Krystal Maughan

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*Research Interests: Mathematical Cryptography, Elliptic Curves,
Random Processes, Computational Number Theory (Arithmetic Geometry), Coding Theory
(Error-Correcting Codes), Algebraic Graph Theory, Quantum Algorithms, Quantum Resource Estimation*

University of Vermont, PhD student   ***2019-present***

Computer Science PhD student, minor in Pure Mathematics

(PhD) classes: *Mathematical (Post-Quantum) Cryptography, Elliptic Curves and Modular Forms, Combinatorial Graph Theory, Spectral Graph Theory, Category Theory, Random Probabilistic Graphs, Secure and Distributed Computation, Abstract Algebra I (Groups), III (Rings/Fields/Galois Theory), IV (Category Theory, Lie Algebra), Privacy Law and Policy, Machine Learning, Data Privacy, Software Verification, Computer Human Interaction.*

Oral Qualification Exams in: *(1) Quantum Computing, Quantum Algorithms and Classical Mathematical Cryptanalysis, (2) Elliptic Curves (3) Combinatorial Graph Theory*

RESEARCH EXPERIENCE:

Research Assistant (Vermont)   ***2021-present***

PhD Supervisors: C. Vincent, J. Near: Research on Isogeny-Based Cryptography

- *Mathematical Cryptography Research*

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

Working Preprints (Computational Number Theory):

- ❖ *Computational Number Theory research to be published in:*   2023-present
  Women in Numbers VI (2024) : Research Directions in Number Theory
  (Srivastava M., Li C., **Maughan K.**, Lauter K., PhD, PhD, Newton R.)

Preprints (Data Privacy and Security):

- ❖ *"Improving Utility for Analysis of Correlated Columns using Pufferfish Privacy"*   2022
  (***Maughan, K.*** *and Near, J.*)

Workshop Conference Posters (Cryptanalysis / Computational Number Theory):

- ❖ *"Compositional Isogeny Schemes"- poster presented,* ***CrossFyre at Eurocrypt***   2023
  *Poster for workshop on Provably Robust Schemes (***Maughan, K***)*
- ❖ *"Compositional Isogeny Schemes"- presented as poster at* ***ACM Richard Tapia***   2022
  *Poster Competition at Conference (***Maughan, K***)*

Collaboration on Other Research Projects in Progress:

- ❖ ***Research Project on (Cryptanalysis / Number Theory)***
  Mathematical Cryptography: Work on Compositional Isogeny Schemes (ongoing) 2022-present
  *(PI: C. Vincent, **Maughan, K.**)*

Collaboration on Other Research Projects in Progress:

- ❖ ***Research Project (Number Theory / Cryptanalysis)***   2023-present
  Error-correcting codes / LDPC using group algebras
  (PI: Chimal-Dzul, H., Hoffer W., **Maughan, K.**, Maya N.A., W., Morris K.)
- ❖ ***Research Project (Number Theory / Graph Theory / Cryptanalysis)***   *2023-present*
  Expander properties of Isogenies
  (Arpin, S., Bowen R., Clements J., Codogni G., Eisenträger K., Ghantous W., Bo Lau J.,
  LeGrow J., Macula J., Mahaney W., **Maughan. K**., *Morrison T., Orvis E., Rickards J.,*
  Sabitova M., Scullard G., Zobernig L.)
- ❖ ***Research Project (Algebraic Graph Theory)***   2023-present
  Asymmetric Graph Colouring and Entropy for Isomorphic Testing Properties
  (***Maughan K.,*** *PI: Rombach, P.*)
- ❖ ***Research Project (Computational Number Theory)***   *2023-present*
  Isogeny-Based Cryptography research
  *(**Maughan K.,** PI: Vincent C.)*
- ❖ ***Research Project (Quantum)***   *2023-present*
  Quantum Backtracking implementation for constraint satisfaction problems (CSP)
  (Jhunjhunwala V., Liu D., **Maughan K.**, *Xia Z, PI: Garcell E., PhD)*
- ❖ ***Research Project (Formal Methods, Cryptanalysis)***   *2023-present*
  Formal Methods project (Baldasty S., Jafri S., **Maughan K.**, *PIs: Near J., Vincent C.)*
- ❖ ***Research Project*** (Machine Learning)   2023-present
  Independent research project
  (*PI: Lees A., PhD,* **K. Maughan**)
- ❖ ***Research Project (Selfish Routing)***
  Summer of Bitcoin (Virtual) "Price of Anarchy in Selfish Routing on the   *2022*
  Lightning Network" (R. Pickhardt, S. Alscher, **K. Maughan**)

