Manuel Sabin

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RESEARCH INTERESTS

– Fine-Grained Complexity Theory, Pseudorandomness, Cryptography, Circuit Lower Bounds, and how these all influence each other

– Interrogating the social impact of CS research, such as Algorithmic "Fairness" and Machine Learning's use in the practice of Law, and the implicit values it often embeds

EMPLOYMENT

Postdoctoral Researcher, *COHUBICOL* 2020-2021
Hosted by Mireille Hildebrandt at Radboud University

EDUCATION

PhD UC Berkeley, *Computer Science* 2014-2020
Advised by Shafi Goldwasser and Christos Papadimitriou
Thesis Title: *On the Utility of Fine-Grained Complexity Theory*

BA CSU Sacramento, *Math/Computer Science* 2009-2014
Minor: Statistics
Graduated with Highest Honors

PUBLICATIONS

Learning with Distributional Inverters
with Eric Binnendyk, Marco L. Carmosino, Antonina Kolokolova, and Ramyaa Ramyaa, in submission.

XOR Codes and Sparse Learning Parity with Noise
with Andrej Bogadnov and Prashant Nalini Vasudevan, in SODA 2019.

Proofs of Work from Worst-Case Assumptions
with Marshall Ball, Alon Rosen, and Prashant Nalini Vasudevan, in CRYPTO 2018.

Fine-Grained Derandomization: From Problem-Centric to Resource-Centric Complexity
with Marco L. Carmosino and Russell Impagliazzo, ICALP 2018.

Average-Case Fine-Grained Hardness
with Marshall Ball, Alon Rosen, and Prashant Nalini Vasudevan, STOC 2017.

ORGANIZED WORKSHOPS

Resistance AI Workshop, co-organized for NeurIPS 2020

– Co-organized with members of the Resistance AI collective with the lens of asking "How does AI shift power in the world?"

– Centered Black and Indigenous activists, researchers, and organizers to present and discuss how to shift power back to marginalized communities

Manifesting the Sociotechnical: Experimenting with Methods for Social Context and Social Justice, *with Ezra Goss, Lily Hu, and Stephanie Teeple,* in ACM FAccT* 2020.

– Collaborated with interdisciplinary team to create and run a workshop addressing the many Science and Technology Studies (STS) critiques of Algorithmic Fairness

– Guided Fairness researchers through Community Organizing-inspired power analysis techniques to understand power differentials inherent in the field

PROGRAM COMMITTEE

Beyond Fairness: Towards a Just, Equitable, and Accountable Computer Vision
Workshop organized by Emily Denton and Timnit Gebru, at CVPR 2021.

Resistance AI
Jointly organized workshop at NeurIPS 2020.

ORGANIZING AND ENGAGEMENT

Organizer in the Resistance AI Nework present
- Active member of the Resistance AI network, helping form its principles, public statements, and activities as it has rapidly grown
- Co-organized the Resistance AI workshop for NeurIPS 2020

Prominently Featured in Simons Institute Educational Short Film Summer 2021
- Simons Institute's Theory Shorts: *Until the Sun Engulfs the Earth: Lower Bounds in Computational Complexity*
- Explained Complexity Theory for a general audience is plain English

Presented at Queer in AI Workshop at ICML Fall 2020
- Gave a talk *"Queer" in AI: Moral Injury and Going Beyond Resilience*
- Gave language and commiseration to the experience of being marginalized in academia and tech

AI Policy and Queer Privacy Panel at Queer in AI Workshop at ICML Fall 2020
- Panelist with Kade Crockford and Alex Hanna, moderated by Jevan Hutson

Founded the QTPRES Conference Spring 2020 *(postponed due to COVID-19)*
- Created, secured funding for, and co-organized *QT Presenters: QTPOC Reclaiming Education and Science (QTPRES)* Conference for sharing STEM concepts with the Queer, Trans, and POC (QTPOC) community in the SF Bay Area
- Reframed 'STEM' as 'the type of truth-seeking QTPOC are often excluded from' (in contrast to the truth-seeking of poetry, art, film, music, dance etc)
- New framing curbs STEM insecurities and allows the community to redefine the culture, presentation norms, questions of interest, framing etc from scratch

