Tyler James Erjavec

CONTACT INFORMATION

University of California, Davis
Department of Physics and Astronomy
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RESEARCH INTERESTS

Rare event detection of neutrinos and dark matter:

- WIMPS, axions, neutrino physics, astrophyiscs, instrumentation

CURRENT ACADEMIC APPOINTMENTS

PhD Candidate, University of California, Davis — September 2018 to present
Department of Physics and Astronomy
College of Letters and Science

- Supervisor: Professor Emilija Pantic
- Experiments and Collaborations
  - Deep Underground Neutrino Experiment (DUNE)
  - Darkside20k

EDUCATION

University of California, Davis, Davis, CA

M.S., Physics, September 2019

The Ohio State University, Columbus, OH

B.S., Physics, May 2015

- *Cum Laude*

REFEREED JOURNAL PUBLICATIONS

[1] G. Collin , N. Rodd, T. Erjavec, K. Perez, *A Compound Poisson Generator approach to Point-Source Inference in Astrophysics*, The Astrophysical Journal Supplement Volume ? (2022)
doi:10.1088/1748-0221/14/10/P10009

[2] N. Saffold, F. Rogers, M. Xiao, R. Bhatt, T. Erjavec, H. Fuke, C.J. Hailey, M. Kozai, D. Kraych, E. Martinez, C. Melo-Carillo, K. Perez, C. Rodriguez, Y. SHimizu, B. Smallshaw. *Passivation of Si(Li) detectors operated above cryogenic temperatures for space-based applications*, Nuclear Instrumentation Methods A Volume 997 (2021)
doi:10.1016/j.nima.2020.165015

[3] F. Rogers, M. Xiao, K. Perez, S. Boggs, T. Erjavec, L. Fabris, H. Fuke, C. Hailey, M. Kozai, A. Lowell, N. Madden, M. Manghisoni, S. McBride, V. Re, E. Riceputi, N. Saffold, and Y. Shimizu. *Large-area Si(Li) detectors for X-ray spectrometry and particle tracking in the GAPS experiment*, Journal of Instrumentation Volume 14 (2019)
doi:10.1088/1748-0221/14/10/P10009

[4] Kozai M., H. Fuke, M. Yamada, K. Perez, T. Erjavec, C. Hailey, N. Madden, F. Rogers, N. Saffold, D. Seyler, Y, Shimizu, K. Tokuda, and M. Xiao. *Developing a mass-production model of large-area Si(Li) detectors with high operating temperatures*, Nucl.Instrum.Meth A947, (2019) doi:10.1016/j.nima.2019.162695

[5] K. Perez, T. Aramaki, C. Hailey, R. Carr, T. Erjavec, H. Fuke, A. Garvin, C. Harper, G. Kewley, N. Madden, S. Mechbal, F. Rogers, N. Saffold, G. Tajiri, K. Tokuda, J. Williams, and M. Yamada. *Fabrication of low-cost, large-area prototype Si(Li) detectors for the GAP experiment*, Nucl.Instrum.Meth A905, 12-21 (2018)
doi:10.1016/j.nima.2018.07.024

Conference Publications

[6] T. Erjavec, W. Zhang, J. Engstrom. *Area selective atomic layer deposition: new recipe development*. In: Proceedings of the 2013 National Nanotechnology Infrastructure Network Convocation August 11–14, 2013. Atlanta, GA, USA.

Conference Talks

[7] T. Erjavec, on behalf of the ARTIE Collaboration. *Measurement of the total neutron cross section on argon in the energy range 30-70 keV*. APS, April 10th, 2022. New York, New York.

[8] T. Erjavec, on behalf of the ARTIE Collaboration. *Measurement of the total neutron cross section on argon in the energy range 30-70 keV*. LIDINE, September 15th, 2021. San Diego, California.

[9] T. Erjavec, on behalf of the ARTIE Collaboration. *Measurement of the total neutron cross section on argon in the energy range 30-70 keV*. APS Far West Section, October 10th, 2020. Manoa, Hawaii.

[10] T. Erjavec,W. Zhang, and J. Engstrom. *Area selective atomic layer deposition: new recipe development*. 2013 NNIN Annual Convocation, August 12th, 2013. Atlanta, GA, USA.

Conference Posters

[11] T. Erjavec and J. Vierinen. *Design and Evaluation of Compact Antennae for Ionospheric Sounding*. In: Proceedings of 2014 AGU Conference, December 15–19, 2014. San Francisco, CA, USA. Poster abstract.

[12] T. Erjavec,W. Zhang, and J. Engstrom. *Area selective atomic layer deposition: new recipe development*. In: 2013 NNIN Annual Convocation, August 12th, 2013. Atlanta, GA, USA.

Teaching Experience

University of California, Davis, Davis, CA

Teaching Assistant — **Spring Quarter 2020**
Physics 80

- Introductory python-based lab course for physics majors

Teaching Assistant — **Winter Quarter 2020**
Physics 130A

- Undergraduate particle physics course

Teaching Assistant — **Fall Quarter 2018**
Physics 7A

- Discussion-based physics course biological science majors

The Ohio State University, Columbus, OH

Group Physics Tutor — **May 2015 to May 2016**

- Department tutor for non-calculus and calculus based undergraduate physics courses

Professional Experience

Post Baccalaureate Researcher, Massachusetts Institute of Technology — **Sept. 2016 to Sept. 2018**
Department of Physics

- Supervisor: Prof. Kerstin Perez
- Development and characterization of lithium-drifted silicon detectors for gamma spectroscopy for use in the General Antiparticle Spectrometer
- Oversaw all aspects of laboratory operations
- Development of Non-Poissonian Template fitting software to NuSTAR x-ray data

