Krystal Maughan

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Github: https://github.com/kammitama5
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Research Interests: Isogeny-Based Cryptography, Mathematical Cryptography, Elliptic Curves, AI Interpretability, Game Theory, Random Processes, Combinatorics, Graph Theory

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University of Vermont, PhD student ***2019-present***
Computer Science PhD student, minor in Pure Mathematics

RESEARCH EXPERIENCE:

Research Assistant (Vermont) ***2021-present***
PhD Supervisors: C. Vincent, J. Near: Research on Isogeny-Based Cryptography
- *Mathematical Cryptography Research*

Research Assistant: P. Rombach: Research on Computational Combinatorics ***2022-present***
- *Algebraic Combinatorial Graph Theory Research*

Research Assistant (Vermont) ***2019-2022***
Supervisor: Joe Near: Research on Provable Fairness and (Differential) Privacy Using Machine Learning. Funded via Amazon Research Award (2020-2022 PI: J. Near, D. Darais).

Working Preprints:
- *Mathematical Cryptography: Work on Compositional Isogeny Schemes (ongoing) (Mentor: C. Vincent)* *2022-present*
- *Combinatorics: Work on Computational Combinatorial Graph Theory research (Mentor: M. Rombach) (ongoing)* *2022-present*

Preprints:
- *"Price of Anarchy in Selfish Routing on the Lightning Network" (ongoing) (R. Pickhardt, S. Alscher, **K. Maughan**)* *2022-present*
- *"Improving Utility for Analysis of Correlated Columns using Pufferfish Privacy" (**Maughan, K.** and Near, J.)* *2022*
- *Prediction Sensitivity: Continual Audit of Individual Fairness in Deployed Models (**Maughan, K.**, Ngong, I., Near, J.) (**submitted: under review***)* *2022*
- *Prediction Sensitivity: Continual Audit of Counterfactual Fairness in Deployed Classifiers (**Maughan, K.**, Ngong, I., Near, J.)* *2022*
- *"Continual Audit of Individual Fairness in Deployed Classifiers via Prediction Sensitivity" (**Maughan, K**, I. Ngong and J. Near)* *2021*

Workshop Publications:
- *"Towards a Measure of Individual Fairness for Deep Learning" (**Maughan, K.** and Near, J.) - presented as poster for **MD4SG*** *2020*
- *"Towards Auditability for Fairness in Deep Learning" (Ngong, I., **Maughan, K.** and Near, J.)- presented as poster for **AFCI at NeurIPS*** *2020*

Workshop Conference Posters:

- *"Compositional Isogeny Schemes"- presented as poster at **ACM Richard Tapia Conference (**Maughan, K**)*** *2022*
- *"Continual Audit of Individual Fairness in Deployed Classifiers via Prediction Sensitivity" at **EAAMO Doctoral Consortium*** *2022*
- *"Archipelago Penseé" (**Maughan, K**.)* *2020*
  *Presented writing and artwork as poster for **RAIS (Resistance AI) at NeurIPS***

Whitepapers:

- *Client Telemetry Aggregation, Microsoft internal (joint work with: P. Angulo, PhD)* *2021*

Collaboration on Other Research Projects in Progress:

- ***Women in Number Theory 6 at BIRS** (Banff, Canada)* (selected participant) 2023
  Research on "Machine Learning and Arithmetic Geometry / Statistics"
  (Number Theory research led by mentors K. Lauter, R. Newton and co-authors)
- ***OpenMined Medical Federated Learning Program** (ongoing)* *2022*
  (joint work with with several co-authors)

Graduate Teacher's Assistant, Fall/Spring 2019-2020 (Vermont) ***2019-2020***
Compiler Construction with Haskell (taught by Joe Near) *2020*
Advanced Web Design (taught by B. Erickson)
Programming with Matlab (taught by R. Dasari) *2019*
Data Privacy with Jupyter, Python (taught by J. Near)

