AMANDA BOWER

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EDUCATION

University of Michigan-Ann Arbor (UM-AA) *2014-2020 (expected)*
Applied and Interdisciplinary Mathematics PhD
NSF Graduate Fellow
Thesis Advisors: Laura Balzano and Martin Strauss

University of Michigan-Dearborn (UM-D) *2009-2013*
Bachelor of Science, Mathematics Major
Minors: Applied Statistics and Computer and Information Science
GPA: 3.98/4.0

RESEARCH INTERESTS

My research is broadly in machine learning. I enjoy problems that are theoretically sound yet practically motivated. Specifically, my recent research interests include

- algorithmic fairness and bias,
- rankings and preference learning, and
- algorithmic fairness of rankings.

SELECTED PUBLICATIONS AND PREPRINTS

1. A. Bower, H. Eftekhari, Y. Yurochkin, and Y. Sun, **"Individually Fair Rankings."** In submission.
2. A. Bower and L. Balzano, **"Preference Modeling with Context-Dependent Salient Features."** ICML 2020.
3. Y. Yurochkin*, A. Bower*, and Y. Sun, **"Training individually fair ML models with sensitive subspace robustness"**. ICLR 2020. Selected for a Spotlight talk (15%).
4. A. Bower*, L Niss*, Y Sun*, and A. Vargo, **"Debiasing Representations by Removing Unwanted Variation Due to Protected Attributes."** FAT-ML workshop at ICML 2018.
5. A. Bower, L. Jain, L. Balzano, **"The Landscape of Nonconvex Quadratic Feasibility."** ICASSP 2018. Selected for oral presentation (14%).
6. A. Bower*, S. Kitchen*, L. Niss*, M. Strauss*, A. Vargo*, and S. Venkatasubramanian*. **"Fair Pipelines."** FAT-ML workshop at ICML 2018.

$*$ = Equal Contribution

WORK AND TEACHING EXPERIENCE

Netflix May - August 2019
Machine Learning Researcher, Intern *Los Angeles, CA*

· I audited algorithms for bias with the Content Demand Modeling team. My responsibilities included giving presentations on my work and writing an internal memo.

University of Michigan September - December 2018
Graduate Student Instructor for graduate level machine learning *Ann Arbor, MI*

· For a graduate level machine learning course taught by C. Scott and S. Sekeh, I held office hours, organized and taught a python tutorial, graded exams, and answered questions on an online forum.

University of Michigan Math and Science Scholars July - August 2017, 2018
Course Assistant *Ann Arbor, MI*

· I was a course assistant and mentor to talented high school students for a math and art course taught by Martin Strauss.

UCLA/IPAM Research in Industrial Projects for Students June - August 2013
Undergraduate Researcher *Los Angeles, CA*

· I was a project manager of a research project whose goal was to improve the search algorithm used by the USC Shoah Foundation for indexed video testimonies of survivors of the Holocaust and other genocides. My advisor was Zicong Zhou.

Williams College SMALL Research Experience for Undergraduates June - August 2012
Undergraduate Researcher *Williamstown, MA*

· I did research in number theory and probability. My advisor was Steven J. Miller.

University of Michigan-Dearborn September 2011 - April 2012
Mentor and grader *Dearborn, MI*

· I mentored for advanced calculus I and graded for number theory.

TALKS AND POSTERS

- **Preference Modeling with Context-Dependent Salient Features**
  1. Talk at ICML 2020.
  2. Poster and lightening talk at Heidelberg Laureate Forum, 2020.
  3. Poster at Women in Machine Learning workshop at NeurIPS, 2019.
- **Training individually fair ML models with sensitive subspace robustness**
  1. Spotlight talk (15% of accepted papers) at ICLR 2020.
  2. Talk at the Institute for Advanced Study domain adaptation reading group, 2020.
- **Debiasing Representations By Removing Unwanted Variation Due To Protected Attributes**
  1. Poster (presented by L. Niss) at FAT-ML workshop at ICML in Stockholm, Sweden, 2018.
  2. Poster at the University of Michigan MIDAS Annual Data for Public Good Symposium, 2019.
  3. Poster at the University of Michigan Women in Big Data at Michigan Symposium, 2018.
- **The Landscape of Non-Convex Quadratic Feasibility**
  1. Talk (oral acceptance rate 14%) at IEEE ICASSP in Calgary, Alberta, Canada, 2018.
  2. Talk at the University of Michigan Applied and Interdisciplinary Math Student Seminar, 2018.
  3. Poster at the University of Michigan Student Symposium for Interdisciplinary Statistical Sciences, 2018.
  4. Poster at University of Michigan MCubed Symposium, 2018.
- **Fair Pipelines**

