

CURRICULUM VITAE

JEFFREY P. THAYER

PROFESSOR
AEROSPACE ENGINEERING SCIENCES DEPARTMENT
COLORADO CENTER FOR ASTRODYNAMICS RESEARCH
UNIVERSITY OF COLORADO
BOULDER, COLORADO 80309-0429

RESEARCH PROFILE

My research program is rooted in applying engineering solutions to study the aerospace environment from our Earth's surface to the geospace environment – that region of space strongly influenced by earth's gravitational and magnetic fields. I specialize in geophysical fluid dynamics, gas and plasma interactions, thermodynamics, and electrodynamics applied to the atmosphere and geospace. This field of research has increased over the years as our society rapidly becomes more dependent economically and socially reliant on space and space assets. Understanding the atmosphere and geospace environment is critical for our “space” society and indications are that this field will continue to grow. I also specialize in active remote sensing techniques employing engineering concepts to design, develop, deploy and apply laser radars (lidars) to geoscience studies and apply radar techniques to geospace studies. The active remote sensing techniques engage engineering concepts and solutions with an acute understanding of the scientific purpose. This effectively bridges and balances engineering concerns with scientific expectations. Lidar remote sensing is also a rapidly developing field with broad applications.

EDUCATION

- 1986 - 1990 University of Michigan
Ph.D. in Atmospheric and Space Science
- Thesis Title: Neutral Wind Vortices in the High-Latitude Thermosphere
 - Graduate Advisor: Prof. Timothy L. Killeen
- 1984 - 1986 University of Michigan
M.S. in Atmospheric Science
- 1980 - 1984 State University of New York, College at Oneonta
B.S. in Meteorology, magna cum laude

PROFESSIONAL EXPERIENCE

- 2017 – Present University PI, Space Weather Technology, Research and Education Center
- 2016 – 2018 Associate Chair for Undergraduate Affairs
- 2014 – Present Chief Technology Officer, ASTRALiTe LLC.
- 2013 – Present Director, Colorado Center for Astrodynamics Research
University of Colorado, Boulder, CO

- 2012 – Present Professor, Aerospace Engineering Sciences Department
University of Colorado, Boulder, CO
- 2011 – 2012 Visiting Scientist at NCAR's High Altitude Observatory
- 2009 – 2012 Associate Professor (Tenured), Aerospace Engineering
Sciences Department
University of Colorado, Boulder, CO
- 2004 – 2009 Associate Professor (Tenure-Track), Aerospace Engineering
Sciences Department
University of Colorado, Boulder, CO
- 1995 – 2004 Senior Research Physicist
SRI International, Menlo Park, CA
- 1990 – 1994 Research Physicist
SRI International, Menlo Park, CA
- 1984 – 1990 Graduate Research Assistant
University of Michigan, Ann Arbor, MI
- Developed remote sensing techniques and numerical tools to study geophysical fluid dynamics in the high latitude thermosphere. These tools included Fabry-Perot observations from the Dynamics Explorer-2 spacecraft and from groundbased instrumentation in Thule and Sondrestrom Greenland; numerical simulations using the NCAR TIGCM; and the development of a vector spherical harmonic neutral wind model.

PUBLICATIONS AND PRESENTATIONS

110+ Scientific publications in professional journals, such as, Journal of Geophysical Research (Space Physics and Atmospheres), Geophysical Research Letters, Applied Optics, Optical Engineering, Journal of Atmospheric and Solar-Terrestrial Physics.

40+ Invited talks at professional meetings and colloquia.

100+ Contributed talks at professional meetings.

RECENT PROFESSIONAL SERVICE ACTIVITIES

2018 – Present: NASA Heliophysics Midterm Decadal Survey Assessment Committee

2015 – 2017: Co-chair of NSF Quo Vadis? Community Workshop

2015 – 2018: Member of the NASA Living with a Star Institute

2014 – 2015: Co-chair of the NSF AST/AGS Mid-term review of Arecibo Observatory

2012 – 2014: Member of NCAR’s HAO External Advisory Committee

2010 – 2012: Member of the NAS Atmosphere-Ionosphere-Magnetosphere committee for the Decadal Survey for Space Science

2007 – 2010: Chair of the NSF CEDAR Science Steering Committee

2008 – 2009: Organizing committee for the Ionosphere – Thermosphere – Mesosphere Research Program

2007 – 2009: Guest Editor for the Journal of Atmospheric and Solar-Terrestrial Physics

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

2017 – Joseph T. Negler Professorship

2016 – CU Boulder Faculty Assembly Award for Excellence in Research

2015 – Aerospace Department’s Outstanding Undergraduate Teaching and Mentoring Award

2015 – Distinguished Alumni Award SUNY Oneonta

2012 – College of Engineering Dean’s Award for Outstanding Research

2012 – Roubos Engineering Endowed Faculty Fellowship

2011 – College of Engineering Dean’s Award for Outstanding Teaching

2010 – University of Colorado Provost’s Faculty Achievement Award

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

American Geophysical Union

Optical Society of America

American Institute of Aeronautics and Astronautics

Institute of Electrical and Electronics Engineers

PATENT ACTIVITY

Issued Patents:

Thayer, J. P., S. E. Mitchell, and M. Hayman, Invention Title: Remote Measurement of Shallow Depths in Semi-Transparent Media, U.S. Patent No. 9,476,980 Issued 10/25/2016.

Thayer, J. P., S. E. Mitchell, and M. Hayman, Invention Title: Remote Measurement of Shallow Depths in Semi-Transparent Media, European Patent, EP 2705350 B1, Issued April 5, 2017

Pending Patents

Thayer, J. P. and A. Gisler, Light Detection and Ranging System and Method of Using the Same, Application No. 62/483,704, April 10 2017.

Thayer, J. P., S. E. Mitchell, M. Hayman, A. Gisler, G. Crowley, Invention Title: Remote Measurement of Shallow Depths in Semi-Transparent Media, Continuation in Part, March 16, 2017

PEER-REVIEWED JOURNAL ARTICLES*

*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 □□ symbol in superscript.

1. Barton-Grimley, R. A., R. A. Stillwell, and J. P. Thayer (2018), High resolution photon time-tagging lidar for atmospheric point cloud generation, Optics Express, Vol 26., No. 20,

doi10.1364/OE.26.026030.

2. Stillwell, R. A., R. R. Neely III, J. P. Thayer, M. D. Shupe, and D. D. Turner (2018), Improved cloud-phase determination of low-level liquid and mixed-phase clouds by enhanced polarimetric lidar, *Atmos. Meas. Tech.*, 11, 835-859, doi.org/10.5194/amt-11-835-2018.
3. Stallard, T. S., H. Melin, S. Miller, L. Moore, J. O'Donoghue, J. E. P. Connerney, T. Satoh, R. A. West, J. P. Thayer, V. W. Hsu, and R. Johnson (2017), The Great Cold Spot in Jupiter's upper atmosphere, *Geophys. Res. Lett.*, 44, 3000–3008, doi:10.1002/2016GL071956.
4. Fowler, C. M., Andersson, L., Shaver, S. R., Thayer, J. P., Huba, J. P., Lillis, R. J. ... Jakosky, B. M. (2017). MAVEN observations of ionospheric irregularities at Mars. *Geophysical Research Letters*, 44, 10,845–10,854. <https://doi.org/10.1002/2017GL075189>.
5. Liu, H., J. Thayer, Y. Zhang, and W. K. Lee (2017), The non–storm time corrugated upper thermosphere: What is beyond MSIS?, *Space Weather*, 15, doi:10.1002/2017SW001618.
6. Lucas, G. M., J.P. Thayer, and W. Deierling (2017), Statistical analysis of spatial and temporal variations in atmospheric electric fields from a regional array of field mills, *J. Geophys. Res.*, 122, doi:10.1002/2016JD025944.
7. Stillwell, R. A., P. Pilewskie, J.P. Thayer, M. O'Neill, R.R. Neely III (2017), Monte Carlo Method for the Analysis of Laser Safety for High Powered Lidar System under Different Atmospheric Conditions. *J. Laser Appl.*, 29:2.
8. Thayer, J. P., S. E. Mitchell, and M. Hayman, Invention Title: Remote Measurement of Shallow Depths in Semi-Transparent Media, U.S. Patent No. 9,476,980 Issued 10/25/2016.
9. Hsu, V. W., J. P. Thayer, W. Wang, and A. Burns (2016), New insights into the complex interplay between drag forces and its thermospheric consequences, *J. Geophys. Res. Space Physics*, 121, 10,417–10,430, doi:10.1002/2016JA023058.
10. Lucas, G. M., Baumgaertner, A. J. G., Thayer, J. P. (2015), A global electric circuit model within a community climate model, *J. Geophys. Res. Atmos.*, 120, 12,054–12,066, doi:10.1002/2015JD023562.
11. Sutton, E. K., J. P. Thayer, W. Wang, S. C. Solomon, X. Liu, and B. T. Foster (2015), A self-consistent model of helium in the thermosphere, *J. Geophys. Res. Space Physics*, 120, doi:10.1002/2015JA021223.
12. Burns, A. G., S. C. Solomon, W. Wang, L. Qian, Y. Zhang, L. J. Paxton, X. Yue, J. P. Thayer, and H. L. Liu (2015), Explaining solar cycle effects on composition as it relates to the winter anomaly, *J. Geophys. Res. Space Physics*, 120, 5890–5898, doi:10.1002/2015JA021220.
13. Greer, K. R., J. P. Thayer, V. L. Harvey, and E. D. Peck (2015), Modeling and mechanisms of polar winter upper stratosphere/lower mesosphere disturbances in WACCM, *J. Geophys. Res. Atmos.*, 120, doi:10.1002/2015JD023471.
14. Leake, J. E.; DeVore, C. R.; Thayer, J. P.; Burns, A. G.; Crowley, G.; Gilbert, H. R.; Huba, J. D.; Krall, J.; Linton, M. G.; Lukin, V. S.; Wang, W. (2014), Ionized Plasma and Neutral Gas Coupling in the Sun's Chromosphere and Earth's Ionosphere/Thermosphere, *Space Science Reviews*, Volume 184, Issue 1-4, pp. 107-172, doi: 10.1007/s11214-014-0103-1.
15. Baumgaertner, A. J. G., Lucas, G. M., Thayer, J. P., and Mallios, S. A. (2014): On the role of

clouds in the fair weather part of the global electric circuit, *Atmos. Chem. Phys.*, 14, 8599-8610, doi:10.5194/acp-14-8599-2014.

