Tanvi Bajpai

PhD Candidate and Graduate Research Assistant

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Education

- **University of Illinois at Urbana Champaign (UIUC)** — Urbana, IL
  Ph.D Candidate in Computer Science — *Aug. 2019 – July 2025*
  - GPA: 3.9
  - Co-advisors: Prof. Chandra Chekuri and Prof. Eshwar Chandrasekharan
  - Research Areas:
    - Theoretical Computer Science (e.g., Algorithm Design and Optimization, ML Theory)
    - Human-Computer Interaction (e.g., Social Computing, Online Moderation, Applied NLP)

- **Carnegie Mellon University (CMU)** — Pittsburgh, PA
  B.S. in Computer Science (Additional Major in Discrete Math & Logic), University Honors — *Aug. 2015 – May. 2019*
  - GPA: 3.6
  - Research Advisor: Prof. R. Ravi

Technical Skills

- **Programming Languages**: Python, Java/Javascript, C/C++, SQL, HTML/CSS, OCaml, Processing
- **ML/AI & Data Tools**: PyTorch, TensorFlow, scikit-learn, Keras, XGBoost, pandas, NumPy, Matplotlib
- **Optimization & Modeling**: Agent-Based Modeling (NetLogo, Mesa), Gurobi
- **Other Tools**: LaTeX, Git, Linux/Unix

Work Experience

- **AliveCor** — Mountain View, CA
  Data Science Research Intern — *May 2023 - August 2024*
  - Developed deep learning models, including transformer-based architectures, for ECG classification and time-series forecasting using PyTorch and TensorFlow; integrated signal processing techniques to enable real-time, clinical-grade analysis at scale.
  - Built end-to-end ML pipelines for training and evaluation on millions of ECG records, with a focus on interpretability, reproducibility, and clinical reliability.
  - Designed experiments to evaluate model performance across patient subgroups, comparing baseline and optimized architectures using precision, recall, and latency metrics.
  - Collaborated with product leadership and clinical reviewers to identify morphology variants and expand classifier coverage for downstream integration into health-facing applications.

- **Microsoft** — Redmond, WA
  Explorer (SWE + PM) Intern — *Summer 2017*
  - Built a scalable SDK for developing AI-powered moderation chatbots, streamlining trust & safety tooling and enabling internal teams to integrate automated abuse detection features.
  - Developed MOSSMO, a reference chatbot leveraging the SDK, which applied NLP and sentiment analysis to flag toxic behavior and improve community safety
  - Contributed to AI-driven moderation solutions using Node.js and ML models, supporting content review and real-time abuse detection across large-scale gaming platforms.

Selected Technical Projects

- **Agent-Based Simulation of Moderation under Queueing and Scheduling Constraints.**
  Developed an interactive agent-based simulation using Mesa to model the dynamics of Reddit's modqueue, focusing on fairness, delay, and system load under varying prioritization strategies. The tool allows researchers, moderators, and community members to explore how design decisions and interface constraints affect moderation outcomes and shape tradeoffs in sociotechnical systems. This work is aimed at helping researchers to understand moderation workflows and empowering users to make informed decisions about community interventions. Forms the final chapter of Ph.D. thesis.
  arXiv:2409.16840

Publications

Papers Under Submission and Pre-prints

- ***Covering with Few Submodular Constraints: A Generalized Approach to Fair Covering.***
  pre-print; to be submitted for peer review in November 2024
  Tanvi Bajpai, Chandra Chekuri, Pooja Kulkarni

- ***Modeling the Modqueue: Towards Understanding and Improving Report Resolution on Reddit.***
  pre-print; submitted for peer review in September 2024
  Tanvi Bajpai, Eshwar Chandrasekharan

Peer-Reviewed Conference Publications

- ***Bicriteria Approximation Algorithms for Priority Matroid Median.***
  ACM International Conference on Approximation Algorithms for Combinatorial Optimization Problems (APPROX '23)
  Tanvi Bajpai, Chandra Chekuri

- ***Measuring User-Moderator Alignment on r/ChangeMyView.***
  ACM Conference On Computer-Supported Cooperative Work And Social Computing (CSCW '23)
  **Received Best Paper Award
  Vinay Koshy, **Tanvi Bajpai**, Eshwar Chandrasekharan, Karrie Karahalios, Hari Sundaram

- ***ConvEx: A Visual Conversation Exploration System for Discord Moderators.***
  ACM Conference On Computer-Supported Cooperative Work And Social Computing (CSCW '23)
  Frederick Choi, **Tanvi Bajpai**, Sowmya Pratipati, Eshwar Chandrasekharan

