Dr. Bea Gallardo-Lacourt
Researcher
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Education

Ph.D. Atmospheric and Oceanic Sciences, 2016 – Atmospheric and Oceanic Sciences Department, UCLA, USA

Advisors: Professor Larry R. Lyons & Dr. Yukitoshi Nishimura

Thesis: Properties of Mesoscale Flows in the Nightside Auroral and Subauroral Ionosphere

M. Sc., Atmospheric and Oceanic Sciences, UCLA, USA

B. Eng., Engineering Physics, Physics Department, University of Santiago, Chile

B. Sc. in Applied Physics, Physics Department, University of Santiago, Chile

Awards and Fellowships

2024: NASA Robert H. Goddard Leadership Award

2024: NASA GSFC Heliophysics Science Division Peer Award

2021: NASA Science and Exploration Directorate—Diversity, Equity, and Inclusion Award as a member of the Equity Task Force and NGAPS DEI subcommittee

2020: NASA GSFC Heliophysics Science Division Peer Award

2020: Editor's citation for Excellence in Refereeing, Journal of Geophysical Research

2019: NASA Postdoctoral Program Fellowship

2019: NASA Group Achievement Award—STEVE team

2019: NASA Robert H. Goddard Exceptional Achievement for Science Award—STEVE Team

2016: UCLA Bosart Award: For Unselfish Service to Fellow Students

2015-2016: UCLA Dissertation Year Fellowship

2015: UCLA Morris Neiburger Award: For Excellence in Graduate Teaching

2014: Outstanding Student Paper Award, AGU Fall Meeting 2014

2014: First place student Poster Award on Ionosphere-Thermosphere, CEDAR workshop

2010: AGU Fall Meeting Student travel grant (Grad Student)

2009: AGU Fall Meeting Student travel grant (Undergraduate)

Experimental Experience

Magnetometer Installation

Installing two magnetometers of the SAMBA Project (South American Meridional B-field Array) in Antarctica bases Escudero and Bernardo O'Higgins. January 2013

Employment

Researcher	Department of Physics, Catholic University of America & NASA Goddard Space Flight	April 2022 – Present
Postdoctoral Researcher	NASA Postdoctoral Program Fellow. NASA Goddard Space Flight Center & USRA	May 2019 – April 2022
Postdoctoral Scholar	Department of Physics and Astronomy University of Calgary	March 2017 - May 2019
Postdoctoral Scholar	Department of Atmospheric and Oceanic Sciences UCLA	August 2016 – March 2017
Teaching Assistant	Department of Atmospheric and Oceanic Sciences UCLA	September 2014 –March 2014
Graduate Student Researcher	Department of Atmospheric and Oceanic Sciences UCLA	January 2011 – June 2016
Physicist Intern	Chilean Air Force	January 2009 – March 2009
Physics Laboratory Instructor	Department of Physics Andres Bello University Chile	March 2008 – December 2009
Lecturer in Mechanics and Thermodynamics	Department of Physics University of Santiago Chile	March 2009 – June 2009
Teaching Assistant Physics Laboratory	Department of Physics University of Santiago Chile	March 2004 - December 2009

Community and Volunteer Activities

July 2024 – Present	COSPAR: Commission D. Organizer of the session D 3.2 Cross-scale Coupling and Multi-point Observations in the Solar Wind and Magnetosphere
June 2024 – Present	**Member of the CEDAR Science Steering Committee (CSSC)**
April 2024 – Present	**International Secretary of the Latin American Association of Space Physicists (ALAGE)**
June 2023 – Present	**Co-Lead of the ISSI Working Group ARCTICS: Auroral Research Coordination: Towards Internationalised Citizen Science**
January 2023 – Present	Member of the AGU SPA Early Career Leadership Advisory Committee (Chair: January 2023 – December 2024)
October 2022 – Present	**NASA's Geospace Dynamic Constellation (GDC) Ground-Based Coordination Lead**
September 2022 – Present	Secretary of the National Society of Hispanic Physicists
June 2022 - Present	Member of the AGU International Award Committee
January 2022 – Present	Chair of the NSF Funded GEM Focus Group: The Nightside Transition Region
October 2021 – Present	**Organizer of the NSF Funded STEVE Workshops**
April 2021 – Present	NSF Proposal Reviewer
June 2020 – Present	**Geospace Editor – AGU Books**
March 2020 – Present	Associate Investigator of the PUNCH (Polarimeter to UNify the Corona and Heliosphere) NASA Mission
October 2019 – Present	NASA Review Panel Participant
January 2018 – December 2021	Member of the AGU Global Engagement Committee
June 2015 – June 2016	Vice President of Atmospheric and Oceanic Sciences Department student association (XEP), University of California, Los Angeles

August 2015 – March 2017	Member, Organization for Cultural Diversity in Science - UCLA The Organization for Cultural Diversity in Science strives to create a close-knit community among the graduate students in the sciences, with an emphasis in cultural diversity through the underrepresented groups at UCLA

Journal Peer Reviewer

- AGU Advances
- AGU Earth & Space Sciences
- Earth And Planetary Physics Journal
- Frontiers
- Geophysical Research Letters
- Journal of Geophysical Research: Space Physics
- Nature: Scientific Reports
- Space Weather Journal

Memberships

American Geophysical Union, 2008 – Present
Japan Geoscience Union, 2018 – Present
American Physical Society, 2021 – Present
National Society of Hispanic Physicists, 2022 – Present
European Geosciences Union, 2023 – Present

