MILIJANA SURBATOVICH

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RESEARCH INTERESTS

My research is in developing formal models, analysis tools, and runtime systems for intermittent computing devices, spanning different abstraction layers from systems to programming languages and applications.

1 EDUCATION

PhD Candidate, Electrical & Computer Engineering **08/17 – Present**

Carnegie Mellon University (Pittsburgh, PA)

Expected graduation 08/2023

MS, Electrical & Computer Engineering **05/20**

Carnegie Mellon University (Pittsburgh, PA)

GPA 3.77

BS, Computer Science **09/13 – 05/17**

University of Rochester (Rochester, NY)

Minor in Russian

Summa Cum Laude

2 RESEARCH EXPERIENCE

Doctoral Student, ECE Department, Carnegie Mellon University. **08/17 – Present**

Researching compilers, programming languages and formal methods for intermittent computing.

- Designing execution models and formalisms to reason about general concurrency for intermittent systems
- Designing information flow type-systems for intermittent computing correctness
- Developed formalisms and compiler tools to enable correct-by-construction timeliness for intermittent systems. Published in PLDI 2021.
- Defined a formal framework to reason about memory consistency of intermittent systems. Published in OOPSLA 2020.
- Identified and characterized a new bug type caused by inputs on an emerging platform. Designed static and dynamic program analyses to detect the bug. Published in OOPSLA 2019.
- Advisors: Brandon Lucia, Limin Jia

Research Assistant, Cylab, Carnegie Mellon University. **05/17 – 08/17**

- Designed and developed a user study to analyze security perceptions and user behavior on IFTTT, an end-user programmable IoT service

REU internship at the Institute for Software Research, Carnegie Mellon University. **05/16 – 08/16**

- Project used information flow theory to analyze security & privacy violations in Internet of Things devices. Built an analytical model in Datalog to track secrecy and integrity violations on a popular IoT service. Published in WWW 2017.

3 PUBLICATIONS

- **Milijana Surbatovich**, Limin Jia, and Brandon Lucia. 2021. Automatically enforcing fresh and consistent inputs in intermittent systems. Proc. 42nd ACM SIGPLAN International Conference on Programming Language Design and Implementation (PLDI 2021). DOI: https://doi.org/10.1145/3453483.3454081
- **Milijana Surbatovich**, Brandon Lucia, and Limin Jia. 2020. Towards a formal foundation of intermittent computing. Proc. ACM Program. Lang. 4, OOPSLA, Article 163 (November 2020) DOI: https://doi.org/10.1145/3428231
- Camille Cobb, **Milijana Surbatovich**, Anna Kawakami, Mahmood Sharif, Lujo Bauer, Anupam Das, Limin Jia. 2020. How Risky Are Real Users' IFTTT Applets? USENIX Symposium on Usable Privacy and Security (SOUPS 2020)
- **Milijana Surbatovich**, Limin Jia, and Brandon Lucia. 2019. I/O dependent idempotence bugs in intermittent systems. Proc. ACM Program. Lang. 3, OOPSLA, Article 183 (October 2019) DOI: https://doi.org/10.1145/3360609
- **Milijana Surbatovich**, Jassim Aljuraidan, Lujo Bauer, Anupam Das, and Limin Jia. 2017. Some Recipes Can Do More Than Spoil Your Appetite: Analyzing the Security and Privacy Risks of IFTTT Recipes. In Proceedings of the 26th International Conference on World Wide Web (WWW 17). DOI: https://doi.org/10.1145/3038912.3052709

4 MENTORING AND TEACHING EXPERIENCE

Mentoring

- Mentoring an undergraduate summer research intern in a project on Information flow types for intermittent computing. **Summer 2021**
- Mentored an undergraduate research intern who developed a Coq formalization of the theorem for basic intermittent system correctness **Summer 2020**
- Mentored three undergraduate interns in developing a custom reader for the JavaCard environment, and one REU program intern in a project on analyzing end-user security and privacy harms in IoT services. **Summer 2019**

Graduate Teaching Assistantships

- **Formal Foundations of Security**. (CMU course 15-316). Responsibilities included weekly office hours, and grading of homeworks, labs, and exams.

- **Secure Software Systems.** (CMU course 18-732). Responsibilities included weekly office hours, running some recitations, project rollout and infrastructure maintenance, and grading.

Undergraduate Teaching Assistantships

Lab and Project Teaching Assistant **2016 - 2017**

- For **Computer Organization** and **Front-end Web Development**. Responsibilities included weekly lab sessions and office hours, grading labs and projects.

Workshop Leader **2015 - 2016**

- **Science of Programming** and **Science of Data Structures**. Responsibilities included leading mandatory weekly workshops, grading weekly quizzes and the exams.
- The position required taking a weekly class on leadership and pedagogy skills.

5 TALKS AND TUTORIALS

- Automatically Enforcing Fresh and Consistent Inputs in Intermittent Systems (at **PLDI 2021**)
- Towards a Formal Foundation of Intermittent Computing (at **OOPSLA 2020**)
- I/O dependent idempotence bugs in intermittent systems (at **OOPSLA 2019**)
- Getting Started with Intermittent Computing (tutorial at **MICRO 2018**)
- Security & Privacy Flaws in End-User IoT Programming (at **PrivacyCon 2018**)
- Security & Privacy Flaws in End-User IoT Programming (at **WWW 2017**)

6 HONORS

Received CyLab Presidential Fellowship **2021**

Inducted to Phi Beta Kappa **2017**

7 GRADUATE COURSES

- 15-745 Optimizing Compilers for Modern Architectures
- 15-814 Types and Programming Languages
- 15-812 Programming Language Semantics
- 15-712 Advanced Operating and Distributed Systems
- 18-730 Introduction to Computer Security
- 18-732 Secure Software Systems
- 18-742 Computer Architecture and Systems
- 18-743 Energy Aware Computing