Brandon Amos

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bamos • Last updated on February 13, 2022

Current Position

Research Scientist, Facebook AI Research (Meta), New York City 2019 – Present

Education

Ph.D. in Computer Science, Carnegie Mellon University (0.00/0.00) 2014 – 2019
Thesis: *Differentiable Optimization-Based Modeling for Machine Learning*
Advisor: J. Zico Kolter

B.S. in Computer Science, Virginia Tech (3.99/4.00) 2011 – 2014

Previous Positions

Research Assistant, Carnegie Mellon University (Advisor: J. Zico Kolter) 2016 – 2019
Research Intern, Intel Labs, Santa Clara (Host: Vladlen Koltun) 2018
Research Intern, Google DeepMind, London (Hosts: Nando de Freitas and Misha Denil) 2017
Research Assistant, Carnegie Mellon University (Advisor: Mahadev Satyanarayanan) 2014 – 2016
Data Scientist Intern, Adobe Research, San Jose (Host: David Tompkins) 2014
Research Assistant, Virginia Tech (Advisors: Layne Watson and David Easterling) 2013 – 2014
Research Assistant, Virginia Tech (Advisors: Jules White and Hamilton Turner) 2012 – 2014
Research Assistant, Virginia Tech (Advisors: Binoy Ravindran and Alastair Murray) 2012 – 2014
Software Intern, Snowplow, London (Remote) 2013 – 2014
Software Intern, Qualcomm, San Diego 2013
Software Intern, Phoenix Integration, Virginia 2012
Network Administrator Intern, Sunapsys, Virginia 2011

Honors & Awards

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

Publications [Google Scholar]

Representative publications that I am a primary author on are highlighted.

2022

1. *Tutorial on amortized optimization for learning to optimize over continuous domains* [code]
Brandon Amos
arXiv 2022

2. *Cross-Domain Imitation Learning via Optimal Transport*
Arnaud Fickinger, Samuel Cohen, Stuart Russell, and **Brandon Amos**
ICLR 2022

2021

3. *On the model-based stochastic value gradient for continuous reinforcement learning* [code] [slides]
Brandon Amos, Samuel Stanton, Denis Yarats, and Andrew Gordon Wilson
L4DC 2021 (Oral)

4. *Riemannian Convex Potential Maps* [code] [slides]
Samuel Cohen*, **Brandon Amos***, and Yaron Lipman
ICML 2021

5. *CombOptNet: Fit the Right NP-Hard Problem by Learning Integer Programming Constraints* [code]
Anselm Paulus, Michal Rolínek, Vít Musil, **Brandon Amos**, and Georg Martius
ICML 2021

6. *Scalable Online Planning via Reinforcement Learning Fine-Tuning*
Arnaud Fickinger, Hengyuan Hu, **Brandon Amos**, Stuart Russell, and Noam Brown
NeurIPS 2021

7. *Aligning Time Series on Incomparable Spaces* [code] [slides]
Samuel Cohen, Giulia Luise, Alexander Terenin, **Brandon Amos**, and Marc Peter Deisenroth
AISTATS 2021

8. *Learning Neural Event Functions for Ordinary Differential Equations* [code]
Ricky T. Q. Chen, **Brandon Amos**, and Maximilian Nickel
ICLR 2021

9. *Neural Spatio-Temporal Point Processes* [code]
Ricky T. Q. Chen, **Brandon Amos**, and Maximilian Nickel
ICLR 2021

10. *Improving Sample Efficiency in Model-Free Reinforcement Learning from Images* [code]
Denis Yarats, Amy Zhang, Ilya Kostrikov, **Brandon Amos**, Joelle Pineau, and Rob Fergus
AAAI 2021

11. *Neural Fixed-Point Acceleration for Convex Optimization* [code]
Shobha Venkataraman* and **Brandon Amos***
ICML AutoML 2021

