

Travis Morrison

Virginia Tech	<code>tmo@vt.edu</code>
225 Stanger St	https://travismo.github.io
McBryde Hall 516	Citizenship: USA
Blacksburg, VA 24061 USA	Languages: English

EMPLOYMENT

2020 – Assistant Professor, Virginia Tech, Mathematics Department
2018 – 2020 Postdoctoral fellow, University of Waterloo, The Institute for Quantum Computing

VISITING APPOINTMENTS

2017 05 Intern, Microsoft Research, Cryptography group. (Mentor: Kristin Lauter)

EDUCATION

2018 05 Ph.D. Mathematics, Pennsylvania State University
(Advisor: Kirsten Eisenträger)
2012 06 B.A. Mathematics, University of California, Santa Cruz

RESEARCH INTERESTS

Number theory and applications to cryptography.

PUBLICATIONS

1. Toward a classification of isolated j -invariants (with Abbey Bourdon, Sachi Hashimoto, Timo Keller, Zev Klagsbrun, David Lowry-Duda, Filip Najman, and Himanshu Shukla). [arXiv:2311.07740](#).
2. Computing supersingular endomorphism rings using inseparable endomorphisms (with Jenny Fuselier, Annamaria Iezzi, Mark Kozek, and Changningphaabi Namoi-jam). [arXiv:2306.03051](#).
3. Supersingular Curves You Can Trust (with Andrea Basso, Giulio Codogni, Deirdre Connolly, Luca De Feo, Tako Boris Fouotsa, Guido Maria Lido, Lorenz Panny, Sikhar Patranabis, Benjamin Wesolowski). *EUROCRYPT 2023*. eprint: 2022/1469.
4. Homomorphic Encryption Standard (with Martin Albrecht, Melissa Chase, Hao Chen, Jintai Ding, Shafi Goldwasser, Sergey Gorbunov, Shai Halevi, Jeffrey Hoffstein, Kim Laine, Kristin Lauter, Satya Lokam, Daniele Micciancio, Dustin Moody, Amit Sahai, Vinod Vaikuntanathan). 2022. Book chapter in Protecting Privacy through Homomorphic Encryption (eds Kristin Lauter, Wei Dai, and Kim Laine).
5. Chabauty-Coleman computations on rank one Picard curves. (with Sachi Hashimoto). 2021. Simons Symposia: Arithmetic Geometry, Number Theory, and Computation. [arXiv:2002.03291](#)

6. Computing endomorphism rings of supersingular elliptic curves and connections to pathfinding in isogeny graphs (with Kirsten Eisenträger, Sean Hallgren, Chris Leonardi, and Jennifer Park). pp. 215–232 in Proceedings of the Fourteenth Algorithmic Number Theory Symposium (ANTS-XIV), edited by Steven Galbraith, Open Book Series 4, Mathematical Sciences Publishers, Berkeley, 2020. [arXiv:2004.11495](#).
7. Diophantine definability of nonnorms of cyclic extensions of global fields. *Transactions of the AMS* 372, pp. 5825–5850 (2019). [arXiv:1710.07357](#).
8. Cycles in the supersingular isogeny graph and corresponding endomorphisms (with Efrat Bank, Catalina Camacho-Navarro, Kirsten Eisenträger, and Jennifer Park). *Research Directions in Number Theory: Women in Numbers 4*, (2019). [arXiv:1804.04063](#).
9. Supersingular isogeny graphs and endomorphism rings: reductions and solutions (with Kirsten Eisenträger and Sean Hallgren and Kristin Lauter and Christophe Petit). *EUROCRYPT 2018*. 40 pages.
10. Universally and existentially definable subsets of global fields (with Kirsten Eisenträger). *Mathematical Research Letters*, Volume 25, No. 4 (2018). [arXiv:1609.09787](#).

EXTERNAL GRANTS

2021 – 2022 Cyber Commonwealth Initiative. Project title: Evaluation of Lattice-Based Candidates in the NIST Post-Quantum Cryptography Standardization Process in Terms of Security and Performance in Hardware, PI (co-PI: Kris Gaj, George Mason University) \$200,000 (VT portion: \$76,000).

INVITED RESEARCH TALKS

2024	01	“Joint Mathematics Meetings, AMS Special Session on Computable Mathematics: A Special Session Dedicated to Martin D. Davis” San Francisco, CA
2023	12	Wake Forest University, Mathematics colloquium
	10	“AMS Fall Southeastern Sectional Meeting, Special Session on Number Theory and Friends” Mobile, AL
	06	“Arithmetic, Geometry, Cryptography and Coding Theory” CIRM
2023		“SIAM Southeastern Atlantic Section Annual Meeting, Public Key Cryptography and Applications” Blacksburg, VA
	04	“AMS Spring Central Sectional Meeting, Special Session on Algorithms, Number Theory, and Cryptography” Cincinnati, OH
2022	07	Research Program Seminar, Park City Mathematics Institute
2020	11	ACCESS, virtual
	1	Clemson University, Colloquium
2019	11	Virginia Tech University, Colloquium
	11	McMaster University, Model theory seminar
	10	Carnegie Mellon University, Algorithms, complexity, and optimization seminar
	10	University of Vermont, Arithmetic geometry seminar

