

# Alakh Chopra

*Mathematics, Logic, and Computer Science*

Chennai Mathematical Institute

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## Research Interests

- Foundations of mathematics and mathematical logic
- Formal structures and axiomatic set theory
- Formal verification and block-chain technology

## Education

2018 **M.Sc. in Computer Science**, *Chennai Mathematical Institute*, **9.94 (out of 10)**, Batch topper.

Advisor : Dr. S. P. Suresh

Thesis: Graded Provability Logics and Ordinal Analysis

Research Area: Model checking, Constraint solving, Type theory.

2013 **B.Tech. Computer Science and Engineering**, *Indraprastha Institute of Information Technology, Delhi (IIIT-Delhi)*, **9.77 (out of 10)**, Batch topper.

Advisor : Dr. Debajyoti Bera

Thesis: Representation of Solutions of Combinatorial Structures as  $\Pi_1^0$  Classes

### Masters Courses

Proofs and Types, Graduate Logic, Ordinal Analysis, Recursion Theory, Independence Proofs in Set Theory, Descriptive Set Theory, Algebra, Set Theory

## Awards and Scholarships

2018 **CMI Medal of Excellence**. The Medal is awarded to the student with the highest CGPA of the passing batch.

2016 **IIIT-Delhi Chancellor's Gold Medal**. The Medal is awarded to the student with the highest CGPA of the passing batch.

Runner's up, **Best Bachelor's thesis**, 2016.

2008 – **NTSE Scholarship**. National Talent Search Examination is a prestigious national examination to award high-school students with high academic and research potential.

## Research Experiences

Sep'20 – **Microsoft Research Bangalore**. [Research intern](#). *Bangalore*.

Mar'21 Studies in Testing of Byzantine Fault Tolerance Protocols

**Project:** Analysis of BFT protocols, their semantics and model assumptions, and implementation in a testing framework to try and detect known bugs.

Aug'19 – **Chennai Mathematical Institute.** [Visiting student.](#) *Chennai.*

Now Mathematical logic, Quantifier elimination in array theory.

**Project:** Intruder detection problem and proof theory  
How to buy Casper and go broke.

**Project:** Combinatorial set theory  
How to buy Casper and go broke.

May'17 – **Tata Institute of Fundamental Research (TIFR)** [Summer intern](#) *Mumbai.*

Jul'17 Mathematical logic, Quantifier elimination in array theory.

**Project:** Combinatorial set theory  
How to buy Casper and go broke.

## Workshops, Summer school and Talks

4-10 Dec'19 **Seminar Series**, *Chennai Mathematical Institute, Chennai, India.*

Presentation: Suslin Trees and Partition Relations

28-1 Jul'18 **Hilbert-Bernays Summer School in Logic and Computation**, *Germany.*

Classical logic, computability theory, verification, and ordinal analysis

Presentation: Cut Elimination Theorems and Veblen Functions.

28-1 Jul'17 **Hilbert-Bernays Summer School in Logic and Computation**, *Germany.*

Student talk: Reverse Mathematics and Hilbert's Programme

4-10 Dec'17 **Logic 2 Series**, *Institute of Mathematical Sciences, Chennai, India.*

Presentation: Recursively Inseparable Sets and Trakhtenbrot's Theorem

10 Aug'16 **Institute theory seminar**, *IIIT-Delhi.*

Presentation: Introduction to Lambda Calculus: Origin and Motivation

4-10 Dec'16 **The First Indian SAT SMT School**, *TIFR, Mumbai, India.*

## Computer skills

PL	Haskell, C, Python, Java	Type Setting	LaTeX, Libre, Microsoft Office
Familiar With	Scheme, MiniKanren, C++, Idris	OS	Linux, Unix, Microsoft Windows
Web dev	HTML5, CSS3, JS, Node.js	Database	Redis
IDE	Vim, Geanny, Eclipse, Microsoft Visual Studio	Certificate Training	CEH, RHCE6, C, C++, DS

Certified Ethical Hacker [CEHv8](#) by EC-Council.

## Languages

Hindi Mother tongue  
English Fluent

## Teaching Experience

- Winter'16 **Modern Algebra**, *IIIT-Delhi*, Delhi, *India*.  
under Prof. Samaresh Chatterji, Class of about 15
- Winter'16 **Graph Theory**, *IIIT-Delhi*, Delhi, *India*.  
under Prof. Somitra Sanadhya, Class of about 100
- Fall'15 **Discrete Mathematics**, *IIIT-Delhi*, Delhi, *India*.  
under Prof. Somitra Sanadhya, Class of about 140

## References

Name	Mandayam Srivas	Ashutosh Gupta
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