



Terrestrial Physics. Preprints available upon request

20+ Invited talks at professional meetings and colloquia.

100+ Contributed talks at professional meetings.

#### **RECENT PROFESSIONAL SERVICE ACTIVITIES**

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2007 - 2009: Chair of the NSF CEDAR Science Steering Committee

2006-2007: Co-chair of the Greenland Space Science Symposium

2005 – 2007: NSF CEDAR Science Steering Committee Member

2004 – 2006: Guest editor for the Journal of Atmospheric and Solar-Terrestrial Physics

2003 – 2005: Vice-chair of the URSI Commission G working group on incoherent scatter radar

2003 – 2005: NASA Geospace Mission and Operations Working Group

1999: NASA Sun-Earth Connections Roadmap Team Member

1998 – 2003: NASA Science and Technology Definition Team for Solar-Terrestrial Probe Geospace Electrodynamics Connections Mission

1998 – 2003: AGU Committee on Atmospheric and Space Electricity

1997 – 2002: NSF CEDAR Community Representative for the NASA TIMED mission

1997 – 2000: AMS Committee on Laser Atmospheric Studies

#### **RECENT PROFESSIONAL AWARDS AND HONORS**

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2005 – University of Michigan Alumni Merit Award

2005 – NASA Group Achievement Award

2004 – SRI Presidential Achievement Award

2000 – NASA Sun-Earth Connections Group Achievement Award

#### **PROFESSIONAL MEMBERSHIPS**

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American Geophysical Union

Optical Society of America

American Institute of Aeronautics and Astronautics

PEER-REVIEWED JOURNAL ARTICLES\*

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\*Authors that are graduate students supported and advised by Prof. Thayer are indicated in **Bold** and postdoctoral authors supported and advised by Prof. Thayer are indicated by the  $\psi$  symbol in superscript.

1. Thayer, J. P., and J. M. Livingston, Observations of wintertime arctic mesosphere cooling associated with stratosphere baroclinic zones, *Geophys. Res. Lett.*, 35, L18803, doi:10.1029/2008GL034955, 2008.
2. Thayer, J. P., J. Lei <sup>$\psi$</sup> , J. M. Forbes, E. K. Sutton, and R. S. Nerem, Thermospheric density oscillations due to periodic solar wind high-speed streams, *J. Geophys. Res.*, 113, A06307, doi:10.1029/2008JA013190, 2008.
3. Lei, J.  <sup>$\psi$</sup> , J. P. Thayer, J. M. Forbes, E. K. Sutton, and R. S. Nerem, Rotating Solar Coronal Holes and Periodic Modulation of the Upper Atmosphere, *Geophys. Res. Lett.*, 35, L10109, doi:10.1029/2008GL033875, 2008.
4. Cosgrove, R. B., and J. P. Thayer, Parametric dependence of electric field variability in the Sondrestrom database: A linear relation with Kp, *J. Geophys. Res.*, 111, A10313, doi:10.1029/2006JA011658, 2006.
5. Milikh, G. M., L. P. Goncharenko, Y. S. Dimant, J. P. Thayer, and M. A. McCready, Anomalous electron heating and its effect on the electron density in the auroral electrojet, *Geophys. Res. Lett.*, 33, doi:10.1029/2006GL026530, 2006.
6. Kwak, Y.-S., B.-H. Ahn, B.A. Emery, J.P. Thayer, M. McCready, J.F. Watermann, Electrodynamical characteristics of the polar ionosphere over the auroral and polar cap regions based on incoherent scatter radar measurements, *J. Atmos. Solar-Terr. Phys.*, Vol. 68, pp. 881-900, 2006.
7. Thayer, J. P. and G. E. Thomas, "Foreword: Special issue on phenomena of the summertime mesosphere," *J. Atmos. Solar-Terr. Phys.*, Vol. 68, 1, pp. 1-4, 2006.
8. Thayer, J.P. and W. Pan <sup>$\psi$</sup> , Lidar observations of sodium density depletions in the presence of polar mesospheric clouds, *J. Atmos. Solar-Terr. Phys.*, doi:10.1016/j.jastp.2005.08.012, Vol. 68, 1, pp. 85-92, 2006.
9. Doe, R. A., J. P. Thayer, and S. C. Solomon, Incoherent scatter radar measurements and modeling of high-latitude solar photoionization, *J. Geophys. Res.*, 110, A10303, doi:10.1029/2005JA011129, 2005.
10. Goncharenko, L., J. E. Salah, A. Van Eyken, V. Howells, J. P. Thayer, V. I. Taran, B. Shpynev, Q. Zhou, J. Chau, Observations of the April 2002 geomagnetic storm by the global network of incoherent scatter radars, , *Annales Geophysicae*, Vol 23, pp 163-181, 2005.
11. Fromm, M., R. Bevilacqua, R. Servranckx, J. Rosen, J.P. Thayer, J. Herman, and D. Larko, Pyrocumulonimbus injection of smoke to the stratosphere: Observations and impact of a super blowup in northwestern Canada on 3-4 August 1998, *J. Geophys. Res.*, 110, D08205, doi:10.1029/2004JD005350, 2005.