Selected Press Coverage

- "STEVE and another aurora-like flows perplex scientists with their complex physics"—Science News, December 2023
- "How to find STEVE, the purple streak that looks like an aurora but isn't"—Washington Post, April 2023
- "Scientists Solve The Mystery of STEVE, And Find It's So Much More Than An Aurora"—Forbes Magazine, 2019
- "Steve the odd 'aurora' revealed to be two sky shows in one"—National Geographic, 2019
- "It's official: The Strange, Aurora-Like STEVE Is a Completely Unique Celestial Phenomenon"—Space, 2019
- "The aurora named STEVE is not an aurora"—Nature, 2018
- "The bright purple ribbon—named STEVE—is an entirely new celestial phenomenon"—Science Magazine, 2018
- "Scientists Are Puzzled By Mysterious Lights In The Sky. They Call Them STEVE"—NPR, 2018
- "STEVE the Aurora Isn't An Aurora After All"—Discover Magazine, 2018
- "STEVE the Purple Beam of Light Is Not An Aurora After All"— Smithsonian Magazine

- "New Kind of Aurora Is Not An Aurora At All"—AGU Newsroom, 2018

Invited Lectures

1. **Gallardo-Lacourt, B.,** Particle motion in the solar wind-magnetosphere-ionosphere system, Invited Lecture at Introduction to Heliophysics Class—Undergraduate Level. Prof: Victor Pinto, University of Santiago Chile, March 2025.
2. **Gallardo-Lacourt, B.,** Subauroral Dynamics and MIT Coupling, Invited Lecture at Space Weather III Class—Graduate Level. Prof: Denny Oliveira. Catholic University of America, November 2024.
3. **Gallardo-Lacourt B.,** High and midlatitude electrodynamics with an emphasis on ground-based instruments, Invited Lecture at Space Weather I Class—Graduate Level. Prof: Anna DeJong, Catholic University of America, November 2020.

Selected Outreach Presentations

1. Gallardo-Lacourt, B., STEM para Todas 2025. A STEM immersion program designed for high school students in Peru. Virtual presentation on my academic trajectory. February 2025.
2. Gallardo-Lacourt, B., NASA in Spanish, Series of interviews about the Total Solar Eclipse of April 2024.
3. Gallardo-Lacourt, B., NASA in Spanish, Spanish interviews on the Total lunar eclipse 2022.
4. Gallardo-Lacourt, B., Y. Collado-Vega, and M.-J. Viñas, NASA in Spanish, Live Coverage of the South American Eclipse, December 14, 2020
5. Gallardo-Lacourt, B., Basic concepts of Space Physics and the Aurora, Primary School Science Fair, Chile, November 2020
6. Gallardo-Lacourt, B., The Aurora, Five-minutes thesis webinar on Space Weather, NOAA Space Weather Prediction Center, August 2020

Peer Reviewed Publications

1. **Gallardo-Lacourt, B.,** Grandin, M., Marchaudon, A., and Barthelemy, M., Unresolved Questions in Subauroral Science: Exploring Key Challenges in Physics and Chemistry, Under review in Surv Geophys., 2025.
2. **Gallardo-Lacourt, B.,** Nishimura, Y., Kepko, L., Spanswick, E. L., Gillies, D. M., Knudsen, D. J., Brurchill, J., Skone, S. H., Pinto, V. A., Chaddock, D., Kuzub, J., and Donovan, E. F.. (2024). Unexpected STEVE observations at high latitude during quiet geomagnetic conditions. Geophysical Research Letters, 51, e2024GL110568. https://doi.org/10.1029/2024GL110568
3. **Gallardo-Lacourt, B.**, Wing, S., Kepko, L., Gillies, D. M., Spanswick, E. L., Roy, E. A., & Donovan, E. F. (2022). Polar cap boundary identification using redline optical data and DMSP satellite particle data. Journal of Geophysical Research: Space Physics, 127, e2021JA030148. https://doi.org/10.1029/2021JA030148
4. **Gallardo-Lacourt, B.**, Frey, H.U. & Martinis, C. Proton Aurora and Optical Emissions in the Subauroral Region. Space Sci Rev 217, 10 (2021). https://doi.org/10.1007/s11214-020-00776-6.

