

Gerard Lawler

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EDUCATION

- PhD in Physics **University of California, Los Angeles**
Thesis: *Improvements to Normal Conducting High Gradient Accelerator Performance at Cryogenic Temperatures*
- MS in Physics **University of California, Los Angeles**
- Coursework (4 courses, 12 credit hours) **US Particle Accelerator School**
- BA in Physics, *cum laude* with distinction **Boston University**
Senior Honors Thesis: *Design and Analysis of Permanent Magnet Penning Trap for AEGIS Collaborations Antiproton-beam Studies*

SUMMARY

I am interested primarily in the use of accelerator physics for medical and industrialization with a focus on miniaturization and cost reduction. To this end I have focused most in the past on high gradient accelerating cavities and high brightness cathodes enabled by cryogenic operation.

RESEARCH EXPERIENCE

Particle Beam Physics Laboratory (PBPL), UCLA 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

- Data mining and analysis for characterization of daily Martian ionosphere measurements
- semi-empirical modeling of peak electron density and total 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 south-west 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, *Laboratory 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. DOI: [10.3390/instruments8010012](https://doi.org/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. DOI: [10.3390/instruments8010014](https://doi.org/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. DOI: [10.3390/instruments8010019](https://doi.org/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. DOI: [10.3390/photonics8060216](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](https://doi.org/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](https://doi.org/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. DOI: [10.3390/instruments3040057](https://doi.org/10.3390/instruments3040057).

Mann, Joshua et al. (2019). “1D Quantum Simulations of Electron Rescattering with Metallic Nanoblades”. In: *Instruments* 3.4. DOI: [10.3390/instruments3040059](https://doi.org/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. DOI: [10.3390/instruments3030048](https://doi.org/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: *Nucl Instrum and Meth A* 909. 3rd European Advanced Accelerator Concepts workshop (EAAC2017), pp. 224–228. DOI: [10.1016/j.nima.2018.01.061](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: *Nucl Instrum and Meth A* 909. 3rd European Advanced Accelerator Concepts workshop (EAAC2017), pp. 471–475. DOI: [10.1016/j.nima.2018.02.016](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: *Nucl Instrum and Meth A* 909. 3rd European Advanced Accelerator Concepts workshop (EAAC2017), pp. 130–133. DOI: [10.1016/j.nima.2018.02.002](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: *Nucl Instrum and Meth A* 831. Proceedings of the 10th International “Hiroshima” Symposium on the Development and Application of Semiconductor Tracking Detectors, pp. 12–17. ISSN: 0168-9002. DOI: [10.1016/j.nima.2016.03.057](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: [10.1002/2015GL063096](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: [10.1002/2013GL057631](https://doi.org/10.1002/2013GL057631).

OTHER PUBLISHED MANUSCRIPTS

- Bosco, F. et al. (May 2024). “Preliminary tests for the diffusion bonding of high gradient cryogenic radio-frequency cavities”. In: *Proc. IPAC’24* (Nashville, TN). 15, pp. 531–534. DOI: [10.18429/JACoW-IPAC2024-MOPR33](https://doi.org/10.18429/JACoW-IPAC2024-MOPR33).
- Fukasawa, A. et al. (May 2024). “Commissioning an S-band hybrid photocathode gun in Mithra laboratory at UCLA”. In: *Proc. IPAC’24* (Nashville, TN). 15, pp. 1993–1995. DOI: [10.18429/JACoW-IPAC2024-WEPC18](https://doi.org/10.18429/JACoW-IPAC2024-WEPC18).
- Lawler, G. et al. (May 2024). “High gradient operation of cryogenic C-band RF photogun at UCLA”. In: *Proc. IPAC’24* (Nashville, TN). 15, pp. 527–530. DOI: [10.18429/JACoW-IPAC2024-MOPR32](https://doi.org/10.18429/JACoW-IPAC2024-MOPR32).
- Lawler, G. et al. (May 2024). “Reduction of dark current at cryogenic temperatures in a high gradient photogun”. In: *Proc. IPAC’24* (Nashville, TN). 15, pp. 523–526. DOI: [10.18429/JACoW-IPAC2024-MOPR31](https://doi.org/10.18429/JACoW-IPAC2024-MOPR31).
- Li, W. H. et al. (2024). *Compensating slice emittance growth in high brightness photoinjectors using sacrificial charge*. arXiv: [2404.06312](https://arxiv.org/abs/2404.06312) [[physics.acc-ph](https://arxiv.org/archive/physics)].