1. Poster at the FAT-ML workshop at KDD in Halifax, Nova Scotia, Canada, 2017.

HONORS AND AWARDS

- **National Science Foundation Graduate Research Fellowship**, 2015-2020. Fellowship awarded by the National Science Foundation that financially covers 3 years of graduate school. Approximately $130,000.
- **Rackham Merit Fellowship**, 2014-2019. Fellowship awarded by UM-AA to first year graduate students to financially cover 4 semesters and a summer throughout the first five years of graduate school. Approximately $45,000.
- **Kimball Midwest Scholarship**, 2017 and 2018. $1,000.
- **Carroll V. Newsom Scholarship**, 2014. Given by the Department of Mathematics at UM-AA. Approximately $6,000.
- **Chancellor's Medallion**, 2013. Given by UM-D to nine graduating students selected by faculty based on academic record, quality of character, vitality, intellect, and integrity.
- **Chancellor's Scholarship**, 2009-2013. Full tuition given by UM-D. Approximately $45,000.
- **Undergraduate Honors Scholar Award for Outstanding Achievement in Mathematics**, 2013, Given by the Department of Mathematics and Statistics at UM-D.
- **Henry Ford Health System Scholarship**, 2009 and 2012.
- **Susan Nokes Alumni Scholarship**, 2009. Given by Melvindale High School.
- **Linda Bunte Memorial Scholarship**, 2009. Given by Melvindale High School.

PROFESSIONAL SERVICE

NeurIPS Reviewer 2019, 2020

Women in Machine Learning Reviewer 2019

Midwest Machine Learning Symposium June 2017
Poster Contest Organizer *Chicago, IL*

· I co-designed, administered, and implemented code for a graduate student poster contest using rank aggregation algorithms with L. Jain and L. Balzano.

WORKSHOPS, PROGRAMS, AND SUMMER SCHOOLS

Institute for Advanced Study February - March 2020
Visting PhD Student *Princeton, NJ*

· Visited my advisor L. Balzano who was participating in the special year on optimization, statistics, and theoretical machine learning at the Institute for Advanced Study during her sabbatical.

Heidelberg Laureate Forum September 2019
Participant *Heidelberg, Germany*

· Met "the recipients of the most prestigious awards in mathematics and computer science, the Abel Prize, ACM A.M. Turing Award, ACM Prize in Computing, Fields Medal and Nevanlinna Prize" as one of "200 selected young researchers from all over the world."

Fundamentals of Data Analysis July 2018
Participant *Madison, WI*

· Summer school on randomized linear algebra; high-dimensional statistics; interactive machine learning; probability on graphs; continuous optimization; deep learning.

Summer School High Dimensional Representations July 2018
Participant *Berkely, CA*

· Mathematical Sciences Research Institute summer school on compressed sensing and other fundamental machine learning topics

Workshop on Fair Interactive Learning and Fair Representations March 2018
Participant *Philadelphia, PA*

· Computing Community Consortium workshop about algorithmic fairness in the context of interactive algorithms

Workshop on Trustworthy Algorithmic Decision-Making December 2017
Participant *Arlington, VA*

· The goal of the workshop was "to develop ideas . . . to make progress toward understanding, developing, and evaluating trustworthy algorithmic decision-making"

Princeton Research Training Group Summer School in Financial Math June 2013
Participant *Princeton, NJ*

· Summer school on modern and developing topics in financial math such as systemic risk and high-frequency trading.

Women and Mathematics: 21st Century Geometry May 2012
Participant *Princeton, NJ*

· Lecture series on 21st century geometry and mentoring program at the Institute for Advanced Study and Princeton University.

TECHNICAL SKILLS

- Python
- LaTeX
- Matlab
- Familiarity with shell