Brandon Amos

bda@fb.com • bamos.github.io • bdamos
brandondamos • bamos • Last updated on February 24, 2021

Education

Ph.D. in Computer Science (0.00/0.00) 2019
Carnegie Mellon University | Pittsburgh, Pennsylvania
Differentiable Optimization-Based Modeling for Machine Learning
Advisors: J. Zico Kolter (2016 – 2019), Mahadev Satyanarayanan (2014 – 2016)

B.S. in Computer Science, Honors (3.99/4.00) 2014
Virginia Tech | Blacksburg, Virginia
Advisors: Layne Watson, Jules White, Binoy Ravindran

Northside High School | Roanoke, Virginia 2011

Experience

Research Scientist | Facebook AI | New York, New York 2019 – Present
Research Intern | Intel Labs | Santa Clara, California 2018
Host: Vladlen Koltun
Research Intern | Google DeepMind | London, UK 2017
Hosts: Misha Denil and Nando de Freitas
Data Scientist Intern | Adobe Research | San Jose, California 2014
Software Intern | Snowplow | London, UK (Remote) 2013
Software Intern | Qualcomm | San Diego, California 2013
Software Intern | Phoenix Integration | Blacksburg, Virginia 2012
Network Administrator Intern | Sunapsys | Vinton, Virginia 2011

Honors & Awards

NSF Graduate Research Fellowship 2016 – 2019
Nine undergraduate scholarships 2011 – 2014
Benjamin F. Bock, Gay B. Shober, I. Luck Gravett, VT IC CAE, Roanoke County Public Schools Engineering, Papa John's, Pamplin Leader, Scottish Rite of Freemasonry, Salem–Roanoke County Chamber of Commerce

Publications

Google Scholar ID: d8gdZR4AAAAJ

2021a R. T. Q. Chen, **B. Amos**, M. Nickel. "Learning Neural Event Functions for Ordinary Differential Equations". In: *ICLR*. URL: https://arxiv.org/abs/2011.03902.

2021b R. T. Q. Chen, **B. Amos**, M. Nickel. "Neural Spatio-Temporal Point Processes". In: *ICLR*. URL: https://arxiv.org/abs/2011.04583.

2021c S. Cohen, G. Luise, A. Terenin, **B. Amos**, M. P. Deisenroth. "Aligning Time Series on Incomparable Spaces". In: *AISTATS*. URL: https://arxiv.org/abs/2006.12648.

2021d D. Yarats, A. Zhang, I. Kostrikov, **B. Amos**, J. Pineau, R. Fergus. "Improving Sample Efficiency in Model-Free Reinforcement Learning from Images". In: *AAAI*. URL: https://arxiv.org/abs/1910.01741.

2020a B. Amos, D. Easterling, L. Watson, W. Thacker, B. Castle, M. Trosset. "QNSTOP: Quasi-Newton Algorithm for Stochastic Optimization". In: URL: https://vtechworks.lib.vt.edu/bitstream/handle/10919/49672/qnTOMS14.pdf.

2020b B. Amos, S. Stanton, D. Yarats, A. G. Wilson. *On the model-based stochastic value gradient for continuous reinforcement learning*. URL: https://arxiv.org/abs/2008.12775.

2020c B. Amos and D. Yarats. "The Differentiable Cross-Entropy Method". In: *ICML*. URL: https://arxiv.org/abs/1909.12830.

2020d N. Lambert, **B. Amos**, O. Yadan, R. Calandra. "Objective Mismatch in Model-based Reinforcement Learning". In: *L4DC*. URL: https://arxiv.org/abs/2002.04523.

2019a A. Agrawal*, **B. Amos***, S. Barratt*, S. Boyd*, S. Diamond*, J. Z. Kolter*. "Differentiable Convex Optimization Layers". In: *NeurIPS*. URL: http://web.stanford.edu/~boyd/papers/pdf/diff_cvxpy.pdf.