Preprints (Machine Learning):

- ❖ *Prediction Sensitivity: Continual Audit of Counterfactual Fairness in*   *2022*
  *Deployed Classifiers (**Maughan, K.,** Ngong, I., Near, J.)*
  *(presented as poster at **EAAMO Doctoral Consortium**)*
- ❖ *"Towards a Measure of Individual Fairness for Deep Learning"*   *2020*
  *(**Maughan, K.** and Near, J.) - presented as poster for **MD4SG***
- ❖ *"Towards Auditability for Fairness in Deep Learning"*   *2020*
  (Ngong, I., **Maughan, K.** *and Near, J.)- presented as poster for **AFCI at NeurIPS***

Workshop Posters (Machine Learning):

- ❖ *"Archipelago Penseé"*   *2020*
  *(**Maughan, K.**) - presented as a poster for Resistance AI (**RAIS) at NeurIPS***

Whitepapers (Data Privacy and Security):

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

TEACHING EXPERIENCE

- ❖ ***PhD Teaching Fellow***, *iSchool Inclusion Institute (i3), "Computational Thinking"*   2023
- - *1 of 2 PhD applicants chosen to design and teach curriculum for 10-day*
  Summer course at the University of Texas at Austin (with S. Stueve, co-teaching fellow)
- - *Provided salary and funded with accommodation, flight and stipend for supplies.*

TEACHING EXPERIENCE

- ❖ **Guest Lecturer**, *"Privacy Law and Policy", University of Vermont (UVM)*   *2021*
  - *Presented research work on Impacts of Data Leakage and Data Privacy*
- ❖ **Graduate Teaching Assistant**, *University of Vermont (Fall / Spring)*   *2019-2020*
  Compiler Construction (with Haskell), Programming for Engineers (with Matlab),
  Data Privacy (Differential Privacy, K-anonymity, Machine Learning with Python),
  Advanced Web Design (Lead Teaching Assistant)

GRANT WRITING / PROPOSALS (SELECTED)

- ❖ *NSF ITEST Proposal (with several collaborators)*   *2023*
- ❖ *Zaiku Quantum Micro Grant Proposal*   *2023*
- ❖ *Summer of Bitcoin, "Price of Anarchy in Selfish Routing On the Lightning*   *2022*
  Network" (Research proposal with 0.4% acceptance rate, Awarded $3,000)
- ❖ *COST Action Proposal OC-2021-1-25315 "Mathematics and Algorithmics of*   *2021*
  Group actions and Isogenies for Cryptography" (Secondary Proposer)
- ❖ *Microsoft Research, Reinforcement Learning Open Source Festival Proposal*   *2021*
  (Awarded $10,000)
- ❖ *Google Summer of Code, Proposal to Haskell.org*   *2018*
  (Awarded $6,000)
- ❖ *Helium Grant, (for exploring questions on the edge of mainstream thinking)*   *2018*
  (1 of 11 chosen out of 700 applicants; Awarded $1,000)

RESEARCH AWARDS (SELECTED)

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*

ACADEMIC REVIEWER (SELECTED)

AAAI-24 Workshop on Privacy-Preserving Artificial Intelligence (2024), Safe and Trustworthy AI (STAI) at International Conference on Logic Programming 2023 (ICLP),
Algorithmic Fairness through the Lens of Time at NeurIPS 2023 (AFT), AAAI 2023 Workshop on Privacy Preserving Artificial Intelligence (PPAI), PML4DC (Practical Machine Learning for Developing Countries), ICLR / NeurIPS: Algorithmic Fairness through the Lens of Causality and Privacy, ICLR Distributed and Private Machine Learning (DPML), Tiny Papers Workshop at ICLR 2023, Black in AI Workshop @ NeurIPS (2020-present)

REVIEWER (OTHER)

Effective Haskell, by R. Skinner, Springer's AI Ethics Journal

RESEARCH PhD INVITATIONS (ABRIDGED)

Virtual Participant, Summer of Quantum, Laboratory for Physical Sciences (LPS) (2 wks) 2023
- *Qubit fundamentals, hardware, Quantum Algorithms, error-correcting codes*

