

## Education

Ongoing **PhD**, *Electrical Engineering and Computer Science*,  
Minor in Economic Policy,  
Massachusetts Institute of Technology (MIT)  
Laboratory for Information and Decision Systems (LIDS)  
Advisor: **Prof. Eytan Modiano**

2017 to 2019 **SM**, *Electrical Engineering and Computer Science*,  
Massachusetts Institute of Technology (MIT)  
GPA - **5.0**/5.0, Thesis title - “Age of Information & Mobility”  
Advisor: **Prof. Eytan Modiano**

2013 to 2017 **Bachelors of Technology (B.Tech.)**, *Electrical Engineering*,  
Indian Institute of Technology, Bombay (IIT-B)  
GPA - **9.63**/10.0, Minor in Computer Science  
Advisor: **Prof. Sharayu Moharir**

## Research Interests

Communication Networks, Control and Optimization, Machine Learning

## Press Coverage

MIT News, AeroAstro MIT, Schwarzman College of Computing, Institute for Data Systems and Society MIT, Wireless Communications Alliance, AI Magazine, Hackster.io, TechXplore, Autonomous Vehicle International, and Quadricottero.

## Selected Publications

- “WiSwarm: Age-of-Information-based Wireless Networking for Collaborative Teams of UAVs” - **VT**, I. Kadota, E. Tal, M. Shahir Rehman, A. Warren, S. Karaman, E. Modiano; IEEE INFOCOM 2023.
- “Fresh-CSMA: A Distributed Protocol for Minimizing Age of Information” - **VT**, N. Jones, E. Modiano; IEEE INFOCOM 2023.
- “Optimizing Age of Information with Correlated Sources” - **VT**, E. Modiano; ACM Mobihoc 2022, **Best Paper Runner Up Award**.
- “Information Freshness in Multi-Hop Wireless Networks” - **VT**, E. Modiano; IEEE/ACM Transactions on Networking 2022.
- “Computation and Communication Co-Design for Real-Time Monitoring and Control in Multi-Agent Systems” - **VT**, L. Ballotta, L. Carlone, E. Modiano; IFIP WiOpt 2021.
- “An Online Learning Approach to Optimizing Time-Varying Costs of AoI” - **VT**, E. Modiano; ACM MobiHoc 2021.
- “A Whittle Index Approach to Minimizing Functions of Age of Information” - **VT**, E. Modiano; Allerton, 2019.
- “Age Optimal Information Gathering and Dissemination on Graphs” - **VT**, R. Talak, E. Modiano; IEEE Transactions on Mobile Computing 2021.
- “Age of Information in Multi-Source Systems” - **VT**, S. Moharir; IEEE GlobeCom 2017.

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## Presentations

- “WiSwarm: Wireless Networking for Multi-Agent Robotics”, LIDS Student Conference, February, 2023, **Best Presentation Award (Networks Session)**.
- “Information Freshness for Monitoring and Control over Wireless Networks”:
  - LIDS/RLE Communication + Information Theory Seminar, MIT, Spring 2022.
  - Invited Talk, Nokia Bell Labs, December 2022.
  - Invited Talk, Electrical Engineering, IIT-Bombay, December 2022.
  - Invited Talk, School of Technology and Computer Science, TIFR, Mumbai, December 2022.
- “Age Debt: A General Framework For Minimizing Age of Information”, LIDS and Stats Tea Talk, April, 2021.
- “Online Learning for Restless Multi-Armed Bandits”, LIDS Student Conference, January, 2021.
- “Age Optimal Information Gathering and Dissemination on Graphs”, LIDS Student Conference, January, 2019, **Best Presentation Runner Up Award**.

