Gerard Lawler

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Education

- PhD in Physics (in progress) at **University of California, Los Angeles**
- MS in Physics at **University of California, Los Angeles**
- Coursework from **US Particle Accelerator School** (4 courses, 12 credit hours)
- BA in Physics from **Boston University**

Summary

I am a graduate student in physics specializing in the development of novel techniques for increasing electron photoinjector brightness particularly for reducing the size of linear accelerators including free electron lasers (FELs). I am further interested in light-matter interaction and radio-frequency engineering, especially in the context of studying the effects of surface physics on electron emission in extreme conditions such as cryogenic temperatures and high fields.

Research Experience

Particle Beam Physics Laboratory (PBPL), UCLA Aug 2016 - present

- Cryogenics design and operation of RF cavities
- Electron photogun commissioning
- Pulsed power development in C and S band frequencies
- Laser optics and vacuum engineering for high harmonic generation
- Teaching and supervising multiple undergraduate research projects
- Plasmonic and beam dynamics simulations for surface studies involved in high harmonic generation
- Novel multipole magnet design
- Fabrication of nanostructures with photo-lithography
- Created and maintained group department website

AEgIS Collaboration, CERN 2015 - 2016

- Antiproton beam dynamics simulations
- Ion optics design and manufacturing: incl. einzel lenses, hemispheric analyzers, and Penning traps

Center for Space Physics, BU 2012 - 2015

- Data mining and analysis for characterization of daily Martian ionosphere measurements
- semi-empirical modeling of peak electron density and totel electron content of Martian ionosphere
- web design and maintenance of Mars International Reference Ionosphere (MIRI) website

Projects

CYBORG Beamline Link to Webpage

Commissioning of new CYBORG (CrYogenic Brightness-Optimized Radiofrequency Gun) beamline for photoemission and RF testing. Project also includes commissioning of Multi-Objective Testing for High Gradient Radiofrequency Accelerators (MOTHRA) laboratory space on the site of the former UCLA cyclotron lab. The space includes a 30 in concrete bunker and associated laser clean room to perform studies relevant to the development of ultra high gradient RF accelerators and infrastructure development towards an ultra compact xray free electron laser. Development of S.O.P.

MITHRA Laboratory Link to Webpage

Worked on development of an electron linear accelerator test facility located on UCLA's southwest campus in Westwood called MITHRA (Megavolt InTense High-gradient Research Accelerator (MITHRA)).

Beam Production and Cathode Development Read more

Electrons used in linear accelerators are generated via materials known as cathodes. At PBPL we study emission physics from a theoretical perspective in order to study cathode behavior in order to improve beam brightness, current, and other figures of merit. Developed several concepts for higher brightness photo and field emission cathodes.

MIRI Link to Homepage

The Mars International Reference Ionosphere (MIRI) is a semi empirical modeling reference for Martian ionosphere properties.

Teaching Experience

UCLA Department of Physics and Astronomy, *Teaching Assistant* 2019

- Upper division lab for physics majors
- Curriculum redesign focusing more on scripting and data analysis with statistical software packages

Boston University Physics Department, *Learning Assistant* 2014 - 2015

- Ran discussions with graduate teaching assistant, and held independent office hours to assist students
- Taught introductory electromagnetism course for pre-medical students and advanced lab course for graduate students

Boston University Physics Department, , *Lab technician* 2012 - 2015

- Maintained physics demonstration stock room for department.
- Designed and created new demonstrations of physical phenomenon for classes and special events.

Museum of Science Boston, *SciCORE Intern* 2011

- Educated visitors and interpreted exhibits for them.
- Designed exhibit displays and interpretations for use with the general public.
- Trained new staff and volunteers

Peer-Reviewed Publications

Bosco, Fabio et al. (2024). "Manipulation and Wakefield Effects on Multi-Pulse Driver Beams in PWFA Injector Stages". In: *Instruments* 8.1. ISSN: 2410-390X. DOI: 10.3390/instruments8010012.

Lawler, Gerard Emile et al. (2024). "Improving Cathode Testing with a High-Gradient Cryogenic Normal Conducting RF Photogun". In: *Instruments* 8.1. ISSN: 2410-390X. DOI: 10.3390/instruments8010014.

Rosenzweig, James B. et al. (2024). "A High-Flux Compact X-ray Free-Electron Laser for Next-Generation Chip Metrology Needs". In: *Instruments* 8.1. ISSN: 2410-390X. DOI: 10.3390/instruments8010019.