2019b B. Amos. "Differentiable Optimization-Based Modeling for Machine Learning". PhD thesis. Carnegie Mellon University. URL: https://github.com/bamos/thesis/raw/master/bamos_thesis.pdf.

2019c B. Amos, V. Koltun, J. Z. Kolter. "The Limited Multi-Label Projection Layer". In: *arXiv preprint arXiv:1906.08707*. URL: https://arxiv.org/abs/1906.08707.

2019d E. Grefenstette, **B. Amos**, D. Yarats, P. M. Htut, A. Molchanov, F. Meier, D. Kiela, K. Cho, S. Chintala. "Generalized Inner Loop Meta-Learning". In: *arXiv preprint arXiv:1910.01727*. URL: https://arxiv.org/abs/1910.01727.

2018a B. Amos, L. Dinh, S. Cabi, T. Rothörl, S. G. Colmenarejo, A. Muldal, T. Erez, Y. Tassa, N. Freitas, M. Denil. "Learning Awareness Models". In: *International Conference on Learning Representations*. URL: https://openreview.net/forum?id=r1HhRfWRZ.

2018b B. Amos, I. D. J. Rodriguez, J. Sacks, B. Boots, J. Z. Kolter. "Differentiable MPC for End-to-end Planning and Control". In: *NeurIPS*. URL: https://arxiv.org/abs/1810.13400.

2018c N. Brown, T. Sandholm, **B. Amos**. "Depth-Limited Solving for Imperfect-Information Games". In: *NeurIPS*. URL: http://arxiv.org/abs/1805.08195.

2018d J. Wang, **B. Amos**, A. Das, P. Pillai, N. Sadeh, M. Satyanarayanan. "Enabling Live Video Analytics with a Scalable and Privacy-Aware Framework". In: *ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM)* 14.3s, p. 64. URL: https://dl.acm.org/citation.cfm?id=3209659.

2017a B. Amos and J. Z. Kolter. "OptNet: Differentiable Optimization as a Layer in Neural Networks". In: *ICML*. URL: http://arxiv.org/abs/1703.00443.

2017b B. Amos, L. Xu, J. Z. Kolter. "Input Convex Neural Networks". In: *ICML*. URL: http://arxiv.org/abs/1609.07152.

2017c M. Chen, **B. Amos**, L. T. Watson, J. Tyson, Y. Cao, C. Shaffer, M. Trosset, C. Oguz, G. Kakoti. "Quasi-Newton Stochastic Optimization Algorithm for Parameter Estimation of a Stochastic Model of the Budding Yeast Cell Cycle". In: *IEEE/ACM Transactions on Computational Biology and Bioinformatics*. URL: https://par.nsf.gov/servlets/purl/10111392.

2017d Z. Chen. "An Empirical Study of Latency in an Emerging Class of Edge Computing Applications for Wearable Cognitive Assistance". In: *Proceedings of the Second ACM/IEEE Symposium on Edge Computing*. ACM, p. 12. URL: https://www.cs.cmu.edu/~zhuoc/papers/latency2017.pdf.

2017e P. L. Donti, **B. Amos**, J. Z. Kolter. "Task-based End-to-end Model Learning". In: *NeurIPS*. URL: http://arxiv.org/abs/1703.04529.

2017f K. Ha, Y. Abe, T. Eiszler, Z. Chen, W. Hu, **B. Amos**, R. Upadhyaya, P. Pillai, M. Satyanarayanan. "You can teach elephants to dance: agile VM handoff for edge computing". In: *Proceedings of the Second ACM/IEEE Symposium on Edge Computing*. ACM, p. 12. URL: https://www.cs.cmu.edu/~15-821/READINGS/PAPERS/ha2017.pdf.