16. Hsu, V. W., J. P. Thayer, J. Lei, and W. Wang (2014), Formation of the equatorial thermosphere anomaly trough: Local time and solar cycle variations, *J. Geophys. Res. Space Physics*, 119, doi:10.1002/2014JA020416.
17. Lei, J., W. Wang, J. P. Thayer, X. Luan, X. Dou, A. G. Burns, and S. C. Solomon (2014), Simulations of the equatorial thermosphere anomaly: Geomagnetic activity modulation, *J. Geophys. Res. Space Physics*, 119, 6821–6832, doi:10.1002/2014JA020152.
18. Liu, X., W. Wang, J. P. Thayer, A. Burns, E. Sutton, S. C. Solomon, L. Qian, and G. Lucas (2014), The winter helium bulge revisited, *Geophys. Res. Lett.*, 41, 6603–6609, doi:10.1002/2014GL061471.
19. Lei, J., J. P. Thayer, W. Wang, J. Yue, and X. Dou (2014), Nonmigrating tidal modulation of the equatorial thermosphere and ionosphere anomaly, *J. Geophys. Res. Space Physics*, 119, doi:10.1002/2013JA019749.
20. Liu, X., J. P. Thayer, A. Burns, W. Wang, and E. Sutton (2014), Altitude variations in the thermosphere mass density response to geomagnetic activity during the recent solar minimum, *J. Geophys. Res. Space Physics*, 119, doi:10.1002/2013JA019453.
21. Mitchell, S. E. and J. P. Thayer (2014) Ranging through Shallow Semitransparent Media with Polarization Lidar. *J. Atmos. Oceanic Technol.*, 31, 681–697. doi: <http://dx.doi.org/10.1175/JTECH-D-13-00014.1>
22. Neely, R. R., O. B. Toon, S. Solomon, J.-P. Vernier, C. Alvarez, J. M. English, K. H. Rosenlof, M. J. Mills, C. G. Bardeen, J. S. Daniel, and J. P. Thayer (2013), Recent anthropogenic increases in SO₂ from Asia have minimal impact on stratospheric aerosol, *Geophys. Res. Lett.*, 40, doi:10.1002/grl.50263.
23. Greer, K., J. P. Thayer, and V. L. Harvey (2013), A climatology of polar winter stratopause warmings and associated planetary wave breaking, *J. Geophys. Res. Atmos.*, 118, 4168–4180, doi:10.1002/jgrd.50289.
24. Baumgaertner, A. J. G., J. P. Thayer, R. R. Neely III, and G. Lucas (2013), Toward a comprehensive global electric circuit model: Atmospheric conductivity and its variability in CESM1 (WACCM) model simulations, *J. Geophys. Res. Atmos.*, 118, doi:10.1002/jgrd.50725.
25. Neely, Ryan R., Matthew Hayman, Robert Stillwell, Jeffrey P. Thayer, R. Michael Hardesty, Michael O'Neill, Matthew D. Shupe, Catherine Alvarez, (2013): Polarization Lidar at Summit, Greenland, for the Detection of Cloud Phase and Particle Orientation. *J. Atmos. Oceanic Technol.*, 30, 1635–1655
26. Thayer, J. P., X. Liu, J. Lei, M. Pilinski, and A. G. Burns (2012), The impact of helium on thermosphere mass density response to geomagnetic activity during the recent solar minimum, *J. Geophys. Res.*, 117, A07315, doi:10.1029/2012JA017832.
27. Lei, J., A. G. Burns, J. P. Thayer, W. Wang, M. G. Mlynczak, L. A. Hunt, X. Dou, and E. Sutton (2012), Overcooling in the upper thermosphere during the recovery phase of the 2003 October storms, *J. Geophys. Res.*, 117, A03314, doi:10.1029/2011JA016994.

28. Liu, J., L. Liu, B. Zhao, J. Lei, J. P. Thayer, and R. L. McPherron (2012), Superposed epoch analyses of thermospheric response to CIRs: Solar cycle and seasonal dependencies, *J. Geophys. Res.*, 117, A00L10, doi:10.1029/2011JA017315.
29. Lei, J., J. P. Thayer, W. Wang, X. Luan, X. Dou, and R. Roble (2012), Simulations of the equatorial thermosphere anomaly: Physical mechanisms for crest formation, *J. Geophys. Res.*, 117, A06318, doi:10.1029/2012JA017613.
30. Mannucci, A. J., B. T. Tsurutani, S. C. Solomon, O. P. Verkhoglyadova, and J. P. Thayer (2012), How do coronal hole storms affect the upper atmosphere?, *EOS Transactions, AGU*, 93, 8.
31. Lei, J., J. P. Thayer, W. Wang, A. D. Richmond, R. Roble, X. Luan, X. Dou, X. Xue, T. Li (2012), Simulations of the equatorial thermosphere anomaly: Field-aligned ion drag effect, *J. Geophys. Res.*, 117, A01304, doi:10.1029/2011JA017114.
32. Hayman, M. and J. P. Thayer, (2012), General description of polarization in lidar using Stokes Vectors and polar decomposition of Mueller matrices, *J. Opt. Soc. Am.*, 29, 400-409.
33. Lei, J., J. P. Thayer, W. Wang, and R. L. McPherron (2011), Impact of CIR Storms on Thermosphere Density Variability during the Solar Minimum of 2008, *Solar Physics*, Volume 274, Numbers 1-2, 427-437, DOI: 10.1007/s11207-010-9563-y.
34. Gerrard, A. J., Y. Bhattacharya, and J. P. Thayer (2011), Observations of in-situ generated gravity waves during a stratospheric temperature enhancement (STE) event, *Atmos. Chem. Phys.*, 11, 11913-11917, doi:10.5194/acp-11-11913-2011.
35. Neely, R. R., III, J. M. English, O. B. Toon, S. Solomon, M. Mills, and J. P. Thayer (2011), Implications of extinction due to meteoritic smoke in the upper stratosphere, *Geophys. Res. Lett.*, 38, L24808, doi:10.1029/2011GL049865.
36. Deng, Y., Y. Huang, J. Lei, A. J. Ridley, R. Lopez, and J. Thayer (2011), Energy input into the upper atmosphere associated with high-speed solar wind streams in 2005, *J. Geophys. Res.*, 116, A05303, doi:10.1029/2010JA016201.
37. Lei, J., J. P. Thayer, G. Lu, A. G. Burns, W. Wang, E. K. Sutton, and B. A. Emery (2011), Rapid recovery of thermosphere density during the October 2003 geomagnetic storms, *J. Geophys. Res.*, 116, A03306, doi:10.1029/2010JA016164.
38. Neely, R. R. and J. P. Thayer (2011), Raman Profiling of Tropospheric Water Vapor over Kangerlussuaq, Greenland, *Journal of Atmospheric and Oceanic Technology*, Vol. 28, pp. 1141-1148.
39. Hayman, M. and J. P. Thayer, (2011), Lidar polarization measurements of PMCs, *J. Atmos. Solar-Terr. Phys.*, doi:10.1016/j.jastp.2010.08.007.
40. Reimuller, J.D., Thayer, J.P., Baumgarten, G., Chandran, A., Hulley, B., Rusch, D., Nielsen K., Lumpe, J. (2011), Synchronized imagery of noctilucent clouds at the day-night terminator using airborne and spaceborne platforms, *J. Atmos. Solar-Terr. Phys.*, doi:10.1016/j.jastp.2010.11.022
41. Mitchell, S., J. P. Thayer, M. Hayman (2010), Polarization Lidar for Shallow Water Depth Measurement, *Applied Optics*, 49(36), 20 Dec 2010.
42. Thayer, J. P., K. Greer, and V. L. Harvey (2010), Front-like behavior in the Arctic wintertime

- upper stratosphere and lower mesosphere, *J. Geophys. Res.*, 115, doi:10.1029/2010JD014278.
43. Lei, J., J. P. Thayer, A. G. Burns, G. Lu, and Y. Deng (2010), Wind and temperature effects on thermosphere mass density response to the November 2004 geomagnetic storm, *J. Geophys. Res.*, 115, A05303, doi:10.1029/2009JA014754.
 44. Lei, J., J. P. Thayer, and J. M. Forbes (2010), Longitudinal and geomagnetic activity modulation of the equatorial thermosphere anomaly, *J. Geophys. Res.*, 115, A08311, doi:10.1029/2009JA015177.
 45. Pedatella, N. M., J. Lei, J. P. Thayer, and J. M. Forbes (2010), Ionosphere response to recurrent geomagnetic activity: Local time dependency, *J. Geophys. Res.*, 115, A02301, doi:10.1029/2009JA014712.
 46. Kelley, M. C., M. J. Nicolls, R. H. Varney, R. L. Collins, R. Doe, J. M. C. Plane, J. Thayer, M. Taylor, B. Thurairajah, and K. Mizutani (2010), Radar, lidar, and optical observations in the polar summer mesosphere shortly after a space shuttle launch, *J. Geophys. Res.*, 115, A05304, doi:10.1029/2009JA014938.
 47. Brower, L., J. P. Thayer, and J. St.-Maurice, Frictionally heated electrons in the high-latitude D region, *J. Geophys. Res.*, 114, A12302, doi:10.1029/2009JA014421, 2009.
 48. Chang, L. C., J. P. Thayer, J. Lei, and S. E. Palo, Isolation of the global MLT thermal response to recurrent geomagnetic activity, *Geophys. Res. Lett.*, 36, L15813, doi:10.1029/2009GL039305, 2009.
 49. 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, *J. Atmos. Solar-Terr. Phys.*, 71, 434-445, 2009.
 50. Hayman, M. and J. P. Thayer, Explicit description of polarization coupling in Lidar applications, *Optics Letters*, Vol. 34, 5, 2009.
 51. Lei, J., J. P. Thayer, J. M. Forbes, Q. Wu, C. She, W. Wan, W. Wang, Ionosphere response to solar wind high-speed streams, *Geophys. Res. Lett.*, 35, L19105, doi:10.1029/2008GL035208, 2008.
 52. Crowley G., 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, *Geophys. Res. Lett.*, 35, L21106, doi:10.1029/2008GL035745, 2008.
 53. Pedatella, N. M., J. M. Forbes, J. Lei, J. P. Thayer, and K. M. Larson, Changes in the longitudinal structure of the low-latitude ionosphere during the July 2004 sequence of geomagnetic storms, *J. Geophys. Res.*, 113, A11315, doi:10.1029/2008JA013539, 2008.
 54. J. Watermann, K. Kauristie, and J. P. Thayer, Introduction to the special issue: Transport processes in the coupled solar wind–geospace system seen from a high-latitude vantage point, *Journal of Atmospheric and Solar-Terrestrial Physics*, 70, 2233–2234, 2008.
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58. Lei, J., 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.
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62. 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.
63. 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.
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68. 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.

69. 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.
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PEER-REVIEWED CONFERENCE PROCEEDINGS

1. Gisler, A. and J. P. Thayer, Remote characterization of turbid water using a novel Lidar technique, SPIE Defense + Commercial Sensing 2018, paper 10631-38, Gaylord Palms Resort & Convention Center, Orlando, Florida, United States, 15 - 19 April 2018.
2. Ghada Ellithy, Jeffrey P. Thayer, Johannes Wibowo, Geoff Crowley, Andy Gisler, Rory A. Barton-Grimley, Maureen Corcoran, and Gerald Thompson, Shallow water Lidar system for

overtopping breach measurements, US Society of Dams Conference, Miami FL, 2018.

