

Curriculum Vitæ
AGNIT MUKHOPADHYAY

Climate & Space Sciences & Engineering Department • University of Michigan
2455 Hayward Street, Ann Arbor, MI 48109 • (734)-881-0625
agnitm@umich.edu • clasp.engin.umich.edu/people/agnitm/

EDUCATION

- Doctor of Philosophy** in *Space Sciences & Scientific Computing* | UNIVERSITY OF MICHIGAN 2017 - 22
Thesis: Sources of Ionospheric Conductance - Balance and Impacts
Advisors: Dr. Michael W. Liemohn & Dr. Daniel T. Welling
Present Status: Candidate
- Master of Science** in *Aerospace Engineering* | UNIVERSITY OF MICHIGAN 2016 - 18
Specialization: Gas Dynamics
- Bachelor of Technology** in *Aerospace Engineering* | PUNJAB ENGINEERING COLLEGE 2012 - 16
Specialization: Aerodynamics & Gas Propulsion
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RESEARCH EXPERIENCE

- Graduate Student Research Assistant**, *University of Michigan, Ann Arbor* 2017 - Present
I am investigating the various sources of auroral plasma and their individual effects on space weather, by developing a physics-driven numerical model. Funded through the *NASA Earth & Space Sciences Fellowship (2018 - 21)* and *Rackham Predoctoral Fellowship (2021 - 22)*.
- Visiting Research Scholar**, *University of Texas at Arlington* Spring 2019
Developed an initial numerical framework of coupling a global space weather model with the physics-driven aurora model. Funded through the *Rackham Research Grant Fellowship (2019)*.
- Undergraduate Researcher**, *Punjab Engineering College, Chandigarh* 2013 - 16
Performed numerical simulations to estimate space charging losses on geosynchronous satellites due to extreme space weather. Awarded *Institutional Silver Medal* for research work.
- Visiting Summer Scholar (Astrophysics)**, *Indian Institute of Science, Bangalore* Spring 2015
Performed pseudo-Newtonian gravitational computations on super-massive black holes.
- Exchange Research Student**, *Indian Institute of Technology, Kanpur* Winter 2015
Developed a numerical model to solve for the heat dynamics on a space capsule's heat shield.
- Summer Intern**, *Indian Institute of Technology, Madras* Spring 2014
Investigated morphed wings in bats, and bio-mimed the flapping motion using Fourier series.
- Research Intern**, *Indian Institute of Technology, Bombay* 2013 - 14
Designed and fabricated a payload recovery device for stationary aerostats.
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TEACHING EXPERIENCE

- Grading Assistant**, *University of Michigan, Ann Arbor* 2017 - 2018
I have graded and assisted several course instructors over the last few years in teaching graduate and undergraduate-level courses. They are listed in the following:
Earth System Analysis (323) | Climate & Space Sciences | *Course Instructor:* Prof. Ashley Payne (WN 2021)
Space Plasma Physics (597) | Climate & Space Sciences | *Course Instructor:* Prof. Tamas Gombosi (FA 2020)
Adv. Fluid Mechanics (551) | Climate & Space Sciences | *Course Instructor:* Prof. Jeremy Bassis (FA 2019)
Adv. Fluid Mechanics (551) | Climate & Space Sciences | *Course Instructor:* Prof. R Paul Drake (FA 2018)
Gas Dynamics (225) | Aerospace Engineering | *Course Instructor:* Prof. Mirko Gamba (WN 2017)
- Teaching Assistant**, *Punjab Engineering College, Chandigarh* 2015 - 2016
Aerospace Propulsion (215) | Aerospace Engineering | *Course Instructor:* Prof. T. K. Jindal (WN 2016)
Propulsion & Materials Lab (217) | Aerospace Engineering | *Course Instructor:* Prof. T. K. Jindal (FA 2015)
- Teaching Aide**, *Indian Institute of Technology, Bombay* Winter 2015
Introduction to Aircraft Design | Aerospace Engineering | *Course Instructor:* Prof. R. S. Pant

HONOURS, FELLOWSHIPS & AWARDS

Fellowships & Grants

RACKHAM PREDOCTORAL FELLOWSHIP	2021 - 22
NASA EARTH & SPACE SCIENCES FELLOWSHIP	2018 - 21
MICHIGAN INSTITUTE OF PLASMA SCIENCES & ENGINEERING FELLOWSHIP	2018
UCAR/NASA-LWS HELIOPHYSICS SUMMER SCHOOL SCHOLARSHIP	2018

