

Curriculum Vitae

Salar Fattahi

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ACADEMIC EXPERIENCE	Assistant Professor August 2020 - present University of Michigan, Ann Arbor, MI, USA, Department of Industrial and Operations Engineering, <i>Other Affiliations:</i> Michigan Institute for Data Science, Michigan Institute for Computational Discovery and Engineering, Controls Group
	Visiting Assistant Professor June 2020 - August 2020 University of Michigan, Ann Arbor, MI, USA, Department of Industrial and Operations Engineering

EDUCATION	PhD, University of California, Berkeley , Berkeley, CA, USA May 2016 – July 2020 Industrial Engineering and Operations Research Minor in Statistics Thesis: <i>Structure-Aware Methods in Large-Scale Computational Problems: Machine Learning, Optimization, and Control</i> Advisors: Prof. Javad Lavaei and Prof. Somayeh Sojoudi Committee: Prof. Alper Atamturk, Prof. Shmuel Oren, and Prof. Murat Arcak
	MS, University of California, Berkeley , Berkeley, CA, USA August 2015 – May 2016 Industrial Engineering and Operations Research Advisor: Prof. Javad Lavaei
	MS, Columbia University , New York City, NY, USA September 2014 – August 2015 Electrical Engineering Advisor: Prof. Javad Lavaei
	BS, Sharif University of Technology , Tehran, Iran August 2009 – July 2014 Electrical Engineering Minor in Computer Science

HONORS	1. INFORMS ENRE Best Student Paper Award (as a co-author) 2020 <i>For the paper “Smoothing Property of Load Variation Promotes Finding Global Solutions of Time-Varying Optimal Power Flow”</i>
	2. Outstanding Student Paper Award of the IEEE Conference on Control Technology and Applications 2020 <i>For the paper “Absence of Spurious Local Trajectories in Time-Varying Optimization: A Control-Theoretic Perspective”</i>
	3. Best-of-the-Best Paper Award of the 2020 Power Energy Society General Meeting 2020

For the paper “Load Variation Enables Escaping Poor Solutions of Time-Varying Optimal Power Flow”

4. **IEOR Faculty Fellowship Award** 2019
The highest graduate student award (single award) in the IEOB Department, UC Berkeley
 5. **Winner of INFORMS Data Mining Best Paper Award** 2018
For the paper “Graphical Lasso and Thresholding: Equivalence and Closed-Form Solutions”
 6. **Finalist for American Control Conference Best Student Paper Award** 2018
For the paper “Closed-Form Solution and Sparsity Path for Inverse Covariance Estimation Problem”, (5 finalists out of 1623 submitted papers)
 7. **Winner of Katta G. Murty Best Paper Award** 2018
For the paper “Graphical Lasso and Thresholding: Equivalence and Closed-Form Solutions”, IEOB Department, UC Berkeley
 8. **Outstanding Graduate Student Instructor Award** 2017
In recognition of my achievements as a teaching assistant, UC Berkeley
 9. **Marshall-Oliver-Rosenberger Fellowship Award** 2017
Given annually to at most 2 PhD students with demonstrated research in decision science, IEOB Department, UC Berkeley
 10. **Best Reviewer Award** 2016
IEEE Transactions on Smart Grid (*Impact Factor: 10.486*)
 11. **Armstrong Fellowship Award** 2014
Columbia University
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PUBLICATIONS

* indicates that the student is advised by me.

Preprints:

1. Jianhao Ma*, Salar Fattahi, “Implicit Regularization of Subgradient Method in Robust Matrix Recovery: Don’t be Afraid of Outliers”, Submitted for publication, 2021. [\[Link\]](#)
2. S. Fattahi, A. Gómez, “Scalable Inference of Sparsely-changing Markov Random Fields with Strong Statistical Guarantees”, Submitted for publication, 2021. [\[Link\]](#)
3. S. Fattahi, “Learning Partially Observed Linear Dynamical Systems from Logarithmic Number of Samples”, to appear in **Learning for Dynamics & Control Conference**, 2021. [\[Link\]](#)
4. J. Mulvaney-Kemp, S. Fattahi, J. Lavaei, “Smoothing Property of Load Variation Promotes Finding Global Solutions of Time-Varying Optimal Power Flow”, conditionally accepted to **IEEE Transactions on Control of Network Systems**, 2020. [\[Link\]](#)
- **INFORMS ENRE Best Student Paper Award, 2020**
5. S. Fattahi, C. Jozs, R. Mohammadi, J. Lavaei, S. Sojoudi, “Absence of Spurious Local Trajectories in Time-varying Optimization”, under the second round of review for **IEEE Transactions on Automatic Control**, 2020. [\[Link\]](#)

