ALEXANDER A. MASSOUD

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PROFESSIONAL SUMMARY

Physics doctoral researcher with 4+-years of experience in space physics applications of radar systems. Effective scientific writer for publications. Practiced verbal communicator for different audiences. Professional, personable, and excited to collaborate.

EDUCATION

Ph.D., Physics (Candidate), UT Dallas — August 2021 - Present
Topic keywords: Electricity and magnetism, space (plasma) physics, aeronomy, ionosphere, radar, phased array, incoherent scatter radar, equatorial spread F

M.S., Physics, The University of Texas at Dallas — August 2021 - May 2024

B.A., Physics, Ithaca College — August 2016 - May 2020
Minors in English and Mathematics

WORK EXPERIENCE

Research Assistant — Fall 2021 - Present
The University of Texas at Dallas

- **Signal processing with a radar system** — October 2024 - Present
  - Designed and implemented signal processing algorithm for raw voltage data from a radar system using the Python Programming Language
  - Produced velocity data by combining radial velocity in different pointing directions
  - Communicated methodology/workflow to external collaborators in regular meetings
  - ⇒ Demonstrated skills: Signal processing, curve fitting, Python, Doppler radar
  - ⇒ Outcomes: ∼55-hours of processed observations with calculated velocity data and spectral widths
  - ⇒ Scholarly output: 1 oral presentation (abstract submitted)
- **Managing undergraduate research projects** — August 2024 - Present
  - Identified topics for undergraduate research and recruited interested students
  - Hosted weekly meetings to assign research tasks, discuss methodology, and direct students toward future research opportunities
  - Facilitated practice sessions for student presentations and edited student writing
  - ⇒ Demonstrated skills: Project management, Python, MATLAB, mentorship, proofreading
  - ⇒ Outcomes: 300-days of analyzed radar measurements, ∼3.5-years of processed and analyzed GNSS signals, 1 acceptance to a research opportunity (NSF REU)
  - ⇒ Scholarly output: 1 first author publication (under review), 1 coauthor publication (in progress), 1 poster presentation (abstract accepted), 3 coauthor poster presentations, 1 coauthor poster presentation award

- **Analyzing new application areas for a radar system** May 2023 - Present
  - Cultivated subject matter expertise about a radar system and the necessary physics for explaining observations (i.e., space physics)
  - Identified and addressed new science questions by analyzing radar measurements using the Python Programming Language and MATLAB
  - Processed radar observations and maintained a local database of measurements
  - Created effective messaging to publish and present results of analyses to different audiences (e.g., undergraduates, early/mid/late-career researchers, etc.)

  ⇒ Demonstrated skills: Independent research, data processing, Python, MATLAB, scientific writing, copyediting, public speaking, understanding an audience, analytical thinking, time management, collaboration, business travel

  ⇒ Outcomes: ∼915-days of processed and analyzed radar measurements, 1 highly competitive fellowship (DoD NDSEG)

  ⇒ Scholarly output: 1 Ph.D. dissertation (Defense expected Spring 2026), 2 first author publications, 2 coauthor publications, 3 invited oral presentations, 4 oral presentations, 4 poster presentations, 2 poster presentation awards, 4 professional development opportunities
- **Simulating electric fields with empirical models** October 2021 - February 2023
  - Integrated numerous empirical models to drive space physics equation for simulation
  - Wrote code documentation and shared simulation in open access publication

  ⇒ Demonstrated skills: Modeling, Python, documentation

  ⇒ Outcomes: 1 open access empirical model

  ⇒ Scholarly output: 1 first author publication, 2 poster presentations

PUBLICATIONS

Massoud, A. A., Rodrigues, F. S., Sousasantos, J., Kuyeng, K. M., Scipión, D. E., and Padin, C. (2025), Study of local and non-local post-midnight equatorial spread-F generation based on long-term AMISR-14 observations, Earth Planets and Space, 77(189), doi:10.1186/s40623-025-02319-1.

Massoud, A. A., Rodrigues, F. S., Sousasantos, J., Milla, M. A., Scipion, D. E., Apaza, J. M., Kuyeng, K. M., and Padin, C. (2024), First climatology of F-region UHF echoes observed by the AMISR-14 system at the Jicamarca radio observatory and comparison with the climatology of VHF echoes observed by the collocated JULIA radar, Journal of Atmospheric and Solar-Terrestrial Physics, 263, doi:10.1016/j.jastp.2024.106328.

