

# Michael W. Dusenberry

Research Engineer  
Google Brain  
Mountain View, CA

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## Education

**B.S. Computer Science (Minor, Chemistry)** Aug 2008 – May 2012  
**Appalachian State University, Boone, NC**

Summa cum laude (4.0 major, 3.98 cumulative)  
Outstanding Senior in Computer Science Award

**M.D. Candidate** Aug 2012 – (May 2014)  
**The Brody School of Medicine at East Carolina University, Greenville, NC**

Completed the first two years of the M.D. degree before leaving.

## Experience

**Research Engineer** June 2021 –  
**Google Brain, Mountain View, CA**

Research software engineer focused on Bayesian deep learning research and engineering, with applications to medicine and other safety-critical problems where uncertainty, reliability, and robustness matter.

**Research Engineer** July 2020 – June 2021  
**Google Cloud AI Research, Sunnyvale, CA**

Research software engineer focused on Bayesian deep learning research and engineering, with applications to public health and other high-stakes industries.

**AI Resident** June 2018 – July 2020  
**Google Brain & Google Health Research, Mountain View, CA**

AI Resident focused on research in Bayesian deep learning and medicine.

**Committer & PMC Member, Apache SystemML** Nov 2015 –  
**The Apache Software Foundation**

Committer & PMC member for the open-source project, Apache SystemML.

**Machine Learning Advisory Software Engineer** July 2017 – June 2018  
**Machine Learning Software Engineer** May 2015 – July 2017  
**IBM Center for Open-source Data & AI Technologies, San Francisco, CA**

Machine learning engineer focused on deep learning research in medicine, and research in distributed systems for machine learning with Python, Scala, TensorFlow, Apache SystemML, and Apache Spark. Joined as part of the initial founding team and helped build the center from the ground up. In July 2017, my responsibilities expanded to include an advisory role for other machine learning projects within the center, as well as the leadership of small teams.

**Researcher, Department of Emergency Medicine** May 2013 – Feb 2017  
**The Brody School of Medicine at East Carolina University, Greenville, NC**

Student researcher building and evaluating the use of custom neural networks (Python, Octave/MATLAB) as a machine learning approach to predicting outcomes in complex clinical cases in the emergency department, under the guidance of Dr. Kori Brewer, Ph.D. and Dr. Charles Brown, M.D. Project started during the M1 summer session as part of the Brody School of Medicine "Summer Scholars Student Research Program". Presented posters at the Brody School of Medicine Medical Student Research Day (2013), and the North Carolina Medical Society Scientific Poster Conference (2013). Primary author on a paper published in the American Journal of Emergency Medicine (2017).

**Researcher, Department of Computer Science**  
**Appalachian State University, Boone, NC**

Aug 2011 – Aug 2012

Recruited from within the CS department, along with two graduate students, to form a research team for building and evaluating the use of online, automatically-grading software systems for use in CS classes.

## Publications

### Preprints

1. Zachary Nado, Neil Band, Mark Collier, Josip Djolonga, **Michael W. Dusenberry**, Sebastian Farquhar, Angelos Filos, Marton Havasi, Rodolphe Jenatton, Ghassen Jerfel, Jeremiah Liu, Zeld Mariet, Jeremy Nixon, Shreyas Padhy, Jie Ren, Tim G. J. Rudner, Yeming Wen, Florian Wenzel, Kevin Murphy, D. Sculley, Balaji Lakshminarayanan, Jasper Snoek, Yarin Gal, and Dustin Tran. Uncertainty Baselines: Benchmarks for Uncertainty & Robustness in Deep Learning. *arXiv:2106.04015*, 2021. <http://arxiv.org/abs/2106.04015>.
2. Jeremy Nixon, **Michael W. Dusenberry**, Linchuan Zhang, Ghassen Jerfel, and Dustin Tran. Measuring calibration in deep learning. *arXiv:1904.01685*, 2019. <https://arxiv.org/abs/1904.01685>.
3. Niketan Pansare, **Michael W. Dusenberry**, Nakul Jindal, Matthias Boehm, Berthold Reinwald, and Prithviraj Sen. Deep learning with Apache SystemML. *arXiv:1802.04647*, 2018. <https://arxiv.org/abs/1802.04647>.
4. **Michael W. Dusenberry** and Fei Hu. Deep learning for breast cancer mitosis detection. 2018.

