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Ellen Arteca

Education

2018–date **PhD in Computer Science**, *Northeastern University*, Boston, USA.
Current work: Program analysis to detect oversynchronization in async/await JavaScript code
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

Publications

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).

2017 Langille, Aaron, Ellen Arteca, and Jonathan Newman. *The impacts of climate change on the abundance and distribution of the Spotted Wing Drosophila (Drosophila suzukii) in the United States and Canada.* PeerJ 5 (2017).

2016 Langille, Aaron, Ellen Arteca, Geraldine Ryan, Lisa Emiljanowicz, and Jonathan Newman. *North American invasion of Spotted-Wing Drosophila (Drosophila suzukii): a mechanistic model of population dynamics.* Ecological Modelling (2016).

Posters

2017 Arteca, Ellen and Alexi Turcotte. *Modified Constrained Blind Amplitude Reconstruction*. Poster session presented at the EQuALS Conference (May 2017).

2017 Turcotte, Alexi and Ellen Arteca. *Multiobjective Root Growth Optimization.* Poster session presented at the EQuALS conference (May 2017).

Service

2018 SPLASH student volunteer

2018 ECOOP student volunteer

2017 SPLASH student volunteer

Theses

2018 **Master's Thesis**, *University of Waterloo*.

- Developing formal semantics and proving type soundness in Coq for an implementation of sound gradual typing for Javascript using information in the virtual machine. The goal is to reduce the runtime checks necessary and improve performance, by determining the checks required via contracts on runtime objects.

2016 **Undergraduate honours thesis**, *Laurentian University*.

- Generating Groebner bases for polynomial ideals: comparative efficiency of Hensel lifting and Chinese Remainder Algorithm (through implementation in Maple).

Other Research Experience

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

Scholarships/Awards

2018
- NSERC PGS D recipient (Canada)

2017
- NSERC CGSM recipient (University of Waterloo)
- President's Graduate Scholarship (University of Waterloo)
- University of Waterloo Graduate Scholarship (University of Waterloo)

2016
- University of Waterloo Entrance Scholarship (University of Waterloo)
- Math Domestic Graduate Award (University of Waterloo)
- Governor General's Silver Medal (Laurentian University)

2014
- NSERC USRA recipient (Laurentian University)

2013
- George M. Miller Proficiency Scholarship (Laurentian University)

2012
- Horace J. Fraser Scholarship (Laurentian University)
- R.J. Askin Memorial Scholarship (Laurentian University)

2012–2014
- Academic Excellence Scholarship, top bracket (Laurentian University)

Teaching Assistant

University of Waterloo
- CS135/CS115 Intro Computer Science
- CS370 Numerical Computation

Laurentian University
- COSC3106 Theory of Computing
- COSC1046/1047 Intro Computer Science 1 and 2
- COSC2836 Computer Software for the Sciences
- MATH1036/1037 Calculus 1 and 2
- MATH2037 Advanced Calculus
- MATH2066 Intro Differential Equations
- MATH1057 Linear Algebra 1
- MATH1056/2056 Discrete Mathematics 1 and 2

Mentoring

May 2017, 2018 — Waterloo Equithon
- Technical mentor at hackathon hosted on Waterloo campus

May 2017 — Workshop in Computer Science for Young Women
- Mentor in workshop for highschool-age girls from across Canada

2013–2015 — Computer Science Laboratory Advisor (Laurentian University)
- running drop-in centre for helping undergraduate students with 1st and 2nd year courses

Professional Experience

Summer 2016 — **Clickmox Solutions**, *Software developer*.
Working with Arduino and DJI Inspire quadcopter.

Summer 2016 — **Jiggit**, *Software developer*.
iOS app development.

Related Activities

2018 — ECOOP Summer School

2017 — Programming Languages Implementation Summer School (audit)

2015–2016 — Laurentian University CS Games team
- Participant in the events for Theoretical Computer Science, Extreme Programming, Software Engineering, Compilers

2014 — Canadian Open Data Experience hackathon

2014 — Great Canadian Appathon 4 hackathon
- Placed 5th overall, winning Best Experimental Game

Languages

Programming — Java, C++, C, C#, Python (with matplotlib, numpy, pandas), Matlab/Octave, Maple, Coq, Typescript/Javascript, Racket

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