

Brandon Amos

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Education

- Ph.D. in Computer Science, Carnegie Mellon University (0.00/0.00) Aug 2014 – May 2019
- M.S. in Computer Science, Carnegie Mellon University (0.00/0.00) Aug 2014 – May 2016
- B.S. in Computer Science, Virginia Tech (3.99/4.00) Aug 2011 – May 2014
- Northside High School (Roanoke, Virginia) Aug 2007 – May 2011

Experience

- Research Scientist, Facebook AI May 2019 – Present
- Research Intern, Intel Labs June 2018 – Sept 2018
- Research Intern, Google DeepMind May 2017 – Oct 2017
- Data Scientist Intern, Adobe Research May 2014 – Aug 2014
- Software Engineer Intern, Snowplow Analytics Dec 2013 – Jan 2014
- Software Engineer Intern, Qualcomm May 2013 – Aug 2013
- Software Engineer Intern, Phoenix Integration May 2012 – Aug 2012
- Network Administrator Intern, Sunapsys Jan 2011 – Aug 2011

Selected Publications

Google Scholar ID: [d8gdZR4AAAAJ](https://scholar.google.com/citations?user=d8gdZR4AAAAJ)

- 2020a** B. Amos and D. Yarats. “The Differentiable Cross-Entropy Method”. In: *ICML*. URL: <https://arxiv.org/abs/1909.12830>.
- 2020b** 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. “Generalized Inner Loop Meta-Learning”. In: *arXiv preprint arXiv:1910.01727*. URL: <https://arxiv.org/abs/1910.01727>.
- 2018a** 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>.
- 2018b** B. Amos. “Learning Awareness Models”. In: *International Conference on Learning Representations*. URL: <https://openreview.net/forum?id=r1HhRfWRZ>.
- 2018c** N. Brown, T. Sandholm, B. Amos. “Depth-Limited Solving for Imperfect-Information Games”. In: *NeurIPS*. URL: <http://arxiv.org/abs/1805.08195>.
- 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** P. L. Donti, B. Amos, J. Z. Kolter. “Task-based End-to-end Model Learning”. In: *NeurIPS*. URL: <http://arxiv.org/abs/1703.04529>.
- 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** 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>.

2014 **B. Amos**, D. Easterling, L. Watson, W. Thacker, B. Castle, M. Trosset. "QNSTOP: Quasi-Newton Algorithm for Stochastic Optimization". In: URL: <https://dl.acm.org/doi/10.1145/3374219>.

Teaching Experience

- o Graduate AI (CMU 15-780), TA S2017
- o Distributed Systems (CMU 15-440/640), TA S2016
- o Software Design and Data Structures (VT CS 2114), TA S2013

Honors & Awards

- o NSF Graduate Research Fellowship 2016 – 2019
- o Eight undergraduate scholarships 2011 – 2014

Service

Reviewer ICML 2018, NeurIPS 2018, NeurIPS Deep RL Workshop 2018, ICLR 2019 (outstanding reviewer), ICML 2019, ICCV 2019

Admissions CMU CSD MS 2014-2015

Skills

Languages C, C++, Fortran, Haskell, Java, Lua, Make, *Mathematica*, Python, R, Scala
Frameworks NumPy, Pandas, PyTorch, SciPy, TensorFlow, Torch7
Systems Linux, OSX

All Publications

Google Scholar ID: [d8gdZR4AAAAJ](https://scholar.google.com/citations?user=d8gdZR4AAAAJ)

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

2020b 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. "Generalized Inner Loop Meta-Learning". In: *arXiv preprint arXiv:1910.01727*. URL: <https://arxiv.org/abs/1910.01727>.

2019e D. Yarats, A. Zhang, I. Kostrikov, **B. Amos**, J. Pineau, R. Fergus. "Improving Sample Efficiency in Model-Free Reinforcement Learning from Images". In: *arXiv preprint arXiv:1910.01741*. URL: <https://arxiv.org/abs/1910.01741>.

2018a **B. Amos**, I. D. J. Rodriguez, J. Sacks, B. Boots, J. Z. Kolter. "Differentiable MPC for End-to-end Planning and Control". In: *NeurIPS*.

2018b **B. Amos**. "Learning Awareness Models". In: *International Conference on Learning Representations*. URL: <https://openreview.net/forum?id=r1HhRfWRZ>.

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. “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*.
- 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.
- 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. “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.
- 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.
- 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.
- 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. “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>.
- 2014a** B. Amos, D. Easterling, L. Watson, B. Castle, M. Trosset, W. Thacker. “Fortran 95 implementation of QNSTOP for global and stochastic optimization”. In: *Spring Simulation Multiconference, High Performance Computer Symposium, Society for Modeling and Simulation International*. URL: <http://dl.acm.org/citation.cfm?id=2663525>.
- 2014b** B. Amos, D. Easterling, L. Watson, W. Thacker, B. Castle, M. Trosset. “QNSTOP: Quasi-Newton Algorithm for Stochastic Optimization”. In: URL: <https://dl.acm.org/doi/10.1145/3374219>.
- 2014c** B. Amos and D. Tompkins. “Performance study of Spindle, a web analytics query engine implemented in Spark”. In: *IEEE CloudCom*. URL: <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7037709>.
- 2014d** 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>.