# Bogdan "Bo" Alexandru Stoica

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## Research Interests

My research focuses on the reliability, efficiency, and security of software systems, with an emphasis on improving their operation, maintenance, and quality assurance lifecycles at scale. To this end, I build tools to help software engineers better write, deploy, and reason about code, enabling them to identify faults more efficiently. I am interested in program analysis, efficient code instrumentation, performance reasoning, and artificial intelligence approaches that support software engineering tasks.

## Education

**University of Chicago** Chicago, IL, United States

*Ph.D. Candidate in Computer Science (Area: Systems and Programming Languages)* September 2019 – August 2025

Dissertation: Principles and Tool Support for Detecting Latent Bugs in Modern Software Systems
Advisor: Prof. Shan Lu
Mentors: Prof. Haryadi Gunawi, Prof. Kexin Pei, Dr. Suman Nath and Dr. Madan Musuvathi

*M.Sc. in Computer Science (Area: Systems and Programming Languages)* September 2019 – June 2022

Dissertation: Exposing Memory Ordering Bugs Efficiently with Active Delay Injection
Advisor: Prof. Shan Lu
Mentors: Prof. Haryadi Gunawi, Dr. Suman Nath and Dr. Madan Musuvathi

**École Polytechnique Fédérale de Lausanne (EPFL)** Lausanne, Switzerland

*Graduate Coursework (Area: Systems and Programming Languages)* September 2014 – August 2015

Mentors: Prof. Vikram S. Adve, Prof. Bernard M. E. Moret and Prof. Viktor Kunčak

**École Polytechnique Fédérale de Lausanne (EPFL)** Lausanne, Switzerland

*M.Sc. in Communication Systems (Area: Information Security)* September 2011 – January 2014

Thesis: Robust Web Content Evaluation
Advisor: Prof. Karl Aberer

**University of Bucharest (UB)** Bucharest, Romania

*B.Sc. in Computer Science (Area: Algorithms and Software Security)* October 2008 – June 2011

Thesis: On Intrusion Detection Systems
Advisor: Prof. Adrian Atanasiu

## Awards and Honors

Distinguished Artifact Evaluator Award (EuroSys'25) 2025
Eckhardt Graduate Fellowship (University of Chicago) 2019 – 2024
Teaching Assistant Award for Outstanding Service (EPFL) 2016 – 2017
Excellence Fellowship for Master's Studies (EPFL) 2011 – 2013
Excellence Scholarship for Bachelor's Studies (UB) 2008 – 2011
Bronze Medal, International Pluridisciplinar Olympiad in Informatics (Tuymaada), Russian Federation 2007

## Peer-Reviewed Publications

[C5] **Who Watches the Watchers? On the Reliability of Softwarizing Cloud Application Management.** Jiawei Tyler Gu, Zhen Tang, Yiming Su, Bogdan Alexandru Stoica, Xudong Sun, William X. Zheng, Yue Zhang, Akond Rahman, Chen Wang, and Tianyin Xu. *In Proceedings of the 23rd USENIX Symposium on Operating Systems Design and Implementation (NSDI), Renton, WA, May 2026. (To appear).* NSDI '26

[C4] **Synthesizing Performance Constraints for Evaluating and Improving Code Efficiency.** Jun Yang, Cheng-Chi Wang, Bogdan Alexandru Stoica, Kexin Pei. *In Proceedings of the 39th Conference on Neural Information Processing System (NeurIPS), San Diego, CA, Dec 2025. (To appear).* NeurIPS '25

[C3] **If At First You Don't Succeed, Try, Try, Again...? Insights and LLM-informed Tooling for Detecting Retry Bugs in Software Systems.** Bogdan Alexandru Stoica*, Utsav Sethi*, Yiming Su, Cyrus Zhou, Shan Lu, Jonathan Mace, Madan Musuvathi, and Suman Nath (*equal contribution). *In Proceedings of the 30th ACM Symposium on Operating Systems Principles. Austin, TX, US. November 2024.* SOSP '24

[C2] **Waffle: Exposing Memory Ordering Bugs Efficiently with Active Delay Injection.** Bogdan Alexandru Stoica, Shan Lu, Madan Musuvathi, and Suman Nath. *In Proceedings of the 18th ACM SIGOPS European Conference on Computer Systems. Rome, Italy. May 2023.* EuroSys '23

[C1] **Wok: Statistical Program Slicing in Production.** Bogdan Alexandru Stoica, Shan Lu, Madan Musuvathi, and Suman Nath. *In Proceedings of the 41st ACM/IEEE International Conference on Software Engineering. Montreal, QC, Canada. May 2019.* ICSE '19