- Pennington, C. et al. (May 2024). “Optimizations for ultrafast electron diffraction with a cryogenic C-band gun”. English (Nashville, TN). presented at IPAC’24, Nashville, TN, 2024, paper SUPC086, unpublished. URL: <https://indico.jacow.org/event/63/contributions/5135>.
- Xu, H. et al. (May 2024). “RF and multipactor analysis for the CARIE RF photoinjector with a photocathode insert”. In: *Proc. IPAC’24* (Nashville, TN). 15, pp. 3248–3250. DOI: [10.18429/JACoW-IPAC2024-THPG04](https://doi.org/10.18429/JACoW-IPAC2024-THPG04).
- Yadav, M. et al. (May 2024). “Long range plasma experiment beam transport with UCLA MITHRA beam line”. In: *Proc. IPAC’24* (Nashville, TN). 15, pp. 3268–3271. DOI: [10.18429/JACoW-IPAC2024-THPG11](https://doi.org/10.18429/JACoW-IPAC2024-THPG11).
- Lawler, G., A. Fukasawa, et al. (May 2023). “Temperature stability in CrYogenic Brightness-Optimized Radiofrequency Gun (CYBORG)”. In: *Proc. IPAC’23* (Venice, Italy). 14, pp. 1425–1427. DOI: [10.18429/JACoW-IPAC2023-TUPA039](https://doi.org/10.18429/JACoW-IPAC2023-TUPA039).
- Lawler, G., A. Mostacci, et al. (May 2023). “Effects of bulk material properties on RF surface resistivity”. In: *Proc. IPAC’23* (Venice, Italy). 14, pp. 1422–1424. DOI: [10.18429/JACoW-IPAC2023-TUPA038](https://doi.org/10.18429/JACoW-IPAC2023-TUPA038).
- Lawler, Gerard et al. (2023). *Improving Interface Physics Understanding in High-Frequency Cryogenic Normal Conducting Cavities*. arXiv: [2310.11578](https://arxiv.org/abs/2310.11578) [physics.acc-ph].
- Montanez, N. et al. (May 2023). “Novel Fabrication Methods and Geometries of Nanoblade Cathodes”. In: *Proc. IPAC’23* (Venice, Italy). IPAC’23 - 14th International Particle Accelerator Conference 14, pp. 1622–1624. DOI: [10.18429/JACoW-IPAC2023-TUPA142](https://doi.org/10.18429/JACoW-IPAC2023-TUPA142).
- Lawler, G.E., F. Bosco, et al. (Oct. 2022). “Cyborg Beamline Development Updates”. In: *Proc. NAPAC’22* (Albuquerque, NM, USA). 5, TUPA80, pp. 512–515. DOI: [10.18429/JACoW-NAPAC2022-TUPA80](https://doi.org/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). 5, TUPA81, pp. 516–518. DOI: [10.18429/JACoW-NAPAC2022-TUPA81](https://doi.org/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, THPOST046, pp. 2544–2547. DOI: [10.18429/JACoW-IPAC2022-THPOST046](https://doi.org/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). 13, THPOST045, pp. 2540–2543. DOI: [10.18429/JACoW-IPAC2022-THPOST045](https://doi.org/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). 5, THYD5, pp. 863–865. DOI: [10.18429/JACoW-NAPAC2022-THYD5](https://doi.org/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). 13, MOPOMS033, pp. 709–712. DOI: [10.18429/JACoW-IPAC2022-MOPOMS033](https://doi.org/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). 5, TUPA86, pp. 535–538. DOI: [10.18429/JACoW-NAPAC2022-TUPA86](https://doi.org/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). 5, TUPA87, pp. 539–541. DOI: [10.18429/JACoW-NAPAC2022-TUPA87](https://doi.org/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). 13, THPOTK027, pp. 2826–2828. DOI: [10.18429/JACoW-IPAC2022-THPOTK027](https://doi.org/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). 13, TUPOPT035, pp. 1085–1088. DOI: [10.18429/JACoW-IPAC2022-TUPOPT035](https://doi.org/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). 13, MOPOMS036, pp. 717–720. DOI: [10.18429/JACoW-IPAC2022-MOPOMS036](https://doi.org/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). 12, WEPAB056, pp. 2728–2731. DOI: [10.18429/JACoW-IPAC2021-WEPAB056](https://doi.org/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). 12, WEPAB096, pp. 2810–2813. DOI: [10.18429/JACoW-IPAC2021-WEPAB096](https://doi.org/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). 12, WEPAB097, pp. 2814–2817. DOI: [10.18429/JACoW-IPAC2021-WEPAB097](https://doi.org/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). 12, WEPAB098, pp. 2818–2821. DOI: [10.18429/JACoW-IPAC2021-WEPAB098](https://doi.org/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). 12, TUPAB092, pp. 1592–1595. DOI: [10.18429/JACoW-IPAC2021-TUPAB092](https://doi.org/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). 12, WEPAB147, pp. 2957–2960. DOI: [10.18429/JACoW-IPAC2021-WEPAB147](https://doi.org/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). 12, THPAB328, pp. 4429–4431. DOI: [10.18429/JACoW-IPAC2021-THPAB328](https://doi.org/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). 12, THPAB344, pp. 4466–4469. DOI: [10.18429/JACoW-IPAC2021-THPAB344](https://doi.org/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

