Khoury College of Computer Science
Northeastern University
Boston, MA, USA
+1 (781) 816 7847
arteca.e [at] northeastern.edu
emarteca.github.io

Ellen Arteca

Education

2018–date **PhD in Computer Science**, *Northeastern University*, Boston, USA.
Thesis: Leveraging large code bases for bug detection and test generation
Supervised by Dr. Frank Tip

2016–2018 **MMath in Computer Science**, *University of Waterloo*, Waterloo, Canada.
Thesis: Formal semantics and mechanized soundness proof for fast gradually typed JavaScript
Supervised by Dr. Gregor Richards

2012–2016 **Bachelor's of Computer Science, Major in Mathematics**, *Laurentian University*, Sudbury, Canada.
Thesis: Modular algorithms for computation of Groebner bases
Supervised by Dr. Stephanie Czapor

Relevant Professional Experience

Summer 2022 **Software Engineering Intern**, *Android Rust (Android Security), Google*.
- Extension of MIRI with C FFI support
  - Allow data flow between interoperating C and Rust programs running in MIRI (including synchronizing of shared C process memory and MIRI abstract memory)
  - Code is open sourced: emarteca/miri
- Integration into Android Rust toolchain for use as a sanitizer on unsafe Rust

Summer 2021 **Applied Science Intern**, *Automated Reasoning Group, Amazon Web Services*.
- Homomorphic transformations on SMT queries
  - Building a dataflow framework for SMT queries in Rust
  - Generating equisatisfiable queries with all string literals anonymized
  - Code is open sourced: awslabs/rust-smt-ir-examples/amzn-smt-string-transformer

Summer 2019 **Research Engineer Intern**, *GitHub (Semmle)*.
- Static analysis for bug detection in use of event-driven APIs in JavaScript
  - Building a model of the API through large-scale analysis of package use
  - Automatically determining incorrect event listener registrations

Fall 2014 **UCOSP: Umple Model-Oriented Programming**, *University of Ottawa*.
- Implementation of UML compositions in Umple compiler and addition to UmpleOnline interface

Summer 2014 **Research Assistant (USRA)**, *Laurentian University*, Funded by NSERC.
- Modelling in computational physics, simulating particle interaction dynamics in large enclosed systems

2013–2016 **Research Assistant**, *Laurentian University*.
- Modelling in computational ecology, simulating fruit fly populations under variable environmental conditions
  - Numerical approximations for populations as systems of coupled DEs
  - Multithreading in Java and C++
  - Large-scale data storage and analysis

Select Publications

2022 Arteca, Ellen and Turcotte, Alexi. *npm-filter: Automating the mining of dynamic information from npm packages*. Proceedings of the 19th International Conference on Mining Software Repositories (MSR 2022).

2022 Turcotte, Alexi and Arteca, Ellen, Ashish Mishra, Saba Alimadadi, and Frank Tip. *Stubbifier: Debloating Dynamic Server-Side JavaScript Applications*. Empirical Software Engineering (2022).

2022 Arteca, Ellen, Sebastian Harner, Michael Pradel, and Frank Tip. *Nessie: Automatically Testing JavaScript APIs with Asynchronous Callbacks*. Proceedings of the 44th International Conference on Software Engineering, ICSE (2022).

2022 Arteca, Ellen, Max Schäfer, Frank Tip. *Learning How to Listen: Automatically Finding Bug Patterns in Event-Driven JavaScript APIs*. IEEE Transactions on Software Engineering.

2021 Arteca, Ellen, Frank Tip, Max Schäfer. *Enabling Additional Parallelism in Asynchronous JavaScript Applications*. ECOOP 2021 European Conference on Object-Oriented Programming, 2021.

2019 Turcotte, Alexi, Ellen Arteca, and Gregor Richards. *Reasoning About Foreign Function Interfaces Without Modelling the Foreign Language*. ECOOP 2019 European Conference on Object-Oriented Programming, 2019.

2017 Richards, Gregor, Ellen Arteca, and Alexi Turcotte. *The VM Already Knew That: Leveraging Compile-Time Knowledge to Optimize Gradual Typing*. Proceedings of the ACM on Programming Languages, OOPSLA (2017).

Professional Development

2020 ISSTA, ECOOP Artifact Evaluation Committee

2019 PhD Curriculum Committee, Northeastern University

2018 ECOOP Summer School

2017 Programming Languages Implementation Summer School (audit)

Languages

Programming Rust, TypeScript/JavaScript, CodeQL, Python (with matplotlib, numpy, pandas), Java, C++, C, Matlab/Octave, Maple

Natural English (native), Spanish (fluent), French (fluent)

Misc

Github emarteca

Citizenship Canadian

Hackathons A variety of game design hackathons during undergrad!

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