

Luke Serafin

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Education

- 08/2019– **Ph.D. in Mathematics**, Cornell University, Ithaca, NY
Advanced to candidacy 09/2023. 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

- 11/2025 “Prelinearizing Funicular Preorders.” Joint with Azul Fatalini. *In preparation.*
- 11/2025 “Intergenerational Equity Without Nonprincipal Ultrafilters over \mathbb{N} .” Joint with Azul Fatalini. *In preparation.*
- 11/2025 “On Strongly Equitable Social Welfare Orders Without the Axiom of Choice.” *In preparation.*
- 11/2025 “Strong Morita Equivalence for Kleene Algebras and Related Structures.” Submitted to *Relationa Methods in Computer Science (RAMICS) 2026*. arXiv identifier not yet available.
- 07/2025 “Ultrafilters over Successor Cardinals and the Tukey Order.” Joint with Tom Benhamou and Justin Moore. Submitted to *Canadian Journal of 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. Advised by Professor Jeremy Avigad.
- 04/2015 “Mathematical Metaphysics.” Honour’s thesis, Carnegie Mellon University, 2015. Advised by Professor Clark Glymour.

Invited Presentations

- 11/21/2025 “**Morita Equivalence for Kleene Algebra**”, *Logic and Computation Seminar, University of Pennsylvania*, Philadelphia, PA
Hosted by Andre Scedrov
- 09/24/2025 “**Kleene Algebras and Morita Equivalence**”, *Logic and Applications (LAP)*, Dubrovnik, Croatia
- 09/17/2025 “**Tukey Types of Ultrafilters Over ω_1** ”, *Logic Seminar, Czech National Academy of Sciences*, Prague, Czech Republic
Hosted by Christopher Lambie-Hanson
- 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 courses including Theoretical Linear Algebra and Calculus (a year-long honours course), Differential Equations for Engineers, Calculus II, and Manifolds.
- 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 safety-sensitive FAA-regulated software for the flight management systems of large airliners.
- 02/2016–12/2017 **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

Spring 2025	Inducted into Phi Kappa Phi
2019—2020	Cornell University First-year Fellowship
Fall 2014	Inducted into Phi Beta Kappa
2012—2015	Moskovitz Scholar
2011—2015	Dean’s list every semester of undergraduate study
2010	Mitchell Award, Civil Air Patrol

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.
Python	Scripting for professional and academic projects.
ADA	Implementation of safety-sensitive software for airliners
MUMPS	Implementation and query interface for medical databases
Ruby	Some exposure as a scripting language for UI testing
Lisp	Some exposure as an implementation and interface language for automated theorem proving

Languages

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