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## Experience

- Fall’17 to Present **Research Assistant**, *Communications and Networking Research Group, LIDS, MIT*
- Use tools from probability, optimization, and learning to formulate and solve problems in networking and control
  - Design new network control policies to achieve timely information delivery in wireless networks for real-time applications
  - Apply our fundamental theory results to IoT, robotics, edge computing and cloud systems
- Summer’22 **Software Engineering Intern**, *GCloud Tech Infra, Google, New York*
- Worked on Sinapse2 - a real-time observed networked modeling system for traffic management in Google’s network
  - Designed and built an input replayer for this system for debugging, recreating network behavior during past events and improving fail-static policies
- Summer’21 **Research Engineering Intern**, *Capacity Engineering and Analysis, Facebook, Menlo Park*
- Worked on a large scale mixed-integer linear programming (MILP) solver, used for long term capacity planning
  - Added detailed constraint tracking and sensitivity analysis to provide deeper insights and interpretability for this solver
  - Proposed an efficient way to perform sensitivity analysis for multiple groups of constraints in a MILP
- Spring’21,23; Fall’22 **Teaching Assistant**, MIT
- 16.36 (Communication Systems and Networks): ran a Software Defined Radio (SDR) lab with experiments covering sampling, modulation, interference and practical aspects of wireless communication, rated 7.0/7.0.
  - 6.7700 (Fundamentals of Probability): taught weekly recitations on measure-theoretic probability to first year graduate students in EECS, also delivered a lecture on mixing in Markov chains, rated 6.8/7.0.
  - 16.09 (Probability and Statistics) (Ongoing): taught introductory probability to sophomore undergrads in AeroAstro.
- Fall’15 **Teaching Assistant**, IIT-B
- Taught introductory quantum physics to a class of 40 freshmen
- Summer’15 **Research Assistant**, *Embedded Systems Lab, Prof. M. Shojaei, IIT-B*
- Worked on a custom embedded system for bio-medical signal acquisition and processing
  - Implemented algorithms for noise cancellation and motion artifact reduction of ECG and EEG signals

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## Relevant Coursework

- At MIT
- **Probability/Stats** - Fundamentals of Probability, Advanced Stochastic Processes, Inference and Information, High-dimensional Statistics.
  - **Optimization/ML** - Math. Programming, Algebraic & Semidefinite optimization, Machine Learning.
  - **Networks/Control** - Data Networks (Theory), Computer Networks (Systems), Dynamic Systems and Control
  - **Others** - Algorithmic Game Theory, Foundations of Development Policy, Collective Choice and Political Economy, Kaufman Teaching Certificate Program.
- At IIT-B
- Information Theory, Optimization Algorithms, Queuing Theory, Reinforcement Learning, Geometric Algorithms, Introduction to Game Theory, Microeconomics.

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## Fellowships and Awards

- **All India Rank 126** in the Join Entrance Exam (JEE) Advanced 2013, amongst 1.3 million candidates
- **Institute Academic Prize**, IIT-Bombay (given to 10 students among 880) for 2015-16
- **Kishore Vaigyanik Protsahan Yojana (KVPY)** fellowship with an **All India Rank of 30**
- Invited by the Govt. of India to view the 62<sup>nd</sup> **Republic Day Parade** for excellent academic performance at the high school level
- **National Talent Search Examination (NTSE)** scholar

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## Professional Service and Advising

- Co-chair for the LIDS Student Conference, MIT, 2020
- Advised undergraduate MIT researchers, Alex Warren and M. Shahir Rehman, co-authors on WiSwarm.
- Reviewer for the following IEEE journals
  - Transactions on Networking (ToN),
  - Transactions on Mobile Computing (TMC),
  - Transactions on Communications (TCOM),
  - Internet of Things Journal (IoT),
  - Journal on Selected Areas in Communications (JSAC), and
  - Transactions on Wireless Communications (TWC)
- Reviewer for IEEE GlobeCom 2022
- Reviewer for IEEE International Symposium on Information Theory (ISIT) 2019, 2020 & 2023
- Reviewer for IEEE INFOCOM Workshop on Age of Information, 2019
- Co-organizer of LIDS & Stats Tea Talks at MIT, 2019
- Treasurer of the MIT Cricket Club

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## Programming Skills

Languages **Proficient:** Python, MATLAB, C/C++, L<sup>A</sup>T<sub>E</sub>X      **Familiar:** SQL, Verilog, Javascript, CSS.  
Platforms Labview/Simulink, GNURadio.