12. Keckhut et al., J. P. Thayer, Review of ozone and temperature lidar validations performed within the framework of the Network for the Detection of Stratospheric Change, *J. Environ. Monit.*, 6, 721-733, 2004.
13. **Gerrard, A. J.**, T. J. Kane, S. D. Eckermann, and J. P. Thayer, "Gravity waves and mesospheric clouds in the summer middle atmosphere: A comparison of lidar measurements and ray modeling of gravity waves over Sondrestrom, Greenland," *J. Geophys. Res.*, 109, D10103, doi:10.1029/2002JD002783, 2004.
14. **Gerrard, A. J.**, T. J. Kane, J. P. Thayer, and S. D. Eckermann, "Concerning the Upper Stratospheric Gravity Wave and Mesospheric Cloud Relationship Over Sondrestrom, Greenland," *J. Atmos. Solar-Terr. Phys.*, 2004, 66, pp. 229-240, 2004.
15. Zhang, S. P., J. P. Thayer, R. G. Roble, J. E. Salah, G. G. Shepherd, L. P. Goncharenko, Q. H. Zhou, "Latitudinal variations of neutral wind structures in the E-region for the March equinox period", *J. Atmos. Solar-Terr. Phys.*, 2004, 66, pp. 105-117, 2004.
16. Thayer, J. P. and J. Semeter, "The convergence of magnetospheric energy flux in the polar atmosphere," doi: 10.1016/j.jastp.2004.01.035, 66, 10, pp. 805-822, 2004.
17. Zhang, S. P., J. E. Salah, N. Mitchell, W. Singer, Y. Murayama, R. R. Clark, A. van Eyken, and J. P. Thayer, Responses of the mesospheric wind at high latitudes to the April 2002 space storm, *Geophys. Res. Lett.* 30, 23, 2225, doi:10.1029/2003GL018521, 2003.
18. Gerding M., G. Baumgarten, U. Blum, J.P. Thayer, K. H. Fricke, R. Neuber, J. Fiedler, "Observation of an unusual mid-stratospheric aerosol layer in the Arctic: possible sources and implications for polar vortex dynamics", *Annales Geophysicae*, Vol 21, pp 1057-1069, 2003.
19. Semeter, J., C.J. Heinselman, J.P. Thayer, R.A. Doe, and H.U. Frey, "Ion upflow enhanced by drifting F-region plasma structure on the nightside polar cap boundary," *Geophys. Res. Lett.* 30, 22, 2139, doi:10.1029/2003GL017747, 2003.
20. Thayer, J. P., G. E. Thomas, and F.-J. Lübken, Foreword: Layered phenomena in the mesopause region, *J. Geophys. Res.*, 108(D8), 8434, doi:10.1029/2002JD003295, 2003.
21. Thayer, J. P., M. Rapp, A. J. Gerrard, E. Gudmundsson, and T. J. Kane, Gravity-wave influences on Arctic mesospheric clouds as determined by a Rayleigh lidar at Sondrestrom, Greenland, *J. Geophys. Res.*, 108(D8), 8449, doi:10.1029/2002JD002363, 2003.
22. Watermann, J., G.S. Bust, J.P. Thayer, T. Neubert, and C. Coker, Mapping plasma structures in the high-latitude ionosphere using beacon satellite, incoherent scatter radar and ground-based magnetometer observations, *Ann. Geophysics*, Vol. 45, p. 177-189, 2002.
23. Watermann, J., P. Stauning, O. Rasmussen, V.O. Papitashvili, V.A. Popov, and J.P. Thayer, "Observation of field-aligned and ionospheric currents during space weather month, September 1999," *Adv. Space Res.*, Vol. 30, No. 10, pp. 2203-2208, 2002.
24. **Gerrard, A. J.**, J. P. Thayer, and T. J. Kane, Mesospheric clouds and the duality of gravity waves, *Eos Transactions of the American Geophysical Union*, 83(43), 488, 2002.
25. **Gerrard, A.J.**, T.J. Kane, J. P. Thayer, T.J. Duck, J. Whiteway, "Synoptic-scale study of the arctic polar vortex's influence on the middle atmosphere," *J. Geophys. Res.*, 107 (D16), doi 10.1029/2001JD000681, pp ACL1,1-15, 2002.

