

# 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

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## Publications

- 11/2025 “Prelinearizing Funicular Preorders.” Joint with Azul Fatalini. *In preparation*.
- 11/2025 “Intergenerational Equity Without Nonprincipal Ultrafilters over  $\mathbf{N}$ .” 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.

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## 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  $\omega_1$ ”**, *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

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## 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).

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## 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

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## 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.  
L<sup>A</sup>T<sub>E</sub>X 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

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## Languages

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