ARITRA MITRA

1 (765) 253-2057 • amitra20@seas.upenn.edu • https://www.seas.upenn.edu/~amitra20/

ACADEMIC APPOINTMENTS

August 2020 - Present | **Postdoctoral Researcher**
Department of Electrical and Systems Engineering, University of Pennsylvania
Philadelphia, PA
Supervisors: Prof. George Pappas and Prof. Hamed Hassani

EDUCATION

July 2020 | **Ph.D. in Electrical Engineering**
Purdue University, West Lafayette, IN. GPA : 4.0/4.0
Advisor: Prof. Shreyas Sundaram
Thesis: "New Approaches to Distributed State Estimation, Inference and Learning with Extensions to Byzantine-Resilience"

July 2015 | **M.Tech in Electrical Engineering**
Indian Institute of Technology, Kanpur, India. GPA : 10.0/10.0
Advisor: Prof. Laxmidhar Behera
Thesis: "Sliding Mode Control Strategies for Robotic Systems"

July 2013 | **B.E. in Electrical Engineering**
Jadavpur University, West Bengal, India. GPA: 8.97/10.0

RESEARCH INTERESTS

Control, estimation, inference, and learning over networks; security and resilience in multi-agent systems; distributed algorithms; analysis of dynamical processes on networks; sequential decision-making.

AWARDS AND HONORS

- **ECE Fellowship**, Purdue University, 2015.
- **Academic Excellence Award**, Indian Institute of Technology Kanpur, 2015.
- **University Gold Medal** for securing 1st rank (in a class of 104) in the Electrical engineering department of Jadavpur University, 2013.
- Secured 99.84 percentile (out of $\sim 125,000$ candidates) in the Graduate Aptitude Test in Engineering (GATE) conducted nationwide for higher studies in engineering in India, 2013.
- Secured 99.12 percentile (out of $\sim 385,000$ candidates) in the IIT-JEE exam held nationwide for undergraduate studies in engineering in India, 2009.

PUBLICATIONS

Papers under Review

(S1) **A. Mitra**, J. A. Richards, S. Bagchi and S. Sundaram, "Distributed State Estimation over Time-Varying Graphs: Exploiting the Age-of-Information", under review at IEEE Transactions on Automatic Control.

(S2) **A. Mitra**, F. Ghawash, W. Abbas, and S. Sundaram, "On the Impacts of Redundancy, Diversity and Trust in Resilient Distributed State Estimation", under review at IEEE Transactions on Control of Network Systems.

Peer Reviewed Journal Papers

(J1) **A. Mitra**, J. A. Richards and S. Sundaram, "A New Approach to Distributed Hypothesis Testing and Non-Bayesian Learning: Improved Learning Rate and Byzantine-Resilience", IEEE Transactions on Automatic Control, *Conditionally Accepted*.

(J2) **A. Mitra** and S. Sundaram, "Byzantine-Resilient Distributed Observers for LTI Systems", Automatica, vol. 108, 2019.

(J3) **A. Mitra**, J. A. Richards, S. Bagchi and S. Sundaram, "Resilient Distributed State Estimation with Mobile Agents: Overcoming Byzantine Adversaries, Communication Losses, and Intermittent Measurements", Autonomous Robots: Special Issue on Foundations of Resilience for Networked Robotic Systems, vol. 43, no. 3, pp. 743-768, Mar. 2019.

(J4) **A. Mitra** and S. Sundaram, "Distributed Observers for LTI Systems", IEEE Transactions on Automatic Control, vol. 63, no. 11, pp. 3689 - 3704, Nov. 2018.

Peer Reviewed Conference Papers

(C1) **A. Mitra**, S. Bagchi and S. Sundaram, "Event-Triggered Distributed Inference", 59th IEEE Conference on Decision and Control (CDC), Jeju Island, Republic of Korea, 2020 (*to appear*).

(C2) **A. Mitra**, J. A. Richards and S. Sundaram, "A Communication-Efficient Algorithm for Exponentially Fast Non-Bayesian Learning in Networks", 58th IEEE Conference on Decision and Control (CDC), Nice, France, 2019.

(C3) Y. Mao, **A. Mitra**, S. Sundaram and P. Tabuada, "When is the Secure State-Reconstruction Problem Hard?", 58th IEEE Conference on Decision and Control (CDC), Nice, France, 2019.

(C4) **A. Mitra**, J. A. Richards, and S. Sundaram, "A New Approach for Distributed Hypothesis Testing with Extensions to Byzantine-Resilience", American Control Conference (ACC), Philadelphia, PA, 2019.