26. **Gerrard, A.J.**, T.J. Kane, J.P. Thayer, C.S. Ruf, and R.L. Collins, "Consideration of non-Poisson distributions for Lidar applications," *Applied Optics*, Vol. 40, No. 9, pp. 1488-1492, 2001.
27. Xu, L., A.V. Kustov, J.P. Thayer, and M.A. McCready, "SuperDARN Convection and Sondrestrom plasma drift," *Annales Geophys...*, 19, 749-759, 2001.
28. Hecht, J.H., D.L. McKenzie, A.B. Christensen, D.J. Strickland, J.P. Thayer, J. Watermann, "Simultaneous observations of lower thermospheric composition change during moderate auroral activity from Kangerlussuaq and Narsarsuaq Greenland," *J. Geophys. Res.*, Vol. 105, No. A12, pp. 27109-27118, 2000.
29. Thayer, J.P., "High latitude currents and their energy exchange with the ionosphere-thermosphere system," *J. Geophys. Res.*, Vol. 105, No. A10, pp. 23015-23024, 2000.
30. **Gerrard, A.J.**, T.J. Kane, J.P. Thayer, "Year-round temperature and wave measurements of the Arctic middle atmosphere for 1995-1998," Geophysical Monograph 123, Atmospheric Science across the Stratopause, AGU, 2000.
31. Richmond, A.D., and J.P. Thayer, Ionospheric electrodynamics: A tutorial, *Magnetospheric Current Systems*, Geophysical Monograph Volume 118, 2000.
32. Buonsanto, M.J., S.A. Gonzalez, G.Lu, B.W. Reinisch, and J.P. Thayer, "Coordinated incoherent scatter radar study of the January, 1997 storm," *J. Geophys. Res.*, Vol. 104, No. A11, pp. 24625-24637, 1999.
33. Buonsanto, M.J., S. Gonzales, X. Pi, J. M. Ruohoniemi, M. Sulzer, W. Swartz, J.P. Thayer, and D.N. Yuan, "Radar chain study of the May, 1995 storm," *J.A.S.T.P.*, pp. 233-248, 1999.
34. Heinselman, C.J., J.P. Thayer, and B.J. Watkins, "A high-latitude observation of sporadic sodium and sporadic E layer formation," *Geophys. Res. Lett.* Vol. 25, No. 16, p. 3059, 1998.
35. **Gerrard, A.J.**, T.J. Kane, and J.P. Thayer, "Noctilucent clouds and wave dynamics: Observations at Sondrestrom, Greenland," *Geophys. Res. Lett.* Vol. 25, No. 15, p. 2817, 1998.
36. Sanchez, E.R., J.P. Thayer, J.D. Kelly, and R.A. Doe, "Energy transfer between the ionosphere and magnetosphere during the January 1997 CME event," *Geophys. Res. Lett.* Vol. 25, No. 14, p. 2597, 1998.
37. Lu. et al., J.P. Thayer, "Global energy deposition during the January 1997 magnetic cloud event," *J. Geophys. Res.*, Vol. 103, No. A6, pp. 11,685-11,694, 1998.
38. Thayer, J.P., "Radar measurements of the energy rates associated with the dynamic ionospheric load/generator," *Geophys. Res. Lett.*, Vol. 25, No. 4, pp. 469-472, 1998.
39. Thayer, J.P., "Height-resolved Joule heating rates in the high-latitude E region and the influence of neutral winds," *J. Geophys. Res.*, Vol. 103, No. A1, pp. 471-487, 1998.
40. Thayer, J.P., N.B. Nielsen, R. Warren, C.J. Heinselman, and J. Sohn, "Rayleigh lidar system for middle atmosphere research in the arctic," *Opt. Eng.*, Vol. 36, No. 7, pp. 2045-2061, 1997.
41. Hecht, J.H., J.P. Thayer, D.J. Gutierrez, and D.L. McKenzie, "Multi-instrument zenith observations of noctilucent clouds over Greenland on July 30/31, 1995," *J. Geophys. Res.*, Vol. 102, No. D2, pp. 1959-1970, 1997.
42. **Gerrard, A.J.**, T.J. Kane, D.D. Meisel, J.P. Thayer, R.B. Kerr, "Investigation of a resonant lidar

for measurement of ionospheric metastable helium,” *Journal of Atmospheric and Solar-Terrestrial Physics*, Vol. 59, No. 16, pp. 2023-2035, 1997.

43. Thayer, J.P., N.B. Nielsen, and J. Jacobsen, “Noctilucent Cloud Observations over Greenland by a Rayleigh Lidar,” *Geophys. Res. Lett.*, Vol. 22, No. 21, pp. 2961-2964, 1995.
44. Gary, J.B., R.A. Heelis, and J.P. Thayer, “Summary of Field-Aligned Poynting Flux Observations from DE 2,” *Geophys. Res. Lett.*, Vol. 22, No. 14, pp. 1861-1864, 1995.
45. Thayer, J.P., J.F. Vickrey, R.A. Heelis, and J.B. Gary, “Interpretation and Modeling of the High-Latitude Electromagnetic Energy Flux,” *J. Geophys. Res.*, Vol. 100, No. A10, pp. 19,715-19,728, 1995.
46. Thayer, J.P., G. Crowley, R.J. Niciejewski, T.L. Killeen, J. Buchau, and W.W. Reinisch, “Ground-based observations of ion/neutral coupling at Thule and Qaanaq, Greenland: IMF  $B_z$  dependence,” *J. Geophys. Res.*, Vol. 100, No. A7, pp. 12,189, 1995.
47. Thayer, J.P. and T.L. Killeen, “A Kinematic Analysis of the High-Latitude Neutral Thermospheric Circulation Pattern,” *J. Geophys. Res.*, Vol. 98, No. A7, pp. 11,549-11,565, 1993.
48. Niciejewski, R.J., T.L. Killeen, R.M. Johnson, and J.P. Thayer, “The Behavior of the High-Latitude F-Region Neutral Thermosphere in Relation to IMF Parameters,” *Adv. Space Res.*, Vol. 12, No. 6, pp. 215-218, 1992.
49. Thayer, J.P., and J.F. Vickrey, “On the Contribution of the Thermospheric Neutral Wind to High Latitude Energetics,” *Geophys. Res. Lett.*, Vol. 19, No. 3, pp. 265-268, 1992.
50. Killeen, T.L., F.G. McCormac, A.G. Burns, J.P. Thayer, R.M. Johnson, and R.J. Niciejewski, “On the Dynamics and Composition of the High-Latitude Thermosphere,” *J. Atmos. Terr. Phys.*, Vol. 53, No. 9, pp. 797-815, 1991.
51. Thayer, J.P. and T.L. Killeen, “Vorticity and Divergence in the High-Latitude Upper Thermosphere,” *Geophys. Res. Lett.*, Vol. 18, No. 4, pp. 701-704, 1991.
52. McCormac, F.G., T.L. Killeen, and J.P. Thayer, “The Influence of IMF  $B_y$  on the High-Latitude Thermospheric Circulation During Northward IMF,” *J. Geophys. Res.*, Vol. 96, No. A1, pp. 115-128, 1991.
53. McCormac, F.G., T.L. Killeen, J.P. Thayer, G. Hernandez, C.R. Tschan, J-J. Ponthieu, and N.W. Spencer, “Circulation of the Polar Thermosphere During Geomagnetically Quiet and Active Times as Observed by Dynamics Explorer 2,” *J. Geophys. Res.*, Vol. 92, pp. 10133-10139, 1987.
54. Thayer, J.P., T.L. Killeen, F.G. McCormac, C.R. Tschan, J-J. Ponthieu, and N.W. Spencer, “Thermospheric Neutral Wind Signatures Dependent on the East-West Component of the Interplanetary Magnetic Field for Northern and Southern Hemispheres as Measured from Dynamics Explorer-2,” *Ann. Geophys.*, Vol. 5a, pp. 363-368, 1987.

