

# MMS Student Accomplishments

(Updated April 16, 2023)

Institution	Ph.D. Dissertations	Master Theses	Undergraduate Theses	Student Paper Awards
Embry-Riddle Aeronautical University	2	1		1
Imperial College London, UK	1	3		
KTH Royal Institute of Technology, Sweden	2	3	2	1
Kyoto University, Japan	1	1		
Nagoya University, Japan		1		
Rice University	1	1		
The Catholic University of America	2			
The University of Iowa	1	1		
The University of Tokyo, Japan	1	8		
Tokyo Institute of Technology, Japan		1		
University of Bergen, Norway	1			1
University of California, Los Angeles	3			1
University of Colorado Boulder	3			1
University of Delaware	2	1		
University of Graz, Austria	1	3		1
University of Maryland, College Park	2			
University of Michigan	4			
University of New Hampshire	5		1	
University of Texas at San Antonio	4	1		1
University of Toulouse, France	5	2		
University of Wisconsin - Madison	2			
Uppsala University, Sweden	4			
<b>Total</b>	<b>43</b>	<b>27</b>	<b>3</b>	<b>7</b>

## Ph.D. Dissertations

### 2024

Hubbert, Mark A., Distinguishing Electron-Only Flux Rope Erosion and Electron-Only Onset of Reconnection from Ion-Coupled Reconnection in Earth's Magnetotail, Ph.D Dissertation, University of California, Los Angeles, CA, 2024

Lindberg, Martin, Electron Heating and Acceleration at Earth's Collisionless Bow Shock, Ph.D Dissertation, KTH, Sweden, 2024

Liou, Yu-Lun, Plasma Physical Processes of the Dayside Geospace Solar Wind - Magnetosphere Coupling, Ph.D Dissertation, Embry-Riddle Aeronautical University, Daytona Beach, FL, 2024

### 2023

Akhtar, Ardakani S., Influence of O<sup>+</sup> on Onset and Energy Release in the Earth's Magnetotail, Ph.D. Dissertation, University of New Hampshire, Durham, NH, 2023.

Cuesta, Manuel, The Radial Evolution of Turbulence Properties Observed in the Solar Wind, Ph.D. Dissertation, University of Delaware, USA, 2023.

Marshall, Andrew, MMS Observations of Secondary Reconnection X-Lines and the Unexpected Phenomena Surrounding Them, PhD Thesis, Rice University, 2023.

Beedle, Jason, Exploring the Kinetic Scale Mechanism of the Dayside Magnetopause Current System, PhD Thesis, The Catholic University of America, 2023

Wang, Xiantong, First-Principle Modeling and Machine Learning for Space Weather Forecasting, Ph.D. Thesis, University of Michigan, 2022.

## **2022**

Alqeeq Soboh, Energy conversion processes related to dipolarization fronts in the Earth's magnetotail, Ph.D. Thesis, Sorbonne Université, Paris, cofunded by CNES and PAUSE programme, France, 2022.

Fargette, Naïs, The role of magnetic reconnection in the formation of flux ropes and switchbacks in the heliosphere, Ph.D. Thesis, University of Toulouse, France, 2022.

Kolstø, Håkon Midthun, Magnetic Reconnection and Heavy Ions, Ph.D. Thesis, University of Bergen, 2022.

Lenouvel, Quentin, Machine learning identification of Electronic Diffusion Regions at the Earth's magnetopause observed by the MMS mission, Ph.D. Thesis, University of Toulouse, France, 2022.

Raptis, Savvas. High-speed jets and related phenomena at Earth's bow shock and magnetosheath. Diss. KTH Royal Institute of Technology, 2022.

Rice, Rachel C., MMS Observations of the Kelvin-Helmholtz Instability and Associated Ion Scale Waves. Ph.D. Dissertation, Embry-Riddle Aeronautical University, Daytona Beach, FL, 2002.

Robertson, Sadie L., Flux Ropes at the Earth's Magnetopause: an Investigation with the Magnetospheric Multiscale Mission, Ph.D. Thesis, Imperial College London, 2022.

Rogers, Anthony, The Active Tail in the MMS Era: An Ion Perspective, Ph.D. Dissertation, University of New Hampshire, NH, 2022

Steinvall, Konrad, Electrostatic plasma waves associated with collisionless magnetic reconnection, Ph.D. Dissertation, Uppsala University and Swedish Institute of Space Physics, Uppsala, Sweden, 2022.

Walia, Nehpreet K., Study of slow-mode shocks in magnetic reconnection based on hybrid simulations and satellite observations, Ph.D. Thesis, The University of Tokyo, 2022.

Wang, Xiantong, First-Principle Modeling and Machine Learning for Space Weather Forecasting, Ph.D. Thesis, University of Michigan, 2022.

