

Ankush Das

Assistant Professor, Boston University

Center for Computing and Data Sciences
665 Commonwealth Avenue
Boston, MA 02215
✉ ankushd@bu.edu
🌐 ankushdas.github.io

Research Interests

Programming Languages, Concurrency, Blockchain, Resource Analysis, Session Types, Type Systems, Formal Verification, Static Analysis, Model Checking

Education

- 2015 – 2021 **Ph.D. in Computer Science**, *Carnegie Mellon University (CMU)*, Pittsburgh, PA, USA, GPA – 4.0/4.0, Advisor: *Prof. Jan Hoffmann*
- 2010 – 2014 **B. Tech. in Computer Science and Engineering with Honors**, *Indian Institute of Technology*, Bombay, India, GPA – 8.92/10

Employment

- 2023 – Present **Tenure-Track Assistant Professor**, *Boston University*, Boston, MA
- 2021 – 2023 **Applied Scientist**, *Amazon*, Santa Clara, CA

Honors and Awards

- 2024 **Distinguished Paper Award**, POPL 2024
- 2021 **Invitation to TOPLAS special issue**, ESOP 2021
- 2020 **Best Junior System Description Paper Award**, FSCD 2020
- 2019 **Meta Fellowship**, Finalist
- 2009 **All India Rank 1** in **Indian National Mathematics Olympiad (INMO)**
- 2010 **All India Rank 45** in **IITJEE**

Publications and Patents

Journals

- TOPLAS 2022 **Ankush Das**, *Henry DeYoung, Andreia Mordido, Frank Pfenning*. **Nested Session Types**, *ACM Transactions on Programming Languages and Systems*.
- LMCS 2022 **Ankush Das**, *Frank Pfenning*. **Rast: A Language for Resource-Aware Session Types**, *Logical Methods in Computer Science*.

Peer-Reviewed Conferences

- POPL 2024 *Henry DeYoung, Andreia Mordido, Frank Pfenning*, **Ankush Das**. **Parametric Subtyping for Structural Parametric Polymorphism**, 51st ACM SIGPLAN Symposium on Principles of Programming Languages.
- CAV 2023 *Andrew Apicelli, Sam Bayless, Ankush Das, Andrew Gacek, Dhiva Jaganathan, Saswat Padhi, Vaibhav Sharma, Michael W. Whalen, Raveesh Yadav*. **Automated Analyses of IOT Event Monitoring Systems**, 35th International Conference on Computer Aided Verification.
- POPL 2023 **Ankush Das**, *Di Wang, Jan Hoffmann*. **Probabilistic Resource-Aware Session Types**, 50th Symposium on Principles of Programming Languages.
- ESOP 2022 *Zeeshan Lakhani, Ankush Das, Henry DeYoung, Andreia Mordido, Frank Pfenning*. **Polarized Subtyping**, 31st European Symposium on Programming.

