# Jeremy Gaison – Curriculum Vitae


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## Preface

This CV gives details on a variety of my accomplishments and experiences throughout my academic career. Besides lists of my degrees and awards including competitive, national accolades as well as contributed and invited talks and publications, I also focus on my academic experiences and my longstanding commitment to science outreach efforts and mentoring. I've organized and led teams across a wide range of science outreach efforts aimed at broad general audiences as well as targeted groups. These efforts also include mentoring students in middle school through undergraduate and as well as preparing peers and younger students to take over the outreach leadership after I've moved on. This comprehensive document broadly demonstrates my commitment to academic pursuits and scientific outreach and mentoring.

## Appointments

**Sep 2023 - Present** Pacific Northwest National Laboratory, 902 Battelle Blvd, Richland, WA 99354
*Physicist*

**Oct 2021 - Sep 2023** Pacific Northwest National Laboratory, 902 Battelle Blvd, Richland, WA 99354
*Linus Pauling Postdoctoral Fellow*

## Education

**2021** Ph.D. in Physics - Yale University, New Haven, CT

**2018** Ph.M. in Physics - Yale University, New Haven, CT

**2017** M.S. in Physics - Yale University, New Haven, CT

**2015** B.S. in Physics and Mathematics - Drexel University, Philadelphia, PA
GPA: 3.92

## Awards

**2023** PNNL Postgraduate Research Symposium Best Postdoctorate Oral Presentation Award
PNNL award for talk on antenna array characterization and development.

**2021** Linus Pauling Distinguished Postdoctoral Fellowship
PNNL Lab-wide award for scientist for exceptional postdoc candidates

**2018** APS FGSA Travel Award (National)
Travel award for graduate student to present a talk at a conference

**2017** NSF GRFP Fellow (National)
Fellowship for graduate students in STEM fields

**2016** Benjamin Silliman Fellow (Yale Graduate School)
Endowed Fellowship for Yale graduate students

**2014** Goldwater Scholar (National)
Scholarship for top 300 undergraduates in STEM research looking to pursue a Ph.D.

**2014** Walter R. Coley Award (Drexel Physics Dept.)
Scholarship awarded to physics student at the top of the class of rising seniors

**2013** Harry S. Chen Award (Drexel Physics Dept.)
Scholarship awarded to physics student of high merit

**2012** M. Russel Wehr Award (Drexel Physics Dept.)
Scholarship awarded to physics underclassman who shows promise in teaching or science outreach

**2010** National Merit Scholar
Awarded to top 1% of students as determined by the National College Board's PSAT.

## Research Experience

**Sep 2023 - Present** PNNL, 902 Battelle Blvd, Richland, WA 99354
*Physicist*

Develops instrumentation, simulation, and analysis towards mission spaces in nuclear and particle physics.

**Oct 2021 - Sep 2023** PNNL, 902 Battelle Blvd, Richland, WA 99354
*Linus Pauling Postdoctoral Fellow*

Develop advanced techniques in Cyclotron Radiation Emission Spectrosopy (CRES) with the Project 8 collaboration towards making the first measurement of the absolute mass of the neutrino. Designed hardware systems as well as expand the scale of simulation and analysis tools.

**Jul 2015 - Aug 2021** Yale University, 272 Whitney Avenue, New Haven, CT 06511
*Graduate Student Researcher*

Develop and characterize antineutrino detector hardware both in house and on site at Oak Ridge National Lab, analyze data and write simulations in Python/C/ROOT as part of the PROSPECT collaboration. Coordinated working groups across multiple collaborations and countries in joint analysis efforts.

**Mar 2014 - June 2015** Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104
*Particle Physics Research Assistant*

Analyzed data from the EXO-200 collaboration using ROOT, developed new analysis software to search for specific decays with novel variables for fitting. Additionally developed simulations for source calibration studies for the PROSPECT collaboration using ROOT.

**Apr 2013 - Sep 2013** Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104
*Mathematics Research Assistant*

Wrote simulations in MATLAB to model low amplitude soliton waves in heterogeneous chains of nonlinear springs and masses. Coauthored a rigorous proof on a theorem approximating solutions of these solitons.

**Apr 2012 - Sep 2012** US Army Research Laboratory, 2800 Powder Mill Road, Adelphi, MD 20783
*Nuclear Physics Research Assistant*

Helped manufacture, test, and calibrate radiation detectors, monitored beam time of the ATLAS accelerator at Argonne National Laboratory, and analyzed isotope spectroscopy using RadWare coincidence software.

