EKANSHDEEP GUPTA

+1 646-238-3839 ⋄ ekansh@nyu.edu

cs.nyu.edu/~eg3134

EDUCATION

New York University (NYU), USA   Fall 2020 - Ongoing
Doctorate of Philosophy (PhD)   GPA: 3.92/4
Computer Science

Chennai Mathematical Institute (CMI), India   Fall 2017 - Spring 2020
Bachelor of Science (Honours)   GPA: 9.67/10
Mathematics and Computer Science

RESEARCH INTERESTS

Formal methods, automated reasoning, separation logic, programming languages, symbolic execution, verification, logic.

RESEARCH EXPERIENCE

Courant Institute of Mathematical Sciences   Ongoing
Mentor: Thomas Wies   *New York University*

Creating a symbolic execution based automated verifier for separation logic. Seek to extend existing verifiers like Viper and Iris with better support for extensions of separation logic with custom resource algebras and better automation.

Laboratoire Spécification et Vérification   Summer 2019
Mentor: Alain Finkel   *École Normale Supérieure, Paris-Saclay*

Studied well-structured transition systems. Introduced and solved the Well Structured Problem and showed undecidability results for several classes of Presburger counter machines. Proved decidability for a subclass by finding a new algorithm; also showed a shorter proof of reachability for 1-affine nets.

R.C. Bose Summer Internship in Cryptology   Summer 2018
Mentor: Goutam Paul   *Indian Statistical Institute, Kolkata*

Studied Coding Theory, read about the algebraic construction and implementation of Low Density Parity Check (LDPC) codes followed by a technique to improve upon the standard LDPC Codes using belief propagation and list-erasure decoding.

INTERNSHIPS

Amazon Web Services   Summer 2022
S3 Automated Reasoning Group   *New York*

PUBLICATIONS

A. Finkel and E. Gupta. The Well Structured Problem for Presburger Counter Machines. *In Proceedings of the 39th Conference on Foundations of Software Technology and Theoretical Computer Science* (FSTTCS'19)

RELEVANT COURSEWORK

Computer Science: Honours Programming Languages, Abstract Interpretation, Theoretical Machine Learning, Functional Programming in Haskell, Imperative Programming in Python, Theory of Computation, Logic Automata and Games, Data Mining and Machine Learning, Proofs and Types, Mathematical Logic.

Mathematics: Real & Complex Analysis, Multivariable Analysis, Metric Space Topology, Calculus, Differential Equations, Linear Algebra, Group Theory, Ring and Field Theory, and Probability Theory.

TALKS AND PRESENTATIONS

Gödel's Incompleteness Theorems   November 2020
Presented as part of weekly Formal Methods Seminar at NYU. Introduced the historical context for Gödel's Theorems. Defined Gödel Numbering and showed in detail how it can be used to prove incompleteness of any sufficiently powerful logical system.

The Well Structured Problem for Presburger Counter Machines   December 2019
Presented at FSTTCS'19. Introduced the well structured problem and the strong well structured problem for transtition systems; demonstrated its solutions for several classes of Presburger Counter machines.

Dependent Types and the λP system   November 2019
Introduced the λP extension of lambda calculus with dependent types; discussed strong normalisation property and compared logical expressiveness with intuitionistic first order logic.

WORKSHOPS AND CONFERENCES

SPLASH 2021   October 2021
   ACM SIGPLAN, Chicago, Illinois

FSTTCS 2019   December 2019
   Indian Institute of Technology, Bombay, India

ForMaL—DigiCosme School on Formal Methods and Machine Learning   June 2019
   ENS Paris-Saclay, Cachan, France

TEACHING EXPERIENCE

Theory of Computation—Instructor: Prof. Aiswarya   Fall 2019
Teaching assistant: made weekly problem sets, held tutorials.

Discrete Mathematics—Instructor: Prof. Srivathsan   Fall 2019
Teaching assistant: made weekly problem sets, held weekly tutorials and clarified doubts.

Programming and Algorithms using Python—Instructor: Prof Madhavan Fall 2019-21
Teaching assistant: answered questions on the online forum and reviewed problem sets.

AWARDS AND FELLOWSHIPS

· MacCracken Fellowship: 2020-2026
· Chennai Mathematical Institute Fellowship: 2017-20
· Kishore Vaigyanik Protsahan Yojna Fellowship for undergraduate students: 2017-20
· Madhava Mathematics Competition 2019 — 2nd position across India

TECHNICAL STRENGTHS

Languages: English, Hindi.
Programming Skills: C++, Java, OCaml, Haskell, Python, Coq, Dafny, JavaScript, LaTeX.