Sara Sussman

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Education

Princeton University, Physics Ph.D. Candidate — *Starting Fall 2018*

Boston University, Physics B.A. Summa Cum Laude — *May 2018*

Research Experience

Undergraduate Researcher, Prof. Kearns Group, Boston University — *9/2016 - present*
Super-Kamiokande (SK) and Hyper-Kamiokande (HK) Collaborations

Senior Research Project: Dinucleon and Nucleon Decay into Two-Body Final States with No Hadrons
Searched for 10 dinucleon and nucleon decay modes using the entire SK dataset.

SK Event Reconstruction Software Developer: APFIT
Located and solved a set of Cherenkov-ring-counting issues.

HK Front-end Electronics Developer: Prototype QTC-TDC Board
Wrote DAQ software, tested QTC/TDC performance, FPGA programming to improve performance.

SK Outer Detector High Voltage Expert
Developed remote control software for new HV crates, integrated and installed new crates in SK.

Undergraduate Researcher, Prof. Franklin Group, Harvard University — *12/2015 - 9/2016*
ATLAS Collaboration

Website: Find Problematic Muon Spectrometer Detector Elements: http://cern.ch/muons/
Users upload eta-phi histograms and learn which elements overlay spatial coordinates in question.

DAQ Software for Prototype Micromegas Apparatus
Wrote and tested geometry and track reconstruction library for ATLAS muon upgrade prototype.

Awards

Joseph Henry Merit Prize, Princeton University — *2018*
College Prize in Physics, Boston University — *2018*
April APS Meeting Student Travel Awards, DPF and SPS — *4/2018*
International Neutrino Summer School (INSS), Poster Competition, 3rd Prize — *Fermilab, 8/2017*
INSS Group Tutorial, Oral Presentation Competition, 2nd Prize — *Fermilab, 8/2017*
Undergraduate Research Opportunities Program Fellowship, Boston University — *2017,2018*

Recent Presentations

Dinucleon and Nucleon Decay into Two-Body Final States with No Hadrons — *APS April Meeting Columbus OH, 4/14/18*

Prototype Front-End Electronics for Hyper-Kamiokande QTC-TDC Board — *BU Advanced Lab Seminar Boston MA, 10/15/2017*

Multi-GeV Multi-Ring Event Reconstruction in Super-Kamiokande (Poster) — *INSS, Fermilab Batavia IL, 8/17/2017*

Side By Side By Side: ν Event Simulation in Super-K, NOvA and ArgoNeuT — *INSS, Fermilab Batavia IL, 8/17/2017*

Graduate Courses Completed

Physics: Advanced Particle Physics I; Introduction to Particle Physics; Cosmology

Engineering/Design: Electronics for Scientists; Advanced Laboratory

Math: Mathematical Physics

Teaching/Mentoring Experience

Research Mentor (Hardware) — *Fermilab*
Mentored high school summer intern at Fermilab with Dr. Jin-Yuan Wu. — *Batavia IL, 8/2017*

Math Mentor — *Girls' Angle*
Guided female K-8 students in creative mathematical explorations. — *Cambridge MA, 2015*

Student-Teacher and Volunteer — *Charlestown High School*
Taught high school juniors and seniors calculus and precalculus. — *Boston MA, 2015*

Teacher, Junction and Splash! — *Educational Studies Program*
Taught topics in physics, math and chess to high school students at MIT. — *Cambridge, MA 2014-15*

Corps Member — *City Year Boston*
Tutored and mentored K-8 students in math in a bilingual Dorchester school. — *Boston MA, 2013-2014*

Leadership

Director, Junction — *MIT, Cambridge MA, 2015*
Redesigned summer program where 41 high school students do independent research with 1:1 mentoring. See more at this link.

Director, Spring High School Studies Program (HSSP) — *MIT, Cambridge MA, 2015*
Led six week Saturday program where 500 high school students take courses taught by undergraduates.

Director, Denney Math — *Dorchester MA, 2014*
Created a weekly evening inquiry-based algebra class for local teenagers.

Director, The Checkmate Club — *Dorchester MA, 2013-2014*
Created a weekly math, logic and chess program for local teenagers.

Assistant Crew Leader, The Food Project — *Dorchester & Lincoln, MA, 2012-2013*
Led a diverse group of 15 teenagers in urban/rural farming and discussed social justice issues.

Skills

Programming: C/C++, Python, FORTRAN, ROOT, Mathematica, MATLAB, Verilog, VHDL, JavaScript, HTML/CSS

Software: Intel Quartus Prime, Xilinx Vivado Design Suite, ExpressPCB

Hardware: Cherenkov detectors, high voltage systems, gaseous ionization detectors, data acquisition and timing systems, digital and analog circuits, lab equipment such as NIM modules, multichannel analyzers and oscilloscopes, basic machining with mills and laser cutters (plastic and steel)