Tanvi Bajpai

PhD Candidate and Graduate Research Assistant

tbajpai2@illinois.edu
tanvibajpai.com

Education

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

- **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, HTML/CSS

Work Experience

- **AliveCor** — Mountain View, CA
  Data Science Research Intern — *May 2023 - August 2024*
  - Developed and deployed deep learning models for real-time ECG classification using PyTorch and TensorFlow, integrating signal processing techniques for clinical-grade accuracy at scale.
  - Built end-to-end ML pipelines supporting efficient training, evaluation, and deployment across millions of data points, with a focus on interpretability and reliability in healthcare settings.
  - Designed experiments to evaluate model performance across patient subgroups, comparing baseline architectures to optimized models using precision, recall, and latency metrics.
  - Collaborated cross-functionally with product and clinical teams to translate research insights into product features and improve user trust in health predictions.

- **Microsoft** — Redmond, WA
  Explorer (SWE + PM) Intern — *Summer 2017*
  - Developed and deployed AI-powered chatbot solutions for Mixer and Xbox Live using Node.js and machine learning models, enabling efficient content moderation and automated abuse detection at scale.
  - Designed and implemented MOSSMO, an advanced moderator chatbot that leveraged NLP and sentiment analysis models to detect and automatically report inappropriate behavior, improving online community safety and engagement.
  - Built a scalable SDK for chatbot development, streamlining AI-driven moderation tools and providing enhanced trust & safety functionalities for platform users.

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 both researchers 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)