5. **Gallardo-Lacourt, B.**, G. W. Perry, W. E. Archer, and E. Donovan (2019), How did we miss this? An upper atmospheric discovery named STEVE, Eos, 100, https://doi.org/10.1029/2019EO117351.
6. **Gallardo-Lacourt, B.**, Frey, H.U. & Martinis, C. Proton Aurora and Optical Emissions in the Subauroral Region. Space Sci Rev 217, 10 (2021). https://doi.org/10.1007/s11214-020-00776-6
7. **Gallardo-Lacourt, B.**, J. Liang, Y. Nishimura, E. Donovan (2018), *On the origin of STEVE: Particle precipitation or ionospheric skyglow?* Geophysical Research Letters, 45. https://doi.org/10.1029/2018GL078509 **[Featured article and GRL Cover]**
8. **Gallardo-Lacourt, B.,** Nishimura, Y., Donovan, E., Gillies, D. M., Perry, G. W., Archer, W. E., et al. (2018). *A statistical analysis of STEVE*. Journal of Geophysical Research: Space Physics, 123, 9893–9905. https://doi.org/10.1029/2018JA025368
9. **Gallardo-Lacourt, B**., Y. Nishimura, L. R. Lyons, E. V. Mishin, J. M. Ruohoniemi, E. Donovan, V. Angelopoulos, and N. Nishitani (2017), *Influence of auroral streamers on rapid evolution of ionospheric SAPS flows*, *Journal of Geophysical Research: Space Physics., 122, 12, 406-12, 420, http://doi.org/10.1002/2017JA024198*.
10. **Gallardo-Lacourt, B**., Y. Nishimura, L. R. Lyons, J. M. Ruohoniemi, E. Donovan, V. Angelopoulos, K. A. McWilliams, and N. Nishitani (2014), *Ionospheric flow structures associated with auroral beading at substorm auroral onset*, J. Geophys. Res. Space Physics, 119, 9150-9159, http://doi.org/10.1002/2014JA020298
11. **Gallardo-Lacourt, B**., Y. Nishimura, L. R. Lyons, S. Zou, V. Angelopoulos, E. Donovan, K. A. McWilliams, J. M. Ruohoniemi, and N. Nishitani (2014), *Coordinated SuperDARN THEMIS ASI observations of mesoscale flow bursts associated with auroral streamers*, J. Geophys. Res. Space Physics, 119, http://doi.org/10.1002/2013JA019245 **[Featured article]**
12. **Gallardo-Lacourt, B.**, Y. Nishimura, L. R. Lyons, and E. Donovan (2012), *External triggering of substorms identified using modern optical versus geosynchronous particle data, Ann. Geophys.*, 30, 667-673, http://doi.org/10.5194/angeo-30-667-2012
13. Partamies, N., Dayton-Oxland, R., Herlingshaw, K., Virtanen, I., **Gallardo-Lacourt, B.,** Syrjäsuo, M., Sigernes, F., Nishiyama, T., Nishimura, T., Barthelemy, M., Aruliah, A., Whiter, D., Mielke, L., Grandin, M., Karvinen, E., Spijkers, M., and Ledvina, V. E.: First observations of continuum emission in dayside aurora, Ann. Geophys., 43, 349–367, https://doi.org/10.5194/angeo-43-349-2025, 2025.
14. Grandin, M., Ledvina, V.E., Musset, S., Partamies, N., Frissell, N. A., Bruus, E., Nicoll, K. A., Mkrtchyan, H., **Gallardo-Lacourt, B.,** Alfonsi, L., et al., Citizen Science in Space and Atmospheric Sciences: Opportunities and Challenges. Surv Geophys (2025). https://doi.org/10.1007/s10712-025-09888-6.
15. Shumko, M., Artemyev, A. V., Raptis, S.et al. What is the relationship between the aurora and relativistic electron precipitation during a storm-time substorm?. ESS Open Archive. April 17, 2025.
16. Cribb, V., Pulkkinen, T. I., Kepko, L., **Gallardo-Lacourt, B.**, Partamies, N., et al. Inner Magnetospheric and Ionospheric Responses to Solar Wind Driving During Omega Band Events. ESS Open Archive. March 27, 2025. http://doi.org/10.22541/essoar.174309724.41608145/v1
17. Spanswick, E., Liang, J., Houghton, J., Chaddock, D., Donovan, E., **Gallardo-Lacourt, B.**, Keenan, C., Rosehart, J., Nishimura, Y., Hampton, D., and Gillies, D. M., Association of structured continuum emission with dynamic aurora. Nature Communications, 15, 10802 (2024). https://doi.org/10.1038/s41467-024-55081-5.
18. Nishimura, Y., **Gallardo-Lacourt, B.**, Donovan, E. F., Angelopoulos, V., & Nishitani, N. (2024). Auroral and magnetotail dynamics during quiet-time STEVE and SAID. Journal

