

# MATT J. KUSNER

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## EMPLOYMENT

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**University College London** *September 2019 - Present*

Associate Professor in Machine Learning, Department of Computer Science

**University of Oxford** *October 2018 - September 2019*

Associate Professor in Machine Learning, Department of Computer Science

Tutorial Fellow at Jesus College

**European Lab for Learning & Intelligent Systems (ELLIS)** *Jul 2021 - Present*

ELLIS Scholar

**The Alan Turing Institute**

Turing Fellow

Research Fellow

*October 2018 - Present*

*October 2016 - October 2018*

## EDUCATION

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**Cornell University** *August 2015 - August 2016*

Visiting Ph.D. student in Dept. of Computer Science

Advisor: Kilian Q. Weinberger

**Washington University in St. Louis** *August 2011 - August 2016*

Ph.D. from Dept. of Computer Science & Engineering

Advisor: Kilian Q. Weinberger

## PROFESSIONAL ACTIVITIES

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**NeurIPS Workshop: Algorithmic Fairness through the Lens of Causality and Interpretability**

2020 *Co-organizer*

**NeurIPS Workshop: Machine Learning for Molecules** *2020 Co-organizer*

**NIPS Workshop: Critiquing and Correcting Trends in Machine Learning** *December 2018*

*Co-organizer*

*Montreal, Canada*

**NIPS Workshop: Machine Learning for Molecules and Materials** *December 2017; 2018*

*Co-organizer*

*Long Beach, CA; Montreal, Canada*

**UAI Conference** *August 2018*

*Publications Chair*

*Monterey, CA*

**NIPS Press Conference** *December 2017*

*Invited Speaker*

*Long Beach, CA*

**NIPS Workshop on Machine Learning for Molecules and Materials** *December 2017*

*Co-organizer*

*Long Beach, CA*

**ICML Conference** *June 2016*

*Workflow Chair*

*New York, NY*

**ICML Workshop: Resource-Efficient Machine Learning** *July 2015*

*Co-organizer*

*Lille, France*

<b>ICML Workshop: Learning with Test-Time Budgets</b> <i>Co-organizer</i>	June 2013 Atlanta, GA
<b>ICML 2020 Top 33% Reviewer</b>	June 2020
<b>ICML 2019 Top 5% Reviewer</b>	June 2019
<b>NeurIPS 2018 Top 30% Reviewer</b>	December 2018
<b>Area Chair</b> NeurIPS, ICLR, ICML	
<b>Program Committee</b> NeurIPS, ICML, ICLR, AISTATS, FAT*, JMLR, AAAI, KDD	

## PUBLICITY

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<b>Forbes</b> <a href="https://tinyurl.com/bdb84kd9">https://tinyurl.com/bdb84kd9</a>	November 2021
<b>Centre for Data Ethics and Innovation</b> <a href="https://tinyurl.com/76wfe7rb">https://tinyurl.com/76wfe7rb</a>	November 2020
<b>Harvard Business Review</b> <a href="https://tinyurl.com/3yatpnc4">https://tinyurl.com/3yatpnc4</a>	October 2020
<b>Wired</b> <a href="https://tinyurl.com/y29n58tl">https://tinyurl.com/y29n58tl</a>	February 2019
<b>Forbes</b> <a href="https://tinyurl.com/yxbrpwax">https://tinyurl.com/yxbrpwax</a>	March 2018
<b>The Guardian</b> <a href="https://tinyurl.com/y893qsto">https://tinyurl.com/y893qsto</a>	August 2017
<b>The New Scientist</b> <a href="https://tinyurl.com/l4zfkv2">https://tinyurl.com/l4zfkv2</a>	March 2017
<b>The Future of Life Institute</b> <a href="https://tinyurl.com/y3xgnmgy">https://tinyurl.com/y3xgnmgy</a>	December 2015
<b>OpenTable</b> <a href="https://tinyurl.com/y3ohyyw3">https://tinyurl.com/y3ohyyw3</a>	August 2015