12. *Sliced Multi-Marginal Optimal Transport*
Samuel Cohen, Alexander Terenin, Yannik Pitcan, **Brandon Amos**, Marc Peter Deisenroth, and K S Sesh Kumar
NeurIPS OTML 2021

13. *Input Convex Gradient Networks*
Jack Richter-Powell, Jonathan Lorraine, and **Brandon Amos**
NeurIPS OTML 2021

14. *Imitation Learning from Pixel Observations for Continuous Control*
Samuel Cohen, **Brandon Amos**, Marc Peter Deisenroth, Mikael Henaff, Eugene Vinitsky, and Denis Yarats
NeurIPS DeepRL 2021

15. *MBRL-Lib: A Modular Library for Model-based Reinforcement Learning* [code]
Luis Pineda, **Brandon Amos**, Amy Zhang, Nathan Lambert, and Roberto Calandra
arXiv 2021

2020

16. *The Differentiable Cross-Entropy Method* [code] [slides]
Brandon Amos and Denis Yarats
ICML 2020

17. *Objective Mismatch in Model-based Reinforcement Learning*
Nathan Lambert, **Brandon Amos**, Omry Yadan, and Roberto Calandra
L4DC 2020

18. *QNSTOP: Quasi-Newton Algorithm for Stochastic Optimization* [code]
Brandon Amos, David Easterling, Layne T. Watson, William Thacker, Brent Castle, and Michael Trosset
ACM TOMS 2020

19. *Neural Potts Model*
Tom Sercu, Robert Verkuil, Joshua Meier, **Brandon Amos**, Zeming Lin, Caroline Chen, Jason Liu, Yann LeCun, and Alexander Rives
MLCB 2020

20. *Deep Riemannian Manifold Learning*
Aaron Lou, Maximilian Nickel, and **Brandon Amos**
NeurIPS Geo4dl 2020

2019

21. *Differentiable Optimization-Based Modeling for Machine Learning* [code]
Brandon Amos
Ph.D. Thesis 2019

22. *Differentiable Convex Optimization Layers* [code]
Akshay Agrawal*, **Brandon Amos***, Shane Barratt*, Stephen Boyd*, Steven Diamond*, and J. Zico Kolter*
NeurIPS 2019

23. *The Limited Multi-Label Projection Layer* [code]
Brandon Amos, Vladlen Koltun, and J. Zico Kolter
arXiv 2019

24. *Generalized Inner Loop Meta-Learning* [code]
Edward Grefenstette, **Brandon Amos**, Denis Yarats, Phu Mon Htut, Artem Molchanov, Franziska Meier, Douwe Kiela, Kyunghyun Cho, and Soumith Chintala
arXiv 2019

2018

25. *Learning Awareness Models*
Brandon Amos, Laurent Dinh, Serkan Cabi, Thomas Rothörl, Sergio Gómez Colmenarejo, Alistair Muldal, Tom Erez, Yuval Tassa, Nando de Freitas, and Misha Denil
ICLR 2018

26. *Differentiable MPC for End-to-end Planning and Control* [code]
Brandon Amos, Ivan Dario Jimenez Rodriguez, Jacob Sacks, Byron Boots, and J. Zico Kolter
NeurIPS 2018

27. *Depth-Limited Solving for Imperfect-Information Games*
Noam Brown, Tuomas Sandholm, and **Brandon Amos**
NeurIPS 2018

28. *Enabling Live Video Analytics with a Scalable and Privacy-Aware Framework*
Junjue Wang, **Brandon Amos**, Anupam Das, Padmanabhan Pillai, Norman Sadeh, and Mahadev Satyanarayanan
ACM TOMM 2018

2017

29. *OptNet: Differentiable Optimization as a Layer in Neural Networks* [code] [slides]
Brandon Amos and J. Zico Kolter
ICML 2017

30. *Input Convex Neural Networks* [code] [slides]
Brandon Amos, Lei Xu, and J. Zico Kolter
ICML 2017

