

Maria De-Arteaga

CONTACT INFORMATION

Pittsburgh, PA

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EDUCATION

Carnegie Mellon University Pittsburgh, PA, USA

Joint Ph.D. Student in Machine Learning & Public Policy
Machine Learning Department and Heinz College

August 2014 – Present

- Member of the Auton Lab, co-advisors: Prof. Artur Dubrawski and Prof. Alexandra Chouldechova.
- Research projects:
 - Algorithmic fairness: Characterizing and mitigating risks of algorithmic decision support.
 - Canonical Autocorrelation Embeddings and its application to predict neurological recovery.
 - Pattern detection for counter-human trafficking and sexual violence research.

Carnegie Mellon University Pittsburgh, PA, USA

Master of Science, Machine Learning
Machine Learning Department

August 2014 – May 2017

- Research project: Canonical Autocorrelation Analysis and its use for radiation threat detection.
- Coursework includes: advanced machine learning, statistical machine learning, statistics theory, probabilistic graphical models, convex optimization, causal inference, bayesian statistics.

Universidad Nacional de Colombia Bogota, Colombia

Bachelor of Science, Mathematics

August 2008 – August 2013

- Member of the computational linguistics research group.
- Bachelor's Thesis: vector models in text mining and its applications to author profiling tasks.
- Coursework includes: probability, topology, real analysis, theory of computation, field theory, logic, multilinear algebra and canonical forms, demobilization processes, sociology of conflict, forced migration, political corruption.

Universidad Autónoma de Madrid Madrid, Spain

Exchange student

January 2012 – December 2012

- Coursework includes: numerical methods for ordinary differential equations, graduate-level course on democratic transition processes in the Arab world.

WORK EXPERIENCE

Microsoft Research Cambridge, MA, USA

Research intern

May 2018 – August 2018

- Algorithmic fairness research, advised by Dr. Adam Kalai (primary advisor), Dr. Hanna Wallach, Dr. Jennifer Chayes and Dr. Christian Borgs.
- Research projects: (1) Risks of semantic representation bias in online hiring and recruiting pipelines, (2) Unsupervised bias enumeration in word embeddings.

Microsoft Research Redmond, WA, USA

Research intern

May 2017 – August 2017

- Healthcare NeXT's Clinical Sensing and Analytics Group, advised by Dr. Sumit Basu.
- Research project: Applied machine learning to gain epidemiological insights from unstructured medical records.

University of Applied Sciences of Western Switzerland HES-SO Sierre, Switzerland

Research intern

June 2014 – August 2014

- MedGIFT research group, advised by Dr. Henning Müller.
- Research project: Prediction of query results of specialized medical search engines using log files.

Quantil S.A.S. Bogota, Colombia

Data mining researcher

August 2013 – June 2014

- Research and development of machine learning and data mining tools.
- Research projects include: fraud detection for Colombia's Health Ministry, and money laundering detection for Colombia's Finance Ministry.

Connectas Bogota, Colombia

Investigative journalist

March 2012 – June 2012

- In-depth research for the journalistic investigation “The Jungle Highway”, directed by a Nieman Fellow at Harvard.

Publicaciones Semana - Especiales Regionales Bogota, Colombia

Journalist

August 2010 – December 2011

- Reporting and writing mainly focused on agriculture and environment for *Semana*, a major opinion and analysis magazine in Colombia.

ONGOING
COLLABORATIONS

Connectas

Advisor

September 2015 – Present

- Advisory position, design and planning of data journalism strategies. Distinguished member of *Connectas Hub*, a network of journalists across the Americas.

TEACHING
EXPERIENCE

Intelligent Systems Architectures, Universidad de los Andes Bogota, Colombia

Visiting Instructor

Summer 2017

- Masters and PhD course on foundations of machine learning and its applications.

Data Mining (95-791), Carnegie Mellon University Pittsburgh, PA, United States

Teaching assistant

Fall 2016

- Instructor: Artur Dubrawski
- Masters course focused on the understanding of fundamental data mining methodologies.

Machine Learning (10-601), Carnegie Mellon University Pittsburgh, PA, United States

Teaching assistant

Spring 2016

- Instructor: Nina Balcan and William Cohen
- Masters course on the mathematical, statistical and computational foundations of the field.

Colombian Mathematical Olympiad (OCM) Bogota, Colombia

Instructor

January 2010 – August 2010

- Teaching middle school participants in preparation for international competitions. Designing national and international tests.
- Courses: number theory, combinatorics.

AWARDS

Research awards

- *Microsoft Research Dissertation Grant*, 2018.
- *1st Place Innovation Award on Data Science*, Data for Policy, 2016.
- *Best Student Presentation Award*, Domestic Nuclear Detection Office (DNDO) Academic Research Initiative Grantees Conference, 2015.

Academic awards

- Recognitions upon graduation, Universidad Nacional de Colombia, 2013:
 - ‘Grado de Honor’, maximum recognition given to bachelor graduates: Awarded to 1 in 168 graduates of the Science Faculty, and 9 in ~ 2.500 graduates of the university.
 - Commencement speech for the Science Faculty.
- *Best GPA Scholarship* every semester throughout bachelor’s degree.
- *Top 5 Admission Exam Scholarship*, Universidad Nacional de Colombia, 2008.
- *Best high school graduates of the country Scholarship*, 2008.
- 8th place in the Colombian Mathematical Olympiad, 2007.
- Member of the Colombian team for the Rioplatense Mathematical Olympiad in Argentina, 2007.