of Geophysical Research: Space Physics, 129, e2024JA032941. https://doi.org/10.1029/2024JA032941
19. Grandin, M., Bruus, E., Ledvina, V. E., Partamies, N., Barthelemy, M., Martinis, C., Dayton-Oxland, R., **Gallardo-Lacourt, B.**, Nishimura, Y., Herlingshaw, K., Thomas, N., Karvinen, E., Lach, D., Spijkers, M., and Bergstrand, C.: The Gannon Storm: citizen science observations during the geomagnetic superstorm of 10 May 2024, Geosci. Commun., 7, 297–316, https://doi.org/10.5194/gc-7-297-2024, 2024.
20. Cribb, V., T. Pulkkinen, L. Kepko, **B. Gallardo-Lacourt**, and E. Donovan (2024). Solar Wind Drivers of Auroral Omega Bands. Geophysical Research Letters, 51, e2024GL109756. http://doi.org/10.1029/2024GL109756
21. Oliveira, D., L. Alves, S. Blake, B. Carter, D. Chakrabarty, G. D'Angelo, E. Echer, C. Ferradas, M. Finley, **B. Gallardo-Lacourt**, D. Gershman, J. Gjerloev, et al., Predicting Interplanetary Shock Occurrence for Solar Cycle 25: Opportunities and Challenges in Space Weather Research. Space Weather, 22, e2024SW003964. https://doi.org/10.1029/2024SW003964
22. Sorathia, K. A., Shumko, M., Sciola, A., Michael, A., Merkin, V. G., **Gallardo-Lacourt, B.**, et al. (2024). Identifying the magnetospheric drivers of giant undulations: Global modeling of the evolving inner magnetosphere and its auroral manifestations. Geophysical Research Letters, 51, e2024GL110772. https://doi.org/10.1029/2024GL110772
23. Macho E.P., Bristow W., **Gallardo-Lacourt B.**, Shepherd S.G., Ruohoniemi J.M. and Correia E. (2024), Exploring the relationship between STEVE and SAID during three events observed by SuperDARN. Front. Astron. Space Sci. 11:1422164. http://doi.org/10.3389/fspas.2024.1422164
24. Zhang, Y., **B. Gallardo-Lacourt**, L. Paxton, P. J. Erickson, M. Hairston, & W. R. Coley (2024). STEVE events with FUV emissions. Journal of Geophysical Research: Space Physics, 129, e2023JA032017. https://doi.org/10.1029/2023JA032017
25. Gabrielse C., Gkioulidou M., Merkin S., Malaspina D., Turner D. L., Chen M. W., Ohtani S., Nishimura Y., Liu J., Birn J., Deng Y., Runov A., McPherron R. L., Keesee A., Lui A. T. Y., Sheng C., Hudson M., **Gallardo-Lacourt B.**, Angelopoulos V., Lyons L., Wang C.-P., Spanswick E. L., Donovan E., Kaeppler S. R., Sorathia K., Kepko L., Zou S. (2023). Mesoscale phenomena and their contribution to the global response: a focus on the magnetotail transition region and magnetosphere-ionosphere coupling. Frontiers in Astronomy and Space Sciences, 10, DOI: 10.3389/fspas.2023.1151339, https://www.frontiersin.org/articles/10.3389/fspas.2023.1151339.
26. Ledvina V., Brandt L., MacDonald E., Frissell N., Anderson J., Chen T. Y., French R. J., Di Mare F., Grover A., Battams K., Sigsbee K., **Gallardo-Lacourt B.**, Lach D., et al. (2023). Agile collaboration: Citizen science as a transdisciplinary approach to heliophysics. Frontiers in Astronomy and Space Sciences, 10, https://www.frontiersin.org/articles/10.3389/fspas.2023.1165254
27. Svaldi, V., Matsuo, T., Kilcommons, L., & **Gallardo-Lacourt, B.** (2023). High-latitude ionospheric electrodynamics during STEVE and non-STEVE substorm events. Journal of Geophysical Research: Space Physics, 128, e2022JA030277. https://doi.org/10.1029/2022JA030277
28. Gillies, D. M., Liang, J., **Gallardo-Lacourt, B.**, & Donovan, E. (2023). New insight into the transition from a SAR arc to STEVE. Geophysical Research Letters, 50, e2022GL101205. https://doi.org/10.1029/2022GL101205
29. Shumko, M., Chaddock, D., **Gallardo-Lacourt, B.**, Donovan, E. F., Spanswick, E. L., Halford, A. J., Thompson, I., and Murphy, K. (2022), AuroraX, PyAuroraX, and aurora-asi-lib: a user-friendly auroral all-sky imager analysis framework. Frontiers in Astronomy and Space Sciences, Methods Article, Section Space Physics, doi: 10.3389/fspas.2022.1009450

30. Martinis, C., Griffin, I., **Gallardo-Lacourt, B.**, Wroten, J., Nishimura, Y., Baumgardner, J., & Knudsen, D. J. (2022). Rainbow of the night: First direct observation of a SAR arc evolving into STEVE. Geophysical Research Letters, 49, e2022GL098511. https://doi.org/10.1029/2022GL098511. **[Featured article & GRL cover]**
31. Nishimura, Y., Hussein, A., Erickson, P. J., **Gallardo-Lacourt, B.**, & Angelopoulos, V. (2022). Statistical study of magnetospheric conditions for SAPS and SAID. Geophysical Research Letters, 49, e2022GL098469. https://doi.org/10.1029/2022GL098469
32. Lyons L. R., **Gallardo-Lacourt B.**, Nishimura Y. (2022), Chapter 2 - Auroral structures: Revealing the importance of meso-scale M-I coupling, Cross-Scale Coupling and Energy Transfer in the Magnetosphere-Ionosphere-Thermosphere System, Elsevier, https://doi.org/10.1016/B978-0-12-821366-7.00004-4
33. Shumko, M., **Gallardo-Lacourt, B.**, Halford, A. J., Liang, J., Blum, L. W., Donovan, E., et al. (2021). A strong correlation between relativistic electron microbursts and patchy aurora. Geophysical Research Letters, 48, e2021GL094696. https://doi.org/10.1029/2021GL094696
34. Martinis, C., Nishimura, Y., Wroten, J., Bhatt, A., Dyer, A., Baumgardner, J., & **Gallardo-Lacourt, B.** (2021). First simultaneous observation of STEVE and SAR arc combining data from citizen scientists, 630.0 nm all-sky images, and satellites. Geophysical Research Letters, 48, e2020GL092169. https://doi.org/10.1029/2020GL092169
35. Forsyth, C., Sergeev, V.A., Henderson, M.G., Nishimura, Y., and **Gallardo-Lacourt, B.** Physical Processes of Meso-Scale, Dynamic Auroral Forms. Space Sci Rev 216, 46 (2021). https://doi.org/10.1007/s11214-020-00665-y
36. Archer, W. E., St.- Maurice, J.-P., **Gallardo-Lacourt, B.**, Perry, G. W., Cully, C. M., & Donovan, E. et al. (2019b). The vertical distribution of the optical emissions of a Steve and Picket Fence event. Geophysical Research Letters, 46, 10719– 10725. https://doi.org/10.1029/2019GL08447. **[GRL cover]**
37. Archer, W. E., **Gallardo-Lacourt, B.**, Perry, G. W., St.-Maurice, J.-P., Buchert, S. C., & Donovan, E. F. (2019a). Steve: The optical signature of intense subauroral ion drifts. Geophysical Research Letters, 46, 6279– 6286. https://doi.org/10.1029/2019GL082687
38. Gillies, D. M., Donovan, E., Hampton, D., Liang, J., Connors, M., Nishimura, Y., **Gallardo-Lacourt, B.**, and Spanswick, E. (2019). First observations from the TREx Spectrograph: The optical spectrum of STEVE and the Picket Fence phenomena. Geophysical Research Letters, 46, 7207– 7213. https://doi.org/10.1029/2019GL083272
39. Nishimura, Y., **Gallardo-Lacourt, B.**, Zou, Y., Mishin, E., Knudsen, D. J., Donovan, E. F., et al. (2019). Magnetospheric signatures of STEVE: Implications for the magnetospheric energy source and interhemispheric conjugacy. Geophysical Research Letters, 46, 5637– 5644. https://doi.org/10.1029/2019GL082460. **[Featured article]**
40. Gabrielse, C., Pinto, V., Nishimura, Y., Lyons, L., **Gallardo-Lacourt, B.**, & Deng, Y. (2019). Storm time mesoscale plasma flows in the nightside high-latitude ionosphere: A statistical survey of characteristics. Geophysical Research Letters, 46, 4079–4088. https://doi.org/10.1029/2018GL081539
41. Liang, J., Donovan, E., Connors, M., Gillies, D., St-Maurice, J. P., Jackel, B., **Gallardo-Lacourt, B.**, Spanswick, E. L., and Chu, X. (2019). Optical spectra and emission altitudes of double-layer STEVE: A case study. Geophysical Research Letters, 46, 13630–13639. https://doi.org/10.1029/2019GL085639
42. Chu, X., Malaspina, D., **Gallardo-Lacourt, B.**, Liang, J., Andersson, L., Ma, Q., et al (2019). Identifying STEVE's Magnetospheric Driver Using Conjugate Observations in the Magnetosphere and on the Ground. Geophysical Research Letters, 46, 12665–12674. https://doi.org/10.1029/2019GL082789
43. Gabrielse, C., Y. Nishimura, L. R. Lyons, **B. Gallardo-Lacourt**, Y. Deng, and E. Donovan (2018), *Statistical properties of meso-scale plasma flows in the nightside high-latitude*