31. *Task-based End-to-end Model Learning* [code]
Priya L. Donti, **Brandon Amos**, and J. Zico Kolter
NeurIPS 2017

32. *Quasi-Newton Stochastic Optimization Algorithm for Parameter Estimation of a Stochastic Model of the Budding Yeast Cell Cycle*
Minghan Chen, **Brandon Amos**, Layne T. Watson, John Tyson, Yang Cao, Cliff Shaffer, Michael Trosset, Cihan Oguz, and Gisella Kakoti
IEEE/ACM TCBB 2017

33. *You can teach elephants to dance: agile VM handoff for edge computing*
Kiryong Ha, Yoshihisa Abe, Thomas Eiszler, Zhuo Chen, Wenlu Hu, **Brandon Amos**, Rohit Upadhyaya, Padmanabhan Pillai, and Mahadev Satyanarayanan
SEC 2017

34. *An Empirical Study of Latency in an Emerging Class of Edge Computing Applications for Wearable Cognitive Assistance*
Zhuo Chen, Wenlu Hu, Junjue Wang, Siyan Zhao, **Brandon Amos**, Guanhang Wu, Kiryong Ha, Khalid Elgazzar, Padmanabhan Pillai, Roberta Klatzky, Daniel Siewiorek, and Mahadev Satyanarayanan
SEC 2017

35. *A Scalable and Privacy-Aware IoT Service for Live Video Analytics* [code]
Junjue Wang, **Brandon Amos**, Anupam Das, Padmanabhan Pillai, Norman Sadeh, and Mahadev Satyanarayanan
ACM MMSys 2017 (Best Paper)

2016

36. *OpenFace: A general-purpose face recognition library with mobile applications* [code]
Brandon Amos, Bartosz Ludwiczuk, and Mahadev Satyanarayanan
CMU 2016

37. *Collapsed Variational Inference for Sum-Product Networks*
Han Zhao, Tameem Adel, Geoff Gordon, and **Brandon Amos**
ICML 2016

38. *Quantifying the impact of edge computing on mobile applications*
Wenlu Hu, Ying Gao, Kiryong Ha, Junjue Wang, **Brandon Amos**, Zhuo Chen, Padmanabhan Pillai, and Mahadev Satyanarayanan
ACM SIGOPS 2016

39. *Privacy mediators: helping IoT cross the chasm*
Nigel Davies, Nina Taft, Mahadev Satyanarayanan, Sarah Clinch, and **Brandon Amos**
HotMobile 2016

2015 and earlier

40. *Edge Analytics in the Internet of Things*
Mahadev Satyanarayanan, Pieter Simoens, Yu Xiao, Padmanabhan Pillai, Zhuo Chen, Kiryong Ha, Wenlu Hu, and **Brandon Amos**
IEEE Pervasive Computing 2015

41. *Bad Parts: Are Our Manufacturing Systems at Risk of Silent Cyberattacks?*
Hamilton Turner, Jules White, Jaime A. Camelio, Christopher Williams, **Brandon Amos**, and Robert Parker
IEEE Security & Privacy 2015

42. *Early Implementation Experience with Wearable Cognitive Assistance Applications*
Zhuo Chen, Lu Jiang, Wenlu Hu, Kiryong Ha, **Brandon Amos**, Padmanabhan Pillai, Alex Hauptmann, and Mahadev Satyanarayanan
WearSys 2015

43. *The Case for Offload Shaping*
Wenlu Hu, **Brandon Amos**, Zhuo Chen, Kiryong Ha, Wolfgang Richter, Padmanabhan Pillai, Benjamin Gilbert, Jan Harkes, and Mahadev Satyanarayanan
HotMobile 2015

44. *Are Cloudlets Necessary?*
Ying Gao, Wenlu Hu, Kiryong Ha, **Brandon Amos**, Padmanabhan Pillai, and Mahadev Satyanarayanan
CMU 2015

