

# Alexi Turcotte

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## Current Position

2023-date **Postdoctoral Researcher**, CISPA Helmholtz Institute for Information Security, Saarbrücken, Saarland, Germany.  
Advised by Andreas Zeller.  
Fuzzing highly-constrained software systems, building analyzers for data science languages, and improving analysis of JavaScript bundles.

## Education

2018-2023 **PhD in Computer Science**, Northeastern University, Boston, MA, USA.  
Advised by Frank Tip and Jan Vitek.  
Thesis: *Optimizing Asynchronous JavaScript Applications*  
Program analysis of JavaScript, and type systems and language design for R. Broadly, worked on dynamic languages, data science languages, fuzzing, program analysis, and optimizations.

2016-2018 **MMath in Computer Science**, University of Waterloo, Waterloo, Ontario, Canada.  
Advised by Gregor Richards.  
Thesis: *Reasoning About FFIs: Blame and Nondeterministic Formal Semantics*.  
Formulated a scheme to define formal semantics for languages interoperating using foreign function interfaces (FFIs) without modelling the foreign language.

2012-2016 **BSc Math and Computer Science**, Laurentian University, Sudbury, Ontario, Canada.  
Advised by Hafida Boudjellaba.  
Thesis: *Optimal Parameters for Predator-Prey Models*.  
Developed a method to estimate parameters for a Lotka-Volterra predator-prey model.

## Select Papers

ICSE'26 Wenyan Xu, **Alexi Turcotte**, and Cristian-Alexandru Staicu. *D-BUNDLR: Destructing JavaScript Bundles for Effective Static Analysis*.

ICSE'26 Farideh Khalili and Satyajit Gokhale, **Alexi Turcotte**, Dale Xu, and Frank Tip. *Remediating Superfluous Re-Rendering in React Applications*.

ASE'25 **Alexi Turcotte** and Neev Nirav Mehta. *The Fault in our Stats*.

FSE'25 **Alexi Turcotte** and Zheyuan Wu. *Expressing and Checking Statistical Assumptions*. **ACM SIGSOFT Distinguished paper award!**

TSE'24 Denini Silva, Martin Gruber, Satyajit Gokhale, Ellen Arteca, **Alexi Turcotte**, Marcelo d'Amorim, Wing Lam, Stefan Winter, and Jonathan Bell. *The effects of computational resources on flaky tests*.

ASE'23 **Alexi Turcotte**, Satyajit Gokhale, and Frank Tip. *Increasing the Responsiveness of Web Applications by Introducing Lazy Loading*.

ASE'22 **Alexi Turcotte**, Mark W. Aldrich, and Frank Tip. *Reformulator: Automated Refactoring of the N+1 Problem in Database-Backed Applications*.

EMSE'22 **Alexi Turcotte**, Ellen Arteca, Ashish Mishra, Saba Alimadadi, and Frank Tip. *Stubbifier: Debloating Dynamic Server-Side JavaScript Applications*.

ICSE'22 **Alexi Turcotte**, Michael D. Shah, Mark W. Aldrich, and Frank Tip. *DrAsync: Identifying and Visualizing Anti-Patterns in Asynchronous JavaScript*. **Best Artifact Award!**

OOPSLA'22 Satyajit Gokhale, **Alexi Turcotte**, and Frank Tip. *Automatic Migration from Synchronous to Asynchronous JavaScript APIs*.

OOPSLA'20 **Alexi Turcotte**, Aviral Goel, Filip Kříkava, and Jan Vitek. *Designing Types for R, Empirically*.

ECOOP'19 **Alexi Turcotte**, Ellen Arteca, and Gregor Richards. *Reasoning About Foreign Function Interfaces Without Modelling the Foreign Language*.

OOPSLA'17 Gregor Richards, Ellen Arteca, and **Alexi Turcotte**. *The VM Already Knew That: Leveraging Compile-Time Knowledge to Optimize Gradual Typing*.

## Other Papers

ASE'22 Mark W. Aldrich, **Alexi Turcotte**, Matthew Blanco, and Frank Tip. *Augur: Dynamic (Tool) Taint Analysis for Asynchronous JavaScript*.

SLE'22 **Alexi Turcotte**, Pierre Donat-Bouillud, Filip Kříkava, and Jan Vitek. *signatr: A Data- (Tool) Driven Fuzzing Tool for R*.

MSR'22 Ellen Arteca and **Alexi Turcotte**. *npm-filter: Automating the Mining of Dynamic Information from npm Packages*.

DMTCS'22 Ahmad Biniaz, Kshitij Jain, Anna Lubiw, Zuzana Masárová, Tillmann Miltzow, Debajyoti Mondal, Anurag Murty Naredla, Josef Tkadlec, and Alexi Turcotte. *Token Swapping on Trees*. Discrete Mathematics & Theoretical Computer Science. (Contributors listed in alphabetical order.)