3. **Stillwell, R. A.**, R. R. Neely III, M. D. Shupe, J. P. Thayer, and D. D. Turner, Multi-Sensor Identification of Polar Mixed Phase Clouds, 28th International Laser Radar Conference, Bucharest, Romania, June 2017.
4. Neely III, R. R., **R.A. Stillwell**, J.P. Thayer, and S. Cole, Properties of Horizontally Oriented Ice Crystals over Summit, Greenland, 28th International Laser Radar Conference, Bucharest, Romania, June 2017.
5. **Stillwell, R.A.**, R.R. Neely III, P. Pilewskie, M. O'Neill, J.P. Thayer, and M. Hayman, An Autonomous Polarized Raman Lidar System Designed for Summit Camp, Greenland, 27th International Laser Radar Conference (Poster and extended abstract), New York, New York, USA, July 2015.
6. **Neely III, R. R.**, J. P. Thayer, R. M. Hardesty, O. B. Toon, S. Solomon, Meteoritic Smoke in the Upper Stratosphere: Implications for Backscatter Lidar Inferred from Lidar Observations and Global Aerosol Microphysical Modeling, 26th International Laser Radar Conference, 2012.
7. **Mitchell, S. E.**, J. P. Thayer, Enhanced characterization of semitransparent media through application of polarization lidar, 26th International Laser Radar Conference, 2012
8. **Neely III, R. R.**, **M. Hayman**, J. P. Thayer, R. M. Hardesty, M. O'Neill, **R. Stillwell**, C. Alvarez, The Cloud, Aerosol Backscatter and Polarization Lidar at Summit, Greenland, 26th International Laser Radar Conference, 2012.
9. **Hayman, M.**, J. P. Thayer, **R. R. Neely III**, New polarization measurement technique developed using the Stokes vector lidar equation, 25th International Laser Radar Conference, 2010.
10. Thayer, J. P. and **M. Hayman**, Lidar polarization approaches for polar mesospheric cloud detection, 25th International Laser Radar Conference, 2010.
11. **Neely III, R. R.**, J. P. Thayer, R. M. Hardesty, **M. Hayman**, M. O'Neill, W. Eberhard, R. Alvarez, R. Marchbanks, S. Sandberg, Depolarization LIDAR at Summit, Greenland for the detection of cloud phase and stratospheric aerosols, 25th International Laser Radar Conference, 2010.
12. **Mitchell, S.**, J. P. Thayer, **M. Hayman**, J. Adler, L. Safari, Superglacial lake water depth measurement using modulated polarization lidar, 25th International Laser Radar Conference, 2010.
13. Chu, X., W. Huang, J. P. Thayer, Z. Wang, and J. A. Smith, Progress in MRI Fe-Resonance/Rayleigh/Mie Doppler Lidar, Proceeding of the 25th International Laser Radar Conference, pp. 947-950, St. Petersburg, Russia, 4-9 July 2010.
14. **M. Hayman** and J. P. Thayer, Accounting for System Affects in Depolarization Lidar, in Conference on Lasers and Electro-Optics/International Quantum Electronics Conference, OSA Technical Digest (CD) (Optical Society of America, 2009), paper JTuD86.
15. **Hayman, M.**, J. P. Thayer, W. Pan^ψ, **N. Bradley**, **S. Mitchell**, Greenland Lidar depolarization measurement technique for polar mesospheric cloud detection, International Laser Radar Conference, 2008.

16. Chu, X., W. Huang, J. S. Friedman, and J. P. Thayer, MRI: Mobile Fe-Resonance/Rayleigh/Mie Doppler lidar principle, design, and analysis, Proceeding of the 24th International Laser Radar Conference, pp. 801-804, 2008.
17. Thayer, J.P., N.B. Nielsen, R.B. Kerr, J. Noto, Rayleigh Lidar observations during Arctic summer conditions, IGARRS Symposium, Lincoln Nebraska, May, 1996.
18. Thayer, J. P., E. Uthe, and J. D. Kelly, Survey of Optical and RF Remote-Sensing Instrumentation and Capabilities at the Sondrestrom, Greenland, Atmospheric Research Facility, Proceedings of IEEE Topical Symposium on Combined Optical, Microwave, Earth and Atmosphere Sensing, 1993.
19. Thayer, J. P., ARCLITE: The Arctic Lidar Technology Facility at Sondre Stromfjord, Greenland, Proceeding of the 16th International Laser Radar Conference, pp. 201-203, 1992.

PAPERS IN PRESS, REVISION, REVIEW AND PREPARATION

1. Stillwell, R. A., R. R. Neely III, J. P. Thayer, V. P. Walden, N. Miller and M. D. Shupe: Radiative Influence of Horizontally Oriented Ice Crystals over Summit, Greenland. In Preparation for Geophysical Research Letters, 2018.
2. R. Barton-Grimley, J. P. Thayer and M. Hayman, Non-linear target count rate estimation in single photon lidar due to first photon bias, under review, Optics Letters, 2018.
3. J. P. Thayer, Hsu, V. W., and T. Johnsrud (2018), Vertical Circulations in the Upper Thermosphere as Inferred from Helium Behavior, J. Geophys. Res. Space Physics, in preparation.
4. J. P. Thayer, A. Gisler, R. Barton-Grimley, P. Kinzel, C. Leigletter, G. Crowley, High-Resolution Ranging through Water by Polarimetric Lidar using Intrapulse Phase Modification Induced by Scattering, in preparation
5. G. Lucas and J. P. Thayer, Efficiency of global current generation from thunderstorms, J. Geophys. Res. Atmospheres, in preparation, 2018.

INVITED TALKS AND SYMPOSIA*

*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., Earth's Interaction Region: Plasma-Neutral Interactions in the Weakly Ionized gas of Earth's High Latitude Upper Atmosphere, Workshop Exploring Systems-Science Techniques for the Earth's Magnetosphere-Ionosphere-Thermosphere, Fuller Lodge, Los Alamos, New Mexico, July 24-26, 2018.
2. Thayer, J. P., Space Weather Effects at Low Earth Orbit: What a Drag, University of Colorado Friends of the Magnetosphere Seminar, Jan 30, 2018.
3. Thayer, J. P., V. W. Hsu, H. Holt, T. Johnsrud, Vertical Couplings in the I-T System through Neutral Gas Motions, AGU TESS Meeting, Leesburg VA, May 20-24, 2018.
4. Thayer, J. P., T. Berger, D. Baker, S. Cranmer, C. Pankratz, N. Halverson, C. Randall, and T. Fuller-Rowell, Space Weather Technology, Research, and Education Center (SWx TREC), Space

Weather Workshop, Westminster, CO, April 16-20, 2018.

5. Thayer, J. P., Coupling and Transport Processes from the Upper Mesosphere through the Middle Thermosphere (80-200 km), plenary talk at the NSF CEDAR meeting, Santa Fe, NM, June 2018.
6. Thayer, J. P., Plasma-Neutral Interactions in the MLT-X (80-200 km altitude range), plenary tutorial talk at the NSF CEDAR meeting, Keystone, CO, June 2017.
7. Thayer, J. P., Space Weather Effects on Thermosphere Drag, 97th American Meteorological Society Annual Meeting, Seattle, WA, USA, January 2017.
8. Thayer, J. P., A. Baumgartner, G. Lucas, A quasi-static global electric circuit (GEC) model in WACCM, Invited plenary talk, NSF CEDAR meeting, Santa Fe, NM, June 2016.
9. Thayer, J. P., and V. Hsu, Earth's Interaction Region: Plasma-Neutral Interactions in the Weakly Ionized gas of Earth's High Latitude Upper Atmosphere, Triennial Earth Sun-Summit, AGU and AAS Meeting, Indianapolis, IN, April, 2015.
10. Thayer, J. P., X. Liu, W. Wang, A. Burns, Helium as a Dynamical Tracer in the Thermosphere, American Geophysical Union, SA21B-07, San Francisco, CA, December 2014.
11. Thayer, J. P., "Colorado Center for Astrodynamics Research: Lidar Techniques for Geoscience Applications", Ball Aerospace, December 2014.
12. Thayer, J. P., "Lidar Techniques for Geoscience Applications", University of Colorado, Computational Optical Sensing and Imaging Seminar, 2013.
13. Thayer, J. P., "Exploring Success Together: Space Research & Technology", Senate Space and Technology Caucus, Hart Senate Office Building 902, Washington, D.C., Jan 28, 2013.
14. Thayer, J. P., and X. Liu, "The Role of Preconditioning on Thermosphere Mass Density", American Geophysical Union, SA32A-05, San Francisco, CA, December 2013.
15. Thayer, J. P., C. Gardner, and G. Swenson, "A Large Aperture Lidar Observatory for Exploring the Interaction of Our Atmosphere with Space", American Geophysical Union, SA32A-07, San Francisco, CA, December 2013.
16. Thayer, J. P., J. Lei, X. Liu, "Thermosphere Response to CIR/HSS Events", International Symposium on Recent Observations and Simulations of the Sun-Earth System II, Borovets, Bulgaria, September 11-16, 2011.
17. Thayer, J. P., J. Lei, X. Yue, and S. T. Ram, "Ionosphere and Thermosphere Variability During the Recent Solar Minimum," European Geophysical Union Meeting, Session ST3.2, Vienna, Austria, April 2011.
18. Thayer, J. P., "The Global Implications and Grand Challenge of Neutral-Ion Interactions in the Polar Regions", American Geophysical Union, SA53B-04, San Francisco, CA, December 2010.
19. Thayer, J. P., "CEDAR Strategic Plan," CEDAR Meeting 2010, Boulder, CO, June 2010
20. Thayer, J. P., "The Periodic Rise and Fall of the Earth's Upper Atmosphere", MIT, Haystack Observatory, Buonsanto Lecture, Nov 19, 2009.
21. Thayer, J. P., "Solar Wind - Thermosphere Coupling: A Newly Discovered Breathing Mode of the Upper Atmosphere", Boston University, Center for Space Physics, Invited Seminar, Feb.

2009.

