Curriculum Vitae for Mackenzie Meyer

2234 Electrical Engineering and Computer Sciences Building
1301 Beal Avenue maemeyer@umich.edu
Ann Arbor, MI 48109

Education

Ph.D. in Applied Physics August 2022
University of Michigan Ann Arbor, MI
Enrolled in Graduate Certificate in Plasma Science and Engineering.
Advisor - Professor Mark Kushner

B.S. in Physics and Mathematics May 2017
University of Wisconsin Madison Madison, WI
Cumulative GPA - 3.768/4.000

Research Experience

Postdoctoral Research Fellow August 2022 - present
Computational Plasma Science and Engineering Group Ann Arbor, MI
University of Michigan, Department of Electrical Engineering and Computer Science
Advisor - Professor Mark Kushner

- Modeled methane production in a low-temperature plasma and identified strategies to optimize methyl radical flux to the liquid. (ongoing)
- Modeled plasma-aerosol droplet interactions. (ongoing)

Graduate Student Researcher September 2019 - August 2022
Computational Plasma Science and Engineering Group Ann Arbor, MI
University of Michigan, Department of Electrical Engineering and Computer Science
Advisor - Professor Mark Kushner

- Updated the 2D modeling platform *nonPDPSIM*. Updates included support for Gmsh, automatic solvation of electrons into liquid, ability to use averaged electron-impact rate coefficients in the neutral plasma option, and a new interpolation option for the electric field.
- Modeled the sheath that forms around a water droplet in a helium RF glow discharge using *nonPDPSIM*.
- Investigated the long timescale chemistry of a helium plasma interacting with a liquid water droplet using the global model *GlobalKin*.
- Analyzed a dielectric barrier discharge to predict ozone production efficiency and developed a surface reaction mechanism to explain ozone increase with addition of nitrogen.
- Analyzed a photoionization detector to predict and optimize photon flux.

Graduate Student Researcher January 2018 - September 2019
Nonequilibrium Gas and Plasma Dynamics Laboratory Ann Arbor, MI
University of Michigan, Department of Aerospace Engineering
Advisor - Professor Iain Boyd

- Wrote a simulation to numerically calculate the erosion of a wire by sputtering and compared results to experimental measurements.
- Implemented an uncertainty analysis that involved varying the fit parameters of the sputtering yield models to generate confidence intervals on erosion predictions.

Science Undergraduate Laboratory Intern May 2017 - August 2017
Energy Systems Division Lemont, IL
Argonne National Laboratory
Advisors - Dr. Patricia Ignacio-de Leon, Dr. Kaizhong Gao

- Tested how using different surfactants changed the properties of a porous aerogel.
- Characterized the aerogel using thermogravimetric analysis and scanning electron microscope imaging.

Undergraduate Research Assistant November 2013 - May 2017
Wisconsin Space Physics, X-Ray Astrophysics Madison, WI
University of Wisconsin Madison, Department of Physics
Advisor - Professor Dan McCammon

- Designed a program with a graphical user interface for an Ocean Optics spectrometer.
- Built a new calibration system using a laser diode and optical fiber for Transition Edge Sensors.

