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## CV of Joseph Hollowed

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Webpage: <https://jhollowed.github.io/pages/>

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### EDUCATION

**University of Michigan:** Ann Arbor MI  
Attended September 2019 – May 2025  
*PhD in Physics* awarded May 2025  
*Dissertation Defense* completed January 2025

**DePaul University:** Chicago IL  
Attended September 2013 – August 2017  
*B.S. in Physics; Minor in Computer Science* awarded August 2017

### RESEARCH EXPERIENCE

#### **University of Michigan Physics & Climate and Space Sciences Departments**

*Postdoctoral Researcher*, May 2025–October 2025

University of Michigan

- Wrote and published dissertation research related to volcanic perturbation of stratospheric dynamics
- Research related to validation of new treatments of thermodynamics and moist processes in the DOE E3SM coupled climate model

#### **Climate Systems Group**

*Research Intern*, May 2023–August 2023

Sandia National Laboratories

- Worked on implementation of passive tracers species in the DOE E3SM coupled climate model, designed for assessment of the general circulation of the stratosphere

#### **University of Michigan Physics & Climate and Space Sciences Departments**

*Graduate Student*, January 2021–May 2025

University of Michigan

- Research related to stratospheric dynamics, global transport of trace gasses, and perturbations to the general circulation of the Earth by stratospheric aerosols

- Work on modeling subgrid physics related to volcanic aerosol injections of the stratosphere and aerosol radiative forcing in the DOE E3SM coupled climate model

### **University of Michigan Physics Department**

**Graduate Student**, September 2019–January 2021

University of Michigan

- Worked on weak-lensing simulation support for galaxy-cluster cosmology, developing a software package for the generation of synthetic weak-lensing signals from sets of simulated galaxy cluster observations

### **Cosmological Physics and Advanced Computing Group**

**Argonne Associate**, September 2017–July 2019

Argonne National Laboratory

- Contributed to development of cosmological simulation components and processing tools
- Contributed to generation and validation of synthetic galaxy catalogs
- Worked on weak-lensing simulation support for galaxy-cluster cosmology

### **Cosmological Physics and Advanced Computing Group**

**Research Aide**, June 2016–September 2016; December 2016–September 2017

Argonne National Laboratory

- Performed analysis of South Pole Telescope data against simulated analogues, working toward probes of cosmology using galaxy cluster velocity-dispersion observables

### **X-Ray Science Microscopy Group**

**Research Aide**, June 2015–September 2015; December 2015

Argonne National Laboratory

- Developed image segmentation software for use with X-Ray fluorescence microscopy data

### **DePaul AstroPhysics Working Group**

**Research Member**, March 2015 – June 2015

DePaul University Physics Department

- Founded the Working Group with a small team of students and faculty
- Worked on exoplanet detection/confirmation via Kepler Space Telescope data

## **PUBLICATIONS**

### **Papers in Preparation**

**Hollowed, J.**, Jablonowski, C., Ehrmann, T., Bull, D., Wagman, B., & Hillman, B. (submission 2025). **Volcanic Aerosol Modification of the Stratospheric Circulation in E3SMv2 Part I: Wave–Mean Flow Interaction.**

**Hollowed, J.**, Jablonowski, C., Ehrmann, T., Bull, D., Wagman, B., & Hillman, B. (submission 2025). **Volcanic Aerosol Modification of the Stratospheric Circulation in E3SMv2 Part II: Brewer-Dobson Circulation**

## Refereed Journal Papers

**Hollowed, J.**, Jablonowski, C., Brown, H., Hillman, B., Bull, D., & Hart, J. (2024). **HSW-V v1.0: localized injections of interactive volcanic aerosols and their climate impacts in a simple general circulation model**. *Geoscientific Model Development*. 17. 15. 10.5194/gmd-17-5913-2024

Korytov, D., Rangel, E., Bleem, L., Frontier, N., Habib, S., Heitmann, K., **Hollowed, J.**, & Pope, A. (2023). **Modeling the Galaxy Distribution in Clusters using Halo Cores**. *The Open Journal of Astrophysics*. 6. 24. 10.21105/astro.2302.04194

LSST Dark Energy Science Collaboration. (2021). **The LSST DESC DC2 Simulated Sky Survey**. *The Astrophysical Journal Supplement Series*. 253. 31. 10.3847/1538-4365/abd62c

Korytov, D., Hearin, A., Kovacs, E., Larsen, P., Rangel, E., **Hollowed, J.**, ... & Chang, C. (2019). **CosmoDC2: A Synthetic Sky Catalog for Dark Energy Science with LSST**. *The Astrophysical Journal Supplement Series*. 245. 26. 10.3847/1538-4365/ab510c

Heitmann, K., Uram, T., Finkel, H., Frontiere, N. Habib, S., Pope, A., Rangel, E., **Hollowed, J.**, Korytov, D., Larsen, P., ... & Foster, I. (2019). **HACC Cosmological Simulations: First Data Release**. *The Astrophysical Journal Supplement Series*. 244. 17. 10.3847/1538-4365/ab3724

## Technical Reports

Ehrmann, T., Wagman, B., Bull, D., Hillman, B., **Hollowed, J.**, Brown, H., Peterson, K., Swiler, L., Watkins, J. & Hart, J. (2024). **Identifying Northern Hemisphere Stratospheric and Surface Temperature Responses to the Mt. Pinatubo Eruption within E3SMv2-SPA**. *Sandia Report. SAND2024-12730*. Sandia National Laboratories

LSST Dark Energy Science Collaboration. (2021). **DESC DC2 Data Release Note**. *arXiv preprint. arXiv:2101.04855*

