

## Xinlin Li

**Title:** Professor

**Citizenship:** USA

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**Education:**

1986—1992, Dartmouth College, New Hampshire, Ph.D. in Physics. Thesis topic: *Ring Current Oxygen Ion Interaction with Micropulsations*, (Mary K. Hudson)

1982—1985, Shanghai Institute of Optics and Fine Mechanics, Academia Sinica, M.S. in Physics. Thesis topic: *Interaction of Intense Laser Light with Plasmas*, (Zhizhan Xu)

1978—1982, University of Science and Technology of China, B.S. in Physics

**Professional Societies:**

American Geophysical Union

Asian and Oceanic Geophysical Society

**Employment:**

2011—Present, Dept. of Aerospace Engineering Sciences and Laboratory for Atmospheric and Space Physics, University of Colorado at Boulder, Professor.

2009—2011, Dept. of Aerospace Engineering Sciences and Laboratory for Atmospheric and Space Physics, University of Colorado at Boulder, Associate Professor (with tenure).

2002—2009, Dept. of Aerospace Engineering Sciences and Laboratory for Atmospheric and Space Physics, University of Colorado at Boulder, Associate Professor (without tenure).

2000—2002, Dept. of Aerospace Engineering Sciences and Laboratory for Atmospheric and Space Physics, University of Colorado at Boulder, Associate Research Professor.

1995—2000, Laboratory for Atmospheric and Space Physics, University of Colorado at Boulder, Research Associate.

1993—1995, Dartmouth College, Research Associate.

1992—1993, Dartmouth College, Postdoctoral Research Associate.

1989—1991, Dartmouth College, Research Assistant.

1987—Summer, Space Sciences Laboratory at UC Berkeley, visiting graduate student.

1986—1989, Dartmouth College, Teaching Assistant.

1985—1986, Shanghai University of Science and Technology, Lecturer.

1983—1985, Shanghai Institute of Optics and Fine Mechanics, Research Assistant.

**Experiences and Responsibilities:**

As a professor of aerospace engineering sciences, Professor Li supervises and supports a number of graduate students as well as professional research associates and assistants. His principal research interests

are studies of solar wind energy coupling into Earth's magnetosphere and of energetic particle dynamics in the magnetosphere. His early contribution to the successful simulation and explanation of the prompt formation of new radiation belts associated with a strong interplanetary shock on March 24, 1991 caused a major change in our understanding of particle transport in the radiation belt. Furthermore he and his collaborators made the first direct comparison of long-term and continuous measurements of energetic electrons in the solar wind and in the magnetosphere, concluding that the energetic electrons in the solar wind cannot directly supply the MeV electrons observed at geosynchronous orbit and that additional internal acceleration processes are required within the magnetosphere to produce the outer radiation belt. His current research includes analysis and interpretation of particle and field data from satellites and ground stations, energetic particle instrument development, modeling and simulation of energetic particle transport associated with magnetic storms and substorms, and prediction and real-time forecast of MeV electrons and the Dst, AL, AU, and AE indices. His teaching activities include aerospace environment, space dynamics, thermodynamics, and space-flight hardware design. He was awarded a CubeSat project from NSF and has been leading a group of graduate students as they design, build, calibrate, and test the CubeSat system, which was delivered on 1/9/2012, launched on 9/13/2012. The CubeSat operated for more than two years and returned high quality data. Recently, he was awarded another CubeSat project from NASA, CubeSat: Inner Radiation Belt Experiment (CIRBE), which will be ready for launch in late 2021.

**Awards:**

1. NASA Group Achievement Award in recognition for exceptional dedication, skill, and perseverance in developing and delivering the Van Allen Probes for its long-awaited science mission on time and under budget, 2013.
2. NASA Group Achievement Award in recognition of outstanding contribution to the THEMIS mission, 2008.
3. Outstanding Young (45 yr or younger) Oversea Scientist Award from Chinese National Science Foundation (no more than one recipient in space physics was selected per year), 2007.
4. NASA/THEMIS Project Recognition acknowledging for outstanding contributions to the Science Support, Specially Instrument Definition and Mission Design to Address Radiation Belt Physics, 2006.
5. The European Space Agency Award in recognition of outstanding contribution made to Cluster's exploration of Geospace, 2006.
6. NASA Group Achievement Award on Polar/CEPPAD team, 1998.
7. NASA Group Achievement Award on Polar/CEPPAD team, 1995.
8. The Most Skillful Chairperson in 1994 workshop on: "Coupling of Micro- and Meso-scale Processes in Space Plasma Transport," October 16-19, 1994, Guntersville, Alabama.