Nicks, Bradley Scott et al. (2021). "High-Density Dynamics of Laser Wakefield Acceleration from Gas Plasmas to Nanotubes". In: *Photonics* 8.6. ISSN: 2304-6732. DOI: https://doi.org/10.3390/photonics8060216.

Rosenzweig, J B et al. (Sept. 2020). "An ultra-compact x-ray free-electron laser". In: *New Journal of Physics* 22.9, p. 093067. DOI: 10.1088/1367-2630/abb16c.

Roussel, R., G. Andonian, W. Lynn, et al. (Jan. 2020). "Single Shot Characterization of High Transformer Ratio Wakefields in Nonlinear Plasma Acceleration". In: *Phys. Rev. Lett.* 124 (4), p. 044802. DOI: 10.1103/PhysRevLett.124.044802.

Lawler, Gerard et al. (2019). "Electron Diagnostics for Extreme High Brightness Nano-Blade Field Emission Cathodes". In: *Instruments* 3.4. ISSN: 2410-390X. DOI: https://doi.org/10.3390/instruments3040057.

Mann, Joshua et al. (2019). "1D Quantum Simulations of Electron Rescattering with Metallic Nanoblades". In: *Instruments* 3.4. ISSN: 2410-390X. DOI: 10.3390/instruments3040059.

Roussel, Ryan et al. (2019). "Externally Heated Hollow Cathode Arc Plasma Source for Experiments in Plasma Wakefield Acceleration". In: *Instruments* 3.3. ISSN: 2410-390X. DOI: 10.3390/instruments3030048.

Rosenzweig, J.B., A. Cahill, et al. (2018). "Ultra-high brightness electron beams from very-high field cryogenic radiofrequency photocathode sources". In: *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* 909. 3rd European Advanced Accelerator Concepts workshop (EAAC2017), pp. 224–228. ISSN: 0168-9002. DOI: https://doi.org/10.1016/j.nima.2018.01.061.

Rosenzweig, J.B., F. Filippi, et al. (2018). "Adiabatic plasma lens experiments at SPARC". In: *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* 909. 3rd European Advanced Accelerator Concepts workshop (EAAC2017), pp. 471–475. ISSN: 0168-9002. DOI: https://doi.org/10.1016/j.nima.2018.02.016.

Roussel, R., G. Andonian, M. Conde, et al. (2018). "Measurement of transformer ratio from ramped beams in the blowout regime". In: *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* 909. 3rd European Advanced Accelerator Concepts workshop (EAAC2017), pp. 130–133. ISSN: 0168-9002. DOI: https://doi.org/10.1016/j.nima.2018.02.002.

Pacifico, N. et al. (2016). "Direct detection of antiprotons with the Timepix3 in a new electrostatic selection beamline". In: *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* 831. Proceedings of the 10th International "Hiroshima" Symposium on the Development and Application of Semiconductor Tracking Detectors, pp. 12–17. ISSN: 0168-9002. DOI: https://doi.org/10.1016/j.nima.2016.03.057.

Mendillo, M et al. (2015). "The equivalent slab thickness of Mars' ionosphere: Implications for thermospheric temperature". In: *Geophysical Research Letters* 42.9, pp. 3560–3568. DOI: https://doi.org/10.1002/2015GL063096.

Mendillo, Michael et al. (2013). "A new semiempirical model of the peak electron density of the Martian ionosphere". In: *Geophysical Research Letters* 40.20, pp. 5361–5365. DOI: https://doi.org/10.1002/2013GL057631.

Other Published Manuscripts

Li, W. H. et al. (2024). *Compensating slice emittance growth in high brightness photoinjectors using sacrificial charge*. arXiv: 2404.06312 [physics.acc-ph].

Lawler, G., A. Fukasawa, et al. (May 2023). "Temperature stability in CrYogenic Brightness-Optimized Radiofrequency Gun (CYBORG)". English. In: *Proc. IPAC'23* (Venice, Italy). IPAC'23 - 14th International Particle Accelerator Conference 14. JACoW Publishing, Geneva, Switzerland, pp. 1425–1427. ISBN: 978-3-95450-231-8. DOI: 10.18429/JACoW-IPAC2023-TUPA039.

Lawler, G., A. Mostacci, et al. (May 2023). "Effects of bulk material properties on RF surface resistivity". English. In: *Proc. IPAC'23* (Venice, Italy). IPAC'23 - 14th International Particle Accelerator Conference 14. JACoW Publishing, Geneva, Switzerland, pp. 1422–1424. ISBN: 978-3-95450-231-8. DOI: 10.18429/JACoW-IPAC2023-TUPA038.

