

Curriculum Vitae: Branton M. Demoss

Erdős number: Undefined

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About

A physics and mathematics student with an interest in computational methods.

Education

University of Oxford - Visiting Student: Mathematics & Theoretical Physics, 2016-2017

University of Colorado Boulder – BA Physics & Mathematics, planned graduation in 2018 -
current GPA 3.7/4.0

Fairview High School - Graduated 2014 - GPA 3.9/4.0 with IB Diploma

Relevant Courses

In Progress:

Quantum Mechanics
Electricity & Magnetism 2
Quantum Computing

Physics Honors
History of Science

Completed:

Calculus 1/2/3
Linear Algebra
Discrete Maths
Differential Equations
General Physics 1/2,
and Laboratory
Modern Physics
Experimental Physics

Classical Mechanics 1
Programming
Data Structures
Set Theory
Real Analysis
Classical Mechanics 2
Electricity & Magnetism 1

Skills

C++/Java/
Node.js
ROOT/
Mathematica

Monte Carlo simulations
*nix systems
LaTeX
Chinese (mandarin)
Ability to learn new things (light humor)

Publications

Secondary Particle Showers from Hadron Absorber Interactions; Forthcoming.

A tech-note published internally for the DUNE collaboration. Discusses the effects new geometry at the Long Baseline Neutrino Facility will have on neutrino production and measurement. I found that low energy neutrino contamination from the so-called hadron absorber was a significant problem, and defined quantitatively how this would affect measurement statistics. Can be found at my personal website or, if you have access, the Fermilab LBNE document database.

Experience

Researcher, High Energy Particle Physics Group, CU Boulder; May 2015 - Present

As a researcher under Professors Eric Zimmerman and Alysia Marino, I do computational physics simulations of various neutrino experiments. Currently my simulations focus on DUNE at Fermilab, a planned neutrino oscillation experiment. Built electronics to verify integrity of stopped-muon counters to be placed in the DUNE beamline. Unfortunately my code cannot be shared publicly.

Museum Assistant, University of Colorado Museum of Natural History; August 2014 - Present

Teaching children and their families about science and its connection to the natural world.

Projects of Interest

Stopped-muon detector: Designed system to get data from PMTs in stopped muon counter and perform various analyses and integrity checks such as verification of muon lifetime. Ongoing.

DUNE geometry analysis: Ran Monte Carlo simulations using CERN's GEANT4 package to analyze how new downstream geometry would affect neutrino production and measurement uncertainties. Also redesigned codebase to be more clean and clear.

DroidShark: An unpublished application written in Java for the Android OS that analyzes login data sent over unsecured wifi networks, and copies SessionID information then spoofs an IP address to gain access to unsecured accounts. Intended merely as a proof-of-concept. Many sites (Facebook!) have since switched to SSL connections by default.

PGJP (Pretty Good Java Privacy): Intended to be a clone of the standard encryption protocol "PGP" re-written in Java. This was another proof-of-concept designed to showcase Java's ability to easily handle tasks in PGP such as hashing, data compression, symmetric-key cryptography, and public-key cryptography. The mathematics of cryptography is a keen interest of mine.