ionosphere, Journal of Geophysical Research: Space Physics, 123, 6798–6820. https://doi.org/10.1029/2018JA025440.

44. E. A. MacDonald, E. Donovan, Y. Nishimura, D. M. Gillies, **B. Gallardo-Lacourt**, W. Archer, E. L. Spanswick, M. Connors, N. Case, B. Jackel, D. Knudsen, N. Bourassa, M. Heavner, B. Kosar, C. Ratzlaff, I. Schofield (2018), *New Science in Plain Sight: Citizen Scientists Lead to Discovery of Optical Structure in the Upper Atmosphere*, Science Advances, vol.4, no. 3, eaaq0030, DOI: 10.1126/sciadv.aaq0030.
45. Liu, J., L. R. Lyons, W. E. Archer, **B. Gallardo-Lacourt**, Y. Nishimura, Y. Zou, C. Gabrielse, and J. M. Weygand (2018), *Flow shears at the poleward boundary of omega bands observed during conjuctions of Swarm and THEMIS ASI*, Geophysical Research Letters, 45, 1218-1227, doi: 10.1002/2017GL076485.
46. Lyons, L. R., Y. Zou, Y. Nishimura, **B. Gallardo-Lacourt**, V. Angelopoulos, and E. Donovan (2018), *Stormtime substorm onsets: occurrence and flow channel triggering,* Earth, Planets and Space, 70: 81, doi: 10.1186/s40623-018-0857-x.
47. L. R. Lyons, B**. Gallardo-Lacourt**, Y. Zou, Y. Nishimura, P. Anderson, V. Angelopoulos, E. F. Donovan, J. M. Ruohoniemi, E. Mitchells, L. J. Paxton, and N. Nishitani (2017), Driving of Strong Nightside Reconnection and Geomagnetic Activity by Polar Cap Flows: Applications to CME Shocks and Possible Other Situations, Journal of Atmospheric and Solar-Terrestrial Physics, 177, 73-83, https://doi.org/10.1016/j.jastp.2017.09.013
48. L. R. Lyons, **B. Gallardo-Lacourt**, S. Zou, J. M. Weygan, Y. Nishimura, W. Li, M Gkioulidou, V. Angelopoulos, E. F. Donovan, J. M. Ruohoniemi, B. J. Anderson, S. G. Shepherd, and N. Nishitani (2016), *2013 March 17 Storm: Synergy of Observations Related to Electric Field Modes and their Ionospheric and Magnetospheric Effects*, J. Geophys. Res. Space Physics, 121,10,880-10,897, doi:10.1002/2016JA023237
49. Lyons L. R., Nishimura Y., **Gallardo-Lacourt B.**, Zou Y., Donovan E. F., Mende S., Angelopoulos V., Ruohoniemi J. M., McWilliams K. A., Hampton D. L., Nicolls M. J. (2015). Dynamics Related to Plasma Sheet Flow Bursts as Revealed from the Aurora. Auroral Dynamics and Space Weather. (eds Y. Zhang and L.J. Paxton). https://doi.org/10.1002/9781118978719.ch8
50. Lyons, L. R., Nishimura Y., **Gallardo-Lacourt B.**, Nicolls M. J., Chen S., Hampton D. L., Bristow W. A., Ruohoniemi J. M., Nishitani N., Donovan E. F., and Angelopoulos V. (2015). Azimuthal flow bursts in the Inner Plasma Sheet and possible connection with SAPS and Plasma sheet earthward flow bursts. Journal of Geophysical Research, Space Physics. 5009-5021. https://doi.org/10.1002/2015JA021023
51. Lyons, L. R., Y. Nishimura, **B. Gallardo-Lacourt**, Y. Zou, E. Donovan, S. Mende, V. Angelopoulos, J. M. Ruohoniemi, and K. McWilliams (2013), *Westward traveling surges: Sliding along boundary arcs and distinction from onset arc brightening*, J. Geophys. Res. Space Physics, 118, 7643–7653, doi:10.1002/2013JA019334