A. Romanov, M. De-Arteaga, H. Wallach, J. Chayes, C. Borgs, A. Chouldechova, S. Geyik, K. Kenthapadi, A. Kalai, *Whats in a name? Reducing bias in bios without access to protected attributes*, In Proceedings of the Conference of the North American Chapter of the Association for Computational Linguistics (NAACL), 2019.

M. De-Arteaga, A. Romanov, H. Wallach, J. Chayes, C. Borgs, A. Chouldechova, S. Geyik, K. Kenthapadi, A. Kalai, *Bias in Bios: A Case Study of Semantic Representation Bias in a High-Stakes Setting*, In Proceedings of the ACM Conference on Fairness, Accountability, and Transparency (FAT*), 2019.

N. Swinger*, M. De-Arteaga*, N. Heffernan IV, M. Leiserson, A. Kalai, *What are the biases in my word embedding?*, In Proceedings of the AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society (AIES), 2019. (*Indicates equal contribution)

M. De-Arteaga, J.Chen, P. Huggins, J. Elmer, G. Clermont, A. Dubrawski, *Predicting Neurological Recovery with Canonical Autocorrelation Embeddings*, PLoS ONE, 2019.

M. De-Arteaga, A. Dubrawski, A.Chouldechova, *Learning under selective labels in the presence of expert consistency*, Workshop on Fairness, Accountability, and Transparency in Machine Learning (FAT/ML), ICML, 2018.

M. De-Arteaga, W. Herlands, D. Neill, A. Dubrawski, *Machine Learning for the Developing World*, ACM Transactions on Management Information Systems, 2018.

M. De-Arteaga, A. Dubrawski, *Discovery of Complex Anomalous Patterns of Sexual Violence in El Salvador*, Data for Policy, 2016. **1st Place Innovation Award on Data Science.**

W. Herlands, M. De-Arteaga, D. Neill, A. Dubrawski, *Lass0: Sparse Non-Convex Regression by Local Search*, Workshop on Optimization for Machine Learning, NIPS, 2015.

M. De-Arteaga, I. Eggel, C. Kahn, H. Müller, *Analyzing Image Search Behaviour of Radiologists: Semantics and Prediction of Query Results*, Journal of Digital Imaging, 2015.

M. De-Arteaga, I. Eggel, B. Do, D. Rubin, C. Kahn Jr. H. Müller, *Comparing Image Search Behaviour in the ARRS GoldMiner Search Engine and a Clinical PACS/RIS*, Journal of Biomedical Informatics, 2015.

Bias in Bios: A Case Study of Semantic Representation Bias in a High-Stakes Setting, ACM Conference on Fairness, Accountability, and Transparency (FAT*), 2019.

Fairness In Prediction Models Used By Public Service Agencies, INFORMS, 2018.

Guiding public service agencies with machine learning: Opportunities and risks, Special Session on Social Change In and Through Mathematics and Education, AMS Sectional Meeting, 2018.

Challenges of data-driven decision making with humans in the loop, Google Fairness in ML Workshop, 2018.

Machine learning, sexual violence crimes and decision-support systems, Office of the Attorney General of Colombia, 2018.

Learning under selective labels in the presence of expert consistency, Workshop on Fairness, Accountability, and Transparency in Machine Learning (FAT/ML), 2018.

Machine Learning for the Developing World, Data science and machine learning for development and humanitarian action session, UNESCO Tech4Dev Conference, 2018. **Closing Keynote.**

Machine Learning for the Developing World, École polytechnique fédérale de Lausanne (EPFL), 2018.

Using expert consensus to learn under selective labels, Google Women in Tech Summit, 2018.

Challenges of child maltreatment predictive models, Allegheny County Department of Human Service, 2017.

Predicting Neurological Recovery with Canonical Autocorrelation Embeddings, John Heinz III College at Carnegie Mellon University, 2017.

Canonical Autocorrelation Analysis for Radiation Threat Detection, John Heinz III College at Carnegie Mellon University, 2016.

Leveraging Multidimensional Autocorrelations to Boost Sensitivity of Spectral Anomaly Detection, DNDO Annual Academic Research Initiative Grantees Conference, 2015. **Best Student Presentation Award**.

Data Science for Social Good, Winchester Thurston School, ongoing series (2015-Present).

Author Profiling, an Application of Computational Linguistics, Colombian Congress of Young Linguists, 2013.

PROFESSIONAL
SERVICE

Organizer

- Co-founder and co-organizer, Workshop series *Machine Learning for the Developing World (ML4D)* (NeurIPS 2017-2018).
- Co-organizer, CVPR Workshop *Computer Vision for Global Challenges* (2019).
- Co-organizer FAT* reading group at Carnegie Mellon University.
- Co-organizer Machine Learning for the Developing World (ML4D) reading group at Carnegie Mellon University.

Program committee

FAT* 2019.

Reviewer

FAT* 2019, Journal of Digital Imaging (2016-2018).

PROGRAMMING

Python, R, Matlab, L^AT_EX.