# Curriculum Vitae:
# Branton M. Demoss

Erdös number: Undefined

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About

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

Education

University of Colorado Boulder – BA Physics and Mathematics, planned graduation in 2017 - current GPA 3.6/4.0

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

Relevant Courses

In Progress:
Set Theory
Real Analysis
Classical Mechanics and Mathematical Methods of Physics 2
Electricity & Magnetism 1

Completed:
Calculus 1/2/3
Linear Algebra
Discrete Maths
Ordinary Differential Equations
General Physics 1/2, and Laboratory
Modern Physics (Special Relativity and Intro. Quantum)
Experimental Physics
Classical Mechanics and Mathematical Methods of Physics 1
Programming
Data Structures

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; August 2015.
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 experiment beamline.

Museum Assistant, University of Colorado Museum of Natural History; August 2014 - May 2015
I helped to plan and execute Museum Family Days, where families were invited to come to the museum and learn about various topics in the sciences relating to natural history. Communication of the scientific process to both children and curious adults was a key focus. My most popular event was “Numbers in Nature” in which I presented various mathematical patterns found in nature. Some elementary/middle school teachers took notes and said they would give presentations to their classes!

Projects of Interest

DUNE geometry analysis: I ran Monte Carlo simulations using CERN’s GEANT4 package to analyze how new downstream geometry would affect neutrino production and measurement uncertainties. Ongoing.

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.

On the Viability of Liquid Fluoride Thorium Reactor (LFTR) Designs: An elementary research project/paper written for the IB program. This paper examined the physical properties of LFTR Molten Salt Reactors in comparison with traditional Light Water Reactors.