2017g J. Wang, **B. Amos**, A. Das, P. Pillai, N. Sadeh, M. Satyanarayanan. "A Scalable and Privacy-Aware IoT Service for Live Video Analytics". In: *Proceedings of the 8th ACM on Multimedia Systems Conference*. ACM, pp. 38–49. URL: http://elijah.cs.cmu.edu/DOCS/wang-mmsys2017.pdf.

2016a B. Amos, B. Ludwiczuk, M. Satyanarayanan. *OpenFace: A general-purpose face recognition library with mobile applications*. Tech. rep. Technical Report CMU-CS-16-118, CMU School of Computer Science. URL: http://reports-archive.adm.cs.cmu.edu/anon/anon/2016/CMU-CS-16-118.pdf.

2016b N. A. J. Davies, N. Taft, M. Satyanarayanan, S. Clinch, **B. Amos**. "Privacy mediators: helping IoT cross the chasm". In: *HotMobile*. URL: http://eprints.lancs.ac.uk/78255/1/44691.pdf.

2016c W. Hu, Y. Gao, K. Ha, J. Wang, **B. Amos**, Z. Chen, P. Pillai, M. Satyanarayanan. "Quantifying the impact of edge computing on mobile applications". In: *Proceedings of the 7th ACM SIGOPS Asia-Pacific Workshop on Systems*. ACM, p. 5. URL: https://dl.acm.org/doi/10.1145/2967360.2967369.

2016d H. Zhao, T. Adel, G. Gordon, **B. Amos**. "Collapsed Variational Inference for Sum-Product Networks". In: *ICML*. URL: http://proceedings.mlr.press/v48/zhaoa16.html.

2015a Z. Chen, L. Jiang, W. Hu, K. Ha, **B. Amos**, P. Pillai, A. Hauptmann, M. Satyanarayanan. "Early Implementation Experience with Wearable Cognitive Assistance Applications". In: *WearSys*. URL: http://www.cs.cmu.edu/~satya/docdir/chen-wearsys2015.pdf.

2015b Y. Gao, W. Hu, K. Ha, **B. Amos**, P. Pillai, M. Satyanarayanan. *Are Cloudlets Necessary?* Tech. rep. Technical Report CMU-CS-15-139, CMU School of Computer Science. URL: http://reports-archive.adm.cs.cmu.edu/anon/anon/2015/CMU-CS-15-139.pdf.

2015c K. Ha, Y. Abe, Z. Chen, W. Hu, **B. Amos**, P. Pillai, M. Satyanarayanan. *Adaptive VM handoff across cloudlets*. Tech. rep. Technical Report CMU-CS-15-113, CMU School of Computer Science. URL: http://ra.adm.cs.cmu.edu/anon/2015/CMU-CS-15-113.pdf.

2015d W. Hu, **B. Amos**, Z. Chen, K. Ha, W. Richter, P. Pillai, B. Gilbert, J. Harkes, M. Satyanarayanan. "The Case for Offload Shaping". In: *HotMobile*. URL: http://www.cs.cmu.edu/~satya/docdir/hu-hotmobile2015.pdf.

2015e M. Satyanarayanan, P. Simoens, Y. Xiao, P. Pillai, Z. Chen, K. Ha, W. Hu, **B. Amos**. "Edge Analytics in the Internet of Things". In: *IEEE Pervasive Computing* 2, pp. 24–31. URL: https://www.cs.cmu.edu/~satya/docdir/satya-edge2015.pdf.

2015f H. Turner, J. White, J. A. Camelio, C. Williams, **B. Amos**, R. Parker. "Bad Parts: Are Our Manufacturing Systems at Risk of Silent Cyberattacks?" In: *Security & Privacy, IEEE* 13.3, pp. 40–47. URL: http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7118094.

2014 T. Andrew, **B. Amos**, D. Easterling, C. Oguz, W. Baumann, J. Tyson, L. Watson. "Global Parameter Estimation for a Eukaryotic Cell Cycle Model in Systems Biology". In: *Summer Simulation Multiconference, Society for Modeling and Simulation International*. URL: http://dl.acm.org/citation.cfm?id=2685662.