GRANT WRITING / PROPOSALS

- *Summer of Bitcoin, "Price of Anarchy in Selfish Routing On the Lightning Network" (Research proposal with 0.4% acceptance rate, Awarded $3,000)* *2022*
- *COST Action Proposal OC-2021-1-25315 "Mathematics and Algorithmics of Group actions and Isogenies for Cryptography" (Secondary Proposer)* *2021*
- *Microsoft Research, Reinforcement Learning Open Source Festival Proposal (Awarded $10,000)* *2021*
- *CDS&E Computational and Data-Enabled Science and Engineering Database Grant Proposal for SageMaths (as Key Personnel)*
  (PI B. Hutz, PhD) (not awarded) *2020*
- *Google Summer of Code, Proposal to Haskell.org*
  (Awarded $6,000) *2018*
- *Helium Grant, (for exploring questions on the edge of mainstream thinking)*
  (1 of 11 chosen out of 700 applicants; Awarded $1,000) *2018*

RESEARCH AWARDS

***2nd Place Winner**, Best Research Project (tie with X. Zhang),* *2022*
UVM CS Research Day for "Price of Anarchy in Selfish Routing on the Lightning Network"
***Best Poster**, Brilliant Idea Category, Mediterranean Machine Learning Summer School* *2021*

MERIT-BASED MENTORSHIPS / RESEARCH MENTORSHIPS

Mentee, Algorithmic Game Theory Workshop (AGT), Economics and Computation *2022*
- *(mentor: H. Zhang, PhD), paper dissection and Ask me Anything session*

Mentee, MD4SG Mentorship Program, with J. Finocchiaro, PhD (1 of 3) *2022-2023*

MERIT-BASED MENTORSHIPS / RESEARCH MENTORSHIPS

Mentee, AiC Connectors Program with Facebook, with S. Lim, PhD *2022*
Mentee, BlackComputeHer Fellowship, with Y. Rankin, PhD, A. Robinson, M.Ed *2022*
Mentee, Microsoft's Tech Resilience (mentors: O. Kroshkina, M. Ward) *2022*
Mentee, Google's CS Research Mentorship Program (CSRMP) with A. Lees, PhD *2021*
Mentee, AiC Connectors Program with Facebook with O. Dalleleau, PhD *2021*
Mentee, She256 Blockchain Group with P. Mishra, PhD *2021*
Mentee, Women in Privacy and Security (WISP), D. Sharma, PhD *2021*
Mentee, Algorithmic Game Theory (AGT), Economics and Computation Conference *2020*
- *Global Outreach Mentorship with S. Gupta, PhD (EC 2020)*

Mentee, LatinX in AI Research Workshop Mentorship, C. White, PhD (NeurIPS 2021) *2021*
Mentee, LatinX in AI Research Workshop Mentorship with J. Barajas, PhD (ICML 2020) *2020*
Mentee, Mentored by Amal Ahmed, PhD, *2020-present*
- *ICFP 2020, ACM SIGPLAN-Mentorship, organized by T. Ringer*

Mentee, Lighthouse3 AI Ethics Mentoring Externship with F. McEvoy (1 of 20 chosen) *2020*
Mentee, Code2040 Fellowship with Ben Waber, PhD *2020*

ACADEMIC REVIEWER

Reviewer, Springer AI and Ethics Journal *2020 - present*
Reviewer, AAAI 2023 Workshop on Privacy Preserving Artificial Intelligence (PPAI) *2022*
Reviewer, PML4DC (Practical Machine Learning for Developing Countries), ICLR *2021- 2022*
Reviewer, Algorithmic Fairness through the Lens of Causality and Privacy *2022*
- *Extended Abstract and Paper Track*

Reviewer, BlackAIR Summer Research Grant Program *2021*
Reviewer, ICLR Distributed and Private Machine Learning workshop (DPML) *2021*
Committee Reviewer, HCI Track, GHC (Grace Hopper Conference) *2021*
Reviewer for AFCR workshop at NeurIPS (Fairness, Accountability, Robustness) *2021*
Reviewer for AFCI workshop at NeurIPS (Fairness and Accountability) *2020*
Reviewer for Black in AI at NeurIPS workshop *2020-2022*
Reviewer and Programme Committee Member, LXAI@ICML Workshop *2020*
Committee Reviewer, HCI Track, GHC (Grace Hopper Conference) *2020*
Chair Reviewer, PML4DC (Practical ML for Developing Countries) workshop, ICLR *2020*
Reviewer, Tapia Conference (Panels and Workshops) *2020 - 2022*
Reviewer, Travel Grant Applications, Black in AI for AAAI *2020*