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PEER-REVIEWED CONFERENCE PROCEEDINGS

1. **Hayman, M.**, J. P. Thayer, W. Pan<sup>¶</sup>, **N. Bradley, S. Mitchell**, Greenland Lidar depolarization measurement technique for polar mesospheric cloud detection, International Laser Radar Conference, 2008.

2. Thayer, J.P., N.B. Nielsen, R.B. Kerr, J. Noto, Rayleigh Lidar observations during Arctic summer conditions, IGARRS Symposium, Lincoln Nebraska, May, 1996.

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PAPERS IN PRESS, REVISION, REVIEW AND PREPARATION

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1. Chu, X., C. Yamashita, P. J. Espy, G. J. Nott, E. J. Jensen, H. Liu, W. Huang, J. P. Thayer, Responses of Polar Mesospheric Cloud Brightness to Stratospheric Gravity Waves at the South Pole and Rothera, Antarctica, accepted, *J. Atmos. Solar-Terr. Phys.*, 2008.
2. N. M. Pedatella, J. M. Forbes, J. Lei<sup>ψ</sup>, J. P. Thayer, and K. M. Larson, Changes in the longitudinal structure of the low-latitude ionosphere during the July 2004 geomagnetic storms, *J. Geophys. Res.*, accepted, 2008.
3. Lei, J. <sup>ψ</sup>, J. P. Thayer, J. M. Forbes, E. K. Sutton, and R. S. Nerem, M. Temmer, A. M. Veronig, Thermospheric density response to high-speed solar wind streams during the declining phase of solar cycle 23, in press, *J. Geophys. Res.*, 2008.
4. Lei, J. <sup>ψ</sup>, J. P. Thayer, J. M. Forbes, Q. Wu, C. She, W. Wan, W. Wang, Ionosphere response to solar wind high speed streams, in press, GRL, June 2008.
5. G. Crowley, A. Reynolds, J. P. Thayer, J. Lei, L.J. Paxton, A.B. Christensen, Y. Zhang, R.R. Meier, D.J. Strickland, Periodic Modulations in Thermospheric Composition by Solar Wind High Speed Streams, accepted, GRL October 2008.
6. **Hayman, M.** and J. P. Thayer, Explicit description of polarization coupling in Lidar applications, submitted, *Optics Letters*, October 2008.
7. **Brower, L.**, J. P. Thayer, and J.-P. St. Maurice, Frictionally enhanced electron temperatures in the high-latitude *D*-region, in preparation, *J. Geophys. Res.*, 2008.
8. **Hayman, M.**, J. P. Thayer, J. van der Laan, E. Gudmundsson, J. Livingston. **K. Greer**, Optical Configuration for Lidar Depolarization Measurements of Polar Mesospheric Clouds in the Summer Arctic, in preparation, *Applied Optics*, 2008.
9. A. J. Gerrard, J. P. Thayer, J. Livingston, and Y. Bhattacharya, Observations of in-situ generated gravity waves during a stratospheric temperature enhancement (STE) event, in preparation, GRL, 2008.

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INVITED TALKS AND SYMPOSIA\*

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\*All invited talks and symposia listed are those presented by Dr. Thayer since 1996. Numerous talks with Dr. Thayer as coauthor presented by others are not listed.

1. Thayer, J. P., J. Lei, J. M. Forbes, G. Crowley, M. Mlynczak, Q. Wu, "A New Solar-Terrestrial Connection: Multi-Day Oscillations in Thermosphere and Ionosphere Properties," American Geophysical Union, San Francisco, CA, December 2008.
2. Thayer, J. P., "A System Science Approach to Geospace Research," Space-Based Ionosphere

Thermosphere Conference, Manhattan Beach, California, October 2007.