45. *Adaptive VM handoff across cloudlets*
Kiryong Ha, Yoshihisa Abe, Zhuo Chen, Wenlu Hu, **Brandon Amos**, Padmanabhan Pillai, and Mahadev Satyanarayanan
CMU 2015

46. *Global Parameter Estimation for a Eukaryotic Cell Cycle Model in Systems Biology*
Tricity Andrew, **Brandon Amos**, David Easterling, Cihan Oguz, William Baumann, John Tyson, and Layne T. Watson
SummerSim 2014

47. *Applying machine learning classifiers to dynamic Android malware detection at scale* [code]
Brandon Amos, Hamilton Turner, and Jules White
IWCMC 2013

Repositories

facebookresearch/theseus | ★210 | *Differentiable non-linear optimization library* 2022
facebookresearch/mbrl-lib | ★567 | *Model-based reinforcement learning library* 2021
facebookresearch/dcem | ★95 | *The Differentiable Cross-Entropy Method* 2020
facebookresearch/higher | ★1.3k | *PyTorch higher-order gradient and optimization library* 2019
bamos/thesis | ★262 | *Ph.D. Thesis LaTeX source code* 2019
cvxgrp/cvxpylayers | ★1.2k | *Differentiable Convex Optimization Layers* 2019
locuslab/mpc.pytorch | ★521 | *Differentiable Model-Predictive Control* 2018
locuslab/icnn | ★236 | *Input Convex Neural Networks* 2017
locuslab/optnet | ★381 | *OptNet experiments* 2017
locuslab/qpth | ★517 | *Differentiable PyTorch QP solver* 2017
bamos/densenet.pytorch | ★736 | *PyTorch DenseNet implementation* 2017
bamos/block | ★261 | *Intelligent block matrix constructions* 2017
bamos/setGPU | ★98 | *Automatically use the least-loaded GPU* 2017
bamos/dcgan-completion.tensorflow | ★1.3k | *Image completion with GANs* 2016
cmusatyalab/openface | ★14.3k | *Face recognition with deep neural networks* 2015
bamos/zsh-history-analysis | ★172 | *Analyze and plot your zsh history* 2014
bamos/cv | ★342 | *Source for this CV: Creates LaTeX/Markdown from YAML/BibTeX* 2013
bamos/dotfiles | ★234 | *Linux, mutt, xmonad, vim, emacs, zsh* 2012

Invited Talks

Columbia University 2021
IBM Research 2021
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 2020
SIAM MDS Minisymposium on Learning Parameterized Energy Minimization Models 2020
New York University CILVR Seminar 2019
INFORMS Session on Prediction and Optimization 2019
Facebook AI Research 2019
ISMP Session on Machine Learning and Optimization 2018
Google Brain 2018
Bosch Center for AI 2018
Waymo Research 2018
Tesla AI 2018
NVIDIA Robotics 2018
Salesforce Research 2018
OpenAI 2018
NNAISENSE 2018
UC Berkeley 2018

Interns and Students

Aaron Lou (visiting FAIR from Cornell and Stanford) 2020 – 2022
Eugene Vinitsky (visiting FAIR from Berkeley) 2021 – 2022
Arnaud Fickinger (visiting FAIR from Berkeley) 2021 – 2022
Samuel Cohen (visiting FAIR from UCL) 2021 – 2022

Ricky Chen (visiting FAIR from Toronto, now: scientist at FAIR) 2020
Paul Liang (visiting FAIR from CMU) 2020
Phillip Wang (at CMU, now: CEO at Gather) 2018

Professional Activities

Reviewing: AAAI, ICML, NeurIPS, ICLR, ICCV, CVPR, ICRA

NeurIPS Learning Meets Combinatorial Optimization Workshop Organizer 2020
CVPR Deep Declarative Workshop Organizer 2020
ECCV Deep Declarative Tutorial Organizer 2020
CMU CSD MS Admissions 2014 – 2015

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

Skills

Programming	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, git, tmux, zsh