

David Mascharka

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covariant.ai
Research Engineer

Berkeley, CA
2019–

MIT Lincoln Laboratory
Researcher

Lexington, MA
2017–2019

Drake University
B.S. Computer Science, Mathematics; B.A. Philosophy

Des Moines, IA
2013–2017

Experience

Research.....

MIT Lincoln Laboratory

Lexington, MA

Computer Vision–Visual Reasoning

Summer 2017–Spring 2018

- Developed neural module network architecture explicitly modeling visual attention
- Attention mechanism provides unparalleled model transparency and diagnostic insight
- GitHub: TbD-nets / Paper: CVPR 2018

Drake University

Des Moines, IA

Algorithmic Information Theory, PI:Chris Porter

Fall 2016–Spring 2017

- Utilized conditional Kolmogorov complexity to classify galactic spectra
- Investigated application of Normalized Compression Distance to real-world data

MIT Lincoln Laboratory

Lexington, MA

Computer Vision–Semantic Segmentation, PI:Arjun Majumdar

Summer 2016

- Developed a Theano-based deep learning library
- Applied modified SegNet architecture to novel aerial datasets

MIT Haystack Observatory

Westford, MA

Scientific Data Processing, PI:Victor Pankratius

Summer 2015–Spring 2016

- Demonstrated viability of mobile platforms for real-time scientific data collection and processing
- GitHub: MCheetah scientific data processing pipeline for Android

Drake University

Des Moines, IA

Indoor Localization, PI:Eric Manley

Summer 2014–Spring 2016

- GitHub: LIPS / Paper: CCNC 2016

Drake University

Des Moines, IA

Protein Folding/Structure, PI:Timothy Urness

Spring 2014–Spring 2016

- Paper: American Journal of Undergraduate Research

Professional.....

MIT Lincoln Laboratory

Lexington, MA

Computer Vision – Object detection in synthetic aperture radar imagery

Spring 2018–Spring 2019

MIT Lincoln Laboratory

Lexington, MA

Computer Vision – Object detection from small UAVs

Spring 2018–Spring 2019

Software & Volunteer.....

MIT BeaverWorks Summer Institute

Cambridge, MA

Assistant Instructor: CogWorks

2018, 2019

MyGrad autograd and machine learning library

Contributor, maintainer

PythonLikeYouMeanIt.com

Editor, contributor

Relevant Skills

Languages: C++, Java (including Android), Perl, Python

Computation/Learning: PyTorch, MXNet, dlib

Software development: Git

Other: Data truthing/labeling

Publications

Computer Science.....

David Mascharka, Philip Tran, Ryan Soklaski, and Arjun Majumdar. Transparency by Design: Closing the Gap Between Performance and Interpretability in Visual Reasoning. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Salt Lake City, June 2018.

Victor Pankratius, David Mascharka, P. J. Erickson, Frank Lind, Anthea Coster, Michael Hirsh, John Swoboda, and Joshua Semeter. Mahali: Mobile Phones and Cloud Computing in Space Weather and Beyond. In *American Meteorological Society Annual Conference, 14th Conference on Space Weather*, Seattle, January 2017.

Anthea Coster, Victor Pankratius, Timothy Morin, Will Rogers, Frank Lind, P. J. Erickson, David Mascharka, Don Hampton, and Joshua Semeter. The Mahali Project: Deployment Experiences from a Field Campaign in Alaska. In *Institute of Navigation: International Technical Meeting - GNSS in Environmentally Challenged Environments*, Monterey, California, January 2016.

David Mascharka and Eric D. Manley. LIPS: Learning Based Indoor Positioning System Using Mobile Phone-Based Sensors. In *2016 13th IEEE Annual Consumer Communications & Networking Conference (CCNC)*, Las Vegas, January 2016.

Joel Venzke, David Mascharka, Paxten Johnson, Rachel Davis, Katie Roth, Leah Robison, Adina Kilpatrick, and Timothy Urness. Utilizing Machine Learning to Accelerate Automated Assignment of Backbone NMR Data. *American Journal of Undergraduate Research*, 13(1), January 2016.

David Mascharka and Victor Pankratius. Mobile Devices and GPU Parallelism in Ionospheric Data Processing. In *American Geophysical Union, 46th Annual Fall Meeting*, San Francisco, USA, December 2015. ID 62710, Session IN44A-06.

Joel Venzke, Paxten Johnson, Rachel Davis, Katie Roth, David Mascharka, and Leah Robison. Accelerating Biomolecular Nuclear Magnetic Resonance Assignment with A*. In *Midwest Instruction and Computing Symposium (MICS)*, Madison, Wisconsin, April 2014.

Philosophy.....

David Mascharka. Cyborgs and Śūnyatā. *Episteme*, 29, May 2018.

Presentations & Posters

- MIT LL Intelligence, Surveillance & Reconnaissance Systems and Technology Workshop 2018
- SPIE Defence + Commercial Sensing 2018
- MIT Advanced Research and Technology Symposium (ARTS) 2018
- MIT LL Anti-Access/Area Denial (A2/AD) Systems and Technology Workshop 2017, 2018
- Iowa Space Grant Consortium invited speaker 2017
- Drake Undergraduate Science Collaborative Institute invited speaker 2014, 2015, 2016