Calvin McCarter

http://calvinmccarter.com/

CONTACT
INFORMATION

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EDUCATION

Carnegie Mellon University, Pittsburgh, PA

Ph.D. in Machine Learning   **August 2013 - May 2019**

▷ Advisor: Seyoung Kim

▷ Selected Courses: Probabilistic Graphical Models, Convex Optimization, Statistical Machine Learning, Foundations of Machine Learning Theory

University of Michigan, Ann Arbor, MI

Bachelor of Science in Engineering   **August 2009 - May 2013**

▷ Major: Computer Science, Minor: Mathematics   GPA: 3.98/4.00

▷ Selected Courses: Operating Systems, Computer Architecture, Database Systems, Numerical Methods, Linear Algebra, Theoretical Statistics

EXPERIENCE

Lightmatter, ML Scientist   **January 2021 - February 2022**

Researched ways to accelerate deep learning inference on custom photonic hardware. Explored finetuning strategies to ensure model accuracy despite hardware noise and quantization. Helped guide development of next generation of hardware to improve noise robustness.

Tempus Labs, ML Scientist   **June 2019 - January 2021**

Created and validated a new batch effect correction method, which was deployed on the Tempus RNA-seq pipeline as the source-of-truth for all clinical AI models and pharma data deliveries. Developed a new topic model for gene expression deconvolution in metastatic cancers. Explored network learning methods and graph neural nets for gene expression networks and chromosomal rearrangement graphs.

Carnegie Mellon University, PhD Student   **August 2013 - May 2019**

Worked on sparse graphical model learning problems and scalable optimization algorithms for tasks in systems biology. My focus was on using statistical machine learning to discover the gene regulatory networks which explain the effect of genetic variation on clinical traits.

Van Andel Research Institute, Research Intern   **Summer 2013**

Worked under the supervision of Brian Haab to apply feature selection method to pancreatic cancer biomarker discovery and to validate method on proteomics database.

Google, Software Engineering Intern   **Summer 2012**

Worked on server backend for Google Flight Search, developing functionality to improve quality of results for live Flight Search queries.

University of Michigan, Research Assistant   **Winter - Fall 2011**

Worked under the supervision of Valeria Bertacco and Debapriya Chatterjee to develop post-silicon validation method. Designed and implemented parallel algorithm in CUDA.

Arbor Networks, Summer Intern   **Summer 2011**

Implemented instrumentation in deep packet inspection system and prepared performance analysis tools geared to IPv6 transition.

University of Michigan, Research Assistant   **Summer 2010**

Analyzed data from simulated advertising auctions under the supervision of Michael Wellman to understand impact of bidding strategies on advertiser profitability.

R Hanson, D Martin, <u>C McCarter</u>, J Paulson, "If Loud Aliens Explain Human Earliness, Quiet Aliens Are Also Rare." *The Astrophysical Journal (APJ)*, 2021.

LE Fernandes, ..., <u>C McCarter</u>, et al., "Real-world Evidence of Diagnostic Testing and Treatment Patterns in US Breast Cancer Patients with Implications for Treatment Biomarkers from RNA-sequencing Data." *Clinical Breast Cancer*, 2020.

<u>C McCarter</u>, J Howrylak, S Kim, "Learning Gene Networks Underlying Clinical Phenotypes Using SNP Perturbations", *PLOS Computational Biology*, 2020.

<u>C McCarter</u> and S Kim, "Large-Scale Optimization Algorithms for Sparse Conditional Gaussian Graphical Models", *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2016.

<u>C McCarter</u> and S Kim, "On Sparse Gaussian Chain Graph Models", *Advances in Neural Information Processing Systems (NeurIPS)*, 2014.

S Moon, <u>C McCarter</u>, YH Kuo, "Active learning with partially featured data", *Proceedings of the 23rd International Conference on World Wide Web*, 2014.

<u>C McCarter</u>, D Kletter, H Tang, K Partyka, Y Ma, S Singh, J Yadav, M Bern, B Haab, "Prediction of Glycan Motifs Using Quantitative Analysis of Multi-lectin Binding", *Proteomics Clinical Applications*, vol: 7, issue: 9-10, 2013.

D Chatterjee, <u>C McCarter</u>, V Bertacco, "Simulation-based Signal Selection for State Restoration in Silicon Debug", *International Conference on Computer-Aided Design (ICCAD)*, 2011.

PREPRINTS A Basumallik, D Bunandar, N Dronen, L Levkova, <u>C McCarter</u>, L Nair, D Walter, D Widemann, "Adaptive Block Floating-Point for Analog Deep Learning Hardware." *Under Review*, 2021.

SELECTED REFEREED PUBLICATIONS <u>C McCarter</u>, B Leibowitz, J Michuda, JS Bell, C Igartua, KP White. "Transcriptome background tissue correction in metastatic cancers using a correlated composition admixture model", *Cancer Res. American Association for Cancer Research*, vol: 80, 2020.

K Kandasamy, <u>C McCarter</u>. "Penalised Additive Least Squares Models for High Dimensional Nonparametric Regression and Function Selection", *Large-Scale Kernel Learning Workshop @ ICML*, 2015.

PATENTS D Bunandar, <u>C McCarter</u>, A Basumallik, "Improving the accuracy of analog linear processor." US Provisional Patent 63/287,219 (2021).

J Michuda, ..., <u>C McCarter</u>, et al., "Systems and methods for multilabel cancer classification." US Patent App. 17/150,992 (2021).

SELECTED OPEN-SOURCE CONTRIBUTIONS

onnx2pytorch	https://github.com/ToriML/onnx2pytorch	
Converts ONNX models to PyTorch.		[main contributor]
PerturbNet	https://github.com/SeyoungKimLab/PerturbNet	
Learns multi-omic gene regulatory networks.		[main contributor]
MLPerf Inference	https://github.com/mlcommons/inference	
Deep learning benchmark.	[memory-efficient pyramidal encoder for RNN-Transducer]	
matrix-completion	https://github.com/tonyduan/matrix-completion	
Classical matrix completion.	[incremental singular-vector thresholding]	
PyTorch	https://github.com/pytorch/pytorch	
Deep learning framework.	[added LazyInstanceNorm]	
nanopq	https://github.com/matsui528/nanopq	
Product quantization (PQ) and optimized PQ.	[eigenvalue allocation initialization]	

LANGUAGES Python (PyTorch, TensorFlow, pandas, NumPy, Numba), Matlab, C++, C, CUDA, Shell, LaTeX

Teaching	*Probabilistic Graphical Models* (Teaching Assistant)	Spring 2016
	Introduction to Machine Learning (Teaching Assistant)	Fall 2015

Activities and Professional Service

Paper reviewing **June 2016 - Present**
Reviewer for *NeurIPS*, *IEEE Internet of Things*, *Statistics and Computing*, and *SciPy*.

University of Pittsburgh Biomedical Informatics Training Program **2017**
Mentor to undergraduate research intern through iBRIC program.

Middle school science fair judging **2015-2020**
Science fair judge for Pennsylvania Junior Academy of Science and Chicago Public Schools.

Machine Learning Department Student Research Symposium **2014**
Member of organizing committee. Created website and helped plan symposium.

English Language Institute Conversation Circle Program **2011 - 2013**
Group leader of conversation circle for ESL students at University of Michigan.

University of Michigan Robocup (Robot Soccer) Team **2009 - 2012**
Member and team leader (2010-2011). Developed computer vision subsystem.