# Saket Upadhyay

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## Personal Profile

I am a Ph.D. student at the University of Virginia's Computer Science Department. I am researching low-level software and hardware security, working on hardware-level type safety in modern CISC processors. I play with LLVM instrumentations, debuggers, and low-level languages on Intel x86 processors and Apple M2. I have a strong background in cybersecurity, specifically in threat intelligence, malware analysis, and reverse engineering x86 Windows malware.

## Education

**University of Virginia** *Virginia, USA*

Ph.D. in Computer Science *Aug 2022 - Current*

- GPA 3.8/4
- Steering committee member in Computer Architecture Student Association (CASA), works on website management and organizational security.
- Teaching Assistant: Compilers CS4620
- Courses: graduate compilers, graduate computer architecture, hardware security.

**Vellore Institute of Technology** *Bhopal, India*

BTech in Computer Science *May 2018 - May 2022*

- CGPA 8.5/10
- Established and led the student research and development group in the cybersecurity department.
- Conducted cybersecurity workshops for high-school students and faculty training where I gave live demonstrations and taught security concepts.

## Work Experience

**University of Virginia** *Charlottesville, VA*

Research Assistant *Aug 2022 - Current*

- Low-level software and hardware security research with Dr. Ashish Venkat.
- **Technical Skills:** C++, Linux/Windows VMs, Linux tools, LLVM, LLVM IR, Python, x86 assembly, *nix scripting, Git, software build systems (CMake, ninja, makefiles), development on HPC clusters, data analysis, research documentation (LaTeX).

**Uptycs** *Bangalore, India (Remote)*

Security Research Intern *Jul 2021 - Jan 2022*

- Collaborated with a small team to expand the existing threat intelligence database that enables cloud-native application protection platform (CNAPP) and extended detection and response (XDR) solutions.
- Wrote and validated YARA rules for new malware families for XDR platform.
- Validated detection rules for CNAPP and XDR deployment (development).
- Learned advanced malware reverse engineering and AV evasion techniques from renowned and experienced malware researchers.
- Gave a talk on 'Automating malware process scanning with Python3' in PyCode2021 Conference.
- **Technical Skills:** C++, Linux/Windows VMs, Linux tools, YARA, Python, x86 assembly, Scripting, Git., Debuggers, IDA Pro, Ghidra
- **Soft Skills:** Teamwork, Time Management, Communication, Presentation skills.

**Madhya Pradesh Police Department** *Bhopal, MP, India*

Project Intern *May 2021*

- Deployed a custom web application on University servers to aid in managing students' projects in cyber security.
- Lead a project on Android-based fine-grain location tracking.
- Worked with the DSP of MP police and the department head of cybersecurity at VIT Bhopal. Learned how to manage people and large-scale projects.
- **Technical Skills:** C++, Git, Android (JAVA), HTML, JS, CSS, LAMP software stack (Linux, Apache, MySQL, PHP & Python), DNS setup and forwarding.
- **Soft Skills:** Teamwork, Communication, Team Management, Asset Management.

## Skills

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|---|---|
| **Core** | x86, ARM, Operating Systems (Threads, Process Control, Memory/Resource Management, Virtual Memory), Compilers (AST, Grammars, State Machines, Optimizations), LLVM, Bash/Shell Scripting, Security Testing, Reverse Engineering (GDB, Ghidra, IDA Pro, x32dbg, LLDB), Threat Analysis, Threat Models (OWASP, MITRE Att&ck). |
| **Programming** | C, C++, Python, x86 and ARM Assembly. |
| **Miscellaneous** | *nix systems, LaTeX, Microsoft Office, Git, Adobe Creative Cloud suite (Photoshop, PremierePro, Aftereffects, Lightroom) |
| **Soft Skills** | Time Management, Teamwork, Scientific problem solving, Documentation, Public speaking, Mass presentation. |

## Achievements

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|---|---|---|
| 2019 | **Best Paper Award,** IEEE International Conference on Big Data 2019 | *USA* |
| 2020 | **Winner ,** Ultimate Secure Code Tournament | *Global* |
| 2020 | **Winner,** TrendMicro Cloud Security CTF | *Global* |
| 2020 | **Winner,** DEFCON 28 Secure Code Tournament | *USA* |
| 2021 | **1st Runner-up,** HackDSC Hackathon, Google DSC | *India* |

## Publications

### Book Chapters

Nature-Inspired Malware and Anomaly Detection in Android-Based Systems
Saket Upadhyay
*Advances in Nature-Inspired Cyber Security and Resilience*, 2022

### Conference Proceedings

PACE: Platform for Android Malware Classification and Performance Evaluation
Ajit Kumar, Vinti Agarwal, Shishir K. Shandilya, Andrii Shalaginov, Saket Upadhyay, Bhawna Yadav
*2019 IEEE International Conference on Big Data (Big Data)*, 2019, Los Angeles, CA, USA

### Journal Articles

Modified Firefly Optimization Algorithm-Based IDS for Nature-Inspired Cybersecurity
Shishir Kumar Shandilya, Bong Jun Choi, Ajit Kumar, Saket Upadhyay
*Processes* 11.3 (2023). 2023

AI-assisted Computer Network Operations testbed for Nature-Inspired Cyber Security based adaptive defense simulation and analysis
Shishir Kumar Shandilya, Saket Upadhyay, Ajit Kumar, Atulya K. Nagar
*Future Generation Computer Systems* 127 (Feb. 2022) pp. 297–308. 2022

PACER: Platform for Android Malware Classification, Performance Evaluation and Threat Reporting
Ajit Kumar, Vinti Agarwal, Shishir Kumar Shandilya, Andrii Shalaginov, Saket Upadhyay, Bhawna Yadav
*Future Internet* 12.4 (Apr. 2020) p. 66. 2020

## Interests

Cooking, Boxing, Mountain biking, Hiking, Swimming, Community Service.

## Languages

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| **English** | Full professional proficiency (ILR level 4) |
| **Hindi** | Native proficiency (ILR level 5) |
| **Marathi, Gujarati, Punjabi** | Elementary proficiency (ILR level 1) |
| **Russian, Dutch** | (ILR level 0) |

** ILR = Interagency Language Roundtable scale.*

References available upon request.