

# Curriculum Vitae for Mackenzie Meyer

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## Education

### Ph.D. Candidate in Applied Physics

Began September 2017

University of Michigan

Ann Arbor, MI

Cumulative GPA - 3.928/4.000

Enrolled in Graduate Certificate in Plasma Science and Engineering.

Milestones - Passed Qualifying Exam (August 2018), Passed Preliminary Exam (September 2020)

Thesis Committee - Mark Kushner (Chair), Benjamin Jorns, John Foster, Herek Clack, Carolyn Kuranz

### B.S. in Physics and Mathematics

May 2017

University of Wisconsin Madison

Madison, WI

Cumulative GPA - 3.768/4.000

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## Research Experience

### Graduate Student Researcher

September 2019 - present

Computational Plasma Science and Engineering Group

Ann Arbor, MI

University of Michigan, Department of Electrical Engineering and Computer Science

Adviser - Professor Mark Kushner

- Updated the 2D modeling platform nonPDPSIM to include support for Gmsh and automatic solvation of electrons when crossing the boundary between liquid and gas.
- Investigated how a humid helium plasma interacts with a liquid water droplet using nonPDPSIM. (ongoing)
- Investigated the long timescale chemistry using the global model GlobalKin. (ongoing)

### Graduate Student Researcher

January 2018 - September 2019

Nonequilibrium Gas and Plasma Dynamics Laboratory

Ann Arbor, MI

University of Michigan, Department of Aerospace Engineering

Adviser - Professor Iain Boyd

- Simulated the plumes of two Hall thrusters using the hybrid PIC-DSMC code MPIC.
- Wrote a simulation to numerically calculate the erosion of a cylindrical geometry by sputtering and compared results to experimental measurements.
- Implemented an uncertainty analysis that involved varying the fit parameters of the sputter yield models.

### Science Undergraduate Laboratory Intern

May 2017 - August 2017

Energy Systems Division

Lemont, IL

Argonne National Laboratory

Advisers - Dr. Patricia Ignacio-de Leon, Dr. Kaizhong Gao

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

### Undergraduate Research Assistant

November 2013 - May 2017

Wisconsin Space Physics, X-Ray Astrophysics

Madison, WI

University of Wisconsin Madison, Department of Physics

Adviser - 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 x-ray detectors called Transition Edge Sensors.

## Journal Publications

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F. T. Jaeckel, C. V. Ambarish, N. Christensen, R. Gruenke, L. Hu, K. L. Kripps, D. McCammon, M. McPherson, **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

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**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 2019 forum (2019)

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)

## Patents & Patent Applications

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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. 16/228,593 (2018)

## Conference Presentations Given

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**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

**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

**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 Presentations Co-authored

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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

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

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**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

**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

## Activities

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### Applied Physics Student Mentor

University of Michigan

Mentored a first year student in Applied Physics.

August 2019 - present

Ann Arbor, MI

## Honors and Awards

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### 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