

Ankush Das

PhD student, CMU

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Research Interests

Programming Languages, Blockchain and Smart Contracts, Resource Analysis, Session Types, Type Systems, Logic, Formal Verification, Static Analysis

Education

- 2015 – Present **Ph.D. in Computer Science**, *Carnegie Mellon University*, 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.

Internships and Industry Experience

- Summer 2019 **Facebook**, *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*.

Publications and Patents

Peer-Reviewed Conferences

- 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.
- Arxiv Preprint **Ankush Das**, *Di Wang, Jan Hoffmann*. **Probabilistic Resource-Aware Session Types**, 2020.
- 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.

Workshop Papers

- LOLA 2016 **Ankush Das, Jan Hoffmann. Learning Cost Semantics for Modeling Running Time of OCaml Programs**, Syntax and Semantics of Low-Level Languages.

Patents

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

Honors and Awards

- 2020 **Best Junior System Description Paper Award**, FSCD 2020
- 2019 **Facebook Fellowship**, Finalist
- 2009 **All India Rank 1 in Indian National Mathematics Olympiad (INMO)**
- 2010 **All India Rank 45 in IITJEE** amongst 470,000 aspirants
- 2008–14 **NTSE Scholarship**: Awarded by the MHRD, Govt. of India

Mentored Students

- 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

- 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

- Jul 2017 **Work Analysis of Session-Typed Programs**, *Schloss Dagstuhl*, Germany, Dagstuhl Seminar.
- 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; University of Lisbon; Imperial College, London; University of Edinburgh; University of Colorado Boulder; Massachusetts Institute of Technology; New York University; Princeton University; University of California, San Diego; University of Texas, Austin; University of Wisconsin, Madison; Cornell University; Boston University; Yale University; University of Illinois, Urbana-Champaign; Purdue University; University of Washington; Facebook Seattle; IIT Delhi; IIT Bombay; Microsoft Research, Bangalore, India

Schools and Seminars

- Jul 2017 **Dagstuhl Seminar on Resource Bound Analysis**, *Schloss Dagstuhl*, Germany.
- Jun 2016 **Oregon Programming Languages Summer School**, *University of Oregon*.
- May 2009 – 10 **International Mathematical Olympiad Training Camp**, *HBCSE*, Mumbai.
- May 2011 **Nurture Programme**, *TIFR*, Mumbai.

Academic Service and Organizer Work

- 2020 **SIGPLAN Long-Term Mentor**, *SPLASH*.
- 2020 **Mentor in Programming Language Mentoring Workshop (PLMW)**, *SPLASH*.
- 2020 **Member of Committee on Diversity, Equity, and Inclusion**, *Computer Science Department*, Carnegie Mellon University.
- 2020 **Equity, Diversity, and Inclusion Committee Member**, *Graduate Student Assembly*, Carnegie Mellon University.
- 2020 **Graduate Application Support Mentor**, *Computer Science Department*.
- 2019 **Artifact Evaluation Committee Member**, *PLDI 2019*, *POPL 2019*.
- 2019 **Program Committee Member**, *DICE-FOPARA 2019*.
- 2017 – 18 **External Reviewer**, *FSCD 2017*, *FSCD 2018*, *ICALP 2018*, *CSL 2018*, *FLOPS 2018*, *JLAMP 2018*, *COORDINATION 2020*, *ESOP 2020*.
- 2017 – 21 **Speakers Club**, *Member*, Carnegie Mellon University.
- Fall 2018 **Constructive Logic**, *Teaching Assistant*, Carnegie Mellon University.
- Fall 2017 **MS in Computer Science**, *Admissions Committee*, Carnegie Mellon University.
- Spring 2017 **Programming Languages Group Lunch**, *Organizer*, Carnegie Mellon University.
- Fall 2016 **Type Systems**, *Teaching Assistant*, Carnegie Mellon University.
- 2016 **Logic in Computer Science (LICS)**, *Student Volunteer*, Columbia University.