**Jun 2011 - Sep 2011** Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104
*STAR Researcher*

Scholar of the Students Tackling Advanced Research (STAR) Program. Analyzed over 10 years of KamLAND data using self developed C++ software, set limits on the power output of a naturally occurring georeactor.

## Publications

**Sep 2023** A. Ashtari Esfahani et al. (Project 8 Collaboration)
*Tritium Beta Spectrum and Neutrino Mass Limit from Cyclotron Radiation Emission Spectroscopy*
DOI: PhysRevLett 131 (2023) 102502, arXiv:2212.05048

**Jul 2023** M. Adriamirado et al. (PROSPECT Collaboration)
*Final Measurement of the $^{235}$U Antineutrino Energy Spectrum with the PROSPECT-1 Detector at HFIR*
DOI: PhysRevLett 131 (2023) 021802, arXiv:2212.10669

**Mar 2023** A. Ashtari Esfahani et al. (Project 8 Collaboration)
*Cyclotron Radiation Emission Spectroscopy of Electrons from Tritium Beta Decay and $^{83m}$Kr Internal Conversion*
DOI: arXiv:2303.12055

**Mar 2022** A. Ashtari Esfahani et al. (Project 8 Collaboration)
*The Project 8 Neutrino Mass Experiment*
DOI: arXiv:2203.07349

**Jul 2021** M. Andriamirado et al. (PROSPECT Collaboration)
*Limits on Sub-GeV Dark Matter from the PROSPECT Reactor Antineutrino Experiment*
DOI: PhysRevD 104 (2021) 012009, arXiv:2104.11219

**Jul 2021** M. Andriamirado et al. (PROSPECT Collaboration)
*PROSPECT-II Physics Opportunities*
DOI: JPhysG 49 (2022) 7 070501, arXiv:2107.03934

**Jul 2021** H. Almazhán et al. (PROSPECT and STEREO Collaborations)
*Joint Measurement of the $^{235}$U Antineutrino Spectrum by PROSPECT and STEREO*
DOI: PhysRevLett 128 (2022) 8 081802, arXiv:2107.03371

**Jun 2021** F. P. An et al. (Daya Bay and PROSPECT Collaborations)
*Joint Determination of Reactor Antineutrino Spectra from $^{235}$U and $^{239}$Pu Fission by Daya Bay and PROSPECT*
DOI: PhysRevLett 128 (2022) 8 081801, arXiv:2106.12251

**Feb 2021** M. Andriamirado et al. (PROSPECT Collaboration)
*Improved Short-Baseline Neutrino Oscillation Search and Energy Spectrum Measurement with the PROSPECT Experiment at HFIR*
DOI: PhysRevD 103 (2021) 032001, arXiv:2003.12654

**May 2020** A.B. Balantekin et al. (PROSPECT Collaboration)
*Nonfuel Antineutrino Contributions in the High Flux Isotope Reactor*
DOI: PhysRevC 101 (2020) 054605, arXiv:2003.12654

**Oct 2019** J. Ashenfelter et al. (PROSPECT Collaboration)
*The Radioactive Source Calibration System of the PROSPECT Reactor Antineutrino Detector*
DOI: NIMA 944 (2019) 162465, arXiv:1906.07244

**Jun 2019** J. Ashenfelter et al. (PROSPECT Collaboration)
*Measurement of the Antineutrino Spectrum from $^{235}$U Fission at HFIR with PROSPECT*
DOI: PhysRevLett 122 (2019) 251801, arXiv:1812.10877

**Feb 2019** J. Ashenfelter et al. (PROSPECT Collaboration)
*A Low Mass Optical Grid for the PROSPECT Reactor Antineutrino Detector*
DOI: JINST 14 (2019) P04014, arXiv:1902.06430

**Jan 2019** J. Ashenfelter et al. (PROSPECT Collaboration)
*Lithium-loaded Liquid Scintillator Production for the PROSPECT Experiment*
DOI: JINST 14 (2019) P03026, arXiv:1901.05569

**Dec 2018** J. Ashenfelter et al. (PROSPECT Collaboration)
*First search for short-baseline neutrino oscillations at HFIR with PROSPECT*
DOI: PhysRevLett. 121 (2018) 251802, arXiv:1806.02784

**Jun 2018** J. Ashenfelter et al. (PROSPECT Collaboration)
*Performance of a segmented $^{6}$Li-loaded liquid scintillator detector for the PROSPECT experiment*
DOI: JINST 13 (2018) P06023, arXiv:1805.09245

**Oct 2016** J. Ashenfelter et al. (PROSPECT Collaboration)
*The PROSPECT Physics Program*
DOI: Journal of Phys. G 43 (2016) 11, arXiv:1512.02202