Journal Publications

4. K. Konina, J. Kruszelnicki, **M. Meyer**, and M. J. Kushner, "Surface Ionization Waves Propagating over Non-Planar Substrates: Wavy Surfaces, Cut-Pores and Droplets", Submitted to Plasma Sources Science and Technology (2022)
3. **M. Meyer**, G. Nayak, P. J. Bruggeman, and M. J. Kushner, "Sheath formation around a dielectric droplet in a He atmospheric pressure plasma", Journal of Applied Physics **132**, 083303 (2022)
2. **M. E. Meyer**, M. P. Byrne, I. D. Boyd, and B. A. Jorns, "Quantifying Uncertainty in Predictions of Spacecraft Erosion Induced by a Hall Thruster", Journal of Spacecraft and Rockets **59**, 988–1000 (2022)
1. F. T. Jaeckel, C. V. Ambarish, N. Christensen, R. Gruenke, L. Hu, K. L. Kripps, D. McCammon, M. McPheron, **M. Meyer**, A. Roy, D. Wulf, S. Zhang, Y. Zhou, J. S. Adams, S. R. Bandler, J. Chervenak, A. Datesman, M. Eckart, A. J. Ewin, F. M. Finkbeiner, R. Kelley, C. Kilbourne, A. Miniussi, F. S. Porter, J. Sadleir, K. Sakai, S. J. Smith, N. A. Wakeham, E. Wassell, W. Yoon, K. Morgan, D. Schmidt, D. Swetz, and J. Ullom, "Energy Calibration of High-Resolution X-Ray TES Microcalorimeters With 3 eV Optical Photons", IEEE Transactions on Applied Superconductivity **29**, 1–4 (2019)

Publications in Conference Proceedings

2. **M. E. Meyer**, M. P. Byrne, B. A. Jorns, and I. D. Boyd, "Erosion of a meshed reflector in the plume of a hall effect thruster, Part 1: Modeling", in Aiaa propulsion and energy forum and exposition (2019), AIAA Paper 2019–3987
1. M. P. Byrne, **M. E. Meyer**, I. D. Boyd, and B. A. Jorns, "Erosion of meshed reflector in the plume of a Hall effect thruster, Part 2: Experiments", in Aiaa propulsion and energy 2019 forum (2019), AIAA Paper 2019–3988

Patents

1. P. Ignacio-de Leon, P. D. Laible, **M. E. Meyer**, C. R. Povinelli, K. L. Tracey, and D. Y. A. Arenas, "Surfactant-Templated Synthesis of Nanostructured Xerogel Adsorbent Platforms", pat. US11052374B2 (2021)

Conference Presentations Given

4. **M. Meyer**, G. Nayak, P. Bruggeman, and M. Kushner, *Plasma-Produced Reactive Species Interactions with Liquid Water Droplets*, Presentation at APS GEC 2021, 2021
3. **M. Meyer**, M. Kushner, G. Nayak, and P. Bruggeman, *Interactions between Atmospheric Pressure Humid Helium Plasmas and Liquid Water Droplets*, Presentation at ICOPS 2020, Marina Bay Sands, Singapore (Virtual), 2020
2. **M. Meyer**, G. Nayak, P. J. Bruggeman, and M. J. Kushner, *Modeling Humid Helium Plasmas and Their Interaction with Liquid Water Droplets*, Presentation at APS GEC 2020, San Diego, California (Virtual), 2020
1. **M. E. Meyer**, M. P. Byrne, B. A. Jorns, and I. D. Boyd, *Erosion of a meshed reflector in the plume of a Hall effect thruster, Part 1: Modeling*, Presentation at AIAA Propulsion and Energy 2019 Forum, Indianapolis, IN, 2019

Conference Abstracts Submitted

3. **M. Meyer**, X. Huang, A. D. Sivakumar, X. Fan, and M. Kushner, *Maximizing Photon Flux in a Miniaturized Photoionizatin Detector*, Presentation at AVS 2022, Pittsburgh, PA, 2022
2. K. Konina, **M. Meyer**, and M. J. Kushner, *Consequences of Photoelectron and Electric Field Emission on Propagation of Surface Ionization Waves*, Presentation by M. Kushner at GEC 2022, Sendai, Japan, 2022

1. K. Konina, S. Rasker, J. Morsell, **M. Meyer**, S. Kerketta, I. Adamovich, S. Shannon, and M. J. Kushner, *Are Atmospheric Pressure Plasma Surface Interactions Controllable?*, Presentation by M. Kushner at International Symposium Plasma Catalysis for CO2 Recycling, Krakow, Poland, 2022