9. National Citation of Merit from Academia Sinica for Research Project: “Interaction of Intense Laser Light with Plasmas,” 1988.
10. Best Research Paper Award for young scientists from Shanghai Science and Technology Association for the work: “Effect of Small-Scale DC Magnetic Fields on Filamentation in Laser-Produced Plasmas,” 1987.

**Current Research Activities:**

Dynamics of Earth’s space environment, particularly in the magnetosphere; energy conversion from the solar wind into the magnetosphere, particle acceleration and transport, magnetic storms and substorms, and space weather effects. In particular:

- (1) the source, loss, energization, and transport of relativistic electrons in the magnetosphere, especially during major geomagnetic storms when the relativistic electrons have their largest variations, with the goal of understanding the fundamental physical mechanisms and making reliable prediction and forecast of the variations based on physical models.
- (2) energetic particle injection and magnetic and electric field configuration changes associated with geomagnetic storms and magnetospheric substorms.
- (3) spatial structure and temporal variation of electric and magnetic fields in the inner magnetosphere.
- (4) real time forecast of MeV electrons at geosynchronous orbit and the Dst, AU, AL, AE indices.
- (5) energetic particle instrument development and spacecraft design.

**Spaceflight Programs Involved:**

Principal Investigator (PI) on NASA/H-TIDES/LCAS funded CubeSat: Inner Radiation Belt Experiment (CURBE), \$4M, 08/13/2018-08/12/2022.

Co-Investigator on NASA/Miniature X-ray Solar Spectrometer (MinXSS) CubeSat Mission, a project heavily involved with students. MinXSS-1 was released from International Space Station in May of 2016, operated for a year and returned high quality data before its re-entry in May of 2017. MinXSS-2 was launched in December 2018. PI: Tom Woods

PI on NSF funded CubeSat mission: Colorado Student Space Weather Experiment (CSSWE), a \$998,484 project heavily involved with students. The CubeSat system was delivered on 1/9/2011, launched on 13 September 2012, and the mission ended in October 2014.

Deputy-PI on NASA/Living With a Star (LWS)/Radiation Belt Storm Probe (RBSP)/Mission of Opportunity Radbelt Experiment (MORE), a \$1.5 Million project for the phase A study, 2007-2009. PI: Dan Baker.

Co-Investigator on NASA/LWS/RBSP/Energetic Particle, Composition, and Thermal Plasma (ECT) instrument suite, launched on 30 August 2012 and in operation. PI: Harlan Spence.

Co-Investigator on NASA/LWS/RBSP/Electric Field and Waves (EFW), launched on 30 August 2012 and in operation. PI: John Wygant.

Co-Investigator on NASA/THEMIS (Time History of Events and Macroscale Interactions During Substorms) mission. THEMIS, one of NASA/MIDEX missions, consisting of five space probes, was launched on 17 Feb. 2007 and in operation. PI: Vassilis Angelopoulos.

Co-Investigator of NASA/SAMPEX (Solar, Anomalous, and Magnetospheric Particle Explorer). NASA stopped the operation in June 2005 and gave it to the Dept. of Defense. Data were collected until its re-entry on 13 November 2012, and data analysis and archiving continue. PI: Glenn Mason.

Co-Investigator of NASA/IMEX (Inner Magnetosphere Explorer), a university explorer project, we completed the Phase A study, 1998-1999. PI: John Wygant.

Team member of NASA/POLAR/CEPPAD (Comprehensive Energetic Particle and Pitch Angle Distribution Experiment), operation ceased in April 2008 but data analysis and modeling work continues. PI at CU: Dan Baker.

Team member of NASA/CLUSTER/RAPID, in operation. PI at CU: Dan Baker.