Participant, WIN6, (mentors: Lauter K., Newton R.)   *2023*
- *Research project at BIRS, to be published in 10th WIN proceedings 2024 (Banff, Canada)*
- *Received award for lodging, travel (~1 of 42) (March 26th to March 31st)*

RESEARCH PhD INVITATIONS (ABRIDGED)

Participant, BIRS, Isogeny-based cryptography Banff research workshop   *2023*
- *Co-organized by de Quehen, Petit C. and Martindale C.*

Participant, SQuInT Chemistry Fellowship (to attend Southwest Quantum Information   *2023*

Invited Participant, 2023 Fields Medal Student Symposium, Birkar C., (Virtual)   *2023*

Participant, Quantum Workshop at North Carolina State (Nov 18-19)   *2023*

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

(organized by E. Abraham, J. Avigad, J. Ellenberg, M. Heule, T. Tao, K. Buzzard, T. Gowers)

Participant, PCMI Graduate Summer School (1 of 50),"Quantum Computation"(3 weeks) 2023
- *Awarded full funding (housing, registration, flight) (July 16-August 5th)*
- *Coursework on: Quantum and quantum-inspired linear algebra,*
- *Quantum fourier transforms and quantum information theory, LDPC codes*
- *Topological aspects of quantum codes, quantum hamiltonian complexity*
- *Quantum learning theory*

Participant, Rethinking Number Theory (4th edition)   *2023*
- *Collaborative research in Number Theory (June 12th to 23rd and beyond)*
- *Organized by A. Serrano López, M. West, H. Goodson*

Participant, Twelfth Summer School on Formal Techniques + FMiTF Bootcamp   *2023*
- *Received admission, housing and funding for flight*
- *Labs using Vampire Theorem Prover, Alloy, TPTP, PVS, Easycrypt*
- *Guest lecture on Paxos by L. Lamport (May 23rd to June 2nd) (Menlo College, Atherton)*

Participant, ICERM's LMFDB, Computation and Number Theory (LuCaNT) workshop   *2023*
- *(Provided housing, registration)*

Invited Participant, Lorentz Center, "Machine-Checked Proofs", Leiden, the Netherlands 2023
- *Lean Workshop, Funding (provided housing, funding for travel)*

Invited Participant, High Assurance Crypto Software (HACS) (Tokyo, Japan)   *2023*
- *(Post-quantum) cryptographic verification workshop (conflicted with WIN6)*

Invited Participant, CrossFyre at Eurocrypt (Lyon, France)   *2023*
- *Cryptography, Robustness and Provably Secure Schemes for Female Young Researchers: presented research poster*
  (Received funding for accommodation, registration and flight courtesy of PQ-Shield)

Participant, Arizona Winter School, "Point Counting and Applications" (J. Pila)   *2023*
- *Applications of Point-counting for algebraic points of bounded degree (Tucson, AZ)*

Virtual Participant, "Algebraic Cycles, L-Values, and Euler Systems": MSRI   *2023*
- *Originally granted registration but opted for virtual attendance*

Virtual Participant, Research Institute for Mathematical Sciences (RIMS)   *2023*
- *Zeta functions and their representations*

Participant, 1st Roots of Unity reunion, American Institute of Mathematics, Pasadena CA 2023

Participant, Doctoral Consortium at ACM Richard Tapia Conference (Washington, D.C.) 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*

Invited to proceeding AWM Research Symposium at University of Minnesota (UMN))   *2022*

Invited Participant, IAS/ Park City Mathematics Institute (PCMI)   *2022*
- *Graduate Summer School, Computational Number Theory (fully-funded: declined offer)*

RESEARCH PhD INVITATIONS (ABRIDGED)

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 Participant, Arizona Winter School, Southwest Arithmetic Geometry Center	2022

- *Automorphic Forms beyond GL2: Unitary Groups Study Group (mentor E. Eischen)*

Virtual Participant, West Coast Number Theory (WCNT): Problems in Number Theory	2021
Selected Participant, GREPSEC VI (1 of 42)	2023
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*

MERIT-BASED GRANTS / FELLOWSHIPS / SCHOLARSHIPS (ABRIDGED)

Fellow, SQuInT Chemistry Fellowship (to attend Southwest Quantum Information And Technology (SQuInT) (flight, housing and registration covered) (1 of 5)	2023
Fellow, Institute for Logic and Data Science (ILDS) Coq and Lean Autumn School	2023