Lawler, Gerard et al. (2023). *Improving Interface Physics Understanding in High-Frequency Cryogenic Normal Conducting Cavities*. arXiv: 2310.11578 [physics.acc-ph].

Montanez, N. et al. (May 2023). "Novel Fabrication Methods and Geometries of Nanoblade Cathodes". English. In: *Proc. IPAC'23* (Venice, Italy). IPAC'23 - 14th International Particle Accelerator Conference 14. JACoW Publishing, Geneva, Switzerland, pp. 1622–1624. ISBN: 978-3-95450-231-8. DOI: 10.18429/JACoW-IPAC2023-TUPA142. URL: https://indico.jacow.org/event/41/contributions/1573.

Lawler, G.E., F. Bosco, et al. (Oct. 2022). "Cyborg Beamline Development Updates". In: *Proc. NAPAC'22* (Albuquerque, NM, USA). International Particle Accelerator Conference 5. JACoW Publishing, Geneva, Switzerland, TUPA80, pp. 512–515. ISBN: 978-3-95450-232-5. DOI: 10.18429/JACoW-NAPAC2022-TUPA80.

Lawler, G.E., A. Fukasawa, Z. Li, A. Mostacci, et al. (Oct. 2022). "Design of a High-Power RF Breakdown Test for a Cryocooled C-Band Copper Structure". In: *Proc. 5th Int. Particle Accel. Conf. (NAPAC'22)* (Albuquerque, NM, USA). International Particle Accelerator Conference 5. JACoW Publishing, Geneva, Switzerland, TUPA81, pp. 516–518. ISBN: 978-3-95450-232-5. DOI: 10.18429/JACoW-NAPAC2022-TUPA81.

Lawler, G.E., A. Fukasawa, N. Majernik, J.R. Parsons, et al. (July 2022). "CrYogenic Brightness-Optimized Radiofrequency Gun (CYBORG)". In: *Proc. IPAC'22* (Bangkok, Thailand). International Particle Accelerator Conference 13. JACoW Publishing, Geneva, Switzerland, THPOST046, pp. 2544–2547. ISBN: 978-3-95450-227-1. DOI: 10.18429/JACoW-IPAC2022-THPOST046.

Lawler, G.E., A. Fukasawa, N. Majernik, and J.B. Rosenzweig (July 2022). "Temperature Dependent Effects on RF Surface Resistivity". In: *Proc. IPAC'22* (Bangkok, Thailand). International Particle Accelerator Conference 13. JACoW Publishing, Geneva, Switzerland, THPOST045, pp. 2540–2543. ISBN: 978-3-95450-227-1. DOI: 10.18429/JACoW-IPAC2022-THPOST045.

Lawler, G.E., N. Majernik, J.I. Mann, N. Montanez, et al. (Oct. 2022). "Development of Nanopatterned Strong Field Emission Cathodes". In: *Proc. NAPAC'22* (Albuquerque, NM, USA). International Particle

Accelerator Conference 5. JACoW Publishing, Geneva, Switzerland, THYD5, pp. 863–865. ISBN: 978-3-95450-232-5. DOI: 10.18429/JACoW-NAPAC2022-THYD5.

Lawler, G.E., N. Majernik, J.I. Mann, N.E. Montanez, et al. (July 2022). "Emittance Measurements of Nanoblade-Enhanced High Field Cathode". In: *Proc. IPAC'22* (Bangkok, Thailand). International Particle Accelerator Conference 13. JACoW Publishing, Geneva, Switzerland, MOPOMS033, pp. 709–712. ISBN: 978-3-95450-227-1. DOI: 10.18429/JACoW-IPAC2022-MOPOMS033.

Mann, J.I., T. Arias, S.S. Karkare, et al. (Oct. 2022). "Simulations of Nanoblade Cathode Emissions with Image Charge Trapping for Yield and Brightness Analyses". In: *Proc. NAPAC'22* (Albuquerque, NM, USA). International Particle Accelerator Conference 5. JACoW Publishing, Geneva, Switzerland, TUPA86, pp. 535–538. ISBN: 978-3-95450-232-5. DOI: 10.18429/JACoW-NAPAC2022-TUPA86.