Skype A Scientist 2017-2020
- Skyped with various on-site and online high school and elementary school classrooms across the US including rural areas and with diverse demographics
- Gave pop intuitions of theoretical CS and explained academic pathways, funding, traveling, and opportunities

EECS Peer at UC Berkeley 2017-2020
- Hold office hours for graduate students in EE and CS as a peer counselor

Volunteered for Empowering Womxn Of Color Conference (EWOCC) Spring 2018
- Was a general volunteer for EWOCC at UC Berkeley, helping this important conference go smoothly
- Learned conference organization skills to later create my QTPRES conference for the Bay Area QTPOC community

Dinner With a Scientist Spring 2018
- Had dinner with groups of 4th and 5th grade Oakland elementary students from underrepresented backgrounds and gave them insight into a career in STEM
- Showed math "magic tricks" to poise math as a creative field that can get weird and interesting in higher education

Mentor in Directed Reading Program at UC Berkeley Fall 2017
- Mentored Berkeley undergraduate Sichao (Jeff) Xu through complexity theory and derandomization literature

Created and Maintained Blog *On The Shoulders Of Windmills* 2015-2016
- Posted on our responsibilities as academics and scientists and on technology through a sociotechnical lens
- Posted on my experiences in graduate school and openly on mental health in academia

Graduate Panelist for the CSU Sacramento SHPE Chapter Conference Fall 2014
- Talked to Latinx undergraduates about the process and opportunities of academia
- Gave information and resources on REUs, fellowships, and application processes

Featured in *Sí Magazine* that features role models for Latinx youths Fall 2014

TEACHING AND OUTREACH

E125: Engineering Ethics and Society Spring 2020
- Worked with Prof. Raluca Scarlat to co-teach ethics in engineeringing through a sociotechnical lens
- Helped direct reading list, co-facilitated class discussions, and graded

Created and Taught Lessons in the Berkeley Math Circle Fall 2018
- Introduced high school and middle school students to the philosophy of complexity theory using Interactive and Zero-Knowledge Proofs as concrete concepts

CS276: Graduate Cryptography, Graduate Student Instructor Fall 2015
- Assisted Alessandro Chiesa, *UC Berkeley*
- Created/taught lessons on Zero-Knowledge Proofs, held office hours, and graded

CS172: Computability and Complexity, Graduate Student Instructor Spring 2015
- Assisted Luca Trevisan, *UC Berkeley*
- Ran discussion sections, held office hours, and graded

Jointly Taught NSF LSAMP Summer Math Program Summer 2014-2015
- Taught incoming CSU Sacramento underrepresented STEM students
- Guided students through problem solving on recreational math problems and calculus problems to reintroduce them to math as a creative and social activity
- Trained in how to "spread thinking around a room"

Project Creator/Leader for UC Berkeley SMASH Academy Summer 2014
- Designed five-week math project for low-income high school STEM students
- Used problem solving of recreational math problems, building to exploring pure math through Symmetry Groups to show math as a creative enterprise

Assisted COSMOS Program with Monica Vazirani, *UC Davis* Summer 2014
- Helped teach Summer program for exceptional high school students for one week
- Gave students problems in basic Abstract Algebra and assisted them

STAT50: Introduction to Probability and Statistics, Teaching Assistant Fall 2012
- Assisted Dr. Coşkun Çetin, *CSU Sacramento*
- Tutored students in Probability and held office hours

Tutor in California State University Sacramento Math Lab 2011-2013
- Tutored diverse undergraduate population in all core math courses

INVITED TALKS

Aalborg University SECURE Workshop May 2021
Participatory Privacy: Towards Returning Power and Autonomy to Communities

Boston University Algorithms and Theory Seminar — October 2020
Discriminatory and Liberatory Algorithms:
Contextualizing and Renaming Algorithmic "Fairness"

Mechanism Design for Social Good Workshop — August 2020
Discussant for Keynote Speaker Stephanie Dinkins

ICML Queer in AI Workshop — July 2020
"Queer" in AI: Moral Injury and Going Beyond Resilience

Resistance AI Network — June 2020
Discriminatory and Liberatory Algorithms:
Contextualizing and Renaming Algorithmic "Fairness"

UC San Diego Theory Seminar — May 2020
Discriminatory and Liberatory Algorithms:
How Do We Define "Fair" Responsibly?

