

First Committee Meeting

Progress Report

Jason Balaci

McMaster University

Oct. 21st, 2021

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2 Project

- Drasil
- Goal #1: Typed Expression Language
- Goal #2: Model Discrimination – “ModelKinds”

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Who am I?

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- I am **Jason Balaci**



Me, Fall 2019

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- Currently pursuing a thesis-based Master's of Computer Science (M.Sc) at *McMaster University*, under the supervision of **Dr. Jacques Carette**



Me, Fall 2019

Overview of Progression Towards C.S. M.Sc.

Course-related progression

- I'm required to complete¹:

¹https://academiccalendars.romcmaster.ca/preview_program.php?catoid=45&poid=23470&returnto=9166

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- I've completed:
 - CAS 701 "Logic & Discrete Mathematics" - Theory course, Fall 2020
 - CAS 761 "Generative Programming" - Software course, Fall 2020
 - CAS 763 "Certified Programming with Dependent Types" - Theory & Software course, Winter 2021
 - COMPSCI 6TB3 "Syntax-Based Tools and Compilers" - Systems course, Winter 2021

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- Together, the courses completed satisfies the "Courses Requirement" as mentioned in the academic calendar¹ and the "Regulations for the Computer Science M.Sc. Program" document².

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- Conducted “full-time” research for at least 1 full semester (Spring/Summer 2021), and “part-time” research during courses.

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- Conducted “full-time” research for at least 1 full semester (Spring/Summer 2021), and “part-time” research during courses.
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- Attended a thesis defence to learn about what to expect from a thesis defence meeting (and learn about their research).

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- Attended a thesis defence to learn about what to expect from a thesis defence meeting (and learn about their research).
- Supervisory committee is formed, and we’re currently having our first supervisory committee.
 - *Supervisor:* Dr. Jacques Carette
 - Dr. Spencer Smith
 - Dr. Wolfram Kahl

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Drasil's Logo

[Carette et al., 2021][Yggdrasil - Wikipedia, 2021]

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 - with a focus on research software.



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- TODO: here!

Drasil Case Studies

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 - **Proportional Derivative Controller (PDController)** - Examining the output of a “Power Plant” (Process Variable) over time.
 - **Solar Water Heating System (SWHS)** - Modelling of a solar water heating system with phase change material, predicting temperatures and change in heat energy of water and the PCM over time.

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 - **SWHS without Phase Change Material (NoPCM)** - Modelling of a solar water heating system without phase change material, predicting temperatures and change in heat energy of water and the PCM over time.

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- **Slope Stability Analysis (SSP)** - Assessment of the safety of a slope (composed of rock and soil) subject to gravity, identifying the surface most likely to experience slip and an index of its relative stability (factor of safety).

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 - **Heat Transfer Coefficients between Fuel and Cladding in Fuel Rods (HGHC)** - Examining the heat transfer coefficients related to clad.

GlassBR Generates Code!



Which case studies currently generate code?

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Not all case studies generate code yet!

Some are a work-in-progress, and some require more infrastructure to enable it.

Where will I be contributing?

Fin.
Thank you!

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References I



Carette, J., Smith, S., Balaci, J., Hunt, A., Wu, T.-Y., Crawford, S., Chen, D., Szymczak, D., MacLachlan, B., Scime, D., and Niazi, M. (2021).

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Yggdrasil - Wikipedia (2021).

Yggdrasil.