## Pre-prints and technical reports

[P1] **Statistical Program Slicing: a Hybrid Slicing Technique for Analyzing Deployed Software.** Bogdan Alexandru Stoica, Swarup K Sahoo, James R Larus, Vikram S Adve. *arXiv:2201.00060, December 2021.* `https://arxiv.org/abs/2201.00060` arXiv '21

## Employment

**University of Illinois at Urbana-Champaign** — Urbana, IL, United States

*Postdoctoral Research Associate* — August 2025 – present

*Hosts: Prof. Tianyin Xu and Prof. Darko Marinov*

I work at the intersection of Systems, Software Engineering, Programming Languages, and Artificial Intelligence (AI), designing techniques that help software engineers better write, deploy, and reason about their code. I build tools that combine traditional software testing and monitoring techniques with modern AI approaches.

**University of Chicago** — Chicago, IL, United States

*Research Assistant* — September 2019 – August 2025

*Advisor: Prof. Shan Lu*

I developed automated fault detection techniques for large-scale systems implemented in a wide range of programming languages (C, C++, C#, Java, and Python). I designed bug-finding tools that combine program analysis, fault injection, code instrumentation, and AI-guided code comprehension to isolate and expose correctness and performance defects.

**Google** — Sunnyvale, CA, United States

*PhD Software Engineering Intern (Core ML Engineering)* — June 2023 – September 2023

*Mentors: Gloria Shen and Dr. Ilya Kavalerov*

I prototyped a pipeline that helps software engineers pinpoint regression bugs in Google's ML infrastructure more efficiently. The key functionality of the pipeline is matching character-level differences between consecutive builds to high-order program structures (e.g. class, package, etc.) which are later traced back to the relevant tests exercising

these code changes. The prototype is currently being integrated with TensorFlow's build framework.

**Meta** Seattle, WA, United States

*Research Intern (Systems & Infrastructure, Profiling)* June 2022 – October 2022

*Mentors: Nathan Slingerland and Jacie Fan*

I developed a rules-based engine that identifies inefficient C++ code patterns at scale by analyzing billions of low-level execution profiles collected across Cloud services. The tool is currently being integrated with Meta's existing code efficiency analysis protocols to help developers pinpoint difficult-to-find performance bottlenecks.

**Microsoft Research** Redmond, WA, United States

*Research Collaborator* January 2020 – June 2020

*Mentors: Dr. Suman Nath and Dr. Madan Musuvathi*

I explored a series of bug diagnosis techniques that integrate with existing software testing frameworks. I investigated fault injection strategies to help expose difficult-to-reproduce bugs in distributed applications. This exploratory work led to Waffle, a push-button fault injection tool that helps developers trigger memory ordering concurrency bugs (see [C1]) and to Wasabi, a LLM-informed fault injection tool that helps developers expose bugs in retry mechanisms (see [C2]).

**Microsoft Research** Redmond, WA, United States

*Research Intern* July 2018 – September 2018

*Mentors: Dr. Weidong Cui and Dr. Ben Niu*

I designed and implemented a C++ tool for tracing heap memory management requests to help program state recovery during offline execution replay. This extended Windows Debugger's reverse debugging engine by increasing the current recovery rate and allowing it to replay longer execution traces.

**École Polytechnique Fédérale de Lausanne (EPFL)** Lausanne, Switzerland

*Research Assistant* September 2015 – December 2018

*Mentors: Prof. Vikram S. Adve, Prof. Bernard M. E. Moret, and Dr. Swarup K. Sahoo*

I designed techniques to help developers analyze their code more efficiently. I prototyped a suite of C and C++ tools for scalable bug diagnosis using program analysis, efficient code instrumentation, and emerging hardware support for execution tracing.

**Microsoft** Prague, Czech Republic

*Software Development Engineer (Automated Testing Infrastructure)* February 2014 – August 2014

*Mentor: Travis Merkel*

I helped develop automated testing frameworks (C, C++ and Python) for the Skype tool chain. I used these to design performance testbeds which identified several critical memory leaks and buffer overflow bugs.

**Bitdefender Labs** Bucharest, Romania

*Software Development Engineering Intern (R&D)* June 2012 – September 2012

*Mentor: Teodor Stoenescu*

I developed a stand-alone, secondary SSL certificate validation tool for the Bitdefender Anti-virus suite (C/C++). Parts of my code were integrated in the 2013 release of the software.

**Bitdefender Labs** Bucharest, Romania

*Software Development Engineer (R&D)* May 2010 – August 2011

*Mentors: Mihai Chiriac and Teodor Stoenescu*

I developed several modules of a new Anti-virus suite for virtual environments (C/C++). I focused on optimizing network traffic processing and implemented a multi-layer cache which increased scanning throughput by 50%.