**Aug 2015** J. Ashenfelter et al. (PROSPECT Collaboration)
*Light Collection and Pulse-Shape Discrimination in Elongated Scintillator Cells for the PROSPECT Reactor Antineutrino Experiment*
DOI: JINST 10 (2015) P11004, arXiv:1508.06575

**Jun 2015** J. Ashenfelter et al. (PROSPECT Collaboration)
*Background Radiation Measurements at High Power Research Reactors*
DOI: Nucl. Instru. Meth. Phys. Res. A 806 (2016) 401, arXiv:1506.03547

**Oct 2014** J. Gaison, S. Moskow, J. D. Wright, and Q. Zhang
*Approximation of Polyatomic FPU Lattices by KdV Equations*
SIAM Multiscale Modeling & Simulation, 12(3), 953-995. (43 pages)

## Presentations

**Oct 2022** J. Gaison
*Characterizing Waveguide Antennas for Project 8*
Talk presented at APS Division of Nuclear Physics 2022, New Orleans, LA

**Aug 2022** J. Gaison
*Measuring Neutrino Mass Using Novel RF Techniques with Project 8*
Talk presented at PNNL Postgraduate Symposium 2022, Richland, WA

**July 2021** J. Gaison
*Joint Isotope-Dependent Analysis of the Daya Bay and PROSPECT Reactor Antineutrino Spectra*
Talk presented at APS Division of Particles and Fields 2021 (virtual)

**Apr 2021** J. Gaison
*Joint Isotope-Dependent Analysis of the Daya Bay and PROSPECT Reactor Antineutrino Spectra*
Talk presented at APS April Meeting 2021 (virtual)

**Apr 2021** J. Gaison
*Joint Isotope-Dependent Analysis of the Daya Bay and PROSPECT Reactor Antineutrino Spectra*
Talk presented at APS April Meeting 2021 (virtual)

**Oct 2020** J. Gaison
*Joint Analyses of Reactor Antineutrino Spectra*
Talk presented at APS Division of Nuclear Physics 2020 (virtual)

**Jun 2020** J. Gaison
*Towards a Joint Constraint of the U-235 Reactor Antineutrino Spectrum by Combining the Daya Bay, PROSPECT, and STEREO Measurements*
Research poster presented at Neutrino 2020, Chicago, IL (virtual)

**Jun 2020** J. Gaison
*Towards a Joint Constraint of the U-235 Reactor Antineutrino Spectrum by Combining the Daya Bay, PROSPECT, and STEREO Measurements*
Research poster presented at Neutrino 2020, Chicago, IL (virtual)

**Dec 2018** J. Gaison
*The Short Baseline Search for Sterile Neutrinos at Reactors*
Invited talk presented NuPhys2018, London, UK

**Apr 2018** J. Gaison
*Calibration and Initial Performance of the PROSPECT Detector*
Talk presented to the APS April Meeting, Columbus, OH

**Oct 2016** J. Gaison
*Development and Characterization of $^{6}$Li-doped Liquid Scintillator Detectors for PROSPECT*
Talk presented to the APS Division of Nuclear Physics, Vancouver, B.C., Canada

**Oct 2014** J. Gaison, M. Dolinski, Y.-R. Yen
*Searching for the Decay of $^{136}$Xe to the Excited State of $^{136}$Ba Using EXO-200*
Research poster presented to the APS Division of Nuclear Physics, Waikaloa, HI

**Oct 2012** J. Gaison, J. J. Carroll, M. S. Litz
*Spectroscopy of $^{161}$Yb Using ATLAS/Gammasphere*
Research poster presented to the APS Division of Nuclear Physics, Newport Beach, CA and at the Sigma Pi Sigma Quadrennial Congress, Orlando, FL

**Sep 2011** J. Gaison, J. Maricic, E. Damon
*Searching for a Naturally Occurring Georeactor with Antineutrinos*
Research poster presented at the Drexel STAR Researcher Poster Symposium, Philadelphia, PA

## Education and Outreach Experience

**Feb 2022 - Feb 2023** Richland, WA 99352
*DOE Science Bowl Volunteer*

Moderated and coordinated logistics for matches in the Pacific Northwest Regional DOE Science Bowl Competition. Matches were hosted both virtually and in-person for regional high school students and were held to rigorous and controlled standards for consistency across national efforts.

**Jun 2018 - Jun 2020** Yale University, New Haven, CT 06511
*Science in the News Director*

Collaborate with local libraries and coordinate logistics, personnel, and schedules for multiple series of talks for the Science in the News program as part of the Yale Science Diplomats. Ran speaker auditions, managed talk coordinators and mentored speakers as they developed their talks.

