HANCHENG MIN

Postdoctoral Researcher & Center for Innovation in Data Engineering and Science (IDEAS) Electrical and Systems Engineering & University of Pennsylvania Email: hanchmin@seas.upenn.edu & Web: https://hanchmin.github.io/

EDUCATION

Johns Hopkins University , Baltimore, MD Ph.D., Electrical and Computer Engineering	September 2018 - July 2023
University of Pennsylvania , Philadelphia, PA Master of Science in Engineering, Electrical and Systems Engineering	September 2016 - May 2018
Tongji University , Shanghai, China Bachelor of Engineering, Major: Automation	September 2012 - July 2016
RESEARCH EXPERIENCE	
Postdoctoral Researcher , Vidal-lab, University of Pennsylvania Advisor: René Vidal	August 2023 - Present
Graduate Research Assistant , NetD-lab, Johns Hopkins University <i>Primary Advisor</i> : Enrique Mallada; <i>Co-advisor</i> : René Vidal	September 2018 - July 2023
Graduate Research Assistant , Kod [*] lab, University of Pennsylvania <i>Mentor</i> : Ömür Arslan	June 2017 - May 2018

Preprints

- [P1] **H. Min** and E. Mallada, "Learning dynamic clusters in weakly-connected coherent network systems," 2023, in preparation.
- [P2] **H. Min**, R. Pates, and E. Mallada, "A frequency domain analysis of slow coherency in networked systems," 2023, submitted to *Automatica*, under review, under revision.
- [P3] H. Min, S. Tarmoun, R. Vidal, and E. Mallada, "Convergence and implicit bias of gradient flow on overparametrized linear networks," 2023, in preparation.

Journal

- [J1] A. Castellano, H. Min, J. Bazerque, and E. Mallada, "Learning to act safely with limited exposure and almost sure certainty," *IEEE Transaction on Automatic Control (TAC)*, vol. 68, no. 5, pp. 2979–2994, May 2023.
- [J2] H. Min, F. Paganini, and E. Mallada, "Accurate reduced order models for coherent heterogeneous generators," *IEEE Control Systems Letters (L-CSS)*, vol. 5, no. 5, pp. 1741– 1746, Nov. 2021, also in ACC 2021.

Conference

[C1] Y. Jiang, H. Min, and B. Zhang, "Oscillations-aware frequency security assessment via efficient worst-case frequency nadir computation," in *Power Systems Computation Conference* (*PSCC*), to appear, Jun. 2024.

- [C2] H. Min, E. Mallada, and R. Vidal, "Early neuron alignment in two-layer relu networks with small initialization," in *International Conference on Learning Representations (ICLR)*, to appear, May 2024, pp. 1–8.
- [C3] H. Min and R. Vidal, "Can implicit bias imply adversarial robustness?" In Proceedings of the 41th International Conference on Machine Learning (ICML), to appear, Jul. 2024.
- [C4] A. Castellano, H. Min, J. Bazerque, and E. Mallada, "Learning safety critics via a non-contractive binary bellman operator," 2023, to appear in Asilomar Conference on Signals, Systems, and Computers.
- [C5] H. Min and E. Mallada, "Learning coherent clusters in weakly-connected network systems," in Proceedings of The 5th Annual Learning for Dynamics and Control Conference (L4DC), vol. 211, PMLR, Jun. 2023, pp. 1167–1179.
- [C6] H. Min and E. Mallada, "Spectral clustering and model reduction for weakly-connected coherent network systems," in 2023 American Control Conference (ACC), 2023, pp. 2957– 2962.
- [C7] H. Min, R. Vidal, and E. Mallada, "On the convergence of gradient flow on multi-layer linear models," in *Proceedings of the 40th International Conference on Machine Learning (ICML)*, vol. 202, PMLR, Jun. 2023, pp. 24850–24887.
- [C8] Z. Xu, H. Min, S. Tarmoun, E. Mallada, and R. Vidal, "Linear convergence of gradient descent for finite width over-parametrized linear networks with general initialization," in *Proceedings of The 26th International Conference on Artificial Intelligence and Statistics* (AISTATS), vol. 206, PMLR, Apr. 2023, pp. 2262–2284.
- [C9] A. Castellano, H. Min, J. A. Bazerque, and E. Mallada, "Reinforcement learning with almost sure constraints," in *The 4th Annual Learning for Dynamics and Control Conference* (*L4DC*), vol. 168, PMLR, Jun. 2022, pp. 559–570.
- [C10] H. Min, S. Tarmoun, R. Vidal, and E. Mallada, "On the explicit role of initialization on the convergence and implicit bias of overparametrized linear networks," in *The 38th International Conference on Machine Learning (ICML)*, vol. 139, PMLR, Jul. 2021, pp. 7760–7768.
- [C11] H. Min and E. Mallada, "Dynamics concentration of tightly-connected large-scale networks," in 58th IEEE Conference on Decision and Control (CDC), Dec. 2019, pp. 758–763.
- [C12] O. Arslan, H. Min, and D. E. Koditschek, "Voronoi-based coverage control of pan/tilt/zoom camera networks," in 2018 IEEE International Conference on Robotics and Automation (ICRA), May 2018, pp. 5062–5069.

