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

Research Experience

- Carnegie Mellon University, Zico Kolter — Apr 2016 – Present
  - Machine learning and optimization
- Intel Labs, Vladlen Koltun — June 2018 – Sept 2018
  - Machine learning
- Google DeepMind, Nando de Freitas — May 2017 – Oct 2017
  - Machine and reinforcement learning
- Carnegie Mellon University, Mahadev Satyanarayanan — Aug 2014 – Apr 2016
  - Applied machine learning and mobile systems
- Virginia Tech, Jules White — May 2012 – May 2014
  - Mobile systems, cyber-physical systems, and security
- Virginia Tech, Layne Watson — Jan 2013 – May 2014
  - Scientific computing, global/stochastic optimization, and bioinformatics
- Virginia Tech, Binoy Ravindran — Nov 2012 – Mar 2014
  - Heterogeneous compilers

Selected Publications

Google Scholar ID: d8gdZR4AAAAJ

[1] **B. Amos**, I. D. J. Rodriguez, J. Sacks, B. Boots, J. Z. Kolter, "Differentiable MPC for End-to-end Planning and Control," in *NeurIPS*, 2018. [Online]. Available: https://arxiv.org/abs/1810.13400.

[2] N. Brown, T. Sandholm, **B. Amos**, "Depth-limited solving for imperfect-information games," in *NeurIPS*, 2018. [Online]. Available: http://arxiv.org/abs/1805.08195.

[3] **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*, 2018. [Online]. Available: https://openreview.net/forum?id=r1HhRfWRZ.

[4] P. L. Donti, **B. Amos**, J. Z. Kolter, "Task-based End-to-end Model Learning," in *NeurIPS*, 2017. [Online]. Available: http://arxiv.org/abs/1703.04529.

[5] **B. Amos** and J. Z. Kolter, "OptNet: Differentiable Optimization as a Layer in Neural Networks," in *ICML*, 2017. [Online]. Available: http://arxiv.org/abs/1703.00443.

[6] **B. Amos**, L. Xu, J. Z. Kolter, "Input Convex Neural Networks," in *ICML*, 2017. [Online]. Available: http://arxiv.org/abs/1609.07152.

[7] H. Zhao, T. Adel, G. Gordon, **B. Amos**, "Collapsed Variational Inference for Sum-Product Networks," in *ICML*, 2016. [Online]. Available: http://www.cs.cmu.edu/~hzhao1/papers/ICML2016/BL-SPN-main.pdf.

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

[9] **B. Amos**, D. Easterling, L. Watson, W. Thacker, B. Castle, M. Trosset, "QNSTOP-QuasiNewton Algorithm for Stochastic Optimization," 2014. [Online]. Available: https://vtechworks.lib.vt.edu/bitstream/handle/10919/49672/qnTOMS14.pdf.

Teaching Experience

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

Industry Experience

- 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

CMU Graduate Coursework

- Statistical Machine Learning (10-702, Au), L. Wasserman — S2017
- Deep Reinforcement Learning (10-703, Au), R. Salakhutdinov and A. Fragkiadaki — S2017
- Intermediate Statistics (10-705, Au), L. Wasserman — F2016
- Topics in Deep Learning (10-807), R. Salakhutdinov — F2016
- Convex Optimization (10-725), R. J. Tibshirani — F2015
- Algorithms in the Real World (15-853), G. Blelloch and A. Gupta — F2015
- Semantics of Programming Languages (15-812), A. Platzer — S2015
- Optimizing Compilers for Modern Architecture (15-745), T. Mowry — S2015
- Advanced Operating and Distributed Systems (15-712), D. Andersen — F2014
- Mobile and Pervasive Computing (15-812), M. Satyanarayanan and D. Siewiorek — F2014

Honors & Awards

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

Skills

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

Service

Reviewer	ICML 2018, NeurIPS 2018, NeurIPS Deep RL Workshop 2018, ICLR 2019 (outstanding reviewer), ICCV 2019
Admissions	CMU CSD MS 2014-2015

All Publications

Google Scholar ID: d8gdZR4AAAAJ

Preprints and Tech Reports

[P1] **B. Amos**, B. Ludwiczuk, M. Satyanarayanan, "Openface: A general-purpose face recognition library with mobile applications," Technical Report CMU-CS-16-118, CMU School of Computer Science, Tech. Rep., 2016. [Online]. Available: http://reports-archive.adm.cs.cmu.edu/anon/anon/2016/CMU-CS-16-118.pdf.

[P2] Y. Gao, W. Hu, K. Ha, **B. Amos**, P. Pillai, M. Satyanarayanan, "Are cloudlets necessary?" Technical Report CMU-CS-15-139, CMU School of Computer Science, Tech. Rep., 2015. [Online]. Available: http://reports-archive.adm.cs.cmu.edu/anon/anon/2015/CMU-CS-15-139.pdf.

