Shaan Ul Haque

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Research Interests: Reinforcement Learning, Stochastic Approximation, Machine Learning

EDUCATION

PhD in Machine Learning, Industrial and Systems Engineering, Georgia Tech, GPA: 4/4 **2022 — present**
– *Advisor: Prof. Siva Theja Maguluri*

Bachelor of Technology, Electrical Engineering, IIT Bombay, GPA: 9.52/10 **2018 — 2022**
– *Minor, Computer Science and Engineering,* IIT Bombay
– *Honours, Electrical Engineering,* IIT Bombay

Intermediate/+2, Science, Delhi Public School, Ranchi, Percentage: 92.7% **2017 — 2018**

Matriculation, Delhi Public School, Ranchi, CGPA: 10/10 **2015 — 2016**

HONOUR AND AWARDS

- Honorable mention in the 2024 **Alice and John Jarvis Best Paper Award** in ISyE, Georgia Tech
- Recipient of **Stewart Topper Fellowship Award** from ISyE, Georgia Tech
- Recipient of **ISYE Stewart M. Fell Stipend** from ISyE, Georgia Tech
- Awarded **Undergraduate Research Award-01** (URA-01) by IIT Bombay for research on **RADAR Imaging**
- Secured **All India Rank 111** in **JEE Advanced, 2018** among selected 172,000 aspirants
- Bagged a rank of **481** in **JEE Mains, 2018** among 1.2 million students across the whole country
- Stood among the **state wise top 1%** in **National Standard Examination in Chemistry (NSEC)**
- Recipient of fellowship by the **Indian Institute Of Science (IISc), Bangalore** for clearing **Kishore Vagyanik Protsahan Yojana (KVPY)**
- Awarded scholarship by Government of India for clearing **NTSE (National Talent Search Examination)**

PUBLICATIONS

- **SU Haque**, A. Rajwade, K. Gurumoorthy, "Joint Probability Estimation Using Tensor Decomposition and Dictionaries," 2022 30th European Signal Processing Conference (EUSIPCO), Belgrade, Serbia, 2022, pp. 2226-2230, Link
- **SU Haque**, S. Chandak, F. Chiariotti, D. Gunduz, P. Popovski, "Learning to Speak on Behalf of a Group: Medium Access Control for Sending a Shared Message," in IEEE Communications Letters, vol. 26, no. 8, pp. 1843-1847, Aug. 2022, Link
- S. Sharma, A. Girish, N. Rakhashia, V. M. Gadre, **SU Haque**, A. Ansari, R.B. Pachori, P. Radhakrishna, P. Sahay, "Theoretical Analysis of an Inverse Radon Transform Based Multicomponent Micro-Doppler Parameter Estimation Algorithm," 2022 National Conference on Communications (NCC), Mumbai, India, 2022, pp. 70-75, Link

Pre-prints and Submissions

- **SU Haque**, ST Maguluri, "Stochastic Approximation with unbounded Markovian noise: A General-Purpose Theorem", arXiv:2410.21704 , Submitted

- **SU Haque**, S. Khodadadian, ST Maguluri, "Tight Finite Time Bounds of Two-Time-Scale Linear Stochastic Approximation with Markovian Noise", arXiv:2401.00364 , To be Submitted to a Journal (Honourable Mention in the 2024 Alice and John Jarvis Best Paper Award)

- S Zhang, Z Zhang, Z Chen, **SU Haque**, ST Maguluri, "Finite-Sample Analysis of Seminorm Contractive Stochastic Approximation with Applications in Average-Reward Reinforcement Learning", Pre-print, To be Submitted to a Journal

Invited Talks

- "Stochastic Approximation with Unbounded Markovian Noise: A General-Purpose Theorem", INFORMS Annual Meeting, October 2024 (Slides)

- "Tight Finite Time Bounds of Two-Time-Scale Linear Stochastic Approximation with Markovian Noise", ACO Student Seminar, April 2024 (Slides)

- "Tight Finite Time Bounds of Two-Time-Scale Linear Stochastic Approximation with Markovian Noise", DCL Student Symposium 2024, February 2024 (Slides)

Teaching Experience

- **ISyE 2027 (TA) -** Probability with Applications

  - Instructor: Prof. Sigrun Andradottir, Spring 2023
  - Instructor: Prof. Robert Foley, Fall 2022

Student Mentoring

- **Puneet Bagga, Sushanth Malipati** - Fall 2024

  - Sample complexity analysis for stochastic approximation of non-expansive operators.

- **Pranay Begwani, Akhter Abdullah Tahmid** - Fall 2024

  - Single-time scale vs two-time-scale: Finite-time performance comparison.

Key Courses

- **Machine Learning-** Machine Learning: Theory and Methods, Mathematical Foundations of Machine Learning, Advanced Machine Learning, Foundations of Intelligent and Learning Agents, Advanced Algorithms for Image Processing

- **Optimization and Algorithms-** Optimization for Reinforcement Learning, Linear Programming, First order methods in optimization for Machine Learning, Design and Analysis of Algorithms

- **Mathematics and Statistics-** Stochastic Processes 1, Theoretical Statistics, Real Analysis, Introduction to Stochastic Optimization, Advanced Probability and Random Processes

Technical Skills

- **Programming Languages and Libraries -** C++, Python, TensorFlow, SciPy, NumPy, PuLP, MATLAB
- **Deep Learning -** CNNs, RNNs, GANs, Deep Q-Networks, Auto Encoder Models

Position of responsibilities

- **Organizing Assistant | AI4OPT, Georgia Tech**   [Aug '23 - Dec '23]

  Assited in organizing 15+ weekly seminar series for AI4OPT

- **Activity Associate | Green Campus, National Service Scheme(NSS), IITB**   [Apr '19 - Apr '20]

  Mentored 100+ volunteers with a team of 7 members for the rejuvenation of ecosystem of the institute