

# Radhika Garg



## SUMMARY

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My research interests lie in Applied cryptography with a focus on generic secure multi-party computation (MPC). I am especially interested in making MPC scalable for real world systems, as well as accessible with minimum developer efforts. I have designed and implemented a generic MPC framework based on homomorphic encryption scalable to more than 100 parties. Recently, I have been working on introducing MPC compilation directly into the LLVM architecture for robust and performant optimization of MPC source code.

## EDUCATION

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**Northwestern University** *September 2022 - Present*  
Ph.D. Computer Science, Advisor: Dr. Xiao Wang GPA: 3.967/4

**Indian Institute of Technology, Roorkee** *July 2018 - May 2022*  
B.Tech. Computer Science and Engineering GPA : 9.371/10

## PUBLICATIONS

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**Radhika, Kang Yang, Jonathan Katz, Xiao Wang.** Scalable Mixed-Mode MPC. *IEEE Symposium on Security & Privacy 2024*.

## WORK EXPERIENCE

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**Graduate Research Assistant | Northwestern University** September 2022 - Present  
*Advisor: Dr. Xiao Wang*  
– My work focuses on generic secure multiparty computation (MPC).  
– Designed a multiparty lookup table protocol based on threshold homomorphic encryption. Built a mixed-mode MPC framework based on the lookup table protocol scalable to more than a 100 parties.

**Research Intern | Northwestern University** February 2022 - May 2022  
*Advisor: Dr. Xiao Wang*  
– Implemented GMW (Goldreich-Micali-Widgerson) based MPC compiler as part of the emp-toolkit.  
– Collaborated on a scalable multiparty garbled circuit protocol.

**Software Engineering Intern | AI4SG, Google Research** June 2021 - August 2021  
*Advisor: Dr. Aparna Taneja*  
– Worked on the fairness analysis of a project that focused on limited resource allocation problems in domains like preventive healthcare information, telecommunications, etc.  
– Experimented with various clustering algorithms that fed an RMAB model and analysed the results to compare the fairness.

**Software Engineering Intern | Google Maps, Bangalore** May 2020 - June 2020  
*Mentor: Murugappan Sekar and Priyank Sharma*  
– Worked on a Time-Lapse Visualizer web app that offers the user a customizable visualisation tool for time-varying geographic datasets where users can view data at different snapshots of time by moving a time slider.

## ACHIEVEMENTS

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Cabell first year fellowship	Selected among the 10 recipients of all applicants in the McCormick School of Engineering and Applied Sciences.
Best BTP Award	Awarded the best B.Tech. thesis project in the Computer Science Dept. 2022
Code Jam to I/O for Women 2020	Secured 21st rank worldwide and a ticket to Google I/O 2020.
Joint Entrance Examination 2018 (Advanced)	Ranked in top 0.4 percentile with a rank of 669 among 150,000 candidates.

## RELEVANT TECHNICAL COURSEWORK

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<b>Graduate</b>	Introduction to Cryptography, Advanced Topics in Modern Cryptography, Differential Privacy.
<b>Undergraduate</b>	Information Security, Advanced Operating Systems, Compiler Design, Machine Learning.

## SKILLS

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<b>Languages</b>	C, C++, Python, Scala, Javascript, Bash.
<b>Software Packages</b>	Emp-toolkit, Openfhe, LLVM, Git, GDB, Django, ReactJS, NextJS.
<b>Platforms/Architectures</b>	Linux, Windows, WSL, Docker.

## OUTREACH AND PROFESSIONAL DEVELOPMENT

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**Team Member | GWiC, Northwestern University** *November 2022 - Present*  
Part of the organizing team of the Graduate Women in Computing (GWiC) events.

**Chief Coordinator | IMG IIT Roorkee** *May 2021 - May 2022*  
Led the team of 40 students in development and maintenance of official software and services ecosystem of IIT Roorkee. Coordinated between the IIT Roorkee administration and the student team for deployment and maintenance of various softwares and services.

**Mentor | Student Mentorship Program, IIT Roorkee** *August 2020 - May 2021*  
Mentored five freshman students in Computer Science, IIT Roorkee.

**Mentor | Technovation Girls** *January 2020 - May 2020*  
Mentored group of girls to build a mobile app to address real-world problems.