6. S. Fattahi, S. Sojoudi, “Sample Complexity of Sparse System Identification Problem for Linear Time-Invariant Systems”, conditionally accepted to **IEEE Transactions on Control of Network Systems**, 2020. [\[Link\]](#)

Journal Papers:

1. S. Fattahi, S. Sojoudi, “Exact Guarantees on the Absence of Spurious Local Minima for Rank-1 Non-negative Robust Principal Component Analysis”, to appear in **Journal of Machine Learning Research (JMLR)**, 2020. [\[Link\]](#)
2. S. Fattahi, N. Matni, S. Sojoudi, “Efficient Learning of Distributed Linear-Quadratic Regulators”, **SIAM Journal on Control and Optimization (SICON)**, 2020. [\[Link\]](#)
3. S. Fattahi, S. Sojoudi, “Graphical Lasso and Thresholding: Equivalence and Closed-Form Solutions”, **Journal of Machine Learning Research (JMLR)**, vol. 20, pp. 364–407, 2019. [\[Link\]](#)
 - **INFORMS Data Mining Best Paper Award - Applied Track, 2018**
 - **Katta G. Murty Best Paper Award, 2018.**
4. S. Sojoudi, S. Fattahi, J. Lavaei, “Convexification of Generalized Network Flow Problem”, **Mathematical Programming**, vol. 173, pp. 353–391, 2019. [\[Link\]](#)
5. S. Fattahi, J. Lavaei, A. Atamtürk, “A Bound Strengthening Method for Optimal Transmission Switching in Power Systems with Fixed Connected Subgraph”, **IEEE Transactions on Power Systems**, vol. 34, pp. 280–291, 2019. [\[Link\]](#)
6. S. Fattahi, G. Fazelnia, J. Lavaei, M. Arcak, “Transformation of Optimal Centralized Controllers Into Near-Global Static Distributed Controllers”, **IEEE Transactions on Automatic Control**, vol. 64, pp. 63–77, 2019. [\[Link\]](#)
7. S. Fattahi, R. Y. Zhang, S. Sojoudi, “Linear-Time Algorithm for Learning Large-Scale Sparse Graphical Models”, **IEEE Access**, vol. 7, pp. 12658–12672, 2019. [\[Link\]](#)
8. S. Fattahi, M. Ashraphijou, J. Lavaei, A. Atamtürk, “Conic Relaxation of the Unit Commitment Problem”, **Energy**, vol. 134, pp. 1079–1095, 2017. [\[Link\]](#)

Conference Papers:

1. S. Fattahi, C. Jozs, R. Mohammadi, J. Lavaei, S. Sojoudi, “Absence of Spurious Local Trajectories in Time-Varying Optimization: A Control-Theoretic Perspective”, **IEEE Conference on Control Technology and Applications (CCTA)**, 2020. [\[Link\]](#)
 - **Outstanding Student Paper Award**
2. J. Mulvaney-Kemp, S. Fattahi, J. Lavaei, “Load Variation Enables Escaping Poor Solutions of Time-Varying Optimal Power Flow”, **IEEE Power & Energy Society General Meeting**, 2020. [\[Link\]](#)
 - **Best-of-the-Best Conference Paper Award**
3. S. Fattahi, N. Matni, S. Sojoudi, “Learning Sparse Dynamical Systems from a Single Sample Trajectory”, **IEEE Conference on Decision and Control (CDC)**, 2019. [\[Link\]](#)
4. R. Y. Zhang, S. Fattahi, S. Sojoudi, “Large-Scale Sparse Inverse Covariance Estimation via Thresholding and Max-Det Matrix Completion”, **International Conference on Machine Learning (ICML)**, 2018. [\[Link\]](#)

