Tempe, AZ, USA
anya.chaturvedi@asu.edu
anyachaturvedi27.github.io
anyachaturvedi

ANYA **CHATURVEDI**

Research Summary

Ph.D. student focusing on research in graph algorithms spanning two themes: coordination under severe locality constraints (anonymity and bounded memory) in dynamic networks, and combinatorial optimization in centralized as well as distributed settings. Published work appears in *IEEE/ACM Transactions on Networking*, *DISC* (Brief Announcement), SAND, and a NeurIPS workshop (DiffCoALG).

Research Interests

Graph algorithms · Dynamic graphs · Distributed algorithms · Randomized algorithms · Approximation algorithms · Combinatorial optimization · Learning-assisted combinatorial optimization on graphs

Education

Aug 2022–Present	**Ph.D. in Computer Science (GPA 4.0/4.0) [Expected Summer 2026]** Arizona State University, Tempe Advisor: Prof. Andréa W. Richa
Aug 2018–Aug 2020	**Master of Science in Computer Science (GPA 4.0/4.0)** Arizona State University, Tempe
Jul 2014–May 2018	**Bachelor of Technology in Information Technology (GPA 8.54/10.0)** Motilal Nehru National Institute of Technology Allahabad, India

Research Experience

- **Graduate Research Assistant, Arizona State University** 2022–Present
  Advisor: Prof. Andréa W. Richa
  - Ph.D. thesis research on combinatorial optimization and distributed coordination in dynamic graph settings.
  - Design algorithms and establish theoretical guarantees for problems including all-or-nothing multicommodity flow, maximum independent set and coordination tasks (local mutual exclusion, synchronization).
  - Collaborate with researchers across multiple universities on interdisciplinary projects, bridging theory and practice.
  - Resulted in peer-reviewed publications and ongoing manuscripts under review and in preparation.
- **Visiting Scholar, Purdue University** Summer 2023
  Mentor: Prof. Ananth Grama
  - Studied fault and noise tolerance in neural networks via fault/noise injection experiments.
  - Formulated optimization questions and parallel variants relevant to robustness evaluation.
  - Collaborated with the Grama and Szpankowski Labs.
- **Graduate Research Assistant, Arizona State University** 2018–2020
  Advisor: Prof. Andréa W. Richa
  - Master's thesis on the **All-or-Nothing Multicommodity Flow** problem; developed and analyzed bicriteria approximation guarantees that improve throughput while minimizing edge-capacity violations.

- Implemented experimental evaluation to study the randomized algorithm's behavior across diverse graph families and demand patterns.
- Initial version published in *ACM SIGMETRICS Performance Evaluation Review*; extended version published in *IEEE/ACM Transactions on Networking*.

- **Undergraduate Research Intern, IIT Kanpur** Summer 2017
  Mentor: Prof. Surender Baswana
  - Studied randomized algorithms and demonstrated their practical effectiveness through implementations for the **Smallest Enclosing Circle** and **Minimum Spanning Tree** problems.
  - Implemented **Borůvka's algorithm** for MST and engineered efficient routines for large-scale inputs.
  - Evaluated correctness and scalability on instances with **>1,000,000** nodes.
- **Undergraduate Research Intern, IIT Delhi** Summer 2016
  Mentor: Prof. Naveen Garg
  - Studied the NP-hard **Capacitated k-Center** problem, gaining initial exposure to approximation algorithms and algorithmic trade-offs.
  - Developed intuition for approximation techniques and counterexamples in NP-hard optimization settings.

Publications

- Anya Chaturvedi, Chandra Chekuri, Andréa W. Richa, Matthias Rost, Stefan Schmid, and Jamison Weber. "Improved Throughput for All-or-Nothing Multicommodity Flows with Arbitrary Demands." *ACM SIGMETRICS Performance Evaluation Review*, 49(3):22–27, 2022. doi: 10.1145/3529113.3529121.
- Anya Chaturvedi, Chandra Chekuri, Mengxue Liu, Andréa W. Richa, Matthias Rost, Stefan Schmid, and Jamison Weber. "Improved Throughput for All-or-Nothing Multicommodity Flows With Arbitrary Demands." *IEEE/ACM Transactions on Networking*, 32(2):1435–1450, 2024. doi: 10.1109/TNET.2023.3325437.
- Anya Chaturvedi, Joshua J. Daymude, and Andréa W. Richa. "On the Runtime of Local Mutual Exclusion for Anonymous Dynamic Networks." *In Symposium on Algorithmic Foundations of Dynamic Networks* (SAND 2025), *LIPIcs* 330, 15:1–15:16, 2025. doi: 10.4230/LIPIcs.SAND.2025.15.
- Devendra Parkar, Anya Chaturvedi, and Joshua J. Daymude. "Unsupervised Learning of Local Updates for Maximum Independent Set in Dynamic Graphs." NeurIPS 2025 Workshop on *Differentiable Learning of Combinatorial Algorithms (DiffCoALG)*; accepted to *IJCNN 2026*. arXiv: 2505.13754.
- Rida Bazzi, Anya Chaturvedi, Andréa W. Richa, and Peter Vargas. "Brief Announcement: Synchronization in Anonymous Networks Under Arbitrary Dynamics." *In International Symposium on Distributed Computing* (DISC 2025), *LIPIcs* 356, 49:1–49:8, 2025. doi: 10.4230/LIPIcs.DISC.2025.49.
- **Under Review:**
  - Rida Bazzi, Cameron Bickley, Anya Chaturvedi, Andréa W. Richa, and Peter Vargas. "Synchronization in Anonymous Networks Under Arbitrary Dynamics." (Extended version of DISC paper; submitted to a theoretical computer science venue.)
  - Anya Chaturvedi, Billy K. Moses Jr., Christian Scheideler, and Prudence Wong. "Online Algorithms for Set Packing with Renewable Capacities."
- **In Preparation:**
  - Anya Chaturvedi, Joshua J. Daymude, Andréa W. Richa, and Christian Scheideler. Manuscript in preparation for *Distributed Computing* (journal).
  - Manuscript in preparation (spatial localization algorithm; interdisciplinary project; planned submission in 2026).