VIS'20 Cameron Moy, Julia Belyakova, **Alexi Turcotte**, Sara Di Bartolomeo, and Cody Dunne. *Just typeical: Visualizing Common Function Type Signatures in R*.

ICOOLPS'19 **Alexi Turcotte** and Jan Vitek. *Towards a Type System for R*.

CCCG'18 Therese Biedl, Ahmad Biniaz, Veronika Irvine, Philipp Kindermann, Anurag Murty Naredla, and Alexi Turcotte. *Integral Unit Bar-Visibility Graphs*. Canadian Conference on Computational Geometry. (Contributors listed in alphabetical order.)

LATIN'18 Therese Biedl, Martin Derka, Veronika Irvine, Anna Lubiw, Debajyoti Mondal, and Alexi Turcotte. *Partitioning Orthogonal Histograms into Rectangular Boxes*. Latin American Theoretical INformatics Symposium. (Contributors listed in alphabetical order.)

## Posters

2017 Alexi Turcotte and Ellen Arteca. *Multi-Objective Root Growth Optimization*. Poster session at the EQuALS Conference.

2017 Ellen Arteca and Alexi Turcotte. *Modified Constrained Blind Amplitude Reconstruction*. Poster session at the EQuALS Conference.

## Service

2026 OOPSLA Program Committee

2026 OOPSLA Web Co-Chair

2025 ISSTA Program Committee

2024 ISSTA Program Committee

2023 ACM Transactions on Software Engineering and Methodology (TOSEM) Reviewer

2023 IEEE Transactions on Software Engineering (TSE) Reviewer  
2022 ISSTA Artifact Evaluation Committee  
2020 ISSTA Artifact Evaluation Committee  
2020 ECOOP Artifact Evaluation Committee  
2019 OOPSLA Artifact Evaluation Committee

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## Experience

2023-Date **Postdoc, CISPA (w/ Andreas Zeller), Germany.**  
Lots of cool and fun research.

2019 **Research Intern, Oracle Labs, Switzerland.**  
Worked on dynamic software updating and hot code reloading in the Graal/Truffle framework.

2015 **Software Developer, AdvanceWorx Canada.**  
Developed a few iOS apps which interfaced with the FLIR One thermal camera, notably an app for adjusting visualizations of thermal video and images.

2015 **Research Assistant, Laurentian University.**  
Wrote front-end and data processing code to assist Dr. Francois Caron's lab in using the DOMFLuor MATLAB package.

2014 **UCOSP: Umple (Model-Oriented Programming), University of Ottawa.**  
Umple is a UML-to-source compiler. Implemented the UML specialization feature in the Umple compiler and UmpleOnline interface.

2014 **Research Assistant (Statistics and Data Analysis), Laurentian University.**  
Worked on some small projects with Dr. Hafida Boudjellaba, notably on correlation analysis between actual and imaged (with 3D medical imaging device) operated area for tumor removal procedure.

2014 **Researcher, DreamStar.**  
Developed and implemented algorithm to detect REM cycles through heart rate data. Involved data normalization, noise reduction, and testing against EEG sleep cycle data.

2013-2018 **Teaching Assistant, Laurentian University and University of Waterloo.**  
Marking and running labs and tutorials for a variety of courses, including 3rd year algorithms (CS341) at Waterloo, and 3rd year theory of computation (COSC3106) at Laurentian.

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## University Service

2021-2022 Faculty Hiring Committee for the Khoury College of Computer Sciences at Northeastern (**I received a Distinguished Service Award for this!**)

2020-2021 PhD Student Admissions Committee

2018-2019 Curriculum Committee for the College of Computer and Information Science at Northeastern

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## Invited Talks

Oct 2023 *Detecting and Repairing Anti-Patterns in Asynchronous JavaScript*  
© University of Stuttgart

Feb 2023 *Detecting and Repairing Anti-Patterns in Asynchronous JavaScript*  
© University of Aarhus

Feb 2023 *Detecting and Repairing Anti-Patterns in Asynchronous JavaScript*  
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Dec 2022 *Detecting and Repairing Anti-Patterns in Asynchronous JavaScript*  
© City University of New York (CUNY) Graduate Research Day, NYC, NY, USA

Nov 2022 *Detecting and Repairing Anti-Patterns in Asynchronous JavaScript*  
© Simon Fraser University (SFU), Vancouver, BC, Canada

## Languages

Programming Rust, Java, C, C++, C#, Objective C, Swift, Python, R, MATLAB/Octave, Rocq, TypeScript and JavaScript, Racket, CodeQL  
Natural English (Fluent), French (Fluent), German (Intermediate)

## Misc

Github reallyTG  
Service I received an “Outstanding Service Award” from Northeastern for my service on the hiring committee in the 2022 hiring season.  
Citizenship Canada  
Hackathons I like them, my team placed top 5 in the Great Canadian Appathon 4 (a gamejam) and won “Most Innovative Game”!  
NSERC Held an NSERC PGS-D Scholarship