5. S. Fattahi, S. Sojoudi, “Data-Driven Sparse System Identification”, **Annual Allerton Conference on Communication, Control, and Computing**, 2018. [\[Link\]](#)
6. S. Fattahi, S. Sojoudi, “Non-Asymptotic Analysis of Block-Regularized Regression Problem”, **IEEE Conference on Decision and Control (CDC)**, 2018. [\[Link\]](#)
7. S. Fattahi, S. Sojoudi “Closed-Form Solution and Sparsity Path for Inverse Covariance Estimation Problem”, **American Control Conference (ACC)**, 2018. [\[Link\]](#)
- **Best Student Paper Award - Finalist**
8. G. Darivianakis, S. Fattahi, J. Lavaei, J. Lygeros, “High-Performance Cooperative Distributed Model Predictive Control for Linear Systems”, **American Control Conference (ACC)**, 2018. [\[Link\]](#)
9. S. Fattahi, R.Y. Zhang, S. Sojoudi, “Sparse Inverse Covariance Estimation for Chordal Structures”, **European Control Conference (ECC)**, 2018. [\[Link\]](#)
10. S. Fattahi, J. Lavaei, A. Atamtürk “Promises of Conic Relaxations in Optimal Transmission Switching of Power Systems”, **IEEE Conference on Decision and Control (CDC)**, 2017. [\[Link\]](#)
11. S. Fattahi, J. Lavaei, M. Arcak “A Scalable Method for Designing Distributed Controllers for Systems with Unknown Initial State”, **IEEE Conference on Decision and Control (CDC)**, 2017. [\[Link\]](#)
12. S. Fattahi, J. Lavaei, “On the Convexity of Optimal Decentralized Control Problem and Sparsity Path”, **American Control Conference (ACC)**, 2017. [\[Link\]](#)
13. S. Fattahi, J. Lavaei, “Theoretical Guarantees for the Design of Near Globally Optimal Static”, **Annual Allerton Conference on Communication, Control, and Computing**, 2016. [\[Link\]](#)
14. M. Ashraphijou, S. Fattahi, J. Lavaei, A. Atamtürk, “A Strong Semidefinite Programming Relaxation of the Unit Commitment Problem”, **IEEE Conference on Decision and Control (CDC)**, 2016. [\[Link\]](#)
15. S. Fattahi, J. Lavaei, “Convex Analysis of Generalized Flow Networks”, **IEEE Conference on Decision and Control (CDC)**, pp. 1569-1576, 2015. [\[Link\]](#)
16. S. Fattahi, G. Fazelnia, J. Lavaei, “Transformation of Optimal Centralized Controllers Into Near-Global Static Distributed Controllers”, **IEEE Conference on Decision and Control (CDC)**, 2015. [\[Link\]](#)
17. S. Fattahi, M. Azghani, F. Marvasti, “An Algorithm for Detecting Exact Regions of Moving Objects in Video Frames”, **IEEE International Symposium on Telecommunications**, 2014. [\[Link\]](#)

TEACHING

University of Michigan:

- IOE611: Nonlinear Programming Graduate Course, IOE, Fall 2021
(*Instructor*)
- IOE491: Advanced Topics in Applied Data Analytics Undergraduate Course, IOE, Winter 2021
(*Instructor*)

UC Berkeley:

- Learning and Optimization Graduate Course, IEOR, Spring 2020
(*Teaching Assistant*)
- Applied Dynamic Programming Graduate Course, IEOR, Spring 2018
(*Guest lecturer and teaching assistant*)

- Nonlinear and Discrete Optimization Undergraduate Course, IEOR, Fall 2015-2016
(*Guest lecturer and teaching assistant*)

Columbia University:

- Convex Optimization for Electrical Engineering Graduate Course, EE, Spring 2014
(*Teaching assistant*)

INVITED TALKS

1. **INFORMS Annual Meeting (*upcoming*)**, virtual, October 2021,
“Scalable Inference of Sparsely-changing Markov Random Fields”
2. **Modeling and Optimization: Theory and Applications (MOPTA) (*upcoming*)**, virtual,
August 2021,
“Implicit Regularization of Sub-gradient Method in Robust Matrix Recovery”
3. **University of Michigan**, Controls Group, October, 2020,
“learning and control of linear dynamical systems in high dimensions”
4. **Arizona State University**, Department of Industrial Engineering, Tempe, AZ, January, 2020,
“Scalable and Guaranteed Computation for Structured Systems”
5. **University of Illinois Urbana-Champaign**, Department of Industrial and Enterprise Systems
Engineering, Champaign, IL, January, 2020,
“Scalable and Guaranteed Computation for Structured Systems”
6. **University of Michigan**, Department of Industrial and Operations Engineering, Ann Arbor, MI,
January, 2020,
“Scalable and Guaranteed Computation for Structured Systems”
7. **MIT Sloan**, School of Management, Operations Research and Statistics Group, Cambridge, MA,
January, 2020,
“Scalable and Guaranteed Computation for Structured Systems”
8. **Purdue University**, Department of Industrial Engineering, West Lafayette, IN, January, 2020,
“Scalable and Guaranteed Computation for Structured Systems”
9. **University of Pittsburgh**, Department of Industrial Engineering, Pittsburgh, PA, January, 2020,
“Scalable and Guaranteed Computation for Structured Systems”
10. **INFORMS Annual Meeting**, Seattle, WA, October, 2019,
“Exact Guarantees On the Absence of Spurious Local Minima For Non-negative Robust Principal
Component Analysis”
11. **INFORMS Annual Meeting**, Seattle, WA, October, 2019,
“Learning Large-scale Sparse Graphical Models: Theory and Algorithm”
12. **SIAM Conference on Computational Science and Engineering (CSE19)**, Spokane, WA,
February, 2019,
”Learning Large-Scale Sparse Graphical Models: Theory, Algorithm”
13. **13th Data Mining & Decision Analytics Workshop**, Phoenix, AZ, November, 2018,
“Graphical Lasso and Thresholding: Equivalence and Closed-form Solutions”