Sousasantos, J., Rodrigues, F. S., Fejer, B. G., Abdu, M. A., *Massoud, A. A.,* and Valladares, C. E., (2023), On the Role of Mild Substorms and Enhanced Hall Conductivity in the Plasma Irregularities Onset and Zonal Drift Reversals: Experimental Evidence at Distinct Longitudes Over South America, Earth and Space Science, 10, doi:10.1029/2023EA003071.

Rodrigues, F. S., Milla, M. A., Scipion, D., Apaza, J. M., Kuyeng, K. M., Sousasantos, J., *Massoud, A. A.,* and Padin, C. (2023), On new two-dimensional UHF radar observations of equatorial spread F at the Jicamarca Radio Observatory, Earth Planets and Space, 75, doi:10.1186/s40623-023-01876-7.

Massoud, A. A., Shidler, S. A. and Rodrigues, F. S. (2023), A height-dependent climatological model of the equatorial ionospheric zonal plasma drifts (EZDrifts): Description and application to an analysis of the longitudinal variations of the zonal drifts, Journal of Space Weather and Space Climate, 13, doi:10.1051/swsc/2023006.

PRESENTATIONS

Massoud, A. A. and Rodrigues, F. S. (2025), Radar studies of ionospheric irregularities with AMISR-14: New two-dimensional observations. Invited talk at the New Jersey Institute of Technology department of physics (oral presentation).

Massoud, A. A. and Rodrigues, F. S. (2025), Ground-based radar studies of equatorial spread F with new two-dimensional observations. Invited talk at the Air Force Research Laboratory, NM (oral presentation).

Massoud, A. A., Rodrigues, F. S., Kuyeng, K. M., and Scipión, D. E. (2025), Studies of post-midnight ESF over Jicamarca using two-dimensional radar observations. Presented at the 2025 CEDAR conference (oral presentation).

Massoud, A. A., Rodrigues, F. S., Kuyeng, K. M., and Scipión, D. E. (2025), *On the vertical plasma drift conditions prior to post-midnight ESF*. Presented at the 2025 CEDAR conference (poster presentation).

Abubakar, A. A., *Massoud, A. A.,* Rodrigues, F. S., Kuyeng, K. M., and Scipión, D. E. (2025), First climatology results of equatorial vertical drifts derived from new medium power ISR observations at Jicamarca. Presented at the 2025 CEDAR conference (poster presentation).

Kikuchi, M. T., Gomez Socoloa, J., *Massoud, A. A.,* Perez, C., Terra, P., Brum, C. G. M., and Rodrigues, F. S. (2025), On the long-term behavior of amplitude scintillation over Puerto Rico: Effects of increasing solar activity during solar cycle 25. Presented at the 2025 CEDAR conference (poster presentation).

Kikuchi, M. T., Gomez Socoloa, J., *Massoud, A. A.,* Perez, C., Terra, P., Brum, C. G. M., and Rodrigues, F. S. (2025), On the long-term behavior of unexpected GNSS signal degradation observed over Puerto Rico: Effects of increasing solar activity. Presented at the 2025 Undergraduate Research Scholar Awards Finals (poster presentation, third place).

Kikuchi, M. T., Gomez Socoloa, J., *Massoud, A. A.,* Perez, C., Terra, P., Brum, C. G. M., and Rodrigues, F. S. (2025), On the long-term behavior of unexpected GNSS signal degradation observed over Puerto Rico: Effects of increasing solar activity. Presented at the 2025 Undergraduate Research Scholar Awards Semifinals (poster presentation).

Massoud, A. A., Rodrigues, F. S., and Sousasatnos, J. (2025), Two-dimensional radar studies of post-midnight equatorial F-region irregularity development. Presented at the 2025 NRSM meeting (oral presentation).

Massoud, A. A., Rodrigues, F. S., Sousasatnos, J., Apaza, J. M., Kuyeng, K. M., Scipion, D., and Padin, C. (2024), Two-dimensional radar studies of post-midnight ESF using AMISR-14. Presented at the MST16/iMST3 workshop (oral presentation).

