

A K M Rokonuzzaman Sonet

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🎓 Education

2020–Present **Ph.D. Candidate in Financial Mathematics**, Florida State University, USA
Dissertation Title: Algorithmic Stability of Heavy-Tailed Stochastic Gradient Algorithms
Advisor: Dr. Lingjiong Zhu
Expected Graduation: Spring 2026

2020–2022 **Master of Science in Financial Mathematics**, Florida State University, USA

2015–2019 **Bachelor of Science in Mathematics**, University of Dhaka, Bangladesh

📁 Experience

2022–Present **Department of Mathematics, Florida State University**
Instructor of Record

- Calculus and Analytic Geometry III — Fall 2025, Spring 2026
- Calculus and Analytic Geometry II — Spring 2025, Fall 2024
- Calculus and Analytic Geometry I — Spring 2024

Designed and taught Calculus I–III with full responsibility for syllabus, instruction, assessment, and grading for approximately 30 students each semester

Recitation Instructor

- Discrete Mathematics II — Fall 2023
- Discrete Mathematics I — Spring 2023, Summer 2022
- Calculus I — Fall 2022

Facilitated problem sessions, ran quizzes, office hours, coordinated with course instructor.

Assistant in Course Development

- Calculus and Analytic Geometry I — Summer 2024

Developed course content and assessments, aligned outcomes

Summer 2023, 2025 **Graduate Research Assistant**, Florida State University
Supervisor: Dr. Lingjiong Zhu
Project: The Heavy-Tail Methods in Machine Learning

- Investigate the emergence of heavy-tails in stochastic gradient algorithms
- Study algorithmic stability under heavy-tailed noise
- Characterize tail indices and analyze their implications on generalization

Jan 2021–Dec 2021 **Graduate Teaching Assistant**, Florida State University

- Taught Pre-Calculus Algebra to approximately 30 students
- Assisted in teaching various undergraduate courses
- Helped students grasp fundamental concepts and enhance their problem-solving skills
- Led discussion sections, graded and held office hours
- Assisted with exam proctoring and student support

Research Work

Research Interests

Stochastic Optimization and Machine Learning Theory, Algorithmic Stability and Generalization, Data Science, Computational Finance and Derivative Pricing, Financial Risk Management

Manuscripts - Preprint

- Dang, Thanh, Melih Barsbey, **A K M Rokonuzzaman Sonet**, Mert Gurbuzbalaban, Umut Simsekli, and Lingjiong Zhu (2025). *Algorithmic Stability of Stochastic Gradient Descent with Momentum under Heavy-Tailed Noise*. arXiv: [2502.00885](https://arxiv.org/abs/2502.00885) [[stat.ML](#)].

Manuscripts — In Preparation

- **A K M Rokonuzzaman Sonet**, Lingjiong Zhu, Emergence of Heavy-Tails in Homogenized Decentralized Stochastic Gradient Descent (DE-SGD)
- **A K M Rokonuzzaman Sonet**, Lingjiong Zhu, The Heavy-Tail Phenomenon in Stochastic Gradient Descent with Momentum (SGDm)

Presentations

- *Applied Quantitative Finance: A Project Portfolio*, Quant Finance Boot Camp, Erdős Institute, June 2025. Topics: Portfolio Optimization, Delta Hedging, Option Pricing
- *Stock Price Prediction using LSTM*, Data Science Boot Camp, Erdős Institute, June, 2022
- *Study of Some Basic Epidemiological Models*, Department of Mathematics, University of Dhaka, December 2018

Awards

- *Bettye Anne Busbee Case Graduate Fellowship*, recognition for outstanding scholarly work leading to doctoral candidacy, Department of Mathematics, Florida State University, 2024
- *FSU Math Distinguished Teaching Assistant Award*, an award for outstanding TA performance, 2025
- *University Scholarship* on undergraduate studies, University of Dhaka, 2019
- *The Duke of Edinburgh's Award: Bronze Level*, a global youth achievement award for individuals, 2018
- *Champion, Intra-Department Mathematics Contest*, Department of Mathematics, University of Dhaka, 2015

Professional Memberships

- American Mathematical Society (AMS)
- Society for Industrial and Applied Mathematics (SIAM)
- Bangladesh Mathematical Society (BMS)

Service

- **Volunteer**, Florida State University Math Fun Day, 2026
- **Treasurer**, Bangladesh Student Association, Florida State University, 2022-23
- **Volunteer**, University Women's Mathematics Olympiad, 2018
- **Volunteer**, Light of Hopes Youth Foundation, 2016-19

References

- **Lingjiong Zhu, Ph.D.**

Professor, Department of Mathematics, Florida State University

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Phone: +1 (850) 644-2202

Relationship: Ph.D. Dissertation Advisor

- **Giray Okten, Ph.D.**

Professor and Associate Chair for Graduate Studies, Department of Mathematics, Florida State University

Email: gokten@fsu.edu

Phone: +1 (850) 644-8713

Relationship: Ph.D. Dissertation Committee Member

- **Penelope Kirby, Ph.D.**

Coordinator of Graduate Teaching Assistants, Department of Mathematics, Florida State University

Email: pkirby@fsu.edu

Phone: +1 (850) 644-3737

Relationship: Graduate Teaching Assistant Coordinator

- **Arash Fahim, Ph.D.**

Associate Professor, Department of Mathematics, Florida State University

Email: afahim@fsu.edu

Relationship: Graduate Course Instructor