology. Online paper: [here](#).

**Iman Nodozi**, Abhishek Halder, and Ion Matei. "A Controlled Mean Field Model for Chiplet Population Dynamics." IEEE Control Systems Letters, also in 62nd IEEE Conference on Decision and Control (CDC), Singapore, 2023. Online paper: [here](#).

Charlie Yan, **Iman Nodozi**, and Abhishek Halder. "Optimal Mass Transport over the Euler Equation." 62nd IEEE Conference on Decision and Control (CDC), Singapore, 2023. Online paper: [here](#). 🏆 Invited paper in Session 'Optimal Transport'

**Iman Nodozi**, Jared O'Leary, Abhishek Halder, and Ali Mesbah. "A Physics-informed Deep Learning Approach for Minimum Effort Stochastic Control of Colloidal Self-Assembly." 2023 American Control Conference (ACC), San Diego, California, USA. Online paper: [here](#). 🏆 Invited paper in Session 'Learning and Stochastic Optimal Control'

🏆 2024 American Automatic Control Council's O. Hugo Schuck Best Paper Award

**Iman Nodozi**, and Ricardo Sanfelice. "A Mixed Integer Approach for the Solution of Hybrid Model Predictive Control Problems." 61st IEEE Conference on Decision and Control, Cancún, Mexico, 2022. Online paper: [here](#).

**Iman Nodozi**, and Abhishek Halder. "Schrödinger Meets Kuramoto via Feynman-Kac: Minimum Effort Distribution Steering for Noisy Nonuniform Kuramoto Oscillators." 61st IEEE Conference on Decision and Control, Cancún, Mexico, 2022. Online paper: [here](#).

**Iman Nodozi**, and Abhishek Halder. "A Distributed Algorithm for Measure-valued Optimization with Additive Objective." 25th International Symposium on Mathematical Theory of Networks and Systems (MTNS 2022), Beyreuth, Germany, 2022. Online paper: [here](#). 🏆 Invited paper in Session 'Optimal transport: Theory and applications in networks and systems'

**Iman Nodozi**, and Mehdi Rahmani. "LMI-based mixed-integer model predictive control for Hybrid systems." International Journal of Control (2020): 2336-2345. Online paper: [here](#).

**Iman Nodozi**, and Mehdi Rahmani. "LMI-based model predictive control for switched nonlinear systems." Journal of Process Control 59 (2017) 49-58. Online paper: [here](#).

Mehdi Rahmani, and **Iman Nodozi**. "Phase-locked loops redesign by the Lyapunov theory." Electronics Letters 51.21 (2015): 1664-1666. Online paper: [here](#).

## REFERENCES

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**Abhishek Halder** : Associate Professor of Department of Aerospace Engineering, Iowa State University | [ahalder@iastate.edu](mailto:ahalder@iastate.edu)

**Ali Mesbah** : Associate Professor of Chemical and Biomolecular Engineering, University of California, Berkeley | [mesbah@berkeley.edu](mailto:mesbah@berkeley.edu)

**Ricardo Sanfelice** : Professor of Department of Electrical and Computer Engineering, University of California, Santa Cruz | [ricardo@ucsc.edu](mailto:ricardo@ucsc.edu)

**Mehdi Rahmani** : Associate Professor of Department of Electrical Engineering, Imam-Khomeini International University | [mrahmani@eng.ikiu.ac.ir](mailto:mrahmani@eng.ikiu.ac.ir)