**Hollowed, J.** (2019). **Lightcone Construction for HACC Cosmological Simulations with LANTERN**. *arXiv e-prints*. arXiv:1906.08355

## Doctoral Dissertation

Hollowed, J. (2025). **Modifications of Stratospheric Dynamics and Circulation by Volcanic Eruptions**, Doctoral Dissertation, University of Michigan, Ann Arbor, March 2025

## Candidacy Prospectus

Hollowed, J. (2022). **A Simplified Sub-grid Parameterization for Volcanic Aerosol Injections**

**of the Stratosphere in E3SMv2 in Support of the DOE CLDERA Project**, Candidacy Prospectus, University of Michigan, Ann Arbor, July 2022

## **PRESENTATIONS**

### **How Volcanic Eruptions Modify the Earth's Climate (1/10/25)**

Ph.D. Dissertation Defense, *University of Michigan, Ann Arbor, MI*

### **Quantifying Global Atmospheric Circulation Changes in Response to Stratospheric Volcanic Aerosols (8/1/24)**

Sandia FROCEE Summer Research Symposium, *Virtual*

### **Dynamically Identifying Circulation Changes by Volcanic SAIs with the E90 Passive Tracer (10/16/23)**

DOE CLDERA All-Hands Meeting, *Sandia National Laboratories, Albuquerque NM*

### **Atmospheric Forcing by Volcanic Aerosols Identified by Dynamic Tracer Constituents (8/2/23)**

Sandia FROCEE Summer Research Symposium, *Virtual*

### **Simulating the Climate Forcing of Volcanic Aerosols with a Simplified Interactive Model (4/2/23 and 12/5/23)**

European Geosciences Union General Assembly 2023 (poster), *Austria Center Vienna, Vienna, Austria*

American Geophysical Union Fall Meeting 2023 (poster), *Mascone Center, San Francisco, CA*

### **A Simple Model of Volcanic Aerosol Forcing Against an Idealized Climatological Background in Support of the DOE CLDERA Project (12/12/22)**

American Geophysical Union Fall Meeting 2022, *McCormick Place Convention Center, Chicago IL*

### **CLDERA Tiered Verification: HSW++ Idealized Volcanic Aerosol Forcing (7/7/22 and 7/27/22)**

Preliminary Exam, *University of Michigan, Ann Arbor MI*

DOE CLDERA All-Hands Meeting, *Sandia National Laboratories, Albuquerque NM*

### **Mt. Pinatubo-Inspired Idealized Climate Data Sets with Embedded Pathways (5/16/22)**

DOE CLDERA All-Hands Meeting, *Virtual*

### **Modeling Systematics in Galaxy Cluster Mass Estimation (5/21/19)**

Young Scientist Symposium Series, *Argonne National Laboratory, Lemont IL*

### **Cluster Weak Lensing Simulations (2/26/19)**

LSST Dark Energy Science Collaboration Meeting, *University of California, Berkeley, Berkeley CA*

### **Simulation Calibration of Cluster WL Mass Measurements (6/25/18 and 7/26/18)**

South Pole Telescope Cluster Face to Face, *University of Chicago, Chicago, IL and*

LSST Dark Energy Science Collaboration Meeting, *Carnegie Mellon University, Pittsburgh, PA*

### **Validation of Synthetic Sky Catalogs (11/7/2017 and 11/14/2017)**

American Physical Society Prairie Session Fall Meeting, *University of Illinois at Chicago, Chicago IL*  
Young Scientist Symposium Series, *Argonne National Laboratory, Lemont IL*

**Cluster Cosmology from Velocity Dispersions** (8/31/2016 and 11/4/2016)

Internal Group Presentation, *Argonne National Laboratory, Lemont IL*

DePaul Undergraduate Science Showcase, *DePaul University, Chicago IL*

**Image Segmentation of X-Ray Fluorescence Data** (9/4/2015 and 11/6/2015)

Internal Group Presentation, *Argonne National Laboratory, Lemont IL*

DePaul Undergraduate Science Showcase (poster), *DePaul University, Chicago IL*

**FELLOWSHIPS**

Michigan Institute for Computational Discovery and Engineering Fellowship: Awarded Spring 2018

DePaul Dean's Undergraduate Fellowship: Summer 2015

**AWARDS AND HONORS**

National Science Foundation Graduate Research Fellowship Program Honorable Mention: Fall 2019

Argonne High Energy Physics Pacesetters Award: Summer 2018

Physics Student of the Year/Most Outstanding Graduating Senior in Physics Award: Spring 2017

DePaul University graduating honors: *magna cum laude*: Spring 2017

DePaul College of Science and Health Dean's List: All quarters of attendance

DePaul College of Computing and Digital Media Dean's List: All quarters of attendance

Dean's Scholarship of \$11,000 per year at DePaul University: 2013-2017

**PROFESSIONAL MEMBERSHIP**

American Geophysical Union Member (AGU)

European Geosciences Union Member (EGU)

American Physical Society Member (APS)

**TEACHING**

***Physics & Astronomy:***

Electromagnetism, Optics, and Radiation (Laboratory); Fall 2019 (UM), undergraduate course

Electromagnetism, Optics, and Radiation (Laboratory); Winter 2020 (UM), undergraduate course

Introduction to Astrobiology; Fall 2020 (UM), undergraduate course

Alien Skies: A Tour Through the Universe; Fall 2020 (UM), undergraduate course

***Climate & Earth Science:***

Atmospheric Dynamics I; Winter 2025 (UM), graduate course (grader)

Geophysical Fluid Dynamics; Fall 2023 (UM), undergraduate course (grader)

Earth and Space System Dynamics; Winter 2023 (UM), undergraduate course (grader)

Climate & Climate Change; Winter 2021 (UM), undergraduate course