- ***Harmonizing the Cacophony with MIC: An Affordance-aware Framework for Platform Moderation.***
  ACM Conference On Computer-Supported Cooperative Work And Social Computing (CSCW '22)
  Tanvi Bajpai, Drshika Asher, Anwesa Goswami, Eshwar Chandrasekharan

- ***Revisiting Priority k-Center: Fairness and Outliers.***
  International Colloquium on Automata, Languages and Programming (ICALP '21)
  Tanvi Bajpai, Deeparnab Chakrabarty, Chandra Chekuri, Maryam Negahbani

Peer-Reviewed Journal Publications

- ***A new system-wide diversity measure for recommendations with efficient algorithms.***
  SIAM Journal of Mathematics of Data Science, Volume 1 (SIMODS '19)
  Arda Antikacioglu, **Tanvi Bajpai**, R. Ravi

Honors and Awards

- **Outstanding TA Award, UIUC** Fall 2020
  - Awarded to five teaching assistants in the Computer Science Department each semester in recognition of their dedication to teaching and excellence in supporting student learning, as nominated by faculty members.
- **K&L Gates Prize, CMU** 2019
  - University Award for the graduating senior who best inspires fellow students to embrace a love of learning through a combination of intellectual achievement, engagement with the community, and exemplary character.
- **Women's Association Outstanding Graduating Senior Award, CMU** 2019
  - Award for graduating seniors, emphasizing recognition of students committed to advancing women in their academic pursuits and promoting gender equity within their fields of study.
- **Mark Stehlik Introductory & Service Teaching Award, CMU** 2019
  - Award for the graduating senior who demonstrates exceptional dedication and invaluable contributions to teaching introductory courses, enhancing the learning experience for new students.
- **Senior Leadership Recognition, CMU** 2019
- **University Honors, CMU** 2019
- **Mark Stehlik SCS Alumni Undergraduate Impact Scholarship, CMU** 2018
  - Scholarship awarded to undergraduate students in the CMU School of Computer Science who demonstrate a commitment to excellence beyond the classroom, making significant contributions to the field of computer science and positively impacting their communities.

Service and Outreach

Reviewing

- **ACM Conference on Human Factors in Computing Systems** (2024)
- **ACM-SIAM Symposium on Discrete Algorithms**(2024)
- **ACM Conference On Computer-Supported Cooperative Work And Social Computing** (2023)
- **Operations Research Letters Journal** (2021-2022)

Outreach

- **Graduate Women in Computer Science (GradWCS)**
  Founder, Co-President (UIUC, 2019 - 2021, 2023 - present)
- **Illinois Secondary Teaching & CS Initiative**
  Course Designer, Instructor (UIUC, 2020-2022)
  - Designed and taught a discrete math course for Illinois teachers as part of a statewide CS education effort.
- **Women School of Computer Science (W@SCS)**
  Undergraduate Event Coordinator, Graduate Student Liaison (CMU, 2017 - 2019)

Institutional Service

- **Broadening Participation in Computing Committee**
  (UIUC, 2020 - 2021)
- **School of Computer Science Dean Search Committee**
  (CMU, 2018 - 2019)

Teaching

I've worked as a teaching assistant for the following courses.

- **University of Illinois at Urbana-Champaign**
  - CS 598SC: Social Computing. Spring 2022
  - CS 374: Introduction to Algorithms and Models of Computation. Fall 2020^{+}, Fall 2021
  - CS 473: Algorithms. Spring 2020, Fall 2024
  - CS 173: Discrete Structures. Fall 2019^{+}, Summer 2020^{+}
- **Carnegie Mellon University**
  - 15-451/15-651: Algorithm Design and Analysis. Spring 2018, Spring 2019
  - 15-151: Mathematical Foundations of Computer Science. Fall 2016, Fall 2017*, Fall 2018*

$+$ denotes semester placed on *Teachers Ranked as Excellent* list, $*$ denotes semester serving as Head Teaching Assistant.

Student Advising and Mentoring

- **Sowmya Pratipati** (Fall 2021 - Spring 2024)
  Sowmya received the UIUC CS Stars Fellowship in Fall 2021 and Fall 2022.
- **Drshika Asher** (Summer 2021 - Spring 2024)
  Drshika received the UIUC CS Stars Fellowship in Fall 2021. During the summer of 2022, she interned at Microsoft Research. In Spring 2022, she was named a Clare Boothe Luce Scholar.
- **Anwesa Goswami** (Spring 2021)