

Daniel C. DeFreez

CONTACT

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ABOUT

I am an Associate Professor of Computer Science at Southern Oregon University, where I teach AI Engineering, systems software, and theory. I have long-standing interests in program analysis, security, and why computers are the way they are. I lead the Artificial Societies research group, where students work on agent-based modeling and distributed simulation. I am returning to static analysis and systems exploitation as AI models become more capable at reverse engineering.

I earned my PhD at UC Davis, where I was advised by Cindy Rubio-González and Aditya Thakur. My thesis was on error-handling specification inference and the application of word embeddings to software.

I live in Medford, OR with my wife Rebekah, our rescue dog Gus, Bunjamin the rescue rabbit, and our two Siberian forest cats, Bubba and Una.

EDUCATION

Ph.D. in Computer Science

Graduated December 2019

University of California, Davis

Dissertation: Unlikely Paths: Error-handling Specification Inference for Software that Uses the Return-code Idiom

M.S. in Mathematics and Computer Science

Graduated June 2012

Southern Oregon University

Thesis: Android Privacy Through Encryption

B.S. in Sociology

Graduated June 2006

University of Oregon

PEER-REVIEWED PUBLICATIONS

DeFreez, Daniel, Jackson Harrower, Travis Wood, and Cynthia Salbato. “The Wizard in the Town Plaza: Voice-Based Interactive Storytelling in Public Spaces.” International Conference on Computational Creativity. 2025.

Mogensen, Noah, and **DeFreez, Daniel**. “Transpiling Nand2Tetris to VHDL for Teaching Digital Logic.” In Proceedings of the 2023 Annual Conference on Innovation and Technology in Computer Science Education.

DeFreez, Daniel, Antara Bhowmick, Ignacio Laguna, and Cindy Rubio-González. “Detecting and Reproducing Error-Code Propagation Bugs in MPI Implementations.” Proceedings of the 25th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming. 2020.

DeFreez, Daniel, Haaken Martinson Baldwin, Cindy Rubio-González, and Aditya V. Thakur. “Effective Error-Specification Inference via Domain-Knowledge Expansion.” Proceedings of the 2019 27th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering. 2019.

DeFreez, Daniel, Aditya V. Thakur, and Cindy Rubio-González. “Path-based function embedding and its application to error-handling specification mining.” Proceedings of the 2018 26th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE 2018).

DeFreez, Daniel. “Mining error-handling specifications for systems software.” Proceedings of the 2018 26th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE 2018).

DeFreez, Daniel, Aditya Thakur, and Cindy Rubio-González. “Poster: Path-Based Function Embeddings.” 2018 IEEE/ACM 40th International Conference on Software Engineering: Companion.

DeFreez, Daniel, Bhargava Shastry, Jean-Pierre Seifert. “A First Look at Firefox OS Security.” 2014 Mobile Security Technologies Workshop. arXiv:1410.7754.

AWARDS

Best Poster Award *June 2025*
International Conference on Computational Creativity (ICCC) for “The Wizard in the Town Plaza”

ACM Student Research Competition *November 2018*
1st place in the graduate category at ESEC/FSE conference.

RESEARCH RESOURCES

Principal Investigator, NSF ACCESS Explore Allocation *April 2026 - April 2027*
“Exploring Generative Social Science at Scale with GPU-Accelerated Agent-Based Models.” Allocation CIS260563: 200,000 ACCESS credits for research computing.

SERVICE

Southern Oregon University *2025 - 2026*
Member, Program Personnel Committee for Dr. Bernadette Boscoe’s promotion; Workday Student Faculty Advisory Group. Coordinated capstone projects, maintained classroom and lab infrastructure, and organized the annual CS Jeopardy event.

Southern Oregon University *2024 - 2025*
Chair, Dr. David Pouliot’s tenure committee; member, Dr. Maggie Vanderberg’s promotion committee.