Awards

AMERICAN METEOROLOGICAL SOCIETY <i>Annual Meeting</i> - BEST STUDENT PRESENTATION AWARD	2020, '21
NSF <i>Geospace Environment Modeling</i> (GEM) WORKSHOP - BEST STUDENT POSTER AWARD	2019
RACKHAM STUDENT RESEARCH GRANT	2019
MICHIGAN GEOPHYSICAL UNION - BEST POSTER AWARD	2019
NASA CCMC STUDENT RESEARCH CONTEST WINNER	2017
SILVER MEDALIST in <i>Aerospace Engineering (equiv. to summa cum laude)</i>	2016
INSTITUTE COLOUR OF PUNJAB ENGINEERING COLLEGE <i>for exemplary leadership</i>	2016
ICICI TRINITY AWARD CERTIFICATE OF APPRECIATION	2014
GOLD MEDALIST in <i>Grade X Final Examinations</i>	2010
AIR INDIA RANK STATE & DISTRICT AWARDS	2008

Highlighted Travel Grants

RACKHAM STUDENT TRAVEL GRANT	2018, '20
<i>Travel Grant to the NSF GEM WORKSHOP</i>	2018, '19
<i>Travel Grant to the CHAPMAN CONFERENCE ON SPACE WEATHER</i>	2019
<i>Travel Grant to the NSF Couplings, Energetics, Dynamics of Atmosphere (CEDAR) WORKSHOP</i>	2017, '18
<i>Travel Grant to the NSF Solar Heliospheric & Interplanetary Environment (SHINE) WORKSHOP</i>	2017

OUTREACH & SERVICE

Leadership

STUDENT REPRESENTATIVE to NSF Geospace Environment Modeling (GEM) Workshop	2019 - Present
GRADUATE EMPLOYEE ORGANIZATION (GEO) STEWARD for Climate & Space, UMichigan.	2019 - Present
PEER MENTORSHIP ORGANIZING COMMITTEE MEMBER, Climate & Space, UMichigan.	2018 - Present
CAMPUS LEAD of University of Michigan to THE INDIAN EMBASSY IN THE USA.	2019 - 20
SECRETARY OF THE INDIAN STUDENT ASSOCIATION (ISA) at the UMichigan.	2017 - 18
JOINT SECRETARY of Astronomy and Space Physics Society at Punjab Engineering College.	2015 - 16
MEMBER OF THE STUDENT ACTIVITIES COUNCIL at Punjab Engineering College.	2015 - 16

Service

PANELIST (<i>Invited</i>) for Space Weather Workshop Session on " <i>Sectors of the Space Weather Enterprise</i> "	2021
CO-CONVENER of AGU Session on " <i>Recent Advances in Characterizing the Ionospheric Conductance</i> "	2020
MENTOR through the <i>Peer Mentorship Program</i> at Climate & Space, University of Michigan	2020
EXECUTIVE SECRETARY for <i>NASA Heliophysics Division's Supporting Research (H-SR) Panel</i>	2020
PANELIST for <i>Proposal Writing Workshop</i> at Climate & Space, University of Michigan	2019, '20
REVIEWER for the <i>Journal of Geophysical Research - Space Physics</i>	2019 - Present
PHYSICS AND MATH TUTOR through the <i>National Service Scheme of India</i> .	2012 - 15

Affiliations

American Meteorological Society	2019 - Present
American Geophysical Union	2017 - Present
American Institute of Aeronautics and Astronautics	2013 - 2017

TECHNICAL SKILLS

LANGUAGES	Python 2/3, FORTRAN 90, C/C++, L ^A T _E X, MATLAB, Shell
OPERATING SYSTEMS	Linux, Windows, Mac
SOFTWARE	IDL, TecPlot, OpenMPI, ANSYS, CATIA, Gambit, FLUENT, MS Office, SWMF

PUBLICATIONS

PEER-REVIEWED

Mukhopadhyay, A., Vandegriff E., Swiger B. M., Welling, D. T., Liemohn, M. W., Ridley, A. J., Burleigh, M. R., et al. (in prep) “Global Driving of Auroral Conductance: Ring Current and Grid Convergence”, to be submitted in *Geophysical Research Letters*.

Mukhopadhyay, A., Welling, D. T., Liemohn, M. W., Ridley, A. J., Zou, S., Anderson, B. J., Burleigh, M. R., Connor, H. K., et al. (in prep) “Global Driving of Auroral Conductance: Balance of Sources”, to be submitted in *Journal of Geophysical Research - Space Physics*.

Liemohn, M. W., Shane, A. D., Azari, A. R., Petersen, A. K., Swiger, B. M., **Mukhopadhyay, A.**, (2021) “RMSE is Not Enough: Guidelines to Robust Data-Model Comparisons for Magnetospheric Physics”, under review in *Journal of Atmospheric and Solar-Terrestrial Physics*, [Paper ID JASTP-D-20-00308](#).