- ESOP 2021 **Ankush Das, Henry DeYoung, Andreia Mordido, Frank Pfenning. Nested Session Types**, 30th European Symposium on Programming.
- CSF 2021 **Ankush Das, Stephanie Balzer, Jan Hoffmann, Frank Pfenning, Ishani Santurkar. Resource-Aware Session Types for Digital Contracts**, 34th IEEE Computer Security Foundations Symposium.
- SAS 2020 **Ankush Das and Shaz Qadeer. Exact and Linear-Time Gas-Cost Analysis**, 27th International Static Analysis Symposium.
- PPDP 2020 **Ankush Das and Frank Pfenning. Verified Linear Session-Typed Concurrent Programming**, 22nd International Symposium on Principles and Practice of Declarative Programming.
- CONCUR 2020 **Ankush Das and Frank Pfenning. Session Types with Arithmetic Refinements**, 31st International Conference on Concurrency Theory.
- FSCD 2020 **Ankush Das and Frank Pfenning. Rast: Resource-Aware Session Types with Arithmetic Refinements (System Description)**, 5th International Conference on Formal Structures for Computation and Deduction.
- ICFP 2018 **Ankush Das, Jan Hoffmann, Frank Pfenning. Parallel Complexity Analysis with Temporal Session Types**, 23rd ACM SIGPLAN International Conference on Functional Programming.
- LICS 2018 **Ankush Das, Jan Hoffmann, Frank Pfenning. Work Analysis with Resource Aware Session Types**, 33rd Annual Symposium on Logic in Computer Science.
- TACAS 2017 **Ankush Das, Jan Hoffmann. ML for ML: Learning Cost Semantics by Experiment**, 23rd International Conference on Tools and Algorithms for the Construction and Analysis of Systems.
- ATVA 2017 **Ankush Das, Akash Lal. Precise Null Pointer Analysis Through Global Value Numbering**, 15th International Symposium on Automated Technology for Verification and Analysis.
- POPL 2017 *Jan Hoffmann, Ankush Das, Shu-Chun Weng. Towards Automatic Resource Bound Analysis for OCaml*, 44th Symposium on Principles of Programming Languages.
- CONCUR 2017 *S. Akshay, Supratik Chakraborty, Ankush Das, Vishal Jagannath, Sai Sandeep. On Petri Nets with Hierarchical Special Arcs*, 28th International Conference on Concurrency Theory.
- CAV 2015 **Ankush Das, Shuvendu K. Lahiri, Akash Lal, Yi Li. Angelic Verification: Precise Verification Modulo Unknowns**, 27th International Conference on Computer Aided Verification.
- TAMC 2015 **Ankush Das, Shankara Narayanan Krishna, Lakshmi Manasa, Ashutosh Trivedi, Dominik Wojtczak. On Pure Nash Equilibria in Stochastic Games**, 12th Annual Conference on Theory and Applications of Models of Computation.

Patents

- 2015 *Ram Bhushan Agrawal, Akhilesh Godi, Ankush Das. Robust Method to Find Layout Similarity between Two Documents*, US Patent 9,235,758 B1.

Research Internships

- Summer 2019 **Meta, Seattle, WA**, Research Intern, Mentor: *Shaz Qadeer*
- Summer 2017 **Microsoft Research, Redmond, WA**, Research Intern, Mentor: *Patrice Godefroid*
- 2014 – 2015 **Microsoft Research, Bangalore, India**, Research Fellow, Mentor: *Akash Lal*

- Summer 2013 **Adobe Research**, *Noida, India*, Research Intern, Mentor: Ram B. Agrawal
Summer 2012 **Institute of Science and Technology**, *Austria*, Research Intern, Mentor: Prof. Krishnendu Chatterjee

Interns and Mentored Students

- Summer 2023 **Gan Shen**, *Building user-friendly abstractions for expressing concurrent protocols in Rust*
Summer 2022 **Joomy Korkut**, *Expressing communication protocols in distributed systems as a transition system that is verified by the Rust compiler*
Summer 2022 **Michalis Kokologiannakis (co-mentor)**, *Optimal stateless dynamic partial-order reduction algorithm for message-passing systems*
Summer 2022 **Gan Shen (co-mentor)**, *Automated test generation for distributed systems*
Summer 2022 **Darion Cassel (co-mentor)**, *Information flow type system for design-level security analysis of AWS services*
2018 – 2020 **Ishani Santurkar**, *Integration of session types with functional programming*
2019 – 2020 **Stephen McIntosh**, *Design of blockchain simulation within the Nomos language*

