Brandon McKinzie

2211 Carleton Street — Berkeley, CA 94704 — (916) 208 - 5924
Email: mckinziebrandon@berkeley.edu — Website: mckinziebrandon.me

EDUCATION

University of California, Berkeley
- B.A. in Physics, Dec. 2016
- Minor in Computer Science
- 3.82 GPA

AWARDS

Dean's Honor List – UC Berkeley
Best Undergrad. Theoretical Research – APS Conference
Laslett Scholarship – UC Berkeley Physics Department
Longest-Serving Intern – Congressman Dan Lungren

RESEARCH AND WORK EXPERIENCE

Automatic Generation of Deep Neural Networks – UC Berkeley   *Sept. 2016 - Dec. 2016*
Advised by Prof. Dawn Song, Gilad Katz, and Jose Rozanec
- Implemented support for early-stopping during the architecture search process.
- Extended the set of allowed merge operations between network layers.
- Refactored initial codebase to improve stability & scalability.
- Automated conversion from Scala (architecture generation) to Python (Tensorflow/TFLearn).

Virtual Reality – MIT Media Laboratory   *Summer 2016*
Living Mobile Group
- Designed virtual training environments in Unity3D for use with the HTC Vive.
- Implemented support for full-body tracking with personalized avatars.
- Built circuits containing inertial measurement units, bend sensors, and Arduinos.
- Gained experience developing with the Unity3D game engine and C#.

Clustering Algorithm for the sPHENIX Collaboration – MIT   *Summer 2016*
Heavy Ion Group, Laboratory for Nuclear Science
- Implemented a photon clustering algorithm (C++) for the sPHENIX collaboration.
- Designed cluster visualization software and user interface.
- Optimized algorithms previously used at the Large Hadron Collider for new detector hardware.

Event Generation & Jet Finding - Berkeley National Laboratory   *Jan. 2015 - June 2016*
Relativistic Nuclear Collisions Program
- Built a toy model event generator (C++) for particle collisions at the Large Hadron Collider (LHC).
- Designed an analysis framework for identifying jets in both simulations and LHC data.
- Primary contributor to both the design and 3D-printing of the Event-Plane Detector (STAR collaboration).
- Optimized topological cuts for D0 meson decays detected at STAR.
- Official member of the ALICE and STAR collaborations.

Lattice Quantum Chromodynamics - Brookhaven National Lab   *June 2015 - August 2015*
Advised by Dr. Meifeng Lin
- Employed novel lattice QCD techniques to compute the proton isovector scalar charge.
- Computed meson properties from sets of simulated gauge configurations.
- Studied modern methods for calculating nucleon form factors.

Nuclear Physics Research - UC Davis   *August 2013 - August 2014*
Advised by Profs. Manual Calderon and Daniel Cebra
- Computed first estimate for the systematic uncertainty of Upsilon polarization at CMS.
- Optimized effective signal of Upsilons produced at $\sqrt{s_{NN}} = 200$ GeV in 2012 p-p STAR dataset.

Lead Tutor - Folsom Lake College Tutoring Center   *August 2013 - May 2014*
- Lead tutor for Departments of Physics, Mathematics, and Chemistry.
- Held walk-in and private tutoring sessions daily.
- Organized class/group tutoring sessions weekly.

ADDITIONAL SKILLS

Programming Languages	Strong proficiency: C, C++, Java, and Python (numpy, scipy, etc).
	Working proficiency: HTML/CSS, JavaScript, R, MATLAB.
Linux	Experienced with advanced BASH scripting and Unix customization.
	Primary distributions: Arch, CrunchBang, and Ubuntu derivatives.
Miscellaneous	Daily user of the TensorFlow and Keras libraries.
	Vim and LaTeXenthusiast – regularly write plugins/packages for both.
	Passionate learner – work through online courses & textbooks in spare time.

NOTEWORTHY COURSEWORK

Artificial Intelligence	Search algorithms, Markov decision processes and reinforcement learning.
Grade: A	Overview of research topics in machine learning and deep learning.
Machine Learning	Classification, regression, density estimation, clustering, dimensionality reduction.
Grade: A-	Implemented all algorithms in *Elements of Statistical Learning* from scratch.
Neural Computation	Sparse coding, RNNs, Boltzmann Machines, and dynamical models.
Grade: A	Hebbian learning, autoencoders, and locally competitive algorithms.
Data Structures	Designed text editor in Java supporting word wrapping, text selection, etc.
Grade Received: A	Implemented web mapping application inspired by Google Maps.
Adv. Linear Algebra	Emphasis on formulating proofs with advanced notation.
Grade Received: A	QR factorization, rayleigh's principle, Jordan canonical form, etc.
Quantum Computing	Emphasis on quantum computational algorithms and efficiency.
Grade Received: A	Models for quantum error correction and complexity theory.
Laboratory Experience	Hands-on preparation for experimental physics research.
Grades Received: A, A	Data collection/analysis, equipment operation, and error analysis.
Particle Physics	Feynman calculus, cross sections, decay rates, and fundamental interactions.
Grade Received: A	Quantum field theory, gauge theories, symmetry breaking, and more.