

# Daine L. Danielson

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## Education

B.S. Computational Physics  
Minor Mathematics  
University of California, Davis, 2017

Nuclear Science and Security Consortium Student 2012–2016  
NSSC Summer School 2012, 2013, 2014

## Work experience

### Neutrino and Nuclear Physics Intern

Neutrino and Dark Matter Group; Dept. of Physics; University of California, Davis; 2011–present.

Subatomic Physics Group, LANSCE, Los Alamos National Laboratory, 2014–present.

Rare Event Detection Group, Lawrence Livermore National Laboratory, 2013, 2015–present.

*Investigating new experimental and mathematical approaches to the neutrino mass hierarchy problem.*

*Proved applications for WATCHMAN (water-Cherenkov nonproliferation detector) in measuring the neutrino mass hierarchy.*

*Designed, built, and tested cryogenic in-situ photon detection system for mini-CAPTAIN liquid argon time-projection chamber. Designed, developed, installed, and maintained photonics data acquisition software and hardware for mini-CAPTAIN.*

*Performed first laser calibration and laser timing measurement for mini-CAPTAIN.*

*Diagnosed and mitigated severe wire-plane crosstalk in mini-CAPTAIN.*

*Deep Underground Neutrino Experiment (DUNE) detector and data acquisition research and development (CAPTAIN and mini-CAPTAIN liquid argon time-projection chambers, water-Cherenkov far detector).*

*CANDU reactor antineutrino monitoring science applications development (transportable liquid scintillator detector).*

### Student Researcher

Cryogenic Electronics Group, Dept. of Physics and Astronomy, San Francisco State U., 2009–2010.

*Developed next-generation tantalum-based and niobium-based superconducting tunnel junctions for X-ray spectroscopy at Lawrence Berkeley National Laboratory.*

*Investigated gadolinium film based portable neutron detectors for San Francisco Police Department.*

Cofounder, Chief Architect  
whitecoat, Inc.; 2014–present.

## Research

### Publications

#### Authored

Measurement of Low and High Intensity Neutrons with a Liquid Argon Time Projection Chamber  
C. E. Taylor, **D. Danielson**, et. al.  
*Nucl. Inst. Meth. Phys. Res. A, (in preparation).*

CAPTAIN Electronics Technical Report  
 Charles Taylor, Richard Van de Water, David Lee, Jacqueline Mirabal-Martinez, Walter Sondheim,  
 Robert Cooper, **Daine Danielson**, and Peter Madigan.  
*Los Alamos Unlimited Release LA-UR-16-24370 (2016).*

Study of Neutron Interactions in a Liquid Argon Time Projection Chamber  
 E. Guardincerri, D. Cline, R. Svoboda, **D. Danielson**, et. al.  
*Los Alamos Neutron Science Center Proposal NS-2016-7313-A (2016).*

CAPTAIN-MINER $\nu$ A: Neutrino-Argon Scattering in a Medium-Energy Neutrino Beam  
*Los Alamos Unlimited Release LA-UR-15-28458, Fermilab Proposal 1061 (2015).*

Large Reactor-Neutrino Mixing Angle Supports a Fourier Approach to the Mass Hierarchy Problem.  
 Daine L. Danielson. *Explorations: the UC Davis Undergraduate Research Journal 17 (2015).*

### Acknowledged

Development of Tantalum-Based Superconducting Tunnel Junction Detectors for X-Ray Absorption Spectroscopy  
 Faustin Carter. *Master's Thesis, M.S. Physics, San Francisco State University (2009).*

### Conference Presentations

Distinguishing Two Reactors using Directional Methods; Lawrence Livermore National Laboratory  
 WATCHMAN Collaboration Meeting – August, 2016.

Time Projection Chamber / Photon Detection System DAQ Synchronization; Santa Fe, New Mexico  
 CAPTAIN Collaboration Meeting – July, 2016.

Neutrino Detector Design for Directional Mid-Field Nuclear Nonproliferation, 2016  
 UC Davis 27th Annual Undergraduate Research, Scholarship & Creative Activities Conference.

mini-CAPTAIN Photon Detection System Summary; Santa Fe, New Mexico–2015  
 CAPTAIN Collaboration Meeting – November, 2015.

