Hancheng Min | Curriculum Vitae

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Ph.D. Candidate, ECE Department
Johns Hopkins University, Baltimore, MD, USA

Research interests: Networked Dynamical Systems, Deep Learning Theory, Reinforcement Learning

Education

- **Johns Hopkins University** — **Baltimore, MD, U.S.**
  Ph.D. Candidate, Electrical and Computer Engineering — *Sep. 2018—Now*
  GPA: 4.0/4.0
- **University of Pennsylvania** — **Philadelphia, PA, U.S.**
  Master of Science in Engineering, Major: Systems Engineering — *Sep. 2016—May 2018*
  GPA: 4.0/4.0
- **Tongji University** — **Shanghai, China**
  Bachelor of Engineering, Major: Automation — *Sep. 2012—Jun. 2016*
  GPA: 4.5/5.0

Research Experience

- **Graduate Research Assistant** — **Baltimore, MD, U.S.**
  NetD-Lab, ECE Dept., Johns Hopkins University — *Sep. 2018—Now*
  (Advisor: Enrique Mallada, Co-advisor: René Vidal)
- **Graduate Research Assistant** — **Philadelphia, PA, U.S.**
  *Kod*Lab, Penn Engineering GRASP Lab, University of Pennsylvania* — *Jun. 2017—May 2018*
  (Advisor: Daniel E. Koditschek)
- **Undergraduate Research Assistant** — **Shanghai, China**
  Yuan's research group, Tongji University — *Jun. 2015—Jun. 2016*
  (Advisor: Hongliang Yuan)

Research Projects

- **Convergence and Implicit Bias of Gradient Methods on Linear Networks** [4] 2020-Now
  - Full characterization of convergence rate of gradient flow on two-layer linear networks
  - Understand the convergence and implicit bias for random initialization with large hidden layer width
  - Ongoing works extend current result [4] to multi-layer linear networks and nonlinear networks
- **Learning to Act Safely with Limited Exposure and Almost Sure Certainty** [1] 2021-Now
  - Safe RL: Constrained reinforcement learning problem that only allows finite exposure to damage/failure
  - Assured Q-learning: Learning optimal policy efficiently under safety constraint
  - Ongoing works consider more general types of safety constraints
- **Coherence and Concentration in tightly-connected networks** [2], [3], [5] 2018-Now
  - Characterization of coherent dynamics in heterogeneous networked dynamical systems
  - Application to model reduction in power networks
- **Voronoi-based coverage control for mobile sensor networks** [6], [7] 2017-2018
  - Coverage control of pan-tilt-zoom camera systems
  - Developed program for calibrating/control/visualize PTZ cameras in real-world experiments

Publications

[1] A. Castellano, **H. Min**, J. Bazerque, and E. Mallada, "Learning to act safely with limited exposure and almost sure certainty," May 2021, under review.

[2] **H. Min** and E. Mallada, "Coherence and concentration in tightly-connected networks," 2021, under review.

[3] **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.

[4] **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 *Proceedings of the 38th International Conference on Machine Learning*, ser. Proceedings of Machine Learning Research, vol. 139, PMLR, Jul. 2021, pp. 7760–7768.

[5] **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.

[6] 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.

[7] **H. Min**, "On balancing event and area coverage in mobile sensor networks," Master's thesis, University of Pennsylvania, 2018.

Programming Skills

Python(Tensorflow, Gym, Sklearn, OpenCV), Matlab, C/C++

Selected Coursework

- **University of Pennsylvania**
  Graduate Courses *Sep. 2016—May 2018*
  - Model Predictive Control
  - Advanced Probability
  - Machine Learning
  - Dynamical Systems for Engineering and Biological Applications
- **Johns Hopkins University**
  Graduate Courses *Sep. 2018—Now*
  - Nonlinear Optimization
  - Networked Dynamical Systems
  - Statistical Theory
  - Unsupervised Learning
  - Control Systems Design
  - Random Signal Analysis
  - High-dimensional Probability
  - Stochastic Processes

Presentations

- "On the explicit role of initialization and implicit bias of overparametrized linear networks", 38th International Conference on Machine Learning, Virtual, July 2021
- "Accurate Reduced Order Models for Coherent Heterogeneous Generators", American Control Conference 2021, Virtual, May 2021
- "Dynamics Concentration of Large-Scale Tightly-Connected Networks", 58th Conference on Decision and Control, Nice, France Dec 2019
- "Accurate Reduced Order Models for Coherent Synchronous Generators", NetD-Lab group meeting, Fall 2019

- "Localize Eigenvalues of Transfer Matrix of Network Dynamical Systems", NetD-Lab group meeting, Spring 2019
- "Literature Review: A Convex Characterization of Robust Stability for Positive and Positively Dominated Linear Systems", NetD-Lab group meeting, Fall 2018

Professional Service

Technical Reviewer

Journal: TAC, Control System Letter
Conference: ICML, CVPR, NeurIPS, ICLR, ACC

Teaching Experience

- **Teaching Assistant**
  EN.520.637 Foundation of Reinforcement Learning, Johns Hopkins University *Fall 2021*
- **Teaching Assistant**
  EN.520.637 Foundation of Reinforcement Learning, Johns Hopkins University *Fall 2020*
- **Teaching Assistant**
  EN.520.629 Networked Dynamical Systems, Johns Hopkins University *Fall 2019*
- **Teaching Assistant**
  edX Course: Robotics: Locomotion and Engineering, Penn Engineering Online Learning *Spring 2018*

Awards and Honors

- *MINDS Data Science Spring Fellowship 2021* *Jan. 2021*
- *MINDS Data Science Fellowship 2019/2020* *Nov. 2019*
- *Third Prize, Tongji Scholarship of Excellence* *Dec. 2015*
- *Third Prize, Tongji Scholarship of Excellence* *Dec. 2014*
- *Third Prize, Tongji University Electronic Design Contest* *Dec. 2014*
- *Second Prize, Tongji Scholarship of Excellence* *Dec. 2013*
- *First Prize, The Chinese Mathematics Competetion (Shanghai Preliminary)* *Nov. 2013*