3. Thayer, J. P., "The Polar Ionosphere-Thermosphere: A System in Flux," IUGG, Perugia, Italy, July 2007.
4. Thayer, J. P., "Observations of High Latitude Energy Deposition," NCAR MLT Seminar, March 2007.
5. Thayer, J. P., "Polar Ionosphere-Thermosphere science and its coupling: A broad perspective from a narrow view", 2006 CEDAR Meeting, Santa Fe, NM, June 2006.
6. Thayer, J. P., "Space Systems and Science Education at the University of Colorado", 2006 Space Weather Week Conference, Boulder, Colorado, March, 2006.
7. Thayer, J. P., "Future Direction for Polar Energetics", American Geophysical Union, Fall Meeting, San Francisco, CA., December, 2005.
8. Thayer, J. P., "Polar Studies of the Ionosphere-Thermosphere System", Atmospheric, Oceanic, Space Sciences Department Seminar, University of Michigan, October, 2005.
9. Thayer, J. P., "Remote sensing of the aurora," Remote Sensing Seminar Series, University of Colorado, Boulder, CO., March 2005.
10. Thayer, J. P., "Remote sensing of the polar aerospace environment," Program for Atmospheric and Oceanic Science Seminar, University of Colorado, Boulder, CO., November, 2004.
11. Thayer, J. P., "The high-latitude ionosphere-thermosphere system and its coupling to the magnetosphere," Electrical Engineering Seminar, Stanford University, Palo Alto, CA., March, 2004.
12. Thayer J. P., "Remote sensing of the polar aerospace environment," Aerospace Engineering Sciences Department Seminar, University of Colorado, Boulder, CO., February, 2004.
13. Thayer, J. P., X. Chu, C. Gardner, J. Friedman, M. Hagan, R. Roble, J. Plane, "Narrowband Fe/Rayleigh Doppler Lidar For Middle Atmosphere Observations From Research Aircraft and Remote Sites," CEDAR Lidar Working Group, Boulder, CO., September, 2004.
14. Kozyra, J. et al., "Extreme Solar Activity in 2002 – What happened in our atmosphere?," American Geophysical Union, Fall Meeting, San Francisco, CA., December, 2003.
15. Thayer, J. P., "Height resolved observations of electrodynamic properties in the high-latitude E region," American Geophysical Union, Fall Meeting, San Francisco, CA., December, 2003.
16. Thayer, J. P., "The polar ionosphere-thermosphere system: Where the field lines end," NCAR Seminar, Boulder, CO., June, 2003.
17. Thayer, J. P., "M-I coupling from the ionosphere-thermosphere perspective: Melting the frozen-in flux," Geospace Electrodynamics Modeling Conference, Snowmass, CO., July, 2003.
18. Thayer, J. P., "Small-scale structure in plasma and electrodynamic parameters as observed by incoherent scatter radar," Coupling of Energetics and Dynamics of Atmospheric Regions Conference, E-field variability workshop, Longmont, CO., June 2003.
19. Thayer, J. P., "Future Challenges in Polar Aeronomy," American Geophysical Union, Fall Meeting, San Francisco, CA., December, 2001.

20. Thayer, J. P., M. Rapp, A. J. Gerrard, E. Gudmundsson, T. J. Kane, "Arctic Mesospheric Cloud Observations and Characterization by the Sondrestrom, Greenland Rayleigh Lidar, 1994 through 2000," International Conference on Layered Phenomena of the Mesopause Region, Asilomar, CA, October, 2001.
21. Thayer, J. P., "Polar aeronomy: Where the field lines end," CEDAR Conference, Longmont, CO., June 2001.
22. Thayer, J. P., "Portable instruments with an ISR," Relocatable Atmospheric Observatory Conference, Penn State University, March 2001.
23. Thayer, J. P. and C. J. Heinselman, ISR contributions to neutral studies, Physics Department Seminar, Clemson University, Clemson, SC, September 2000.
24. Thayer, J. P., Review of NLC measurements by lidar, Electrical Engineering Seminar, Stanford University, Palo Alto, CA., March, 2000.
25. Thayer, J. P., Monitoring of noctilucent clouds by lidar, American Meteorological Society, Long Beach, CA, January 2000.
26. Thayer, J. P., Review of NLC measurements by lidar, IUGG, Birmingham, England, July 1999.
27. Thayer, J. P., Recent scientific highlights from the Sondrestrom research facility, URSI, Toronto, Canada, August 1999.
28. Thayer, J. P., NLC characteristics and behavior as determined by Rayleigh lidar measurements over Greenland, International Workshop on Layered Phenomena in the Mesopause Region, Kuehlungsborn, Germany, September, 1998.
29. Thayer, J. P., Lidar measurements of NLCs, CEDAR, Boulder, CO, June 1998.

#### CONFERENCE PRESENTATIONS\*

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\*All presentations listed are those presented by Dr. Thayer since 1996. Numerous talks with Dr. Thayer as coauthor presented by others are not listed.

1. Thayer, J. P., "CEDAR: The Integrative Aeronomy Approach," 2008 CEDAR Meeting, Midway, Utah, June 2008.
2. Thayer, J. P., "A System Science Approach to Geospace Research," 2007 CEDAR Meeting, Santa Fe, NM, June 2007.
3. Thayer, J. P., "Sondrestrom Greenland Lidar Status," 2007 CEDAR Meeting, Santa Fe, NM, June 2007.
4. Thayer, J. P., X. Chu, G. Swenson, D. Fritts, and J. She, "A consortium of resonance and Rayleigh lidars," 2006 CEDAR Meeting, Santa Fe, NM, June 2006.
5. Thayer, J. P. and A. Wires, "AMISR coordination with rockets," 2006 CEDAR Meeting, Santa Fe, NM, June 2006.
6. Thayer, J. P., J. Livingston, A. J. Gerrard, and A. Sivjee, "Wintertime Stratopause warmings," 2005 CEDAR Meeting, Santa Fe, NM, June 2005.

