# Alexi Turcotte

*Northeastern University*
*Boston, MA, USA*
*(+1) 857 302 4058*
*turcotte.al [at] northeastern [dot] edu*

## Education

2018-Date **PhD in Computer Science**, *Northeastern University, Boston, MA, USA*.
Advised by Jan Vitek and Frank Tip.
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.

## Programming Languages and Software Engineering Papers

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

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

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

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.**

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

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*.

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*.

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

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.

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

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.

## Professional Development and Community Service

2022 ISSTA Artifact Evaluation Committee

2021-2022 Faculty Hiring Committee for the Khoury College of Computer Sciences at Northeastern

2020 ISSTA Artifact Evaluation Committee

2020 ECOOP Artifact Evaluation Committee

2019 OOPSLA Artifact Evaluation Committee

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

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| 2018 | ECOOP Summer School |
| 2017 | Programming Languages Implementation Summer School (PLISS) |

## Languages

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| Programming | Java, C, C++, C#, Objective C, Swift, Python, R, MATLAB/Octave, Coq, TypeScript and JavaScript, Racket, CodeQL |
| Native | English (Fluent), French (Fluent) |

## Misc

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| 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 | Currently holding an NSERC PGS-D Scholarship |