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Luke Serafin

Education

08/2019– **Ph.D. in Mathematics**, *Cornell University*, Ithaca, NY
Note: Leave of absence Fall 2020–Spring 2022

08/2022–05/2024 **M.S. in Computer Science**, *Cornell University*, Ithaca, NY

08/2012–12/2015 **M.S. in Mathematical Sciences**, *Carnegie Mellon University*, Pittsburgh, PA
Note: Concurrent with bachelor's study

08/2011–05/2015 **B.S. in Mathematical Sciences with a double major in Logic & Computation**, *Carnegie Mellon University*, Pittsburgh, PA

Publications

08/2025 "Prelinearizing Funicular Preorders." Joint with Azul Fatalini. *In preparation.*

08/2025 "Intergenerational Equity Without Nonprincipal Ultrafilters over **N**." Joint with Azul Fatalini. *In preparation.*

08/2025 "On Strongly Equitable Social Welfare Orders Without the Axiom of Choice." *Submitted to TODO.*

07/2025 "Kleene Algebras and Morita Equivalence." *Accepted to Logic and Applications (LAP) 2025. To be published after the conference concluding 28 September 2025.*

07/2025 "Ultrafilters over Successor Cardinals and the Tukey Order." Joint with Tom Benhamou and Justin Moore. Submitted to *Advances in Mathematics.* arXiv:2507.22307.

12/2017 "A Formally Verified Proof of the Central Limit Theorem." Joint with Jeremy Avigad and Johannes Hölzl. *Journal of Automated Reasoning*, 59(4):389–423, 2017.

05/2016 "On Generalizations of Separating and Splitting Families." Joint with Daniel Condon, Samuel Coskey, and Cody Stockdale. *The Electronic Journal of Combinatorics*, 23(3):3–36, 2016

12/2015 "A Formally Verified Proof of the Central Limit Theorem." Master's thesis, Carnegie Mellon University, 2015.

04/2015 "Mathematical Metaphysics." Honour's thesis, Carnegie Mellon University, 2015.

Invited Presentations

09/2025 **"Kleene Algebras and Morita Equivalence"** ***(Accepted)***, *Logic and Applications (LAP)*, Dubrovník, Croatia
Note: Schedule not yet published

09/02/2025 **"Prelinearization, Social Welfare, and the Axiom of Choice"**, *Logic Seminar, Carnegie Mellon University*, Pittsburgh, PA
Hosted by Sumun Iyer

03/02/2025 **"Concerning Prelinearization of Analytic Preorders and Economics"**, *South Eastern Logic Symposium (SEALS)*, Gainesville, FL

02/13/2025 **"On Winning the Infinite Hat Game"**, *Mathematics Colloquium, Miami University*, Oxford, OH
Hosted by Paul Larson

02/10/2025 **"Choice and Equitable Social Welfare"**, *Logic Seminar, Rutgers University*, New Brunswick, NJ
Hosted by Filippo Calderoni

03/27/2024 **"Some Social Welfare Without Free Ultrafilters"**, *Logic Seminar, University of Toronto*, Toronto, ON
Hosted by Spencer Unger

Employment

08/2022– **Teaching Assistant, Research Assistant, and Grader**,
Cornell University, Ithaca, NY
Semester-by-semester contracts with stipend to teach, carry out research, or provide grading support for a course.

12/2020–02/2025 **Quality Assurance Lead Engineer**, *Sogeti USA*, Scottsdale, AZ
Leading teams to design, implement, and maintain automated software testing for a large healthcare client.
Note: Part-time beginning 08/2022 due to PhD.

05/2018–08/2019 **Software Engineer**, *Honeywell International*, Phoenix, AZ
Designing, implementing, and maintaining saftey-sensitive FAA-regulated software for the flight management systems of large airliners.

02/2015–12/2017 **Software Developer**, *Epic Systems Corporation*, Madison, WI
Designing, implementing, and maintaining software to process and store healthcare provider records.

01/2012–12/2015 **Teaching Assistant, Research Assistant, Tutor, Grader, and Disability Resource Assistant**,
Carnegie Mellon University, Pittsburgh, PA
Semester-by-semester undergraduate contracts to teach, carry out research, or provide grading or disability resource support for a course.

06/2014–08/2014 **Student Researcher**, *Boise State University*, Boise, ID
Participant in 2014 Complexity Across Disciplines REU, with participation resulting in the 2016 publication of the paper "On Generalizations of Separating and Splitting Families" in the journal *Electronic Journal of Combinatorics* (23(3):3–36).

Honours

Phi Beta Kappa Inducted Fall 2014

Phi Kappa Phi Inducted Spring 2025

Technical Skills

C programming language Academic and professional projects. Includes knowledge of C#, C++, and Java.

SML Academic automated reasoning projects.

Isabelle Formalization of Central Limit Theorem.

LaTeX	Preparation of academic papers.
HTML, CSS, JavaScript, TypeScript	Web development.

Languages

- English (Native speaker)
- German (B2)
- French (B1)
- Italian (A2)
- Spanish (A2)
- Russian (A1)
- Hungarian (A1)
- Czech (A1)