7. Thayer, J. P., "E-region electrodynamics at high latitudes," 2005 CEDAR Meeting, Santa Fe, NM, June 2005.
8. Thayer, J.P. and W. Pan, "Lidar investigation of polar mesospheric clouds from Sondrestrom, Greenland," *International Conference on Layered Phenomena of the Mesopause Region*, Cambridge, England, August, 2004.
9. Thayer, J. P. and J. Semeter, "Observations of high-latitude magnetospheric energy deposition," *American Geophysical Union*, Fall Meeting, San Francisco, CA., December, 2003.
10. Niciejewski, R.J. and J.P. Thayer, "Small scale structure in Neutral Winds at Sondre Stromfjord, Greenland," *American Geophysical Union*, Fall Meeting, San Francisco, CA., December, 2003.
11. Thayer, J. P., C.J. Heinselman, R.A. Doe, J. Semeter, M.A. McCready and T.A. Valentic, "Variability and structure in ionospheric state parameters as observed by the Sondrestrom incoherent scatter radar for an entire solar cycle," *COSPAR International Conference*, Houston, TX, October, 2002.
12. Thayer, J. P., "Sondrestrom radar support of the NASA TIMED mission," *CEDAR Conference*, Longmont, CO., June 2002.
13. Thayer, J. P., M. A. McCready, C. J. Heinselman, R. Tsunoda. A. Stromme, A. van Eyken, "Observations of the High-Latitude Ionospheric Response to the Onset of the April 2002 Storm," *American Geophysical Union, Fall Meeting*, San Francisco, CA, December, 2002.
14. Thayer, J. P., SABER / Sondrestrom facility TIMED science, *NASA TIMED pre-launch science meeting*, April 2001.
15. Thayer, J. P. and C. J. Heinselman, "Radar measurements of electromagnetic exchange within the high latitude ionosphere-thermosphere system," *European Geophysical Society*, Nice, France, March, 2001.
16. Thayer, J. P., "High latitude energy exchange within ionosphere-thermosphere system," *American Geophysical Union, Spring Meeting*, Baltimore, MD, May 2000.
17. Thayer, J. P., A. J. Gerrard, T. J. Kane, T. J. Duck, and J. A. Whiteway, Synoptic-scale Study of the Arctic Polar Vortex's Influence on the Stratosphere and Mesosphere, *CEDAR*, Boulder, CO, June 2000.
18. Heinselman, C. J. and J. P. Thayer, E-region neutral winds and ion-neutral collision frequencies: new insights, *CEDAR*, Boulder, CO, June 2000.
19. Thayer, J. P., Electrical energy deposition at high latitudes: A statistical look, *American Geophysical Union, Fall Meeting*, San Francisco, CA, December, 1999.
20. Thayer J. P., Sondrestrom facility status, *CEDAR*, Boulder, CO, June 1999.
21. Thayer, J. P., M-I-T energy transfer: The electrodynamic role of the ionosphere-thermosphere system, *AGU Chapman Conference on Magnetospheric Currents*, Kona, Hawaii, January 1999.
22. Thayer, J. P., The neutral wind's role in high-latitude electrodynamics: How significant a factor?, *American Geophysical Union, Fall Meeting*, San Francisco, CA, December, 1998.
23. Thayer, J. P., N. B. Nielsen, R. B. Kerr, J. Noto, Rayleigh lidar observations during arctic summer conditions, *IEEE International Geoscience and Remote Sensing Society (IGARSS) Symposium*,

Lincoln, Nebraska, May 1996.

24. Thayer, J. P., N. B. Nielsen, and J. Sohn, Two Seasons of Noctilucent Cloud Observations by a Rayleigh Lidar over Greenland, *International Laser Radar Conference*, Free University of Berlin, Berlin Germany, July, 1996.

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STUDENT CONFERENCE PRESENTATIONS (ORAL AND POSTER)\*

\*All presentations listed are those presented by Dr. Thayer's graduate students or advised students

1. **Hayman, M.**, J. P. Thayer, W. Pan<sup>¶</sup>, **N. Bradley, S. Mitchell**, Greenland Lidar depolarization measurement technique for polar mesospheric cloud detection, ILRC, Boulder, CO June 2008.
2. **Wiren A.** and J. P. Thayer, "Polar E-region Ion Motion and Related Thermospheric Properties," AGU Meeting, San Francisco, CA, December 2007.
3. **Brower, L.**, J. P. Thayer, G. Lu, "Mesospheric Joule Heating During the Halloween Superstorm 2003," AGU Meeting, San Francisco, CA, December 2007.
4. **Wiren A.** and J. P. Thayer, "Polar E-region Ion Motion and Related Thermospheric Properties," CEDAR Meeting, Santa Fe, NM, June 2007. (Runner-up for best student poster out of 40).
5. **Brower, L.**, J. P. Thayer, G. Lu, "Mesospheric Joule Heating During the Halloween Superstorm 2003," CEDAR Meeting, Santa Fe, NM, June 2007.
6. **Reimuller, J.**, J. P. Thayer, A. Merkel, S. Corda, "Time Evolution Imaging of Polar Mesospheric Clouds using Airborne and Spaceborne Platforms," CEDAR Meeting, Santa Fe, NM, June 2007.
7. **Greer, K.**, J. P. Thayer, V. L. Harvey, J. Livingston, "Wintertime Stratopause Warmings and Mesosphere Coolings," CEDAR Meeting, Santa Fe, NM, June 2007.
8. **Brower, L.**, J. P. Thayer, J.-P., G. Lu and J.-P. St.-Maurice, "Mesospheric Joule Heating During the Halloween Superstorm 2003," Greenland Space Science Symposium, Kangerlussuaq, Greenland, May 2007.
9. **Wiren, A.** and J. P. Thayer, "E-region Ion Motion and Related Thermospheric Properties," Greenland Space Science Symposium, Kangerlussuaq, Greenland, May 2007.

