Benjamin D. Killeen

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Education

- **The Johns Hopkins University** — Baltimore, MD
  Ph.D. in Computer Science — *Expected: 2024*

- **University of Chicago** — Chicago, IL
  Bachelors in Computer Science with Honors — *June 2019*
  Minor in Physics — *GPA: 3.81*

Experience

- **University of Chicago** — Chicago, IL
  Instructional Assistant — *January 2019 - June 2019*
  - **Teaching Assistant**: Instructed students in practical and theoretical machine learning methods, driven by Python and Tensorflow. Wrote supplementary course material and assisted with grading assignments.
  - **Grader**: Provided constructive feedback and quantitative grades for Scientific Visualization and Intro to Comp. Sci. I & II. Augmented classroom instruction via Piazza.

- **Epic Systems** — Madison, WI
  Software Development Intern — *June 2018 - August 2018*
  - **Predictive Modeling**: Developed custom machine learning functionality for SlicerDicer, a web-based tool enabling clinicians to investigate health data.

- **IBM Research - Almaden** — San Jose, CA
  Research Intern — *June 2017 - September 2017*
  - **Systolic Data Flow of CNNs**: Developed algorithms for systolic data flow of Convolutional Neural Networks with analog-memory-based deep learning. Simulated forward propagation time and estimated a speedup over state-of-the-art GPUs by two orders of magnitude.

Patents and Publications

- Hundt, Andrew, **Benjamin Killeen**, Heeyeon Kwon, Chris Paxton, and Gregory D. Hager. "'Good Robot!': Efficient Reinforcement Learning for Multi-Step Visual Tasks via Reward Shaping." ArXiv:1909.11730 [Cs], September 25, 2019. http://arxiv.org/abs/1909.11730.

- Burr, Geoffrey and **Killeen, Benjamin**. Efficient Processing Convolutional Neural Network Layers using Analog-Memory-Based Hardware. Provisional U.S. Patent filed October 12, 2018.

- Ambrogio, S., Narayanan, P., Tsai, H., Shelby,, R., Boybat, I., Nolfi, C.D., Sidler, S., Giordano, M., Bodini, M., Farinha, N., **Killeen, B.**, Cheng, C., Jaoudi, Y., and Burr, G. "Equivalent-Accuracy Accelerated Neural Network Training using Analog Memory." *Nature* 558:60 - 67 (2018). https://rdcu.be/TTx2

Skills

Python • Tensorflow/Keras • PyTorch • C • Scala • Java • MatLab • JavaScript • LaTeX • Haskell • Emacs
Communication Skills • Scientific Writing • Experimental Design • Neural Networks

Projects

- **Artifice**: High precision object detection in scientific images, driven by Deep Neural Networks, available at github.com/benjamindkilleen/artifice .
- **Creative Writing**: Science fiction novel detailing Martians' return to a long-abandoned Earth.

Coursework

Deep Learning • Computer Integrated Surgery • Unsupervised Learning • Computer Vision • Machine Learning
Operating Systems • Networks • Scientific Visualization • Computer Systems • Programming Languages
Honors Combinatorics • Honors Algorithms • Honors Discrete Math • Multivariate Calculus • Linear Algebra
Quantum Mechanics I & II • Classical Mechanics • Electronics • Electricity and Magnetism • Statistics