22. 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.
23. Thayer, J. P., "A System Science Approach to Geospace Research," Space-Based Ionosphere Thermosphere Conference, Manhattan Beach, California, October 2007.
24. Thayer, J. P., "The Polar Ionosphere-Thermosphere: A System in Flux," IUGG, Perugia, Italy, July 2007.
25. Thayer, J. P., "Observations of High Latitude Energy Deposition," NCAR MLT Seminar, March 2007.
26. 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.
27. Thayer, J. P., "Space Systems and Science Education at the University of Colorado", 2006 Space Weather Week Conference, Boulder, Colorado, March, 2006.
28. Thayer, J. P., "Future Direction for Polar Energetics", American Geophysical Union, Fall Meeting, San Francisco, CA., December, 2005.
29. Thayer, J. P., "Polar Studies of the Ionosphere-Thermosphere System", Atmospheric, Oceanic, Space Sciences Department Seminar, University of Michigan, October, 2005.
30. Thayer, J. P., "Remote sensing of the aurora," Remote Sensing Seminar Series, University of Colorado, Boulder, CO., March 2005.
31. Thayer, J. P., "Remote sensing of the polar aerospace environment," Program for Atmospheric and Oceanic Science Seminar, University of Colorado, Boulder, CO., November, 2004.
32. 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.
33. Thayer J. P., "Remote sensing of the polar aerospace environment," Aerospace Engineering Sciences Department Seminar, University of Colorado, Boulder, CO., February, 2004.
34. 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.
35. Kozyra, J. et al., "Extreme Solar Activity in 2002 – What happened in our atmosphere?," American Geophysical Union, Fall Meeting, San Francisco, CA., December, 2003.
36. 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.
37. Thayer, J. P., "The polar ionosphere-thermosphere system: Where the field lines end," NCAR Seminar, Boulder, CO., June, 2003.
38. Thayer, J. P., "M-I coupling from the ionosphere-thermosphere perspective: Melting the frozen-in flux," Geospace Electrodynamics Modeling Conference, Snowmass, CO., July, 2003.

39. 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.
40. Thayer, J. P., "Future Challenges in Polar Aeronomy," American Geophysical Union, Fall Meeting, San Francisco, CA., December, 2001.
41. 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.
42. Thayer, J. P., "Polar aeronomy: Where the field lines end," CEDAR Conference, Longmont, CO., June 2001.
43. Thayer, J. P., "Portable instruments with an ISR," Relocatable Atmospheric Observatory Conference, Penn State University, March 2001.
44. Thayer, J. P. and C. J. Heinselman, ISR contributions to neutral studies, Physics Department Seminar, Clemson University, Clemson, SC, September 2000.
45. Thayer, J. P., Review of NLC measurements by lidar, Electrical Engineering Seminar, Stanford University, Palo Alto, CA., March, 2000.
46. Thayer, J. P., Monitoring of noctilucent clouds by lidar, American Meteorological Society, Long Beach, CA, January 2000.
47. Thayer, J. P., Review of NLC measurements by lidar, IUGG, Birmingham, England, July 1999.
48. Thayer, J. P., Recent scientific highlights from the Sondrestrom research facility, URSI, Toronto, Canada, August 1999.
49. 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.
50. Thayer, J. P., Lidar measurements of NLCs, CEDAR, Boulder, CO, June 1998.

CONFERENCE PRESENTATIONS*

*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., A. Gisler, G. Crowley, G. Thompson, C. Anderson (2018), Mapping of Shallow Water and Underwater Scenes Using a Revolutionary Lidar Technique, 2018 GRSG North America Oil & Gas Workshop, Boulder, CO, 11-12 July, 2018.
2. Thayer, J. P., A. Gisler, R. Barton-Grimley, G. Crowley, G. Thompson (2018), Novel Lidar Technique for use in Nearshore Bathymetry and Measurements of Coastal Landscapes, [CD34B-0133] presented at 2018 Ocean Sciences Meeting, Portland, OR, 12-16 Feb, 2018.
3. Thayer, J. P., A. Gisler, R. Barton-Grimley, G. Crowley, G. Thompson (2018), Advancements in

Shallow-Water Bathymetry Using a Novel Polarimetric Lidar Technique, International Lidar Mapping Forum, Denver Conference Center, Feb 5-8, 2018.

4. Thayer, J. P., V. Hsu, and T. Johnsrud, Upper Thermosphere Vertical Circulations Inferred from Helium Behavior, AGU Fall Meeting, New Orleans, LA, USA, December 2017.
5. Thayer, J. P., G. Crowley, G. Thompson, and A. Gisler, Shallow-Water Bathymetry using a Novel Polarimetric Lidar Technique, 18th Annual JALBTCX Airborne Coastal Mapping and Charting Workshop, 6-8 June 2017, Savannah International Trade and Convention Center.
6. Thayer, J. P., A. Gisler, R. Barton-Grimley, G. Thompson, and G. Crowley, Lidar Technologies for Remote Underwater Mapping, NSF 2016 Accelerating Innovation Research – Technology Translation (AIR-TT), Grantee Meeting, Atlanta GA, June 5-8, 2016.
7. Thayer, J. P., Liu, X., A. Burns, W. Wang, and E. Sutton, Composition change and its effect on Thermosphere mass density response during geomagnetic activity, European Geophysical Union Meeting, Session ST3.2, Vienna, Austria, April 2014.
8. Baumgaertner, A. J. G., G. Lucas, and J. P. Thayer, On the role of non-electrified clouds in the Global Electric Circuit, European Geophysical Union Meeting, Session NH1.4, Vienna, Austria, April 2014.
9. Thayer, J. P., C. Gardner, and G. Swenson, “An Observatory for Studying Universal Processes in Earth-like Planetary Atmospheres,” 2013 CEDAR Meeting, Boulder, CO, June 2013.
10. Thayer, J. P., X. Lui, M. Pilinski, and Alan Burns, “Thermosphere Mass Density Response to Geomagnetic Activity During the Recent Solar Minimum”, AGU Chapman Conference, 4CESM, April 8-12, 2013.
11. Thayer, J. P., Katelynn Greer, Lynn Harvey, Hanli Liu, Chihoko Yamashita, Ethan D. Peck, Cora E. Randall, Polar Winter Middle Atmosphere Gravity Wave Generation and Mesosphere Cooling, AGU conference, SA41A-2067, San Francisco CA, 3-7 December 2012.
12. Thayer, J. P., K. Greer, V. L. Harvey, Front-Like Behavior in the Arctic Winter Middle Atmosphere, SPARC-SSW conference, Kyoto, Japan, 22-24 February, 2012.
13. Thayer, J. P. and J. Lei, “Impact of Solar Wind High Speed Streams on the Thermosphere,” Workshop on the Causes and Consequences of the Minimum of Solar Cycle 24, Boulder CO, May 17-19, 2011.
14. Thayer, J. P., “The Altitude Distribution of Joule Energy Deposition due to Geomagnetic Activity and the Response of the Thermosphere Mass Density,” 2011 CEDAR Meeting, Santa Fe, NM, June 2011.
15. Thayer, J. P. and J. Lei, “Impact of Solar Wind High Speed Streams on the Thermosphere / Ionosphere,” Workshop on the High Speed Streams, Boulder CO, Sept., 2010.
16. Thayer, J. P., “CEDAR: The Integrative Aeronomy Approach,” 2008 CEDAR Meeting, Midway, Utah, June 2008.
17. Thayer, J. P., “CEDAR: The Integrative Aeronomy Approach,” 2008 CEDAR Meeting, Midway, Utah, June 2008.
18. Thayer, J. P., “A System Science Approach to Geospace Research,” 2007 CEDAR Meeting,

Santa Fe, NM, June 2007.

19. Thayer, J. P., "Sondrestrom Greenland Lidar Status," 2007 CEDAR Meeting, Santa Fe, NM, June 2007.
20. 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.
21. Thayer, J. P. and A. Wren, "AMISR coordination with rockets," 2006 CEDAR Meeting, Santa Fe, NM, June 2006.
22. Thayer, J. P., J. Livingston, A. J. Gerrard, and A. Sivjee, "Wintertime Stratopause warmings," 2005 CEDAR Meeting, Santa Fe, NM, June 2005.
23. Thayer, J. P., "E-region electrodynamics at high latitudes," 2005 CEDAR Meeting, Santa Fe, NM, June 2005.
24. 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.
25. Thayer, J. P. and J. Semeter, "Observations of high-latitude magnetospheric energy deposition," American Geophysical Union, Fall Meeting, San Francisco, CA., December, 2003.
26. 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.
27. 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.
28. Thayer, J. P., "Sondrestrom radar support of the NASA TIMED mission," CEDAR Conference, Longmont, CO., June 2002.
29. 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.
30. Thayer, J. P., SABER / Sondrestrom facility TIMED science, NASA TIMED pre-launch science meeting, April 2001.
31. 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.
32. Thayer, J. P., "High latitude energy exchange within ionosphere-thermosphere system," American Geophysical Union, Spring Meeting, Baltimore, MD, May 2000.
33. 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.
34. Heinselman, C. J. and J. P. Thayer, E-region neutral winds and ion-neutral collision frequencies: new insights, CEDAR, Boulder, CO, June 2000.

35. Thayer, J. P., Electrical energy deposition at high latitudes: A statistical look, American Geophysical Union, Fall Meeting, San Francisco, CA, December, 1999.
36. Thayer J. P., Sondrestrom facility status, CEDAR, Boulder, CO, June 1999.
37. 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.
38. 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.
39. 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.
40. 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 Universitie of Berlin, Berlin Germany, July, 1996.

Student/Research Associate Conference Presentations (Oral and Poster)*

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

1. Holt, H. L., J. P. Thayer, and T. Johnsrud, Equatorial Thermosphere Anomaly and Related Helium Density Signatures, NSF CEDAR Workshop, Santa Fe, NM, 2018 (First Place Student Poster Prize Winner).
2. Barton-Grimley, R. A., R. A. Stillwell, and J. P. Thayer, High resolution atmospheric polarimetric lidar using time-correlated single photon counting principles (Oral), AGU Fall Meeting, New Orleans, LA, USA, December 2017.
3. Stallard, T., Melin, H., Burrell, A. G., Hsu, V. W., Johnson, R., Moore, L., O'Donoghue, J., and Thayer, J. P., AGU Fall Meeting, New Orleans, LA, USA, December 2017.
4. Stillwell, R. A., R. R. Neely III, M. D. Shupe, J. P. Thayer, and D. D. Turner, Multi-Sensor Identification of Polar Mixed Phase Clouds (Oral), 28th International Laser Radar Conference, Bucharest, Romania, June 2017.
5. Neely III, R. R., R.A. Stillwell, J.P. Thayer, and S. Cole, Properties of Horizontally Oriented Ice Crystals over Summit, Greenland (Oral), 28th International Laser Radar Conference, Bucharest, Romania, June 2017.
6. Stillwell, R. A., R.R. Neely III, and J. P. Thayer, Multi-Sensor Observations of Polar Ice Clouds and Horizontally Oriented Ice Crystals (Oral), 10th International Symposium on Tropospheric Profiling, Fort Collins, CO, USA, May 2017.
7. Stillwell, R. A., R.R. Neely III, J. P. Thayer, and M. O'Neill, (Mis)Identification of Arctic Mixed Phase Clouds By Polarization Lidar (Oral), 97th American Meteorological Society Annual Meeting, Seattle, WA, USA, January 2017.
8. Barton-Grimley, R. A., J. P. Thayer, R.A. Stillwell, A. Gisler, G. Crowley, Atmospheric Polarimetric Lidar Applied to Glacial Melt Water Measurements (Oral), 97th American Meteorological Society Annual Meeting, Seattle, WA, USA, January 2017.