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CU INTERNAL SERVICE

2007 – 2008: AES Chair of the Graduate Program Committee

2007 – 2008: AES Executive Committee

2005 – Present: AES remote sensing, earth and space focus area, graduate curriculum committee

2005 – 2007: AES undergraduate curriculum and teaching committee (lead on aerospace sciences and instrumentation area)

2004 – Present: Graduate Committee for the Atmospheric And Oceanic Science Department

SUPERVISED THESES

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- Doctoral
- 1) Ashley Wiren, Plasma-Neutral Interactions at Reentry Altitudes, AES Post-Comp, expected completion: May 2010
  - 2) Jason Reimuller, Observations and Analysis of Polar Mesospheric Clouds, AES Post-Comp, expected completion: May 2010
  - 3) Matt Hayman, Daytime Iron Lidar System Design, ECE Pre-Comp, expected completion: May 2011
  - 4) Steve Mitchell, Airborne Lidar System Design for Glacial Studies, AES Pre-Comp, expected completion: May 2012.
  - 5) Laura Brower, Jupiter Electrodynamics, AES Pre-Comp, expected completion May 2012.
  - 6) Xianjing Liu, E-region Electrodynamics, AES Pre-Comp, expected completion May 2013.
  - 7) Ryan Neely III, Raman and Depolarization Lidar for Arctic Stratosphere Studies, ATOC Pre-Comp, expected completion May 2013.

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Masters

- 1) Andrew Chereck, Lidar System Detection Scheme, AES Masters, completed May 2007.
- 2) Laura Brower, Thesis Title: Aerospace Environment Study of Electron Temperatures in Earth's Polar *D* region, AES Masters, completed May 2008.
- 3) Katelynn Greer, Polar Stratosphere – Mesosphere Dynamics, AES Masters, expected completion May 2009.

DOCTORAL THESIS COMMITTEE MEMBER

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Andrew Gerrard, Penn State University, External PhD Advisor, 2000

Eric Sutton, CU Aerospace Engineering Sciences, committee member, completed May 2008.

Chunmei Kang, CU Aerospace Engineering Sciences, committee member, completed May 2008.

Jonathan Fentzke, CU Aerospace Engineering Sciences, committee member, expected completion May 2010.

Loren Chang, CU Aerospace Engineering Sciences, committee member, expected completion May 2010.

Scott Knappmiller, CU Physics Department, committee member, expected completion May 2011.

Xiaoli Zhang, CU Aerospace Engineering Sciences, committee member, expected completion May 2012.

John Creasey, CU Aerospace Engineering Sciences, committee member, expected completion May 2012.

#### UNDERGRADUATE STUDENTS MENTORED

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Katelynn Greer	2006	Design and construction of a research lidar system, REU Program, Senior
Stephen Crooks	2006	Design and construction of a research lidar system, Senior
Nick Bradley	2007	Greenland lidar system evaluation and data analysis, Junior
William Wheeler	2007	Lidar telescope stability testing and verification, Sophomore
Nick Bradley	2008	Discovery Learning Apprenticeship, Senior
Vicki Hsu	2008	Radar data analysis tools, Freshman

#### POSTDOCTORAL FELLOWS & RESEARCH ASSOCIATES

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Weilin Pan	Post-doc from 2003 – 2005, SRI International
Wentao Huang	Post-doc from 2005 – 2007 and Research Associate from 2007 – present, CU AES Department
Jiuhou Lei	Research Associate from 2008 – present, CU AES Department

#### CLASSES TAUGHT

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Aerospace Engineering Senior Project (ASEN 4018/4028): Fall '04 and Spr '05

Thermodynamics and Aerodynamics (ASEN 2002): Fall '05, '06, '07, '08

Thermodynamics and Heat Transfer (ASEN 3113): Fall '05

Radar and Remote Sensing (ASEN 5254/ECEN5245): Spring '05, '06, '07, '09

Remote Sensing Seminar (ASEN 6210): Spring '06

Special Topics: Upper Atmospheres (ASEN 6619): Spring '08

#### CURRENT RESEARCH PROJECTS

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**PI**

Title: Monitoring outlet glacier mass balance and dynamics with low cost unmanned aerial systems  
Funding Source: NASA Earth and Space Science Fellowship  
Total: \$90,000  
Duration: 09/01/08 – 08/31/11

**PI**

Title: CEDAR Science Steering Committee 2007-2009  
Funding Source: NSF  
Total: \$106,000  
Duration: 01/15/08 - 01/14/10

**Co-PI**

Title: MRI: Development of a mobile iron-resonance/Rayleigh/Mie Doppler lidar  
Funding Source: NSF  
Total: \$1,200,000  
Co-PI portion: \$600,000  
Duration: 09/01/07 - 08/31/09

**PI**

Title: Time evolution imaging of polar mesospheric clouds using airborne and spaceborne platforms  
Funding Source: NASA Earth and Space Science Fellowship  
Total: \$90,000  
Duration: 09/01/07 – 08/31/10