### Journals & Conferences

5. Sercan Ö. Arık, Joel Shor, Rajarishi Sinha, Jinsung Yoon, Joseph R. Ledsam, Long T. Le, **Michael W. Dusenberry**, Nathanael C. Yoder, Kris Popenoerf, Arkady Epshteyn, Johan Euphrosine, Elli Kanak, Isaac Jones, Chun-Liang Li, Beth Luan, Joe Mckenna, Vikas Menon, Shashank Singh, Mimi Sun, Ashwin Sura Ravi, Leyou Zhang, Dario Sava, Kane Cunningham, Hiroki Kayama, Thomas Tsai, Daisuke Yoneoka, Shuhei Nomura, Hiroaki Miyata, and Tomas Pfister. A prospective evaluation of AI-augmented epidemiology to forecast COVID-19 in the USA and Japan. *npj Digital Medicine*, 2021. <https://doi.org/10.1038/s41746-021-00511-7>.
6. Yeming Wen, Ghassen Jerfel, Rafael Muller, **Michael W. Dusenberry**, Jasper Snoek, Balaji Lakshminarayanan, and Dustin Tran. Combining Ensembles and Data Augmentation can Harm your Calibration. In *Proc. of International Conference on Learning Representations (ICLR)*, 2021. <https://arxiv.org/abs/2010.09875>.
7. **Michael W. Dusenberry**, Ghassen Jerfel, Yeming Wen, Yi-an Ma, Jasper Snoek, Katherine Heller, Balaji Lakshminarayanan, and Dustin Tran. Efficient and scalable bayesian neural nets with rank-1 factors. In *Proc. of International Conference on Machine Learning (ICML)*, 2020. <http://arxiv.org/abs/2005.07186>.

8. **Michael W. Dusenberry**, Dustin Tran, Edward Choi, Jonas Kemp, Jeremy Nixon, Ghassen Jerfel, Katherine Heller, and Andrew M. Dai. Analyzing the role of model uncertainty for electronic health records. In *Proc. of ACM Conference on Health, Inference, and Learning (ACM CHIL)*, 2020. <https://arxiv.org/abs/1906.03842>.
9. Edward Choi, Zhen Xu, Yujia Li, **Michael W. Dusenberry**, Gerardo Flores, Yuan Xue, and Andrew M. Dai. Graph convolutional transformer: Learning the graphical structure of electronic health records. In *Proc. of Association for the Advancement of Artificial Intelligence (AAAI)*, 2020. <https://arxiv.org/abs/1906.04716>.
10. Dustin Tran, **Michael W. Dusenberry**, Mark van der Wilk, and Danijar Hafner. Bayesian Layers: A module for neural network uncertainty. In *Proc. of Neural Information Processing Systems (NeurIPS)*, 2019. <https://arxiv.org/abs/1812.03973>.
11. **Michael W. Dusenberry**, Charles K Brown, and Kori L Brewer. Artificial neural networks: Predicting head CT findings in elderly patients presenting with minor head injury after a fall. *The American Journal of Emergency Medicine*, 2017. <https://doi.org/10.1016/j.ajem.2016.10.065>.
12. Matthias Boehm, **Michael W. Dusenberry**, Deron Eriksson, Alexandre V Evfimievski, Faraz Makari Manshadi, Niketan Pansare, Berthold Reinwald, Frederick R Reiss, Prithviraj Sen, Arvind C Surve, and Shirish Tatikonda. SystemML: Declarative machine learning on Spark. In *Proc. of the VLDB Endowment*, 2016. <https://doi.org/10.14778/3007263.3007279>.