Talks

Conference Presentations

- Jan 2023 **Probabilistic Resource-Aware Session Types**, *POPL 2023*
Jun 2021 **Resource-Aware Session Types for Digital Contracts**, *CSF 2021*
Nov 2020 **Exact and Linear-Time Gas-Cost Analysis**, *SAS 2020*
Sep 2020 **Verified Linear Session-Typed Concurrent Programming**, *PPDP 2020*
Sep 2020 **Session Types with Arithmetic Refinements**, *CONCUR 2020*
Jul 2020 **Rast: Resource-Aware Session Types with Arithmetic Refinements (System Description)**, *FSCD 2020*
Sep 2018 **Parallel Complexity Analysis with Temporal Session Types**, *ICFP 2018*
Jul 2018 **Work Analysis with Resource-Aware Session Types**, *LICS 2018*
Apr 2017 **ML for ML: Learning Cost Semantics by Experiment**, *TACAS 2017*
May 2015 **On Pure Nash Equilibria in Stochastic Games**, *TAMC 2015*

Invited Talks

- Oct 2021 **Resource-Aware Session Types for Digital Contracts**, *Dagstuhl Seminar*, Germany
Apr 2021 **Resource-Aware Session Types for Digital Contracts**, *Meta; Amazon*, USA
Jul 2017 **Work Analysis of Session-Typed Programs**, *Dagstuhl Seminar*, Germany
May 2014 **Termination of Initialized Integer Linear Programs**, *Microsoft Research*, Bangalore, India, Invited talk for the position of research fellow

Seminar Presentations

- 2019 – 2020 **Resource-Aware Session Types for Digital Contracts**, Stanford University; University of Pennsylvania; Harvard University; Imperial College, London; University of Edinburgh; Massachusetts Institute of Technology; New York University; Princeton University; University of California, San Diego; University of Texas, Austin; University of Wisconsin, Madison; Cornell University; Yale University; University of Illinois, Urbana-Champaign; University of Washington.

Schools and Seminars

- Oct 2021 **Rigorous Methods for Smart Contracts**, *Schloss Dagstuhl*, Germany
- Jul 2017 **Resource Bound Analysis**, *Dagstuhl Seminar*, Germany
- Jun 2016 **Oregon Programming Languages Summer School**, *University of Oregon*
- 2009 – 2010 **International Mathematical Olympiad Training Camp**, *HBCSE*, Mumbai
- May 2011 **Nurture Programme**, *TIFR*, Mumbai

Academic Service and Organizer Work

- 2024 **Organizer**, *Oregon Programming Language Summer School*, Boston University, Boston
- 2019 – 2024 **Program Committee**, *Member*, POPL 2024, ESOP 2023, FoSSaCS 2022, DICE-FOPARA 2019
- 2021 – 2022 **Day 1 Science Mentorship Program**, *Mentor*, Amazon
- 2020 – 2022 **ACM SIGPLAN Long-Term Mentorship Program**, *Mentor*
- 2020 **Programming Language Mentoring Workshop (PLMW)**, *Mentor*, SPLASH
- 2020 **Committee on Diversity, Equity, and Inclusion**, *Member*, Computer Science Department, CMU
- 2020 **Equity, Diversity, and Inclusion Committee**, *Member*, Graduate Student Assembly, CMU
- 2020 **Graduate Application Support Mentor**, *Computer Science Department*, CMU
- 2019 **Artifact Evaluation Committee**, *Member*, PLDI 2019, POPL 2019
- 2017 – 2022 **External Reviewer**, PLDI 2023, LICS 2022, CONCUR 2021, CSL 2021, ESOP 2020, COORDINATION 2020, JLAMP 2018, FLOPS 2018, CSL 2018, ICALP 2018, FSCD 2018, FSCD 2017
- 2017 – 2021 **Speakers Club**, *Member*, CMU
- Fall 2018 **15-317 Constructive Logic**, *Teaching Assistant*, CMU
- Fall 2017 **MS in Computer Science Admissions Committee**, *Member*, CMU
- Spring 2017 **Programming Languages Group Lunch**, *Organizer*, CMU
- Fall 2016 **15-814 Types and Programming Languages**, *Teaching Assistant*, CMU
- 2016 **Logic in Computer Science (LICS)**, *Student Volunteer*, Columbia University