

Michelle X. Bui

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EDUCATION

University of Michigan

Doctor of Philosophy (PhD) in Space Sciences

Aug. 2025 – Present

Cornell University

Masters of Science (MS) in Atmospheric Sciences
Deans McNair Scholar

Aug. 2021 – Aug. 2024

University of Texas at Arlington

Honors Bachelor of Science (BS) in Physics; Minor in Mathematics
McNair Scholar
Cum Laude

Aug. 2017 – Jun. 2021

Arlington High School

Distinguished Achievement High School Diploma
National Merit Commended Scholar
Summa Cum Laude

Aug. 2014 – Jun. 2017

SKILLS

- Computational modeling experience in geophysical fluid dynamics and plasma dynamics.
- Experience in computational languages and programs such as Python, Julia, MATLAB, SQL, R, and SAS Analytics.
- Radar data analysis experience in coherent scatter radar techniques using Cornell University's Radar Laboratory in Ithaca, NY.
- Data analysis experience using the CEDAR Madrigal Database, NASA CDAWeb Database, NASA OMNIWeb Plus Database, JHU-APL SuperMAG Database, NASA SSCWeb database, and UC Berkeley THEMIS Database.
- Knowledge of illustrative and logistical software programs such as ParaView, L^AT_EX, Inkscape, Wacom, Google Suite, and Microsoft Office Suite.
- Instruction, curriculum, and tutoring experience ranging from middle school, high school, AP-level, and college-level courses in physics, calculus, chemistry, and other related courses, including online creation of instructional activities and labs.
- Writing, presentation, and communication capabilities as shown through numerous manuscripts and presentations at the national and local levels.

RESEARCH EXPERIENCE

Graduate Student Staff Assistant at University of Michigan **Aug. 2025 – Present**
Co-advisors: Daniel Welling and Tuija Pulkkinen
Research goal: Investigate magnetosphere-ionosphere-thermosphere coupling

Graduate Research Assistant at Cornell University **Aug. 2021 – Aug. 2024**
Advisor: David Hysell
Research goal: Investigate local plasma irregularities in the upper midlatitudes

- Developed ion and neutral computational fluid simulations, locally representing the lower E-region ionosphere and lower thermosphere.
- Analyzed coherent scatter radar data to observe structuring of sporadic-*E* ionization layers.

Undergraduate Researcher at UT Arlington **Jan. 2018 – May 2021**
Advisor: Ramon Lopez
Research goal: Investigate impacts of solar wind on Earth's magnetosphere

- Studied the relationship between solar wind, magnetopause current, and magnetopause motion using theoretical and statistical analyses
- Investigated effects of high speed solar wind stream events on bursty bulk flow events in the magnetotail using analysis techniques on NASA satellite data.

Advisor: Daniel Welling

Research goal: Investigate space weather from the ground level and above

- Studied the connection between magnetotail tilt and inter-hemispheric asymmetries in ionospheric outflow through model and observational data analyses.
- Triangulated ground-based magnetometer data from SuperMAG to determine fluctuations in magnetic field and applied these results to interdisciplinary research regarding fluctuations in bird migratory patterns.

PUBLICATIONS

- Bui, M. X.; Hysell, D.; Larsen, Miguel. (2023) **Midlatitude Sporadic E-Layer Horizontal Structuring Modulated by Neutral Instability and Mixing in the Lower Thermosphere.** *Journal of Geophysical Research: Space Physics*. 128(2).
- Gulson-Castillo, E. R.; Van Doren, B. M.; Bui, M. X.; Horton, K. G.; Li, J.; Moldwin, M. B.; Shedden, K.; Welling, D. T.; Winger, B. M. (2023) **Space weather disrupts nocturnal bird migration.** *Proceedings of the National Academy of Sciences*. 120(42).
- Bui, M. X.; Lopez, R.E. (2021) **Comparing Approximate Total Current of the Dayside Magnetopause to Solar Wind Pressure.** *McNair Scholars Research Journal*, Vol. 24. University of Texas at Arlington Libraries.
- Hysell, D. L.; Bui, M. X.; Larsen, M. F. (2024) **Observations and Model of Subauroral Sporadic E Layer Irregularities Driven by Turning Shears and Dynamic Instability.** *Journal of Geophysical Research: Space Physics*. 129(8).