## **2021**

Nguyen Gautier, Study of the coupling between magnetosphere and solar wind with machine learning, Ph.D. Thesis, University of Paris-Saclay, France, 2021.

Qi, Yi, Magnetic Reconnection on the Earth's Magnetopause: Identification, Magnetic Flux Transport and Magnetic Entanglement. Ph.D. Dissertation, University of California, Los Angeles, CA 2021.

Payne, Dominic, Multiscale Dynamics of Energy Transfer within the Electron Diffusion Region of Magnetic Reconnection, Ph.D. Dissertation, University of New Hampshire, NH, 2021

Starkey, Michael J., Ion Instrumentation for Space Physics Applications & Pickup Ion Dynamics at Quasi-Perpendicular Shocks, Ph. D. Thesis, University of Texas at San Antonio, Southwest Research Institute, 2021.

## **2020**

Afshari, Arya, An Analysis of Electron Landau Dumping as a Turbulent Dissipation Mechanism in the Terrestrial Magnetosheath, Ph.D. Dissertation, The University of Iowa, Iowa, 2020.

Bandyopadhyay, Riddhi, Turbulent Heating In Space Plasmas: Theory And Observations, Ph.D. Dissertation, University of Delaware, USA, 2020.

Fadanelli, Sid, Magnetic configurations, reconnection and energy transfers in space plasmas, Ph.D. Thesis, University of Toulouse, France, 2020.

Lichko, Emily, Magnetic Pumping as a Source of Particle Heating, Ph.D. Dissertation, University of Wisconsin – Madison, 2020.

Oimatsu, Satoshi, Energy Transfer Between Pc4-5 Geomagnetic Pulsations and Energetic Ions due to Drift-Bounce Resonance in the Earth's Magnetosphere, Ph.D. Dissertation, Kyoto University, Japan, 2020.

Rager, Amy, Multiscale Current System of the Dayside Magnetopause, Ph.D. Dissertation, The Catholic University of America, Washington, DC, 2020.

Wetheron, Blake, Magnetic Reconnection in the Age of the Magnetospheric Multiscale Mission, Ph.D. Dissertation, University of Wisconsin – Madison, 2020.

## **2019**

Akhavan-Tafti, Mojtaba, Evolution of Flux Transfer Events at the Magnetopause: MMS Observations and Global Hybrid-Vlasov Simulations, Ph.D. Dissertation, University of Michigan, Ann Arbor, MI, 2019.

Cozzani, Giulia, Microphysics of magnetic reconnection in near-Earth space : spacecraft observations and numerical simulations, Ph.D. Dissertation, University of Paris-Saclay and University of Pisa, France/Italy, 2019.

Johlander, Andreas, Ion dynamics and structure of collisionless shocks in space, Ph.D. Dissertation, Uppsala University and Swedish Institute of Space Physics, Uppsala, Sweden, 2019.

Manuzzo, Roberto, Magnetopause study by means of a multi-fluid approach, Ph.D. Dissertation, Sorbonne Université and University of Pisa, Paris, France /Italy, 2019.

Paulson, Kristoff, In Situ Observations of Pearl Pulsations and Development of a Low-Noise Fluxgate Magnetometer, Ph.D. Dissertation, University of New Hampshire, Durham, NH, 2019.

Zhao, Cong, Statistical Study on Two Types of Flux Transfer Events Observed by MMS Spacecraft, Ph.D. Dissertation, University of California, Los Angeles, CA, 2019.

## **2018**

Broll, Jef, Ion Dynamics at Earth's Bow Shock and Magnetopause, Ph.D. Dissertation, University of Texas at San Antonio, Southwest Research Institute, 2018.

Eriksson, Elin, Electron-scale physics in space plasma: Electron energization in near-Earth space, Ph.D. Dissertation, Uppsala University and Swedish Institute of Space Physics, Uppsala, Sweden, 2018.

Haiducek, John, Exploring Magnetotail Structure and Dynamics with Magnetohydrodynamic Simulations, Ph.D. Thesis, University of Michigan, 2018.

Holmes, Justin, Properties of nonlinear solitary structures in astrophysical and space plasmas, Ph.D. Dissertation, University of Colorado, Boulder, CO, 2018.

Issaad Kacem, Structure et dynamique de l'interface entre des tubes de flux entrelacés observés à la magnétopause terrestre par la mission MMS, Ph.D. Thesis, University of Toulouse, France, 2018.

## **2017**

Chen, Yuxi, Advanced Space Plasma Simulations Using a High-Order Accurate Method and the Magnetohydrodynamics with Embedded Particle-in-Cell Model, Ph.D. Thesis, University of Michigan, 2017.