## Software

1. Bayesian Layers: A module for neural network uncertainty 2018  
Dustin Tran, **Michael W. Dusenberry**, Mark van der Wilk, Danijar Hafner.
2. SystemML-NN: A deep learning library for Apache SystemML 2016  
**Michael W. Dusenberry**
3. SystemML: Declarative machine learning on Spark 2015  
Matthias Boehm, **Michael W. Dusenberry**, Deron Eriksson, Alexandre V Evfimievski, Faraz Makari Manshadi, Niketan Pansare, Berthold Reinwald, Frederick R Reiss, Prithviraj Sen, Arvind C Surve, and Shirish Tatikonda.

## Talks

1. ACM Conference on Health, Inference, and Learning (ACM CHIL), Virtual July 24, 2020  
*Analyzing the Role of Model Uncertainty for Electronic Health Records*
2. International Conference on Machine Learning (ICML), Virtual July 15, 2020  
*Efficient and Scalable Bayesian Neural Nets with Rank-1 Factors*
3. ICML workshop on Uncertainty & Robustness in DL, Long Beach, CA June 14, 2019  
*Analyzing the Role of Model Uncertainty for Electronic Health Records*
4. Practical Big Data Workshop, Ann Arbor, MI June 7, 2019  
*Bayesian Deep Learning for Medicine*
5. SF Big Analytics Meetup - Yelp HQ, San Francisco, CA April 18, 2018  
*Deep Learning for Breast Cancer Mitosis Detection*

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| 6. OpenTech AI conference at IBM Finland, Helsinki, Finland<br><i>AI + Healthcare</i>   | March 14, 2018 |
| 7. OpenTech AI conference at IBM Finland, Helsinki, Finland<br><i>Deep Learning for Breast Cancer Mitosis Detection</i>             | March 13, 2018 |
| 8. SF Big Analytics Meetup - GoPro HQ, San Mateo, CA<br><i>Deep Learning for Mitosis Detection</i>                                  | Oct 18, 2017   |
| 9. Strata Hadoop World, San Jose, CA<br><i>Deep Learning For Predicting Breast Cancer Proliferation Scores with Apache SystemML</i> | March 15, 2017 |
| 10. UC Berkeley Data Dialogs Conference, Berkeley, CA<br><i>Predicting Breast Cancer Proliferation Scores with Apache SystemML</i>  | Sept. 7, 2016  |
| 11. UC Berkeley Data Science Web Talks, Berkeley, CA<br><i>Deep Learning with Apache SystemML</i>                                   | Aug. 24, 2016  |
| 12. Datapalooza, Denver, CO<br><i>Apache SystemML</i>   | May 19, 2016   |

## Mentoring

Fei Hu (IBM ML Engineering Intern)	June 2017 - Dec 2017
Anooj Patel (IBM ML Engineering Intern)	Summer 2017
Madison J. Myers (IBM Data Science Intern)	June 2016 - Feb 2017

## Teaching

Teaching Assistant, CS3548: General Purpose GPU Programming Appalachian State University, Boone, NC	July 2011 – Aug 2011
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## Academic Services

Reviewer, Neural Information Processing Systems (NeurIPS)	2020 –
Reviewer, International Conference on Machine Learning (ICML)	2020 –
Reviewer, International Conference on Learning Representations (ICLR)	2021 –
Reviewer, ACM Conference on Health, Inference, and Learning (ACM CHIL)	2020 –
Reviewer, Machine Learning for Healthcare (ML4H) workshop at NeurIPS	2019 –
- Best Reviewer Award (1 of 3), 2020	
Reviewer, Uncertainty and Robustness in Deep Learning (UDL) workshop at ICML	2020 –

## Blog Posts

*Mixture Density Networks*: [mikedusenberry.com/mixture-density-networks](http://mikedusenberry.com/mixture-density-networks)

## Skills

**Languages:** Python (current), {C, Scala, Java, Octave/MATLAB, Prolog} (previous)

**Libraries:** JAX, NumPy, TensorFlow, PyTorch, Apache SystemML, Apache Spark

**Tools:** Git, tmux, Vim, L<sup>A</sup>T<sub>E</sub>X