14. **INFORMS Annual Meeting**, Phoenix, AZ, November, 2018,
“A Bound Strengthening Method for Optimal Transmission Switching in Power Systems”
15. **INFORMS Annual Meeting**, Phoenix, AZ, November, 2018,
“Data Driven Sparse System Identification”
16. **Federal Energy Regulatory Commission (FERC)**, conference on *Increasing Market and Planning Efficiency through Improved Software*, Washington, DC, July, 2017,
“Convex Formulation of the Optimal Transmission Switching Problem”
17. **Tsinghua-Berkeley Shenzhen Institute**, Berkeley, CA, November, 2017,
“Structural Optimization: From Power Systems to Machine Learning”
- **Best Poster Presentation Award - Second Place**
18. **INFORMS Annual Meeting**, Houston, TX, October, 2017,
“Promises of Conic Relaxations in Optimal Transmission Switching of Power Systems”
19. **INFORMS Annual Meeting**, Houston, TX, October, 2017,
“Power System State Estimation Problem: Optimal Sensor Placement”
20. **INFORMS Annual Meeting**, Houston, TX, October, 2017,
“Data-driven Methods for Learning Graphical Models”
21. **Defense Advanced Research Projects Agency (DARPA)**, Young Faculty Award Meeting, Arlington, VA, October, 2016,
“Near-Global Solutions of Non-convex Problems”
22. **Modeling and Optimization: Theory and Applications (MOPTA)**, Lehigh, PA, August 2016,
“On the Convexity of Optimal Decentralized Control Problem and Sparsity Path”
23. **INFORMS Annual Meeting**, Nashville, TN, November, 2016,
“On the Convexity of Optimal Decentralized Control Problem and Sparsity Path”
24. **INFORMS Annual Meeting**, Nashville, TN, November, 2016,
“Optimal Distributed Control of Power Systems with a High Level of Renewable Energy”

ADVISING
EXPERIENCE

PhD Students:

- Geyu Liang, University of Michigan (IOE) Fall 2021 (*incoming student*)
- Jianhao Ma, University of Michigan (IOE) Winter 2021 - Summer 2025 (*expected*)

Master Students:

- Tong Xu, University of Michigan (LSA) Winter 2020 - Summer 2021 (*expected*)

Other Students:

- Rachel Tham, UC Berkeley (EECS) Summer 2018

Doctoral Committee:

- Zhe Du, University of Michigan (EECS)

PROFESSIONAL
ACTIVITIES

1. **Poster Committee**
Learning for Dynamics & Control Conference

2021

2. **Session Organizer** 2021
 INFORMS Annual Meeting, Anaheim, CA
 Session title: “Recent Advances in Data-driven Non-convex Optimization”
3. **Session Organizer** 2020
 INFORMS Annual Meeting, National Harbor, MD
 Session title: “Optimization, Learning, and Control”
4. **Session Organizer** 2019
 INFORMS Annual Meeting, Seattle, WA
 Session title: “Recent Advances in Large-Scale Optimization”
5. **Signatory Committee Member of IEOR Graduate Student Organization** 2019
 IEOR Department, UC Berkeley
6. **Technical Program Committee** 2018
 International Conference on Applied Energy
7. **Graduate Mentor** 2018
 Summer Undergraduate Program in Engineering Research at Berkeley (SUPERB), UC Berkeley
8. **Mentor** 2018
 Engineers for a Sustainable World (ESW), UC Berkeley
9. **Reviewer**
 Journal of Machine Learning Research, Journal of Optimization Theory and Applications, SIAM
 Journal on Control and Optimization, IEEE Transactions on Automatic Control, Automatica,
 Conference on Neural Information Processing Systems, International Conference on Machine Learning,
 IEEE Transactions on Smart Grid, IEEE Transactions on Power Systems, IEEE Transactions on
 Control of Network Systems, IEEE Control System Letters, IEEE Access, Systems & Control Letters,
 International Journal of Electrical Power and Energy Systems, International Conference on Artificial
 Intelligence and Statistics, Conference on Decision and Control, American Control Conference,
 European Control Conference, IEEE SmartGridComm15 Symposium