

# John C. Kolesar, Ph.D.

AKW 211, 51 Prospect Street, New Haven, CT 06511

☎ 301-503-5299 (cell) • ✉ jkolesar98@gmail.com, john.kolesar@yale.edu

📄 johnckolesar.github.io, www.linkedin.com/in/john-kolesar-a1348b24a

## Education

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### Yale University

New Haven, Connecticut

*Ph.D., Computer Science*

2020–2026

Advisor: Ruzica Piskac

Earned M.S. en route to Ph.D. in 2022

### Cornell University

Ithaca, New York

*Bachelor of Arts with Distinction in All Subjects*

2016–2020

Majors:

- Mathematics (Magna cum Laude, Computer Science concentration)
- Classics (Latin concentration)

Minors:

- Computer Science
- Philosophy

Cumulative Grade Point Average: 3.97

Computer Science GPA: 4.02

## Honors

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### Phi Beta Kappa

*Cornell University College of Arts & Sciences*

2020

### Nathan Hale Associates Fellow

*Yale Graduate School of Arts & Sciences*

2021

### Arts & Sciences Dean's List

*Cornell University*

*All available semesters*

## Graduate Course Work Performance

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Grade of H (maximum grade for Yale GSAS) in all graded graduate courses

## Research Interests

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- Programming Languages
- Formal Verification
- Cryptography
- Zero-Knowledge Proofs
- Symbolic Execution
- Software-Defined Networking
- Automatic Program Repair
- Competitive Programming
- Regular Expressions and KAT

## Thesis

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- o John Charles Kolesar. **Coinductive Proof Systems for Private Program Verification**. Doctoral Dissertation, Yale University, 2026.

## Conference Publications

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- o Daniel Luick, Ning Luo, John Kolesar, Timos Antonopoulos, Xiao Wang, Eran Tromer, Ruzica Piskac. **Efficient Zero-Knowledge Proofs for First-Order Logic with Quantifiers**. Under Preparation.
- o John Kolesar, Timos Antonopoulos, Ruzica Piskac. **Validation of NetKAT Proof Certificates in Zero Knowledge**. Under Submission.
- o Jialu Zhang, Jialiang Gu, Wangmeiyu Zhang, José Pablo Cambroner, John Kolesar, Ruzica Piskac, Daming Li, Hanyuan Shi. **A Systematic Study of Time Limit Exceeded Errors in Online Programming Assignments**. Under Submission.
- o John Kolesar, Martin Schäfer, Robin Salkeld, Remy Willems, Willem Visser. **Enforceable Explainability Properties for Pricing Models**. Under Preparation.
- o John C. Kolesar, Shan Ali, Timos Antonopoulos, Ruzica Piskac. **Coinductive Proofs of Regular Expression Equivalence in Zero Knowledge**. *OOPSLA*, 2025.
- o John Kolesar, Tancrede Lepoint, Martin Schäfer, Willem Visser. **Safe Validation of Pricing Agreements**. *ICSE*, 2025.
- o Daniel Luick, John Kolesar, Timos Antonopoulos, William R. Harris, James Parker, Ruzica Piskac, Eran Tromer, Xiao Wang, Ning Luo. **ZKSMT: A VM for Proving SMT Theorems in Zero Knowledge**. *USENIX Security*, 2024.
- o John C. Kolesar, Ruzica Piskac, William T. Hallahan. **Checking Equivalence in a Non-strict Language**. *OOPSLA*, 2022.
- o Jialu Zhang, De Li, John C. Kolesar, Hanyuan Shi, Ruzica Piskac. **Automated Feedback Generation for Competition-Level Code**. *ASE*, 2022.

## Journal Publications

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- o John C. Kolesar, Ruzica Piskac, William T. Hallahan. **Checking Equivalence in a Non-strict Language**. *Journal of Functional Programming*, 2025.

