

Gargi Mitra

Indian Institute of Technology Madras

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Present Status

I am presently pursuing research work as an Interdisciplinary Direct PhD scholar (4th year) in Indian Institute of Technology Madras with Prof. V Kamakoti (Department of Computer Science & Engineering) and Dr. Nitin Chandrachoodan (Department of Electrical Engineering). My research interests include Network Security & Privacy and Secure Internet Architecture. I am also interested in emerging technologies in this domain and working on developing secure network solutions based on the Blockchain platform.

Education

Program	Institution	%/CGPA	Year of completion
PhD, Interdisciplinary (Computer Science & Engg. + Electrical Engg.)	Indian Institute of Technology, Madras	8.21/10	2015 - Present
B.Tech. in Computer Science & Engg.	St.Thomas' College of Engg. & Tech., Kolkata	8.96/10	2013
WBCHSE (West Bengal Board)	Bidya Bharati Girls' High School, Kolkata	85%	2009
WBBSE (West Bengal Board)	Bidya Bharati Girls' High School, Kolkata	84.75%	2007

Professional Experience

Programmer Analyst

August 2013 to May 2015

Cognizant Technology Solutions India Pvt. Ltd.

- Worked in Database and Data Warehouse Management and Business Intelligence.

Technical Skills

- **Languages** - {Python, Java, C, C++, Linux Shell Scripting, PL/SQL}-Proficient, {Solidity, Go, T-SQL}-Competent
- **Hardware Description Language** - Verilog
- **High Level Chip Synthesis Tool** - Bluespec
- **Database Platforms** - Oracle 10g/11.2, MS SQL Server 2008/ 2012
- **Blockchain Technologies** - Ethereum, IBM Hyperledger Fabric
- **Operating Systems** - Linux, Windows XP, Windows 7
- **Tools/IDE** - \LaTeX , SQL Server Integration Services, SQL Server Reporting Services 2010/2012, IBM Infosphere Datastage 8.5, SQL Server Management Studio, SQL Developer for Oracle, NetBeans

Course Work

- | | |
|---|---|
| ◦ Applied Cryptography | ◦ Computer Architecture |
| ◦ Advanced Computer Networks | ◦ CAD for VLSI systems |
| ◦ Digital IC Design | ◦ Digital Design Verification |
| ◦ Digital System Testing & Testable Design | ◦ Introduction to Research |
| ◦ Logic and Combinatorics in Computer Science | ◦ Special Topics in Computer Science and Technology |

Research Projects

1. White Mirror: Leaking Sensitive Information from Interactive Netflix Movies using Encrypted Traffic Analysis

PhD Research project, Ongoing

IIT Madras

- On 28th December 2018, Netflix released the first mainstream interactive movie called 'Black Mirror: Bandersnatch'. In this work, we use this movie as a case-study to show for the first time that fine-grained information (i.e., choices made by users) can be revealed from encrypted traffic.

2. Analyzing Leakage of Side-Channel Information from Encrypted Browsing Traffic: A Passive Attack to Gain Competitive Business Intelligence

PhD Research project, Ongoing

IIT Madras

- The proposed attack technique identifies stable side channels in HTTPS-encrypted communication channels and builds a lightweight framework for predicting client interests.

3. Hastakshara: A Passive Side Channel Based Webpage Fingerprinting Attack for Uncovering Client Intent

PhD Research project, presented at IMC 2017, Poster Session

IIT Madras

- The proposed attack technique identifies intents of users accessing a target website from encrypted traffic traces.
- The applicability of the metrics quantifying the side-channel leakage can be used to craft light-weight defense techniques that prevent fingerprinting attacks in general.

4. Ankapala: The Account Book for Fighting Corruption in Food Security

PhD Research project

IIT Madras

- A blockchain-based solution for fighting fraud and corruption in Public Distribution System in India.
- The applicability of the study of blockchain features can be extended to developing secure network solutions based on the Blockchain platform.

5. Eradicator: An Integrated Approach for Defense against Cyber Attacks in PLC based Industrial Control Systems

Research Project as part of Cyber Security Awareness Week 2017; Team size: 4

IIT Madras

- Eradicator is a comprehensive defense framework for distributed ICS (Industrial Control System) environments, that uses a holistic view of the ICS and leverages process specific parameters to detect cyber-attacks and thereby isolates the root cause of the attack, and mitigates it.

