Krystal Maughan

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Research Interests: Differential Privacy, Provable Fairness, Machine Learning

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University of Vermont, PhD candidate   *2019-present*
Differential Privacy, Provable Fairness, Machine Learning
Skills: Python, R, Haskell, LaTeX, Jupyter, SQL, AWS, PySpark, Tensorflow, Pytorch, Git

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

Research Assistant, PLAID Lab (Vermont)   *2020-present*
Supervisors: Joe Near and Swati Gupta: Research on Participatory Fairness

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

Research Intern, Autodesk Summer 2020 (Pier 9, San Francisco: remote)   *2020*
Research Intern for Forge Team, Differential Privacy project

Graduate Writing Consultant, Fall 2020 (Vermont)   *2020-2021*
Writing Mentor and Consultant for graduate students
Technical Writing Consultant for fields as broad as Materials Science to History

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

RELEVANT WORK EXPERIENCE
Mercury: *Software Engineering Intern (San Francisco)*   *2019*
Apple, Inc.: *Software Engineering Intern (Sunnyvale)*   *2019*
Google Summer of Code: *Developer for Haskell.org (remote)*   *2018*
Mozilla: *Increasing Rust's Reach Developer (remote)*   *2018*

PUBLICATIONS:
Peer-Reviewed Workshop Publications:
- ❖ *"Towards a Measure of Individual Fairness for Deep Learning"*   *2020*
  (**Maughan, K.** *and Near, J.) - presented as poster for* **MD4SG 2020**

PUBLICATIONS:
Peer-Reviewed Workshop Publications:

- ❖ *"Towards Audibility for Fairness in Deep Learning"*   *2020*
  *(Ngong, I., **Maughan, K.** and Near, J.)- presented as poster for **AFCI at NeurIPS***
- ❖ *"Archipelago Penseé" (**Maughan, K**.)*   *2020*
  *- presented as a poster: **RAIS at NeurIPS***

INVITED RESEARCH POSTER PRESENTATIONS

- ❖ *"Towards a Measure of Individual Fairness for Deep Learning"* **(first author)**   *2021*
  Mediterranean Machine Learning Summer School (M2L) (Winter cohort)
- ❖ *Poster Presentation, 4th **MD4SGD 2020** Annual Proceedings*   *2020*
  "Towards a Measure of Individual Fairness for Deep Learning" **(first author)**
- ❖ *Poster Presentation, Carnegie Mellon's (CMU) **AI for Social Good Symposium*** *2020*
  "Examining Implicit Bias in Police Data: Lessons Learned about Reproducibility
  And Transparency in AI"
- ❖ *"Towards Audibility for Fairness in Deep Learning"*   *2020*
  *(Ngong, I., **Maughan, K.** and Near, J.)- presented as poster for **AFCI at NeurIPS***
  (Algorithmic Fairness through the lens of Causality and Interpretability)
- ❖ *Poster Presentation for **RAIS at NeurIPS***   *2020*
  (1st Resistance AI Workshop Proceedings,) "Archipelago Penseé" **(first author)**

INVITED RESEARCH TALKS

- ❖ *"Towards a Measure of Individual Fairness for Deep Learning" ;*   *2021*
  Jane Street PhD Symposium
- ❖ *"Towards a Measure of Individual Fairness for Deep Learning" ;*   *2021*
  Amazon Science internal presentation (with advisor Dr. J. Near)
- ❖ *"Creating an end to end participatory data survey pipeline with*   *2020*
  variable constraints" (Data Economies and Governance MD4SG working group)
- ❖ *"Towards a Measure of Individual Fairness for Deep Learning" ;*   *2020*
  Short Presentation given for UVM/CS++ Research Day (20 min talk)
- ❖ *"Personalized Robotic Control using MISL"*   *2019*
  for UVM/CS++ Research Day (20 min talk)

RESEARCH AWARDS

- ❖ *Outstanding Poster Award for Brilliant Idea Category,"Towards a Measure of Auditability in Fairness for Deep Learning", Mediterranean Machine Learning Summer School (2021)*

