Alexi Turcotte

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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 Programming Languages and Software Engineering Papers

ICSE'26 Wenyuan Xu, **Alexi Turcotte**, and Cris 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*. **ACM SIGSOFT 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 Křikava, 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 *(Tool)* Mark W. Aldrich, **Alexi Turcotte**, Matthew Blanco, and Frank Tip. *Augur: Dynamic Taint Analysis for Asynchronous JavaScript*.

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

MSR'22 *(Tool)* 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.

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

ICOOOLPS'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.

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.

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.

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.

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

University Service

2021-2022	Faculty Hiring Committee for the Khoury College of Computer Sciences at Northeastern
2020-2021	PhD Student Admissions Committee
2018-2019	Curriculum Committee for the College of Computer and Information Science at Northeastern

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* @ CISPA Helmholtz Center for Information Security
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
Summer Schools	I attended the 2018 ECOOP Summer School, and 2017 Programming Languages Implementation Summer School (PLISS)
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