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| | 06 | Microsoft Research, Cryptography colloquium |
| | 05 | “49th John H. Barrett Memorial Lectures”, University of Tennessee, Knoxville, TN |
| | 03 | “AMS Spring Central and Western Sectional Meeting, Special Session on Emerging Connections in Number Theory” Honolu, HI |
| | 03 | “AMS Spring Central and Western Sectional Meeting, Special Session on The Mathematics of Cryptography” Honolu, HI |
| | 01 | “Joint Mathematics Meetings, AMS special session on Definability and decidability problems in number theory”, Baltimore, MD |
| 2018 | 11 | “Elliptic Curve Cryptography 2018” Osaka |
| | 5 | Korean Institute for Advanced Study, Number theory seminar |
| | 4 | Cornell University, Number theory seminar |
| | 3 | Tufts University, Algebra, geometry, and number theory seminar |
| 2017 | 12 | University of Michigan, Ann Arbor, Group, Lie, and number theory seminar |
| | 11 | “Rutgers-Newark Junior Number Theory Days” Newark, NJ |
| | 09 | Pennsylvania State University, Algebra and number theory seminar |
| | 03 | “Southeastern AMS Sectional Meeting, Special Session on Computability in Algebra and Number Theory” Charleston, SC |
| 2016 | 10 | “Definability and Decidability Problems in Number Theory” Oberwolfach |
| | 10 | Pennsylvania State University, Algebra and number theory seminar |

CONTRIBUTED TALKS

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| 2018 | 4 | “Upstate Number Theory 2018” SUNY Buffalo |
| | 1 | “Joint Mathematical Meetings, MAA General Contributed Paper Session on Number Theory II” San Diego, CA |
| 2017 | 05 | “Upstate Number Theory 2017” Binghamton University |

ACADEMIC HONORS

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| 2018 | | Ayoub Award in Algebra and Number Theory, Pennsylvania State Mathematics Department |
| | | Global Programs Graduate Student Travel Grant, Pennsylvania State University (Declined) |
| 2017 | | Mathematics department nominee for university-wide Penn State Alumni Association Dissertation Award, 2017 |
| 2011 | | Merit Fellowship, Outstanding project in Geometry, and Outstanding Project in Algebra, MASS 2011 |

LEADERSHIP ROLES IN CONFERENCES

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| 2021 | 1 | Organized the AMS special session at JMM 2021 on "Mathematics of cryptography" with Angela Robinson and Gretchen Matthews. |
| 2020 | 10 | Project leader for "Rethinking Number Theory" |

COMPUTER EXPERIENCE

- Languages: Python
- Packages: Sage, Magma

TEACHING EXPERIENCE

VIRGINIA TECH

2024	01	Math 5126: Algebra
2023	08	Math 5125: Algebra
	08	Math 4176: Cryptography II
	01	Math 5114: Topics in Algebra
	01	Math 4176: Cryptography II
2022	08	Math 4176: Cryptography II
	01	Math 4176: Cryptography II
2021	08	Math 4175: Cryptography I
	01	Math 4134: Number theory
		Math 4176: Cryptography II

PENN STATE UNIVERSITY, UNIVERSITY PARK

2018	01	Math 231: Multivariable Calculus, <i>Instructor</i>
2015 – 2017		Ritner Experience, <i>Tutor</i>
2015	08	Math 231: Multivariable Calculus, <i>Instructor</i>
		Math 232: Integral and Vector Calculus, <i>Instructor</i>
2015	01	Math 36: Insights into Mathematics <i>Instructor</i>
2014	08	Math 36: Insights into Mathematics <i>Instructor</i>
	01	Math 21: College Algebra II <i>Instructor</i>
2013	08	Math 36: Insights into Mathematics <i>Instructor</i>
2013	08	Math 110: Business Calculus <i>Teaching Assistant</i>
	06	Math 251: Ordinary Differential Equations <i>Instructor</i>
	01	Math 313a: Concepts of Geometry <i>Teaching Assistant</i>

SERVICES

2021 –	Colloquium committee, chair
2020 –	Coorganizer of Virginia Tech Algebra seminar
2019 – 2020	Organized cryptography reading group seminar at University of Waterloo
2017 – 2019	Reviewer or referee for: PQCrypto 2018, manuscripta mathematica, Crypto 2019, Number-Theoretic Methods in Cryptography 2019, Selected Areas in Cryptography 2019, ASIACRYPT 2020, .
2013 – 2017	Penn State, Climate and Diversity Workshop, <i>Organizer, Lead organizer in 2015, nominated for Eberly College of Science Climate and Diversity Award in 2015.</i>
2013 – 2015	Penn State, Graduate Student Number Theory Seminar, <i>Organizer</i>
2015 – 2016	Penn State, Expand Your Horizons Workshop, Cryptography course, <i>Teaching Assistant</i>