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@hgoldstein95

Harrison Goldstein

Postdoctoral Fellow

I am a postdoc working with Leo Lampropoulos and Benjamin Pierce. My work combines programming languages, software engineering, and human-computer interaction to improve the tools that developers use to build software. The bulk of my work so far has focused on *property-based testing.*

Education

Ph.D. in Computer Science
University of Pennsylvania

M.Eng. in Computer Science
Cornell University

B.S. in Computer Science
Cornell University

Teaching

Penn CIS 552
Head TA 2020-2021

Penn CIS 810
Head TA 2021

Cornell CS 3110
Head TA 2017

Cornell Eng. Leadership
Head TA 2017

Cornell CS 2112
TA 2016

Awards and Honors

Victor Basili Postdoctoral Fellowship
University of Maryland

Certificate in Engineering Leadership
Cornell ECLP

Selected Publications

Property-Based Testing for the People
Dissertation

Tyche: Making Sense of Property-Based Testing Effectiveness
UIST 2024 Research Paper

Property-Based Testing in Practice   DISTINGUISHED PAPER
ICSE 2024 Research Paper

Reflecting on Random Generation   DISTINGUISHED PAPER
ICFP 2023 Research Paper

Parsing Randomness
OOPSLA 2022 Research Paper

Grants

NSF #2402449 SHF: Medium: Usable Property-Based Testing
National Science Foundation

TYCHE: An IDE for Property-Based Testing
Amazon Research Award 2023

Employment

University of Maryland, College Park
Victor Basili Postdoctoral Fellow 2024-

Galois, Inc.
Research Intern 2023

Amazon Web Services
Research Intern 2020

Selected Service Roles

Steering Committee Member NJPLS Ongoing	**Research Mentor** DeepSpec REU
Speaker PLMW (POPL'24, ICFP'24)	**Organizer** NJPLS 2023
Research Mentor REPL REU 2023, 2024	**Social Chair** POPL 2021
PC Member HATRA 2023	**A/V Coordinator** ICFP 2021

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Publications, Talks, and Grants

Dissertation

Property-Based Testing for the People
Harrison Goldstein
advised by Benjamin C. Pierce
approved by Stephanie Weirich (committee chair), Andrew Head, Mayur Naik, Hila Peleg
Defended May 24, 2024

Refereed Conference Publications

UIST'24	**Tyche: Making Sense of Property-Based Tesing Effectiveness** **Harrison Goldstein**, Jeffrey Tao, Zac Hatfield-Dodds, Benjamin C. Pierce, Andrew Head User Interface Software and Technology (UIST) 2024. 13 pages.
PLDI'24	**Stream Types** J. W. Cutler, C. Watson, E. Nkurumeh, P. Hilliard, **H. Goldstein**, C. Stanford, B. C. Pierce Programming Language Design and Impl. (PLDI) 2024. 24 pages.
PLDI'24	**Daedalus: Safer Document Parsing** I. Diatchki, M. Dodds, **H. Goldstein**, B. Harris, D. Holland, B. Razet, C. Schlesinger, S. Winwood Programming Language Design and Implementation (PLDI) 2024. 24 pages.
ICSE'24 Distinguished	**Property-Based Testing in Practice** **Harrison Goldstein**, Joseph W. Cutler, Daniel Dickstein, Benjamin C. Pierce, Andrew Head International Conference on Software Engineering (ICSE) 2024. 23 pages.
ICFP'23 Distinguished	**Reflecting on Random Generation** **Harrison Goldstein**, Samantha Frohlich, Meng Wang, Benjamin C. Pierce International Conference on Functional Programming (ICFP) 2023. 34 pages.
OOPSLA'22	**Parsing Randomness** **Harrison Goldstein**, Benjamin C. Pierce Obj.-Oriented Programming, Systs., Langs., and Apps. (OOPSLA) 2022. 25 pages.
ESOP'21	**Do Judge a Test by its Cover: Combining Combinatorial and Property-Based Testing** **Harrison Goldstein**, John Hughes, Leonidas Lampropoulos, Benjamin C. Pierce European Symposium on Programming (ESOP) 2021. 27 pages.

Workshop Papers and Experience Reports

OCaml'24	**Mica: Automated Differential Testing for OCaml Modules** Ernest Ng, **Harrison Goldstein**, Benjamin C. Pierce OCaml Workshop 2024. 2 pages.

ICFP'23	**Etna: An Evaluation Platform for Property-Based Testing (Experience Report)** J. Shi, A. Kelles, **H. Goldstein**, B. C. Pierce, L. Lampropoulos International Conference on Functional Programming (ICFP) 2023. 17 pages.
HATRA'22	**Some Problems with Properties: A Study on Property-Based Testing in Industry** **Harrison Goldstein**, Joseph W. Cutler, Adam Stein, Benjamin C. Pierce, Andrew Head Human Aspects of Types and Reasoning Assistants (HATRA) 2022. 8 pages.
SysML'18	**Programming Language Support for Natural Language Interaction** Alex Renda, **Harrison Goldstein**, Sarah Bird, Chris Quirk, Adrian Sampson Conference on Machine Learning and Systems (SysML) 2018. 3 pages.

Demos

SCF'24	**Demonstrating FEDT: Supporting Characterization Experiments in Fabrication Research** V. Savage, N. Püsök, **H. Goldstein**, C. Nandi, J. Yi Ren and L. Oehlberg Symposium on Computational Fabrication (SCF) 2024.
UIST'23	**Tyche: In Situ Analysis of Random Testing Effectiveness** **Harrison Goldstein**, Benjamin C. Pierce, Andrew Head User Interface Software and Technology (UIST) 2023.