ACADEMIC JOURNALS (AI/Machine Learning)

Board Member, AI and Ethics, Springer *2020*

REVIEWER (NON-ACADEMIC PEDAGOGICAL)

Published Book, "Effective Haskell" by R. Skinner *2022*
Medium Post, "Pure Print Style Debugging in Haskell" by R. Skinner *2022*

RESEARCH PhD INVITATIONS (ABRIDGED)

Participant, WIN6, "Machine Learning and Arithmetic" (mentors: K. Lauter, R. Newton) *2023*
- *Research in Arithmetic Statistics and Machine Learning at BIRS (Banff, Canada)*

RESEARCH PhD INVITATIONS (ABRIDGED)

Participant, IPAM "Machine Assisted Proofs" (Feb 13-17), (Los Angeles, California) *2023*
- *Formal methods at the intersection of Pure Mathematics and Computer Science*

Participant, Doctoral Consortium at ACM Richard Tapia Conference (Washington, D.C.) *2022*
Invited Participant, Doctoral Consortium at ACM EAAMO Conference (via travel award) *2022*
Participant,1st Roots of Unity Summer School: Arithmetic Geometry group (fully-funded) *2022*
(focus on Arithmetic Geometry and Arithmetic Statistics with six PhD students; also
Invited to proceeding AWM Research Symposium at University of Minnesota (UMN))
Invited Participant, IAS/ Park City Mathematics Institute (PCMI) *2022*
Graduate Summer School, Computational Number Theory (fully-funded: declined offer)
Virtual Participant, Preliminary Arizona Winter School: Heights and Model Theory *2022*
- *"Introduction to Model Theory with Applications" with R. Nagloo*

Virtual Participant, 16th International Symposium on Orthogonal Polynomials, *2022*
Special Functions and Applications
Virtual Participant, Random : The Conference on Randomization and Computation *2022*
Virtual Participant, BIRS, Algebraic Methods in Coding Theory and Communication *2022*
Virtual Participant, COGENT: Cohomology, Geometry and Explicit Number Theory *2022*
Virtual Participant, Stinson66: New Advances in Designs, Codes and Cryptography *2022*
Virtual Attendee, Recent Advances on Total Search Problems *2022*
Virtual Participant, Arizona Winter School *2022*
- *Automorphic Forms beyond GL2: Unitary Groups Study Group (mentor E. Eischen)*

Virtual Participant, West Coast Number Theory (WCNT): Problems in Number Theory *2021*
Virtual Participant, Doctoral Consortium at ACM FAccT Conference *2021*
Participant, Community-Driven Cryptography Seminar (Brown / John Hopkins) *2021-present*
Participant, GREPSEC V: *2021*
- *(Graduate Students in Privacy and Security Early Career Workshop)*

Participant, Isogeny-Based Cryptography Winter School *2021*
Participant, Post-Quantum Networks Workshop *2021*
Participant, PRIMA Summer School *2021*
- *Rational curves and moduli spaces in arithmetic geometry*

Initiative for Cryptocurrencies and Contracts (IC3) Blockchain Bootcamp *2021*
- *Worked on group project : Fairness consensus for Miner Extractable Value (MEVs)*
- *Implemented Aequitas protocol from paper with authors for fairness simulation*
- *One of top four winning teams chosen*

The Alan Turing Institute:
- *Invited Participant,"Threats and Opportunities for AI in Cybersecurity"* *2021*
- *Invited Participant,"Society-centric approaches to AI challenges in* *2021*

Participant, Scottish Programming Languages and Verification School *2021*
Invited Participant,"Key themes for informing a Research Roadmap", *2021*
Alan Turing Institute, Invited Participant, "Environmental Enables for AI challenges in" *2021*
Simons Institute, Average-Case Complexity: From Cryptography to Statistical Learning *2021*
Simons Institute, Optimization Under Symmetry *2021*
Simons Institute, Innovations in Theoretical Computer Science (ITCS) *2021*
Simons Institute, Geometric Methods in Optimization and Sampling Bootcamp *2021*