Mechanism Design for Social Good Working Group on Bias — March 2020
Discriminatory and Liberatory Algorithms:
How Do We Define "Fair" Responsibly?

Swarthmore College Computer Science Department — February 2020
Discriminatory and Liberatory Algorithms:
Restructuring Algorithmic "Fairness"

Oberlin College Computer Science Department — January 2020
Discriminatory and Liberatory Algorithms:
Restructuring Algorithmic "Fairness"

MIT Algorithms and Complexity Seminar — November 2019
Discriminatory and Liberatory Algorithms:
Restructuring Algorithmic "Fairness"

Simons Institute Pseudorandomness Reunion — June 2018
Fine-Grained Derandomization

UC San Diego Theory Seminar — June 2018
Fine-Grained Derandomization

MIT Algorithms and Complexity Seminar — April 2018
Fine-Grained Derandomization

UC Berkeley Theory Lunch — February 2018
Fine-Grained Derandomization

Simons Institute Industry Day — March 2017
Proofs of Work from Worst-Case Assumptions

Stanford Theory Lunch — February 2017
Average-Case Fine-Grained Hardness

UC Berkeley Theory Lunch — January 2017
Average-Case Fine-Grained Hardness

Simons Institute Fine-Grained Complexity Reunion — December 2016
Average-Case Fine-Grained Hardness

PARTICIPATED WORKSHOPS

Beyond Fairness: Towards a Just, Equitable, and Accountable Computer Vision — Summer 2021
CVPR 2021

CRYPTIC COMMONS: Transdisciplinary Probes of the Ideal and Real World in Actual Cyber-Physical Systems — Spring 2021
SECURE at Aalborg University

Philosopher's Seminar: Interpretability Issues in Machine Learning — Fall 2020
COHUBICOL

Fairness — Summer 2019
Simons Institute Summer Cluster

Lower Bounds in Computational Complexity — Fall 2018
Simons Institute Semester

Meta-Complexity — July 2018
Oxford Mathematical Institute

Pseudorandomness — Spring 2017
Simons Institute Semester

Winter School on the Sum of Squares Algorithm — January 2017
UC San Diego

Proof Complexity — May 2016
Chebyshev Laboratory at St.Petersburg State University

Fine-Grained Complexity & Algorithm Design — Fall 2015
Simons Institute Semester

Cryptography — Summer 2015
Simons Institute Semester

SAT & Satisfiability Modulo Theories Summer School — July 2015
Stanford University

Randomization in Numerical Linear Algebra — June 2015
Gene Golub SIAM Summer School in Delphi, Greece

INTERNSHIPS

Visiting Researcher, *MIT*, Advised by Ryan Williams — Fall 2019
Visiting Researcher, *UC San Diego*, Advised by Russell Impagliazzo — Summer 2018
Visiting Researcher, *CUHK*, Advised by Andrej Bogdanov — Summer 2017
FACT Center, *IDC Herzliya*, Advised by Alon Rosen — Summer 2016
TRUST REU, *Stanford University*, Advised by Dan Boneh — Summer 2013

HONORS AND AWARDS

NSF Graduate Research Fellowship — Spring 2015
Chancellor's Fellowship (campus-wide), *UC Berkeley* — Spring 2014
Excellence Award, *Department of Computer Science, UC Berkeley* — Spring 2014
Faculty Endowment Scholarship (campus-wide), *CSU Sacramento* — Spring 2014
Commencement Speaker, *CSU Sacramento* — Spring 2014
Roger Leezer Scholarship, *Department of Math, CSU Sacramento* — Fall 2013
Stewart Moredock Scholarship, *Department of Math, CSU Sacramento* — Fall 2013

President of CSUS Chapter of SIAM, *CSU Sacramento* 2012-2013

EXTERNAL REVIEWER Journal of Cryptology (JoC) 2019, CRYPTO 2018, Foundations of Computer Science (FOCS) 2018, Theory of Cryptography Conference (TCC) 2018, Foundations of Computer Science (FOCS) 2017