Speaking

Talk Invited	**My PhD Compass: 6 Ways to Guide a PhD Towards Success** **Harrison Goldstein** PL Mentoring Workshop @ ICFP, September 2024
Podcast Invited	**Harry Goldstein | Property-Based Testing | #55** Jack Waudby, **Harrison Goldstein** Disseminate Podcast, June 2024
Talk	**Usable Property-Based Testing** **Harrison Goldstein** Amazon Web Services, June 2024
Talk Invited	**Consider Collaboration** Samantha Frohlich, **Harrison Goldstein** PL Mentoring Workshop @ POPL, January 2024
Talk Invited	**Advancing Property-Based Testing in Theory and Practice** **Harrison Goldstein** Microsoft Research, UC Berkeley, Galois, Inc., UCSC, University of Bristol
Talk	**Property-Based Testing in Practice** **Harrison Goldstein** Jane Street Programming Languages Colloquium, December 2023
Podcast Invited	**TheForkJoin Episode 2** Oliver Flatt, Rachit Nigam, **Harrison Goldstein** TheForkJoin
Talk	**Some Problems with Properties** **Harrison Goldstein** NJPLS October 2022
Talk	**Reflecting on Random Generation** **Harrison Goldstein** NJPLS May 2022

Posters

ICFP'21   **Ungenerators**
Harrison Goldstein
ICFP 2021

POPL'20   **Algebraic Combinatorial Testing**
Harrison Goldstein
POPL 2020

Drafts and Blog Posts

Delimited Continuations and Monads
Harrison Goldstein
Unpublished PhD Milestone Draft, April 2021

Conferences after COVID: An Early Career Perspective
Joseph W. Cutler, **Harrison Goldstein**, Andrew K. Hirsch, Jaemin Hong, Chandrakana Nandi
SIGPLAN PL Perspectives Blog, March 2021

Funded Grant Proposals

NSF #2402449 SHF: Medium: Usable Property-Based Testing
2023-2024
Made significant contributions, in the form of both research project ideas and grant writing, to help secure a NSF Medium grant. This grant helped to fund my dissertation work, and it will continue to fund follow-on projects.
Team: Benjamin Pierce (co-PI), Andrew Head (co-PI), **Harrison Goldstein** (contributor)

Amazon Research Award: TYCHE: An IDE for Property-Based Testing
Spring 2023
Secured funding from AWS to fund my ongoing work on user interfaces for property-based testing. This award includes the opportunity to collaborate with contacts at AWS, including Michael Hicks, on interfaces that support real industrial workloads.
Team: **Harrison Goldstein** (primary author), Benjamin Pierce (co-PI), Andrew Head (co-PI)

Education

Ph.D. in Computer Science, University of Pennsylvania
2019–2024

M.Eng. in Computer Science, Cornell University
2018 — GPA 4.02

B.S. in Computer Science, Cornell University
2014–2018 — GPA 4.08

Teaching and Advising

Courses

Penn CIS 552 "Advanced Programming"
Prof. Stephanie Weirich
Head TA 2020-2021

Penn CIS 810 "Writing and Speaking with Style"
Prof. Benjamin C. Pierce
Head TA 2021

Cornell CS 3110 "Functional Programming"
Prof. Nate Foster
Head TA 2017

Cornell Engineering Leadership
Profs. Erica Dawson and Werner Zorman
Head TA 2017

Cornell CS 2112 "Object-Oriented Design and Data Structures (Honors)"
Prof. Dexter Kozen
TA 2016

Graduate Advisees

Collaborator and Research Mentor, Joseph W. Cutler

Collaborator and Research Mentor, Jessica Shi

Co-Advisor, Ernest Ng

Service

Conference Organizing and Reviewing

Steering Committee Member, NJPLS — Ongoing

Reviewer, PLATEAU 2024

Co-Organizer, Celebration for Benjamin Pierce's 60th Birthday

PC Member, HATRA 2023

Organizer, NJPLS 2023

Social Chair, POPL 2021

A/V Coordinator, ICFP 2021

Mentorship

Speaker, PL Mentoring Workshop @ ICFP 2024

Ph.D. Mentor, SIGPLAN-M

Ph.D. Mentor, Penn CIS Mentoring

Speaker, PL Mentoring Workshop @ POPL 2024

Research Mentor, REPL REU 2023

Research Mentor, DeepSpec REU

Misc.

Editor in Chief, PLClub Blog 2021-2024

Awards and Honors

Victor Basili Postdoctoral Fellowship
University of Maryland, Computer Science Department

Certificate in Engineering Leadership
Cornell Engineering Leadership Certification Program

1st Place, Business Plan Competition
Cornell School of Hotel Administration

Employment

University of Maryland, College Park
Victor Basili Postdoctoral Fellow 2024-
Working with Prof. Leonidas Lampropoulos on topics related to usable property-based testing.

Galois, Inc.
Research Intern 2023
Worked on two research papers related to the SafeDocs DARPA program. Provided expertise on testing that helped situate the papers in the broader research context.

Amazon Web Services
Research Intern 2020
Worked on Zelkova, a tool for analyzing and proving properties about AWS access policies. Encoded logical constraints from access policies as SMT formulas, in order to infer policy implications.

Broadway Technology
Software Engineer and Software Engineering Intern 2017–2019
Built mission-critical internal tools for the company's financial personnel, in particular facilitating a transition to new financial tracking software. Designed and implemented data connectors, financial calculations, web interfaces, and more.

Susquehanna International Group, LLC
Technology Intern 2016
Helped to implement a safety system, protecting the firm from anomalous trading behaviors. Built an engine for executing business rules as monitors for live trading activities.

Last Second Beach, LLC
Chief Technology Officer 2015–2016
Helped to lead a small, early stage start-up, focused on providing one-price vacations. Built a demo iOS application, helping the company to win a $25,000 grant as part of a Business Plan Competition.