Dargent, Jérémy, Modélisation numérique de la dynamique des ions froids dans le cadre de la reconnexion magnétique à la magnétopause terrestre, PhD Thesis, University of Toulouse, France, 2017.

Goodrich, K. A., PhD 2017, Kinetic Electric Field Signatures Associated with Magnetic Turbulence and Their Impact on Space Plasma Environments, Ph.D. Dissertation, University of Colorado, Boulder, CO, 2017.

Lora Price, The Effects of Turbulence on Magnetic Reconnection at the Magnetopause, Ph.D. Dissertation, Department of Physics, University of Maryland, 2017.

## **2016**

Genestreti, Kevin J., Spatial characteristics of magnetotail reconnection and properties of the plasmasphere during dayside reconnection, Ph.D. Dissertation, University of Texas at San Antonio, Southwest Research Institute, 2016.

Norgren, Cecilia, Electron-scale physics in space plasma: Thin boundaries and magnetic reconnection, Ph.D. Dissertation, Uppsala University and Swedish Institute of Space Physics, Uppsala, Sweden, 2016.

Schmid, Daniel, Magnetotail Dipolarization Fronts, Ph.D. Dissertation, University of Graz, Austria, November 2016.

Shuster, J., "Smoking-Gun" Observables of Magnetic Reconnection: Spatiotemporal Evolution of Electron Characteristics Throughout the Diffusion Region, Ph.D. Dissertation, University of New Hampshire, 2016.

Stawarz, Julia E., Collisionless Plasma Turbulence: Insights from Magnetohydrodynamic and Hall Magnetohydrodynamic Simulations and Observations of the Earth's Magnetosphere, Ph.D. Dissertation, University of Colorado Boulder, 2016.

Vines, Sarah K., Ion scale characteristics and dynamics of dayside magnetopause reconnection exhausts: Effects of interplanetary magnetic field orientation, Ph.D. Dissertation, University of Texas at San Antonio, Southwest Research Institute, 2016

## **2015**

Dahlin, Joel T., Electron Acceleration in Magnetic Reconnection, Ph.D. Dissertation, Department of Physics, University of Maryland, College Park, 2015.

## **Master Theses**

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## **2023**

Chepuri, S., Studying the Earth's Magnetosphere with Energetic Particles, Master Thesis, University of Iowa, 2023.

Masuda, Miki, Relation between whistler wave intensity and shock parameters at Earth's bow shock, Master Thesis, The University of Tokyo, Japan, 2023.

## **2022**

Guerra, Marco, Investigation of inductive electric fields in Earth's magnetotail using Magnetospheric Multiscale (MMS) multipoint measurements, Master Thesis, KTH Royal Institute of Technology, 2022.

Wang, Yanwen, Determining Energy Cascade Rate In Magnetohydrodynamics By Third-Order Law, Master Thesis, University of Delaware, USA, 2022.

## **2021**

Dahani, Souhail, The helicity of magnetic flux ropes at the Earth's magnetopause, Master Thesis, University of Toulouse, France, 2021.

Grönlund, Arthur, Statistical Survey of Earth's Magnetopause Using MMS Data: Pressure Balance, Total Pressure Contributions and Magnetopause Velocity near the Subsolar Point, Dawn- and Dusk Flanks, Master Thesis, KTH Royal Institute of Technology, 2021.

Shimada, Ryoya, Study of mirror mode in earth's magnetosheath using MMS observations, Master Thesis, The University of Tokyo, 2021.

Teubenbacher, Daniel, Deriving Plasma Densities from Controlled Spacecraft Potential Data for Turbulence Analysis in the Magnetosheath, Master Thesis, University of Graz, 2021.

## **2020**

Araki, Mizuho, Preferential ion and electron heating of magnetic reconnection: Statistical study based on 3-D Maxwellian fitting to plasma velocity distribution function, Master Thesis, The University of Tokyo, 2020.

Blasl, Kevin Alexander, In-situ spacecraft observations of surface waves at Earth's magnetopause during periods of southward interplanetary magnetic field, Master Thesis, University of Graz, 2020.

Foghammar-Nömtak, Carl, Automatic SLAMS detection and magnetospheric classification in MMS data, Master Thesis, KTH Royal Institute of Technology, 2020.

Takahashi, Keita, A method for estimation of cold plasma density from whistler mode waves observed by Magnetospheric Multiscale mission spacecraft, Master Thesis, Kyoto University, 2020.

Umegaki, Chika, Characteristics of high-frequency whistler waves in Earth's bow shock observed by MMS spacecraft, Master Thesis, The University of Tokyo, 2020.

Watanabe, Kaori, Statistical study on electron and ion temperatures in the near-Earth plasma sheet during the active phases, Master Thesis, The University of Tokyo, 2020.

