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Education

Virginia Polytechnic Institute and State University (Virginia Tech)	08/2015 – 05/2021
Ph. D. in Electrical Engineering (thesis)	
Virginia Polytechnic Institute and State University (Virginia Tech)	08/2019 – 12/2020
M. A. in Data Analytics and Applied Statistics	
Virginia Polytechnic Institute and State University (Virginia Tech)	08/2015 – 05/2017
M. S. in Electrical Engineering	
West Bengal University of Technology, Kolkata, India (WBUT)	08/2006 – 05/2010
B. Tech in Electronics and Communication Engineering	

Appointments

Embry-Riddle Aeronautical University	Research Scientist	09/2024 – Present
Virginia Tech	Postdoctoral Associate	05/2021 – 09/2024
Tata Consultancy Services	Information Technology Analyst	09/2010 – 07/2015

Research Grants

Co-I (Institutional PI) of NASA LWS Research Award 'Ionospheric responses to thunderstorm-generated acoustic and gravity waves over the continental US'	2022 – 2026
PI of NSF Award 'Collaborative Proposal: Investigation of ionospheric density response to American Solar Eclipses using coordinated radio observations with modeling support'	2024 – 2027
Co-I of NASA Research Award 'Determining the connections between driving conditions, magnetosphere-ionosphere-ground properties, and extreme geomagnetic and geoelectric disturbances'	2024 – 2025
PI of NSF-GEM Research Award 'Collaborative Research: GEM: Modeling Ionospheric and Magnetospheric Current Interactions with Submarine Cables'	2024 – 2027

Fellowships & Awards

JSPS(Japan)	JSPS Postdoctoral Fellowship (Short-term)	2022
Nagoya University	ISEE international joint research fellowship	2022
IEEE/WiSEE	Best conference paper	2021
NCAR/UCAR	ASP-GVP Fellowship	2020
Virginia Tech	Pratt Fellowship	2019
LANL/ISR	Vella Fellowship and ISR-1 summer school	2018
Techno India	Won 'Electronically Yours' event in the category 'Newron'	2010

Professional Services

AGU Fall Meeting	Primary Convener.	2022

	OSPA Judge.	Since 2021
NASA	Panel Reviewer of NASA Program.	2023
Virginia Tech	Mentor of Google Summer of Code.	2018
SuperDARN	Active member of SuperDARN Data Visualization Working group.	Since 2021
Reviewer	Nature Communication; JGR: Space Physics; Space Weather; Radio Science; Astrophysical Journal; Earth Planet and Science; Transactions on Geoscience and Remote Sensing; Advances in Space Research; EGU Sphere; Journal of Space Weather and Space Climate.	Since 2019
NSF	Panel Reviewer of NSF Program.	2024
CEDAR	Judge	2022 / 2024

Journal Publications

- **Chakraborty, S.**, Qian, L., Mrak, S., Mabie, J., Goncharenko, L., Mclnerney, J. M., & Bullett, T. (2025). Formation of the ionospheric G-condition following the 2017 Great American Eclipse. Earth and Space Science, 12, e2024EA004007. https://doi.org/10.1029/2024EA004007

- Oberheide, J., Aggarwal, D., Bergsson, B., **Chakraborty, S.** et al. Impact of Terrestrial Weather on the Space Weather of the Ionosphere-Thermosphere: Initial Results from a NASA Living with a Star Focused Science Topic. Surv Geophys (2025). https://doi.org/10.1007/s10712-025-09895-7

- Rout, D., Kumar, A., Singh, R., Patra, S., Karan, D. K., **Chakraborty, S.**, et al. (2024). Evidence of unusually strong equatorial ionization anomaly at three local time sectors during the mother's day geomagnetic storm on 10–11 May 2024. Geophysical Research Letters, 52, e2024GL111269. https://doi.org/10.1029/2024GL111269

- Shi, X., **Chakraborty, S.**, Baker, J. B. H., Hartinger, M. D., Wang, W., Ruohoniemi, J. M., et al. (2025). Statistical characterization of joule heating associated with ionospheric ULF perturbations using superDARN data. Journal of Geophysical Research: Space Physics, 130, e2024JA033452. https://doi.org/10.1029/2024JA033452

- Liu, X., Zhang, D., Coster, A. J., Xu, Z., Shi, X., & **Chakraborty, S.** (2024). The morphology and oscillations of nightside mid-latitude ionospheric trough at designated longitudes in the Northern Hemisphere. Journal of Geophysical Research: Space Physics, 129, e2024JA032864. https://doi.org/10.1029/2024JA032864

- Inchin, P. A., Bhatt, A., Bramberger, M., **Chakraborty, S.**, Debchoudhury, S., & Heale, C. (2024). Atmospheric and ionospheric responses to orographic gravity waves prior to the December 2022 cold air outbreak. Journal of Geophysical Research: Space Physics, 129, e2024JA032485. https://doi.org/10.1029/2024JA032485