Manwani, P. et al. (Oct. 2022). "Simulations for the Space Plasma Experiments at the SAMURAI Lab". In: *Proc. NAPAC'22* (Albuquerque, NM, USA). International Particle Accelerator Conference 5. JACoW Publishing, Geneva, Switzerland, TUPA87, pp. 539–541. ISBN: 978-3-95450-232-5. DOI: 10.18429/JACoW-NAPAC2022-TUPA87.

Parsons, J.R. et al. (July 2022). "Temperature Dependent Effects on Quality Factor in C-band RF Cavities". In: *Proc. IPAC'22* (Bangkok, Thailand). International Particle Accelerator Conference 13. JACoW Publishing, Geneva, Switzerland, THPOTK027, pp. 2826–2828. ISBN: 978-3-95450-227-1. DOI: 10.18429/JACoW-IPAC2022-THPOTK027.

Sakai, Y. et al. (July 2022). "Introduction of Westwood Linear Accelerator Test Facility in University of California Los Angeles". In: *Proc. IPAC'22* (Bangkok, Thailand). International Particle Accelerator Conference 13. JACoW Publishing, Geneva, Switzerland, TUPOPT035, pp. 1085–1088. ISBN: 978-3-95450-227-1. DOI: 10.18429/JACoW-IPAC2022-TUPOPT035.

Wang, B. et al. (July 2022). "Simulations of Laser Field Emission from Nanostructures with Image Charge Trapping and Band Structure Transitions". In: *Proc. IPAC'22* (Bangkok, Thailand). International Particle Accelerator Conference 13. JACoW Publishing, Geneva, Switzerland, MOPOMS036, pp. 717–720. ISBN: 978-3-95450-227-1. DOI: 10.18429/JACoW-IPAC2022-MOPOMS036.

Fukasawa, A. et al. (Aug. 2021). "Advanced Photoinjector Development at the UCLA SAMURAI Laboratory". In: *Proc. IPAC'21* (Campinas, SP, Brazil). International Particle Accelerator Conference 12. JACoW Publishing, Geneva, Switzerland, WEPAB056, pp. 2728–2731. ISBN: 978-3-95450-214-1. DOI: 10.18429/JACoW-IPAC2021-WEPAB056.

Lawler, G.E., A. Fukasawa, Z. Li, N. Majernik, et al. (Aug. 2021). "RF Testbed for Cryogenic Photoemission Studies". In: *Proc. IPAC'21* (Campinas, SP, Brazil). International Particle Accelerator Conference 12. JACoW Publishing, Geneva, Switzerland, WEPAB096, pp. 2810–2813. ISBN: 978-3-95450-214-1. DOI: 10.18429/JACoW-IPAC2021-WEPAB096.

Lawler, G.E., J.I. Mann, et al. (Aug. 2021). "Initial Nanoblade-Enhanced Laser-Induced Cathode Emission Measurements". In: *Proc. IPAC'21* (Campinas, SP, Brazil). International Particle Accelerator Conference 12. JACoW Publishing, Geneva, Switzerland, WEPAB097, pp. 2814–2817. ISBN: 978-3-95450-214-1. DOI: 10.18429/JACoW-IPAC2021-WEPAB097.

Lawler, G.E. et al. (Aug. 2021). "Cryogenic Component and Material Testing for Compact Electron Beamlines". In: *Proc. IPAC'21* (Campinas, SP, Brazil). International Particle Accelerator Conference 12. JACoW Publishing, Geneva, Switzerland, WEPAB098, pp. 2818–2821. ISBN: 978-3-95450-214-1. DOI: 10.18429/JACoW-IPAC2021-WEPAB098.

Majernik, N. et al. (Aug. 2021). "Demonstration FELs Using UC-XFEL Technologies at the SAMURAI Laboratory". In: *Proc. IPAC'21* (Campinas, SP, Brazil). International Particle Accelerator Conference 12. JACoW Publishing, Geneva, Switzerland, TUPAB092, pp. 1592–1595. ISBN: 978-3-95450-214-1. DOI: 10.18429/JACoW-IPAC2021-TUPAB092.

Mann, J.I., T. Arias, G.E. Lawler, et al. (Aug. 2021). "Simulations of Nanoblade-Enhanced Laser-Induced Cathode Emissions and Analyses of Yield, MTE, and Brightness". In: *Proc. IPAC'21* (Campinas, SP, Brazil). International Particle Accelerator Conference 12. JACoW Publishing, Geneva, Switzerland, WEPAB147, pp. 2957–2960. ISBN: 978-3-95450-214-1. DOI: 10.18429/JACoW-IPAC2021-WEPAB147.