- *Part of the Working Formal Methods Symposium (Bucharest, Romania)*

SOUPS 2023 Grant for Black Computer Science Students (USENIX 2023)	2023
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*

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)*	
(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

OTHER GRANTS/ FELLOWSHIPS (ABRIDGED)

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
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

OTHER GRANTS/ FELLOWSHIPS (ABRIDGED)

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
PL+HCI Swimmer Summer School (on Programming Languages and Usability)	2020
Sage-Days-104 : To work on SageMath Software: Arithmetic Dynamics	2019
Simons Institute (Berkeley) Error-Correcting Codes and High-Dimensional	2019
Expansion Boot Camp (attendee)	
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)	
OPLSS (Oregon Programming Languages Summer School Grant) - declined offer	2018

INSTITUTIONAL PROSPECTIVE FACULTY PhD INVITATIONS

❖ Invited Participant, Rochester Institute of Technology: RIT Pathways to RIT (Pathways from PhD to Faculty programme)	2023
❖ Invited Participant, Rochester Institute of Technology: Pathways to RIT Computing edition	2023

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
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, TwoSigma Mock Interview Day for Early Career Women (Quant Research)	2021
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
Summer of Bitcoin, Blockchain (Lightning Network) PhD Research intern (remote)	2022

GRADUATE SCHOOL INTERNSHIPS

Microsoft Research, *Independent Contractor, Summer 2021 (New York: remote)*   2021
Microsoft, *PhD Intern, Summer 2021 (Redmond: remote)*   2021
Autodesk, *PhD Intern, Summer 2020 (Pier 9, San Francisco: remote)*   2020

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

OTHER (NON-INDUSTRY) TALKS (ABRIDGED)

Presenter, Google CSRMP, "Quantum backtracking and implications to cryptography"   2023
Number Theory in Quantum, American Institute of Mathematics (AIM),   2023
Roots of Unity Workshop, Caltech (Pasadena, Los Angeles)
"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", Graph Theory and Spectral Graph Theory (15 min) 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
"Composable Forgetful Isogeny Graph Cryptography", Google CSRMP Research   2021
"Isogeny Cryptography",School for Poetic Computation, Re-learning to love Maths   2021
PLAID Lab Speaker, "Information Theory: from Spacecraft to Blockchain"   2021

INDUSTRY TALKS (ABRIDGED)

"Isogeny-Based Cryptography", JP Morgan AI Research Cryptography Group (1 hour)   2022
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

MERIT-BASED MENTORSHIPS / RESEARCH MENTORSHIPS (SELECTED)

Mentee, Black Scholars Doctoral Mentorship   2023
   - *Mentor: K. Clark, PhD.*
Mentee, Institute for African-American Mentoring in Computing Sciences (IAAMCS)   2023
   - *Mentor: J. Gilbert, PhD*
Mentee, LXAI Computer Vision (LXCV) at CVPR (Computer Vision) workshop   2023
   - *Mentor: F. N. Paravecino, PhD (Research collaborations)*

MERIT-BASED MENTORSHIPS / RESEARCH MENTORSHIPS (SELECTED)

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

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, Mentored by A. Ahmed, PhD,   2020-present
- *ICFP 2020, ACM SIGPLAN-Mentorship, organized by T. Ringer*

CLASSES (OTHER)

Audit / Other: *Internet Scale Consensus in the Blockchain Era (Information Theory class at Stanford), Matroids & Polytopes, Theory of Algebraic Differential Equations, Elementary Number Theory, Fundamentals of Mathematics, Extremal Graph Theory, Model Theory and Applications*

CLASSES (AUDIT)

University of Waterloo via Fields Academy, Algebraic Graph Theory and Quantum Computing   2024
- *Quantum walks and Quantum homomorphisms, automorphisms and colouring*

QIndia: Fundamentals of Quantum Operations   2023
- *Amplitude Amplification, Phase Estimation, HHL and Shor's Algorithm*
- *Capstone project on Amplitude Amplification*

Zaiku Group, Software Verification Course (online)   2023
- *Class focused on Quantum Formalism, functional programming and Software verification for Homotopic Minds taught by B. Ahrens, PhD using Lean 3 Final project involved formalising a SAT solver using Lean*