Diagnosing and Mitigating Electronic Noise in the Mini-CAPTAIN Liquid-Argon Time Projection Chamber, 2015, UC Davis 26th Annual Undergraduate Research, Scholarship & Creative Activities Conference.

Physics Mentality – Open Mind Opens Doors, 2015  
 UC Davis Alumni Physics Careers Seminar.

Building the mini-CAPTAIN Photon Detection System; Santa Fe, New Mexico–2015  
 CAPTAIN Collaboration Meeting – February, 2015.

mini-CAPTAIN Photon Detection System Status; Los Angeles, California–2014  
 CAPTAIN Collaboration Meeting – November, 2014.

Noise in the Liquid-Nitrogen Filled mini-CAPTAIN Time Projection Chamber;  
 Santa Fe, New Mexico–2014  
 CAPTAIN Collaboration Meeting – July, 2014.

Investigation of the Sensitivity of WATCHMAN to Measure the Neutrino Mass Hierarchy;  
 Walnut Creek, California–2014  
 University & Industry Technical Interchange Review Meeting.

Viability of a Fourier Approach to the Neutrino Mass Hierarchy Problem in WATCHMAN, 2014  
 UC Davis 25th Annual Undergraduate Research, Scholarship & Creative Activities Conference.

Determining the Hierarchy of Neutrino Masses Using Discrete Fourier Analysis;  
Newport News, Virginia–2013  
*2013 Fall Meeting of the APS Division of Nuclear Physics.*

Determining the Hierarchy of Neutrino Masses Using Fourier Analysis and Matched-Filter Signal Processing, 2013, *UC Davis 24th Annual Undergraduate Research, Scholarship & Creative Activities Conference.*

Dare to Prevent STDs Globally, Washington DC–2014  
Bridging the Gap Between Food and Medicine with Technology, Washington DC–2014  
*37th Annual Fulbright Conference.*

## *Workshops*

Expert Reference for Nuclear Innovation Bootcamp,  
University of California, Berkeley–2017.

Continuous Mentor for Nuclear Innovation Bootcamp,  
Nuclear Innovation Alliance and US Dept. of Energy; University of California, Berkeley–2016.

Workshop on the Application of Open Source Tools for Nuclear Nonproliferation Research,  
Nuclear Science and Security Consortium; University of California, Berkeley–2015.

Long-Baseline Neutrino Experiment (LBNE) Water-Cherenkov Reconstruction Workshop,  
Fermilab–2011.

## **Skills**

Radiation laboratory experience and training.

Class 4 laser laboratory experience and training.

Clean room laboratory experience and training.

Room-temperature / cryogenic photo development and characterization proficiency.

Data acquisition hardware and software development proficiency.

C++ fluency.

Python fluency.

CERN ROOT proficiency (C++/Cling/CINT/PyROOT).

RAT-PAC detector simulation and analysis proficiency.

HTTP Representational State Transfer (REST) API design and development fluency.

SQL and NoSQL database design proficiency.

SQL and NoSQL object mapping proficiency.

Unified Modeling Language proficiency.

Puppet configuration management proficiency.

UNIX/Windows operating system proficiency.

Classically trained pianist and composer.

## Awards

Chancellor's Award for Excellence in Undergraduate Research, Honorable Mention; UC Davis, 2017.

Research funded by Nuclear Science and Security Consortium, 2012–2016.

Gold President's Volunteer Service Award, 2016.

Gold UC Davis Community Service Award, 2016.

Sigma Pi Sigma physics honor society, 2014.

UC Davis Integrated Studies Honors Program, 2010–2013.

Golden Key International Honor Society, 2012.

National Society of Collegiate Scholars, 2011.

California Scholarship Federation Life Membership, 2010.

James & Leta Fulmor Scholarship; UC Davis, 2010.

Hubert H. Wakeham Scholarship; UC Davis, 2010.

National Merit Scholarship Program Letter of Commendation, 2010.

Advanced Placement Scholar with Distinction, 2010.

English Writing Award; St. Ignatius College Preparatory, 2010.

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<http://danielson.pro/cv>