Patrick Carpanedo

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Boston, MA

English [Native], **Portuguese** [Fluent], **Spanish** [Fluent]

Education

2021 - Expected 2025 **Master's Computer Science** *Boston University* MA, USA

2016 - 2020 **Bachelors of Arts in Physics** *College of the Holy Cross* MA, USA

2012 - 2016 **High School Diploma** *Boston College High School* MA, USA

Publications & Presentations

International Conference & Workshop Papers

- Weifan Chen, Ivan Izhbirdeev, Denis Hoornaert, Shahin Roozkhosh, **Patrick Carpanedo**, Sanskriti Sharma, and Renato Mancuso. Low-Overhead Online Assessment of Timely Progress as a System Commodity. ECRTS

Presentation

- Shahin Roozkhosh, Bassel El Mabsout, Cristiano Rodrigues, **Patrick Carpanedo**, Denis Hoornaert, Su Min Tan, Benjamin Lubin, Marco Caccamo, Sandro Pinto, and Renato Mancuso. Burning Fetch Execution: A Framework for Zero-Trust Multi-Party Confidential Computing. In 2024 Technology Innovation Institute (TII) GENZERO Workshop.

Notable Research

> AXI over Ethernet

This work revolves around using Programmable Logic to export bus-level memory transactions packed into an Ethernet frame to allow methods (e.g. Control Flow Integrity checks, Digital Twinning, and Direct Memory Access) to be processed remotely without kernel intervention.

> Burning Fetch Execution: A Framework for Zero-Trust Multi-Party Confidential Computing

This work tackles the gap in existing safeguarding technology by avoiding byte-level decryption until it is immediately fetched by the processor, by performing on-the-fetch data decryption, immediately followed by erasing right after processing cycles.

Research Positions

Spring 2022 - ongoing **Masters Student Researcher** *Cyber Physical Systems Lab* Boston, MA, USA

- Researched and implemented AXI over Ethernet, integrated hardware for program phase evaluation, and maintained CPS Lab servers (e.g., MegaMind and Proxmox Cluster) to support research, collaboration, and access to development resources. Participated in pseudo-TPC meetings to review papers with the Lead P.I. and volunteered to mentor students in directed studies within the lab.

Summer 2019 **Research Assistant** *College of the Holy Cross* Worcester, MA, USA

- Research Assistant responsible for assembling and verifying subsystems of the Beam Profile Monitor (BPM) system, ensuring electrical tolerances and timings. Debugged the BPM system through experiments, logging findings for the Lead P.I., and facilitated weekly presentations and discussions with different research groups.

Teaching and Mentoring

Spring 2024 - Ongoing **F1Tenth Study Mentor** *Boston University* Boston, MA, USA

- Assisting undergraduates with F1Tenth hardware projects, teaching electronic design basics, and ensuring safe handling of high-current and sensitive electronics.

Fall 2023 **UR2PhD Mentor** *Computing Research Association* Boston University

- Developed mentoring skills, led group and individual sessions with undergraduates to create PoV Display hardware/software modules, sourced and verified components, and trained students in academic research methods.

Spring 2023 **PL-Ethernet Study Mentor** *Boston University* Boston, MA, USA

- Taught Vivado Design Suite basics and FPGA functionality, delegated tasks for debugging FPGA-to-Processor Ethernet connectivity, and facilitated weekly meetings to evaluate undergraduate progress and goals.

Skills

- **Programming:** C, C++, Java, Python, SQL
- **Design:** System Verilog, Verilog, CAD, PCB design, Carpentry, Additive/Subtractive Fabrication
- **Hardware Debugging:** Xilinx Integrated Logic Analyzer, ARM Coresight, Circuit Debugging
- **System Administration:** Network Architecture, Virtual Machine Management