

MOHAMMAD RAFIQUUL ISLAM

LOV 331
Department of Mathematics
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EDUCATION

- FLORIDA STATE UNIVERSITY (FSU) TALLAHASSEE, FLORIDA, USA
(**Currently Enrolled**)
PhD in Financial Mathematics May, 2026 (Anticipated)
- YOUNGSTOWN STATE UNIVERSITY (YSU) YOUNGSTOWN, OHIO, USA
Master of Science, Mathematics May, 2020
Minor in Statistics, Data Analytics, and Actuarial Science
- UNIVERSITY OF DHAKA (DU) DHAKA, BANGLADESH
Master of Science, Applied Mathematics March, 2016
- UNIVERSITY OF DHAKA (DU) DHAKA, BANGLADESH
Bachelor of Science, Mathematics November, 2014
Minor in Statistics and Physics.
- SOCIETY OF ACTUARIES (SOA) SCHAUMBURGH, IL, USA
Probability: Exams P March, 2019
Financial Mathematics: Exam FM March, 2019

TEACHING EXPERIENCE

- DEPARTMENT OF MATHEMATICS
FLORIDA STATE UNIVERSITY TALLAHASSEE, FLORIDA, USA

Instructor of Record

- ★ MAC2311 Calculus with Analytic Geometry I Spring 2025
- ★ MAP4170 Introduction to Actuarial Science Spring 2024
- ★ MAC1140 Pre-calculus and Algebra Spring 2023

As a solo instructor of record for these courses, I am responsible for teaching a class of roughly 30 undergraduate students from different majors including but not limited to computer science, biomedical engineering, pre-finance, marketing, and mathematics.

Grader and Makeup Exam Coordinator

Actuarial Science and Undergraduate mathematics Fall 2024
Combined duty as a grader for the actuarial course *Introduction to Actuarial Mathematics* and schedule manager for missed quizzes for the undergraduate students who missed their scheduled quizzes on their perspective math courses.

Recitation Instructor

Calculus and Analytic Geometry I Fall 2022
I ran two poster presentation sessions of 30 students in each group where they presented mathematical problems and their solutions step by step to their peer classmates followed by a group activity where they solved another set of problems. I also graded their exam scripts and weekly posters.

Lecture & Lab TA

Precalculus and Algebra

Fall 2021 to Summer 2022

As a lecture TA, my job was to facilitate the instructor during the class. This included helping students in class activities such as answering short questions that counted as class attendance, checking students' eligibility forms for taking this course, and others as needed by the instructor.

As a lab TA I worked in a computer lab where students take their weekly quizzes and midterm tests.

- DEPARTMENT OF MATHEMATICS AND STATISTICS
YOUNGSTOWN STATE UNIVERSITY
YOUNGSTOWN, OH, USA

Instructor

Responsible for the preparation and delivery of all lectures, making question papers for all exams, and the grading of tests and homework assignments for the following courses:

- ★ College Algebra
Fall 2018
- ★ Trigonometry
Fall 2019

Teaching Assistant

Spring 2019

Responsible for reviewing course assignments once a week with approximately 30 students, grading homework, administrating and grading course exams, and delivering lectures when the professor was absent for some reason.

Tutor

Work as a tutor at the *Mathematics Assistance Center (MAC)* at YSU to help freshmen and sophomore students to understand the following courses:

- ★ Statistical Literacy and Critical Reasoning
- ★ Pre-calculus and Trigonometry
- ★ College Algebra

- LAKELAND TOURS LLC D.B.A WORLDSTRIDES
ENVISION EMI, LLC
VIENNA, VIRGINIA, USA

Middle School Level

Jun 2019 to July 2019

Summer camp advisor: Civil Engineering Strand, STEM Explore 2019

- ★ Worked as an advisor of the civil engineering strand for a weekly summer camp for middle school students.
- ★ Helped the scholars understand design thinking: Empathize, Define, Ideate, Prototype, and Test to build a Mars habitat using CAD software and physical 3D models

INDUSTRY EXPERIENCE

- DELTA LIFE INSURANCE COMPANY LIMITED
Assistant Vice President, Actuarial and Reinsurance Department
DHAKA, BANGLADESH
September 2017 to July 2018
 - ★ Calculated and processed approximately 500 claims weekly, including death, surrender, and maturity claims, using Excel spreadsheets, and submitted detailed statistical reports to senior management.

- ★ Worked in a team to develop a new short-term endowment assurance product which played an important role in increasing the company's new business by 10% in new policy sales.
 - ★ Refurbished an out-of-sale risk endowment product that increased new policy income by BDT 1,125,000.00.
 - ★ Calculated reserves for group endowment, term, and premium back policies which was a vital part of the final valuation report.
 - ★ Liaised directly with the consulting actuary, providing comprehensive technical and documentation support during the actuarial valuation.
- SANDHANI LIFE INSURANCE COMPANY LIMITED DHAKA, BANGLADESH.
Actuarial Trainee, Actuarial and Technical Department September 2016 to August 2017
- ★ Prepared monthly report for the insurance regulatory authority using raw data obtained from the IT server
 - ★ Generated surrender factor using Excel spreadsheets and surrender models for immature insurance policies.
 - ★ Calculated group insurance liabilities using the group valuation model provided by the chief actuary.
 - ★ Attended group business meetings to explain the benefits and features of our group insurance products.

