Michelle X. Bui

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Second-year graduate research assistant at Cornell University's Atmospheric Sciences, researching ionospheric physics and pursuing a Ph.D. in Atmospheric Sciences.

EDUCATION:

Cornell University **Aug. 2021 – Present**

Doctor in Philosophy (Ph.D.) in Atmospheric Sciences

Deans McNair Scholar

University of Texas at Arlington **Aug. 2017 – Jun. 2021**

Honors Bachelor of Science (B.S.) in Physics; Minor in Mathematics

Graduated Magna Cum Laude

McNair Scholar

Arlington High School **Aug. 2014 – Jun. 2017**

Distinguished Achievement High School Diploma

Graduated Summa Cum Laude

National Merit Commended Scholar

HONORS AND SCHOLARSHIPS:

Deans McNair Graduate Fellowship **Aug. 2021 – May 2022**

Cornell fellowship awarded to graduate students who were awarded the McNair Scholars Fellowship during their undergraduate career.

McNair Scholar **Jan. 2017 – Jun. 2021**

NSF-funded program preparing qualified undergraduates for graduate study, especially students from disadvantaged demographics. Scholars complete the McNair Summer Research Internship under a research advisor and receive resources and support from program staff.

TSAPS Undergraduate Student Presentation Award **Awarded Nov. 2020**

$100 awarded 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 #1 prize given to the top two research papers and oral presentations of the McNair Summer Research Internship. Alongside a $500 scholarship, I will have my paper published in the McNair Scholars Research Journal.

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**

$10,000 merit-based annual scholarship awarded to high achieving admitted students, renewed yearly for four years.

SKILLS:

- Computational modeling experience in geophysical fluid dynamics and plasma dynamics.
- Knowledge and training in Python, LaTeX, MATLAB, R, SAS Analytics, Java, and Microsoft Programs.
- Radar analysis experience in coherent scatter radar using Cornell University's Zeman Laboratory.
- Data analysis experience using NASA's CDAWeb Database, NASA's OMNIWeb Plus Database, JHU-APL SuperMAG Database, NASA's SSCWeb database, and UC Berkeley's THEMIS Database.
- Presentation and communication skills acquired through numerous poster and presentation opportunities.
- Educational experience ranging from preparing college-level physics exam reviews, developing SAT/ACT curriculum, constructing secondary-level science and math curriculum, and tutoring one-one with a variety of students.

RESEARCH EXPERIENCE:

Graduate Research Assistant under Professor David Hysell **Aug. 2021 – Present**

- I am working on simulating a coupled ion-neutral simulation in the lower E-region ionosphere. I have analyzed coherent scatter radar data to observe structuring of sporadic-E of the ionosphere. I simulated geophysical fluid dynamics in the lower thermosphere through the Dedalus PDE-solver in Python to compare the wave morphology of turbulent neutral mixing and the morphology observed in sporadic-E radar images.

Undergraduate Researcher under Professor Ramon Lopez **Jan. 2018 – Present**

- Through the McNair internship, my project involved calculating the approximate magnetopause current and $J \times B$ force along the magnetopause using THEMIS data, OMNIWeb, and Python open-source libraries. I compared the approximate total current of the dayside magnetopause to solar wind pressure to determine a relationship. Then I analyzed the $J \times B$ force along the magnetopause to further understand the relationship between solar wind and magnetopause current.
- Under grad. student Pauline Dredger and postdoc. researcher Fateme Bagheri, I analyzed magnetopause motion and position using multipoint observations of the magnetopause and solar wind conditions using THEMIS data and OMNIWeb.
- Under grad. student Hector Carranza and senior undergrad. Mikayla Streetman, I used Python to analyze high speed solar wind streams on bursty bulk flow events in the magnetotail. Data was collected from OMNIWeb and THEMIS.

Undergraduate Researcher under Asst. Professor Daniel Welling **Jan. 2019 – Present**

- Alongside post-bacc. researcher James McCrum, I studied the correlation between magnetotail tilt and inter-hemispheric asymmetries in ionospheric outflow and model events of Cluster spacecraft crossing the magnetotail using Python open-source libraries.
- In a joint collaboration with Asst. Prof. Ben Winger at University of Michigan, we analyzed ground-based magnetometer data from SuperMAG using triangulation methods in Python to determine fluctuations in magnetic field and applied these results of magnetic field fluctuation patterns to Dr. Winger's research on fluctuations in bird migratory patterns.