9. Gisler, A., R. A. Barton-Grimley, J. P. Thayer, G. Crowley, Innovative technique for high-accuracy remote monitoring of surface water, Fall AGU Meeting, Session H51H-1619, Dec 12-16, 2016.
10. Fuller-Rowell, T. J., J. P. Thayer..., The SWAP upper atmosphere expansion benchmark, Fall AGU Meeting, Session PA13E-06, Dec 12-16, 2016.
11. G. Crowley, J. P. Thayer..., Improved orbit determination and forecasts with an assimilative tool for atmospheric density and satellite drag specification, Fall AGU Meeting, SA41C-03, Dec 12-16, 2016.
12. Burns, A. G., J. P. Thayer..., Why are there winds in the upper thermosphere?, Fall AGU Meeting, SA51C-08, Dec 12-16, 2016.
13. Pilinski, M., J. P. Thayer..., Analyzer for thermospheric mixing on space station (ATMoSS), Fall AGU Meeting, SM53C-04, Dec 12-16, 2016.
14. Stillwell, R.A. , R.R. Neely III, J. P. Thayer, and M. O'Neill, (Mis)Identification of Arctic Mixed Phase Clouds By Polarization Lidar (Talk), 97th American Meteorological Society Annual Meeting, Seattle, WA, USA, January 2017.
15. Barton-Grimley, R., J. P. Thayer, R.A. Stillwell , A. Gisler, G. Crowley, Atmospheric Polarimetric Lidar Applied to Glacial Melt Water Measurements (Talk), 97th American Meteorological Society Annual Meeting, Seattle, WA, USA, January 2017.
16. Hsu, V. W., J. P. Thayer, W. Wang, A. Burns, Impact of Drag Forces on the Dynamics and Thermal Structure of the Upper Thermosphere, CEDAR, Santa Fe, NM, 20-24 June 2016.
17. Hsu, V. W., J. P. Thayer, W. Wang, A. Burns, Thermospheric Signatures of a Momentum-Driven Indirect Energy Mechanism, AGU Fall Meeting, San Francisco, CA, 12-16 December 2016.
18. G. M. Lucas, W. Deirling, J. P. Thayer, "Variability of surface electric fields". Paper and Presentation, Vaisala International Lightning Detection Conference. San Diego, CA, 2016.
19. G. M. Lucas and J. P. Thayer, "Coupling of thunderstorms and ionospheric potentials through the global electric circuit," Presentation, CEDAR Workshop, Santa Fe, NM, 2016.
20. G. M. Lucas, J. P. Thayer, W. Deirling, "Analysis of surface electric fields from an array of electric field mills," Presentation, AGU Fall Meeting, San Francisco, CA, 2016.
21. Stillwell, R.A., R.R. Neely III, J. P. Thayer, and M. D. Shupe, Identification and Misidentification of Arctic Mixed Phase Clouds By Polarization Lidar (Poster), AGU Fall Meeting, San Francisco, CA, USA, December 2016.
22. Stillwell, R.A. , R.R. Neely III, J. P. Thayer, M. O'Neill, and R. Barton-Grimley, Multiple Linear Polarization Lidar with Improved Polarization Retrievals for Enhanced Atmospheric Observation in the Arctic (Talk), EGU Annual Meeting, Vienna, Austria, April 2016.
23. G. M. Lucas and J. P. Thayer, "Magnetospheric Coupling to the Global Electric Circuit," 2015. Poster, 2015 CEDAR Workshop, Seattle, WA.
24. A.W. Gisler, R. Barton-Grimley, J. P. Thayer, G. Thompson, and G. Crowley "Innovative High-Accuracy Lidar Bathymetric Technique for the Frequent Measurement of River Systems" AGU

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25. A.W. Gisler, R. Barton-Grimley, J. P. Thayer, G. Thompson, and G. Crowley "Revolutionary Lidar Bathymetric Technique for Measuring Shallow Water Depth" Poster at Colorado Photonics Industry Association Annual Meeting, 2015.
26. Stillwell, R. A., R.R. Neely III, J. P. Thayer, M. O'Neill, and R. Barton-Grimley, Multiple Linear Polarization Lidar with Improved Polarization Retrievals for Enhanced Atmospheric Observation in the Arctic (Poster), AGU Fall Meeting, San Francisco, CA, USA, December 2015.
27. Barton-Grimley, R., A. Gisler, J. P. Thayer, R.A. Stillwell, S. Grigsby, Novel Polarization Techniques and Instrumentation for Glacial Melt Pong Laser Bathymetry (Talk), AGU Fall Meeting, San Francisco, CA, USA, December 2015.
28. Stillwell, R. A., R.R. Neely III, P. Pilewskie, M. O'Neill, J.P. Thayer, and M. Hayman, An Autonomous Polarized Raman Lidar System Designed for Summit Camp, Greenland (Poster), 27th International Laser Radar Conference, New York, New York, USA, July 2015.
29. O'Neill, M., R. A. Stillwell, R.R. Neely III, P. Pilewskie, J.P. Thayer, Hazard Analysis for an Arctic Based Autonomous Polarized Raman Lidar (Talk), International Laser Safety Conference, Albuquerque, NM, USA, March 2015.
30. Stillwell, R. A., R.R. Neely III, M. O'Neill, M. Hayman, J. P. Thayer, R. Barton-Grimley, and M. Shupe, Polarization Lidar for the Detection of Cloud Phase and Particle Orientation (Talk). 95th American Meteorological Society Annual Meeting, Phoenix, AZ, USA, January 2015.
31. Neely III, R.R, R. A. Stillwell, M. O'Neill, M. Hayman, J. P. Thayer, D. D. Turner, R. M. Hardesty, R. J. Alvarez II, and M. Shupe, Design of an autonomous polarized Raman lidar system for Arctic observations (Talk). 95th American Meteorological Society Annual Meeting, Phoenix, AZ, USA, January 2015.
32. Hsu, V. W., J. P. Thayer, W. Wang, A. Burns, Impact of Ion Drag on the Thermal Structure of the Upper Thermosphere, AGU, San Francisco, CA, 14-18 December 2015.
33. Hsu, V. W., J. P. Thayer, W. Wang, A. Burns, Indirect Momentum-Energy Coupling in the F-region Ionosphere-Thermosphere System, CEDAR, Seattle, WA, 21-25 June 2015. (First Place Student Poster Prize Winner)
34. Greer, K., J. P. Thayer, V. L. Harvey, E. D. Peck and C. E. Randall, Poster: Extreme Stratopause Temperature Events: A prognosticator of Sudden Stratospheric Warmings?, AS19-A032, AOGS, Sapporo Japan, 30 July 2014.
35. Greer, K., J. P. Thayer, V. L. Harvey, E. D. Peck and C. E. Randall, Oral Presentation: Extreme Temperature Events and Planetary Wave Breaking in the Polar Winter Middle Atmosphere, ST02-D2-AM1-RD-003, AOGS, Sapporo Japan, 29 July 2014
36. Baumgaertner AJG, Lucas GM, Thayer JP, Mallios S. Conductivity-model Parameterization for the Effect of Non-electrified Clouds to the Global Electric Circuit. ICAE Conference, Norman OK, 15-20 June 2014
37. Lucas GM, Baumgaertner AJG, Thayer JP, Bayona V, Flyer N. Model Simulations of the Diurnal and Seasonal Variations of the Global Electric Circuit Using a Consistent 3D Model

- Framework. AGU Conference, AE13A-3355, San Francisco CA, 15-19 December 2014.
38. Lucas GM, Baumgaertner AJG, Thayer JP. Numerical modeling of the global electric circuit. Thunderstorm Effects on the Atmosphere-Ionosphere System Summer School, Collioure, France, 23-27 June 2014.
 39. Hsu, V. W., Thayer, J. P., Wang, W. and Burns, A. The Effects of Plasma-Neutral Interactions on Neutral Dynamics. AGU Conference, SA31A-4081, San Francisco, CA, 15-19 December 2014
 40. Hsu, V. W. and Thayer, J. P. Dynamic and Thermal Responses of the Neutral Thermosphere to an Anomaly of Ionization. XCOLAGE Conference, Cusco, Peru, 8-12 September 2014.
 41. Hsu, V. W., Thayer, J. P., Lei, J. and Wang, W. Plasma-Neutral Interactions in Equatorial Anomalies. CEDAR Conference, Seattle, WA, 22-26 June 2014.
 42. Stillwell, R.A., R.R. Neely III, M. O'Neill, J. P. Thayer, M. Hayman and L. Gillis, Design of an Autonomous Polarized Raman Lidar for Arctic Observations (Poster), AGU Fall Meeting, San Francisco, CA, USA, December 2014.
 43. Stillwell, R.A., R.R. Neely III, J. P. Thayer and M. O'Neill, An Autonomous Raman Lidar for Atmospheric Measurement in the Arctic (Poster), Earth System and Space Science Poster Conference, Boulder, CO, November 2014. (Voted best poster in science category "Remote Sensing and Radiative Transfer").
 44. Stillwell, R.A., R.R. Neely III, J. P. Thayer and M. O'Neill, An Autonomous Raman Lidar for Atmospheric Measurement in the Arctic (Poster), Colorado Photonics Industry Association Annual Meeting, Boulder, CO, October 2014.
 45. Stillwell, R.A., R.R. Neely III, M. O'Neill, J. P. Thayer, and L. Gillis, Development of an Arctic High Resolution RMR Lidar (Talk), Young Scientist Symposium on Atmospheric Research, Fort Collins, CO, October 10, 2014.
 46. Stillwell, R.A., R.R. Neely III, M. Hayman, J. P. Thayer and M. O'Neill, Design of an RMR Lidar for High-Resolution Atmospheric Measurement above Summit, Greenland (Poster), Symposium on Meteorological Observation and Instrumentation, Westminster, CO, USA, June 2014. (1st place student poster presentation from the AMS Committee on Measurements)
 47. Stillwell, R.A., R.R. Neely III, M. Hayman, J. P. Thayer and M. O'Neill, Scientific Basis and Specifications for an Arctic High Resolution RMR Lidar (Talk), Symposium on Meteorological Observation and Instrumentation, Westminster, CO, USA, June 2014
 48. Neely III, R.R., R.A. Stillwell, M. Hayman, J. P. Thayer, R. M. Hardesty, and M. O'Neill, Polarization Lidar for the Detection of Cloud Phase and Particle Orientation (Talk), Symposium on Meteorological Observation and Instrumentation, Westminster, CO, USA, June 2014.
 49. Liu, X., J. P. Thayer, A. Burns, W. Wang, E. Sutton, Helium in the recent Solar Minimum, CEDAR conference, June 2013, Boulder, Colorado. (poster).
 50. Liu, X., J. P. Thayer, A. Burns, W. Wang, Altitude Variation of the Thermosphere Mass Density Response to Geomagnetic Storms during the Solar Minimum, AGU CHAPMAN conference, April 2012, Key Largo, Florida
 51. Baumgaertner, A. J. G., E. Lehto, R. R. Neely, J. M. English, Y. Zhu, G. Lucas, J. P. Thayer:

Model simulations of strong atmospheric conductivity disturbances and induced responses of the Global Electric Circuit, AGU Conference, AE22A-03, San Francisco CA, 3-7 December 2013.

