Arghya Bhattacharya, Ph.D. [LinkedIn] [GitHub] [Google Scholar]

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SKILLS

- **Technical Skills:** External-memory algorithm, Parallel algorithm, High-performance computing, Dynamic graph algorithm, Machine learning (ML) advice, ML explainability, Computer networks, File system fragmentation, Distributed computing, Version management (GitHub).

- **In-depth Programming Skills:** C/C++ (including Multithreading tools: std::thread, posix thread, OpenMP), Bash (Memory management: control group; Virtualization: QEMU, KVM; Network: iperf, netcat, FTP, Ethernet/InfiniBand networks, TCP/IP stack, RDMA, RoCE, OFED, and peer-to-peer data transfer systems), Python (Libraries: NumPy, Pandas, Scipy; ML: Keras, PyTorch, Scikit-learn, XGBoost, Cvxpy; Data visualization: Matplotlib, Seaborn, Plotly; Web development: Streamlit, Flask), GitHub (Version control), MySQL, Latex, Matlab.

EDUCATION

- **Stony Brook University**, Dept. of Computer Science — Stony Brook, NY, USA
  Ph.D. in Computer Science, Advisor: Prof. Michael A. Bender — Sep. 2018 – Aug. 2024
  - **Thesis: Going Beyond Worst-Case: A Study on Cache Adaptivity and Machine Learning Advice.**
    Committee members: Dr. Michael A. Bender, Dr. Rezaul A. Chowdhury (chair), Dr. Joseph S. B. Mitchell, and Dr. Helen Xu.
  - My thesis sheds light on an algorithm design principle and an empirical framework design to evaluate when programs are cache- and memory-adaptive for external memory applications, i.e., programs maintain performance despite memory fluctuations typical in multicore, multithreaded, shared-memory, and cloud systems. It also shows how to redesign traditional online algorithms for several online problems, e.g., rent-or-buy problems, scheduling in dark, parallel paging with augmentation by single and multiple ML oracles.
  - **Graduate Courses:** Analysis of Algorithms, Computer Networks, Discrete Maths, Data Science, Introduction to Computer Vision, Theory of Database Systems, Medical Imaging.
  - **Academic Services:**
    * **Teaching Assistant:** Theory of Database Systems (CSE 532), System Fundamentals - II (CSE 320), Fundamentals of Information Technology (ISE 218).
    * **Mentored** high-school students for 4 years through High School Women in Science and Engineering (HS-WISE).

- **Jadavpur University**, Dept. of Electrical Engg. — Kolkata, WB, India
  B.E. in Electrical Engineering, Advisor: Prof. Debangshu Dey — Jul. 2012 – May. 2016
  - **Related Coursework**: Advanced Instrumentation (special paper), Digital Signal Processing, Numerical Analysis and Computer Programming, Reliability Engineering, Signals and Systems, Circuit Theory, Control System Engineering.
  - Receipient of Jagadis Bose National Science Talent Search (Senior Scholar 2012).

SELECTED WORK EXPERIENCE (CHECK MY WEBPAGE FOR THE MORE DETAILS)

- **Google**, Google Cloud Platform Compute, Google Cloud — Seattle, WA, USA
  Software Engineer (L4), Manager: Vicky Xu — Sep. 2024 – Present
  - Engineering Google Cloud Platform (GCP) solutions to develop, maintain, and operationalize Bare Metal cloud solutions for demanding applications. The Google Computing Engine (GCE) Node Bare Metal servers allow users to run specialized high-performance workloads, e.g. third-party virtualization software, applications with low-level access to the server, computationally demanding AI workloads, etc. Our team manages the regionally distributed cluster of servers with high-performance connection with a low-latency network fabric.

- **Google**, Playback Services, YouTube — San Bruno, CA, USA
  Software Engineering Ph.D. Intern, Host: Dr. Jie (Jeremy) Zhou, Dr. Kevin Chen — May 2023 – Aug. 2023
  - Collaborated closely with the playback experience, media algorithms, transcoding, and edge streaming teams and extended UVQ to YouTube Shorts, and evaluated multiple ML models through A/B testing to comprehend subjective perception of video quality and learn from contextual factors (such as content type, device type, geolocation, and other streaming objectives).

- **Lawrence Berkeley National Lab**, PASSION Lab, Performance and Algorithms Research Group — Berkeley, CA, USA
  Visiting Student Research Intern, Host: Dr. Helen Xu — Sep 2023 – Dec 2023
  - **Dynamic GAP:** Expanded the experimental framework of the GAP@Berkeley project to incorporate dynamic graph algorithms. Designed batch-parallel algorithms for processing large sparse time-evolving graphs and conducted a comparative study with the top node-wise parallel static algorithm using this framework. [code]

- **Nokia Bell Labs**, Network Systems and Security Research Lab, Bell Labs Core Research — Murray Hill, NJ, USA
  Cloud and Networking Intern, Host: Dr. Edward Grinshpun, Chuck Payette — Jun. 2022 – Aug. 2022
  - Researched out-of-band machine learning-based prediction-enhanced congestion control algorithms tailored for low-latency, high-volume, variable-bitrate applications, such as live video streaming, within 5G wireless network systems.

SELECTED SCIENTIFIC COMMUNICATIONS (GOOGLE SCHOLAR HAS THE COMPLETE LIST)

[1] **Arghya Bhattacharya**, Helen Xu, Michael A. Bender, Rezaul A. Chowdhury, et al., "When Are Cache-Oblivious Algorithms Cache Adaptive? A Case Study of Matrix Multiplication and Sorting," *30th Annual European Symposium on Algorithms (ESA'22)*. [paper] [slides]

[2] **Arghya Bhattacharya**, Rathish Das, "Machine Learning Advised Algorithms for the Ski Rental Problem with a Discount," *Theoretical Computer Science, Elsevier* (the conference version was presented at *16th International Conference and Workshops on Algorithms and Computation (WALCOM'22)*). [article] [paper] [talk] [slides]

[3] **Arghya Bhattacharya**, Dwaipayan Choudhury, and Debangshu Dey, "Edge-enhanced Bi-dimensional empirical mode decomposition based emotion recognition using fusion of feature set," *Soft Computing, Springer* (2018) 22: 889–903 (the conference version was presented at *First IEEE Conference on Control, Measurement and Instrumentation (CMI'16)*). [article] [paper]