PRESENTATIONS

CEDAR: Coupling, Energetics and Dynamics of Atmospheric Regions

- Bui, M.X.; Hysell, D. (Jun. 2024) Modulation of the Midlatitude Sporadic-E layer by MLT Instabilities. Coupling, Energetics and Dynamics of Atmospheric Regions (CEDAR) 2024 Workshop. Poster ID: IRR1-09.
- Bui, M.X.; Hysell, D. (Jun. 2023) Midlatitude Sporadic E-Layer Horizontal Structuring Modulated by Neutral Instability and Mixing in the Lower Thermosphere. Coupling, Energetics and Dynamics of Atmospheric Regions (CEDAR) 2023 Workshop. Poster ID: IRR1-07.
- Bui, M.X.; Hysell, D. (Jun. 2022) VHF radar observations of midlatitude sporadic E-layer structuring. Coupling, Energetics and Dynamics of Atmospheric Regions (CEDAR) 2022 Workshop. Poster ID: MDIT-05.

AGU: American Geophysical Union

- Bui, M.X.; Hysell, D. L; Rojas-Villalba, E. L. (Dec. 2023) Effects of Neutral Instability in the Lower Thermosphere on Midlatitude Sporadic E-Layer Structuring. American Geophysical Union (AGU) 2023 Workshop. Poster ID: SA21C-2691.
- Bui, M.X.; Hysell, D. (Dec. 2022) Midlatitude sporadic E-layer structuring due to instability and mixing in the lower thermosphere. American Geophysical Union (AGU) Fall Meeting 2022. Poster Abstract ID: SA55B-1399.
- Bui, M.; McCrum, J.; Welling, D. Can Interhemispheric Asymmetries in Ionospheric Outflow Wag the Magnetotail? American Geophysical Union (AGU) Fall Meeting 2020. Poster Abstract ID: SM040-737735. Dec. 2020.
- Bagheri, F.; Lopez, R.E.; Dredger, P.M.; Bonde, R.E.F.; Bui, M.; Chapagain, N.; Nelson, C.; Xing, C. Multipoint Observations of Solar Wind Conditions and Magnetopause Motion. American Geophysical Union (AGU) Fall Meeting 2019. Poster Abstract ID: SM51C-3198. Dec. 2019.

Other Presentations

- McCrum, J.; Bui, M.; Welling, D. Does Ionospheric Outflow Wag the Magnetotail? Geospace Environment Modeling (GEM) Workshop 2020. Poster ID: 233. Jul. 2020.
- Bui, M.; Lopez, R.E. Comparing Approximate $J \times B$ force on the Dayside Magnetopause to Solar Wind Pressure. UTA Honors Research Symposium Fall 2020. Poster Presentation. Nov. 2020.
- Bui, M.; Lopez, R. E. Comparing Approximate Total Current of the Dayside Magnetopause and the Force to Solar Wind Pressure. Texas Section of the American Physical Society (TS-APS) Fall Meeting 2020. Oral Presentation. Nov. 2020.
- Bui, M.; Lopez, R.E. Comparing Approximate Total Current of the Dayside Magnetopause to Solar Wind Pressure. UTA McNair Scholars Research Presentations 2020. Oral Presentation. Aug. 2020.
- Bui, M.; Nelson, C.; Xing, C.; Dredger, P.; Bagheri, F.; Lopez, R.E. Identifying Magnetospheric Crossings between Northward and Southward IMF. Bulletin of the 2019 Joint Fall Meeting of the Texas Sections of APS, AAPT, and Zone 13 of the SPS, Vol. 64, No. 18. Poster Abstract ID: A01.00007. Oct. 2019.

- Bagheri, F.; Lopez, R.E.; Dredger, P.; Bonde, R.E.F.; Xing, C; Nelson, C; Chapagain, N.; Bui, M. Study of Magnetopause Motion based on Multiple Crossings of THEMIS Spacecraft. Bulletin of the 2019 Joint Fall Meeting of the Texas Sections of APS, AAPT, and Zone 13 of the SPS, Volume 64, Number 18. Presentation Abstract ID: H01.00009. Oct. 2019.
- Streetman, M.; Bui, M.; Crist, T.; Daniels, L.; Henke, M.; Carranza, H.; Lopez, R.E. Characteristics of Bursty Bulk Flows Originating from High Speed Streams. UTA College of Science ACES Research Symposium. Poster Presentation. Apr. 2018.

HONORS AND SCHOLARSHIPS:

Graduate Excellence in Leadership **May 2024**
Award of \$500, presented at the Cornell Engineering Annual Awards Banquet.

Deans McNair Graduate Fellowship Stipend **Aug. 2021 – May 2022**
Cornell stipend fellowship (\$33,012) awarded to first-year graduate students.