PUBLICATIONS:

Bui, M.; 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). https://doi.org/10.1029/2022JA030929

Bui, M.; 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. http://hdl.handle.net/10106/29689

PRESENTATIONS AND POSTERS:

Bui, M.; Hysell, D. Midlatitude sporadic E-layer structuring due to instability and mixing in the lower thermosphere. Coupling, Energetics and Dynamics of Atmospheric Regions (CEDAR) 2022 Workshop. Poster ID: MDIT-05. Jun. 2022.

Poster presented on Jun. 21, 2022 at the CEDAR 2022 Workshop.

Bui, M.; McCrum, J.; Welling, D. Can Interhemispheric Asymmetries in Ionospheric Outflow Wag the Magnetotail? American Geophysical Union (AGU) Fall Meeting 2020. Abstract ID: SM040-737735. Dec. 2020.

Poster presented on Dec. 15, 2020 at the AGU 2020 Fall Meeting.

Bui, M.; Lopez, R.E. Comparing Approximate J x B force on the Dayside Magnetopause to Solar Wind Pressure. Honors Research Symposium Fall 2020. Nov. 2020.

Poster presented on Dec. 4, 2020 at the Honors Research Symposium.

Bui, M.; Lopez, R.E. Comparing Approximate Total Current of the Dayside Magnetopause to Solar Wind Pressure. UTA McNair Scholars Research Presentations 2020. Aug. 2020.

Research presentation on Aug. 6, 2020 alongside McNair Scholars of the 2020 summer internship.

McCrum, J,; Bui, M.; Welling, D. Does Ionospheric Outflow Wag the Magnetotail? Geospace Environment Modeling (GEM) Workshop 2020. Poster ID: 233. Jul. 2020.

Poster alongside post-baccalaureate researcher James McCrum on Jul. 23, 2020 at Geospace Environment Modeling Workshop.

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. Abstract ID: SM51C-3198. Dec.

2019.

Contributed to a poster by postdoc. researcher Fateme Bagheri on Dec. 13, 2019 at the AGU 2019 Fall Meeting.

Nelson, C.; Bui, M.; 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. Abstract ID: A01.00007. Oct. 2019.

Poster alongside undergraduates Chelsi Nelson and Christina Xing on Oct. 25, 2019 at TSAPS 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. Abstract ID: H01.00009. Oct. 2019.

Contributed to presentation by postdoc. researcher Fateme Bagheri on Oct. 26, 2019 at TSAPS 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. Apr. 2018.

Poster alongside senior undergraduate Mikayla Streetman on Apr. 13, 2018 at the UTA COS ACES Research Symposium.

MEMBERSHIPS

American Geophysical Union **Jan. 2020 – Present**

Member: Attended AGU Meeting Fall 2020.

American Physical Society **Sept. 2019 – Present**

Member: Attended APS regional meetings during 2019-2020

Snee Graduate Organization **Jan. 2022 – Present**

President: Led group meetings and officer meetings, organized events, oversaw expenses

GPSA Representative: Attended GPSA meetings and kept track of relevant updates

Expanding Your Horizons at Cornell **Sept. 2022 - Present**

Brochures and Publicity Chair: Designed and distributed brochures and postcards for applicant recruitment

Women in Physics **Sept. 2017 – May 2021**

President: Led group meetings and managed group activities. Apr. 2018 – Present

Treasurer: Maintained finances and paperwork Jan. 2018 – Apr. 2018

Member: Attended group activities and meetings Sept. 2017 – Jan 2018

STEM Mentorship Program Sponsored by Women in Physics **Sept. 2018 – May 2021**

Founder and Activities Leader: Voluntary visits to high school and junior high students to host science activities and encourage students to pursue STEM careers.

Society of Physics Students **Jan. 2019 – May 2021**

Member: Presented reviews for introductory physics classes. Attended weekly meetings and participated in group activities.

Honors College Council **Sept 2017 – May 2021**

Member: Attended meetings, colloquiums, and group events.

WORK EXPERIENCE

Test Grader for Lecturer Barry Spurlock **Sept. 2018 – Mar. 2020**

Physics I-II test grader until tests were moved online due to COVID-19.

Academic Tutor at Porter Tutoring **Aug. 2017 – Present**

Curriculum-building and teaching experience for middle school and high school sciences and math.

Tutoring experience in Physics I-II, College Algebra – Calculus II, AP-level sciences/math, and SAT/ACT test preparation.

Private Academic Tutor **Jul. 2017 – Present**

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