MERIT-BASED MENTORSHIPS / RESEARCH MENTORSHIPS

Mentee, Global Outreach Mentorship with Dr. Swati Gupta (EC 2020)	*2020*
Mentee, LatinX in AI Research Workshop Mentorship with J. Barajas (ICML 2020)	*2020*
Mentee, Mentored by Amal Ahmed, (ICFP 2020)	*2020*
Mentee, Lighthouse3 AI Ethics Mentoring Externship with F. McEvoy (1 of 20 chosen)	*2020*
Mentee, Code2040 Fellowship with Ben Waber	*2020*

MERIT-BASED GRANTS / SCHOLARSHIPS

TechX Social Impact / Harvard Franklin Fellowship (1 of 12)	*2020*

MERIT-BASED GRANTS / SCHOLARSHIPS

USENIX Enigma Grant	*2021*
Nominee, Microsoft Ada Lovelace Fellowship (1 of 2)	*2020*
Participant, Algorithmic Game Theory Mentoring Workshop (AMW)	*2020*
(co-located with EC 2020)	
WiML ICML Travel Funding Grant (sponsor QuantumBlack)	*2020*
ALife Student Scholarship Recipient (to attend ALife Conference)	*2020*
BRAID Funding to attend Grace Hopper Conference (courtesy of UVM)	*2020*
Udacity's Machine Learning Scholarship for Microsoft Azure	*2020*
NCWIT Change Leader Scholar (1 of 30)	*2020*
NCWIT Collegiate Award Finalist (1 of 85)	*2019*
Code2040 2020 Fellow (1 of 80)	*2019*
WiCyS Student Scholarship (Women in Cybersecurity)	*2019*
Udacity Technology Scholarship (AI track): Intro to Deep Learning with Pytorch	*2019*
Helium Grant (chosen as 1 of 11 out of 700)	*2018*
EaRl Career Scholarship, (R Data Science Scholarship) - declined offer	*2018*
Udacity Bertelsmann Data Science Scholarship - declined offer	*2017*
AT and T Aspire to Tech grant Winner	*2017*
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

Grace Hopper Conference	*2020*
NCWIT/Bloomberg GHC Conference Grant	*2020*
Women of Color in Technology Complimentary Registration	
Financial Aid Grant, SciPy (Scientific Computing with Python)	*2020*
MSRI SACNAS Grant	*2020*
LXAI+BAI@GTC Nvidia Digital DLI Workshop Scholarship Award for DLI workshop	*2020*
"Applications of AI for Anomaly Detection [LDLIW2249] (Deep Learning Institute at GTC)	
ICERM (Brown University) Variable Precision in Mathematical & Scientific Thinking	*2020*
RWC2020 (Real World Crypto: registration, flight, lodging) Grant via IACR	*2020*
CRA-WP Grad Cohort for Women (covers flight, registration, lodging)	*2019*
CRA-WP Grad Cohort for Underrepresented Minorities (flight, registration,lodging)	*2019*
Neurips Conference Travel Grant (includes free registration)	*2019*
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	
NASA L'Space NPWEE Concept Proposal writing programme participant	*2019*

OTHER GRANTS/ FELLOWSHIPS

NASA L'Space Proposal/Review Academy (patentable research proposal for funding)	2019
NASA L'Space Academy (virtual team & mentorship with NASA scientists Level 1)	2019
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

ACADEMIC REVIEWER

Reviewer, Springer AI and Ethics Journal	2020 - present
Reviewer for AFCI workshop at NeurIPS (Fairness and Accountability)	2020
Reviewer for Black in AI at NeurIPS workshop	2020
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
Reviewer, Travel Grant Applications, Black in AI for AAAI	2020
Reviewer, Travel Grant Applications, Clojure Conj (2 rounds)	2017

ACADEMIC SERVICE (AI/Machine Learning)

Black in AI Logistics Co-Chair (NeurIPS)	2020
WiML Senior Program and Mentorship Co-Chair, WiML (NeurIPS)	2020
Committee Member, Zoom Infrastructure, EMNLP	2020
Session Facilitator, ICML 2020 for "Recommender System Research in Industry" (1 of 2)	2020
Volunteer ACL (Association of Computational Linguistics)	2020
Co-organizer, ACL (Association of Computational Linguistics) Black in AI Socials	2020
Volunteer, ICML 2020 (International Conference on Machine Learning)	2020
Volunteer, EC'20 (Economics and Computation)	2020
Volunteer, ICLR (International Conference on Learning Representations)	2020
Member, MD4SG (Mechanism Design for Social Good); Education working group	2020
Member, MD4SG Data and Governance working group	2020
Chair, AAAI Black in AI Annual Lunch	2020
Panelist, AAAI Try AI Workshop	2020
Invited Panelist, CRAFT workshop, FAT* conference (declined offer)	2020