- Gowtam, V. S., Connor, H., Kunduri, B. S. R., Raeder, J., Laundal, K. M., Tulasi Ram, S., **Chakraborty S.**, et al. (2024). Calculating the high-latitude ionospheric electrodynamics using a machine learning-based field-aligned current model. Space Weather, 22, e2023SW003683. https://doi.org/10.1029/2023SW003683

- Boteler, D. H., **Chakraborty, S.**, Shi, X., Hartinger, M. D., & Wang, X. (2024). An examination of geomagnetic induction in submarine cables. Space Weather, 22, e2023SW003687. https://doi.org/10.1029/2023SW003687

- Coyle, S. E., Baker, J. B. H., **Chakraborty, S.**, Hartinger, M. D., Freeman, M. P., Clauer, C. R., et al. (2023). Substorms and solar eclipses: A mutual information-based study. Geophysical Research Letters, 50, e2023GL106432. https://doi.org/10.1029/2023GL106432

- Reiss, M. A., Muglach, K., Mason, E., Davies, E. E., **Chakraborty, S.**, Delouille, V., ... & Veronig, A. (2023). A Community Dataset for Comparing Automated Coronal Hole Detection Schemes. Astrophysical Journal Supplement. https://ore.exeter.ac.uk/repository/handle/10871/134745

- Boteler, D., **Chakraborty, S.**, Shi, X., Hartinger, M. and Wang, X. (2023) Transmission Line Modelling of Geomagnetic Induction in the Ocean/Earth Conductivity Structure. International Journal of Geosciences, 14, 767-791. doi: 10.4236/ijg.2023.148041.

- Rout, D., Patra, S., Kumar, S., Chakrabarty, D., Reeves, G. D., Stolle, C., Pandey, K., **Chakraborty, S.**, Spencer E. A., (2023). The growth of ring current/SYM-H under northward IMF Bz conditions present during the 21–22 January 2005 geomagnetic storm. Space Weather, 21, e2023SW003489. https://doi.org/10.1029/2023SW003489

- Liu, J., **Chakraborty, S.**, Chen, X., Wang, Z., He, F., Hu, Z., et al. (2023). Transient response of polar-cusp ionosphere to an interplanetary shock. Journal of Geophysical Research: Space Physics, 128, e2022JA030565. doi: 10.1029/2022JA030565.

- Collins, K., Gibbons, J., Frissell, N., Montare, A., Kazdan, D., Kalmbach, D., Swartz, D., Benedict, R., Romanek, V., Boedicker, R., Liles, W., Engelke, W., McGaw, D. G., Farmer, J., Mikitin, G., Hobart, J., Kavanagh, G., and **Chakraborty, S.**, (2023). Crowdsourced Doppler measurements of time standard stations demonstrating ionospheric variability, Earth Syst. Sci. Data, 15, 1403–1418, doi:10.5194/essd-15-1403-2023.

- **Chakraborty, S**, Boteler DH, Shi X, Murphy BS, Hartinger MD, Wang X, Lucas G and Baker JBH (2022) Modeling geomagnetic induction in submarine cables. Front. Phys. 10:1022475. doi: 10.3389/fphy.2022.1022475.

- Prikryl, P., Gillies, R. G., Themens, D. R., Weygand, J. M., Thomas, E. G., and **Chakraborty, S.** (2022): Multi-instrument observations of polar cap patches and traveling ionospheric disturbances generated by solar wind Alfvén waves coupling to the dayside magnetosphere, Ann. Geophys., 40, 619-639, doi: 10.5194/angeo-40-619-2022, 2022.

- **Chakraborty, S.**, Qian, L., Baker, J. B. H., Ruohoniemi, J. M., Kuyeng, K., and Mclnerney, J. M. (2022). Driving influences of the Doppler flash observed by SuperDARN HF radars in response to solar flares. Journal of Geophysical Research: Space Physics, 127, e2022JA030342. doi: 10.1029/2022JA030342.

- Shi X, Schmidt M, Martin CJ, Billett DD, Bland E, Tholley FH, Frissell NA, Khanal K, Coyle S, **Chakraborty S**, Detwiller M, Kunduri B and McWilliams K (2022) pyDARN: A Python software for visualizing SuperDARN radar data. Front. Astron. Space Sci. 9:1022690. doi: 10.3389/fspas.2022.1022690.

- **Chakraborty, S**., Baker, J. B. H., and Ruohoniemi, J. M., Probabilistic Short-wave Fadeout Detection in SuperDARN Time Series Observations, 2021 IEEE International Conference on Wireless for Space and Extreme Environments (WiSEE), 2021, pp. 43-48, doi: 10.1109/WiSEE50203.2021.9613835.

