Brandon Amos

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Education

- **Ph.D. in Computer Science** (0.00/0.00) Aug 2014 – May 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) Aug 2011 – May 2014
  Virginia Tech | Blacksburg, Virginia
  Advisors: Layne Watson, Jules White, Binoy Ravindran

- Northside High School | Roanoke, Virginia Aug 2007 – May 2011

Experience

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

Honors & Awards

- NSF Graduate Research Fellowship 2016 – 2019
- Nine 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

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

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

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

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.

Invited Talks

2020 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
2019 New York University CILVR Seminar
2019 INFORMS Session on Prediction and Optimization
2018 ISMP Session on Machine Learning and Optimization
2018 Facebook AI Research
2018 Google Brain
2018 Bosch Center for AI
2018 Waymo Research
2018 Tesla AI
2018 NVIDIA Robotics
2018 Salesforce Research
2018 OpenAI
2018 NNAISENSE

Advising

2020 Aaron Lou (Cornell), FAIR Intern
2020 Ricky Chen (Toronto), FAIR Intern
2020 Paul Liang (CMU), FAIR Intern
2018 Phillip Wang (CMU)