ACADEMIC JOURNALS (AI/Machine Learning)

Board Member, AI and Ethics, Springer	2020

ACADEMIC SERVICE (Other)

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

ACADEMIC SERVICE (Other)

Student volunteer, SPLASH	2018
(Systems, Programming, Languages, and Applications) (declined offer)	

ACADEMIC ASSOCIATION FOR COMPUTING MACHINERY (ACM) MEMBERSHIPS

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

NON-ACADEMIC SERVICE

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

GRANT WRITING / PROPOSALS

CDS&E Computational and Data-Enabled Science and Engineering	2020
Database Grant Proposal for SageMaths (as Key Personnel) (PI Ben Hutz)	

WRITING / PUBLICATIONS / POSTS

Contributor, _Wikipedia: WikiProject Women in Red/AI Ethics_	2020
Tech X Social Impact "_Impossible Markets and Big Dreams_: My interaction with the COO of Impossible Foods"	2020
Tech X Social Impact "_Ready! Start: Exploring the Virtual Healthcare Multiverse_"	2020
Google Summer of Code "_Breaking the Time-Space Barrier with Haskell_"	2018

RESEARCH PhD INVITATIONS

Mediterranean Machine Learning Summer School (_M2L_) (Winter cohort)	2021
Winter Institute in Computational Social Science (_WICSS_) (University of Arizona)	2021
Simons Institute, Innovations in Theoretical Computer Science (_ITCS_)	2021
Self Organizing Conference on Machine Learning (_SOCML_), Machine Learning and Privacy session, Moderated by U. Erlingsson, organized by I. Goodfellow) (1 of 9 chosen)	2020

INDUSTRY PhD INVITATIONS

Participant, Jane Street PhD Symposium (New York, remote)	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

PRESS

VentureBeat "AI needs systemic solutions to systemic bias, injustice and inequality"	2020
Featured by Women of Silicon Valley, June Edition, 16 "Caribbean Techies"	2020
Featured by Women of Silicon Valley, May Edition	2020
Interviewed for CareerGirls.org Boston (videographed at MIT)	2019
Featured by Coursera (Learner Story)	2017

INDUSTRY TALKS

Speaker, EGG on Air Conference (human-centred AI)	2020
Speaker, EGG at Morgan State (talk on Human-centred AI and research)	2020
Presenter, VentureBeat's Transform 2020 Wrap-up for panel on Ethics and AI	2020
Moderator, VentureBeat's Transform 2020 panel on Ethics and AI	2020
Interviewed for Podcast, The Data Standard	2020
Interviewed for OpenMined course (Privacy-Preserving Machine Learning and Fairness)	2020
Interviewed for YouTube Series, Tech Girl Thursdays	2020
Interviewed for Podcast, Women of Silicon Valley	2020
Invited Panelist, Career Girls AI Virtual Camp	2020
Invited Speaker, Autodesk Design (Boston Office) on Differential Privacy	2020
Interviewed for Podcast on Black in AI (1 of 2 persons), iPhone Life Interview	2020
Invited Speaker, Sister to Sister International, Inc (STSI) on AI, Privacy, Ethics	2020
Invited Panelist, Morehouse@Momentum Coding School, "The Data Don't Lie"	2020
Invited Guest, Corecursive Podcast (Technical Podcast)	2020
Featured Session Clip, End of Year Corecursive Podcast (Technical Podcast)	2020
Women in Data Science talk "Why conferences matter" (40 min NeurIPS inspired talk)	2020
"Magic Gnomes: A GHC Compiler talk (5-minute talk at Github for Sentry's Show & Tell)	2019
"Denotational Semantics" (2 minute Lightning Talk for Meetup group)	2018
"Recap of Google I/O 2018" (20 minute presentation at Google Developer Group LA)	2018

