YAHYA SATTAR

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Research Interests

My research interests revolve broadly around the statistical and algorithmic aspects of **sequential learning** and **decision making** in **dynamic** settings, with applications in robotics, autonomous systems, and broader scientific and engineering domains. More precisely, I study the learning and inference problems arising in **Optimal Control**, **Reinforcement Learning**, and **Machine Learning**, using tools and concepts from **Statistical Learning** , **Optimization** , and **Control Theory** .

Academic Appointments

Cornell University · Ithaca, NY, USA — 2023 – Present
· Postdoctoral Associate, *Department of CS*
Hosted by Prof. Sarah Dean

LUMS University · Lahore, Pakistan — 2015 – 2017
· Predoctoral Research Associate, *Department of EE*
Hosted by Prof. Zubair Khalid

Education

University of California · Riverside, CA, USA
· PhD in Electrical Engineering, *Department of ECE* — 2017 – 2023
Advised by Prof. Samet Oymak
· MS in Electrical Engineering, *Department of ECE* — 2017 – 2019

LUMS University · Lahore, Pakistan
· BS in Electrical Engineering, *Department of EE, School of Science and Engineering* — 2011 – 2015

Preprints, Conference, & Journal Publications

(† means equal contribution; titles are hyperlinked to their online pdf)

J1. "Identification and Adaptive Control of Markov Jump Systems: Sample Complexity and Regret Bounds ",
Y. Sattar†, Z. Du†, D.A. Tarzanagh, L. Balzano, N. Ozay, S. Oymak,
In submission to the IEEE Transactions on Automatic Control. TAC 2026

C1. "Explore-then-Commit for Nonstationary Linear Bandits with Latent Dynamics ",
S. Choi, **Y. Sattar**, Y. Jedra, M. Fazel, S. Dean,
In submission to the 29th International Conference on Artificial Intelligence and Statistics. AISTATS 2026

C2. "Pre-trained Large Language Models Learn Hidden Markov Models In-context ",
Y. Dai, Z. Gao, **Y. Sattar**, S. Dean, J.J. Sun,
Advances of Neural Information Processing Systems 39. NeurIPS 2025

C3. "Sub-optimality of the Separation Principle for Quadratic Control from Bilinear Observations ",
Y. Sattar, S. Choi, Y. Jedra, M. Fazel, S. Dean,
IEEE 64th Conference on Decision and Control. CDC 2025

C4. "Finite Sample Identification of Partially Observed Bilinear Dynamical Systems ",
Y. Sattar†, Y. Jedra†, M. Fazel, S. Dean,
The 7th Conference on Learning for Dynamics and Control, U Michigan Ann Arbor (Oral). L4DC 2025

C5. "Learning Linear Dynamics from Bilinear Observations ",
Y. Sattar, Y. Jedra, S. Dean,
The 2025 American Control Conference. ACC 2025

C6. "A Case Study of Low Ranked Self-Expressive Structures in Neural Network Representations ",
U.S. Saini, W. Shiao, **Y. Sattar**, Y. Dahiya, S. Oymak, E.E. Papalexakis,
The 2nd Conference on Parsimony and Learning, Stanford University. CPAL 2025

C7. "Random Features Approximation for Control-Affine Systems ",
K. Kazemian, **Y. Sattar**, S. Dean,
The 6th Conference on Learning for Dynamics and Control, U Oxford. L4DC 2024

J2. "Non-asymptotic and Accurate Learning of Nonlinear Dynamical Systems ",
Y. Sattar, S. Oymak,
Journal of Machine Learning Research (with poster presentation at NeurIPS 2022). JMLR 2022

C8. "Finite Sample Identification of Bilinear Dynamical Systems ",
Y. Sattar, S. Oymak, N. Ozay,
IEEE 61st Conference on Decision and Control. CDC 2022

C9. "Certainty Equivalent Quadratic Control for Markov Jump Systems ",
Y. Sattar[†], Z. Du[†], D.A. Tarzanagh, S. Oymak, L. Balzano, N. Ozay,
The 2022 American Control Conference. ACC 2022

C10. "Data-driven Control of Markov Jump Systems: Sample Complexity and Regret Bounds ",
Z. Du[†], **Y. Sattar**[†], D.A. Tarzanagh, L. Balzano, N. Ozay, S. Oymak,
The 2022 American Control Conference. ACC 2022

C11. "Estimation of Groundwater Storage Variations in Indus River Basin Using GRACE Data ",
Y. Sattar, Z. Khalid,
IEEE International Conference on Acoustics, Speech and Signal Processing. ICASSP 2021

C12. "Group Activity Recognition in Visual Data: A Retrospective Analysis of Recent Advancements ",
S. Sattar **Y. Sattar**, M. Shahzad, M.M. Fraz
IEEE International Conference on Digital Futures and Transformative Technologies. ICoDT2 2021

J3. "Quickly Finding the Best Linear Model in High Dimensions via Projected Gradient Descent ",
Y. Sattar, S. Oymak,
IEEE Transactions on Signal Processing. TSP 2020