## **2019**

Asami, Ryuta, Statistical analysis of cold plasma mixing in the magnetotail based on two-component Maxwellian velocity distribution functions, Master Thesis, The University of Tokyo, 2019.

Cheng, I Kit, Magnetic reconnection exhausts in the magnetosheath and solar wind with Magnetospheric Multiscale, MSci. Thesis, Imperial College London, 2019.

Fargette, Naïs, On the ubiquity of magnetic reconnection inside flux transfer events at Earth's magnetopause, Master Thesis, University of Toulouse, France, 2019.

Kobayashi, Yuki, Study on anomalous resistivity around neutral line in the dayside magnetosphere: Two fluid equation analysis with MMS data, Master Thesis, Nagoya University, 2019.

LaMoury, Adrian, Magnetic reconnection exhausts in the magnetosheath and solar wind with Magnetospheric Multiscale, MSci. Thesis, Imperial College London, 2019.

Pritchard, Kristina, Dayside Asymmetric Reconnection, M.S. in Physics, University of Texas at San Antonio, 2019.

Suzuki, Makoto, Evaluation of Analysis Method for Characteristics of ULF waves in Earth's Magnetosphere observed by MMS, Master Thesis, The University of Tokyo, 2019.

Wellenzohn, Simon, Energy dispersion in the PSBL flows during substorms, Master Thesis, Karl-Franzens University of Graz, Austria, October, 2019.

## **2018**

Walia, Nehpeet Kaur, A statistical study of slow-mode shocks observed in the dayside magnetopause by Magnetospheric Multiscale (MMS), Master Thesis, The University of Tokyo, 2018.

Yano, Makoto, Structure of dayside asymmetric magnetic reconnection with the Magnetospheric Multiscale (MMS) mission, Master Thesis, Tokyo Institute of Technology, 2018.

## **2017**

Bengtson, Miles, Solar Wind-Magnetosphere Coupling: A Global Perspective of Reconnection in the Magnetotail, Master Thesis, Embry-Riddle Aeronautical University, Florida, 2017

Sun, Shiyong, Energy Transfer by Magnetic Reconnection in Space Plasmas, MSc. Thesis, Imperial College London, 2017.

## **2016**

James Webster, Magnetospheric Multiscale Dayside Reconnection Electron Diffusion Region Events, Master's Degree in physics, Rice University, Houston, TX, 2016

## **Undergraduate Theses**

### **2022**

Berglund, Sofie and Wallner, Alice, Using satellite data to calculate entropy of electrons at collisionless shocks, Bachelor Thesis, KTH Royal Institute of Technology, 2022.

### **2021**

Bergson Hallberg, Karl, Electron Acceleration at Earth Bow Shock, Bachelor Thesis, KTH Royal Institute of Technology, 2021.

### **2016**

O'Meera, M., Magnetospheric Multiscale Mission Encounters with the Magnetopause and Bifurcated Current Sheets, Undergraduate Thesis, University of New Hampshire, 2016.

## **Outstanding Student Paper Awards**

### **2022**

Savvas Raptis, KTH Royal Institute of Technology, Sweden

Downstream high-speed plasma jet generation as a direct consequence of shock reformation (<https://www.nature.com/articles/s41467-022-28110-4>), highlighted as Springer 2022: Breakthrough Research Highlights: Astronomy.

### **2021**

Kevin Blasl, University of Graz, Austria

Multi-scale and cross-process character of the Kelvin-Helmholtz instability during southward interplanetary magnetic field conditions, presented at 2021 Fall AGU Meeting

Susanne Flø Spinnangr, University of Bergen

Magnetic Reconnection During Varying Inflow Conditions, presented at 2021 AGU Fall Meeting.

## **2020**

## **2019**

Yi Qi, University of California, Los Angeles

Magnetic Curvature Identification of the Reconnection Line on the Earth's Magnetopause, presented at 2019 GEM Summer Workshop.

## **2018**

## **2017**

Miles Bengtson, Embry-Riddle Aeronautical University

Solar Wind-Magnetosphere Coupling: A Global Perspective of Substorm Onset, First Prize (joint), 2017 Community Coordinated Modeling Center (CCMC) Student Research Contest

## **2016**

Jeffrey Broll, University of Texas at San Antonio

Observations and simulations of specularly reflected  $\text{He}^{++}$  at Earth's quasiperpendicular bow shock, presented at 2016 Fall AGU Meeting.

Katherine Goodrich, University of Colorado at Boulder

Classifying Large-Amplitude Parallel Electric Fields Along the Magnetopause and Their Effect on Magnetic Reconnection, presented at 2016 Fall AGU Meeting.