(C5) **A. Mitra**, J. A. Richards, S. Bagchi, and S. Sundaram, "Finite-Time Distributed State Estimation Over Time-Varying Graphs: Exploiting the Age-Of-Information", American Control Conference (ACC), Philadelphia, PA, 2019.

(C6) **A. Mitra** and S. Sundaram, "A Novel Switched Linear Observer for Estimating the State of a Dynamical Process with a Mobile Agent", 57th IEEE Conference on Decision and Control (CDC), Miami Beach, FL, 2018.

(C7) **A. Mitra**, W. Abbas and S. Sundaram, "On the Impact of Trusted Nodes in Resilient Distributed State Estimation of LTI Systems", 57th IEEE Conference on Decision and Control (CDC), Miami Beach, FL, 2018.

(C8) **A. Mitra** and S. Sundaram, "Secure Distributed State Estimation of an LTI system over Time-varying Networks and Analog Erasure Channels", American Control Conference (ACC), Milwaukee, WI, 2018.

(C9) **A. Mitra** and S. Sundaram, "Distributed Functional Observers for LTI Systems", 56th IEEE Conference on Decision and Control (CDC), Melbourne, Australia, 2017.

(C10) **A. Mitra** and S. Sundaram, "An Approach for Distributed State Estimation of LTI Systems", 54th Annual Allerton Conference on Communication, Control, and Computing, Allerton, IL, 2016.

(C11) **A. Mitra** and S. Sundaram, "Secure Distributed Observers for a Class of Linear Time Invariant Systems in the Presence of Byzantine Adversaries", 55th IEEE Conference on Decision and Control (CDC), Las Vegas, NV, 2016.

(C12) **A. Mitra**, N. Das, R. N. Samant, and L. Behera, "Control of a 4 DOF Barrett WAM Robot: Modeling, Control Synthesis and Experimental Validation", 1st IEEE International Conferance on Control, Measurement and Instrumentation (CMI), 2016, Kolkata, India.

(C13) **A. Mitra** and L. Behera, "Continuous-Time Single Network Adaptive Critic based Optimal Sliding Mode Control for Nonlinear Control Affine Systems", 34th Chinese Control Conference (CCC), 2015, Hangzhou, China.

(C14) **A. Mitra** and L. Behera, "Development of a Fuzzy Sliding Mode Controller with Adaptive Tuning Technique for a MRI Guided Robot in the Human Vasculature", 13th IEEE International Conference on Industrial Informatics (INDIN), 2015, Cambridge, UK.

TEACHING AND MENTORING EXPERIENCE

- Mentored Xingchen Wang, an undergraduate student in the ECE department of Purdue, as part of the Summer Undergraduate Research Fellowship (SURF) Symposium, 2018. His project was titled "Selecting Trusted Nodes for Resilient Distributed State Estimation of LTI Systems".
- Graduate Teaching Assistant for Neural Networks (EE 671), Dec 2014 - Apr 2015, IIT Kanpur.
- Graduate Teaching Assistant for Basics of Electrical Engineering Lab (ESO-203), Aug 2014 - Nov 2014, IIT Kanpur.

PROFESSIONAL SERVICE

Journal Reviewer: IFAC Automatica, Elsevier; IEEE Transactions on Automatic Control; IEEE Transactions on Control of Network Systems; IEEE Transactions on Control Systems Technology; IEEE Transactions on Power Systems; IEEE Transactions on Automation Science and Engineering; IEEE Transactions on Information Forensics and Security; IEEE Transactions on Industrial Informatics; IEEE Control Systems Letters; Annual Reviews in Control, Elsevier; Networks, Wiley.

Conference Reviewer: IEEE Conference on Decision and Control (CDC); American Control Conference (ACC); Indian Control Conference (ICC); IFAC World Congress; IEEE/IFIP International Conference on Dependable Systems and Networks (DSN).

Conference Service

- Part of the Registration team for the 8th IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys), September 16-17, 2019, Chicago, IL, USA.
- Part of the Registration team for the 3rd Conference on Advances in Control and Optimization of Dynamical Systems (ACODS), March 13-15, 2014, IIT Kanpur, India.

RELEVANT GRADUATE COURSEWORK

- **Mathematics**: Linear Algebra, Graph Theory, Real Analysis, Elements of Stochastic Processes, Probability Theory I
- **Control and Optimization**: Introduction to Convex Optimization, Optimization Methods for Systems and Control, Hybrid Systems: Theory and Analysis, Introduction to Analysis of Nonlinear Systems
- **Applied Probability**: Random Variables, Estimation Theory, Introduction to Applied Stochastic Processes, Information Theory and Source Coding, Machine Learning I (audit)

SOFTWARE SKILLS

- Matlab, Mathematica, ANSYS, PSpice, LaTeX, Java and C++.