ALUN CENNYTH STOKES

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EDUCATION

Master of Science (McMaster University) September 2021 - April 2023
Dessins d'Enfants: Optimised Computations and New Infinite Families Dr Cameron Franc

Bachelor of Integrated Science (McMaster University) September 2017 - April 2021
The Search for Self-Contained Numbers Dr Cameron Franc
summa cum laude (10.8/12 cGPA) | (3.8/4 cGPA)

RESEARCH INTERESTS AND CURRENT WORK

My interests are broadly number theoretic, in particular concerning the theory of dessins d'enfants and modular subgroups, including the characterisation of families of non-congruence subgroups. I specialise in writing highly parallel, concurrent, and distributed libraries to address experimental problems in mathematics, and have a good deal of experience with numerous machine learning techniques, in fact having developed a method of symbolic regression to investigate the maximal subgroup structures of finite linear groups. With another group, I investigate the ability to represent global information of finite metric spaces by point-wise properties, as well as the use of a multiplicative generalisation of δ-hyperbolicity to metrize finite metric spaces themselves in low dimension.

FUNDING, GRANTS, AND AWARDS

M. Novotony Fellowship for Excellence in Analysis * Sept 2022 - April 2023
$ 2,500

Ontario Graduate Scholarship * May 2022 - April 2023
$ 15,000

McMaster Math. & Stats. Departmental Grant September 2021 - August 2022
$ 16,000

USRA (NSERC) * May 2021 - August 2021
$ 8,120

Oriel College (Oxford University) Grant * †*Declined*
£5,000

Dean's Honour List September 2017 - April 2021
4 Years of Undergraduate degree

Global Undergraduate Awards * September 2020
First place in North America (Computer Science)

McMaster Stewart Award * May 2020
$ 3,750

STEM Fellowship Big Data Competition * July 2019
$ 3,000

McMaster President's Award September 2017
$ 2,500

† indicates an award was declined due to not attending the funding institution, and * indicates an award was competitive.

TEACHING ASSISTANTSHIPS

McMaster University

January 2023 - April 2023
Mathematical Programming MATH 1MP3

September 2022 - December 2022
Combinatorics MATH 3U03
Math Help Centre Algebra tutor

January 2022 - April 2022
Graduate Topics in Risk Management (Financial Mathematics) MFM 763
Introductory Number Theory MATH 3H03

September 2021 - December 2021
Numerical Linear Algebra MATH 3NA3
Linear Algebra I MATH 1B03

January 2021 - April 2021
Introduction to Discrete Mathematics CS 1DM3

EMPLOYMENT

McMaster University

September 2021 — April 2023 *Supervised by:*
Graduate Research and Teaching Assistant Dr Cameron Franc, others

May 2021 — August 2021 *Supervised by:*
Research Assistant Dr Cameron Franc

Statistics Canada

June 2020 — August 2020 *Supervised by:*
Data Scientist Serge Goussev

McMaster University

May 2020 - Present *Supervised by:*
Research Assistant Drs George Dragomir and Andy Nicas

May 2019 - May 2020 *Supervised by:*
Research Assistant Dr Ned Nedialkov

PUBLICATIONS

[1] **Stokes, A.** Hum, W., Zaslavsky, J. **STEM Fellowship Journal.** **6**(1): 1-5. Available at A Minimal-Input Multilayer Perceptron for Predicting Drug-Drug Interactions.

[2] † **Stokes, A.** Automatically Solving Square-Piece Jigsaw Puzzles using Convolutional Neural Networks with Gradient Boosted Decision Trees. **The Undergraduate Journal.** (12th edition). Accessible at: Automatically Solving Square-Piece Jigsaw Puzzles.

[3] † * **Stokes, A.** The search for self-contained numbers: k-special 3-smooth integer representations and the Collatz conjecture. **MacSphere**, 2021, [Online]. Available at: The search for self-contained numbers.

*Entries marked with † have **not** been peer-reviewed.* *Entries marked with * are theses.*

OTHER SIGNIFICANT WRITINGS

[1] Stokes, A. **May 2022.** Course Notes on O-minimality and the Pila-Wilkie Theorem.

Available upon request, if no link is given.

INVITED TALKS AND SEMINARS

Algebra and Algebraic Geometry Seminar November 2022
McMaster University *On the Characterisation of φ-congruence Subgroups with Image $\mathrm{SL}_3(\mathbb{F}_p)$*

Algebra and Algebraic Geometry Seminar November 2021
McMaster University *An Introduction to Belyi Maps: Computations in Genus 0*

CANDEV January 2020
Government of Canada *Transformer embeddings + t-SNE for course redundancy identification*

Undergraduate Big Data Competition July 2019
STEM Fellowship *Predicting in-vivo Drug Interactions Without Drug Structure*

OTHER PRESENTATIONS

Synopsis 2021 April 2021
McMaster University *k-special 3-smooth Representations and the Collatz Conjecture*

- Discussion of our contributions to OEIS A005184 and relevant background

LaTeX Workshops for Integrated Sciences Students 2019 - 2021
McMaster University *Introductory LaTeX workshops for mathematical document preparation*

TECHNICAL SKILLS

Languages†	**Python, Julia**, Java, SQL, C/C++, CUDA, MATLAB.
Major Libraries†	**SageMath**, **Pytorch**, Tensorflow.
Software & Tools	LaTeX, Git, Zotero, Macuaulay2.
Operating Systems†	**GNU/Linux** (Debian-based, primarily), MacOS, Windows
Misc.	Cloud-based computing (AWS, GCP, Compute Canada)

† *indicates order of proficiency* ***Bolding** indicates preferentiality*

PROFESSIONAL ORGANISATIONS

American Mathematical Society (AMS) *September 2021 - Present*

Canadian Mathematical Society (CMS) *November 2022 - Present*

Society for Industrial and Applied Mathematics (SIAM) *July 2022 - Present*

Institute of Electrical and Electronics Engineers *December 2022 - Present*

MISCELLANY TO FILL OUT THE PAGE

- I maintain reliability status with the Government of Canada until 2030
- I have quite an interest in early analytic philosophy, particularly that of Moore and Wittgenstien
- Kazuo Ishiguro is my favourite author