Conference Presentations Co-authored

6. G. Nayak, **M. Meyer**, M. Kushner, and P. Bruggeman, *Liquid Micro-Droplet Dynamics in an Atmospheric Pressure RF-Driven Glow Discharge*, Presentation by G. Nayak at APS GEC 2021, 2021
5. K. Konina, **M. Meyer**, S. Kerketta, J. Polito, J. Kruszelnicki, and M. J. Kushner, *Plasma Interactions with non-Planar, Wet and Reactive Surfaces*, Presentation by M. Kushner at DOE PICI Meeting 2021, Bethesda, MD, 2021
4. G. Nayak, **M. Meyer**, M. Kushner, and P. Bruggeman, *Reactive Species Transport to Water Micro-Droplets in Atmospheric Pressure RF Glow Discharge*, Presentation by G. Nayak at ICOPS 2021, Virtual, 2021
3. K. Konina, **M. Meyer**, J. Kruszelnicki, J. Polito, S. Kerketta, T. Freeman, and M. J. Kushner, *Atmospheric Pressure Plasma Interactions with Complex Biomedical Surfaces*, Presentation by M. Kushner at ICPM 2021, Virtual, 2021
2. K. Konina, J. Kruszelnicki, **M. Meyer**, N. Y. Babaeva, and M. J. Kushner, *Mastering Interactions of Plasmas with Complex Surfaces*, Presentation by M. Kushner at APS GEC 2020, San Diego, California (Virtual), 2020
1. M. P. Byrne, **M. E. Meyer**, I. D. Boyd, and B. A. Jorns, *Erosion of a meshed reflector in the plume of a Hall effect thruster, Part 2: Experiments*, Presentation by M. Byrne at AIAA Propulsion and Energy 2019 Forum, Indianapolis, IN, 2019

Poster Presentations

6. **M. Meyer**, Z. Yang, J. Foster, M. J. Kushner, and E. DeLang, *Surface Mechanism for Ozone Destruction in Nitrogen Containing Dielectric Barrier Discharges Sustained in Oxygen*, Poster presentation at GRS and GRC 2022, Andover, NH, 2022
5. **M. Meyer**, Z. Yang, J. Foster, M. J. Kushner, and E. DeLang, *Surface Mechanism for Ozone Destruction in Nitrogen Containing Dielectric Barrier Discharges Sustained in Oxygen*, Presentation at ICOPS 2022, Seattle, WA, 2022
4. **M. Meyer**, G. Nayak, P. Bruggeman, and M. J. Kushner, *Plasma-Produced Reactive Species Reactions with Liquid Water Droplets*, Poster presentation at the 2021 Michigan Institute for Plasma Science and Engineering Graduate Student Symposium, 2021
3. **M. Meyer**, G. Nayak, P. Bruggeman, and M. J. Kushner, *Sheath Dynamics Around a Water Droplet in an Atmospheric Pressure Glow Discharge*, Poster presentation at DOE PICI Meeting 2021, Bethesda, MD, 2021
2. **M. Meyer**, G. Nayak, P. J. Bruggeman, and M. J. Kushner, *Modeling Sheath Dynamics around Water Droplets in Low Temperature Plasmas*, Poster presentation at the 2020 Michigan Institute for Plasma Science and Engineering Graduate Student Symposium, 2020
1. **M. Meyer**, M. Byrne, B. Jorns, and I. Boyd, *Modeling the Erosion of a Wire in the Plume of a Hall Thruster*, Poster presentation at the 2019 Michigan Institute for Plasma Science and Engineering Graduate Student Symposium, 2019

Honors and Awards

University of Michigan

2020 MIPSE Graduate Student Symposium Best Poster Award	November 2020

University of Wisconsin Madison

Phi Beta Kappa Member	April 2017
Clarice Cox Scholarship	August 2015
Bernice Durand Undergraduate Research Scholarship	April 2015
Dr. Maritza Irene Stapanian Crabtree Undergraduate Scholarship	April 2015