McNair Scholar **Jan. 2020 – Jun. 2021**
NSF-funded program preparing qualified undergraduates for graduate study. Scholars complete the McNair Summer Research Internship under a research advisor and receive a stipend of \$3,000.

Honors Physics Senior Thesis, Presentation, and Degree **May 2021**
Fulfilled requirements for an Honors Physics degree by completing a senior thesis and presentation entitled "Comparing the $J \times B$ Force and the Approximate Total Current of the Dayside Magnetopause to Solar Wind Pressure."

TSAPS Undergraduate Student Presentation Award **Awarded Nov. 2020**
Award by the Texas Section of the American Physical Society to the top undergraduate student presentations during the Fall 2020 meeting.

UTA McNair Scholars Award: Friends of the Library Scholarship **Awarded Aug. 2020**
I earned the top award given to the top two general audience oral presentations and research papers of the McNair Summer Research Internship.

UTA Libraries Best Papers Scholarship **Awarded Oct. 2020**
\$200 scholarship awarded to the top papers of journals published by UTA Libraries.

UTA McNair Exemplary Senior Scholarship **Awarded Dec. 2020**
\$300 scholarship awarded to exemplary McNair senior students.

UTA Presidential Scholarship **Awarded Aug. 2017**
Full-tuition scholarship (\$48,000) awarded to high achieving admitted students.

WORK EXPERIENCE

Adjunct Instructor & Tutor: Tompkins Comm. College **Aug. 2024 – Mar. 2025**
Class instruction, curriculum development, and tutoring experience in Physics I-II, Chemistry I-II, Calculus I-III, Pre-Calculus, College Algebra, Statistics, and other related courses. Class taught:

- Introduction to Databases: Database management with SQL and Microsoft Access for computer science, accounting, and similar technical interests.

Executive Secretary: NASA Proposal Panel Reviews

Sep. 2023 – Nov. 2023

Organization, management, and technological support for two separate of NASA Heliophysics Proposal Panel Reviews.

Academic Instructor & Tutor: Porter Tutoring

Aug. 2017 – May 2021

Program instruction and tutoring experience in Physics I-II, College Algebra – Calculus II, AP-level sciences/math, middle – high school level math, and middle – high school general sciences. Classes taught:

- Test preparation programs: SAT, P-SAT, ACT
- High school level homeschool instruction: Algebra II, General Physics, Pre-Calculus
- Middle school level homeschool instruction: Algebra I, 8th Grade General Science

Physics I-II Undergraduate Teaching Assistant: UT Arlington

Sept. 2018 – Mar. 2020

Taught exam reviews, hosted office hours, created study resources, and graded exams for Physics I-II.

Private Academic Tutor

Jul. 2017 – Jul. 2021

Tutoring experience in high school sciences/math, AP-level sciences/math, and SAT prep.

WORKSHOPS & EXTRACURRICULAR

Teaching Climate Change Workshop

Aug. 2024

Attended workshop dedicated to supporting teachers and curriculum development pertaining to climate change in New York state area. Hosted at Museum of the Earth in Ithaca, NY.

Incoherent Scatter Radar (ISR) Summer School

Jul. 2023

Attended one-week summer program dedicated to ISR data tutorials for graduate students studying aeronomy. Hosted at Poker Flat ISR in Fairbanks, Alaska.

Space Weather Summer School

Jul. 2022

Attended two-week summer program dedicated to graduate students studying space weather. Hosted at National Center for Atmospheric Research's High Altitude Observatory in Boulder, CO.

Expanding Your Horizons at Cornell

Sep. 2022 - Mar. 2023

Workshop dedicated to STEM activities for 7th-10th grade students. As **Brochures and Publicity Chair**, I distributed brochures and postcards to schools in NY state to recruit student participants.

Snee Graduate Organization

Jan. 2022 – Dec. 2023

Graduate student organization for Earth & Atmospheric Sciences department at Cornell University. As **President**, I led group meetings and officer meetings, organized events, oversaw expenses

Women in Physics (WIP) at UTA

Sep. 2017 – May 2021

Local WIP chapter at UT Arlington, where I served as the local's **President and Treasurer**.

STEM Mentorship Program Sponsored by WIP at UTA

Sept. 2018 – May 2021

Using funding from WIP at UTA, I founded an outreach program to bring STEM activities to high

school and junior high school students.

Society of Physics Students (SPS) at UTA

Local SPS chapter at UTA. I hosted exam reviews using SPS resources.

Jan. 2019 – May 2021

Honors College Council

Undergraduate student organization for Honors College students.

Sept 2017 – May 2021