

# Deep Inder Mohan

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## Education

### Georgia Institute of Technology

*Ph.D. in Computer Science @ School of Cybersecurity and Privacy (SCP)*

Atlanta, USA

2022-present

- GPA - 4.0/4.0
- Co-advised by Sasha Boldyreva and Joseph Jaeger

### International Institute of Information Technology (IIITB)

*Integrated M.Tech. Computer Science and Engineering*

Bangalore, India

2017-2022

- CGPA - 3.71/4.0
- Dean's Merit List awardee for 2017-18, 2018-19, 2019-20, 2020-21, and 2021-22

## Interests and Skills

### Research Interests

- Provable Security, Idealized Models of Computation, Secure Biometric Authentication, Multi-Party Computation.

### Programming Languages

- Python, C, C++, MySQL

### Tools and Technologies

- Libraries: pwntools, ghidra, pandas, scikit-learn
- Vim, Git, L<sup>A</sup>T<sub>E</sub>X

## Projects and Publications

1. **Generic and Algebraic Computation Models** (*CRYPTO 2024*): Created a new framework for the Algebraic Group Model to allow security proofs to directly transfer from the AGM to the GGM (under certain conditions). Our framework supports multiple formalisms and thus allows for easier proof-writing in the AGM. It further resolves all of the logical discrepancies that remained in Fuchsbauer et. al.'s AGM framework. Joint work with Prof. Joseph Jaeger.
2. **Memory-less Biometric Key Storage/Retrieval** (*Ongoing*): Our goal is to create a biometrics-based key storage/retrieval system that does not require the user to remember any secret information beyond their own biometric template. We are currently using a combination of Fuzzy Vaults and Oblivious Pseudorandom Functions. We aim to achieve a provably secure scheme (against computational adversaries) that is also performant enough for real-world deployment. Joint work with Prof. Sasha Boldyreva.

3. **Secure Identity Verification Using Cloud Services and FHE** (*Master's thesis, Paper in Submission*): The problem statement is to create a practically deployable identification platform that delegates all computation and storage to third-party nodes. In collaboration with Prof. Srinivas Vivek as a part of the Modular Open Source Identity Platform (MOSIP). Accepted as a talk at the Trustworthy Digital Identity Conference by the Alan Turing Institute, London. A copy of the successfully defended thesis can be found [here](#).
4. **Modelling prejudice and its effect on societal prosperity**: Created an agent-based model to simulate inter-group prejudice in society, and used it to study the changes/disparities that may arise among groups over time. Research conducted in collaboration with Prof. Shrisha Rao. Paper published in the *Journal of Simulation*.
5. **TVLA Methodology**: Created a python implementation of the Test Vector Leakage Assessment methodology to analyse power traces from AES-128 implementations for potential DPA side-channel attacks. Work done under Prof. Srinivas Vivek. See technical report [here](#).

## Research Experience

- Successfully defended my master's thesis under the guidance of Prof. Srinivas Vivek. We developed a privacy-preserving national identity platform that can outsource computation to untrusted third-parties using homomorphic encryption, and can hence be deployed at minimal initial cost. This project will be incorporated into the MOSIP platform (*Spring 2022*).
- Completed a semester of research under Prof. Ashish Choudhury studying Verifiable Secret Sharing in Secure Multi Party Computation and exploring the feasibility of Perfectly Secure VSS protocols in hybrid (synchronous and asynchronous) network settings (*Spring 2021*).
- Completed a literature survey on AT-free graphs. Covered various results and theorems on AT-Free graphs and also coloring algorithms for these graphs. Final project for CS825 Graph Theory. See final report [here](#) (*Spring 2021*).
- Completed a qualitative research project under Prof. Preeti Mudliar which studies the critical factors for the employability of Indian engineering graduates in IT. See final report [here](#). (*Fall 2020*)
- Completed a research internship under Prof. Dinesh Babu Jayagopi at IIIT Bangalore in the field of Natural Language Processing. (*Summer 2019*)

## TA Experience

### CS6260: Applied Cryptography

Prof. Sasha Boldyreva

August, 2023 - Present

Head TA

### CS 512: Discrete Mathematics and Computability

Prof. Srinivas Vivek

September 2021 - January 2022

### CS 302: Introduction to Automata Theory

Prof. Shrisha Rao

August 2021 - December 2021

### NPTEL course on Secure Computation

Prof. Ashish Choudhury

July, 2021 - October, 2021

## Awards and Achievements

- **Nominated as an RSAC Security Scholar** by Georgia Tech. for the year 2024.
- **Enlisted in Dean's Merit List**, IIT Bangalore, for 5 consecutive years (2017-18, 2018-19, 2019-20, 2020-21, and 2021-22).
- Received a **Scholarship for Academic Excellence** from IITB in the academic year 2018-19, worth INR 50,000.
- Received a **Post Graduate Scholarship** from the All India Council for Technical Education, worth INR 150,000.
- Awarded a student grant to attend USENIX Security '21.
- Co-authored an article on the privacy implications of telemedicine in India with Prof. V. Sridhar. Published in *Financial Express*.
- Winner of **Yadalam Nanjiah Shetty Rolling Shield** (Bangalore Inter-College Debate), organised by Rotary Club of Bangalore, 2019.
- Won 2<sup>nd</sup> place at **Speak Up - Turncoat Debate** at Mood Indigo 2018 (Asia's largest cultural fest), IIT Bombay.

## Positions of Responsibility

- **Communications Chair of the SCS/SCP GSA** (2023-2024): Serving as the communications chair for the joint Graduate Student Association of the School of Computer Science (SCS) and the School of Cybersecurity and Privacy (SCP) at Georgia Tech.
- **Head of Logistics, Zense@IITB** (2019-2020): Served as a core member of Zense, IIT Bangalore's student developers club.
- **Co-founder/Head of DebSoc: Debate Society**, IIT Bangalore.
- **Core Member** of organising team for **Infin8**, IIT Bangalore's Techno-Cultural fest.
- **Master of Ceremonies for TEDx IIT Bangalore** held in March, 2018.
- **Master of Ceremonies for RunBhoomi**: Run for Lake Marathon organised by ELCIA in Bangalore, 2019.
- **Head Student Volunteer for IEEE InDIITA Workshop** held in Bangalore, 2019.
- **Volunteer for the IITB senior mentorship program**, where I mentored thirteen 1st year undergraduate students and helped them in their transition to college life.
- **Master of Ceremonies for Sangam 2020**, IIT Bangalore's annual alumni meet.

## Aptitude Tests

GRE General Test

Quantitative: 169/170 (94<sup>th</sup> percentile)  
Verbal: 163/170 (92<sup>nd</sup> percentile)

TOEFL iBT

Overall Score: 119/120