

## EDUCATION
















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<b>Ph.D. in Computer Science</b> University of Waterloo. Supervised by <a href="#">Aukosh Jagannath</a> and <a href="#">Kimon Fountoulakis</a> .	Sep 2020 – Present
<b>M.Math. in Computer Science (thesis option)</b> University of Waterloo. Supervised by <a href="#">Jeffrey Shallit</a> .	Sep 2018 – Apr 2020
<b>B.Tech. in Computer Science</b> Indian Institute of Technology Jodhpur.	Jul 2012 – May 2016

## EXPERIENCE

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- **Research Intern, Microsoft Research** Jun 2023 – Sep 2023  
Worked on graph learning models for polymorphic malware detection.
  - **Research Intern, Google Research** Oct 2022 – Dec 2022  
Worked with the Graph mining group on scalable GNNs for sparse graphs.
  - **Software Engineer, Microsoft Corporation** Jun 2016 – Jul 2018  
Worked with the Azure compute group on distributed systems and anomaly detection.

## PUBLICATIONS &amp; MANUSCRIPTS

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- **Analysis of Corrected Graph Convolutions.** R. Wang, A. Baranwal, K. Fountoulakis. arXiv preprint 2405.13987, 2024. (*In submission*)  
  - **Optimality of Message-passing Architectures for Sparse Graphs.** A. Baranwal, K. Fountoulakis, A. Jagannath. Neural Information Processing Systems (NeurIPS), 2023.  
  - **Graph Attention Retrospective.** K. Fountoulakis, A. Levi, S. Yang, A. Baranwal, A. Jagannath. Journal of Machine Learning Research (JMLR) vol. 24:246 pp. 1–52, 2023.  
  - **Effects of Graph Convolutions in Multi-layer Networks.** A. Baranwal, K. Fountoulakis, A. Jagannath. International Conference on Learning Representations (ICLR), 2023. (*Spotlight*)  
  - **Graph Convolution for Semi-supervised Classification: Improved Linear Separability and Out-of-distribution Generalization.** A. Baranwal, K. Fountoulakis, A. Jagannath. International Conference on Machine Learning (ICML), 2021. (*Spotlight*)  
  - **Antisquares and Critical Exponents.** A. Baranwal, J. Currie, L. Mol, P. Ochem, N. Rampersad, J. Shallit. Discrete Mathematics & Theoretical Computer Science vol. 25:2, 2023. 
  - **Ostrowski-automatic Sequences: Theory and Applications.** A. Baranwal, L. Schaeffer, J. Shallit. Theoretical Computer Science 858, pp. 122–142, 2021. 
  - **Decision Algorithms for Ostrowski-automatic Sequences.** A. Baranwal. MMath Thesis, University of Waterloo, School of Computer Science, 2020. 
  - **Repetitions in Infinite Palindrome-rich Words.** A. Baranwal, J. Shallit. In Combinatorics on Words. WORDS 2019. LNCS vol. 11682, Springer, pp. 93–105, 2019. 
  - **Critical Exponent of Balanced Words via the Pell Number System.** A. Baranwal, J. Shallit. In Combinatorics on Words. LNCS vol. 11682, Springer, pp. 80–92, 2019. 

## AWARDS AND ACHIEVEMENTS

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- Cheriton Graduate Scholarship, School of Computer Science, University of Waterloo 2024
- President's Graduate Scholarship, University of Waterloo 2023–2024
- Ontario Graduate Scholarship, Province of Ontario and the University of Waterloo 2023–2024
- Best paper award, GroundedML workshop at ICLR 2022
- Top reviewer award, Learning on Graphs conference 2022
- Graduate Excellence Award, University of Waterloo 2020–2022
- Graduate Research Travel Grant, GSPA, University of Waterloo 2019
- Microsoft Engineering Star Award – Changing Status Quo 2017
- Team ranked 14 at ACM ICPC Asia regionals 2015

## TALKS

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- Locally Optimal Message-passing on Feature-decorated Sparse Graphs, [BIRS](#), Banff. May 2024
- Optimality of Message-passing Architectures for Sparse Graphs, NeurIPS, New Orleans. Dec 2023
- Polymorphic Malware Classification using Graph Neural Networks, Microsoft Research. Aug 2023
- Effects of Graph Convolutions in Multi-layer Networks, ICLR (virtual talk). Apr 2023
- Graph Convolutions for semi-supervised learning, ICML (virtual talk). Jul 2021
- Decision Algorithms for Ostrowski-Automatic Sequences, University of Waterloo. Apr 2020
- Repetitions in infinite palindrome-rich words, Loughborough University, England. Sep 2019
- Anomaly detection and monitoring of metrics in Azure services, Microsoft Corporation. Jan 2017

## TEACHING

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- Instructional Apprentice, CS 341 - Algorithms 2019–2024
- Teaching Assistant, CS 135 - Designing Functional Programs 2018–2019

## MISCELLANEOUS

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- Serving as a reviewer for [NeurIPS](#), [ICLR](#), [LoG](#), [UAI](#) 2021–Now
- Received talent bursaries from the [Alberta Machine Intelligence Institute](#) 2023, 2024
- Helped underprivileged kids with education at [SOS Children's Villages of India](#) 2016–2018
- Problem setter for ACM ICPC preliminary contests in India 2015–2016