Invited Presentations

1. **Gallardo-Lacourt, B.,** Rowland, D., Garcia-Sage, K., and Kepko, L., Advancing Space Weather Research in Heliophysics: Integrating Satellite Missions and Ground-Based Observations for a System-Wide Approach, IAGA/IASPEI Joint Scientific Meeting 2025, Lisbon, Portugal, September 2025.
2. **Gallardo-Lacourt, B.,** Nishimura, Y., Kepko, L., Spanswick, E. L., Gillies, D. M., Knudsen, D. J., et al., Magnetotail Processes and Ionospheric Dynamics: Unusual High-Latitude STEVE Event and Subauroral Flow Evolution, IAGA/IASPEI Joint Scientific Meeting 2025, Lisbon, Portugal, September 2025.

3. **Gallardo-Lacourt, B.,** Rowland, D., Garcia-Sage, K., and Kepko, L., Exploring the Prospects for a Vivid Collaborative Science Between the GDC Mission and the Ground-Based Community, SuperDARN Workshop 2025, Roanoke, VA, June 2025.
1. **Gallardo-Lacourt, B.,** Nishimura, Y., Kepko, L., Spanswick, E. L., Gillies, D. M., Knudsen, D. J., et al., Open Questions on STEVE and Subauroral Processes, Invited seminar at the Instituto Nazionale di Geofisica e Vulcanologia (INGV), Rome, May 2025.
2. **Gallardo-Lacourt, B.**, Nishimura, Y., Kepko, L., Spanswick, E. L., Gillies, D. M., Knudsen, D. J., et al. STEVE observations during quiet geomagnetic conditions, Antarctic Geospace and ATmosphere reseArch (AGATA) SCAR Program, March 2025.
3. **Gallardo-Lacourt,** B., Kepko, L., Spanswick, E. L., PUNCH: Connections to the Magnetosphere and the Aurora, PUNCH 6 Science Team Meeting, San Luis Obispo, California, February 2025.
4. **Gallardo-Lacourt, B.**, Nishimura, Y., Kepko, L., Spanswick, E. L., Gillies, D. M., Knudsen, D. J., et al. Unusual High-Latitude STEVE Observation: Exploring the Electrodynamic Influence of Particle Precipitation in the Subauroral Ionosphere, AGU Fall Meeting, Washington DC, December 2024.
5. **Gallardo-Lacourt, B.**, Y. Nishimura, L. Kepko, E. Spanswick, D. M. Gillies, D. Knudsen, J. Burchill, V. Pinto, J. Kuzub, and E. Donovan, Magnetosphere–Ionosphere Drivers and Responses to Large Subauroral Electric Fields. Invited Talk at the International Space Science Institute, Workshop on Physical Links Between Weather and Climate in Space and the Lower Atmosphere. January 2024.
6. **Gallardo-Lacourt, B.**, D. Rowland, L. Kepko, K. Garcia-Sage, and the GDC Science Team, Exploring the Prospects for a vivid collaborative science between the GDC mission and the ground-based community, Space Weather Observations Throughout Latinoamerica, Ushuaia, Argentina, October 2023.
7. **Gallardo-Lacourt B.** et al., Prospects for a Vivid Collaborative Science Between the GDC mission and the Ground-based Community, Asia and Oceania Geosciences Society, Singapore, August 2023
8. **Gallardo-Lacourt B.**, STEVE, a mysterious subauroral optical structure, Invited presentation at the American Physical Society, Mid-Atlantic Section Meeting, December 2021
9. **Gallardo-Lacourt B.**, A mysterious optical subauroral structure names STEVE, Invited Colloquium at Catholic University of America, September 2021
10. **Gallardo-Lacourt B.**, Measuring the Subauroral Region: Links to Stan Sazykyn's work, Invited talk at NSF-CEDAR workshop, June 2021
11. **Gallardo-Lacourt B.**, STEVE: A new upper atmosphere phenomenon, Invited Seminar at Dartmouth College, February 2021
12. **Gallardo-Lacourt B.**, An overview of Space Physics books in the last 60 years and current research on MI coupling, Invited Seminar at Rice University, November 2020
13. **Gallardo-Lacourt, B.**, S. Wing, L. Kepko, D.M. Gillies, E. Spanswick, E. Donovan, Tracking auroral and solar structures using the Optical Flow techniques & automatic identification of the Polar Cap Boundary, Invited Seminar at Rice University, November 2020.
14. **Gallardo-Lacourt, B.**, L. Kepko, D. M. Gillies, N. Alzate, E. Spanswick, N. Viall, C. DeForest, Optical flow technique applied to the aurora and STEREO data, PUNCH Science Meeting, June 2020
15. **Gallardo-Lacourt, B.**, Donovan, Y. Nishimura, G. Perry, W. Archer, J. Liang, D. M. Gillies, and E. Spanswick. STEVE, the mysterious subauroral optical phenomenon, Invited Talk, Space Weather Workshop, Boulder, USA, April 2020—Suspended due to Covid-19