Mukhopadhyay, A., Jia X., Welling, D. T., and Liemohn, M. W., (2021) “Global Magnetospheric Simulations: Performance Quantification of Magnetopause Distances and Convection Potential Predictions”, *Frontiers of Astronomy and Space Physics*. [DOI:10.3389/FSPAS.2021.637197](#)

Mukhopadhyay, A., Welling, D. T., Liemohn, M. W., Ridley, A. J., Chakraborty, S., Anderson, B. J. (2020) “Conductance Model for Extreme Events: Impact of Auroral Conductance on Space Weather Forecasts”, *Space Weather*, 18, e2020SW002551. [DOI:10.1029/2020SW002551](#). (Highlighted in the *Space Weather Quarterly* Issue of December 2020.)

Sharma, N., **Mukhopadhyay, A.**, Sharma, V., Mukund, M. and Pant, R. S., (2014) “Design and Field Trials of Payload Recovery Device for Tethered Aerostats”, *Innovative Design, Analysis and Development Practices in Aerospace and Automotive Engineering Proceedings*, 79 - 84. Springer AG. [DOI:10.1007/978-81-322-1871-5_12](#)

NON PEER-REVIEWED

Ozturk, D., ...[31 total including **Mukhopadhyay, A.**] (2020) “A Collaborative Approach to Understanding Auroral Region Magnetosphere-Ionosphere-Thermosphere Coupling Through Ionospheric Conductivity”, *White Paper* submitted to the [Heliophysics 2050 Workshop](#). (Available at request)

Mukhopadhyay, A., (2017) “Statistical Comparison of Magnetopause Distances and CPCP Estimations from Global MHD Models”, *NASA CCMC Student Contest Report*. Preprint available: [DOI:10.1002/essoar.10502157.1](#). (Link to Report on CCMC Website)

Mukhopadhyay, A., van der Holst, B. and Landi, E., (2017) “Numerical Modeling of the Lower Corona during the Total Solar Eclipse of 2010 July 11”, *Master’s Directive Study Report*. [DOI:10.5281/zenodo.4003116](#).

SELECTED PRESENTATIONS

INVITED PRESENTATIONS

Mukhopadhyay, A., (2020). “Global Driving of Auroral Conductance – Source Balance and Impacts”, *Space Science Seminar*, Department of Physics & Astronomy, Rice University, Austin TX.

Mukhopadhyay, A., (2020). “Conductance Model for Extreme Events: Impact of Auroral Conductance on Space Weather Forecasts”, *Student Paper Celebration & Oral Session*, University of Michigan, Ann Arbor MI.

Mukhopadhyay, A., (2020). “Space Science - A Realm of Engineering & Physics”, *PEC Webinar Series*, Punjab Engineering College, Chandigarh, India.

Mukhopadhyay, A., (2019). “Estimating Auroral Conductance in Global MHD Models”, *Monday Science Telecon*, hosted by NASA Goddard Space Flight Center.

† - Received Travel Support

Mukhopadhyay, A., Burleigh, M. B., Welling, D. T., Vandegriff, E., Liemohn, M. W., Ridley, A. J., Zou, S., and Anderson, B. J. (2021). “Challenges in Space Weather Prediction : Discerning the Impact of Ionospheric Conductance in Global Simulations”, *18th Space Weather Conference at Annual Meeting of American Meteorological Society*. **Awarded Best Student Talk**.

Mukhopadhyay, A., Burleigh, M. B., Welling, D. T., Vandegriff, E., Liemohn, M. W., Ridley, A. J., Zou, S., and Anderson, B. J. (2020). “Challenges in Space Weather Prediction : Discerning the Impact of Ionospheric Conductance in Global Simulations”, *American Geophysical Union 2020*.

Mukhopadhyay, A., Welling, D. T., Burleigh, M., Liemohn, M. W., Ridley, A., Zou, S., Anderson, B., Vandegriff, E., and Gjerloev, J., (2020). “Ionospheric Response in the SWMF – Conductance”, *Space Weather Modeling Framework (SWMF) Users’ Meeting*, University of Michigan, Ann Arbor MI.

Mukhopadhyay, A., Welling, D. T., Burleigh, M., Liemohn, M. W., Ridley, A., Zou, S., Anderson, B., Vandegriff, E., Connor, H., and Gjerloev, J., (2020). “Global Driving of Auroral Conductance - Impacts and Numerical Considerations”, IEMIT Focus Group Session, *Virtual Geospace Environment Modeling Conference*.

† **Mukhopadhyay, A.**, Welling, D. T., Liemohn, M. W. and Ridley, A. (2020). “A Study in Skill: Improving dB/dt Forecasts with Advanced Conductance Models”, *17th Space Weather Conference at Annual Meeting of American Meteorological Society*, Boston, MA. **Awarded Best Student Talk**.