RESEARCH

- RESEARCH ASSISTANT May 2024- August 2024
- ★ NSF project title: The Heavy-Tailed Methods in Machine Learning ([DMS-2208303](#))
 - ★ Supervisor: Lingjiong Zhu, Ph.D, Department of Mathematics, Florida State University.
 - ★ Contributed sub-project: EXTRA Decentralized Stochastic Gradient Langevin Dynamics.
 - Developed and implemented Exact First-Order Algorithm for Decentralized Stochastic Gradient Langevin Dynamics.
 - Conducted theoretical analysis and provided non-asymptotic convergence proofs.
 - Designed and executed numerical experiments to validate the proposed algorithms using both synthetic and real-world data.
 - Collaborated with a multidisciplinary team to publish findings in peer-reviewed journals.
- PUBLICATIONS
- ★ Gurbuzbalaban, M., Islam, M. R., Wang, X., & Zhu, L. (2024). "Generalized EXTRA stochastic gradient Langevin dynamics". *arXiv preprint arXiv:2412.01993*. ([link](#))
 - ★ Mostafa, Fahad; Saha, Pritam; Islam, Mohammad Rafiqul, and Nguyen, Nguyet, "GJR-GARCH Volatility Modeling under NIG and ANN for Predicting Top Cryptocurrencies." *Journal of Risk and Financial Management* 14.9 (2021): 421. ([link](#))
 - ★ Islam, Mohammad Rafiqul, and Nguyet Nguyen. "Comparison of Financial Models for Stock Price Prediction." *Journal of Risk and Financial Management* 13.8 (2020): 181. ([link](#))
- PROJECTS
- ★ *Option pricing techniques: A performance-based comparative study of the randomized quasi-Monte Carlo method and Fourier cosine method*
Pricing financial derivatives such as options with desired accuracy can be hard due to the nature of the functions and complicated integrals required by the pricing techniques. In this paper we investigate the pricing methodology of the European style options using two advanced

numerical methods, namely, Quasi-Monte Carlo and Fourier Cosine (COS). For the RQMC method, we use the random-start Halton sequence. We use the Black-Scholes-Merton model to measure the pricing quality of both of the methods. For the numerical results we compute the option price of the call option and we found a few reasons to prefer the RQMC method over the COS method to approximate the European style options.

★ *Lending Club Data Analysis*

In this project, we apply data analytic methods to predict loan status for the borrowers and lenders. Loans taken by the borrowers can be fully paid, default or charged off and these situations depend on hundreds of factors. In this paper we will primarily deal with few of those predictor variables and try to make prediction for loan status.

★ *The Relationship Between Forced Sexual Activities And Suicidal Attempts Of The Victims*

In this project, we apply data-analytic methods to further explore the relationship between forced sexual activities and suicidal behavior among adolescents in the United States. Our findings build on existing literature that explores this relationship. The sample of the study was taken from the Youth Risk Behavior Surveillance System survey 2017. We used a chi-squared test to find the association of forced sexual activities and suicidal behavior, and we found a strong association. Then we used bivariate logistic regression analysis to ascertain the association of race, age, sex, and education with suicidal attempts after experiencing forced sexual activity (sexual assault). The results of the following paper provide greater insight into the relationship between forced sexual activities and suicide attempts by adolescents.

CONFERENCES

- FSU Financial Mathematics Quant Symposium 2023
- 20th International Mathematics Conference 2017 hosted by Bangladesh Mathematical Society, Dhaka, Bangladesh
- 6th Annual Midwest Actuarial Student Conference hosted by the Society of Actuaries and the University of Wisconsin Milwaukee, WI, USA
- 1st SRU SAS Analytics Day hosted by Slippery Rock University and SAS Institute

AWARDS

- Bettye Anne Busbee Case Graduate Fellowship & Doctoral Mentorship Recognition 2024 (\$1000.00).
- Outstanding Graduate Student in Statistics Award for the 2019-2020 academic year (\$150.00).
- Society of Actuaries (SOA) travel grant to attend 6th Annual Midwest Actuarial Student Conference, University of Wisconsin, Milwaukee, WI (\$125.00).
- Graduate College Premiere Scholarship, Youngstown State University.
- MetLife Bangladesh Actuarial Study Program 2015.

MEMBERSHIPS

- Bangladesh Mathematical Society: Life Member
- Society of Actuaries (SOA), USA: Student Member
- Society for Industrial and Applied Mathematics (SIAM), USA: Student Member

- American Mathematical Society-AMS: Student Member
- Graduate Student Council: FSU Mathematics Department