Bogdan "Bo" Alexandru Stoica

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Research Interests

My research centers around software reliability, efficiency, and security with a focus on automated debugging at scale. To this end, I build tools to help developers better reason about their code and diagnose bugs faster. I am interested in program analysis, efficient code instrumentation, emerging hardware and OS support for execution profiling, performance analysis, and investigating large language models as support for program analysis.

Education

University of Chicago — Chicago, IL, United States

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

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

Thesis: 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

Peer-Reviewed Publications

[C2] **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

[C1] **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

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

Employment

University of Chicago Chicago, IL, United States

Research Assistant September 2019 – present

Advisor: Prof. Shan Lu

I design automated fault diagnosis techniques for large-scale distributed software systems written in C, C++, C#, and Java. I build tools that combine program analysis, fault injection, code instrumentation, and execution profiling to isolate and expose correctness and performance bugs.

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. Champaign, 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. Champaign, 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

European Conference on Computer Systems (EuroSys), Artifact Evaluation Committee 2024
Symposium on Operating Systems Principles (SOSP), Artifact Evaluation Committee 2023
The Annual Conference on Machine Learning and Systems (MLSys), Artifact Evaluation Committee 2023

Symposium on Operating Systems Design and Implementation (OSDI), Artifact Evaluation Committee 2022
European Conference on Computer Systems (EuroSys), Artifact Evaluation Committee 2022
Intl. Conf. on Arch. Support for Prog. Lang. and Operating Systems (ASPLOS), Artifact Evaluation Committee 2022
Symposium on Operating Systems Principles (SOSP), Artifact Evaluation Committee 2021
Intl. Conf. on Programing Languages Design and Implementation (PLDI), Artifact Evaluation Committee 2019
Symposium on Principles and Practice of Parallel Programming (PPoPP), Artifact Evaluation Committee 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

- 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

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