RESEARCH PhD INVITATIONS (ABRIDGED)

Participant, Self Organizing Conference on Machine Learning (SOCML) *2021*
- *Machine Learning, and Privacy session, Moderated by U. Erlingsson* *2021*
- *organized by I. Goodfellow (1 of 9 chosen)*

MERIT-BASED GRANTS / FELLOWSHIPS / SCHOLARSHIPS (ABRIDGED)

(Privacy Engineering Practice and Respect) PEPR Grant, S&P Oakland *2022*
Fellow, BlackComputeHER (2022-2023) (1 of 11) *2022*
Scholarship winner (to attend Richard Tapia Celebration of Diversity in Computing) *2022*
- *(registration, flight, hotel costs, Washington D.C. courtesy BNY Mellon)*

Google Grace Hopper Conference (GHC) Scholarship *2021*
WISP & Black Hat USA Briefings Scholarship (1 of 25) *2021*
Kernel Fellowship Block III via Gitcoin (Security: Zero Knowledge Proofs project) *2021*
Gitcoin Scholarship for Women (for Kernel Fellowship Block III) *2021*
She256 Mentorship focused on ZK Snarks (6 months) *2021*
USENIX Security Conference 2021 (via USENIX Diversity Grant via GREPSEC V) *2021*
TechX Social Impact / Harvard Franklin Fellowship (1 of 12) *2020*
USENIX Enigma Grant *2021*
NCAS Workshop participant (NASA Community College Aerospace Scholars) *2016*
Who's Who/ Peggy Williams Memorial Scholarship/ Best BFA Award (Best of Major) *2008*

OTHER GRANTS/ FELLOWSHIPS (ABRIDGED)

Northeast Combinatorics, Discrete Maths Day (lodging) *2022*
Upstate Number Theory Conference 2021 (lodging provided) *2021*
IEEE Symposium on Security and Privacy (student travel grant, complimentary ticket) *2021*
4th Annual ZK-Proof Workshop (complimentary ticket) *2021*
WISP Privacy+Security Conference *2021*
- *EU Data Law / De-Identification Workshop (Scholarship via WISP)*

ICERM (Brown University) Variable Precision in Mathematical & Scientific Thinking *2020*
RWC2020 (Real World Crypto: registration, flight, lodging) Grant via IACR *2020*
Sage-Days-104 : To work on SageMath Software: Arithmetic Dynamics *2019*
Simons Institute (Berkeley) Error-Correcting Codes and High-Dimensional Expansion Boot Camp (attendee) *2019*
ICERM (Brown University) Encrypted Search Workshop Grant (Lodging provided) *2019*
Cornell Number Theory Conference Grant (Lodging provided) *2019*
MSRI (Mathematical Sciences Research Institute) Grants to attend:
Optimal Transport and applications to machine learning and statistics *2020*
Connections for Women: *2019*
- *Derived Algebraic Geometry, Birational Geometry and Moduli Spaces workshop*
- *Introductory Workshop: Derived Algebraic Geometry and Birational Geometry And Moduli Spaces*

Racket Summer School (National Science Foundation Grant) *2018-2019*
PLMW (Programming Languages Mentorship Workshop) *2018*
ICFP (International Conference Functional Programming)
PLMW(Programming Languages Mentorship Workshop) *2018*
PLDI (Programming Languages Design and Implementation)

OTHER GRANTS/ FELLOWSHIPS (ABRIDGED)

OPLSS (Oregon Programming Languages Summer School Grant) - declined offer *2018*

ACADEMIC SERVICE (ABRIDGED)

Co-Organizer, Co-submitting Summer Workshop, ICLR (with T. Burns, R. Liu) *2022*
Co-Organizer, Tiny Papers Track, ICLR (with T. Burns, R. Liu) (Kigali,Rwanda) *2023*
ICLR Program Committee, ICLR DEI Committee (with R. Liu) *2022, 2023*
Panelist, Google CSRMP (Computer Science Research Mentorship Program) *2022*
Panelist, PhD recruiting event (included multiple schools, sponsored by CodePath) *2020*
Student Volunteer, ICFP (International Conference Functional Programming) *2020*
Student volunteer, ICFP (International Conference Functional Programming) *2018*
Student volunteer, PLDI (Programming Languages Design and Implementation) *2018*
Student volunteer, POPL (Principles of Programming Languages) *2018*
Student volunteer, SPLASH (Systems, Programming, Languages, and Applications) (declined offer)