16. **Gallardo-Lacourt, B.**, Donovan, Y. Nishimura, G. Perry, W. Archer, J. Liang, D. M. Gillies, and E. Spanswick. What do we know about STEVE so far? Invited Seminar, Boston University, Boston, USA, October 2019
17. **Gallardo-Lacourt, B.**, Donovan E., Y. Nishimura, J. Liang, M. Gillies, W. E. Archer, G. W. Perry, and E. L. Spanswick, *STEVE*, SIMLE workshop, Banff, AB, Canada, November 2018.
18. **Gallardo-Lacourt, B.**, D. M. Gillies, E. L. Spanswick, E. Roy, E. Donovan, D. Guo, and A. Ridley, *Polar Cap Boundary Identification Using Redline Imaging Data*, Smile Workshop, Banff, AB, Canada, November 2018.
19. **Gallardo-Lacourt, B.**, Y. Nishimura, E. Donovan, L. Lyons, D. M. Gillies, W. E. Archer, G. W. Perry, E. L. Spanswick, J. M. Ruohoniemi, Mesoscale Structures in the Auroral and Subauroral Regions, International Space Science Institute (ISSI) Workshop, Bern, Switzerland, August 2018.
20. **Gallardo-Lacourt B.**, E. Donovan, Y. Nishimura, G. Perry, W. Archer, J. Liang, D. M. Gillies, and E. Spanswick, *STEVE, the mysterious subauroral feature*, Canadian Association of Physicists, Halifax, NS, June 2018
21. **Gallardo-Lacourt B.**, Y. Nishimura, E. Donovan, L. Lyons, G. Perry, W. Archer, J. Liang, D. M. Gillies, E. Spanswick, and J. M. Ruohoniemi, *Properties of Mesoscale Structures in the Auroral and Subauroral regions*, International Space Science Institute (ISSI) Workshop, Bern, Switzerland, August 2018
22. **Gallardo-Lacourt B.**, E. Donovan, Y. Nishimura, G. Perry, W. Archer, J. Liang, D. M. Gillies, and E. Spanswick, *STEVE, the mysterious subauroral feature*, Canadian Association of Physicists, Halifax, NS, June 2018
23. **Gallardo-Lacourt B.**, E. Donovan, Y. Nishimura, G. Perry, W. Archer, J. Liang, D. M. Gillies, and E. Spanswick*, The knowns and unknowns of STEVE*, CONNEX workshop, Banff, AB, May 2018
24. **Gallardo-**Lacourt B., Y. Nishimura, L. Lyons, E. Donovan, J. M. Ruohoniemi, G. W. Perry, W. E. Archer, J. Liang, D. M. Gillies, E Spanswick, E. MacDonald, and D Knudsen, *An analysis of optical structures: From the Polar Cap Boundary to the Subauroral Region,* NASA Teleconference, Greenbelt, MD, March 2018
25. **Gallardo-Lacourt B.**, E. Donovan, Y. Nishimura, G. Perry, W. Archer, J. Liang, D. M. Gillies, and E. Spanswick, *A new subauroral phenomenon called STEVE*, The Magnetosphere: New Tools, New Thinking, New Results, Puerto Varas, Chile, November 2017
26. **Gallardo-Lacourt, B.**, W. A. Archer, and J. Brown, *Effective Presentations: Communicating efficiently with your scientific peers*, CEDAR Workshop, ***Invited Tutorial***, Keystone, CO, June 2017
27. **Gallardo-Lacourt B.**, *Ionospheric Geography: Coupling*, *Energetics and Dynamics of Atmospheric Regions*, GEM-CEDAR workshop, ***Invited tutorial***, Santa Fe, NM, June 2016
28. **Gallardo-Lacourt B.**, Y. Nishimura, L. Lyons, Y. Zou, V. Angelopoulos, E. Donovan, K. McWilliams, J. M. Rouhoniemi, and N. Nishitani, *SuperDARN observations of structured flows associated with substorm onset beads*, Mechanics of the Magnetospheric System and effects in the Polar Regions, Patagonia, Chile, Noviembre 2013

Selected Recent Presentations

1. **Gallardo-Lacourt, B.**, Y. Nishimura, L. Kepko, E. L. Spanswick, D. M. Gillies, D. J. Knudsen, J. K. Burchill, S. H. Skone, V. A. Pinto, D. Chaddock, J. Kuzub, and E. F.

Donovan, Unexpected STEVE Observations at High-Latitude During Quiet Geomagnetic Conditions, EGU General Assembly, Vienna, Austria, 2025.