52. Lucas, G. M.; Lehto, E.; Baumgaertner, A. J. G.; Thayer, J. P.; Forbes, J. M. and Zhang, X. Modeling the Electrical Characteristics of the Global Electric Circuit. AGU Conference, AE23B-0423, San Francisco CA, 9-13 December 2013.
53. Lucas, G. M.; Baumgaertner, A. J. G., and Thayer, J. Analytic Model of the Global Electric Circuit. CEDAR Conference, Boulder CO, 22-28 June 2013.
54. Liu, X., J. P. Thayer, A. Burns, W. Wang, E. Sutton, S. Solomon, L. Qian, Helium abundance in the upper atmosphere in the recent Solar Minimum , CEDAR conference, June 2013, Boulder, Colorado. (oral).
55. Liu, X., J. P. Thayer, W. Wang, A. Burns, E. Sutton, Composition change and its effect on mass density response during geomagnetic storm, American Geo- physical Union, Fall Meeting 2013, San Francisco, CA. (oral – Best).
56. Baumgaertner, A., J. P. Thayer, R. R. Neely III, and G. Lucas, Towards a comprehensive Global Electric Circuit model: Conductivity and its variability in WACCM model simulations, EGU General Assembly 2013, EGU2013-6670, Vienna Austria.
57. Neely III, R. R., M. Hayman, R. Stillwell, J. P. Thayer, R. M. Hardesty, M. O'Neill, M. Shupe, and C. Alvarez, The Cloud, Aerosol Polarization and Backscatter Lidar at Summit, Greenland, AMS: 12th Conference on Polar Meteorology and Oceanography, Seattle WA, 2013
58. Hsu, V. W. and J. P. Thayer, Ion-neutral Coupling Case Study: A Mechanism for the Formation of the Equatorial Thermosphere Anomaly, AGU Fall Meeting, 1797377, San Francisco CA, 9-13 December 2013
59. Hsu, V. W. and J. P. Thayer, A Mechanism for the Formation of the Equatorial Thermosphere Anomaly, CEDAR conference, Boulder CO, 22-28 June 2013
60. Hsu, V. W. and J. P. Thayer, A Mechanism for the Formation of the Equatorial Thermosphere Anomaly Trough, NCAR Tea Meeting, Boulder CO, 15 November 2013.
61. Greer, K., J. P. Thayer, V. L. Harvey, and E. D. Peck, Disturbances of the Wintertime Polar Upper Stratosphere and Lower Mesosphere: Observations, Modeling & Mechanisms, International Association of Geomagnetism and Aeronomy (IAGA) Meeting, Merida Mexico, 27 August 2013.
62. Greer, K., J. P. Thayer, V. L. Harvey, and E. D. Peck, Disturbances of the Wintertime Polar Upper Stratosphere and Lower Mesosphere, AGU Fall Meeting, SA22A-01, 10 December 2013.
63. Greer, K. R., J. P. Thayer, H-L. Liu, V. L. Harvey, and E. Peck, Planetary Wave Breaking and Extreme Temperature Excursions in the Polar Winter Middle Atmosphere, CEDAR Workshop, Boulder CO, 23-28 June 2013.
64. Greer, K., PWB & Extreme Temperature Excursions: Observations & Modeling, NCAR-HAO Tea Meeting, NCAR Boulder CO, 24 May 2013.
65. Liu Xianjing; Jeff P. Thayer; Alan G. Burns; Wenbin Wang; Jiuhou Lei, Thermosphere mass density response in the Oxygen/Helium transition region, AGU conference, SA23A-2131, San

Francisco CA, 3-7 December 2012.

66. Mitchell, S. and J. P. Thayer, Cryospheric Lidar Remote Sensing of Surface Depolarization and Depth in Semitransparent Media, AGU conference, C21C-0614, San Francisco CA, 3-7 December 2012.
67. Greer Katelynn, Jeff P. Thayer, Lynn Harvey, Ethan D. Peck, and Cora E. Randall, Upper Troposphere Front-like Behavior in the Stratosphere, AGU conference, A21G-0135, San Francisco CA, 3-7 December 2012.
68. Neely, Ryan R., Owen B. Toon, Susan Solomon, Catherine Alvarez, Jason M. English, Karen H. Rosenlof, Michael J. Mills, Charles Bardeen, John S. Daniel, and Jeff P. Thayer, Increased Anthropogenic Sulfur Dioxide Negligibly Impacts Stratospheric Aerosol Compared to Moderate Volcanoes during the decade 2000-2010, AGU conference, A13Q-04, San Francisco CA, 3-7 December 2012.
69. Lei, J. , J. P. Thayer, X. Liu and X. Dou, Impact of CIR Storms on Thermosphere Density Variability during the Solar Minimum of Solar Cycles 23/24, AOGS, ST06-D4-PM2-Pis3-021, Singapore, 2012.
70. Greer, K. R., J. P. Thayer, H-L. Liu, V. L. Harvey, E. Peck, Synoptic-Scale Disturbances of the Wintertime Polar Upper Stratosphere and Lower Mesosphere: A Summary of Observed Characteristics, SPARC-SSW conference, Kyoto, Japan, 22-24 February 2012.
71. Greer, K. R., J. P. Thayer, H-L. Liu, V. L. Harvey, E. Peck, Synoptic-Scale Disturbances of the Wintertime Polar Upper Stratosphere and Lower Mesosphere: A Summary of Observed Characteristics & Potential Vorticity Analysis, CEDAR Workshop, Santa Fe NM, 24-29 June 2012.
72. Greer, K. R., J. P. Thayer, H-L. Liu, V. L. Harvey, E. Peck, Observations and Modeling Climatology of Polar, Wintertime Middle Atmosphere Disturbances, CESM Whole Atmosphere Working Group Meeting, NCAR Boulder CO, 1 February 2012.
73. Greer, K. R., J. P. Thayer, H-L. Liu, V. L. Harvey, E. Peck, Synoptic Scale Baroclinic Instabilities & Planetary Wave Activity in the Polar Winter Middle Atmosphere, CEDAR Workshop, Santa Fe NM, 24-29 June 2012.
74. Liu, X., J. P. Thayer, A. Burns, W. Wang and J. Lei , Altitude and latitude variation of Thermosphere Mass Density Response to Geomagnetic Activity in Composition Transition Regions, CEDAR conference, Santa Fe, New Mexico, 23-29 June 2012.
75. Hsu, V. W., J. T. Fentzke, C. G. M. Brum, I. Strelnikova, M. Rapp, M. Nicolls, First Detection of Meteoric Smoke using the Poker Flat Incoherent Scatter Radar, CEDAR conference, Santa Fe NM, 24-29 June 2012.
76. Hsu, V. W., J. T. Fentzke, C. M. G. Brum, First Detection of Meteoric Smoke using the Poker Flat Incoherent Scatter Radar (PFISR), USNC-URSI National Radio Science Meeting, Boulder CO, 4-7 January 2012.
77. Greer, K. R., J. P. Thayer, H-L. Liu, V. L. Harvey, E. Peck, An Investigation of Dynamical Mechanisms Associated with Planetary Wave Disturbances of the Winter Polar Middle Atmosphere, AGU conference, San Francisco CA, 5-9 December 2011.

78. Hayman, M., J.P. Thayer, R.R. Neely III, M. O'Neill, R. Stillwell, Demonstration of novel polarization lidar technique for identifying horizontally oriented ice crystals, AGU conference, San Francisco CA, 5-9 December 2011.
79. X. Liu, J. P. Thayer, J. Lei, M. D. Pilinski, Altitude Response of Thermosphere Mass Density to CIR/HSS Storm in Solar Minimum, AGU conference, San Francisco CA, 5-9 December 2011.
80. Mitchell, S., J. P. Thayer, Polarization Lidar for Shallow Water Depth Measurement, AGU conference, San Francisco CA, 5-9 December 2011.
81. X. Liu, J. P. Thayer, J. Lei, and M. D. Pilinski, Altitude Response of Thermosphere Mass Density to CIR/HSS Storm in Solar Minimum, CEDAR conference, Santa Fe NM, June 2011. FIRST PRIZE IN POSTER COMPETITION
82. Stillwell, R., J. P. Thayer, and M. Hayman, Accounting for nonlinear sensor behavior in laser remote sensing applications, CEDAR conference, Santa Fe NM, June 2011. UNDERGRADUATE HONORABLE MENTION IN POSTER COMPETITION
83. Hsu, V., L. Goncharenko, J. P. Thayer, and J. Lei, Mid-latitude ion temperature during a sudden stratospheric warming event, CEDAR conference, Santa Fe NM, June 2011.
84. Greer K. R., J. P. Thayer, and V. L. Harvey, Planetary Wave Disturbances of the Wintertime Polar Upper Stratosphere and Lower Mesosphere: A Summary of Observed Characteristics, CEDAR conference, Santa Fe NM, June 2011.
85. Neely III, R. R., M. Hayman, J. P. Thayer, R. M. Hardesty, M. O'Neill, M. Shupe, Initial Results of the Cloud, Aerosol Polarization and Backscatter Lidar at Summit, Greenland, AGU conference, San Francisco CA, 12-17 December 2010. BEST STUDENT PAPER AWARD
86. Mitchell, S., J. Adler, J.P. Thayer, M. Hayman, Polarization Lidar for Shallow Water Supraglacial Lake Depth Measurement, AGU conference, San Francisco CA, 12-17 December 2010.
87. Greer, K., J. P. Thayer, V. L. Harvey, A Climatology of Upper Stratospheric / Lower Mesospheric Disturbances in the Polar Winter, AGU conference, San Francisco CA, 12-17 December 2010.
88. Liu, X., J. P. Thayer, C., Heinselman, Ion-neutral interactions in the Polar E-region, Coupling, AGU conference, San Francisco CA, 12-17 December 2010.
89. Hsu, V., L. Goncharenko, S.-R. Zhang, A. Coster, J. P. Thayer, Mid-latitude ion temperature during a sudden stratospheric warming event, AGU conference, San Francisco CA, 12-17 December 2010.
90. Greer, K., J. P. Thayer, V. L. Harvey, and J. Livingston, Front-like Behavior in the Polar Wintertime Upper Stratosphere and Lower Mesosphere, CEDAR conference, Boulder CO, 20-25 June 2010. (Finalist in CEDAR Student Poster Competition)
91. Greer, K., J. P. Thayer, V. L. Harvey, Front-Like Formations in the Middle Atmosphere: A Precursor to Sudden Stratospheric Warmings?, CEDAR Workshop on Atmospheric Coupling During Stratospheric Sudden Warmings, CEDAR conference, Boulder CO, 22 June 2010.
92. Liu, X., J. P. Thayer, C., Heinselman, Polar E region neutral and ion motion in the current density reference frame, CEDAR conference, Boulder CO, 22 June 2010.