Iago da Silva, *UCLA Undergraduate* 2024 - present
Optics, including mirror box, development for laser insertion of UV for photoemission studies at CYBORG beamline.

April Smith, *UCLA Undergraduate* 2023 - present
Ultra-high vacuum load lock chamber for novel cathode integration in CYBORG beamline.

Sean O’Tool, *UCLA Undergraduate* 2023 - 2024
Cryogenic material testing for cathode plugs in high gradient RF photoguns. Laser optics for CYBORG beamline.

Nathan Montanez, *UCLA Undergraduate* 2022 - 2023
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.

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.

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 ($< 1\text{keV}$) 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 ($< 1\text{keV}$) electrons from novel cathodes.

CONFERENCES AND WORKSHOPS

Center for Bright Beams Annual Meeting, Invited Talk Ithaca, NY, 2024
Title: *Colder and Brighter: Improving Normal Conducting RF Photogun Performance with Cryogenic Materials*

IPAC24, Poster Talk Nashville, TN, 2024
Title: *High Gradient operation of cryogenic C-band RF photogun at UCLA*

IPAC24, Poster Talk Nashville, TN, 2024
Title: *Reduction of dark current at cryogenic temperatures in a high gradient photogun*

MeVArc 2024, Contributed Talk Lake Tahoe, CA, 2024
Title: *Cryogenic High Gradient RF Dark Current Studies at CYBORG Beamline*

HG23, Contributed Talk Frascati, Italy, 2023
Title: *Material Physics Studies for High Gradient Cavities at UCLA CYBORG Beamline*

Center for Bright Beams Annual Symposium, Poster Talk Ithaca, NY, 2023
Title: *CrYogenic Brightness-Optimized Radiofrequency Gun (CYBGORG) Beamline*

Physics and Applications of High Brightness Beams, Poster Talk San Sebastian, Spain, 2023
Title: *CrYogenic Brightness-Optimized Radiofrequency Gun (CYBGORG) Beamline*