## TALKS

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<b>Babel</b> <i>The EU AI Act: Implications for the Technology Sector</i>	February 21, 2023
<b>Pint of Science</b>	May 11, 2022
<b>The Federal Reserve Banks of Cleveland and Philadelphia</b> <i>Causality for Fair Lending</i>	November 10, 2021
<b>RIKEN High-dimensional Statistical Modeling Team Seminar</b>	November 9, 2021
<b>ELLIS Workshop on Causethical ML</b>	July 26, 2021
<b>Cambridge Tech &amp; Society</b>	November 19, 2020
<b>Faculty of Law, Oxford University</b> <i>AI for English Law Conference</i>	March 18, 2019 Panel on AI and Ethics

<b>The Alan Turing Institute</b> <i>To support the Information Commissioners Office</i>	March 13, 2019 Explainability Expert Roundtable
<b>Royal Academy of Engineering</b> <i>To support the Department of Digital, Culture, Media and Sport</i>	November 5, 2018 Algorithmic Bias Roundtable
<b>Talking Machines Podcast</b>	November 1, 2018
<b>AI and ML in Cambridge (CamAIML)</b>	March 15, 2018
<b>Cambridge Centre for Mathematical Sciences</b>	February 20, 2018
<b>Oxford Computational Statistics and Machine Learning Seminar</b>	February 16, 2018
<b>The Royal Society</b>	February 12, 2018
<b>Cambridge University Engineering Department</b>	September 12, 2017

## PUBLICATIONS

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Ibrahim Alabdulmohsin\*, Nicole Chiou\*, Alexander D'Amour\*, Arthur Gretton\*, Sanmi Koyejo\*, Matt J. Kusner\*, Stephen R. Pfohl\*, Olawale Salaudeen\*, Jessica Schrouff\*, Katherine Tsai\*

### **Adapting to Latent Subgroup Shifts via Concepts and Proxies**

The International Conference on Artificial Intelligence and Statistics (AISTATS), 2023.

\* authors contributing equally, listed in alphabetical order

Valentina Zantedeschi, Luca Franceschi, Jean Kaddour, Matt J. Kusner, Vlad Niculae

### **DAG Learning on the Permutahedron**

The International Conference on Learning Representations (ICLR), 2023.

Kirtan Padh, Jakob Zeitler, David Watson, Matt J. Kusner, Ricardo Silva, Niki Kilbertus

### **Stochastic Causal Programming for Bounding Treatment Effects**

Conference on Causal Learning and Reasoning (CLearR), 2023.

Jean Kaddour, Linqing Liu, Ricardo Silva, Matt J. Kusner

### **When Do Flat Minima Optimizers Work?**

Neural Information Processing Systems (NeurIPS), 2022.

Natalie Maus, Haydn T. Jones, Juston S. Moore, Matt J. Kusner, John Bradshaw, Jacob R. Gardner

### **Local Latent Space Bayesian Optimization over Structured Inputs**

Neural Information Processing Systems (NeurIPS), 2022.

Yuchen Zhu, Limor Gultchin, Arthur Gretton, Matt J. Kusner, Ricardo Silva

### **Causal Inference with Treatment Measurement Error: A Nonparametric Instrumental Variable Approach**

The Conference on Uncertainty in Artificial Intelligence (UAI), 2022. *Oral Presentation*

Nitin Agrawal, James Bell, Adrià Gascón, Matt J. Kusner

### **MPC-Friendly Commitments for Publicly Verifiable Covert Security**

*The Conference on Computer and Communications Security (CCS), 2021*

Jean Kaddour, Yuchen Zhu, Qi Liu, Matt J. Kusner, Ricardo Silva

### **Causal Effect Inference for Structured Treatments**

*Neural Information Processing Systems (NeurIPS), 2021*

Hanchen Wang, Qi Liu, Xiangyu Yue, Joan Lasenby, Matt J. Kusner

### **Unsupervised Point Cloud Pre-Training via View-Point Occlusion, Completion**

*The International Conference on Computer Vision (ICCV), 2021*

Valentina Zantedeschi, Matt J. Kusner, Vlad Niculae

**Learning Binary Decision Trees by Argmin Differentiation**

*The International Conference on Machine Learning (ICML), 2021*

Limor Gultchin, David Watson, Matt J. Kusner, Ricardo Silva

**Operationalizing Complex Causes: A Pragmatic View of Mediation**

*The International Conference on Machine Learning (ICML), 2021*

Afsaneh Mastouri\* Yuchen Zhu\*, Limor Gultchin, Anna Korba, Ricardo Silva, Matt J. Kusner, Arthur Gretton, Krikamol Muandet