**Sep 2016 - Jun 2018** Yale University, New Haven, CT 06511
*Science in the News Coordinator*

Coordinated a series of science outreach talks at several different local libraries. I guided the development of the talks as well as coordinated logistics with the speakers and logistics at the event venues.

**Sep 2017 - May 2020** Yale University, New Haven, CT 06511
*Distilled Periodical Editor*

Collaborated with graduate student authors to write articles for *Distilled*, a student-run periodical focusing on science communication and scientific literacy in the context of current events.

**Sep 2018 - Dec 2018** Yale University, New Haven, CT 06511
*Graduate Teaching Fellow*

Operate as teaching support for a graduate level course in experimental particle physics. Responsibilities include development of grading material for homework problems and meeting with students during office hours.

**Sep 2015 - May 2017** Yale University, New Haven, CT 06511
*Graduate Teaching Fellow*

Instruct a section of the introductory physics laboratory course at Yale University. Guides students in the lab class, grades lab reports and quizzes, and meets with students if they have questions or need help.

**Sep 2015 - Mar 2016** Yale University, New Haven, CT 06511
*Science in the News Speaker*

Developed and presented in a series of physics talks at local libraries given to the general public. I worked with a team including two other speakers and coordinators.

**Sep 2014 - Jun 2015** Drexel University, Philadelphia, PA 19104
*Drexel Physics Fellow*

Selected as a tutor for the introductory freshmen physics majors sequence. Covered topics in introductory physics, calculus, and computing.

**Feb 2011 - Jun 2015** Rutgers University, Camden, NJ 08102
*TeenSHARP Tutor / Coordinator*

Coordinated volunteer tutors and tutored high school students from inner city areas near Camden, NJ in math and physics.

**Apr 2013 - Apr 2014** Little Flower Catholic High School, Philadelphia, PA 19140
*Physics Day Instructor*

Collaborated as part of a team teaching physics classes for a day in a girls high school including demos on thermodynamics, electricity and magnetism, and optics.

**Sep 2010 - May 2012** Independence Charter School, Philadelphia, PA 19146
*Physics After School Program Instructor*

Organized volunteers and taught various physics demos at an after school program for 7th and 8th graders. Topics included optics, thermodynamics, E&M, and kinematics.

## Related Experiences

**Sep 2019 - Dec 2019** Yale University Physics Department, New Haven, CT 06511
*"Impact of the Atom" Seminar Participant*

Participated in weekly readings and discussions on the many impacts of atomic physics on the world, focusing on the development and human impact of the atomic bomb.

**June 2019 - May 2020** Yale University Graduate Student Assembly, New Haven, CT 06511
*Treasurer*

Maintained budget for the Yale Graduate Student Assembly and represented graduate student interests at bi-weekly meetings with the Graduate School of Arts and Science Dean's Office.

**Jun 2018 - May 2020** Yale University Graduate Student Assembly, New Haven, CT 06511
*Graduate Student Representative*

Advocated on behalf of graduate students on a variety of issues to Yale University administration as an elected representative from the physics department.

**May 2019** Yale University Office of Career Strategy, New Haven, CT 06511
*3 Minute Thesis Finalist*

Finalist in a graduate school wide competition challenging students to present their thesis work to a general audience in just three minutes using a single, static slide.

**May 2017** Washington D.C.
*Science Funding Advocate*

Coordinated with other members of APS Division of Nuclear Physics to meet with congressional staff to advocate on behalf of the US Department of Energy Office of Science budget.

**2012 - 2014** Drexel University Society of Physics Students, Philadelphia, PA 19146
*Chapter President*

Co-authored proposals for numerous national grants and awards, including multiple Marsh White Outreach Awards, Sigma Pi Sigma Research Grants, and Future Faces of Physics Awards. Managed logistical duties, and ran general meetings.

**2011 - 2012** Drexel University Society of Physics Students, Philadelphia, PA 19146
*Director of Outreach*

Coordinated outreach events with local high school teachers, organized and prepped undergraduate volunteers with various demonstrations for secondary school students, and coordinated a partnership with the TeenSharp program offering college prep services to students in the Camden, NJ area.

## Memberships

- **American Physical Society**
- **APS Division of Nuclear Physics**
- **APS Division of Particles and Fields**
- **APS Forum on Graduate Student Affairs**
- **APS Forum on International Physics**
- **Sigma Pi Sigma Physics Honors Society**
- **National Society of Physics Students**