- LCWS23, Contributed Talk** Menlo Park, CA, 2023
 Title: *Application of CrYogenic Brightness-Optimized Radiofrequency Gun (CYBGORG) for Future Collider Studies*
- IPAC23, Poster Talk** Venice, Italy, 2023
 Title: *Effects of Bulk Material Properties on RF Surface Resistivity*
- IPAC23, Poster Talk** Venice, Italy, 2023
 Title: *Temperature Stability in CrYogenic Brightness-Optimized Radiofrequency Gun (CYBORG)*
- IPAC23, Poster Talk** Venice, Italy, 2023
 Title: *Novel Fabrication Methods and Geometries of Nanoblade Cathodes*
- MeVArc 2022, Contributed Talk** Chania, Greece (hybrid), 2022
 Title: *High Gradient CrYogenic Brightness-Optimized Radiofrequency Gun (CYBORG) Test Bed*
- NAPAC22, Invited Talk** Albuquerque, NM, 2022
 Title: *Emittance Measurements of Nanoblade-Enhanced High Field Cathode*
- NAPAC22, Poster Talk** Albuquerque, NM, 2022
 Title: *CYBORG Beamline Development Updates*
- NAPAC22, Poster Talk** Albuquerque, NM, 2022
 Title: *Design of a High-Power RF Breakdown Test for a Cryocooled C-Band Copper Structure*
- NAPAC22, Poster Talk** Albuquerque, NM, 2022
 Title: *Development of Nanopatterned Strong Field Emission Cathodes*
- Center for Bright Beams Annual Symposium, Poster Talk** Los Angeles, CA, 2022
 Title: *CrYogenic Brightness-Optimized Radiofrequency Gun (CYBORG)*
- IPAC22, Poster Talk** Bangkok, Thailand, 2022
 Title: *Emittance Measurements of Nanoblade-Enhanced High Field Cathode*
- IPAC22, Poster Talk** Bangkok, Thailand, 2022
 Title: *Introduction of Westwood Linear Accelerator Test Facility in UCLA*
- IPAC22, Poster Talk** Bangkok, Thailand, 2022
 Title: *Temperature Dependent Effects on RF Surface Resistivity*
- IPAC22, Poster Talk** Bangkok, Thailand, 2022
 Title: *CrYogenic Brightness-Optimized Radiofrequency Gun (CYBORG)*
- IPAC22, Poster Talk** Bangkok, Thailand, 2022
 Title: *Temperature Dependent Effects on Quality Factor in C-band RF Cavities*
- HG22, Invited Talk** Beijing, China (virtual), 2022
 Title: *UCLA Breakdown & HG Research Updates*

HG22, Invited Talk Beijing, China (virtual), 2022
 Title: *CrYogenic Brightness-Optimized Radiofrequency Gun (CYBORG)*

IPAC21, Poster Talk Campinas, Brazil (virtual), 2021
 Title: *RF Testbed for Cryogenic Photoemission Studies*

IPAC21, Poster Talk Campinas, Brazil (virtual), 2021
 Title: *Initial Nanoblade-Enhanced Laser-Induced Cathode Emission Measurements*

IPAC21, Poster Talk Campinas, Brazil (virtual), 2021
 Title: *Cryogenic Component and Material Testing for Compact Electron Beamlines*

Towards an Ultra-Compact X-ray Free-Electron Laser, Invited Talk Los Angeles, CA, 2021
 Title: *Cryogenic Cathode Photoemission for High Brightness RF Photoinjectors*

International Cryocoolers Conference 21, Contributed Talk Bethlehem, PA (hybrid), 2020
 Title: *Cryocooler Technology for Electron Particle Accelerators*

2019 NSF STC Professional Development Workshop Indianapolis, IN, 2019
 Student representative for NSF Center for Bright Beams

CAM Graduate Student Physics Conference, Poster Talk Sudbury, Canada, 2019
 Title: *Electron Diagnostics for Extreme High Brightness Nano-Blade Field Emission Cathode*

Center for Bright Beams Annual Symposium, Poster Talk Ithaca, NY, 2019
 Title: *Electron Diagnostics for Extreme High Brightness Nano-Blade Field Emission Cathode*

Physics and Applications of High Brightness Beams, Poster Talk Rethimno, Greece, 2019
 Title: *Electron Diagnostics for Extreme High Brightness Nano-Blade Field Emission Cathode*

Joint-US-CERN-Japan-Russia International Accelerator School Tokyo, Japan, 2017
 Topic: *RF Technologies*

APS April Meeting, Poster Talk Salt Lake City, UT, 2016
 Title: *Generating a Reduced-energy Antiproton beam using Channeling Electrostatic elements (GRACE)*

AWARDS

BU UROP (Undergraduate Research Opportunities Program) Award 2016
 Featured article: *Low Energy Antiproton Beam Extractor for use in Antihydrogen Production*

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 facilitate 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