INDUSTRY PhD INVITATIONS (ABRIDGED)

Participant, Meta's Uniting Scholars in Research (Menlo Park, Palo Alto) (1 of 35) *2022*
Virtual Participant, Jane Street's Preview Program, The Game Show / Trading Games *2022*
Virtual Participant, Adobe's Experience Day:Research Track (Emerging Devices)(1 of 35) *2022*
Virtual Participant, Unity Technologies, "Celebrating Creators of Color" *2022*
Virtual Participant, Palo Alto Networks, "Rock Your Resume" event *2022*
Virtual Participant, BNY Mellon, "Bots & Blind Spots: Biases in Machine Learning" *2022*
Virtual Participant, JP Morgan Chase & Co. Advancing Hispanic & Latinos Summit *2022*
Virtual Participant, Asana, AsanaLaunch Interview Prep Series (1 of 50) *2022*
Virtual Participant, Scale AI Machine Learning event (1 of 40) *2022*
Participant, JP Morgan, Advancing Black Pathways in AI & Quant Modelling Summit *2021*
Participant, Facebook, Amplified: Above & Beyond Computer Science Program (PhDs) *2021*
Participant, Facebook's Amplified: Virtual Vivid in Research (1 of 30) *2021*
Participant, Galois 1st Summer School on Trustworthy Machine Learning (1 of 35) *2021*
Participant (via CSRMP), Google PhD Fellowship Summit *2021*
Participant, Jane Street PhD Symposium (New York, remote) (Quant Research) *2021*
Participant, JP Morgan, Advancing Black Pathways in Data Science *2021*
Participant, TwoSigma Mock Interview Day for Early Career Women (Quant Research) *2021*
Participant, Hudson River Trading (HRT) Systems Engineering Tech Talks (1 of 14) *2021*
Participant, Adobe, "The Future of Creativity" (Virtual) *2020*
Participant, Microsoft Research, Frontiers in Machine Learning (Redmond, remote) *2020*
Participant, Discover Bloomberg: Women in Engineering event (New York, remote) *2020*
Participant, Twitter PhD ML Flock Event (New York, Boston office) *2019*

GRADUATE SCHOOL INTERNSHIPS

***JP Morgan,** Quantitative AI Research, Summer Associate (New York) (1 of 10)* *2022*

- *JP Morgan Research Workshop Publication contribution (mentors: S. Mishra PhD, D. Ley, A. Anzagira, E. Albini, D. Magazzeni, PhD)*

***Summer of Bitcoin**, PhD Research intern (mentor: R. Pickhardt)* *2022*

- *Modelling congestion games for Simulating Price of Anarchy Selfish Routing to show the Boundary of Channel Depletion in the Bitcoin Lightning Network*

GRADUATE SCHOOL INTERNSHIPS

***Microsoft Research**, Independent Contractor, Summer 2021 (New York: remote)* *2021*

- *Reinforcement Learning Distributed pipeline project for Vowpal estimators library*

***Microsoft,** PhD Intern, Summer 2021 (Redmond: remote)* *2021*

- *Whitepaper: Fair, private and storage-efficient Telemetry Client-side aggregation (mentor: P. Angulo, PhD)*

***Autodesk,** PhD Intern, Summer 2020 (Pier 9, San Francisco: remote)* *2020*

- *Renyi-Differential Privacy prototyping project for Distributed Databases*

RELEVANT WORK / INDUSTRY EXPERIENCE (Pre-Grad school)

***Mercury Banking (Haskell fintech) :** Software Engineering Intern (San Francisco)* *2019*

***Apple, Inc.:** Software Engineering Intern (Sunnyvale)* *2019*

***Google Summer of Code:** Developer for Haskell.org* *2018*

***Mozilla:** Increasing Rust's Reach Developer* *2018*

NON-ACADEMIC SERVICE (ABRIDGED)