Mukhopadhyay, A., Welling, D. T., Burleigh, M., Ridley, A., Liemohn, M. W., Anderson, B. J. and Gjerloev, J. W. (2019). “Conductance in the Aurora: Influence of Magnetospheric Contributors”, *American Geophysical Union 2019*, San Francisco, CA.

† **Mukhopadhyay, A.**, Welling, D. T., Liemohn, M. W., Burleigh, M. and Ridley, A., (2019). “Conductance Results from SWMF On St. Patrick’s Day Storm of 2013”, *MMV - IEMIT Joint Conductance Challenge, Geospace Environment Modeling Conference*, Santa Fe, NM.

† **Mukhopadhyay, A.**, Welling, D. T., Ridley, A., Liemohn, M. W. and Burleigh, M., (2019). “Identifying Sources of Auroral Conductance in Global MHD Models”, *Geospace Environment Modeling Conference*, Santa Fe, NM. **Awarded Best Poster**.

† **Mukhopadhyay, A.**, (2019). “Ionosphere-Thermosphere and the importance of their coupling to the Magnetosphere”, *Student Day Tutorial, Geospace Environment Modeling Conference*, Santa Fe, NM.

† **Mukhopadhyay, A.**, Ridley, A., Welling, D. T., Liemohn, M. W. and Burleigh, M., (2019). “Ionospheric Conductance - From a Magnetospheric Perspective”, *Conductance Session, CEDAR-GEM Day*, Santa Fe, NM.

Mukhopadhyay, A., Welling, D. T., Robinson, R., Liemohn, M. W., Burleigh, M. and Ridley, A., (2019). “Challenges in Space Weather Prediction : Predicting Auroral Conductance in Global MHD Models for Extreme Events”, *Michigan Geophysical Union*, Ann Arbor, MI. **Awarded Best Poster**.

† **Mukhopadhyay, A.**, Welling, D. T., Robinson, R., Liemohn, M. W., Burleigh, M. and Ridley, A., (2019). “Predicting Auroral Conductance in Global MHD Models for Extreme Events”, *Chapman Conference on Scientific Challenges Pertaining to Space Weather Forecasting Including Extremes*, Pasadena, CA.

† **Mukhopadhyay, A.**, Welling, D. T., Liemohn, M. W., Zou, S. and Ridley, A., (2018). “Challenges in Space Weather Prediction - Estimation of Auroral Conductance”, *American Geophysical Union 2018*, Washington DC.

Mukhopadhyay, A., Welling, D. T. and Liemohn, M. W. (2018). “Updates to the Conductance Model for Extreme Events”. *Modeling Methods and Validation Session - Conductance Challenge, MiniGEM Conference*, Arlington, VA, USA.

† **Mukhopadhyay, A.**, Welling, D. T. and Liemohn, M. W. (2018). “Updated Auroral Conductance in SWMF”. *Modeling Methods and Validation (MMV) Session - Conductance Challenge, Geospace Environment Modeling Conference*, Santa Fe, NM, USA.

† **Mukhopadhyay, A.**, Welling, D. T., Liemohn, M. W., Zou, S. and Ridley, A., (2018). “Challenges in Space Weather Prediction - Estimating Auroral Conductance in Global MHD Models”, *NSF PREEVENTS PI Meeting*, Washington DC, USA.

† **Mukhopadhyay, A.**, Welling, D. T. and Liemohn, M. W., (2018). “Challenges in Space Weather Prediction - Estimating Auroral Conductance in MHD”, *Heliophysics Summer School Symposium*, Boulder, CO, USA.

† **Mukhopadhyay, A.**, Welling, D. T., Liemohn, M. W. and Zou, S., (2018). “Data-Model Comparisons of New Auroral Conductance Model in SWMF”, *Coupling, Energetics and Dynamics of Atmospheric Regions Conference*, Santa Fe, NM, USA.

† **Mukhopadhyay, A.**, van der Holst, B. and Landi, E., (2017). “Numerical Modeling of the Lower Corona during the Total Solar Eclipses”, *Solar Heliospheric & Interplanetary Environment Conference*, Montréal, QC, Canada.

† **Mukhopadhyay, A.** and Welling, D. T., (2017). “Statistical Comparison of Performance of Global MHD Models”. *Coupling, Energetics and Dynamics of Atmospheric Regions Conference*, Keystone, CO, USA. **Awarded CCMC Student Contest Award.**

Mukhopadhyay, A., (2017). “On the Performance of Magnetohydrodynamic Models in the Estimation of Magnetopause Locations”. *Michigan Geophysical Union Symposium*, Ann Arbor, MI, USA.

Mukhopadhyay, A. and Mathpal, R. K., (2015). “Thermal Response Study of Thermal Protection Systems (TPS) of a Space Capsule during atmospheric Re-entry”. *Engineer’s Day Symposium*, Chandigarh, India.