

## **Report on PBASE Overseas Research Visit: Clemson University, USA (FY2025)**

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Under the PBASE program (FY2025), I undertook an overseas research visit to Clemson University, South Carolina, USA, from October 21, 2025, to January 17, 2026, to conduct collaborative research on solar wind-magnetosphere-ionosphere coupling. The primary objective of this visit was to advance ongoing research using advanced simulations of the Multiscale Atmosphere-Geospace Environment (MAGE) model, in collaboration with Dr. Dong Lin of the Department of Physics and Astronomy at Clemson University.

My research focused on investigating the response of the coupled magnetosphere-ionosphere system to negative solar wind dynamic pressure pulses using both observations and global modeling. One of the direct manifestations of global magnetospheric reconfiguration driven by these pressure pulses is the sudden perturbations observed in ground-based magnetometer measurements. At high latitudes, such disturbances are largely governed by variations in field-aligned current (FAC) systems and their ionospheric closure. A major component of my work during this visit involved detailed calculations and diagnostics of FACs and their magnetospheric sources using the MAGE-GAMERA/ReMIX modeling framework. High-resolution MHD parameters from MAGE simulations were used to compute various FAC drivers. In close collaboration with Dr. Lin, I conducted quantitative analyses of these drivers to assess their relative contributions to FAC generation during solar wind pressure pulse events. In addition, I gained hands-on experience in the installation of the MAGE model, and carried out several simulations, which significantly enhanced my technical expertise in global geospace modeling.

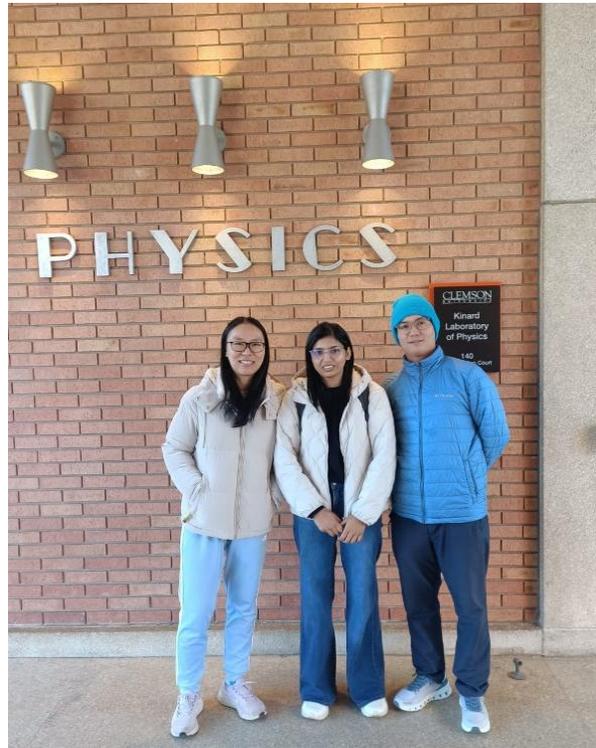
During my stay, I participated in CGS (Center for Geospace Storms) team online meetings, which included experts from the MAGE model working groups. I presented my MAGE modeling results on November 13 and received constructive feedback on both methodology and physical interpretation, which helped improve the robustness of my analysis. I also regularly attended Dr. Lin's group meetings, weekly seminars of the Atmospheric and Space Physics Group, and departmental colloquia at the Department of Physics and Astronomy, providing valuable opportunities for scientific exchange and exposure to a broad range of topics in space and atmospheric physics.

On January 14, 2026, I delivered a seminar in the Atmospheric and Space Physics Group, where I presented my ongoing work including the MAGE modeling results carried out during my stay. The seminar generated productive discussions and valuable feedback from faculty members, postdoctoral researchers, and students.

Outside academic activities, I greatly appreciated the serene and beautiful environment of the Clemson University campus, situated near Lake Hartwell and surrounded by greenery. I

particularly enjoyed visiting the waterfront park and botanical gardens. I also liked working in the university library (R. M. Cooper Library), which provided an excellent atmosphere for focused research. Additionally, during my stay, I traveled to New Orleans in December 2025 to participate in the AGU Meeting.

Overall, this research visit to Clemson University was highly productive. It significantly strengthened my numerical modeling skills, particularly in FAC diagnostics, simulations, and model implementation and contributed meaningfully to my ongoing research and collaborations within the ISEE framework. I sincerely thank Dr. Dong Lin and the Department of Physics and Astronomy at Clemson University for their kind support and warm hospitality throughout my visit. I am also deeply grateful to the PBASE Program for offering me this valuable opportunity and for supporting this overseas research stay. I look forward to applying the knowledge and experience gained to my future research.



*With Dr. Dong Lin and Dr. Xueling Shi*