Massoud, A. A., Rodrigues, F. S., Sousasatnos, J., Apaza, J. M., Kuyeng, K. M., Scipion, D., and Padin, C. (2024), Two-dimensional UHF radar studies of post-midnight ESF at the Jicamarca Radio Observatory. Presented at the 2024 CEDAR conference (poster presentation).

Massoud, A. A. and Rodrigues, F. S. (2024), Radar studies of the near-Earth space environment: Experiences thus far. Invited talk at Ithaca College physics department Spring 2024 banquet (oral presentation).

Massoud, A. A., Rodrigues, F. S., Sousasantos, J., Milla, M. A., Scipion, D., Apaza, J. M., Kuyeng, K. M., and Carlos, P. (2024), Climatology of Equatorial F-region UHF Coherent Backscatter Radar Echoes and Comparison with Colocated VHF Radar Observations. Presented at the 2024 NRSM URSI conference (oral presentation).

Massoud, A. A., Shidler,S., and Rodrigues, F. S. (2023), A height-dependent climatological model of the equatorial ionospheric zonal plasma drifts (EZDrifts): Description and application to an analysis

of spatial variabilities in the neutral wind dynamo. Presented at the 2023 AGU conference (poster presentation).

Massoud, A. A., Rodrigues, F. S., Sousasantos, J., Milla, M. A., Scipion, D., Apaza, J. M., Kuyeng, K. M., and Carlos, P. (2023), On new two-dimensional observations of the near-Earth space environment at low-latitudes using an Ultra-High Frequency (UHF) radar system. Presented at the 2023 UT Dallas Research Day Poster Competition.

Massoud, A. A., Rodrigues, F. S., Sousasatnos, J., Milla, M. A., Scipion, D., Apaza, J. M., and Kuyeng, K. M. (2023), Seasonal and solar flux variations in the occurrence of equatorial F-region UHF radar echoes observed by AMISR-14 at the Jicamarca Radio Observatory. Presented at the 2023 CEDAR conference (poster presentation).

Massoud, A. A., S. Shidler, and F. Rodrigues. (2022), EZDrifts: An analytic global model of the Equatorial F-region Zonal plasma Drifts. Presented at the 2022 CEDAR conference (poster presentation).

GRANTS AND FELLOWSHIPS

- **DoD NDSEG Fellow** August 2023 - Present
  - Awarded by the DoD to pay for full tuition, a monthly stipend, a travel budget, and additional miscellaneous funding
- **Eugene McDermott Graduate Fellow** August 2023 - Present
  - Awarded by UT Dallas to accelerate professional opportunities during graduate study
  - Award amount: $10,000, annually
- **NASA/Texas Space Grant Consortium Fellow** August 2022 - August 2023
  - Awarded by TSGC to supplement full-time graduate study in space research
  - Award amount: $5,000

AWARDS AND PROFESSIONAL DEVELOPMENT

Fall 2024	iMST lidar and radar school, MST16/iMST3 workshop
Summer 2024	Student poster honorable mention, CEDAR workshop
Summer 2024	Incoherent scatter radar workshop, CEDAR workshop
Summer 2023	Student poster honorable mention, CEDAR workshop
Summer 2023	GNSS remote sensing colloquium, CU Boulder
Summer 2022	Incoherent scatter radar summer school, Boston University

PROFESSIONAL SERVICE

Session chairing

2025 NRSM	Co-chair of Space Weather II session
2025 NRSM	Co-chair of Space Weather I session

Peer-review

Fall 2024 - Present	Journal of Geophysical Research: Space Physics

Miscellaneous

2025 April	Delegate judge for Undergraduate Research Scholar Awards

MENTORING

Undergraduate

Fall 2024 - Present	Anthony Abubakar, Computer Science
Fall 2024 - Present	Minori Kikuchi, Physics

PROFESSIONAL AFFILIATIONS

Phi Kappa Phi (National honor society), Sigma Pi Sigma (Physics honors society), Sigma Tau Delta (English honors society), Sigma Xi (Scientific Research Honor Society), American Astronomical Society, American Geophysical Union, USNC-URSI Commission G Early Career Member