2. **Gallardo-Lacourt, B.**, Y. Nishimura, L. Kepko, E. L. Spanswick, D. M. Gillies, D. J. Knudsen, J. K. Burchill, S. H. Skone, V. A. Pinto, D. Chaddock, J. Kuzub, and E. F. Donovan, Unraveling Unexpected Solar Wind-Magnetosphere-Ionosphere Coupling: A Case Study of Extreme Subauroral Ion Drifts When the Solar Wind Disappeared, Invited Talk, COSPAR, Busan, South Korea, 2024.
3. **Gallardo-Lacourt, B.**, S. Wing, L. Kepko, D.M. Gillies, E.L. Spanswick, E. Roy, and E. Donovan (2021), Polar Cap Boundary Identification Using Redline Optical Data and DMSP Satellite Particle Data, AGU Fall Meeting, New Orleans, Louisiana, December 2021
4. **Gallardo-Lacourt, B.**, L.V. Goodwin, L. Kepko, E. Spanswick, and E. Donovan, Analyzing Plasma Convection Using Optical Flow Technique: From the Aurora to the Solar Wind, AGU Fall Meeting, New Orleans, Louisiana, December 2021
5. **Gallardo-Lacourt, B.**, J. Liang, Y. Nishimura, E. F. Donovan, D. M. Gillies, G. W. Perry, W. E. Archer, O. A. Nava, and E. L. Spanswick, On the Origin and geomagnetic conditions of STEVE's formation, AGU Fall Meeting, Washington D.C., December 2018.
6. **Gallardo-Lacourt B.**, E. Spanswick, D. M. Gillies, E. Roy, G. Guo, E. Donovan, and A. Ridley, *Automatic Polar Cap Boundary identification using redline all-sky imagers,* CEDAR Workshop, Santa Fe, NM, June 2018
7. **Gallardo-Lacourt B.**, E. Donovan, Y. Nishimura, G. Perry, W. Archer, J. Liang, D. M. Gillies, and E. Spanswick, O. Nava, and B. Kosar, *STEVE: An optical structure in the subauroral region,* CEDAR Workshop, Santa Fe, NM, June 2018
8. **Gallardo-Lacourt B.**, E. Spanswick, D. M. Gillies, E. Roy, G. Guo, E. Donovan, and A. Ridley, *Polar Cap Boundary identification using redline all-sky imagers,* GEM Workshop, Santa Fe, NM, June 2018
9. **Gallardo-Lacourt B.**, E. Donovan, Y. Nishimura, G. Perry, W. Archer, J. Liang, D. M. Gillies, E. Spanswick, O. Nava, and B. Kosar, *STEVE: An optical structure in the subsuroral region. Location and Geomagnetic conditions during its formation,* GEM Workshop, Santa Fe, NM, June 2018
10. **Gallardo-Lacourt B.**, E. Donovan, Y. Nishimura, G. Perry, W. Archer, J. Liang, D. M. Gillies, E. Spanswick, *On the location of STEVE, the mysterious Subauroral feature*, AGU Fall Meeting, New Orleans, LA, December 2017
11. **Gallardo-Lacourt, B.**, E. Donovan, Y. Nishimura, E. MacDonald, M. Gillies, E. Spanswick, E. Mishin, and M. Ruohoniemi, *Steve: A new Subauroral Phenomenon, CEDAR Workshop*, Kesytone, CO, June 2017
12. **Gallardo-Lacourt, B.**, Y. Nishimura, L. R. Lyons, E. V. Mishin, V. Angelopoulos, E. Donovan, J. M. Ruohoniemi, and N. Nishitani, *What magnetic conditions determine the latitudinal extent of SAPS/SAID subauroral flow enhancements*, AGU Fall Meeting, San Francisco, CA, December 2016
13. **Gallardo-Lacourt, B.**, Y. Nishimura, L. R. Lyons, E. V. Mishin, V. Angelopoulos, E. Donovan, J. M. Ruohoniemi, and N. Nishitani, *Influence of auroral streamers on the rapid evolution of SAPS flows*, Gem Workshop, Santa Fe, NM, June 2016
14. **Gallardo-Lacourt, B.**, Y. Nishimura, L. R. Lyons, E. V. Mishin, V. Angelopoulos, E. Donovan, J. M. Ruohoniemi, and N. Nishitani, *Analysis of campaign events: SAPS flow enhancements due to auroral streamers*, GEM Workshop, Santa Fe, NM, June 2016
15. **Gallardo-Lacourt, B.**, Y. Nishimura, L. R. Lyons, E. V. Mishin, J. M. Ruohoniemi, E. Donovan, V. Angelopoulos, and N. Nishitani, *Influence of auroral streamers on rapid evolution of SAPS flows*, AGU Chapman Conference on Currents and Geospace and Beyond, Dubrovnik, Croatia, May 2016

16. **Gallardo-Lacourt, B.**, Y. Nishimura, L. R. Lyons, E. V. Mishin, J. M. Ruohoniemi, E. Donovan, V. Angelopoulos, and N. Nishitani, *Influence of auroral streamers on rapid evolution of SAPS flows*, AGU Fall Meeting, San Francisco, CA, December 2015
17. **Gallardo-Lacourt, B.**, Student tutorial: *Testing proposed links between mesoscale auroral and polar cap dynamics and substorms*, GEM Workshop - Student day, Snowmass, CO, June 2015
18. **Gallardo-Lacourt B.**, Nishimura T., Lyons L., Angelopoulos V., Donovan E., J. M. Ruohoniemi, Nishitani N., *Influence of auroral streamers on rapid evolution of SAPS flows*, AGU Fall Meeting, San Francisco, CA, December 2014
19. **Gallardo-Lacourt B.**, Nishimura T., Lyons L., Angelopoulos V., Donovan E., McWilliams K., J. M. Ruohoniemi, Nishitani N., *Ionospheric Flow structures associated with auroral beading at the substorm auroral onset*, The 12th. International Conference on Substorms (ICS-12), Ise, Japan, November 2014
20. **Gallardo-Lacourt B.**, Nishimura T., Lyons L., Angelopoulos V., Donovan E., J. M. Ruohoniemi, Nishitani N., *Evaluation of Large and variable ionospheric flows associated with substorm auroral onset*, presented at NSF Geospace Environment Modeling (GEM) Workshop Portsmouth, VA, June 2014