C13. "A Simple Framework for Learning Stabilizable Systems ",
Y. Sattar, S. Oymak,
IEEE Computational Advances in Multi-Sensor Adaptive Processing. CAMSAP 2019

C14. "Accurate Reconstruction of Finite Rate of Innovation Signals on the Sphere ",
Y. Sattar, Z. Khalid, R.A. Kennedy
IEEE International Conference on Acoustics, Speech and Signal Processing. ICASSP 2019

C15. "Robust Reconstruction of Spherical Signals with Finite Rate of Innovation ",
Y. Sattar, Z. Khalid, R.A. Kennedy
IEEE International Conference on Acoustics, Speech and Signal Processing. ICASSP 2017

P1. "Exploring Weight Importance and Hessian Bias in Model Pruning ",
M. Li, **Y. Sattar**, C. Thrampoulidis, S. Oymak,
In submission to the arXiv, available online. (Preprint) 2020

P2. "Convergence of Gradient-based Semi-supervised Learning with Self-training ",
Y. Sattar, S. Oymak,
In submission to the arXiv, avaliable online. (Preprint) 2020

Selected Talks, Tutorials, & Workshop Contributions

W1. "Finite Sample Identification of Partially Observed Bilinear Dynamical Systems"
- · **Poster** at the Workshop on Theoretical Foundations of Applied AI, UW Seattle. UW Seattle 2025
- · **Invited talk** at Prof. Necmiye Ozay's group meeting, U Michigan Ann Arbor. U Michigan 2025

W2. "Learning & Control of Linear Dynamics from Bilinear Observations"
- · **Invited talk** at the Workshop on the Theoretical Aspects of Trustworthy AI, **presented by** my advisor Prof. Sarah Dean at Simons Institute for Theory of Computing. UC Berkeley 2025
- · **Poster** at the Northeast Systems and Control Workshop, U Pennsylvania. U Pennsylvania 2024
- · **Poster** at the Princeton Workshop on Optimization, Learning, and Control. Princeton 2024
- · **Invited talk** at Workshop on Foundations of Reinforcement Learning and Control, **presented by** my advisor Prof. Sarah Dean. ICML 2024

T1. "Statistical Learning Theory for Nonlinear Dynamical Systems"
- · **Invited talk** at Prof. Na Li's group meeting, Harvard University. Harvard 2023
- · **Invited talk** at Prof. Necmiye Ozay's group meeting, U Michigan Ann Arbor. U Michigan 2023

W3. "Finite Sample Identification of Bilinear Dynamical Systems"
- · **Selected talk** at the 40th Southern California Control Workshop, Caltech. Caltech 2022

W4. "Identification and Adaptive Control of Markov Jump Systems: Sample Complexity and Regret Bounds"
- · **Invited talk** at the IEEE CDC Workshop on Statistical Learning Theory for Control. CDC 2022
- · **Poster** at the ICML Workshop on Reinforcement Learning Theory. ICML 2021
- · **Selected talk** at the 38th Southern California Control Workshop, UC Irvine. UC Irvine 2021

Dissertations, & Theses

T1. "The Sample Complexity of Learning Dynamical Systems", PhD in Electrical Engineering. 2023

T2. "Self-Organizing Acoustic Localization Network", BS in Electrical Engineering. 2015

Selected Achievements & Awards

- · **Best paper award nominee**, Conference on Learning for Dynamics & Control. 2025
- · **Dean's distinguished fellowship award**, UC Riverside. 2017
- · **National outreach program (NOP) scholarship award**, LUMS University. 2011

Teaching & Supervision Experience

Teaching Assistant · University of California, Riverside CA, USA

T1. **Optimization for Machine Learning** (EE/CS 248) Winter 2023
Graduate level course lead by Prof. Samet Oymak.

T2. **Introduction to Deep Learning** (EE/CS 228) Spring 2020
Graduate level course lead by Prof. Samet Oymak.

T3. **Probability, Random Variables, and Random Processes** (EE 114) Spring 2019, Winter 2020
Undergraduate level course lead by Prof. Samet Oymak.

T4. **Stochastic Processes** (EE 215) Fall 2018, Fall 2019
Graduate level course lead by Prof. Samet Oymak.

Research Supervision & Outreach · Cornell University, Ithaca NY, USA

R1. Supervising multiple PhD, MS, and MEng students in the CS department, 2024 – present
Research projects around the topic "Quadratic Control from Bilinear Observations".

R2. Research support volunteer for 2025 High school outreach program at Cornell, Summer 2025
Research projects around the topic "Control and Navigation of Weather Balloons".

L1. Guest lecture for the course **Machine Learning in Feedback Systems** (CS 6784). Summer 2023

Reviewing Services

Journals

IEEE Transactions on Automatic Control (TAC) · IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) · IEEE Signal Processing Letters (SPL).

Conferences

International Conference on Artificial Intelligence and Statistics (AISTATS) · International Conference on Learning Representation (ICLR) · International Conference on Knowledge Discovery and Data Mining (KDD) · Conference on Learning for Dynamics & Control (L4DC) · IEEE American Control Conference (ACC) · International Symposium on Information Theory (ISIT).

References

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