Ben Hammel

Menlo Park, CA

www.bdhammel.com | github.com/bdhammel | linkedin.com/in/bdhammel

Education

Doctorate of Philosophy - Physics — *The University of Nevada, Reno* — *Aug. 2016*

Postgraduate Minor - Business Administration — *The University of Nevada, Reno* — *June 2014*

Bachelor of Science - Physics — *The University of California, Santa Barbara* — *June 2010*

Experience

Mythic

Redwood City, CA

Manager - Deep Learning Co-design Team — *Jan. 2020 - Present*

- **Managed a team** of six people to take an experimental and prototyping code base to production. Put in place **best practices**, **CI/CD**, and worked with customers to understand workflow and use cases
- Managed high-risk R&D projects on the critical path. Presented status updates and **worked directly with the senior leadership team** to plan roll-out of features to early-access customers using **agile methodologies**
- Lead engineer overseeing neural network bring-up efforts to **support customer engagements**. Worked with teams across Mythic's technical stack to adapt customer networks to Mythic's hardware.

Senior Machine Learning Engineer - Deep Learning Co-design Team — *Aug. 2019 - Jan. 2020*

- Focused on the co-design of neural network architectures and domain specific hardware to accelerate computer vision applications
- Worked closely with digital and analog circuit design teams to develop software simulations of hardware nonidealities. Models of the hardware were included in neural network training for improved robustness to Mythic's unique analog computation environment
- Implemented **quantization and regularization methods** for deploying robust neural networks in a resource constrained enviroment

Senior Scientist - A.I. Research Team — *Mar. 2018 - Aug. 2019*

- Worked as an **applied researcher** to rapidly-prototype proof-of-principle deep learning applications in computer vision - showcasing Mythic's capabilities for early customer engagement
- Organized internal and external teams as a **project manager** to build **deployment pipelines** for edge use. Built plugins for GStreamer to run pre- and post-processing code that interfaced with Mythic's custom hardware

Lawrence Livermore National Laboratory

Livermore, CA

Collaborating Scientist - Weapons Complex and Integration — *Nov. 2019 - Present*

- Co-developed a deep learning model to **accelerate scientific simulations** of multi-physics Inertial Confinement Fusion (ICF) experiments at the National Ignition Facility. Accelerated simulations of X-ray spectroscopic signatures by $> 100\times$
- Built **MCMC inference** routines utilizing the deep learning accelerated X-ray simulations to **solve the inverse problem** and obtain estimates of unobservable parameters in experiments (e.g. temperature and density)
- Researched the usage of **Bayesian Neural Networks** to directly predict hidden variables within known uncertainty bounds. Thereby allowing the direct predictions of unobservables without the need of expensive MCMC simulations

Insight Data Science

San Francisco, CA

Technical Advisor - Artificial Intelligence Program — *Mar. 2018 - Jan. 2020*

- **Mentored** individuals on **research and engineering projects** across a variety of applications in the deep learning space, including but not limited to **Computer vision**, **Generative Adversarial Networks**, and **Deep Reinforcement Learning**

Fellow - Artificial Intelligence Program — *Jan. 2018 - Mar. 2018*

- Consulted for Harvesting Inc., focused on leveraging AI and remote-sensing to assist farmers in rural areas and developing countries
- Engineered and implemented a **deep neural network** for **object detection** and identification in high-resolution satellite images
- Applied techniques in **transfer learning** and **data augmentation** to achieve high-performance despite limited data

Institute for Shock Physics

Pullman, WA

Postdoctoral Researcher - Warm Dense Matter Group — *Oct. 2016 - Jan. 2018*

- Worked with a small team across **multiple engineering disciplines** (electrical, mechanical, chemical, and software engineering) to develop a high-intensity laser system for a, first-of-its-kind, warm-dense-matter research facility
- Built open-source **probabilistic programing** python-based analysis tools for experimental **error analysis** and simulation analysis, to streamline the work of colleagues

Skill Set

Software Engineering

Programming languages	Python (∼15 years), Yorick (5 years), C++ (1 year)
iOS & web development	Django, Flask, Swift, HTML, CSS, and Javascript
Best Practices	Pytest, PEP8, CI/CD, Docker, Git

Machine Learning and Data Science

Frameworks	Pytorch, TensorFlow, Keras, Pyro, and Scikit-learn
ML Models	Convolutional and Recurrent Neural Networks, Bayesian Inference

Management

Project Management	SCRUM/XP/Kanban, Agile planning, Jira, Confluence, Atlassian REST API
Personel Management	Career growth, Technical mentorship, Accountability

Other

Scientific expertise	High-energy-density physics - matter under extreme conditions
Machineing	Lathe, Mill, Arc and Tig welding, PTC Creo Parametric, Solidworks
Analog & Digital circuit design	Eagle CAD, KiCAD, SPICE, logic debugging

Select Projects & Publications

Publication list

tinyurl.com/9n3p7nsw

Published work from my research in high-energy-density and warm-dense-matter Physics

Personal blog

www.bdhammel.com

A collection of work summarizing projects in physics and the machine learning space

Open source code contributions

github.com/bdhammel

Select open-source code repositories highlighting side projects in software development

Inferring mix from spectroscopic measurements with deep learning

Poster at 2019 Anomalous Absorption Conference

Presentation of work from a collaboration with Lawrence Livermore National Laboratory on using deep learning for interpreting experimental results.

Department of Homeland Security - opioid detection challenge

www.opioiddetectionchallenge.com

Sat on the review panel for the Department of Homeland Security's opioid detection challenge, evaluating proposals in Machine Learning to determine grant funding

Continued education

Certifications available upon request

- Probabilistic graphical models
- Bayesian Inference
- CS Algorithms
- Agile Management