Positions of Responsibility

- Teaching Assistant
 - Digital System Testing and Testable Design, IIT Madras. (Jan 2019 - Present)
 - CAD for VLSI, IIT Madras. (July 2018 - Nov 2018)
 - Interdisciplinary Research Committee, IIT Madras. (Aug 2017 - July 2018)
 - Digital Design Verification, IIT Madras. (Jan 2017 - May 2017)
 - Introduction to Computer Programming, IIT Madras. (Aug 2016 - Dec 2016)
 - Computer Organization, IIT Madras. (Jan 2016 - May 2016)

List of Posters and Publications

- **White Mirror: Leaking Sensitive Information from Interactive Netflix Movies using Encrypted Traffic Analysis**, Gargi Mitra, Prasanna Karthik Vairam, Patanjali SLPSK, Nitin Chandrachoodan, Kamakoti V, SIGCOMM 2019 Poster Session.
- **Towards Measuring Quality of Service in Untrusted Multi-Vendor Service Function Chains: Balancing Security and Resource Consumption**, Prasanna Karthik Vairam, Gargi Mitra, Vignesh Manoharan, Chester Rebeiro, Byrav Ramamurthy, and Kamakoti Veezhinathan, INFOCOM 2019.
- **ApproxBC: Blockchain Design Alternatives for Approximation-Tolerant Resource-Constrained Applications**, Prasanna Karthik Vairam, Gargi Mitra, Chester Rebeiro, Byrav Ramamurthy, and Kamakoti Veezhinathan, IEEE Communications Standards Magazine 2018
- **Hastakshara: A Passive Side Channel Based Webpage Fingerprinting Attack for Uncovering Client Intent**, Gargi Mitra, Prasanna Karthik Vairam, Kamakoti Veezhinathan, Nitin Chandrachoodan, ACM Internet Measurement Conference (IMC'17), Poster Session, London, United Kingdom, 2017 (Poster presentation)
- **Samata: A Framework for identifying Net-Neutrality Violations using Evidence Structures**, Prasanna Karthik Vairam, Karan Saxena, Gargi Mitra, Chester Rebeiro, Kamakoti Veezhinathan, ACM Internet Measurement Conference (IMC'17), Poster Session, London, United Kingdom, 2017 (Poster presentation)
- **Blockchain as an Infrastructure to Build Secure Network Services**, Gargi Mitra, Kamakoti Veezhinathan, Nitin Chandrachoodan, PhD Conclave, ISEA Asia Security and Privacy Conference 2017

Awards and Recognition

- Awarded for being among the **top 100** contestants in a national scientific story-writing competition organized by the Department of Science & Technology, Govt. of India, as part of the AWSAR initiative, *in 2019*
- Won the **first prize** in Gandhi Hazare Award 2018 for proposing technical solutions to fight corruption in the public distribution system in the country, *in 2018*
- Won the **second prize** at TCS Poster Competition, Shaastra 2018, IIT Madras for presenting 'Ankapala: The Account Book for Fighting Corruption in Public Distribution System', *in 2018*
- Received the **Star TA Award** from the Department of Computer Science & Engineering, IIT Madras for contributions towards TA duty for the Aug-Dec 2017 semester
- Won the **first prize** at Embedded Security Challenge, Cyber Security Awareness Week 2017, organized by IIT Kanpur, as a member of the IITM team, for presenting 'Eradicator: An Integrated Approach for Defense against Cyber Attacks in PLC based Industrial Control Systems'
- Received "**Employee of the Quarter**" Award for innovative contributions to a project related to data warehouse management and business intelligence from Cognizant Technology Solutions in the first quarter of 2015

Extra-Curricular Activities

- An active member of WiCS (Women in Computer Science) – IITM since its foundation
- Creative arts (Dual Diploma in Fine Arts from Vidyasagar Academy, Kolkata)
- Competitive programming
- Active member of Cognizant Outreach, a social initiative, from August, 2013 till May, 2015

Personal Details

- Nationality: Indian
- Languages known: English, Hindi, Bengali
- Date of birth: 30 August, 1991
- Permanent address: 15 Sonali Park, Bagpota, Sarsuna, Kolkata - 700061

References

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