- **Chakraborty, S.**, Qian, L., Ruohoniemi, J. M., Baker, J. B. H., Mclnerney, J. M., and Nishitani, N. (2021). The role of flare-driven ionospheric electron density changes on the Doppler flash observed by SuperDARN HF radars. Journal of Geophysical Research: Space Physics, 126, e2021JA029300. doi: 10.1029/2021JA029300.

- Fiori, R.A.D., **Chakraborty, S.**, Nikitina, L., Data-based optimization of a simple shortwave fadeout absorption model, Journal of Atmospheric and Solar-Terrestrial Physics (2022), doi: 10.1016/j.jastp.2022.105843.

- **Chakraborty, S.**, Baker, J. B. H., Fiori, R. A. D., Ruohoniemi, J. M., and Zawdie, K. A. (2021). A modeling framework for estimating ionospheric HF absorption produced by solar flares. Radio Science, 56, e2021RS007285. doi:10.1029/2021RS007285.

- **Chakraborty, S.**, Ruohoniemi, J. M., Baker, J. B. H., Fiori, R. A. D., Bailey, S. M., and Zawdie, K. A. (2021). Ionospheric Sluggishness: A Characteristic Time-Lag of the Ionospheric Response to Solar Flares. Journal of Geophysical Research: Space Physics, 126, e2020JA028813. doi: 10.1029/2020JA028813.
- **Chakrabarty, S.** and Morley, S. K. (2020). Probabilistic Prediction of Geomagnetic Storms and the Kp Index., Journal of Space Weather and Space Climate, doi:10.1051/swsc/2020037.
- Mukhopadhyay, A., Welling, D. T., Liemohn, M. W., Ridley, A. J., **Chakraborty, S.**, and 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.
- **Chakrabarty, S.**, Baker, J. B. H., Ruohoniemi, J. M., Kunduri, B., Nishitani, N., and Shepherd, S. G. (2019). A Study of SuperDARN Response to Co-occurring Space Weather Phenomena. Space Weather, 17, doi:10.1029/2019SW002179.
- **Chakrabarty, S.**, Ruohoniemi, J. M., Baker, J. B. H., and Nishitani, N. (2018). Characterization of short-wave fadeout seen in daytime SuperDARN ground scatter observations. Radio Science, 53, 472-484, doi:10.1002/2017RS006488.
- Fiori, R. A. D., Koustov, A. V., **Chakrabarty, S.**, Ruohoniemi, J. M., Danskin, D. W., Boteler, D. H., and Shepherd, S. G. (2018). Examining the Potential of the Super Dual Auroral Radar Network for Monitoring the Space Weather Impact of Solar X-Ray Flares. Space Weather, 16, doi:10.1029/2018SW001905.

Conference Papers

- **Chakraborty, S.**, Ruohoniemi, J. M., Baker, J. B. H. and Fiori, R. and Zawdie, K. and Bailey, S. and Nishitani, N. and Drob, D. et al., Sluggishness of the Ionosphere: Characteristic time-lag in Response to Solar Flares, 2020 XXXIIIrd General Assembly and Scientific Symposium of the International Union of Radio Science, Rome, Italy, 2020, pp. 1-4, doi: 10.23919/URSIGASS49373.2020.9232206.
- **Chakrabarty, S.**, U. Mukherjee, Circular Micro-strip Antenna Modelling using FDTD method and Design using Genetic Algorithms. CALCON – 2015, ID: EC20140700015.
- **Chakrabarty, S.**, Mukherjee, U., Circular Micro-strip (Coax Feed) Antenna Modelling using FDTD Method and Design using Genetic Algorithms: A Comparative Study on Different Types of Design Techniques, ICCCT - 2014, IEEE Digital Xplore, doi:10.1109/ICCCT.2014.7001514.
- **Chakrabarty, S.**, Mukherjee, U., Comparative Study of Micro-strip antennas designed by coaxial feed and line feed, ICCCT - 2011, IEEE Digital Xplore, doi:10.1109/ICCCT.2011.6075196.
- **Chakrabarty, S.**, Mukherjee, U., Micro-strip antenna optimization using genetic algorithms, ICCCT - 2010, IEEE Digital Explore, doi:10.1109/ICCCT.2011.6075196.