OTHER (NON-INDUSTRY) TALKS

MIT Hacking Racism in Healthcare Challenge (keynote speaker)	2020
PLAID Lab speaker, "What Scientists can learn from Artists"	2020
CS Crew Project talk : contributing to Maths software (CodeWorld, SageMaths)	2019
CS Crew GSoC talk (40-minute talk about Google Summer of Code and Internships)	2019
CS293 Technical Interviewing Workshop Talk	2019

D&I (Diversity and Inclusion) Invitations (Academic Conferences):

KDD 2020 D&I Grant (free registration)	2020
ECCV 2020 (free registration courtesy Google Research)	2020

Developer Conference Grant/ Scholarship Invitations (Non-Academic Conferences):

AppSec (LA) 2019, TechTogetherBoston 2020, Twilio's Signal Conf 2019, Curry On! 2019, RustConf 2018, LambdaConf 2017/2018, Strange Loop 2017, Software Craftsmanship North America (SCNA), Clojure Conj 2016/2017, Clojure West 2017, Chrome Dev Summit 16-18, Google IO 2016-2019

CLASSES (PhD)

Doctoral Research with advisor Joe Near	2021-present
Privacy, Law and Policy, taught by Ryan Kriger (Spring)	2021
Cryptography, taught by Christelle Vincent (Spring)	2021
Secure Computation; taught by Joe Near using Python (Fall)	2020
Machine Learning; taught by Safwan Wshah using Python (Spring)	2020
Doctoral Research with advisors Joe Near and David Darais (Spring, Fall)	2019-2020
Software Verification; taught by David Darais using Agda (Fall)	2019
Data Privacy; taught by Joe Near using Python (Fall)	2019

CLASSES (PhD)

Computer Human Interaction; taught by Josh Bongard (Fall)   *2019*

CLASSES (RELATED)

Participant (1 of 18), "Dark Matters", School for Poetic Computation   *2020*
(taught by American Artist : workshop on Surveillance, data, ethics,
history of Silicon Valley; guests included Dr. Simone Browne, Stephanie Dinkins and
Rashida Richardson)

ONLINE LEARNING (SELECTED)

Stanford EE 374 : Internet-Scale Consensus in the Blockchain Era (D. Tse) (audit)   *2021*
Stanford ICME Summer NLP in Deep Learning Workshop   *2020*
Participant, IBM Qiskit Global Quantum Computing Summer School   *2020*
Participant, PL+HCI Swimmer Summer School   *2020*
(Programming Languages + Human Computer Interaction)
Participant, MSRI, Decidability, Definability and Computability in Number Theory   *2020*

DeepLearning.ai   *2020-2021*
- *Neural Networks and Deep Learning*
- *Improving Deep Neural Networks: Hyperparameter Regularization and Optimization*
- *Structuring Machine Learning Projects*
- *Natural Language Processing Specialization*
- *Cryptography I*
- *Cryptography : Boolean Functions, S-boxes and Related Problems*

Hyperlink Academy   *2020-2021*
- *Design Neighborhood Scale Software (Ostromian economics and computing)*
- *Esoteric Programming Language Theory (Graphical to Impossible programming languages)*
- *Language Construction Workshop (Conlang: Linguistics / made a language) (C. Gorrie)*
- *The Book is a Program 0 (Publishing a book in Racket) (J. Dueck)*
- *GUIs through Art History 0 (Recreating Periods of Art in History using GUIs) (E. Lin)*

InterAccess
- *Parametric Thinking with Images (Grasshopper3D)*   *2020*
- *Generating Images with Shaders (GLSL)*

Gray Area Festival Workshops   *2020*
- *Conceptual Cartography with Mapbox*
- *Data Visualization: Theory to Practice*

Pioneer Works   *2020*
- *Data Visualization as Activism (S. Lavigne)*
- *Feminist Data Set (with C. Sinders)*
- *AI + Creativity (A. Miller, D. Geers and A. Dorsen)*

ONLINE LEARNING (SELECTED)

FutureLearn
- *"Empire: The Controversies of British Imperialism"*   *2020*
- *The Laws of Digital Data, Content and Artificial Intelligence*   *2020*
- *"Functional Programming in Haskell"*   *2017*

Wendy's Subway
- *Reading workshop with Che Gossett on Abolitionist Insurgencies*   *2020*
  (led by C. Gossett, with lecture guest F. Moten)
- *Unsettling Historical Common Sense*

The Improv Group   *2020*
- *Storytelling for Technologists*