93. Hsu, V., J. P. Thayer, X. Liu, Height-resolved joule heating rates in the polar E-region, CEDAR conference, Boulder CO, 22 June 2010.
94. Greer, K., J. P. Thayer, V. L. Harvey, Front-Like Formations in the Middle Atmosphere: Vertical Coupling of Winter Polar Regions, PASI student research, PASI conference, San Juan Argentina, 5 October 2010.
95. Hayman, M., J. P. Thayer, R. R. Neely III, New polarization measurement technique developed using the Stokes vector lidar equation, International Laser Radar Conference, 2010.
96. Thayer, J. P. and M. Hayman, Lidar polarization approaches for polar mesospheric cloud detection, International Laser Radar Conference, 2010.
97. Neely III, R. R., J. P. Thayer, R. M. Hardesty, M. Hayman, M. O'Neill, W. Eberhard, R. Alvarez, R. Marchbanks, S. Sandberg, Depolarization LIDAR at Summit, Greenland for the detection of cloud phase and stratospheric aerosols, International Laser Radar Conference, 2010.
98. Neely III, R. R. and J. P. Thayer, Initial Results from ARCLITE Tropospheric Water Vapor Profiling and Balloon Validation, International Laser Radar Conference, 2010.
99. Neely III, R. R., J. P. Thayer, M. Hayman, M. O'Neill, Depolarization LIDAR at Summit, Greenland for the Detection of Cloud Phase and Stratospheric Aerosols, Annual CIRES Science Rendezvous, 2010.
100. Neely III, R. R. and J. P. Thayer, Raman Profiling and Balloon Validation of Tropospheric Water Vapor in Kangerlussuaq, Greenland, CU's Department of Atmospheric and Oceanic Science's Annual Poster Session, 2010.
101. Hayman, M., J. P. Thayer, J. D. Vance, Accounting for system effects in depolarization lidar, CLEO, Baltimore, MD June 2009.
102. Hayman, M., J. P. Thayer, J. D. Vance, Arclite lidar for PMC depolarization measurements, CEDAR, Santa Fe, NM June 2009.
103. Hayman, M., J. P. Thayer, Depolarization calibration and measurement in the atmosphere, CEDAR, Santa Fe, NM June 2009.
104. Hayman, M., J. P. Thayer, J. D. Vance, Depolarization Lidar applied to polar mesospheric clouds, LPMR, Stockholm, Sweden July 2009.
105. Hayman, M., J. P. Thayer, Optical theory for development of advanced polarization lidar, CPIA, Boulder, CO June 2009.
106. Liu X., J. P. Thayer, J. Lei, Altitude Dependence of the Thermospheric Density Response to Geomagnetic Forcing, CEDAR, Santa Fe, NM, June 2009.
107. Greer, K., J. P. Thayer, V. L. Harvey, and J. Livingston, Baroclinic conditions and anomalous temperature excursions in the arctic winter middle atmosphere, AGU Joint Assembly, Toronto, Canada, May 2009.
108. Greer, K., J. P. Thayer, V. L. Harvey, and J. Livingston, Baroclinic conditions and anomalous temperature excursions in the arctic winter middle atmosphere, CEDAR, Santa Fe, New Mexico, June 2009.
109. Greer, K. and J. P. Thayer, A separated mesopause with front-like behavior in the polar winter

middle atmosphere, CEDAR, Santa Fe, New Mexico, June 2009.

110. Greer, K., J. P. Thayer, V. L. Harvey, and J. Livingston, Baroclinic conditions and anomalous temperature excursions in the arctic winter middle atmosphere, CU ATOC, Boulder CO, December 2009.
111. Adler, J., Mitchell, S., Chu, X., Thayer, J. Development of a Micro Blue / Green Lidar System for Multi-Mission use by Unmanned Aerial Systems (UAS), CIRES Innovative Research Grant Reception, Boulder CO Nov 2009.
112. Mitchell, S., Thayer, J., Chu, X. Monitoring Outlet Glacier Mass-Balance and Dynamics With Low-Cost Unmanned Aerial Systems (UAS), ATOC Graduate Student Poster Session, Boulder CO Dec 2009.
113. Adler, J., Mitchell, S., Chu, X. A micro blue/green laser for unmanned aerial systems (UAS) geoscience research, 2009 CIRES Annual Report
114. Lei J., J. P. Thayer, J. M. Forbes, Impact of CIR storms on the thermosphere during the current solar minimum, Fall AGU meeting, San Francisco, Dec 14-18, 2009.
115. Brower, L., J. P. Thayer, J.-P. St. Maurice, Enhanced Electron Temperatures in the Polar D region, AGU Fall Meeting, San Francisco, CA, December 2009.
116. Lei J., J. P. Thayer, J. M. Forbes, Impact of high speed solar wind streams on the thermosphere during the solar minimum of 2008, HSS-GI workshop, University of Cumbria, Ambleside, UK, 6-11th September, 2009 (Invited).
117. Lei J., J. P. Thayer, Impact of high speed solar wind streams on the thermosphere/ionosphere, 2009 CEDAR Workshop, June 27 - July 2, 2009, Santa Fe, New Mexico, USA (Invited)
118. Brower, L., J. P. Thayer, "Frictionally Enhanced Electron Temperatures in the D Region," CEDAR Meeting, Santa Fe, NM, June 2008.
119. Hayman, M., J. P. Thayer, W. Pan, N. Bradley, S. Mitchell, Greenland Lidar depolarization measurement technique for polar mesospheric cloud detection, ILRC, Boulder, CO June 2008.
120. Wren A. and J. P. Thayer, "Polar E-region Ion Motion and Related Thermospheric Properties," AGU Meeting, San Francisco, CA, December 2007.
121. Brower, L., J. P. Thayer, G. Lu, "Mesospheric Joule Heating During the Halloween Superstorm 2003," AGU Meeting, San Francisco, CA, December 2007.
122. Wren 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).
123. Brower, L., J. P. Thayer, G. Lu, "Mesospheric Joule Heating During the Halloween Superstorm 2003," CEDAR Meeting, Santa Fe, NM, June 2007.
124. 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.
125. Greer, K., J. P. Thayer, V. L. Harvey, J. Livingston, "Wintertime Stratopause Warmings and Mesosphere Coolings," CEDAR Meeting, Santa Fe, NM, June 2007.
126. 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.

127.Wiren, A. and J. P. Thayer, "E-region Ion Motion and Related Thermospheric Properties,"
Greenland Space Science Symposium, Kangerlussuaq, Greenland , May 2007.

CU INTERNAL SERVICE

2016 – 2018: Associate Chair for Undergraduate Studies

2013 – Present: AES Executive Committee

2016: AES Performance Evaluation Committee

2015 – 2016: Member of APS Solar Physics Faculty Search

2015: AES Performance Evaluation Committee

2015 – 2016: AES Undergraduate Committee

2015: AES Reappointment committee for Jay McMahon

2015: AES PUEC member for Zoltan Sternovsky

2014: AES Performance Evaluation Committee

2013 – 2014: Member of APS Solar Physics Faculty Search

2013 – 2014: AES Undergraduate Committee

2013 – 2014: Chair of the ASV Faculty Search

2012 – 2013: Member of the AES Astrodynamics Faculty Search

2012 – Present: Director of the Colorado Center for Astrodynamic Research

2012: AES PUEC member for Zoltan Sternovsky

2009 – 2011: AES ABET Committee Member

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

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

2008 – 2010: AES undergraduate curriculum and teaching committee

2007 – 2008: AES Chair of the Graduate Program Committee

2007 – 2008: AES Executive Committee

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

SUPERVISED THESES

Doctoral

- 1) Matt Hayman, Optical Theory for Design of Advanced Polarization Lidar, University of Colorado, ECEE, **completed August 2011**
- 2) Jason Reimuller, Integrative Remote Sensing Applications to Understanding Noctilucent Clouds and the Greenland Ice Sheet, University of Colorado, AES., **completed December 2011**
- 3) Ryan Neely III, Exploring the Variability of Stratospheric Aerosols, University of Colorado, ATOC, **completed August 2012.**
- 4) Steve Mitchell, Photon-Counting Polarization Lidar for Shallow Water Bathymetry, AES Post-Comp, **completed May 2013.**
- 5) Xianjing Liu, The Effects of Composition on Thermosphere Density Response to Geomagnetic Activity, AES Post-Comp, **completed December 2013.**
- 6) Katelynn Greer, Wave Driven Disturbances of the Thermal Structure in the Polar Winter Upper Stratosphere and Lower Mesosphere, AES Post-Comp, **completed December 2013.**
- 7) Katrina Bossert, Gravity Wave Propagation and Momentum Transport in Variable Environments, AES Post-Comp, **completed December 2015.**
- 8) Vicki Hsu, An Indirect and Dynamically Induced Energy Mechanism in a Plasma-Neutral Atmosphere, AES Post-Comp, **completed December 2016.**
- 9) Robert Stillwell, Observing Microphysical Properties of Atmospheric Water Using Polarization and Raman Lidar, AES Post-Comp, **completed Aug 2017**
- 10) Greg Lucas, Investigating the physical mechanisms that impact electric fields in the atmosphere, AES Post-Comp, **completed May 2017.**
- 11) Matt Tooth, The Application of Statistical Learning Techniques to Studying Arctic Sea Ice Survivability, AES Post-Comp, **completed May 2018.**
- 12) Rory Barton-Grimley, Lidar Bathymetry, AES Pre-Comp, expected completion May 2019
- 13) Hannah Holt, Space Weather, AES Pre-Comp, expected completion May 2021.
- 14) Benjamin Wise, LiDAR Technologies, AES Pre-Comp, expected

completion May 2022

15) Zachery Waldron, Near-Space Studies, AES Pre-Comp, expected completion May 2022

Masters

1) Andrew Chereck, Lidar System Detection Scheme, AES Masters, completed May 2007.

2) Ashley Wiren, Incoherent Scatter Radar studies of the near-earth space environment, AES Masters, completed May 2008.

3) Laura Brower, Thesis Title: Aerospace Environment Study of Electron Temperatures in Earth's Polar *D* region, AES Masters, completed May 2008.

