Caitlin Kuhlman

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Education

2020 *expected*
PhD Computer Science, Worcester Polytechnic Institute
Dissertation: Ranking for Decision Making: Fairness, Accountability, and Usability
Advisor: Elke Rundensteiner

2017
MS Computer Science, Worcester Polytechnic Institute
Thesis: Pivot-based Data Partitioning for Distributed k Nearest Neighbor Mining
Advisor: Elke Rundensteiner

2013
Major Certificate in Computer Science, University of Massachusetts Boston

2007
BFA Fine Arts 3D, Massachusetts College of Art and Design

Research Experience

Aug 2014 - Present
Research Assistant Advisor: Elke Rundensteiner
Computer Science Department, Worcester Polytechnic Institute

Researcher in the Data Science Research Group, focused on investigating novel algorithms for fair prediction and ranking, and developing interactive data analytics tools and visualizations.

Lead researcher and developer on the Massachusetts Technology, Talent, and Economic Reporting System (http://matters.mhtc.org), an online system which integrates open datasets and provides visual interfaces for understanding the economic competitiveness of U.S. states.

Supervisor of undergraduate student teams for their Major Qualifying Projects. Past projects include: a system to automatically integrate heterogeneous data from online sources, a suite of tools for data management and curation (currently used by student teams at Brandeis University), and a public-facing API providing access to a collection of over 30 datasets.
Technologies: Python, Java, PostgreSQL, Javascript, D3

May - Aug 2016
Data Science for Social Good Fellow
IBM Research Yorktown Heights, NY

One of six researchers selected to work with IBM and partner social good organizations. Focus of project: to better quantify innovation in countries around the world. Analyzed over 1400 publicly available economic, demographic, and environmental datasets, and developed interpretable models to help decision makers understand the factors impacting innovation.
Technologies: Python, Jupyter

June - Aug 2015
Technical Intern
MITRE Corporation Bedford, MA

June - Aug 2014
Member of a small team of researchers over two consecutive summers. Analyzed TB scale data for cybersecurity applications. Provided proof-of-concept for a supervised learning based intrusion detection system. Investigated novel techniques leveraging the Hadoop distributed computing framework for automatic feature engineering.
Technologies: Java, MapReduce, Hadoop

May Aug 2013
Research Assistant
Knowledge Discovery Lab, University of Massachusetts Boston

Developed methods for the automatic analysis of geospatial imagery. Implemented a web client for image analysis and released an open source command line tool for image preprocessing.
Technologies: Java, Weka, Javascript

Honors and Awards

2018 **WIN Grant** Worcester Polytechnic Institute.
$10,000 Women's Impact Network Grant to support the 2019 WiDS Central Mass Conference.

2018 **GAANN Fellowship** Worcester Polytechnic Institute.

2014 **ORISE Fellowship** Oak Ridge Institute for Science and Education.
Appointment to the Student Research Participation Program at the U.S. Army NSRDEC.

Leadership

2018 **WiDS Ambassador**
Organizer of the first regional Women in Data Science Central Massachusetts Conference, with 200 registered participants http://www.widscentralmass.org/

2017 **Tutorials Chair Broadening Participation in Data Mining Workshop**
Organized two tutorial sessions at workshop co-located with the ACM SIGKDD Conference. Collaborated on an interactive Jupyter notebook for tutorial session on Algorithmic Fairness.

Publications

Caitlin Kuhlman, MaryAnn VanValkenburg, Elke Rundensteiner. FARE: Diagnostics for Fair Ranking using Pairwise Error Metrics. *The Web Conference (WWW) Web and Society track* 2019. [pdf]

Caitlin Kuhlman, Paul-Henry Schoenhagen, MaryAnn VanValkenburg, Diana Doherty, Malika Nurbekova, Goutham Deva, Zarni Phyo, Elke Rundensteiner, and Lane Harrison. Evaluating Preference Collection Methods for Interactive Ranking Analytics *ACM Conference on Human Factors in Computing Systems (CHI)* 2019. [link]

Latifa F. Jackson, **Caitlin Kuhlman**, Fatimah L.C. Jackson, Keolu Fox. Including Vulnerable Populations in the Assessment of Data from Vulnerable Populations. *Frontiers in Big Data* 2019. [link]

Caitlin Kuhlman, MaryAnn VanValkenburg, Diana Doherty, Malika Nurbekova, Goutham Deva, Zarni Phyo, Elke Rundensteiner, and Lane Harrison. Preference-driven Interactive Ranking System for Personalized Decision Support. *ACM International Conference on Information and Knowledge Management (CIKM)* 2018. [link]

Caitlin Kuhlman and Elke Rundensteiner. Towards an Interactive Learning-to-Rank System for Economic Competitiveness Understanding. *SIGKDD Workshop on Interactive Data Exploration and Analytics (IDEAS)* 2017. [pdf]

Caitlin Kuhlman, Karthikenyan Natesan Ramamurthy, Prassana Sattigeri, Aurelie C. Lozano, Lei Cao, Chandra Reddy, Aleksandra Mojsilovic, Kush R. Varshney. How to foster innovation: a data-driven approach to measuring economic competitiveness. *IBM Journal of Research and Development* 2017.

Caitlin Kuhlman, Yizhou Yan, Lei Cao, and Elke Rundensteiner. Pivot-based Distributed K-Nearest Neighbor Mining. *European Conference on Machine Learning, Principles and Practice of Knowledge Discovery (ECML-PKDD)* Research Track, Springer LNCS, 2017. [pdf]

Yizhou Yan, Lei Cao, **Caitlin Kuhlman**, and Elke Rundensteiner. Distributed Local Outlier Detection in Big Data. *SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)* 2017. [pdf]

Lei Cao, Yizhou Yan, **Caitlin Kuhlman**, Qingyang Wang, Elke Rundensteiner and Mohamed Eltabakh. Multi-tactic Distance-based Outlier Detection. *IEEE International Conference on Data Engineering (ICDE)* 2017. [pdf]

Rodica Neamtu, **Caitlin Kuhlman**, Ramoza Ahsan, and Elke Rundensteiner. The impact of Big Data on making evidence-based decisions. *Book chapter in Frontiers in Data Science. CRC Press Reference* 2017.

Joseph Paul Cohen, Wei Ding, **Caitlin Kuhlman**, Aijun Chen, and Liping Di. Rapid building detection using machine learning. *Applied Intelligence* 45, no. 2: 443-457 2016. [pdf]