MATHEW M. POTTS

RESEARCH SCIENTIST

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EDUCATION

Doctorate of Philosophy, *Physics*	*Expected Graduation Date:* May 2022
Master of Science, *Physics*	Aug. 2017 – May 2021
Bachelor of Science, *Physics*	Aug. 2015 – Aug. 2017

University of Utah, Salt Lake City, Utah

SKILLS

Programming languages: Python (Numpy, TensorFlow, Pandas, Pyroot), C, C++, CERN ROOT, MATLAB, Mathematica, LabVIEW

Markup Languages: HTML, CSS, LATEX

Miscellaneous: Strong analytical problem solving experience, excellent verbal and written communication skills, and great in collaborative environments.

TEACHING EXPERIENCE

University of Utah	Aug. 2017 – May 2019

Teacher Assistant

- Create lesson plans for in class discussion
- Help students overcome misunderstandings

Totally Tutoring	May 2014 – June, 2015

Contracted Tutor

- Tutored physics, mathematics, and chemistry
- Created take home assignments and short lesson plans

RESEARCH EXPERIENCE

Cosmic Rays Research	Aug. 2015 – Present

The Telescope Array (TA) Cosmic Ray Observatory

Department of Physics and Astronomy, University of Utah

Research Advisor: Charles Jui

Thesis: Ultra-high Energy Cosmic Ray Energy Spectrum using Hybrid Analysis with TAx4

- Analyzed the data for the new TA expansion, TAx4, to calculate the energy spectrum of ultra-high energy cosmic rays using hybrid detection.

- Maintained and operated surface and fluorescence detectors for cosmic ray data collection.
- Linux systems administrator of the Telescope Array's data server and computational cluster at the University of Utah.
- Analyzed fluorescence detector's sensitivity to energy and development of cosmic ray interactions in the atmosphere through Monte Carlo simulation. The reconstructed information was analyzed by binning parameters into histograms and fitted using CERN's ROOT data analysis framework.

Accelerator Research   Aug. 2015 – Present

sFLASH Collaboration

Stanford Linear Accelerator Center, National Accelerator Laboratory

- Performed two experiments in 2016 and 2018 aimed at measuring the air fluorescence yield at Stanford Linear Accelerator Center. The air fluorescence yield is a important quantity in determining how much light is produced in cosmic ray air showers.
- Performed photo-multiplier tube calibration with a UV LED diode.
- I assisted in taking the data when the beam was running and was in charge of keeping an experimental log of each data run.
- Analyzed beam run data to find 'golden runs', runs where the beam energy was stable.

Astronomy Research   Aug. 2014 – May 2015

Salt Lake Community College, Salt Lake City, Utah

Research Advisor: Jonathan Barnes

Senior Project: A Closer Look at the KOI-22 Light Curve

- Examined the Kepler exoplanet data to see if we could find evidence of precession in the light curves of "Hot Jupiter" systems that could hint at additional exoplanets.
- Found a trend in the difference of the orbital times of KOI-22 which repeated every sixty-two orbits. This may suggest that a body is perturbing its orbit slightly.

PUBLICATIONS

- M. Potts and C. Jui (TA Collaboration). *Monocular Energy Spectrum using the TAx4 Fluorescence Detector*. Proceedings of Science (ICRC2021) 343.
- R.U. Abbasi et al. (TA Collaboration). *Surface detectors of the TAx4 experiment*. Nuclear Inst. and Methods in Physics Research (2021).
- R.U. Abbasi et al. (TA Collaboration). *Observations of the Origin of Downward Terrestrial Gamma-Ray Flashes*. Journal of Geophysical Research: Atmospheres 123 (2018).
- S. Atwood et al. (sFLASH Collaboration). *Air fluorescence yield measurement at SLAC National Laboratory: sFLASH experiment*. To be published in the Physical Review Letters pending our results from our analysis of the data gathered at SLAC.
- S. Atwood et al. (sFLASH Collaboration). *The Instruments of sFLASH experiment*. Proceeding of Science (ICRC2017) 407.

CONFERENCES/TALKS

- M. Potts. *Ultra-High Energy Spectrum using Hybrid Analysis with TAx4*. Los Alamos National Lab/Stanford Linear Accelerator Center; 2021, Seminar talk.
- M. Potts*. Ultra-High Energy Spectrum using Hybrid Analysis with TAx4*. Georgia Tech; 2021, Undergraduate Seminar.
- M. Potts on behalf of TA. *Monocular Energy Spectrum using the TAx4 Fluorescence Detector*. ICRC(2021).
- M. Potts on behalf of TA. *TAx4 Cosmic Ray Energy Spectrum*. University of Utah; 2020, Research Symposium.
- M. Potts and Jonathan Barnes*. A Closer Look at the KOI-22 Light Curve*. Research Symposium, Salt Lake Community College, Salt Lake City, UT, 2015
- M. Potts and Jonathan Barnes. *A Closer Look at the KOI-22 Light Curve*. Salt Lake Astronomical Society Meeting, Salt Lake City, UT, 2015

ACADEMIC REFERENCES

Charles Jui

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Tareq AbuZayyad

Loyola University Chicago, Lecturer of Physics
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