Zaiku Group, Quantum Formalism   2023
- *Mathematical Tools of Quantum Mechanics, taught by E. Ramirez, PhD*
- *Topics Included: Hilbert Spaces, Quantum Mechanics*

Preliminary Arizona Winter School, "Abelian Varieties over Finite Fields", by L. Dembele   2023

Preliminary Arizona Winter School, Model Theory and Applications, taught by R. Nagloo   2022-2023

QWorld QClass 551: Quantum Software Development with Classiq   2023
- *Quantum Algorithm Research Project under mentorship of a Principal Investigator*
- *Requires project written manuscript (1 out of 80 accepted from ~400 applicants)*
- *Received Classiq Bootcamp certificate (10/13/23)*

CLASSES (AUDIT)

QWorld QClass 23/24: Introductory and Intermediate Level Quantum Courses   *2023*
- *Quantum Algorithms with Classiq, Quantum Key Distribution,*
- *Introduction to Quantum Algorithms, Quantum Error Correction,*
- *Quantum Annealing, Topological Quantum Computing, Quantum Games*
- *Classiq Bootcamp (implementation of quantum challenges daily)*
- *Included workshop onTraining on PennyLane and QML by Xanadu (organized by QWorld, in conjunction with the University of Latvia)*

CLASSES (AUDIT)

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*

IBM Qiskit Global Summer School (Quantum Computation using Qiskit)   *2020*

Book Clubs:

Quantum Computing (2022), Quantum Computing and Quantum Information (2022-2023: study group with Mathematicians, Physicists and Computer Scientists), HDX Expander Graphs (2022-2023)

HACKATHON (Quantum)   *2023*
- *Project: "Quantum project using noisy intermediate-scale quantum (NISQ) Devices"*
    - *Work on cryptography for federated quantum models with DNA data.*

Skills: Python, LaTeX, SageMaths, Qiskit, Classiq, Haskell, Matlab, Jupyter, Pytorch, SQL, AWS, Azure, PySpark, Tensorflow, Git, Lean (3; not 4…yet!), writing proofs.
Quantum benchmarking tools: Qualtran, Bench-Q, pyLiqtr, OpenFermion, Pennylane

PRESS (SELECTED)

Publication at Unitary Fund on Quantum Resource Estimation   2024
Publication Featured in Montreal AI Ethics Institute (MAIEI) newsletter   2022
Publication work Featured in BitMEX Research blog   2022
Featured / interviewed in articles / media by Coursera, NASA-JPL, Google, Udacity,   2016-present
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,
Women of Silicon Valley, CareerGirls, The Summer of Bitcoin experience (SBOE), Technovation,
Rewriting the Code, Montreal AI Ethics Institute, etc.

LEADERSHIP and SERVICE (SELECTED)

Co-Workshop Organizer, Tiny Papers Track at ICLR (Vienna, Austria)   2024
DEI Chair, AISTATS (Valencia, Spain)   2024
Student Volunteer, IEEE International Conference on Quantum Computing   2023
And Engineering (QCE)

LEADERSHIP and SERVICE (SELECTED)

(Junior) Program Committee, Safe and Trustworthy AI (STAI) at the International Conference on Logic Programming (ICLP)	2023
Co-Committee / Area Chair, Broadening Participation and Tiny Papers Workshop at International Conference of Learning Representation (ICLR)	2023
Co-Committee, Broadening Participation and Co-Submitting Summer School at International Conference of Learning Representation (ICLR)	2022
Program Committee, BlackAIR Programme	2021
Virtual Co-Organizer, Women in Machine Learning, Black In AI at NeurIPS (NeurIPS)	2020
Virtual Volunteer Chair, Empirical Methods in Natural Language Processing (EMNLP)	2020

LEADERSHIP and SERVICE (SELECTED)

Virtual Student Volunteer, International Conference of Machine Learning (ICML)	2020
Virtual Student Volunteer, International Conference of Functional Programming (ICFP)	2020
Student Volunteer, Programming Languages and Design Conference (PLDI)	2018
Student Volunteer, International Conference of Functional Programming (ICFP)	2018
Invited Student Volunteer, SIGPLAN conference on Systems, Programming, Languages and Applications (SPLASH) (declined offer)	2018
Student Volunteer, Principles of Programming Languages (POPL)	2017

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

Member, Quantum Resource Estimation Group	*2023-present*
Member, Isogeny Research Club	*2023-present*
Member, Women in Cryptography	*2023-present*
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*