Curriculum Vitae – Daniel L. Smith

Personal Information

Daniel Lewis Smith
dansmith@bu.edu
(203) 206-2559

Education

University of Chicago Chicago, Illinois — *Starting Sep 2018*
Physics Ph.D. Candidate

Boston University Boston, Massachusetts — *Sep 2014 - May 2018*
Physics B.A. Magna Cum Laude with Honors

Oxford High School Oxford, Connecticut — *Sep 2010 - May 2014*
Honors with Distinction

Research

LArIAT Student Researcher Fermilab and Boston University — *May 2015 - May 2018*

- K+ cross section analysis, work relevant to future proton decay and neutrino experiments. Developing software to select kaon events, methods to tag decays and interaction types, simulations of the experiment, and documentation in the form of a Tech Note.
- Development of Time-of-flight reconstruction software, beamline PID algorithms and LArG4 simulations based on Geant4 in C / C++ using LArSoft and Root
- Senior year work for distinction on K+ identification using LArTPC algorithms to find data-driven estimates of future proton decay lifetime limits.
- Located at Fermi National Accelerator Laboratory (Fermilab) in Chicago, Illinois during the summers of 2015, 2016 and 2017 to work directly with the LArIAT experiment and collaboration
- Grants through Boston University's Undergraduate Research Opportunities Program (UROP) from September 2015 until September 2017.
- Advisor - Prof. Edward Kearns

LArTPC Machine Learning Student Researcher B.U. Geneva Program — *Jan 2017 - Aug 2017*

- Study abroad program to study at the University of Geneva while working 20 hours a week at CERN.
- Development of simulation-trained algorithms for shower / track feature-level hit separation. Tested and applied to LArIAT data.
- Preliminary results on using generative machine learning techniques to generate realistic noise in LArTPC simulation using LArIAT Data
- Developed proficiency in Keras software package and CNN and GAN machine learning techniques.
- Advisors - Dr. Robert Sulej and Dr. Dorota Stefan

Hyper-K Student Researcher Fermilab and Boston University — *Apr 2015 - Jan 2018*

- Development of PMT data acquisition hardware for the future Hyper-K experiment, the successor of the Super-K experiment. Assembled and testing the QTC-TDC board, developed at Fermilab.
- Developed proficiency in Quartus 2 and VHDL for the FPGA on the prototyping board
- Advisor - Prof. Edward Kearns

Student Technician Electronics Design Facility — *Sep 2014 - May 2015*

- Developed hardware for the Muon G-2 Experiment located at Fermilab, with a focus on the high-voltage supply board. Saw the board through planning, prototyping, and assembly.
- Developed proficiency in PCB design and assembly
- Advisor - Eric Hazen

Presentations & Posters

"Particle Identification and Kaon Physics in LArIAT" : Poster, APS DPF Conference, Fermilab, August 2017

"Track / Shower CNN Classifier" : Presentation, LArIAT Collaboration Meeting, Fermilab, July 2017

"CNN Classifier and Generative Machine Learning on LArIAT Data" : Presentation, Dune Collaboration Meeting, Fermilab, May 2017

"Generative Adversarial Networks in Liquid Argon" : Presentation, IML Machine Learning Working Group Meeting, CERN, April 2017

"Study of the Positive Kaon Total Interaction Cross Section on LAr in LArIAT" : Poster coauthored with Yale Graduate student Elena Gramellini, ICHEP, Chicago, August 2016

Accolades

Faculty Award for Excellence in Physics Boston University *May. 2018*

Outstanding Student Researcher Boston University *Sep. 2017*

Dean's List Boston University *Sep. 2014 - May 2018*

Skills

Programming Languages :

C / C++ : ROOT 5/6, LArSoft, Geant4

Python : Caffe, NumPy, MatPlot

Others : BASH, Mathematica, Fortran, VHDL

Hardware : TTL Electronics, Microcontrollers, FPGAs, Soldering

Engineering software : KiCAD, Altera Quartus, ModelSim, LibraCAD

Office software : Emacs, LaTex, GitHub

Languages : English (native), Spanish (fluent), French (fundamentals)

Campus Activities & Employment

Learning Assistant Boston University *Sep 2016 - Dec 2016*

- Undergraduate learning assistant for physics classes through Boston University's School of Education and Physics Department. Work includes a 2 credit class on STEM education.
- PY351 Modern Physics for Physics Majors instructed by Professor Claudio Rebbi
- PY313 Modern Physics for Engineers instructed by Professor James Miller

Photon Boston University *Sep 2014 - May 2018*

- Local chapter of the Society of Physics Students.
- Active member, including involvement in recruitment and outreach projects.

Prism Mentor Boston University *Sep 2016 - May 2018*

- Upperclassmen mentor for nine physics freshmen

References

Prof. Edward Kearns
Department of Physics
Boston University
590 Commonwealth Ave. Boston, MA 02215
kearns@bu.edu - (617) 353-3425

Prof. Robert Carey
Department of Physics
Boston University
590 Commonwealth Ave. Boston, MA 02215
carey@bu.edu - (617) 353-6031