**Proximal Causal Learning with Kernels: Two-Stage Estimation and Moment Restriction**

*The International Conference on Machine Learning (ICML), 2021*

\* indicates equal contribution

Qi Liu, Matt J. Kusner, Phil Blunsom

**Counterfactual Data Augmentation for Neural Machine Translation**

*North American Chapter of the Association for Computational Linguistics (NAACL), 2021*

Niki Kilbertus, Matt J. Kusner, Ricardo Silva

**A Class of Algorithms for General Instrumental Variable Models**

*Neural Information Processing Systems (NeurIPS), 2020*

John Bradshaw, Brooks Paige, Matt J. Kusner, Marwin H. S. Segler, Jos Miguel Hernandez-Lobato

**Barking up the right tree: an approach to search over molecule synthesis DAGs**

*Neural Information Processing Systems (NeurIPS), 2020. Spotlight Presentation*

Matt J. Kusner, Joshua R. Loftus

**The long road to fairer algorithms**

*Nature (Comment), 2020*

Limor Gultchin, Matt J. Kusner, Varun Kanade, Ricardo Silva

**Differentiable Causal Backdoor Discovery**

*The International Conference on Artificial Intelligence and Statistics (AISTATS), 2020*

John Bradshaw, Brooks Paige, Matt J. Kusner, Marwin H. S. Segler, Jos Miguel Hernandez-Lobato

**A Model to Search for Synthesizable Molecules**

*Neural Information Processing Systems (NeurIPS), 2019*

Niki Kilbertus, Philip J. Ball, Matt J. Kusner, Adrian Weller, Ricardo Silva

**The Sensitivity of Counterfactual Fairness to Unmeasured Confounding**

*The Conference on Uncertainty in Artificial Intelligence (UAI), 2019*

Matt J. Kusner, Chris Russell, Joshua R. Loftus, Ricardo Silva

**Making Decisions that Reduce Discriminatory Impact**

*The International Conference on Machine Learning (ICML), 2019*

Nitin Agrawal\*, Ali Shahin Shamsabadi\*, Matt J. Kusner, Adrià Gascón

**QUOTIENT: Two-Party Secure Neural Network Training and Prediction**

*The Conference on Computer and Communications Security (CCS), 2019*

John Bradshaw, Matt J. Kusner, Brooks Paige, Marwin H. S. Segler, José Miguel Hernández-Lobato

**A Generative Model For Electron Paths**

*International Conference on Learning Representations (ICLR), 2019*

Amartya Sanyal, Matt J. Kusner, Adrià Gascón, Varun Kanade

**TAPAS: Tricks to Accelerate (encrypted) Prediction As a Service**

*International Conference on Machine Learning (ICML), 2018*

Niki Kilbertus, Adrià Gascón, Matt J. Kusner, Michael Veale, Krishna Gummadi, Adrian Weller

**Blind Justice: Fairness with Encrypted Sensitive Attributes**

*International Conference on Machine Learning (ICML), 2018*

David Janz, Jos van der Westhuizen, Brooks Paige, Matt J. Kusner, José Miguel Hernández-Lobato

**Learning a Generative Model for Validity in Complex Discrete Structures**

*International Conference on Learning Representations (ICLR), 2018*

Chirs Russell\*, Matt J. Kusner\*, Joshua R. Loftus, Ricardo Silva

**When Worlds Collide: Integrating Different Counterfactual Assumptions in Fairness**

*Neural Information Processing Systems (NIPS), 2017*

Matt J. Kusner\*, Joshua R. Loftus\*, Chirs Russell\*, Ricardo Silva

**Counterfactual Fairness** (oral presentation)

*Neural Information Processing Systems (NIPS), 2017*

Matt J. Kusner, Brooks Paige, José Miguel Hernández-Lobato

**Grammar Variational Autoencoder**

*International Conference on Machine Learning (ICML), 2017*

Gao Huang, Chuan Guo, Matt J. Kusner, Yu Sun, Kilian Q. Weinberger, Fei Sha

**Supervised Word Mover's Distance** (oral presentation)

*Neural Information Processing Systems (NIPS), 2016*

Matt J. Kusner, Yu Sun, Karthik Sridharan, Kilian Q. Weinberger

**Private Causal Inference** (oral presentation)

*Artificial Intelligence and Statistics (AISTATS), 2016*

Gustavo Malkomes, Matt J. Kusner, Wenlin Chen, Kilian Q. Weinberger, Benjamin Moseley