[P3] K. Ha, Y. Abe, Z. Chen, W. Hu, **B. Amos**, P. Pillai, M. Satyanarayanan, "Adaptive vm handoff across cloudlets," Technical Report CMU-CS-15-113, CMU School of Computer Science, Tech. Rep., 2015. [Online]. Available: http://ra.adm.cs.cmu.edu/anon/2015/CMU-CS-15-113.pdf.

[P4] **B. Amos**, D. Easterling, L. Watson, W. Thacker, B. Castle, M. Trosset, "QNSTOP-QuasiNewton Algorithm for Stochastic Optimization," 2014. [Online]. Available: https://vtechworks.lib.vt.edu/bitstream/handle/10919/49672/qnTOMS14.pdf.

Conference Proceedings

[C1] **B. Amos**, I. D. J. Rodriguez, J. Sacks, B. Boots, J. Z. Kolter, "Differentiable MPC for End-to-end Planning and Control," in *NeurIPS*, 2018.

[C2] N. Brown, T. Sandholm, **B. Amos**, "Depth-limited solving for imperfect-information games," in *NeurIPS*, 2018. [Online]. Available: http://arxiv.org/abs/1805.08195.

[C3] **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*, 2018. [Online]. Available: https://openreview.net/forum?id=r1HhRfWRZ.

[C4] 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, 2017, pp. 38–49.

[C5] P. L. Donti, **B. Amos**, J. Z. Kolter, "Task-based end-to-end model learning," in *NeurIPS*, 2017. [Online]. Available: http://arxiv.org/abs/1703.04529.

[C6] **B. Amos** and J. Z. Kolter, "OptNet: Differentiable Optimization as a Layer in Neural Networks," in *ICML*, 2017. [Online]. Available: http://arxiv.org/abs/1703.00443.

[C7] **B. Amos**, L. Xu, J. Z. Kolter, "Input convex neural networks," in *ICML*, 2017. [Online]. Available: http://arxiv.org/abs/1609.07152.

[C8] H. Zhao, T. Adel, G. Gordon, **B. Amos**, "Collapsed Variational Inference for Sum-Product Networks," in *ICML*, 2016. [Online]. Available: http://www.cs.cmu.edu/~hzhao1/papers/ICML2016/BL-SPN-main.pdf.

[C9] **B. Amos**, H. Turner, J. White, "Applying machine learning classifiers to dynamic Android malware detection at scale," in *IWCMC Security, Trust and Privacy Symposium*, 2013. [Online]. Available: http://bamos.github.io/data/papers/amos-iwcmc2013.pdf.

Journal Articles

[J1] 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," *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, 2017.

Workshop, Symposium, and Short Papers

[W1] 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, 2017, p. 12.

[W2] Z. Chen, W. Hu, J. Wang, S. Zhao, **B. Amos**, G. Wu, K. Ha, K. Elgazzar, P. Pillai, R. Klatzky, D. Siewiorek, M. Satyanarayanan, "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, 2017, p. 12.

[W3] 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, 2016, p. 5.

[W4] N. A. J. Davies, N. Taft, M. Satyanarayanan, S. Clinch, **B. Amos**, "Privacy mediators: helping IoT cross the chasm," in *HotMobile*, 2016. [Online]. Available: http://eprints.lancs.ac.uk/78255/1/44691.pdf.

[W5] 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*, 2015. [Online]. Available: http://www.cs.cmu.edu/~satya/docdir/chen-wearsys2015.pdf.

[W6] 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*, 2015. [Online]. Available: http://www.cs.cmu.edu/~satya/docdir/hu-hotmobile2015.pdf.

[W7] **B. Amos** and D. Tompkins, "Performance study of Spindle, a web analytics query engine implemented in Spark," in *IEEE CloudCom*, 2014. [Online]. Available: http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7037709.

[W8] 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*, 2014. [Online]. Available: http://dl.acm.org/citation.cfm?id=2685662.

[W9] **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*, 2014. [Online]. Available: http://dl.acm.org/citation.cfm?id=2663525.

Magazine Articles

[M1] M. Satyanarayanan, P. Simoens, Y. Xiao, P. Pillai, Z. Chen, K. Ha, W. Hu, **B. Amos**, "Edge analytics in the internet of things," *IEEE Pervasive Computing*, no. 2, pp. 24–31, 2015. [Online]. Available: https://www.cs.cmu.edu/~satya/docdir/satya-edge2015.pdf.

[M2] H. Turner, J. White, J. A. Camelio, C. Williams, **B. Amos**, R. Parker, "Bad Parts: Are Our Manufacturing Systems at Risk of Silent Cyberattacks?" *Security & Privacy, IEEE*, vol. 13, no. 3, pp. 40–47, 2015. [Online]. Available: http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=7118094.

Posters

[S1] **B. Amos** and J. Z. Kolter, "Input-Convex Deep Networks," in *ICLR Workshop*, 2016. [Online]. Available: http://bamos.github.io/data/posters/2016-iclr-icnn.pdf.

[S2] **B. Amos** and M. Satyanarayanan, "Face Recognition for Context Sensitive IoT Systems," in *HotMobile*, 2016. [Online]. Available: http://bamos.github.io/data/posters/2016-hotmobile-facerec.pdf.