2013 B. Amos, H. Turner, J. White. "Applying machine learning classifiers to dynamic Android malware detection at scale". In: *IWCMC Security, Trust and Privacy Symposium*. URL: http://bamos.github.io/data/papers/amos-iwcmc2013.pdf.

Open Source

facebookresearch/dcem	★77	*The Differentiable Cross-Entropy Method*	2020
facebookresearch/higher	★1.1k	*PyTorch higher-order gradients*	2019
bamos/thesis	★238	*Thesis source cdoe*	2019
cvxgrp/cvxpylayers	★862	*Differentiable convex optimization layers*	2019
locuslab/mpc.pytorch	★436	*PyTorch differentiable model-predictive control*	2018
locuslab/icnn	★212	*Input Convex Neural Network Experiments*	2017
locuslab/optnet	★360	*OptNet Experiments*	2017
locuslab/qpth	★461	*A fast and differentiable QP solver for PyTorch*	2017
bamos/densenet.pytorch	★681	*PyTorch DenseNet implementation*	2017
bamos/block	★253	*An intelligent block matrix library*	2017
bamos/setGPU	★92	*Automatically use the least-loaded GPU*	2017
bamos/dcgan-completion.tensorflow	★1.3k	*Image completion in TensorFlow*	2016
cmusatyalab/openface	★13.9k	*Face recognition with deep neural networks*	2015
bamos/zsh-history-analysis	★160	*Analyze and plot your zsh history*	2014
bamos/cv	★307	*My YAML/LaTeX/Markdown cv*	2013
bamos/dotfiles	★222	*Linux, mutt, xmonad, i3, vim, emacs, zsh*	2012

Invited Talks

Max Planck Institute for Intelligent Systems (Tübingen) Seminar	2020
Montreal Institute for Learning Algorithms Seminar	2020
ECCV Deep Declarative Networks Tutorial	2020
CVPR Deep Declarative Networks Workshop	2020
Caltech CS 159, Guest Lecture	2020
SIAM MDS Minisymposium on Learning Parameterized Energy Minimization Models	2020
New York University CILVR Seminar	2019
INFORMS Session on Prediction and Optimization	2019
Facebook AI Research	2019
ISMP Session on Machine Learning and Optimization	2018

Google Brain	2018
Bosch Center for AI	2018
Waymo Research	2018
Tesla AI	2018
NVIDIA Robotics	2018
Salesforce Research	2018
OpenAI	2018
NNAISENSE	2018

Students & Advising

Aaron Lou (Cornell), FAIR Intern (with Max Nickel)	2020
Ricky Chen (Toronto), FAIR Intern (with Max Nickel)	2020
Paul Liang (CMU), FAIR Intern (with Ed Grefenstette and Tim Rocktäschel)	2020
Phillip Wang (CMU), Undergraduate Researcher	2018
Lei Xu (Tsinghua), CMU Intern (with J. Zico Kolter)	2016

Service

Reviewing: AAAI, ICML, NeurIPS, ICLR*, ICCV, CVPR, ICRA *Outstanding reviewer

NeurIPS Learning Meets Combinatorial Optimization Workshop Organizer	2020
CVPR Deep Declarative Workshop Organizer	2020
ECCV Deep Declarative Tutorial Organizer	2020
CMU CSD MS Admissions	2014 – 2015

Teaching

Graduate AI (CMU 15-780), TA	S2017
Distributed Systems (CMU 15-440/640), TA	S2016
Software Design and Data Structures (VT CS2114), TA	S2013

Skills

Languages	C, C++, Fortran, Haskell, Java, Lua, Make, Mathematica, Python, R, Scala
Frameworks	JAX, NumPy, Pandas, PyTorch, SciPy, TensorFlow, Torch7
Tools	Linux, emacs, vim, evil, org, mu4e, xmonad, i3, git, tmux, zsh