Peter W. Deutsch

Cambridge – Massachusetts

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Education

Massachusetts Institute of Technology
PhD Student, Electrical Engineering and Computer Science   *2022 – Present*
Doctoral Supervisor: Prof. Mengjia Yan

Massachusetts Institute of Technology
Master of Science, Electrical Engineering and Computer Science   *2020 – 2022*
Thesis: Mitigating Memory Controller Side-Channels
Masters Supervisor: Prof. Mengjia Yan

University of British Columbia
Bachelor of Applied Science, Computer Engineering   *2014 – 2020*
Undergraduate Supervisors: Prof. Mieszko Lis & Prof. Prashant Nair

Research Interests

Processor Reliability: Improving chip design processes in light of emergent silent data corruption (SDC) failure modes.

Side-Channel Classification and Defense: Exploration of side-channel taxonomies, comparison schemes, and concrete leakage evaluations.

Memory Defenses: Making DRAM more resilient to timing side-channels and Rowhammer effects.

Publications

Peter W Deutsch, Weon Taek Na, Thomas Bourgeat, Joel S Emer, and Mengjia Yan. Metior: A comprehensive model to evaluate obfuscating side-channel defense schemes. In *Proceedings of the 50th Annual International Symposium on Computer Architecture*, pages 1–16, 2023.

Peter W Deutsch*, Yuheng Yang*, Thomas Bourgeat, Jules Drean, Joel S Emer, and Mengjia Yan. DAGguise: Mitigating memory controller side-channels. In *Proceedings of the 27th ACM International Conference on Architectural Support for Programming Languages and Operating Systems*, pages 329–343, 2022.

Oliver Willers, Christopher Huth, Jorge Guajardo, Helmut Seidel, and Peter Deutsch. On the feasibility of deriving cryptographic keys from mems sensors. *Journal of Cryptographic Engineering*, 10(1):67–83, 2020.

Academic Service

IEEE Transactions on Computers – Special Issue on Hardware Security   **2022**
Reviewer

Work Experience

Research & Academic

Massachusetts Institute of Technology   **Cambridge, MA**

TA/Lab Assignment Developer   *2022 – 2023*
- Assisted in the development and testing of lab assignments for MIT's Secure Hardware Design course.
- Developed an assignment which guides students through performing and characterizing Rowhammer attacks on commodity hardware.

University of British Columbia   **Vancouver, Canada**

Undergraduate Research Student   *2019 – 2020*
- Investigated methods to detect and mitigate speculative execution attacks which utilize cache and DRAM side-channels (ex. Spectre/Meltdown).
- Replicated attacks, benchmarked prior work, and explored new mitigations using SPEC CPU 2017 and gem5.

Bosch Corporate Research   **Stuttgart, Germany**

Microsystems Engineering Student   *2017*
- Researched the use of MEMS gyroscopes as Physical Unclonable Functions (PUFs), facilitating reliable secret key generation in IoT devices.
- Helped to devise and evaluate entropy extraction schemes to generate cryptographically secure keys from highly correlated device features.

University of British Columbia   **Vancouver, Canada**

Undergraduate Teaching Assistant   *2016 – 2020*
- Conveyed Verilog-focused digital design content to hundreds of second and third-year undergraduate students.
- Taught CPEN 211 (Introduction to Microcomputers), CPEN 311 (Digital Systems Design), and CPEN 391 (Computer Engineering Design Studio II).

Industry

Intel Corporation   **Vancouver, Canada**

Verification Engineer Intern   *2018 – 2019*
- Verified system controller ASICs for Intel NAND devices using SystemVerilog and the Universal Verification Methodology (UVM 1.2).
- Designed end-to-end traffic tests to confirm compliance to internal architecture requirements and flash interface specifications, ensuring that comprehensive code coverage was achieved.

Microsemi (Microchip)   **Vancouver, Canada**

Product Design Engineer Intern   *2017*
- Designed and verified top-level RTL glue logic (SystemVerilog & VHDL) for SAS/SATA RAID controllers.
- Implemented appropriate pipelining and clock-domain-crossing synchronization strategies, ensuring that timing closure and MTBF thresholds were met.

Awards

Graduate

Google Research Scholar Grant   **2023**

Topic: Leveraging Accessible Signals for the Efficient Discovery of Corrupt Execution Errors

Advanced Televison and Signal Processing Fellowship   **2020**

Awarded on the recommendation of the Department Head of EECS

Dean's Prize for Academic Excellence in Engineering 2020
Awarded to the head of the graduating undergraduate class in Applied Science

ECE Capstone Faculty Award 2020
Presented to the top ECE Capstone (final year) project teams in 2020

NSERC Undergraduate Student Research Award 2019
Awarded on the recommendation of the Faculty of Applied Science

Trek Excellence Scholarship for Continuing Students 2015, 2016, 2017, 2019
Awarded to students in the top 5% of their program

PMC-Sierra Founders Award in Electrical and Computer Engineering 2019
Awarded on the recommendation of the Department Head of Computer Engineering

Elizabeth and Leslie Gould Scholarship in Engineering 2019
Awarded on the recommendation of the Faculty of Applied Science

J Fred Muir Memorial Scholarship in Engineering 2017
Awarded on the recommendation of the Faculty of Applied Science

J K Zee Memorial Scholarship 2016
Awarded on the recommendation of the Faculty of Applied Science

Volunteerism

MIT Graduate Application Assistance Program **Cambridge, MA**
Treasurer/Graduate Student Volunteer *2021 – Present*
- Worked with underrepresented MIT PhD applicants, providing advice and detailed feedback on personal and research statements.
- Coordinated finances for the program, raising funds to provide fee waivers for underprivileged applicants.

BC COVID-19 3D Printing Group (BCC3D) **Vancouver, Canada**
Printing / Distribution Volunteer *2020*
- Personally manufactured 300+ 3D printed face shield visors and 'ear savers' for use at hospitals and clinics.
- Inspected, sanitized, and packed 10,000+ articles of PPE produced by local volunteers.

University of British Columbia **Vancouver, Canada**
Imagine Day Orientation Leader *2015, 2016, 2019*
- Conducted informative tours for first year orientation, helping to build community relationships and increase the comfort level of new students.