Shao, Y.Z. et al. (Aug. 2021). "Tapered Modular Quadrupole Magnet to Reduce Higher-Order Optical Aberrations". In: *Proc. IPAC'21* (Campinas, SP, Brazil). International Particle Accelerator Conference 12. JACoW Publishing, Geneva, Switzerland, THPAB328, pp. 4429–4431. ISBN: 978-3-95450-214-1. DOI: 10.18429/JACoW-IPAC2021-THPAB328.

Yu, V.S. et al. (Aug. 2021). "Magneto-Optical Trap Cathode for High Brightness Applications". In: *Proc. IPAC'21* (Campinas, SP, Brazil). International Particle Accelerator Conference 12. JACoW Publishing, Geneva, Switzerland, THPAB344, pp. 4466–4469. ISBN: 978-3-95450-214-1. DOI: 10.18429/JACoW-IPAC2021-THPAB344.

Lawler, G. E. et al. (Dec. 2020). "Cryocooler Technology for Electron Particle Accelerators". en. In: 21. International Cryocooler Conference 21. URL: https://cryocooler.org/resources/Documents/C21/077.pdf.

Skills

Programming	Python, C/C++, JAVA, Fortran, IDL, Matlab, Mathematica, LaTeX
Other Software	HFSS, CST, SolidWorks, Lumerical, IDL, ROOT, Matlab, Mathematica, LabVIEW
Operating Systems	Linux (Ubuntu, CentOS, Debian), Windows
Nanofabrication	Photomask layout and write, spin coating, photolithography, sputtering, plasma-enhanced chemical vapor deposition
Electronics	Microcontrollers, signal processing, robotics, fast electronics

Student Advising

Sean O'Tool, *UCLA Undergraduate* 2023 - present

Cryogenic material testing for cathode plugs in high gradient RF photoguns.

Jake Parsons, *UCLA Post-Bac Researcher* 2021 - 2023

Developed cryogenic testing infrastructure and Cband RF power infrastructure at UCLA Mothra laboratory. Several proceedings contributions authored and publication in progress.

Nathan Montanez, *UCLA Undergraduate* 2022 - present

Trained in nanofabrication procedures in coordination with UCLA Nanolab. Data analysis of nanoblade cathode measurements. Developed additional calibration tests for diagnostics. Developing nanofabrication recipe modifications.

Arathi Suraj, *UCLA Undergraduate* 2021 - 2022

Developed testing infrastructure for novel solenoid development and assisted in development of novel solenoid magnets for electron beam diagnostics in UCLA Mothra laboratory.

Oliver Shao, *UCLA Undergraduate* 2019-2020

Performed high frequency cavity simulations using HFSS and magnet simulation of novel pole shape leading to conference proceedings contribution.

Victor Yu, *UCLA Undergraduate* 2018 - 2021

Trained in nanofabrication procedures in coordination with UCLA Nanolab. Manufactured several generations of nanoblade patterned field emission cathodes for characterisation diagnostics. Developed electron beam diagnostics for nanoblade cathodes. Developed two novel cathodes based on AMO techniques leading to multiple provisional patents.

River Robles, *UCLA Undergraduate* 2018 - 2019

Trained in nanofabrication procedures in coordination with UCLA Nanolab. Manufactured several generations of nanoblade patterned field emission cathodes for characterisation diagnostics.

Yumeng Zhuang, *UCLA Undergraduate* 2018 - 2019

Ran beam dynamics simulations using C++ library Ion Beam Simulator and designed beam optics and diagnostic elements for low energy ($<$ 1keV) electrons from novel cathodes.

Kunal Sanwalka, *UCLA Undergraduate* 2017 - 2019

Ran beam dynamics simulations using GPT and designed beam optics and diagnostic elements for low energy ($<$ 1keV) electrons from novel cathodes.

Conferences and Workshops

LCWS23, Contributed Talk 2023

Title: *Application of CrYogenic Brightness-Optimized Radiofrequency Gun (CYBGORG) for Future Collider Studies*

IPAC23, Poster Talk 2023

Title: *Effects of Bulk Material Properties on RF Surface Resistivity*

IPAC23, Poster Talk 2023

Title: *Temperature Stability in CrYogenic Brightness-Optimized Radiofrequency Gun (CYBORG)*

IPAC23, Poster Talk 2023

Title: *Novel Fabrication Methods and Geometries of Nanoblade Cathodes*

MeVArc22, Contributed Talk 2022

Title: *High Gradient CrYogenic Brightness-Optimized Radiofrequency Gun (CYBORG) Test Bed*

