Curriculum Vitae
February, 2025

Shreshtha Chaturvedi

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Education

Ph.D. in Mathematics (Candidate)
The University of Texas at Arlington | Expected Graduation: Spring 2025

- Thesis Title: An Optimization Framework for Parameter Estimation in a Dynamical Sleep Neuronal Model with Machine Learning Applications to Sleep Disorders
- Ph.D. Supervisor: Dr. Pedro Maia
- Research Interests: Applications of Optimization Theory, Mathematical Modeling, and Computational Neuroscience, in Mathematical Biology
- GPA: 4.0

M.Phil. in Mathematics
Dr. B.R. Ambedkar University Delhi | 2021

- Thesis: Group Theory in Cryptography

M.Sc. in Mathematics
University of Delhi | 2018

B.Sc. (Hons.) in Mathematics
University of Delhi | 2016

Teaching Experience at The University of Texas at Arlington

- **Instructor of Record**
  - *Calculus 1* (In-person, 70 students, *Fall 2024*)
  - *Contemporary Math* (In-person, 13 students, *Summer 2024*)
- **Lab Instructor**
  - *Calculus 1* (In-person, 70 students, *Fall 2021, Fall 2023, Spring 2024*)
  - *Calculus 1* (Online, 65 students, *Spring 2022*)
  - *Calculus 2* (In-person, 69 students, *Fall 2022*)
  - *Calculus 2* (In-person, 67 students, *Spring 2023*)
- **Graduate Assistant at Math Learning Resource Center**
  - *All Undergraduate Math Courses* (In-person, *Spring 2025*)

Teaching Experience at Ambedkar University Delhi

- **Graduate Teaching Assistant**
    - *Elementary Group Theory and Ring Theory, Sets and Relations, and Complex Analysis* (In-person, 50 students, *2019-2020*)

Teaching Training Programs

- CIRTL Network Course, First Year Faculty Teaching Academy, Summer 2022
- Graduate Student Teaching Training, Spring 2022

Papers

- **Published**
    - Souvik Roy et al. *"A robust optimal control framework for controlling aberrant RTK signaling pathways in esophageal cancer"*, Journal of Mathematical Biology, 2024

- **Under Review**
    - Shreshtha Chaturvedi, Souvik Roy, and Pedro D. Maia, *"Automated parameter estimation in a three-population neuronal network from recorded sleep hypnograms"* (submitted to a peer-reviewed journal, Nov 2024)

- **In Preparation**
    - Shreshtha Chaturvedi, Souvik Roy, and Pedro D. Maia, *"Classifying sleeper subtypes: Cluster analysis on estimated parameters of a three-population neuronal network"*

Selected Invited Presentations

- **Talks**
    - *"Automated parameter estimation in a three-population neuronal network from recorded sleep hypnograms,"* AMS Fall Eastern Sectional Meeting, University at Albany, NY, USA, Oct 2024

    - *"Why braid groups enrich cryptography,"* International Conference on Analysis, Algebra, Combinatorics, and their Applications, Jadavpur University, India, Jan 2020

    - *"Braid groups in cryptography,"* International Conference on Recent Advances in Algebra, Analysis, and Applications, MLSU, India, Dec 2019

- **Posters**
    - *"Group theory in cryptography,"* Ischia Group Theory, online, Mar 2021

- **Intra-University Events**
    - *"Optimization and Parameter Estimation of a Sleep Dynamical System,"* Mathposium, Nov 2024 (talk)

- *"Using Optimization theory to estimate parameters in a three-population neuronal network,"* MAA and SIAM chapter, Sep 2024 (talk)
- *"Deciphering sleep dynamics: Analyzing the stages in Cannabis users and non-users using Fokker-Planck equations,"* Discover, College of Science, Apr 2024 (poster)
- *"Cannabis effects on sleep architecture: EEG analysis of sleep-stage durations, transitions, and spectral content,"* Mathposium, Nov 2023 (poster)

Undergraduate Mentorship

- *EEG Analysis using MNE Python*, The University of Texas at Arlington, Fall 2022
  - Mentored one undergraduate student in using MNE Python for frequency analysis on a sleep EEG dataset, exploring data preprocessing, analysis techniques, and visualization methods.
- *Algebraic Cryptography*, Ambedkar University Delhi, 2020
  - Mentored two undergraduate students on a research project focused on understanding algebraic structures in cryptography.

Scholarships and Grants

- **2024**
  - Edward and Dorothy Perez Scholarship
  - Dr. Judith J. Carrier Scholarship
  - AMS Travel Grant for the AMS Fall Eastern Sectional Meeting
- **2023**
  - Math Academic Excellence Scholarship
  - Edward and Dorothy Perez Endowed Scholarship
- **2022**
  - Mathematics Student Scholarship and Faculty Research Fund
- **2021**
  - Michael B. and Wanda G. Ray Scholarship for Graduate Studies Award

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Research Workshops and Summer Schools

- **Summer Schools**
  - Neuromatch Academy, Computational Neuroscience, Summer 2022
- **Workshops**
  - TEQIP-III Short-term Course on Introduction to Modern Cryptography, NIT Jamshedpur, July 2019
  - NASI-TIMC Workshop on Coxeter Groups, IIT Patna, Dec 2018

Part-time Work Experience

- Subject Matter Expert (Mathematics), Chegg | 2018 - 2021
- Academic Writer (Mathematics), Evelyn Learning Systems | 2020
- Content Developer (Mathematics), Khan Academy and QBS | 2019 - 2020

Leadership and Engagement

- **American Mathematical Society, Graduate Chapter, UTA**
  - President, 2023-2024
  - Vice President, 2022-2023
- **Computational Neuroscience Journal Club**
  - Active Presenter, led by Dr. Pedro Maia

Membership in Professional Organizations, Community Service & Outreach

- Member, American Mathematical Society (AMS), 2021 - present
- Member, Association for Women in Mathematics (AWM), 2021 - present
- Member, Society for Industrial and Applied Mathematics (SIAM), 2021 - present
- Mentor, First Year Graduate Teaching Assistants in Mathematics, University of Texas at Arlington, Fall 2023
- Organizing Team Member, Mathposium Poster Presentation, The University of Texas at Arlington, 2022 & 2023
- Organizing Team Member, Research Fest, Ambedkar University Delhi, 2020
- Member, Miranda House College Debating Society, University of Delhi, 2013 - 2016

Technical Skills

- **Programming Languages**
  - MATLAB, Python, Mathematica, R
- **Software**
  - LaTeX, Microsoft Office Suite (Word, Excel, PowerPoint)

Key Undergraduate Academic Accomplishments

- All India Rank (AIR) 25, M.Sc. Mathematics Entrance Exam, University of Delhi, 2016
- Qualified Joint Admission Test (JAM) for Mathematics, India, 2016

Volunteer Work

- Intern, RAHI Foundation, "I Will Not Shut Up" campaign on child sexual abuse awareness, Delhi, India, 2015
