

# Brandon Amos

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## Education

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- Ph.D. in Computer Science, Carnegie Mellon University Aug 2014 – May 2019 (expected)
- M.S. in Computer Science, Carnegie Mellon University 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

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- 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

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- 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

## Industry Experience

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- o Data Scientist Intern, Adobe Research May 2014 – Aug 2014
- o Software Engineer Intern, Snowplow Analytics Dec 2013 – Jan 2014
- o Software Engineer Intern, Qualcomm May 2013 – Aug 2013
- o Software Engineer Intern, Phoenix Integration May 2012 – Aug 2012
- o Network Administrator Intern, Sunapsys Jan 2011 – Aug 2011

## CMU Graduate Coursework

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

## Honors & Awards

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

## Skills

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

## Service

Reviewer ICML 2018, NeurIPS 2018, ICLR 2019, NeurIPS Deep RL Workshop 2018  
Admissions CMU CSD MS 2014-2015

## All Publications

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