Southern Oregon University *Winter 2024 - Spring 2025*
Leader, AI Innovation Community

SIGCSE 2024 *Fall 2023*
Program Committee member, Posters track.

Southern Oregon University *Fall 2019 - Winter 2020*
Search Committee Member for Assistant Professor.
Successful hire of David Pouliot.

International Symposium on Software Testing and Analysis *April - May 2017*
Committee Member, Artifact Evaluation Committee

Programming Language Design and Implementation Conference *June 2016*
Volunteer

TEACHING EXPERIENCE

Associate Professor, Southern Oregon University

2024 - Present

Assistant Professor, Southern Oregon University

Winter 2020 - 2024

- AI Engineering (CS 320)
- Theory of Computation (CS 418)
- Computer Organization (CS 314)
- Operating Systems (CS 459)
- Computer Science II, C++ (CS 257)
- Web Development (CS 210)
- Information Technology: Legal and Ethical Issues (CS 310)
- Systems Analysis, pre-capstone (CS 469)
- Programming Languages (CS 452)
- C and UNIX; Software Security

Teaching Assistant, UC Davis

Winter 2014

- Data Structures

Adjunct Instructor, Southern Oregon University

September 2012 - June 2013

- Networks
- Malware Analysis
- Web Development
- Linux System Administration

WORK EXPERIENCE

Co-founder, Practical Program Analysis, LLC (tldrsec)

2018

Co-founded with Clint Gibler, who led the project. CTO until approximately 2020.

Guest Scientist, Deutsche Telekom / TU Berlin

October - December 2014

Network Administrator, Southern Oregon University

March 2010 - September 2012

Intern, Harry & David

Summer 2009

TECHNICAL TALKS

Understanding AI Today

The Springs at Anna Maria, Medford, OR

April 8, 2026

AI's Power of Speech

Rogue Valley AI Lab

July 2025

Vibe Scraping

Rogue Valley AI Lab

June 2025

Invited Speaker

Approaching AI Summit, Architects of the New Paradigm Conference

March 2025

Transpiling Nand2Tetris to VHDL for Teaching Digital Logic.

ITiCSE (Turku, Finland)

July 2023

Semgrep demo
Way West Hackin' Fest

June 2021

Detecting and Reproducing Error-Code Propagation Bugs in MPI Implementations
PPoPP Research Papers Track *February 2020*

Path-based Function Embedding and its Application to Specification Mining
ESEC/FSE Research Papers Track *November 2018*

Mining Error-Handling Specifications for Systems Software
ESEC/FSE Student Research Competition *November 2018*

Automated Bug Finding in Practice
ShellCon *September 2018*
CactusCon *September 2018*

Learning from code
SacPy, Sacramento Python Users' Group *July 2018*

Invited Lecture: Path-based Function Embedding
Southern Oregon University *February 2018*

Invited Lecture: Using LLVM for Program Analysis
Southern Oregon University *February 2016*

A First Look at Firefox OS Security
Mobile Security Technologies Workshop *May 2014*

Attacking .NET Applications at Runtime
Defcon 18 *August 2010*
BlackHat USA Arsenal *August 2010*

TRAININGS
GIVEN

Augmenting Penetration Testing with Lightweight Static Analysis
Naval Air Weapons Station China Lake *October 2018*
Shellcon 2018 *September 2018*
CactusCon 2018 *September 2018*

TOOLS

WHiDL
WHiDL is a source-to-source compiler that translates Nand2Tetris HDL to VHDL, making it possible to run HDL programs on an FPGA while retaining (most) of the simplicity of the original HDL.
<https://github.com/whidl/whidl>

Func2vec
Tool for creating path-based function embeddings from LLVM bytecode files.
<https://github.com/defreez-ucd/func2vec-fse2018-artifact>

Error-Handling Specification Miner
Tool for mining error-handling specifications from systems software.
<https://github.com/defreez-ucd/func2vec-fse2018-artifact>

EESI

Tool for inferring the error values of C functions.

<https://github.com/ucd-plse/eesi>