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

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.

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

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

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

FURTHER OUTREACH 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 upcoming
- 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

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

INVITED TALKS

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

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 *Chebyshev Laboratory at St.Petersburg State University*	May 2016
	Fine-Grained Complexity & Algorithm Design *Simons Institute Semester*	Fall 2015
	Cryptography *Simons Institute Semester*	Summer 2015
	SAT & Satisfiability Modulo Theories Summer School *Stanford University*	July 2015
	Randomization in Numerical Linear Algebra *Gene Golub SIAM Summer School in Delphi, Greece*	June 2015

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