NAPAC22, Invited Contributed Talk 2022

Title: *Development of Nanopatterned Strong Field Emission Cathodes*

NAPAC22, Poster Talk 2022

Title: *Cyborg Beamline Development Updates*

NAPAC22, Poster Talk 2022

Title: *Design of a High-Power RF Breakdown Test for a Cryocooled C-Band Copper Structure*

NAPAC22, Poster Talk 2022

Title: *Nanopatterned Cathodes*

IPAC22, Poster Talk 2022

Title: *Emittance Measurements of Nanoblade-Enhanced High Field Cathode*

IPAC22, Poster Talk 2022

Title: *Introduction of Westwood Linear Accelerator Test Facility in University of California Los Angeles*

IPAC22, Poster Talk 2022

Title: *Temperature Dependent Effects on RF Surface Resistivity*

IPAC22, Poster Talk 2022

Title: *CrYogenic Brightness-Optimized Radiofrequency Gun (CYBORG)*

IPAC22, Poster Talk 2022

Title: *Temperature Dependent Effects on Quality Factor in C-band RF Cavities*

HG22, Invited Talk 2022

Title: *UCLA Breakdown & HG Research Updates*

HG22, Invited Talk 2022

Title: *CrYogenic Brightness-Optimized Radiofrequency Gun (CYBORG)*

IPAC21, Poster Talk 2021

Title: *RF Testbed for Cryogenic Photoemission Studies*

IPAC21, Poster Talk 2021

Title: *Initial Nanoblade-Enhanced Laser-Induced Cathode Emission Measurements*

IPAC21, Poster Talk 2021

Title: *Cryogenic Component and Material Testing for Compact Electron Beamlines*

USPAS20 Winter Session 2020

Course Title: *Particle Driven Wakefield Accelerators; High Brightness Electron Injectors and Applications*

2019 NSF STC Professional Development Workshop 2019

Student representative for NSF Center for Bright Beams

Canadian-American-Mexican Graduate Student Physics Conference, Poster Talk 2019

Title: *Electron Diagnostics for Extreme High Brightness Nano-Blade Field Emission Cathode*

Physics and Applications of High Brightness Beams Workshop 2019

Title: *Electron Diagnostics for Extreme High Brightness Nano-Blade Field Emission Cathode*

USPAS18 Winter Session 2019

Course Title: *Advanced Accelerator Physics*

Joint-US-CERN-Japan-Russia International Accelerator School 2017

Topic *RF Technologies*

APS April Meeting 2017

Title *Generating a Reduced-energy Antiproton beam using Channeling Electrostatic elements (GRACE)*

USPAS16 Summer Session 2016

Course Title: *Self-Consistent Simulations of Beam and Plasma Systems; Unifying Physics of Accelerators, Lasers and Plasma Synergy and Bridges*

USPAS15 Summer Session 2015

Course Title: *Fundamentals of Accelerator Physics and Technology with Simulations and Measurements Lab*

Professional Organization

2018-present **IEEE**, Nuclear and Plasma Sciences Society; Photonics Society; Young Professionals
2018-present **SPIE**
2016-present **APS**,Physics of Beams (DPB); Plasma Physics (DPP); Physics and Society (FPS); Laser Science (DLS); International Physics (FIP); Industrial and Applied Physics (FIAP); Graduate Student Affairs (FGSA); Far West Section (FWS); Early Career Scientists (FECS)

Other Activities

NSF CBB Grad-to-Grad, *Chair* 2020 - present

Chaired graduate student dialogue meetings for NSF Center for Bright Beams in order to facilate inter-university dialogue.

MIPA Program, *Mentor* 2020

UCLA Exploring Your Universe, *Booth Leader* 2019 - present

Designed demonstration of scientific principles of particle accelerators using electrostatic spark generator. Organized and led team of volunteer educators at annual event with hundreds of elementary school aged children and other science enthusiasts.

UCLA Astronomy Live!, *Educator* 2019

IEEE Try Engineering Together, *Mentor* 2019 - 2020

Correspondence between 3rd grade mentee as part of elementary school educational curriculum. Discussed engineering principles and reviewed age appropriate articles with supervision of elementary school instructor

PRISM Program, *Mentor* 2015 - 2016

BU Chapter of Society of Physics Students (SPS), *Co-President* 2014 - 2016

FIRST Robotics Team 125 Ask an Engineer, *Volunteer* 2012

FIRST Robotics Team 125, *Co-Captain* 2011 - 2012