Conference & Poster Presentations

- Anya Chaturvedi, Rida Bazzi, Andréa W. Richa, Peter Vargas. "Brief Announcement: Synchronization in Anonymous Networks Under Arbitrary Dynamics." *DISC 2025*, Berlin, Germany, October 2025. (Conference Talk)

- Anya Chaturvedi, Joshua J. Daymude, Andréa W. Richa. "On the Runtime of Local Mutual Exclusion for Anonymous Dynamic Networks." *SAND 2025*, Liverpool, UK, June 2025. (Conference Talk)
- Anya Chaturvedi, Chandra Chekuri, Andréa W. Richa, Stefan Schmid, Matthias Rost, Jamison Weber. "Improved Throughput for All-or-Nothing Multicommodity Flows with Arbitrary Demands." *ACM SIGMETRICS Performance Evaluation Review*, Online, June 2022. (Conference Talk)
- Anya Chaturvedi, Mentor: Prof. Surender Baswana. "Randomized Algorithms: Theory and Practice." SURGE Undergraduate Research Symposium, IIT Kanpur, India, July 2017. (Poster Presentation)

Industry Experience

- **Automation Software Engineer, Intel Corporation** Sep 2020 – Jun 2022
  - Developed and maintained multiple automation tools to improve internal efficiency for factory analytics workflows.
  - Automated validation and regression testing for production pipelines, reducing manual validation effort and improving release reliability.
  - Collaborated with an operations research team to improve and integrate solver-based optimization modules into workflow automation.
- **Automation Intern, Intel Corporation** Mar 2019 – Aug 2019
  - Improved a web application's cross-platform compatibility by extending support beyond a single browser to work reliably across multiple browsers/environments.
  - Designed software components and implemented testing procedures for security and performance validation.

Teaching & Mentoring Experience

- **Graduate Teaching Assistant, Instructor: Prof. Andréa Richa** Dec 2018 – May 2020
  - Served as a TA for **Foundations of Algorithms** across **three semesters**: two graduate offerings (including one online) and one undergraduate offering with about **65** students each.
  - Led office hours; authored assignments and solution sets; supported students in proof-based problem solving.
  - Contributed to an expanded **Coursera** offering delivered through ASU.
- **Graduate Teaching Assistant, Instructor: Prof. Joshua Daymude** Jan 2026 – May 2026
  - Support the undergraduate **Foundations of Algorithms** course for a class of approximately **120** students through office hours, grading, and course logistics.
- **Research Mentorship** 2022 – 2025
  - Supervise undergraduate and graduate students on research projects in dynamic graphs and distributed algorithms: Briggs Richardson, Peter Vargas, Cameron Bickley; two mentees completed Master's theses, with subsequent positions at Garmin and Microsoft.

Leadership & Service

- Ph.D. Student Council Member, School of Computing & Augmented Intelligence at ASU
- Graduate Programs Chair, ACM Chapter at ASU
- Vice President of External Affairs, Graduate Student Government at ASU
- Director of Accessibility and Inclusion, Graduate Student Government at ASU
- Awards Reviewer, Graduate Student Government at ASU
- Member: UBC International Advisory Board, Women in Computer Science, Software Developers Association, Graduate Women Association

Academic Service

PODC	**Reviewer**, ACM Symposium on Principles of Distributed Computing, Papers Reviewed: 1 (2024), 1 (2025).
MobiHoc	**Reviewer**, ACM International Symposium on Mobile Ad Hoc Networking and Computing, Papers Reviewed: 1 (2024).
ToN	**Reviewer**, IEEE/ACM Transactions on Networking, Papers Reviewed: 1 (2024), 1 (2025).
SIROCCO	**Reviewer**, International Colloquium on Structural Information and Communication Complexity, Papers Reviewed: 1 (2025).
LATIN	**Reviewer**, Latin American Theoretical Informatics Symposium, Papers Reviewed: 1 (2025).

Recognitions and Fellowships

- Graduate Student Government Outstanding Research Award, Arizona State University
- Graduate Student Government Outstanding Mentorship Award, Arizona State University
- Catalyst Student Award, Arizona State University
- Doctoral Student Spotlight, School of Computing and Augmented Intelligence, Arizona State University
- Fulton Fellowship Award, Arizona State University
- Graduate College Travel Award, Arizona State University
- Graduate Student Government Travel Grant, Arizona State University
- School of Computing and Augmented Intelligence Travel Grant, Arizona State University
- Merit Based Scholarship, MNNIT Allahabad, India

References

- **Dr. Andréa W. Richa** (Email: aricha@asu.edu)
  President's Professor, School of Computing and Augmented Intelligence
  Arizona State University, Tempe, AZ, USA
- **Dr. Joshua J. Daymude** (Email: jdaymude@asu.edu)
  Assistant Professor, School of Computing and Augmented Intelligence
  Arizona State University, Tempe, AZ, USA
- **Dr. Christian Scheideler** (Email: scheideler@upb.de)
  Professor, Computer Science Department
  Paderborn University, Germany