Matej Penciak

matej.penciak@gmail.com
https://mpenciak.net

WORK EXPERIENCE

Reilabs   New York City, NY
Software Engineer   *January 2025 - Present*
- Worked on applications of formal verification to Zero Knowledge

Argument Computer Corporation   New York City, NY
Software Engineer and Cryptographer   *May 2022 - November 2024*
- Implemented new folding scheme primitives for Nova (SuperNova compression, CycleFold) in Rust.
- Worked on a team implementing a Spartan SNARK verifier in Solidity.
- Delivered performant implementations of cryptographic primitives in Lean 4.
- Formalized the proof of knowledge soundness for toy models of SNARKs in Lean 4.
- Built a testing and benchmarking framework in Lean 4 to support large scale development tasks.

Department of Mathematics, Northeastern University   Boston, MA
Zelevinsky Research Instructor   *Fall 2019 - May 2022*
- Served as instructor of record for a range of undergraduate and graduate courses in mathematics.
- Organized and ran the Learning Lean seminar for undergrad and graduate students in Spring 2022.
- Organized and ran the Northeastern Summer Mathematics REU in 2021 and 2022.
- Continued research in algebraic geometry, integrable systems, and mathematical physics.

Department of Mathematics, University of Illinois at Urbana-Champaign   Urbana, IL
Research and Teaching Assistant   *Fall 2012- Spring 2019*
- Conducted research in the direction of a Ph.D. thesis in integrable systems and algebraic geometry.
- Awarded the Kuo-Tsai Chen award for outstanding scholastic achievement in geometry and analysis.
- Rated as excellent by students in 7 out of 11 semesters teaching.

EDUCATION

University of Illinois at Urbana-Champaign
Ph.D. Mathematics   *Aug. 2012-May 2019*
- Thesis: *A Spectral Description of the Spin Ruijsenaars-Schneider System*
- Thesis advisor: Thomas A. Nevins

University of Rochester
B.A. Honors Mathematics, B.S. Physics, magna cum laude   *Aug. 2008-May 2012*
- Honors thesis: *Galois Groups of Iterates of Cubics*

SELECTED PUBLICATIONS, PRESENTATIONS, AND PROJECTS

- Maintainer for a number of open source Lean 4 projects: LSpec, FFaCiL.
- Formalization of results in linear algebra and symplectic groups in Lean 3 (contributed and accepted to Mathlib)
- Invited talk in the London Learning Lean Seminar, Spring 2023
- Invited talk in the joint CUHK-Harvard-YMSC Differential Geometry Seminar, Fall 2020
- Martin T. Luu and Matej Penciak. Langlands Parameters of Quivers in the Sato Grassmannian. *Comm. Math. Phys.*, 357(2):775-789,2018

RELEVANT SKILLS

Technical
- **Programming language proficiencies** - Lean 4, Rust, Python, Solidity.
- **Computer algebra software** - Sage, Mathematica, Maple, MATLAB.
- **LaTeX** - Advanced experience for document, presentation, and online documentation preparation.

General
- Experience with creating and maintaining efficient development environments on Linux and Windows.
- Excellent written and verbal communication skills in academic and professional environments.
- **Languages** - English (first language), native Slovak comprehension.