

# 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 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](#)

- 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>.
- 2020a** **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>.
- 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** S. Cohen, G. Luise, A. Terenin, **B. Amos**, M. P. Deisenroth. *Aligning Time Series on Incomparable Spaces*. URL: <https://arxiv.org/abs/2006.12648>.
- 2020e** 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](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](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>.

## Teaching Experience

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

## Honors & Awards

- NSF Graduate Research Fellowship 2016 – 2019
- Eight undergraduate scholarships 2011 – 2014  
Benjamin F. Bock, Intelligence Community Center of Academic Excellence, Roanoke County Public Schools Engineering, Papa John's, Gay B. Shober Memorial, Pamplin Leader, I. Luck Gravett Memorial, Scottish Rite of Freemasonry, Salem–Roanoke County Chamber of Commerce

## Service

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|------------|--|-----------------------|
| Reviewing  | AAAI, ICML, NeurIPS, ICLR*, ICCV, CVPR, ICRA | *Outstanding reviewer |
| Admissions | CMU CSD MS 2014-2015                         |                       |

## Skills

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|------------|--|
| Languages  | C, C++, Fortran, Haskell, Java, Lua, Make, Mathematica, Python, R, Scala |
| Frameworks | jax, NumPy, Pandas, PyTorch, SciPy, TensorFlow, Torch7                   |
| OS         | Linux  |

## All Publications

Google Scholar ID: [d8gdZR4AAAAJ](https://scholar.google.com/citations?user=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** 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://dl.acm.org/doi/10.1145/3374219>.
- 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** S. Cohen, G. Luise, A. Terenin, B. Amos, M. P. Deisenroth. *Aligning Time Series on Incomparable Spaces*. URL: <https://arxiv.org/abs/2006.12648>.

- 2020e** 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](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](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*.
- 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** 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>.
- 2014c** 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>.