## Talks

[T8] **If At First You Don't Succeed, Try, Try, Again...? Insights and LLM-informed Tooling for Detecting Retry Bugs in Software Systems.**
*SOSP'24. Austin, TX, US. Conference Talk.* November 2024

[T7] **Weaving Large Language Models into the Bug Finding Pipeline: Challenges and Opportunities.**
*PACMI'24. Austin, TX, US. Invited Talk.* November 2024
*The 5th Chameleon User Meeting. Atlanta, GA, US. Conference Talk.* November 2024

[T6] **Understanding, Characterizing and Exposing Deeply-Nested Bugs in Large-Scale Systems.**
*University of Illinois at Urbana-Champaign. Urbana, IL, US. Invited Talk.* October 2024

[T5] **Artifact Reproducibility as a Classroom Tool.**
*ACM REP'24. Rennes, France. Invited Tutorial Talk.* June 2024

[T4] **Waffle: Exposing Memory Ordering Bugs Efficiently with Active Delay Injection.**
*EuroSys'23. Rome, Italy. Conference Talk.* May 2023

[T3] **Failure Diagnosis with Hardware Support**
*Imperial Collage London, London, UK. Seminar.* January 2019
*University of Illinois at Urbana-Champaign. Urbana, IL, US. Invited Talk.* September 2018

[T2] **Exploring Hardware Data Logging on Modern CPUs**
*Microsoft Research. Redmond, WA, US. Seminar.* September 2018

[T1] **Modern Hardware and OS Support for Efficient Execution Tracing**
*University of Zurich. Zurich, Switzerland. Invited Talk.* December 2017

## Professional Service

**Conference Chairing and Steering Committe Service**
Artifact Evaluation Co-Chair for the European Conference on Computer Systems (EuroSys) 2026

**Program Committee Service**
Practical Adoption Challenges of ML for Systems (PACMI@SOSP) 2025

**Artifact Evaluation Committee Service**
European Conference on Computer Systems (EuroSys) 2025
Symposium on Operating Systems Principles (SOSP) 2023
The Annual Conference on Machine Learning and Systems (MLSys) 2023
Symposium on Operating Systems Design and Implementation (OSDI) 2022
European Conference on Computer Systems (EuroSys) 2022
Intl. Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS) 2022
Symposium on Operating Systems Principles (SOSP) 2021
Intl. Conf. on Programing Languages Design and Implementation (PLDI) 2019
Symposium on Principles and Practice of Parallel Programming (PPoPP) 2018, 2019

## Teaching Experience

Co-instructor

UChicago, CMSC-33200: Topics in Operating Systems (graduate) 2024

Guest Lecturer

UChicago, CMSC-33200: Topics in Operating Systems (graduate) 2023

Teaching Assistant

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|---|---|
| UChicago, CMSC-14300: Systems Programming (undergraduate), lead teaching assistant | 2023 |
| UChicago, CMSC-22001: Software Construction (undergraduate), lead teaching assistant | 2022 |
| UChicago, MPCS-52030: Operating Systems (graduate), teaching assistant | 2020 |
| UChicago, CAPP-30122: Computer Science with Applications II (graduate), teaching assistant | 2020 |
| UChicago, MPCS-55001: Algorithms (graduate), teaching assistant | 2019 |
| EPFL, CS-173: Digital Systems Design (EPFL, undergraduate), lead teaching assistant | 2018 |
| EPFL, CS-207: Systems Oriented Programming (EPFL, undergraduate), lead teaching assistant | 2015, 2017 |
| EPFL, CS-250: Algorithms (EPFL, undergraduate), teaching assistant | 2015, 2016, 2017 |
| EPFL, CS-450: Advanced Algorithms (EPFL, graduate), teaching assistant | 2013, 2014, 2016 |
| EPFL, CS-150: Discrete Structures (EPFL, undergraduate), teaching assistant | 2013 |

## Research Mentoring

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| M8. **Jun Yang**. UChicago (PhD) | 2024 – now |
| M7. **Casper Wang**. National Taiwan University (BSc) | 2024 – now |
| M6. **Zahra Nabila Maharani**. Dian Nuswantoro University (BSc) | 2023 – now |
| M5. **Wordyka Nainggolan**. Del Insitute of Technology (BSc) | 2024 – 2025 |
| M4. **Shuang Liang**. Ohio State (BSc) | 2023 – 2024 |
| M3. **Yiming Su**. UChicago (BSc) → UIUC (PhD). Publications: [C2] | 2023 – 2024 |
| M2. **Cyrus Zhou**. UChicago (BSc). Publications: [C2] | 2023 – 2024 |
| M1. **Rizky Ramadhana P. K**. Bandung Institute of Tech (BSc) → Virginia Tech (MSc) | 2022 – 2023 |