Invited Presentation

- **Chakraborty, S.** (Invited), Characterization of Solar Flare Effects Observed by High Frequency Radar, HAO Colloquium, 12 July, 2023, Online.
- **Chakrabarty, S.** (Invited), Shi., X., Chisham, G., Ruohoniemi, J. M., Baker, J. B. H., Stern, K., and Thomas, E. G., Coordinated Investigation of Antarctic Total Solar Eclipse (TSE) using SuperDARN HF Radars, CEDAR Workshop, Austin, June 2022.
- Maimaiti, M., **Chakrabarty, S.**, SuperDARN Radars in Space Science Research, CEDAR Workshop, Keystone, June 2017. (Invited)

Selected Presentation

- **Chakraborty, S.**, Nishitani, N., Ruohoniemi, J. M., Shi, X., Baker, J. B. H., \& Ponomarenko, P. V. (2023, December). Solar flare-induced gradient drift instability observed by SuperDARN HF radars. AGU Fall Meeting Abstracts, 2023, SA31B-2861.
- Shi, X., **Chakraborty, S.**, Baker, J. B. H., Hartinger, M., Lin, D., Wang, W., Sterne, K. T. (2023, December). Quantifying Energy Deposition through Joule Heating from Ionospheric Ultra-Low-Frequency Perturbations using SuperDARN Data. AGU Fall Meeting Abstracts, 2023, SA34A-07.
- **Chakraborty, S.**, Nishitani, N., Ruohoniemi, J. M., and Baker, J. B. H., Shi, X., Kunduri, B., Solar Flare effects on High Latitude Electrodynamics, Fall AGU, Chicago, IL, 12-16 December, 2022
- Boteler, D., **Chakraborty, S.**, Shi, X., Murphy, B., Hartinger, M., Wang, X., Lucas, G., and Baker, J., Modeling Geomagnetic Induction in Submarine Cable, Fall AGU, Chicago, IL, 12-16 December, 2022.
- **Chakraborty, S.**, Nishitani, N., Qian, L., Ruohoniemi, J., Baker, J., McInerney, J., The Role of Flare-Driven Ionospheric Electron Density Changes on the Doppler Flash Observed by SuperDARN HF Radars, STE, Nagoya University, Japan, 27 September, 2022.
- **Chakraborty, S.**, Qian, L., Mabie, J., McInerney, J. M., Mark, S., Erickson, P. J., Earle, G., Origination of Ionospheric G-condition following a Total solar eclipse, TESS, Bellevue, WA, 8-11 August, 2022.
- **Chakraborty, S.**, Nishitani, N., Ruohoniemi, J. M., and Baker, J. B. H., Ionospheric Response to Solar Flares Observed in SuperDARN HF Radars SoSpIM, Online, 27-28 June, 2022
- **Chakraborty, S.**, Qian, L., Ruohoniemi, J. M., Baker, J., and McInerney, J., The effects of solar flare-driven ionospheric electron density change on Doppler Flash, SuperDARN Workshop, 2021.
- **Chakraborty, S.**, Baker, J. B. H., Fiori, R. A. D., Ruohoniemi, J. M., & Zawdie, K. A., Testing the role of Dispersion Relation & Collision Frequency Formulations on Estimation of Shortwave-Fadeout (SWF), URSI GASS, Rome, Italy, 2021
- **Chakrabarty, S.**, Baker, J. B. H., Ruohoniemi, J. M., Bailey, S., Fiori, R. A. D., Nishitani, N., A Study of Solar Flare Effects on Mid and High Latitude Radio Wave Propagation using SuperDARN HF Radar, AGU Fall Meeting, Washington DC, 2018.

Outreach & Activities

- Participated in *Summer Camp for the pre-college students,* such as (1) Imagination (rising 7th and 8th graders) and Pathways for Future Engineers (first generation rising 10-12th graders), as a volunteer faculty, organized by the Center for the Enhancement of Engineering Diversity (CEED) at Virginia Tech (Since 2021).
- Participated in *Science and Collaborative talks for the freshmen* as a volunteer faculty, organized by the Center for the Enhancement of Engineering Diversity (CEED) at Virginia Tech (Since 2021).

Industrial Work Experience

A 4.75 years' work experience at Tata Consultancy Services Innovation Labs as IT Analyst. Worked on several projects, based on Home Energy Management System, Device Management System and working different software development modules (PaaS - Platform as a Service) like API and APP gateway, automated user application deployment module, distributed task queue, Sensor data explorer (Cloud-

based). Tools and Software used for projects: Python, Java, C (Language), Java-Script, Lua, HTML, XML and JSON, CSS, Scala, Akka [Parallel computational Framework], Redis, and MySQL.

Also contributed significantly to the development of the new Virginia Tech SuperDARN website using Python-flask framework.

References

Name	Designation	Contact Details
Joseph B. H. Baker	Professor, ECE Department Virginia Tech	M: 1185 Perry Street 453 Whittemore (0111) Virginia Tech Blacksburg, VA 24061 E: bakerjb@vt.edu T: (540) 231-3355
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Michael Hartinger	Research Scientist Space Science Institute	E: mhartinger@spacescience.org
Aroh Barjatya	Professor, Physical Sciences Department Embry-Riddle Aeronautical University	E: Aroh.Barjatya@erau.edu