

Pritam Dash

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RESEARCH INTEREST

Security and Reliability, Trustworthy AI, Embodied AI.

EDUCATION

PhD in Electrical and Computer Engineering

Sep 2020 – Present

University of British Columbia, Canada

Advisor: Dr. Karthik Pattabiraman

MASc in Electrical and Computer Engineering

Sep 2018 – Aug 2020

University of British Columbia, Canada

Advisor : Dr. Karthik Pattabiraman

MS in Software Engineering (BS+MS Integrated Program)

Jul 2011-May 2016

Vellore Institute of Technology, India

AWARDS AND HONORS

- Rising Stars Award for research in Cyber-Physical Systems – 2024 [link](#).
- President's Academic Excellence Award (UBC) – 2023.
- Exemplary talk mention at Usenix Enigma'2022 [link](#)
- Best paper award at IEEE/IFIP DSN'2021 (flagship venue in the field of Dependable Computing research).
- Master's thesis featured in [SERENE-RISC](#) as top ten cybersecurity development in Canada – 2020.
- 4YF Fellowship for doctoral studies at UBC (given to top 10 students in each graduating class) – 2020.
- DAAD Working Internship in Science and Engineering Fellowship – 2015.
- Indian Academy of Sciences Research Fellowship – 2014, 2015 (~120 students selected across India).

RESEARCH EXPERIENCE

Research Assistant at the University of British Columbia, Vancouver, Canada

Sept 2018 – Present

Research Area: Trustworthy AI, Embodied AI (research featured in [UBC](#), [EurekaAlert](#), [TechXplore](#), [GlobalNews](#))

- Proposed a method for training robust and **safe Deep-RL** policies for robotic systems. This approach enhances resilience of robotic systems under adversarial conditions, such as **sensor faults and attacks**, by incorporating temporal logic-based invariants and game-theoretic adversarial training.
- Designed a **robust time series** modeling approach to detect and mitigate sensor anomalies against robotic vehicles (RV). This approach enables the RV to operate safely despite malicious intervention.

Research Area: Machine Learning Security

- Proposed methods to detect and mitigate physically realizable **adversarial patch** attacks against DNNs. This method demonstrated **80% reduction** in misclassification in computer vision benchmark.

Security Analysis and Testing

- Proposed a fuzzing technique to discover **GPS spoofing** vulnerabilities in swarm control algorithms.
- Highlighted the limitations of end-to-end encryption protocols in CPS, and demonstrated how side channel leaks can be exploited to launch active attacks to disrupt CPS operations.

Research Intern at Oracle Labs, Vancouver, Canada

Jul 2022 – Dec 2022

Research Area: AI for Code, Large Language Models

- Proposed a pre-training approach to improve **zero-shot performance** of LLMs in code automation tasks.
- Designed an LLM based **recommendation system** that integrates with developer environments to proactively provide ranked and relevant solutions by eliminating the need for manual prompts.
- This work resulted in filing **two US patents** in the area of LLM and recommendation systems.

Research Engineer at (IAIK) Graz University of Technology, Austria

Jan 2017 – Aug 2018

Research areas: Applied Cryptography, End-to-End Confidentiality, Privacy.

Involved in [CREDENTIAL](#) EU Horizon 2020 Project. Key contributions are as follows:

- Designed a crypto framework for end-to-end confidentiality ([IAIK-JCE](#) extension) in **federated identity management** cloud services. This approach is **used by three services providers** in Germany and Italy.
- Led the efforts in designing approaches for transparent assessment of **GDPR compliance** in cloud services. This work is now used by EuroCloud's StarAudit Certification ([StarAudit](#), [CREDENTIAL](#)).

Research Intern at Institute for Infocomm Research (I2R) – A*STAR, Singapore

Jan – Jun 2016

- Developed game-based techniques for cyber security training and awareness.

Research Intern at Fraunhofer SIT, Darmstadt, Germany

Jun – Jul 2015

- Investigated impact of code changes on security assurance cases of software.

SELECTED PUBLICATIONS

Talks **Pritam Dash**, "Detection is not Enough: Attack Resilience for Safe and Robust Autonomous Robotic Vehicles", Usenix Enigma 2022. [Talk](#) (Exemplary talk mention [link](#)).

Conferences **Pritam Dash**, Ethan Chan, Karthik Pattabiraman, "*SpecGuard: Specification Aware Recovery for Robotic Autonomous Vehicles from Physical Attacks*", ACM CCS 2024.

Pritam Dash, Guanpeng Li, Mehdi Karimibiuki, Karthik Pattabiraman, "Diagnosis-Guided Attack Recovery for Securing Robotic Vehicles from Sensor Deception Attacks", ACM ASIA CCS 2024. *Acceptance Rate 21%*.

Elaine Yao, **Pritam Dash**, Karthik Pattabiraman, "SwarmFuzz: Discovering GPS Spoofing Attacks in Drone Swarms", IEEE/IFIP DSN 2023. *Acceptance Rate 20%*.

Zitao Chen, **Pritam Dash**, Karthik Pattabiraman, "Jujutsu: A Two-stage Defense against Adversarial Patch Attacks on DNNs", ACM ASIA CCS 2023. *Acceptance Rate 16%*.

Pritam Dash, Guanpeng Li, Zitao Chen, Mehdi Karimibiuki, Karthik Pattabiraman, "PID-Piper: Recovering Robotic Vehicles from Physical Attacks", IEEE/IFIP Dependable Systems and Networks (DSN) 2021. *Acceptance Rate 16.4%*. **Best paper award** [Talk](#)

Pritam Dash, Mehdi Karimibiuki, and Karthik Pattabiraman, "Out of Control: Stealthy Attacks on Robotic Vehicles Protected by Control-Based Techniques", ACM ACSAC 2019. *Acceptance Rate 22.6%*. Work featured in [EurekaAlert](#), [TechXplore](#), [GlobalNews](#).

Patents **Pritam Dash**, Arno Schneuwly, Saeid Allahdadian, Matteo Casserini, Felix Schmidt, "Training Syntax-aware Language Models with AST Path Prediction", filed with US Patent Office.

Arno Schneuwly, Saeid Allahdadian, **Pritam Dash**, Matteo Casserini, Felix Schmidt, Eric Sedlar, "doc4code: an AI-driven Documentation Recommender System to aid Programmers", filed with US Patent Office.

Demo/Poster **Pritam Dash**, and Karthik Pattabiraman, "Demo: Recovering Autonomous Robotic Vehicles from Physical Attacks". AutoSec @NDSS 2022

PROFESSIONAL SERVICES

Conferences Sub-reviewer for research track in DSN'22, DSN'21, DSN'20, ISSRE'22, ISSRE'21.

Mentorship Co-supervised a master student and two undergraduate students at UBC (2021-2023).

Date: August 15, 2024

Place: Vancouver, Canada

Pritam Dash