**Co-I**

Title: Neutral atmosphere density interdisciplinary research  
Funding Source: AFOSR  
Total: \$7,500,000  
Co-I portion: \$1,000,000  
Duration: 05/01/07 - 04/30/12

**PI**

Title: Collaborative research: a consortium of resonance and Rayleigh lidars  
Funding Source: NSF  
Total: \$965,000  
Duration: 08/01/06 – 7/31/11

**PI**

Title: AMISR: Graduate studies of high-latitude E-region electrodynamic  
Funding Source: NSF  
Total: \$228,000  
Duration: 01/01/06 – 12/31/08

**PI**

Title: Lidar sensors and cyberinfrastructure for arctic atmospheric research  
Funding Source: NSF  
Total: \$800,000  
Duration: 10/01/05 - 09/30/10

**PI (SRI) / Co-I (CU)**

Title: The Sondrestrom upper atmospheric research facility: a vision for science, service, education and leadership  
Funding Source: NSF  
Total: \$12,500,000  
Co-PI portion: \$260,000  
Duration: 10/01/04 - 09/30/08

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#### PENDING PROPOSALS

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##### **Co-PI**

Title: CEDAR: Investigation of Ionospheric Response to Recurrent Geomagnetic Activity  
Funding Source: NSF  
Total: \$255,000  
Duration: 10/01/08 - 09/30/11

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#### RECENTLY DECLINED PROPOSALS

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##### **Co-I**

Title: Atmosphere-Space Transition Explorer  
Funding Source: NASA  
Total: \$105,000,000  
Co-I portion: \$100,000 / year  
Duration: 05/01/08 - 04/30/09

##### **PI**

Title: TIMED mission: Polar mesospheric cooling associated with stratospheric baroclinic zones  
Funding Source: NASA  
Total: \$324,000  
Duration: 12/01/06 - 11/30/09

##### **Co-PI**

Title: Development of an advanced mobile iron-resonance/Rayleigh/Mie Doppler lidar for atmospheric science and environmental research  
Funding Source: NSF  
Total: \$1,320,000  
Duration: 09/01/06 - 08/31/09

##### **PI**

Title: Collaborative research: development of an advanced iron-resonance/Rayleigh/Mie Doppler lidar for atmospheric science and environmental research  
Funding Source: NSF  
Total: \$1,900,000  
Duration: 09/01/05 - 08/31/08

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#### RECENTLY COMPLETED PROJECTS

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##### **Co-PI**

Title: cedar polar mesospheric cloud research using the sondrestrom greenland lidar

Funding Source: NSF  
Total:\$270,000  
Co-PI portion: \$51,000  
Duration:01/01/05 – 12/31/07

**Co-PI (unfunded collaborator)**

Title: HEX II and JOULE II sounding rocket mission  
Funding Source: NASA  
Duration:01/01/05 – 12/31/07

**PI**

Title: TIMED / CEDAR collaboration on high latitude heating rates  
Funding Source: NASA  
Total:\$201,000  
Duration:07/01/04 – 01/31/06

**PI**

Title: The Sondrestrom upper atmospheric research facility: A vision for science, service, education and leadership  
Funding Source: NSF  
Total: \$12,500,000  
Award Location: SRI International  
Duration: 10/01/03 - 09/30/08

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PAST PROJECTS INITIATED AND COMPLETED AT SRI INTERNATIONAL

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**Co-PI**

Title: GEM: Observational Study of Time-Dependent MI-Coupling During Auroral Formation  
Funding Source: NSF  
Total: \$240,000  
Award Location: SRI International  
Duration: 06/01/03 - 05/31/06

**PI**

Title: CEDAR Post-doc: Investigating Noctilucent clouds at Sondrestrom, Greenland  
Funding Source: NSF  
Total: \$90,000  
Award Location: SRI International  
Duration: 1/15/03 - 01/14/05

**PI**

Title: The Sondrestrom radar facility into the next millenium  
Funding Source: NSF  
Total: \$11,000,000  
Award Location: SRI International  
Duration: 10/01/98 - 09/30/03

**Co-PI**

Title: Space Weather: Capturing Events and Their Geoeffectiveness  
Funding Source: NSF  
Total: \$180,000

Award Location: SRI International  
Duration: 07/15/00 - 07/14/03

**Co-PI**

Title: Noctilucent clouds and dynamics: A CEDAR study  
Funding Source: NSF  
Total: \$210,000  
Award Location: Penn State / SRI International  
Duration: 10/01/98 - 09/30/01

**Co-PI**

Title: Space Weather: Event-Driven Operations and Analysis of the Sondrestrom Radar for the National Space Weather Program  
Funding Source: NSF  
Total: \$150,000  
Award Location: SRI International  
Duration: 09/15/97 - 09/14/00

**PI**

Title: CEDAR: Height-resolved Joule heating rates and the influence of neutral winds  
Funding Source: NSF  
Total: \$120,000  
Award Location: SRI International  
Duration: 01/15/98 - 01/14/00

**Co-PI**

Title: CEDAR: Comparison of Ionospheric Joule Heating Rate with Poynting Flux and Energetic Particle Precipitation Energy Deposition  
Funding Source: NSF  
Total: \$160,000  
Award Location: SRI International  
Duration: 08/30/92 - 08/31/96

**PI**

Title: CEDAR: Sondrestrom Arctic Lidar Technology (ARCLITE) Facility  
Funding Source: NSF  
Total: \$500,000  
Award Location: SRI International  
Duration: 07/15/91 - 12/31/93