Michael Munn Ph.D.

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Industry & Academic Experience

Google Research
Research Engineer Feb 2022 - *present*
- My research is focused on foundational machine learning theory and its application to improving efficiencies in training and fine-tuning large-scale models.

Google Cloud
AI Engineer Apr 2018 - Feb 2022
- Led scoping and delivery for ML/AI engagements with Cloud customers.
- Delivered dedicated ML Instruction for Google's Advanced Solutions Lab

Accenture
ML and Data Science Consultant Jan 2017 - Apr 2018
- Managed and delivered ML/AI consulting projects from initial scoping through to final delivery across multiple verticals.

New York University, Courant Institute
Clinical Assistant Professor Aug 2014 - May 2016

University of Missouri, Department of Mathematics
Assistant Professor Aug 2011 - May 2014

Publications (Books)

1. **Michael Munn**, David Pitman. *Explainable AI for Practitioners: Designing and Implementing Explainable ML Solutions*. O'Reilly, 2022.
2. Valliappa Lakshmanan, Sara Robinson, **Michael Munn**. *Machine Learning Design Patterns: Solutions to Common Challenges in Data Preparation, Model Building and MLOps*. O'Reilly, 2020.

Publications (Articles)

* = equal contribution

1. Benoit Dherin*, **Michael Munn***, Hanna Mazzawi*, Michael Wunder, Javier Gonzalvo. *Learning without Training: The implicit dynamics of in-context learning*.
2. **Michael Munn***, Susan Wei*. *A Bayesian model selection criterion for selecting pretraining checkpoints*. ICML, 2025.
3. **Michael Munn***, Benoit Dherin*, Javier Gonzalvo. *The Impact of Geometric Complexity on Neural Collapse in Transfer Learning*. NeurIPS, 2024.
4. Benoit Dherin*, **Michael Munn***, Hanna Mazzawi, Michael Wunder, Sourabh Medapati, Javier Gonzalvo. *Learning by solving differential equations*.
5. Benoit Dherin, Benny Avelin, Anders Karlsson, Hanna Mazzawi, Javier Gonzalvo, **Michael Munn**. *Training in reverse: How iteration order influences convergence and stability in deep learning*.
6. **Michael Munn***, Benoit Dherin, Javier Gonzalvo. *A margin-based multiclass generalization bound via geometric complexity*. ICML, 2023.
7. Ryan Gillard, Stephen Jonany, Yingjie Miao, **Michael Munn**, Connal de Souza, Jonathan Dungay, Chen Liang, David R. So, Quoc V. Le, Esteban Real. *Unified Functional Hashing in Automated Machine Learning*.
8. Benoit Dherin*, **Michael Munn***, Mihaela Rosca, David G.T. Barrett. *Why neural networks find simple solutions: the many regularizers of geometric complexity*. NeurIPS, 2022.
9. Benoit Dherin*, **Michael Munn***, David G.T. Barrett. *The Geometric Occam's Razor Implicit in Deep Learning*. NeurIPS, 2021.

Publications (Articles) cont'd

10. Tianlin Xu, Li Kevin Wenliang, **Michael Munn**, Beatrice Acciaio. *COT-GAN: Generating Sequential Data via Causal Optimal Transport*. NeurIPS, 2020.

Publications (pre-Google)

author order is alphabethical

1. Sajjad Lakzian, **Michael Munn**. *On the Size of a Ricci Flow Neckpinch via Optimal Transport*. Analysis and Geometry of Metric Spaces, 2021.
2. Qintao Deng, Fernando Galaz-García, Luis Guijarro, **Michael Munn**. *Three-Dimensional Alexandrov spaces with positive or nonnegative Ricci curvature*. Potential Analysis 2017.
3. Lashi Bandara, Sajjad Lakzian, **Michael Munn**. *Geometric singularities and a flow tangent to the Ricci flow*. Annali S.N.S di Pisa, 2015.
4. **Michael Munn**. *Alexandrov spaces with large volume growth*. Journal of Mathematical Analysis and Applications, 2015.
5. Sajjad Lakzian, **Michael Munn**. *Super Ricci flow for disjoint unions*. Analysis and Geometry of Metric Measure Spaces, 2012.
6. **Michael Munn**. *Volume growth and the topology of pointed Gromov-Hausdorff limits*. Differential Geometry and Its Applications, 2010.
7. **Michael Munn**. *Volume growth and the topology of manifolds with nonnegative Ricci curvature*. J. of Geom. Analysis, 2010.
8. Dan Garbin, Jay Jorgenson, **Michael Munn**. *On the appearance of Eisenstein series through degeneration*. Commentarii Mathematici Helvetici, 2008.

Education

University of Warwick — Coventry, UK
National Science Foundation Postdoctoral Fellow
- Research areas: optimal transport, metric measure spaces, Ricci flow

City University of New York — New York, NY
Ph.D. in Mathematics
- Research areas: geometric analysis, topology

University of Notre Dame — South Bend, IN
B.S. in Honors Mathematics
- Magna Cum Laude

Volunteering / Advising

Google.org | GenAI Accelerator, AI Coach
- assisted UK-based NGO Materiom in development and evauation of a bio-materials discovery lab assistant integrating with Gemini 1.5 Pro.
- advised UK-based FullFact team in building a tool using Google's Gemini 1.5 Pro to monitor and analyze online videos to surface misinformation and harmful health claims

Google.org | Tech Lead, The Trevor Project
- led a team of ML SWEs across Google and Trevor, coordinated with business stakeholders to align on delivery and key objectives
- developed a custom conversation simulator model using PyTorch and GPT2/GPT3 to be used by Trevor trainees
- trainees used our conversation simulator for 4,919 hrs of training, removing 35-50 role-play shifts for trainers and the potential to graduate an additional 200-300 new counselors per year

Skills

Programming: `Python`, `SQL`, (beginner) `C++`.

Tools, Skills, Areas of Interest: JAX/Flax, Tensorflow/Keras, PyTorch, Scikit-Learn, Text Generation (GPT, Transformers), Image Generation (GANs, diffusion models), fine-tuning and transfer learning, explainable/interpretable AI and XAI tools (Captum, SHAP, LIME, LIT), statistical learning theory and generalization, implicit regularization, Riemannian geometry, optimal transportation, Google Cloud Platform, AWS, Kubeflow/Kubernetes, BigQuery, Dataflow, Colab/Jupyter, Flask.

Academic Services

Reviewer for: *NeurIPs* 2020, 2022, 2023, 2024, 2025
ICML 2023, 2024, 2025
ICLR 2025