ETHAN MCCARTHY

Programmer • Mathematician • Computer scientist • Logician • Professor

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EMPLOYMENT

Visiting Assistant Professor

University of Florida

2018 – 2020 Gainesville, Florida

Developed Calculus 2 lecture video sequence with interactive online animations and demonstrations. Converted undergraduate courses for online-delivery. Led seminar series for the departmental logic research group and organized regional conference in computability theory. Contributed to in-house textbook for undergraduate sequence, and led graduate sequence, in mathematical logic.

PROJECTS

Turing Machine Simulator

https://ethmcc.github.io/turing/

- Progressive web app built with JavaScript, Node.js, React.

Turing Machine simulator with source code parser. Provides numerous examples users can toggle between, with explanations. Allows users to write their own machines using a custom syntax. Deployed in an educational setting. Responsive design. Progressive web application.

Chess Sudoku Solver

https://ethmcc.github.io/sudoku/

- Python package implementing efficient combinatorial algorithms.

Fast variant Sudoku solver library using an implementation of Donald Knuth's DLX algorithm for multiset-multicover problems. Includes module for classic Sudoku and "Chess Sudoku" variants, including optional adjacency constraints. Was used to obtain the first calculation of the number of unique solutions to the "Miracle Sudoku" variant.

Academic Research in Computability Theory

https://ethmcc.github.io/research/

- Research in the mathematical foundations of computer science.

Ongoing research career in abstract mathematical logic. Invited speaker at dozens of mathematics and computer science conferences throughout the United States, Europe, and Asia. Published in leading national journals in mathematics and mathematical logic. Organized conferences, workshops, and seminars in current research topics.

PORTFOLIO WEBSITE

ethmcc.github.io

https://ethmcc.github.io/

- Portfolio website built in Python, Node.js, Pelican.

Responsive personal portfolio and academic CV website for presenting content related to programming and mathematics. Pygments code-syntax highlighting and LaTeX integration with MathJax. Hosts a portfolio of projects and technical writings related to programming, theoretical computer science, and mathematical logic.

EDUCATION

Ph.D. Mathematics

UW–Madison

2018 Madison, Wisconsin

Supervisor: Prof. Joseph S. Miller
Research topics: theory of computation, computability and complexity, algorithmic information theory and randomness, enumeration degrees, symbolic dynamics, computable structure theory, computable analysis. Minor in mathematical analysis.

OTHER EXPERIENCE

- *Art of Problem Solving*. "Halper" and Grader. *Intro to Programming with Python*, *Intermediate Programming with Python*.

CODING PROFICIENCY

Python (&NumPy)	●●●●●
MATLAB	●●●●○
JavaScript	●●●●○
Haskell	●●○○○
C/C++	●●○○○
Rust	●○○○○

SELECTED PUBLICATIONS

- *Cototal enumeration degrees and their applications to effective mathematics*. Proc. Am. Math. Soc. 146 (2018), 3541—3552.
- *Slopes of computable real-valued functions*. To appear in Arch. Math. Log. (2020).
- *Characterizing the strongly jump-traceable sets via diagonal non-computability*. Preprint.
- *Strong difference randomness and jump domination*. Preprint.

SELECTED AWARDS

- Graduate Research Fellowship, NSF, 2014.
- Herbert T. Graham Scholar (twice named), MSU, 2011, 2012.
- Math in Moscow Scholarship, AMS, 2012.
- Herzog Mathematical Competition, 1st Prize, MSU, 2011.

OTHER INTERESTS

Sailing: Instructor at UW Hoofers student sailing program.