Talia Lily Ringer

https://dependenttyp.es

ACADEMIA

University of Illinois at Urbana-Champaign *2021 – Present*
Assistant Professor

University of Washington *2015 – 2021*
Ph.D. in Computer Science
Advisor: Dan Grossman
Ph.D. Thesis: Proof Repair. Defense video.

University of Maryland, College Park *2008 – 2012*
B.S. in Mathematics and Computer Science
Advisor: Lawrence Washington
Honors Thesis: An Elliptic Curve Threshold Key Establishment Scheme

PUBLICATIONS

Talia Ringer, RanDair Porter, Nathaniel Yazdani, John Leo, and Dan Grossman.
Proof Repair Across Type Equivalences.
PLDI 2021. PUMPKIN Pi tool repository.

Talia Ringer, Alex Sanchez-Stern, Dan Grossman, and Sorin Lerner.
REPLICA: REPL Instrumentation for Coq Analysis.
CPP 2020. Talk video.

Talia Ringer, Karl Palmskog, Ilya Sergey, Milos Gligoric, and Zachary Tatlock.
QED at Large: A Survey of Engineering of Formally Verified Software.
Foundations and Trends® in Programming Languages: Vol. 5: No. 2-3, pp 102-281. 2019.
Project website.

Talia Ringer, Nathaniel Yazdani, John Leo, and Dan Grossman.
Ornaments for Proof Reuse in Coq.
ITP 2019. Talk video, DEVOID tool repository.

Talia Ringer, Nathaniel Yazdani, John Leo, and Dan Grossman.
Adapting Proof Automation to Adapt Proofs.
CPP 2018. Talk video, PUMPKIN PATCH tool repository.

Talia Ringer, Dan Grossman, Daniel Schwartz-Narbonne, and Serdar Tasiran.
A Solver-Aided Language for Test Input Generation.
OOPSLA 2017. Talk video.

Talia Ringer, Dan Grossman, and Franziska Roesner.
AUDACIOUS: User-Driven Access Control with Unmodified Operating Systems.
CCS 2016. Talk video.

RESEARCH VISION

My research makes **program verification** using proof assistants more accessible through better **proof engineering** technologies, especially when it comes to *maintaining* proofs as programs change over time. To that end, I develop foundational results in **dependent type theory**, and use those results to drive the development of tools informed by the needs of real proof engineers. My vision is a future of verification with the help of these tools that is accessible to all programmers. I believe this will help make software more reliable and secure.

UNDERGRADUATE STUDENTS ADVISED

Taylor Blau.
Verifying Strong Eventual Consistency in δ-CRDTs.
Senior Thesis.

Jasper Hugunin.
Constructing Inductive-Inductive Types in Cubical Type Theory.
FOSSACS 2019.

INDUSTRY

Research Scientist Intern at Amazon (Automated Reasoning Group) *Summer 2016*
Developed a solver-aided domain-specific language to generate test inputs.

Software Development Engineer at Amazon (Amazon Business) *2012 – 2015*
Helped launch Amazon Business.
Wrote code used company-wide & loaded by all Amazon.com visitors.

HONORS & AWARDS

College of Engineering Quarterly Fellow *University of Washington*
P.E.O. Scholar *University of Washington*
NSF GRFP Fellow *University of Washington*
Graduated with Honors in Computer Science *University of Maryland*
Graduation Speech Finalist *University of Maryland*
Corporate Scholar *University of Maryland*
Scholar Athlete *University of Maryland*

GRANTS AWARDED

POLYMORPH: Promotion to Optimal Languages Yielding Modular Operator-driven Replacements and Programmatic Hooks. Galois, Northeastern, University of Washington, University of Alabama, and Syracuse University. DARPA V-SPELLS. $11,342,650.

SERVICE

PLDI Program Committee *2022*
SPLASH Hybridization Committee *2021*
SIGPLAN Long-Term Mentoring Committee Founder & Chair *2021*

CAV Program Committee *2021*
Mathematical Structures in Computer Science Reviewer *2020*
Human Aspects of Types and Reasoning Assistants Program Committee *2020*
ICFP Mentoring Chair *2020*
ICFP Programming Languages Mentoring Workshop (PLMW) Co-Chair *2020*
University of Washington Visit Days Panelist *2020*
POPLmark 15 Year Retrospective Panel Lead Organizer *2020*
CAV Artifact Evaluation Committee *2019*
CoqPL Program Committee *2019*
POPL Artifact Evaluation Committee *2018, 2019*
University of Washington Graduate Admissions Committee *2018*
DeepSpec Summer School Student Talks Organizer *2017*

MENTORSHIP, DIVERSITY, & OUTREACH

SIGPLAN Long-Term Mentoring Committee *2020 – Present*
Mentor for the mentorship program listed under service above.

Shut Down PL *2020*
Coorganizer of an anti-racist workshop for programming languages researchers.

Neighbors Feeding Neighbors Seattle & Ballard Food Bank *2020 – 2021*
Packer & delivery driver of food & masks for the hungry during the pandemic.

UW CSE Care Committee *2019 – 2021*
Founder & organizer of a support network for graduate students in times of need.

Jewish Family Services *2017 – 2021*
ESL tutor and friendly visitor for an elderly refugee.

UW CSE & TUNE House *2015 – 2020*
Mentor for undergraduate women and graduate students in computer science.

UW Queer Mentoring Program *2016 – 2019*
Mentor for LGBT students from any major.

The Identity Function *2016 – 2018*
Author of a blog interview series about LGBT computer science researchers.

Amazon *2012 – 2015*
Technical and career mentor for software engineers.

INVITED TALKS

Proof Engineering Tools for a New Era *Spring 2021*
Caltech, UCLA, UMass Amherst, Aarhus, Vermont, UIUC, Virginia

Proof Repair Across Type Equivalences *Fall 2020*
Cornell, CMU

Proof Transformation *Spring 2020*
Logic Supergroup Seminar Series

Proof Engineering Tools for a New Era *Fall 2019*
Rising Stars in CS Lecture Series at UMass Amherst

INVITED SEMINARS AND WORKSHOPS

Dagstuhl Seminar *Fall 2021*
Static Methods for Correctness of Model and Program Transformations

Coq Users and Developers Workshop *Summer 2018, 2019*
An Event for Understanding, Improving, and Extending Coq

Rising Stars *Fall 2019*
An Academic Career Workshop for Women in EECS

TEACHING

University of Washington
TA for Concepts of Programming Languages (Fall 2018), Compilers (Winter 2016)

University of Maryland, College Park
TA for Computer and Network Security (Spring 2012)

INTERESTS

Other academic interests include **domain-specific languages**, **neurosymbolic programming**, **type theory**, **category theory**, **computer security**, **artifical intelligence**, and **cryptography**.

My favorite programming languages are **Coq**, **OCaml**, and **Rosette**. I enjoy writing **Coq plugins** and have implemented several tutorial plugins to help other plugin developers. I am a contributor to the Coq proof assistant. I have extended Rosette to handle strings.

I enjoy **distance running**. I used to compete for **Club Northwest**, a top distance running club in Seattle. I served on the board of Club Northwest from 2015 to 2016. I ran **NCAA Division I Cross-Country** in 2009.

I also enjoy **solving logic and number puzzles**, **writing poetry**, **singing**, **studying Russian**, **making bagels**, **foraging edible mushrooms**, and **composing music for the piano.**