## Talks

- ZK Proofs for SMT Theorems and Regular Expression Equivalence**  
*Carnegie Mellon University, CyLab Crypto Seminar* November 2024
- Coinductive Proofs of Regular Expression Equivalence in Zero Knowledge**  
*FMCAD 2024 Student Forum* October 2024
- ZKSMT: A VM for Proving SMT Theorems in Zero Knowledge**  
*New York University, NJPLS* May 2024

## Poster Presentations

- Coinductive Proofs of Regular Expression Equivalence in Zero Knowledge**  
*FMCAD 2024 Student Forum* October 2024
- Checking Equivalence in a Non-strict Language**  
*Yale University* October 2023

## Industry Work Experience

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### Amazon Web Services

*Applied Scientist Intern, New York City*

*Summer 2024, Summer 2025*

Manager: Martin Schäf

Team: AWS Billing

### Microsoft One Engineering System

*Research Intern, Remote*

*Summer 2022*

Supervisor: Josh Becker

Mentor: Grant Holliday

### Aretec Inc.

*Big Data Software Application Developer*

*Summer 2018, Summer 2019*

Contractor for U.S. Securities and Exchange Commission

New York City (2018)

Washington, D.C. (2019)

## Mentoring Experience

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**Zero-Knowledge Regular Expression Equivalence**

**Yale University**

*Shan Ali*

*Summer 2024*

## Teaching Experience

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**Graduate Teaching Fellow at Yale University**.....

**CPSC 415/515: Law and Large Language Models**

*Taught by Ruzica Piskac and Scott Shapiro*

*Spring 2025*

**CPSC 458/558: Automated Decision Systems**

*Taught by Stephen Slade*

*Spring 2024*

**CPSC 323: Introduction to Systems Programming and Computer Organization**

*Taught by James Glenn and Jay Lim*

*Fall 2023*

**CPSC 484/584: Introduction to Human-Computer Interaction**

*Taught by Marynel Vázquez*

*Spring 2023*

**CPSC 435/535: Building an Internet Router**

*Taught by Robert Soulé*

*Fall 2022*

**CPSC 433/533: Computer Networks**

*Taught by Anurag Khandelwal*

*Spring 2022*

**CPSC 323: Introduction to Systems Programming and Computer Organization**

*Taught by Ruzica Piskac and Rob Brunstad*

*Fall 2021*

**Undergraduate Teaching Assistant at Cornell University**.....

**CS 3110: Data Structures and Functional Programming**

*Taught by Nate Foster*

*Spring 2020*

**CS 4820: Introduction to Analysis of Algorithms**

*Taught by Eva Tardos*

*Fall 2019*

**CS 3110: Data Structures and Functional Programming**

*Taught by Michael Clarkson*

*Fall 2018*

## CS 2112: Honors Object-Oriented Design and Data Structures

*Taught by Dexter Kozen*

*Fall 2017*

## Other Work, Research, and Volunteering Experience

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### **Cornell University**

*Computer Science Research*

Research Advisor: Nate Foster

Subject: Software-Defined Networking with P4

**Ithaca, New York**

*Fall 2019, Spring 2020*

### **Tenley Achievement Program**

*Office Manager*

**Washington, D.C.**

*Summer 2017*

### **Yale University Computer Science Department**

*Graduate Student Advisory Committee Member*

**New Haven, Connecticut**

*2023–2024 Academic Year*

### **Yale University Computer Science Department**

*New Ph.D. Student Mentor*

**New Haven, Connecticut**

*2023–2024, 2024–2025 Academic Years*

### **National University of Colombia**

*Web Chair for LPAR 2023*

**Manizales, Colombia (remote)**

*June 2023*

### **Squash Haven**

*Volunteer Tutor (Computer Science, Mathematics)*

**New Haven, Connecticut**

*Spring 2023, Fall 2023*

### **Yale University Computer Science Department**

*Website Manager for Formal Methods Meetup 2023*

**New Haven, Connecticut**

*October 2023*

### **Yale University Computer Science Department**

*Ph.D. Student Buddy for Admitted Student Day*

**New Haven, Connecticut**

*Spring 2022*

## Skills

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- Proficiency in Java, C, C++, OCaml, Q, Haskell, Python, JavaScript, TypeScript, Dafny
- Experience with Coq, Standard ML, C#, Kusto, Langium, Lean
- Experience with SMT solvers, Excel, LaTeX, Unity, Blender, VirtualBox, Docker