Invited Finalist Judge, Technovation, AI for Good *2021*

Participant, Git Contributors Inclusion Summit *2020*

Reviewer, Code2040 Application Essays *2020*

Reviewer, OpenMined Differential Privacy articles *2020*

Judge, DataKind, Data.org, Inclusive Growth and Recovery Challenge *2020*

Google Developer Student Club Lead (for University of Vermont) *2019*

Reviewer, Travel Grant Applications, Clojure Conj (2 rounds) 2017

OTHER (NON-INDUSTRY) TALKS (ABRIDGED)

"Compositional Isogeny Schemes", Tapia Doctoral Consortium (45 minutes) *2022*

"A Journey through Unboundedness of ranks of Elliptic Curves", (15 minute talk) *2022*
Roots of Unity Workshop (joint talk with O. Del Guercio and M. Bustos Gonzalez)

Brown University, Fair February talk on Security, Privacy, Fairness (30 minutes) *2022*

Meetup "Math for Math's Sake", Virtual Lightning Talk (10-15 minutes) *2022*
"Isogenies, Elliptic Curves and Random Walks on Random Graphs

"Composable Forgetful Isogenies", Google CSRMP Research Alumni Talk (30 minutes) *2022*

"Price of Anarchy in Selfish Routing", Google CSRMP Research Alumni Talk (30 minutes) *2022*

CS Research Day, "Price of Anarchy in Selfish Routing", UVM (16 min) *2022*

ICLR, Main Conference, Opening Remarks by DEI Chairs *2022*

- *"Broadening Participation in Research Initiative" (with R. Liu) (5-10 minutes)*

"Composable Forgetful Isogeny Graph Cryptography", Google CSRMP Research *2021*

"Isogeny Graph Cryptography",School for Poetic Computation, Re-learning to love Maths *2021*

"Isogeny Graph Cryptography", School for Poetic Computation,"Learning to Love Maths" *2021*

Invited Panelist, Peer-connected Undergraduate Research Exploration in Computer and Information Science and Engineering (PRE.CISE) *2021*

University of Vermont, CIS196, Privacy Law Research Talk *2021*

PLAID Lab speaker, "What Scientists can learn from Artists" *2020*

PLAID Lab Speaker, "Information Theory: from Spacecraft to Blockchain" *2021*

CS Crew Project talk : contributing to Maths software (CodeWorld, SageMaths) *2019*

INDUSTRY TALKS (ABRIDGED)

"Isogeny-Based Cryptography", JP Morgan AI Research Cryptography Group (1 hour) 2022
"Prediction Sensitivity:Continual Audit of Counterfactual Fairness in Deployed Classifiers"2022
- *Basis.AI Invited Talk (20 minutes) (New York, NY)*

JP Morgan AI Research Weekly Technical Meeting, (New York) (20 min) 2022
JP Morgan AI Research Reading Group Meeting (30 min) 2022
JP Morgan Summer Symposium (10 min) 2022
Women Who Code: SageMath: "Computational (Pure) Mathematics/Graph Theory" 2022
- *Lightning Talk (2-4 min)*

"Prediction Sensitivity for Fairness in AI", Jane Street Symposium (15 minutes) 2021
"Renyi-Differential Privacy", Autodesk UX Group (20 minutes) 2020

CLASSES (PhD)

Doctoral Research with advisors C. Vincent and J. Near 2021-present
Combinatorial Graph Theory taught by P. Rombach (Fall 2022) 2022
Graduate Combinatorics (Spectral Graph Theory) taught by P. Rombach (Fall)
Independent Study: Category Theory taught by A. Patania (Fall)
Random Probabilistic Graphs, taught by P. Rombach (Spring 2022)
Abstract Algebra IV A: (Ring & Module Theory, Category Theory) taught by T. Dupuy (Fall)
Abstract Algebra IV C: (Elliptic Curves & Modular Forms), taught by C. Vincent (Spring)
Abstract Algebra I taught by P. Rombach (Commutative Group theory) (Fall 2021) 2021
Abstract Algebra III taught by C. Vincent : (Fields, Rings, Galois Theory) (Fall)
(Post-quantum) Mathematical Cryptography, taught by C. Vincent (Spring 2021)
Privacy, Law and Policy, taught by R. Kriger (Spring) 2021
Secure Distributed Computation; taught by J. Near using Python (Fall) 2020
Machine Learning; taught by S. Wshah using Python (Spring) 2020
Doctoral Research with advisors J. Near and D. Darais (Spring, Fall) 2019-2020
Data Privacy; taught by J. Near using Python (Fall) 2019
Software Verification; taught by D. Darais using Agda (Fall) 2019
Computer Human Interaction; taught by J. Bongard (Fall) 2019