4) Katelynn Greer, Thesis Title: Baroclinic Conditions and Anomalous Temperature Excursions in the Arctic Winter Middle Atmosphere, AES Masters, completed May 2009.

5) Michael Rhodes, Coherent Lidar for Wind Turbine Analysis, AES Masters, completed May 2012.

6) James Flemer, AES Masters in Engineering, May 2013.

7) Andrew Gisler, Thesis Title: Monte Carlo Simulations of Polarized Light Propagating Through Optically Dense Media with Applications for Lidar Systems, May 2015.

8) Bryce Garby, Topographic / Bathymetric Lidar Analysis, expected graduation, May 2019.

9) Torfinn Johnsrud, Upper Atmosphere Fluid Dynamics, expected graduation, May 2019.

10) Dawson Beatty, non-thesis, expected graduation, May 2020

DOCTORAL THESIS COMMITTEE MEMBER

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, completed May 2009.

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

Quyen Hart, CU Astrophysics and Planetary Sciences Department, committee member, completed

May 2010.

Xiaoli Zhang, CU Aerospace Engineering Sciences, committee member, completed May 2010.

Milos Jokavic, CU Electrical and Computer Science Engineering, committee member, completed May 2010.

Jonathan Mettes, CU Aerospace Engineering Sciences, committee member, completed Dec. 2010

Licia Ray, CU Astrophysical and Planetary Sciences Department, completed May 2010.

Milos Jankovic, CU Electrical, Computer, Energy Engineering Sciences, committee member, completed May 2010.

Nick Pedatella, CU Aerospace Engineering Sciences, committee member, completed May 2011

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

Susanne Benze, CU Department of Atmospheric and Oceanic Sciences, completed May 2012.

Jeff France, CU Department of Atmospheric and Oceanic Sciences, completed December 2012.

Rob Redmon, CU Aerospace Engineering Sciences, committee member, completed May 2012

Brad Lindseth, CU Electrical, Computer, Energy Engineering Sciences, committee member, completed May 2012

John Smith, CU Aerospace Engineering Sciences, committee member, completed Dec 2014

Bo Tan, CU Aerospace Engineering Sciences, committee member, completed May 2013

Waqas Qazi, CU Aerospace Engineering Sciences, committee member, completed May 2014

Cody Hall, CU AES, committee member, completed May 2014.

Keith Krause, CU Aerospace Engineering Sciences, committee member, completed December 2015

Evan Kalina, CU ATOC Department, committee member, completed May 2015

Shiril Tichkule, CU Department of Electrical, Computer, and Energy Engineering, committee member, expected completion May 2015

Claudia Stephan, CU ATOC Department, committee member, completed December 2015.

Derek Houtz, CU AES, committee member, expected completion, May 2016.

Ryan McGranaghan, CU AES, committee member, completed, May 2016.

McArthur Jones, CU AES, committee member, completed, December 2015.

Ed Theimann, CU EECE, committee member, completed, May 2016.

Diana Loucks, CU AES, committee member, completed, May 2017.

Cody Vaudrin, CU AES, committee member, completed, December 2015.
Josh Pettit, CU ATOC, committee member, expected completion, May 2018.
Sara Hrbek, CU AES, committee member, expected completion, May 2019.
Matthieu Talpe, CU AES, committee member, completed, May 2017.
Federico Gasperini, CU AES, committee member, completed, Dec 2016.
Bill Tandy, CU AES, committee member, completed, Dec. 2017.
Chris Fowler, CU AES, committee member, completed, Dec 2016.
Ashwin Yerasi, CU AES, committee member, expected completion, May 2019.
Daniel Case, CU AES, committee member, expected completion, May 2021
Christopher Maloney, CU ATOC, committee member, expected completion, May 2018.
Andre Lucas, CU AES, committee member, expected completion, May 2021
Shane Grigsby, CU CIRES, committee member, expected completion, May 2019

UNDERGRADUATE STUDENTS MENTORED

Dawson Beatty Fall 2017, Discovery Learning Apprenticeship, Junior
Torfinn Johnsrud 2017-2018, ARSENL Learning Apprenticeship, Junior/Senior
MACULA Senior Projects Team Fall 2016 - Spring 2017
Bryce Garby Spring 2017, ARSENL Learning Apprenticeship, Senior
Brett Bender 2015-2016 Discovery Learning Apprenticeship, Junior
Bryce Garby 2015-2016 ARSENL Learning Apprenticeship, Junior
Anthony Lima 2014-2015 NSF CEDAR grant support
Lewis Gillis 2014-2015 Discovery Learning Apprenticeship, Junior
Robert Stillwell 2011-2012 UROP, Senior
Robert Stillwell 2011 Summer Research Assistant
Robert Stillwell 2010-2011 Discovery Learning Apprenticeship, Junior
Vicki Hsu 2010 - 2011 UROP, Senior
Leyla Safari 2010-2011 UROP, Freshman

Leyla Safari 2009-2010 RSR High School Senior

Vicki Hsu 2009 - 2010 Discovery Learning Apprenticeship, Junior

Vicki Hsu 2008 - 2009 Radar data analysis tools, Freshman, Sophomore

Nick Bradley 2008 - 2009 Discovery Learning Apprenticeship, Senior

Nick Bradley 2007 Greenland lidar system evaluation and data analysis, Junior

William Wheeler 2007 Lidar telescope stability testing and verification, Sophomore

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

POSTDOCTORAL FELLOWS & RESEARCH ASSOCIATES

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 – 2011, CU AES Department

Andreas Baumgartner Research Associate from 2012 – 2014, CU AES Department

Wiebke Deierling Research Associate from 2015-2017, CU AES Department

CLASSES TAUGHT

Aerospace Environments (ASEN 5335): Spring '09

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

Thermodynamics and Aerodynamics (ASEN 2002): Fall '05, '06, '07, '08, '09, '10, '13, '14, '15, '16, '17

Thermodynamics and Heat Transfer (ASEN 3113): Fall '05, '10

Radar and Remote Sensing (ASEN 5254/ECEN5245): Spring '05, '06, '07, '09, '10, '13, '15

Remote Sensing Seminar (ASEN 6210): Spring '06

Special Topics: Upper Atmospheres (ASEN 6619): Spring '08, Fall '12, Spring '16

CURRENT RESEARCH PROJECTS

PI

Title: Novel Polarization Techniques and Instrumentation for Glacial Melt Water Laser Bathymetry

Funding Source: NASA Earth and Space Science Fellowship

Total: \$120,000

Duration: 09/01/16 – 08/31/19

PI

Title: High Resolution, Active Remote Sensing of Cloud Microphysics at Summit, Greenland with Polarized Raman Lidar

Funding Source: NSF

Total Award Amount: \$1,280,351

Co-I portion: \$100,000 / year

Total Award Period Covered: 09/13 - 08/18

Commitment: Summer – 0.5 mo

PI

Title: CEDAR: Investigating Helium Behavior and Its Role in the Thermosphere

Funding Source: NSF

Total Award Amount: \$499,803

Total Award Period Covered: 05/15 - 04/19

Commitment: Summer – 0.6 mo

PI

Title: PFI: AIR-TT Lidar Technologies for Remote Underwater Mapping

Funding Source: NSF

Total Award Amount: \$245,576

Total Award Period Covered: 04/15 - 4/18

Commitment: Summer – 0.25 mo

Co-PI

Title: Enhancements to Satellite Drag

Funding Source: AFRL

Total Award Amount: \$35,000

Total Award Period Covered: 09/17 - 09/19

Commitment: Summer – 0.5 mo

RECENTLY COMPLETED PROJECTS

PI

Title: Collaborative Research: A Consortium of Resonance and Rayleigh Lidars

Funding Source: NSF

Total Award Amount: \$1,424,751

Total Award Period Covered: 11/11 - 10/17

Commitment: Summer – 0.75 mo

PI

Title: Investigation of Ion-Neutral Coupling Processes in the Equatorial F-Region

Funding Source: NASA

Total: \$372,554

Duration: 08/04/10 – 08/3/15

Commitment: Academic 0.5 mo

PI

Title: Thermosphere Density Response to Geomagnetic and Solar Forcing a Consequence of the Unique Conditions of the Current Solar Minimum

Funding Source: NASA

Total: \$307,695

Duration: 01/22/10 – 08/21/14

Commitment: Academic 0.5 mo

PI

Title: CEDAR: Investigation of Baroclinic Disturbances in the Polar Wintertime Middle Atmosphere

Funding Source: NSF

Total: \$421,463

Duration: 01/15/10 – 12/31/14

Commitment: Summer 0.5 mo

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 – 08/31/12

Co-PI

Title: FESD Type 1: Electrical Connections and Consequences Within the Earth System

Funding Source: NSF

Total Award Amount: \$4.9 M

Co-I portion: \$220,000 / year

Total Award Period Covered: 09/11 - 09/16

Commitment: Summer – 1mo

Co-I

Title: Neutral atmosphere density interdisciplinary research

Funding Source: AFOSR

Total: \$7,286,302

Co-I portion: \$250,000 / year

Duration: 08/15/07 - 08/14/12

Commitment: Academic year – 1.0 mo

Co-PI

Title: Atmosphere-Space Transition Region Explorer

Funding Source: NASA – Phase A Study

Total Award Amount: \$750,000

Co-I portion: \$10,000

Total Award Period Covered: 10/11 - 09/12

Co-PI

Title: Satellite Drag Physical Model Module for a Near Real Time Operation Test Bed

Funding Source: AFOSR STTR

Total Award Amount: \$100,000

Co-I portion: \$39,600

Total Award Period Covered: 2/1/12 – 10/31/2012

Commitment: 0.0

PI

Title: CEDAR Science Steering Committee 2007-2010

Funding Source: NSF

Total: \$178,806

Duration: 01/15/08 - 12/31/11

Commitment: Summer – 0.5 mo

PI

Title: Lidar sensors and cyberinfrastructure for arctic atmospheric research

Funding Source: NSF

Total: \$886,946

Duration: 10/01/05 - 09/30/11

PI

Title: Collaborative research: a consortium of resonance and Rayleigh lidars

Funding Source: NSF

Total: \$789,691

Duration: 08/01/06 – 7/31/12

PI

Title: Airborne Campaign for Imaging Polar Mesospheric Clouds During the Deep Solar Minimum

Funding Source: NSF – ATM RAPID

Total: \$77,451

Duration: 07/01/09 – 6/30/11

PI

Title: Time evolution imaging of polar mesospheric clouds using airborne and spaceborne platforms

Funding Source: NASA Earth and Space Science Fellowship

Total: \$30,000 / year

Duration: 09/01/07 – 08/31/10

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: AMISR: Graduate studies of high-latitude E-region electrodynamic

Funding Source: NSF

Total: \$228,000

Duration: 01/01/06 – 12/31/08

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

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

PAST PROJECTS INITIATED AND COMPLETED AT SRI INTERNATIONAL

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