Thesis

- [T1] H. Min, "Exploiting structural properties in the analysis of high-dimensional dynamical systems," Ph.D. Thesis, M.S. thesis, Johns Hopkins University, 2023.
- [T2] H. Min, "On balancing event and area coverage in mobile sensor networks," Master's Thesis, M.S. thesis, University of Pennsylvania, 2018.

SEMINARS, TALKS, AND POSTER PRESENTATIONS

DeepMath 2023, Johns Hopkins University	Nov.	2023
40th International Conference on Machine Learning, Honolulu, HI	Aug.	2023
5th Annual Learning for Dynamics & Control Conference, Philadephia, PA	Jul.	2023
American Control Conference 2023, San Diego, CA	Jun.	2023
University of Michigan. Host: Necmiye Ozay	Jan.	2023
ROSEI Summit, Johns Hopkins University	Jan.	2023
RSRG Seminar, California Institute of Technology. Hosts: Adam Wierman, Steven Low	Jun.	2022
Semiautonomous seminar, UCBerkeley. Hosts: Chinmay Maheshwari, Shankar Sastry	Jun.	2022
MINDS Retreat, Johns Hopkins University	Mar.	2022
2022 TRIPODS Winter School on Interplay between AI and Dyn. Sys., virtual	Jan.	2022

2021 THEORINET Retreat, virtual	Sep.	2021
38th International Conference on Machine Learning, virtual	Jul.	2021
American Control Conference 2021, virtual	May.	2021
58th Conference on Decision and Control, Nice, France	Dec.	2019

PROFESSIONAL SERVICES

Technical Reviewer

- · Journals: Transaction on Automatic Control (TAC); Automatica; Control System Letter (L-CSS); Transaction on Machine Learning Research (TMLR)
- · Conferences: International Conference on Machine Learning (ICML); Computer Vision and Pattern Recognition Conference (CVPR); Conference on Neural Information Processing Systems (NeurIPS); International Conference on Learning Representations (ICLR); Conference on Decision and Control (CDC); American Control Conference (ACC); Conference on Information Sciences and Systems (CISS)

University Service

· Pre-evaluation Admission Committee Member: UPenn ESE PhD Student Search

AWARDS AND HONORS

MINDS Data Science Spring Fellowship 2021	Jan. 2021
MINDS Data Science Fellowship 2019/2020	Nov. 2019
ICRA 2018 Best Paper in Multirobot Nominee	Mar. 2018
Tongji Scholarship of Excellence	2013-2015
Chinese Mathematics Competition (Shanghai Preliminary)	Nov. 2013

TEACHING EXPERIENCE

Teaching Assistant

- · Foundations of Reinforcement Learning (Fall 2020, Fall 2021, Fall 2022), Johns Hopkins University
- · Control Systems, (Spring 2022), Johns Hopkins University
- · Networked Dynamical Systems, (Fall 2019), Johns Hopkins University
- · edX Course: Robotics: Locomotion and Engineering (Spring 2018), Penn Engineering Online Learning

Internship Mentor

· Army Educational Outreach Program (AEOP) High School Internship Mentor (June-Aug 2024), University of Pennsylvania

ADVISING AND MENTORING

Mentoring

Vijay Giri

Ph.D. Student, University of Pennsylvania Department of Computer and Information Science. Advisor: René Vidal Research Project: Learning Boolean functions with multi-head transformer

Nghia Nguyen

Ph.D. Student, University of Pennsylvania Department of Computer and Information Science. Advisor: René Vidal Research Project: Implicit bias of masked autoencoder

Dec. 2023

Dimitris Dimos Ph.D. Student, University of Pennsylvania Department of Computer and Information Science. Advisor: René Vidal Research Project: Generative model for videos **Kyle Poe** Ph.D. Student, University of Pennsylvania Department of Mathematics. Advisor: René Vidal Research Project: Sparse inputs recovery for LTI systems Ph.D. Student, University of Pennsylvania Ziqing Xu Wharton Statistics and Data Science. Advisor: René Vidal Research Project: Convergence of gradient descent on linear networks

Agustin Castellano

Ph.D. Student, Johns Hopkins University Department of Electrical and Computer Engineering. Advisor: Enrique Mallada Research Project: Reinforcement learning with almost sure safety

REFERENCES

Enrique Mallada Associate Professor, Electrical and Computer Engineering Johns Hopkins University, Baltimore, MD

René Vidal

Rachleff University Professor, Electrical and Systems Engineering University of Pennsylvania, Philadelphia, PA

Fernando Paganini

Professor, Electrical and Telecommunications Engineering Universidad ORT Uruguay, Montevideo, Uruguay

Juan Bazerque

Assistant Professor University of Pittsburgh, Pittsburgh, PA Ph.D. Advisor

Postdoc Advisor