tslil clingman

PhD candidate at JHU, expected graduation 2022
Supervised by Emily Riehl

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— Education

- Ongoing **PhD Candidate Math.**
Johns Hopkins, expected graduation 2022
- Spring 2020 **Programme Associate**
Mathematical Sciences Research Institute
Higher Categories and Categorification
- 2018 **Masters Degree**
Johns Hopkins, M.A. Math.
Completed written qualifying exams and oral speciality exam
- 2016-2018 **Principle Fulbright Scholar**
Johns Hopkins
Selected & funded to pursue PhD in Math., transferred from George Washington University
- 2015-2016 **Principle Fulbright Scholar**
George Washington University
Graduate coursework
- 2015 **Masters Degree**
University of Cape Town, M.Sc. Math., with Distinction
Dissertation: "On the local and global properties of information manifolds"
- 2014-2015 **Research Group**
University of Cape Town, Information Geometry
Quantum Gravity and Strings Laboratory
- 2014 **Honours Degree**
University of Cape Town, Pure Math., First Class
- 2011-2013 **Bachelor of Science**
University of Cape Town, Degree with Distinction
Majors: Pure Math., Applied Math., and Astrophysics, each with distinction

— Computer Science

Prior to commencing graduate studies in mathematics, i organised, competed in, and taught the following:

- 2011-2014 **Algorithm Circle**
Theoretical C.S. organisation, University of Cape Town
Lecturer (2011-2014), Vice Chairman (2012, 2014), Chairman (2013) for an organisation that gave free & open, weekly lectures on topics in theoretical computer science (data structures, complexity theory, programming language theory, cryptography) and helped attendees prepare for programming contests.
- Dec. 2012 **Top 10 in Southern Africa**
Google App Developer Challenge
Designed and implemented a website allowing for the easy, intuitive and visual organisation of free-form data into graphs and networks conveying relations and interconnections. Written in Python, Javascript, and using D3.js.
- 2011 & 2012 **Haskell Course**
University of Cape Town
Organised and gave a free & open Haskell programming language course.

In the period 2011-present, i have contributed code to several open-source projects, including:

- MikeOS, a 16bit real-mode operating system written in x86 assembly
- DoomRetro, a modern source port of ID Software's DOOM (II) game engine written in C using SDL2
- tiny-menu.el, an Emacs minor mode to display interactive menus for quick actions written in Emacs Lisp

In the period 2016-present, i have created several medium-to-large projects of my own, including:

- Art-deco clock [AVR C, OpenSCAD], a 3D-printed art-deco clock using an ATTiny24, RTC chip, and two OLED displays
- siege-mode.el [elisp], an Emacs minor mode to surround the region with smart delimiters interactively
- msr [C], a public-key signature verification tool using curve Ed25519, libsodium, GNU argp, and compatible with OpenBSD's signify
- TakWrap [Rust], a TUI for local play of the abstract strategy game of Tak
- ctak [C, ongoing], a line-mode interface for the game of Tak, complete with a computer opponent. This project was designed to learn about (convolutional) neural networks, adversarial tree search, & buildroot for cross-compiling and embedded computing on a Raspberry PI
- ZiRC [Zig, ongoing], a project to learn the Zig programming language and the basics of 3D rendering by building a featureful raycaster engine

Papers

- **Regular Calculi I: Graphical Regular Logic** (arXiv 2109.14123)

joint with B. Fong & D. I. Spivak, on the novel structure of regular calculi and their use as an ergonomic & graphical syntax for regular logic.

- **A common misinterpretation of Isbell's obstruction to monoidal strictfication** (arXiv 2106.03652)

which shows that the widely disseminated obstruction to strictifying the associator is shown to be underspecified as stated, and the truth is more subtle.

- **Bi-representations and bi-initial objects are not so different** (arXiv 2009.05545)

joint with L. Moser, on 2-categorical and double-categorical theorems characterising when pseudofunctors into Cat are representable, with applications to bi-adjunctions and 2-dimensional limits.

- **2-limits and 2-terminal objects are too different** (arXiv 2004.01313)

joint with L. Moser, on the failure of all theorems of the form "a 2-dimensional limit is a 2-dimensional terminal object in a 2-dimensional slice category of cones".

Award

- April 2021 **William Kelso Morrill Award**

Excellence in Mathematics

For love of teaching, love of mathematics, and concern for students, nominated by undergraduates & selected by the department.

— Teaching Experience

See my website for details, including my role as sole instructor, my role in administrating the online homework system, and my work as a course development assistant and the products thereof.

- 2018-2021 **Head T.A. & WeBWorK administrator**

Johns Hopkins
Calculus III & ODE (twice & thrice, resp.) and online homework system

- Spring 2019 **Course development**

Johns Hopkins
Introduction to Proofs, assisted Prof. Riehl in course development

- Fall 2017 **Sole Instructor**

Johns Hopkins
Introduction to Calculus

- Jan. 2017 **Primary Instructor**

Johns Hopkins
Intersession Course: Recreational Math. for All

- 2017-'19, '21 **DRP Mentor**

Johns Hopkins
Mentored projects in: General Topology, Braid Group Representations, Category Theory, Homotopy Type Theory

- Oct. 2014 **Invited Instructor**

University of Cape Town
Introduction to Group Theory

- 2014-2021 **Teaching Assistant**

Real Analysis, Introductory Abstract Algebra, Linear Algebra, Differential Equations, Calculus Sequence, String Theory

— Notable Service & Leadership

- 2019 **Primary organiser**

2019 Category Theory Octoberfest *(website)*,
Johns Hopkins

- 2018 **Chapter representative**

Directed Reading Program (DRP)
Represented the JHU DRP chapter at the Directed Reading Programme Network & Workshop, MIT

- 2017-2019 **Co-organiser**

Directed Reading Program (DRP), Johns Hopkins
Individual pairing of undergraduates with graduates for independent studies (website). Mentor & co-organiser (2017-2019), primary organiser (2018-2019)

- 2015 **Organiser**

Maths Postgrad. Tea Party, University of Cape Town
Founder of a biweekly meeting of graduates, comprising peer lectures and discussions over tea

- 2011-2015 **Various roles**

Algorithm Circle – Theoretical Comp. Sci. Club, University of Cape Town
Free and open lectures, and competition prep. Lecturer (2011-2015), Vice-chairman (2012, 2014), Chairman (2013)

- 2011 & 2012 **Organiser**

Haskell Programming Course, University of Cape Town
Organised and gave a free and open Haskell language programming course

— Competencies

- Comfortable in C and Haskell, with experience in Agda, (x86 & AVR) Assembly, Common Lisp, Coq, LaTeX, Python, Rust, and Zig
- English (fluent), Hebrew (intermediate), Afrikaans (intermediate)

— Personal Pursuits

- *Electronics & 3D printing*: Various projects leveraging micro-controllers and custom circuitry
- *Cellular automata*: Exploration of rule sets and pattern engineering
- *Esoteric Programming Languages*: Authored and implemented several languages (url)
- *Fractal Art*: Exploration of the media of iterated function systems, chaotic maps and attractors, and epicyclic generators
- *Digital Music*: Leveraged trackers and other platforms to create a variety of compositions

References available upon request