# Skillset

<u>Soft Skills</u>	Programming Languages		Theorem Proving	Misc. Tools
strong leadership	Racket	Haskell	Agda	Frama-C
communication	Mozart	$\mathrm{F}\#$	CalcCheck	Ŀ₽ŢĘX
conflict-resolution	Elisp	$\mathrm{C}\#$	Coq	Emacs
problem solving	Smalltalk	Scala	_	SVN & Git
critical thinking	Kotlin	Prolog		Linux
_	Go	TypeScript		Rodin

# **Employment History**

### Tutor

OnCourse Education, Ontario, Canada.

- ◇ Provide weekly educational assistance to Mohawk and McMaster students with their software development studies -primarily utilising the Java language.
- ♦ Personally taught "Data Management and Applications" as per the school board curriculum; 2015.

# Content Designer for CALCCHECK

McMaster University, Ontario, Canada.

- ♦ Built a library for propositional & predicate logic, combinatorics, and the formalisation of Raymond Smullyan's puzzles into calculational proofs.
- ♦ Generated logic and mathematical education content for computing scientists using the CALCCHECK system, which is now a core component of CS & SFWR 2DM3 at McMaster University.

### Software Engineer

Blocher Consulting, Illinois, United States of America.

- ◇ Project lead for maintenance software for the Department of Defence and responsible for architecturing an optimal equipment-lifetime system.
  - Wrote code contracts complemented by unit and integration tests as well as a functional programming approach in C# aiming at accessibility, extensibility, and reduction of technical debt.
  - Created and updated entity-relationship diagrams to accurately model the software system which where then connected to the existing framework via extension methods.
  - The resulting system allowed the Department of Defence to reduce substantial costs.
- ◊ Collaborated with theoretical advisories and presented direction changes and milestones to the stakeholders.
- ♦ Applied the theory of monads to solve issues regarding code clarity and to reduce its density and complexity for another dev-team.
  - Implemented a notion of transactions in F# and ported the utility to C# for the team to use.
- ♦ Participated in scrum meetings and utilised the agile methodology.

Frama-C ATEX Emacs SVN & Git Linux Rodin

March – September 2016

February 2015 – August 2018

May – December 2015

# Educational Background

Ph.D. Candidate in Computer Science *McMaster University*, Ontario, Canada.

- ♦ Active participant in research meetings, taking classes on programming language theory, and reading and reviewing papers associated with program specification.
- ◊ Implementing mathematical theories including datatypes for software engineering, and realising models and associated proof obligations via machine-checkable code.
- ♦ Attend and present seminars, implement code, and realise proofs regarding correctness for program language construction and compilation.

#### Previous Degrees

 M.Sc. McMaster University, Computer Science
Thesis A Mechanisation of Internal Galois Connections In Order Theory Formalised Without Meets https://macsphere.mcmaster.ca/handle/11375/17276
Hon. B.Sc. McMaster University, Mathematics and Computer Science

#### Academic Activities

Sessional Lecturer: Specifications and Correctness

January 2017, 2018, & 2019

January 2010 – April 2015

September 2016 – Present

- McMaster University, Ontario, Canada.
  - ◇ Created original bi-weekly test material for: Propositional logic in the setting of lattices, predicate logic by means of quantification theory, a few search algorithms formalised in Frama-C –most notably, the 'generalised binary search' which does not need its underlying array to be sorted!
  - ♦ Constructed an embedded domain specific language in C for Dijkstra's Guarded Command Language.
  - $\diamond~$  Ran multiple feedback session where students could request learning material —resulting in a 95% approval rating from the students in their evaluation.

#### **Teaching Assistant**

McMaster University, Ontario, Canada

- $\diamond\,$  Explained technical material in an accessible fashion —via usage of analogies.
- $\diamond\,$  Generate class content and solution sets.
- $\diamond\,$  Manage a team of undergraduate teaching assistants; yearly since 2016.
- ♦ Wrote scripts to automate certain tasks for grading.
- ◊ Over 8 years experience: Programming Fundamentals CS 1MD3, Mathematics for Computing CS 1FC3, Discrete Mathematics and Applications CS & SFWR 2DM3, Computer Architecture CS & SWFR 2GA3, Software Specifications CS 3EA3, and Discrete Mathematics & Logic for graduate students CAS 701.

**Reviewer** Relational and Algebraic Methods in Computer Science 17th International Conference, RAMiCS 2018, Groningen, Netherlands.

Author Order Theory and Concept Lattices in Ordered Categories Without Meets, Formalised in Agda Relational and Algebraic Methods in Computer Science 15th International Conference, RAMiCS 2015, Braga, Portugal.

**Reviewer** Relational and Algebraic Methods in Computer Science 14th International Conference, RAMiCS 2014, Marienstatt, Germany.

## **Community Experience and Interests**

- ♦ Co-founder and first president of "Life in Computing & Software", or 'LICS'; 2016.
- $\diamond\,$  Attended and presented at the 2018 DeepSpec Summer School, the Coq intensive at Princeton University.
- $\diamond$  DeltaHacks keynote speaker, 2016 2019.
- $\diamond\,$  Assisted with community outreach in teaching high school kids Elm, 2016 – 2018.
- Blog at http://alhassy.github.io
- $\diamond\,$  Correct-by-construction, functional, and dependently-typed programming
- ◊ Go –the oriental board game of strategy–, goju-ryu karate, soccer, cross-country running, and frisbee.