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.

Research Positions

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

Under Review *Ankush Das and Shaz Qadeer.* **Exact and Linear-Time Gas-Cost Analysis**.

Under Review *Ankush Das and Frank Pfenning.* **Verified Linear Session-Typed Concurrent Programming**.

Under Review *Ankush Das and Frank Pfenning.* **Session Types with Arithmetic Refinements**.

Under Review *Ankush Das, Stephanie Balzer, Jan Hoffmann, Frank Pfenning, Ishani Santurkar.* **Resource-Aware Session Types for Digital Contracts**.

FSCD 2020 *Ankush Das and Frank Pfenning.* **Rast: Resource-Aware Session Types with Arithmetic Refinements**, 5th International Conference on Formal Structures for Computation and Deduction. Best Junior System Description Paper Award!.

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 and 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

2009	Secured **All India Rank 1** in **Indian National Mathematics Olympiad (INMO)**
2010	Secured **All India Rank 45** in **IITJEE** amongst 470,000 aspirants
2008–14	**NTSE Scholarship**: Awarded by the MHRD, Govt. of 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.

Invited Talks

Aug 2019	**Resource-Aware Session Types for Digital Contracts**, *Univ. of Washington*, Seattle, WA, USA.
Jun 2019	**Resource-Aware Session Types for Digital Contracts**, *Facebook*, Seattle, WA, USA.
May 2019	**Resource-Aware Session Types for Digital Contracts**, *IIT Delhi, IIT Bombay, Microsoft Research, Bangalore*, India.
Sep 2018	**Parallel Complexity Analysis with Temporal Session Types**, *St. Louis*, MO, USA, ICFP 2018.
Jul 2018	**Work Analysis with Resource-Aware Session Types**, *Oxford University*, UK, LICS 2018.
Jul 2017	**Work Analysis of Session-Typed Programs**, *Schloss Dagstuhl*, Germany.

Apr 2017	**ML for ML: Learning Cost Semantics by Experiment**, *Uppsala Konsert & Kongress*, Uppsala, Sweden, TACAS 2017.
Jul 2016	**Learning Cost Semantics for Modeling Running Time of OCaml Programs**, *Columbia University*, New York, LOLA 2016.
May 2015	**On Pure Nash Equilibria in Stochastic Games**, *National University of Singapore*, Singapore, TAMC 2015.
May 2014	**Termination of Initialized Integer Linear Programs**, *Microsoft Research*, Bangalore, India, Invited talk for the position of research fellow.

Academic and Organizer Work

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*.
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.

Applicable Coursework

Programming Languages	Type Sytems, Resource Analysis, Interactive and Automated Theorem Proving, Compilers, Implementation of Programming Languages, Abstractions and Paradigms in Programming
Artificial Intelligence	Linear Optimization, Convex Optimization, Introduction to AI, Graduate AI, Foundations of Machine Learning
Formal Methods	Mathematical Foundations of Formal Verification, Formal Specification and Verification of Programs
Mathematics	Substructural Logics, Linear Algebra, Differential Equations, Real Analysis, Complex Analysis, Basic Algebra, Combinatorics, An Introduction to Number Theory and Crytography, Numerical Analysis