**Fast Distributed k-Center Clustering with Outliers on Massive Data**

*Neural Information Processing Systems (NIPS), 2015*

Matt J. Kusner, Yu Sun, Nicholas I. Kolkin, Kilian Q. Weinberger

**From Word Embeddings to Document Distances**

*International Conference on Machine Learning (ICML), 2015*

Matt J. Kusner, Jacob R. Gardner, Roman Garnett, Kilian Q. Weinberger

**Differentially Private Bayesian Optimization**

*International Conference on Machine Learning (ICML), 2015*

Matt J. Kusner, Wenlin Chen, Quan Zhou, Zhixiang (Eddie) Xu, Kilian Q. Weinberger, Yixin Chen

**Feature-Cost Sensitive Learning with Submodular Trees of Classifiers**

*AAAI Conference on Artificial Intelligence (AAAI), 2014*

Matt J. Kusner, Stephen Tyree, Kilian Q. Weinberger, Kunal Agrawal

**Stochastic Neighbor Compression**

*International Conference on Machine Learning (ICML), 2014*

Jacob R. Gardner, Matt J. Kusner, Zhixiang (Eddie) Xu, Kilian Q. Weinberger, John P. Cunningham

**Bayesian Optimization with Inequality Constraints**

*International Conference on Machine Learning (ICML), 2014*

Zhixiang (Eddie) Xu, Matt J. Kusner, Gao Huang, Kilian Q. Weinberger

**Anytime Feature Learning**

*International Conference on Machine Learning (ICML), 2013*

Zhixiang (Eddie) Xu, Matt J. Kusner, Kilian Q. Weinberger, Minmin Chen

**Cost-Sensitive Tree of Classifiers**

*International Conference on Machine Learning (ICML), 2013*

**Journal Publications**

Mrinal Pahwa, Matt J. Kusner, Carl Hacker, David Bundy, Kilian Q. Weinberger, Eric Leuthardt

**Optimizing the Detection of Wakeful and Sleep-Like States for Future Electrographic Brain Computer Interface Applications**

*PLOS ONE Journal, 2015*

Zhixiang (Eddie) Xu, Matt J. Kusner, Kilian Q. Weinberger, Minmin Chen, Olivier Chapelle

**Classifier Cascades and Trees for Minimizing Feature Evaluation Cost**

*Journal of Machine Learning Research (JMLR), 2014*

**Preprints**

Jean Kaddour, Aengus Lynch, Qi Liu, Matt J. Kusner, Ricardo Silva

**Causal machine learning: A survey and open problems**

Ibrahim Alabdulmohsin\*, Nicole Chiou\*, Alexander D'Amour\*, Arthur Gretton\*, Sanmi Koyejo\*, Matt J. Kusner\*, Stephen R. Pfohl\*, Olawale Salaudeen\*, Jessica Schrouff\*, Katherine Tsai\*

**Adapting to Shifts in Latent Confounders using Observed Concepts and Proxies**

Qi Liu, Matt J. Kusner, Phil Blunsom

**A Survey on Contextual Embeddings**

Valentina Zantedeschi, Fabrizio Falasca, Alyson Douglas, Richard Strange, Matt J. Kusner, Duncan Watson-Parris

**Cumulo: A Dataset for Learning Cloud Classes**

NeurIPS Workshop Tackling Climate Change with Machine Learning, 2019. *Best Paper Award.*

Joshua R. Loftus, Chris Russell, Matt J. Kusner, Ricardo Silva

**Causal Reasoning for Algorithmic Fairness**, May 2018

Jacob R. Gardner\*, Paul Upchurch\*, Matt J. Kusner, Yixuan Li, Kilian Q. Weinberger, Kavita Bala, John E. Hopcroft

**Deep Manifold Traversal: Changing Labels with Convolutional Features**, March 2016