Talia Lily Ringer

http://tlringer.github.io/

EDUCATION

University of Washington *2015 – Present*
Ph.D. in Computer Science
M.S. in Computer Science *2017*
Advisor: Dan Grossman
Programming Languages & Software Engineering

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 by Proof Term Transformation.
Under Submission to POPL 2021.

Talia Ringer, Alex Sanchez-Stern, Dan Grossman, and Sorin Lerner.
REPLICA: REPL Analysis for Coq Instrumentation.
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 main interest is in making program **verification** using interactive theorem provers more accessible through better **proof engineering** tools and practices, especially when it comes to *maintaining* proofs as programs change over time. My research extends traditional **proof automation** to view proofs as fluid entities that change over time. My vision is a future of verification with the help of these tools that is accessible to all programmers, not just to experts. I believe that this will help make software more reliable and secure.

CURRENT RESEARCH

Proof Repair for Proof Engineers
I am continuing to help a proof engineer at Galois use the PUMPKIN PATCH proof repair suite to verify an implementation of the TLS Handshake Protocol. As part of this, I am looking at using e-graphs, a data structure from the constraint solver and rewrite system communities, to improve PUMPKIN PATCH's usability and scalability.

STUDENTS ADVISED

Taylor Blau (now at Github).
Verifying Strong Eventual Consistency in δ-CRDTs.
Senior Thesis.

Jasper Hugunin (now at CMU).
Constructing Inductive-Inductive Types in Cubical Type Theory.
FOSSACS 2019.

HONORS & AWARDS

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*

MENTORSHIP, DIVERSITY, & OUTREACH

ICFP Mentorship Program *2020 – Present*
Organizer of a long-term programming languages mentorship program.

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

Neighbors Feeding Neighbors Seattle *2020 – Present*
Packer of food & masks for the hungry during the COVID-19 pandemic.

UW CSE Care Committee *2019 – Present*
Lead organizer of a support network for graduate students in times of need.

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

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

UW QMP *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.

TUNE House *2015 – 2016*
Mentor for undergraduate women in computer science.

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

SERVICE

Human Aspects of Types and Reasoning Assistants Program Committee *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*
Pulse of PLSE Lab Newsletter Author *2019, 2020*
CAV Artifact Evaluation Committee *2019*
CoqPL Program Committee *2019*
POPL Artifact Evaluation Committee *2018, 2019*
ITP Sub-Reviewer *2018*
University of Washington Graduate Admissions Committee *2018*
DeepSpec Summer School Student Talks Organizer *2017*

INVITED TALKS

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 *Delayed (COVID-19)*
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 *Fall 2018*
Teaching Assistant for Concepts of Programming Languages

University of Washington *Winter 2016*
Teaching Assistant for Compilers

University of Maryland, College Park *Spring 2012*
Teaching Assistant for Computer and Network Security

University of Maryland, College Park *2010*
Mathematics and Computer Science Tutor for Student-Athletes

INDUSTRY

Amazon *Summer 2016*
Research Scientist Intern
Worked with the Automated Reasoning Group on automatic test generation. Developed a solver-aided domain-specific language to generate test inputs.

Amazon *2012 – 2015*
Software Development Engineer
Worked with a team to develop the AmazonSupply website. Wrote and deployed code used company-wide and loaded hundreds of thousands of times per day. Developed a data flow analysis tool. Launched Amazon Business.

Amazon *Summer 2011*
Software Development Engineer Intern
Developed an internal web application to generate metadata for the AmazonSupply website in a safe and user-friendly manner. Enabled version control and staging for the metadata.

Carr Astronautics *2010 – 2011*
Corporate Scholars Program – Software Intern
Assisted in the development of a parallel image mosaicing application. Wrote code in C, MATLAB, and Java to read, alter, and write TIFF images with associated geographic data. Awarded a scholarship through the University of Maryland's Corporate Scholars Program.

INTERESTS

Other academic interests of mine include **domain-specific languages**, **program analysis**, **type systems**, **category theory**, **algebra**, **computer security**, and **cryptology**.

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 compete for **Club Northwest**, a top distance running club. I served on the board of Club Northwest from 2015 to 2016. My role was to promote our top runners through social media and writing. 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.**