Sutapa Dey Tithi

stithi@ncsu.edu | Portfolio | Google Scholar | GitHub

Research Interests

- Artificial Intelligence in Education
- Educational Data Mining/Learning Analytics

Education

- **North Carolina State University** — Raleigh, NC
  Ph.D. in Computer Science, GPA: 3.93/4.0 — *Aug 2022 – Present*
  - Advisor: Dr. Tiffany Barnes
- **Bangladesh University of Engineering and Technology** — Bangladesh
  B.Sc. in Computer Science and Engineering, GPA: 3.62/4.0 — *Feb 2017 – May 2022*
  - Thesis: Automated Analysis of Parkinson's Disease using Machine Learning

Research & Professional Experience

- **Graduate Research Assistant** — Raleigh, NC
  NCSU - Advisor: Dr. Tiffany Barnes — *Jun 2023 – Present*
  - Cognitive load theory informed intelligent tutor interface redesign resulting in 50% tutor time. [Poster]
  - Advanced prompting techniques to generate propositional logic solutions and next-step hints, and built an auto-grader to evaluate LLM-generated proofs and hints, and integrated a chat assistant into the existing tutor. [Paper (under review)]
  - Multi-semester experiments with 400+ undergraduate students, Educational Data Mining/Learning Analytics techniques for designing adaptive instructional support mechanisms for promoting active learning, critical thinking, and optimal problem-solving skills. [Paper accepted in CSEDM25 workshop] [Another under review]
  - Developed adaptive step-level and task-level interventions with DRL techniques and knowledge component-based techniques
- **Course Administrator** — Raleigh, NC
  CSC 116 - Introduction to Computing (Java), NCSU — *Summer 2024*
- **Graduate Teaching Assistant** — Raleigh, NC
  CSC 226 - Discrete Mathematics for Computer Scientists, NCSU — *Aug 2022 – May 2023*

Technical Skills

- **Programming Languages:** Python, C/C++, Java, JavaScript, SQL, R, MATLAB
- **Web Technologies:** React.js, Node.js, Flask, HTML/CSS, RESTful APIs, Firebase
- **Databases & Tools:** PostgreSQL, MySQL, Neo4j, Git, GraphViz, Jupyter, LaTeX
- **AI/ML Technologies:** scikit-learn, Keras, TensorFlow, Pandas, NumPy, OpenAI API and Prompt Engineering

Selected Projects

- **Automated Parkinson's Disease Assessment System**: Developed full-stack web application collecting video data from 172 participants in Bangladesh; trained ML models achieving 85% accuracy for automated PD assessment. Live Demo | Video
  Technologies: React.js, Node.js, Firebase, Python, OpenCV, scikit-learn
- **Intelligent Team Formation Platform**: Built collaborative web application enabling project-based team formation with smart matching algorithms and real-time communication features. GitHub | Demo
  Technologies: React, Flask, Python, PostgreSQL
- **Learn Math Educational Platform**: Created comprehensive learning management system with rubric-based assessment, tutorial creation tools, and content quality moderation features. GitHub
  Technologies: React.js, Node.js, PostgreSQL

Publications

[1] S. D. Tithi, X. Tian, M. Chi, and T. Barnes. "Investigating the Impact and Student Perceptions of Guided Parsons Problems for Learning Logic with Subgoals". In: *5th Educational Data Mining in Computer Science Education (CSEDM) Workshop* (2025).

[2] S. D. Tithi, A. K. Ramesh, C. DiMarco, X. Tian, N. Alam, K. Fazeli, and T. Barnes. "The Promise and Limits of LLMs in Constructing Proofs and Hints for Logic Problems in Intelligent Tutoring Systems". In: *arXiv preprint arXiv:2505.04736 (under review in the journal Computers & Education: Artificial Intelligence)* (2025).

[3] T. Adnan, M. S. Islam, S. Lee, E. Wasifur Rahman Chowdhury, S. D. Tithi, K. Noshin, M. R. Islam, I. Sarker, M. S. Rahman, R. B. Schneider, et al. "AI-Enabled Parkinson's Disease Screening Using Smile Videos". In: *NEJM AI* 2.7 (2025), AIoa2400950.

[4] N. Alam, K. Fazeli, X. Tian, M. Chi, and T. Barnes. "Determining Problem Type Using Deep Reinforcement Learning in a Data-Driven Intelligent Tutor". In: *International Conference on Artificial Intelligence in Education*. Springer. 2025, pp. 141–148.

[5] S. D. Tithi, B. Mostafavi, A. K. Ramesh, and T. Barnes. "Strategic Interface Design Can Improve Learning Efficiency in an Intelligent Tutoring System". In: *International Educational Data Mining Society* (2024).

[6] P. Shabrina, B. Mostafavi, S. D. Tithi, M. Chi, and T. Barnes. "Learning Problem Decomposition-Recomposition with Data-Driven Chunky Parsons Problems within an Intelligent Logic Tutor." In: *International Educational Data Mining Society* (2023).

Undergraduate Research Mentees

- (Summer 2024) Clara DiMarco, GCSP REU, NCSU
- (Summer 2025) Anant Patel, Research Intern
- (Summer 2025 - Present) Ramcharan Kottam, Research Intern, GCSP
- (2021/22) Sadia Tabassum, BWCSE Mentoring Program, Bangladesh University of Engineering and Technology

Graduate Mentors

- (2022-2023) Dr. Preya Shabrina, Machine Learning Research Scientist, Meta
- (2025-) Dr. Yang Shi, Assistant Professor in Computer Science, Utah State University