- Affiliations:
  - Laboratory for Nuclear Science (LNS)
  - Center for Theoretical Physics (CTP)

Assistant Researcher, The Ohio State University **May 2015 to May 2016**
Department of Physics

- Supervisor: Prof. Amy Connolly
- Development of front-end electronics for the Askaryan Radio Array (ARA)
- Affiliations:
  - Center for Cosmology and Astroparticle Physics (CCAP)

REU Intern, MIT Haystack Observatory **May 2014 to August 2014**
Atmospheric Sciences

- Supervisor: Prof. Juha Vierinen
- Prototyping of small form-factor ionosonde antennas for ionospheric measurements
- Affiliations:

NNIN REU Intern, Cornell University **May 2013 to August 2013**
Department of Biochemical Engineering

- Supervisor: Prof. James Engstrom
- Recipe development for selective area deposition of tantalum nitride on copper and silicon
- Affiliations:
  - National Nanotechnology Infrastructure Network (NNIN)
  - Cornell Nanoscale Facility (CNF)

Undergraduate Researcher, The Ohio State University **May 2012 to August 2013**
Department of Physics

- Supervisor: Prof. Thomas Lemberger
- Deposition and characterization of 2-d CaYBCO superconducting thin-films
- Affiliations:
  - Center for Emergent Materials (CEM)

Other Meeting Attendance

General Participant

- Coupling, Energetics and Dynamics of Atmospheric Regions (CEDAR) conference, University of Washington, 22-26 June 2014

Service

University of California Davis, Davis, CA
PIMA School, Guest Lecturer **April 2021 - Present**
PIMA Community College Joint Program with Arizona State University:

- Intro to Astronomy and Astrophysics Course
- 30-45 minute lecture on neutrino physics

Development, Outreach Committee, Graduate Student Representative **October 2020 - September 2021**
Faculty committee purposed to:

- Increase departmental presence through community outreach
- Foster Alumni relations
- Develop departmental programs and fellowships to better support our graduate student community

The Ohio State University, Columbus, OH

ASPIRE Coordinator, Workshop Coordinator **August 2014 - April 2016**
Achieving in Science through Physics Instrumentation, Research and Exploration Program designed to increase participation and interest in STEM amongst high-school young women
- Organized and conducted entire April 2016 Workshop
- Designed 2 out of 4 projects for the four-day workshop
  - Interferometry and antenna construction for AM/FM radio exploration
  - Supervised groups of three groups of 10 students in completion of both projects

Breakfast For Science Champions, Volunteer
- Performed science demos with middle school students

Science Saturdays, Volunteer
- Performed science demos with elementary-aged children from underserved communities

HARDWARE AND SOFTWARE SKILLS

Analog and Digital Electronics:
- Tube and silicon photomultipliers, amplifiers, filters, ADCs, noise-reduction
- Fabrication: soldering/reflow stations, PCB design, SMD components

Computer-aided Design Tools:
- Autodesk EAGLE, Autodesk Inventor, Blender, SolidWorks, SPICE

Embedded and Real-time Systems:
- Software and hardware development with Texas Instruments MSP series, Atmel ATmega MCU's, and Xilinx FPGAs

General Experimental Techniques
- Cryogenics, vacuum systems, spectroscopic ellipsometry, x-ray diffraction, pulsed layer deposition wavelength dispersive x-ray spectroscopy, electron beam deposition

Instrumentation, Control, Data Acquisition, Test, and Measurement:
- LabVIEW and other National Instruments data acquisition hardware and software, CAEN digitizers, NIM/CAMAC Equipment

Physics Simulation Environment:
- Geant4, FEKO

Computational and Statistical Methods:
- Monte Carlo, Bayesian statistics, neural networks, signal clustering

Computer Programming:
- Assembly, C, C++, CUDA, Python, GNU make, Visual Basic, Verilog, MATLAB, ROOT, Mathematica

Information/Internet Technology:
- Networking, distributed computing, cluster management

Operating Systems:
- Microsoft Windows family, Apple macOS, Linux

REFERENCES AVAILABLE TO CONTACT

Prof. Emilija Pantic (e-mail: pantic@ucdavis.edu; phone: +1-310-618-4625)
- Associate Professor, Department of Physics, University of California Davis
- ◇ Department of Physics, One Shields Ave, Davis, CA 95616
- ⋆ *Prof. Pantic is my current supervisor.*

Prof. Robert Svoboda (e-mail: http://svoboda.ucdavis.edu/; phone: +1-530-754-9610)
- Professor, Department of Physics, University of California Davis
- ◇ Department of Physics, One Shields Ave, Davis, CA 95616
- ⋆ *Prof. Svoboda is a collaborator on my current work with DUNE*

Prof. Kerstin Perez (e-mail: kperez@mit.edu; phone: +1-617-324-1522)
- Associate Professor, Department of Physics, Massachusetts Institute of Technology
- ◇ Laboratory for Nuclear Science, 77 Massachusetts Ave, Cambridge, MA 02139
- ⋆ *Prof. Perez was my supervisor for my work on GAPS at MIT*

Prof. Juha Vierinen (e-mail: juha-pekka.vierinen@uit.no; phone: +47-77-645-163)
- Assistant Professor, Department of Physics and Technology, University of Tromsø
- ◇ Forskningsparken 1 Room A220, Tromsø, Norway 85287-6106
- ⋆ *Dr. Vierinen was my mentor for my work at MIT Haystack*

Prof. Amy Connolly (e-mail: connolly@physics.osu.edu; phone: +1-614-292-4368)
- Professor, Department of Physics, The Ohio State University
- ◇ Physics Research Building, 191 West Woodruff Ave, Columbus, OH 43210
- ⋆ *Prof. Connolly was my adviser for ARA*