CLASSES (AUDIT)

UVM: Topology (Point-Set Topology) taught by C. Vincent (Fall) 2022
Theory of Algebraic Differential Equations (Differential Geometry, Lie Algebra), taught by T. Dupuy (Fall)
UVM Elementary Number Theory taught by C. Vincent (Spring)
Fundamentals of Mathematics taught by T. Dupuy : (writing proofs) (Spring)
Extremal Graph Theory taught by P. Rombach 2021
Preliminary Arizona Winter School, Model Theory and Applications, taught by R. Nagloo 2022-2023
Stanford: EE 374 : Internet-Scale Consensus in the Blockchain Era (Spring) 2021
- *Information Theory class focused on scalability and protocols in Blockchain*
- *Taught by D. Tse, PhD through Stanford University*
- *Audited class, scribed for Lecture 11, Spring 2021*

CLASSES: OTHER

Arizona Winter School : Intro to Model Theory and Applications (led by R. Nagloo) *2022*
UVM: Book club studying HDX and Expander Graphs (with Pure Maths students) *2022-2023*
Self-study: Matroids, Polytopes 2022-2023

HACKATHONS

R Data Hackathon 2021, First Place, "Cast and Gender Roles in Movie Data" *2021*
- *Our group won First place at the R Data Hackathon 2021 for Best Visualization*

Initiative for Cryptocurrencies and Contracts (IC3) Blockchain Bootcamp *2021*
- *Worked on group project : Fairness consensus for Miner Extractable Value (MEVs)*
- *Implemented Aequitas protocol from paper with authors for fairness simulation*
- *One of top four winning teams chosen*

Skills: Python, Sage, Haskell, LaTeX, Matlab, (learning Rust and R), Jupyter, SQL, AWS, PySpark, Sparklyr, Maplesoft, Tensorflow, Git, writing proofs.

PRESS (SELECTED)

Publication Featured in Montreal AI Ethics Institute (MAIEI) newsletter 2022
Publication work Featured in BitMEX Research blog 2022
Also featured / interviewed in articles / media by Coursera, NASA-JPL, Google, Udacity, The MacArthur Foundation, Venture Beat, The Data Standard, Corecursive Podcast, OpenMined,Career Girls, Dataiku, Scott Hanselman's Podcast, BlackComputeHer, NASA Tech Briefs (40th anniversary), Variety, ACM SPLASH 2022 PLMW Perspectives, the Los Angeles Times, Black Girls Code colouring book on Women Scientists, etc. 2016-present

GUEST WRITER (SELECTED)

Blogpost, ***Summer of Bitcoin*** (joint with S. Alscher) (Lightning Network routing) 2022
Blog posts, **Harvard Tech X Social Impact Fellowship** (3 articles) 2022

ACADEMIC ASSOCIATION FOR COMPUTING MACHINERY (ACM) MEMBERSHIPS

Student Member, International Association of Cryptologic Research (IACR) *2020-present*
SIGecom Special Interest Group on Economics and Computation *2020-present*

NON-ACADEMIC MEMBERSHIP

Student Member, IEEE Computer Society Technical Committee on Security and Privacy *2021-present*
Member, Women in Number Theory *2018-present*
Member, QVNTS (Quebec-Vermont Number Theory Seminar) *2021-present*
Member, Women in Combinatorics *2021-present*
Member, Association for Women in Mathematics *2021-present*
Member, She256 *2021-present*
Member, Women in Security and Privacy (WISP) *2020-present*
Member, IEEE Information Theory Society, Santa Clara Valley Chapter *2016-present*