### **Publications:**

#### **Peer-Refereed Journal Papers:**

H-index: 49 (at the end of 2018)

1. Zhao, H., D. N. Baker, X. Li, A. N. Jaynes, and S. G. Kanekal (2019), The effects of geomagnetic storms and solar wind conditions on the ultrarelativistic electron flux enhancements, *JGR*, under review.
2. Zheng Xiang, Xinlin Li, R. Selesnick, M. A. Temerin, Binbin Ni, Hong Zhao, Kun Zhang, and Leng Ying Khoo (2019), Modeling the quasi-trapped electron fluxes from Cosmic Ray Albedo Neutron Decay (CRAND), *GRL*, accepted.
3. Hong Zhao, Binbin Ni, Xinlin Li, Daniel Baker, William Johnston, Wenxun Zhang, Zheng Xiang, Xudong Gu, Allison Jaynes, Shri Kanekal, J. B. Blake, Seth Claudepierre, Michael Temerin, Herbert Funsten, Geoffrey Reeves, and Alexander Boyd (2019) Plasmaspheric hiss waves generate a reversed energy spectrum of radiation belt electrons, *Nature-Physics*, <https://doi.org/10.1038/s41567-018-0391-6>.
4. K. Zhang (grad student), X. Li, H. Zhao, Q. Schiller, L. Y. Khoo, Z. Xiang, R. Selesnick, M. A. Temerin, and J. A. Sauvaud (2019), Cosmic Ray Albedo Neutron Decay (CRAND) as a source of inner belt electrons: Energy spectrum study, *Geophysical Research Letter*, 26 December 2018, <https://doi.org/10.1029/2018GL080887>
5. Khoo, L. Y. (grad student), Li, X., Zhao, H., Sarris, T. E., Xiang, Z., Zhang, K., et al. (2018). On the initial enhancement of energetic electrons and the innermost plasmopause locations: Coronal mass ejection-driven storm periods. *Journal of Geophysical Research: Space Physics*, 123. <https://doi.org/10.1029/2018JA026074>
6. Zhao H, Baker DN, Li X, Jaynes AN, Kanekal SG. "The Acceleration of Ultrarelativistic Electrons

- During a Small to Moderate Storm of 21 April 2017.” *GEOPHYSICAL RESEARCH LETTERS*. 45 (12) (June 28, 2018): 5818-5825.
7. Zhang D, Liu W, Li X, Sarris T, Xiao C, Wygant JR. ”Observations of Impulsive Electric Fields Induced by Interplanetary Shock.” *GEOPHYSICAL RESEARCH LETTERS*. 45 (15) (August 16, 2018): 7287-7296.
  8. Jaynes AN, Ali AF, Elkington SR, Malaspina DM, Baker DN, Li X, Kanekal SG, Henderson MG, Kletzing CA, Wygant JR. ”Fast Diffusion of Ultrarelativistic Electrons in the Outer Radiation Belt: 17 March 2015 Storm Event.” *GEOPHYSICAL RESEARCH LETTERS*. 45 (20) (October 28, 2018): 10874-10882.
  9. Zhao H, Friedel RHW, Chen Y, Reeves GD, Baker DN, Li X, Jaynes AN, Kanekal SG, Claudepierre SG, Fennell JF, et. al. ”An Empirical Model of Radiation Belt Electron Pitch Angle Distributions Based On Van Allen Probes Measurements.” *JOURNAL OF GEOPHYSICAL RESEARCH-SPACE PHYSICS*. 123 (5) (May 01, 2018): 3493-3511.
  10. Mason, James, et al. (2017), MinXSS-1 CubeSat On-Orbit Pointing and Power Performance: The First Flight of the Blue Canyon Technologies XACT 3-axis Attitude Determination and Control System, *Journal of Small Satellites*, arXiv:1706.06967 [astro-ph.IM].
  11. Li, Xinlin, Richard Selesnick, Quintin Schiller, Kun Zhang, Hong Zhao, Daniel Baker, and Michael Temerin (2017), Measurement of electrons from albedo neutron decay and neutron density in near-Earth space, *Nature* 552, 382-385, doi:10.1038/nature24642.
  12. Califf, S., X. Li, H. Zhao, A. Kellerman, T. E. Sarris, A. Jaynes, and D. M. Malaspina (2017), The role of the convection electric field in filling the slot region between the inner and outer radiation belts, *J. Geophys. Res. Space Physics*, 122, doi:10.1002/2016JA023657.
  13. Xiang, Z., Tu, W., Li, X., Ni, B., Morley, S. K., & Baker, D. N. (2017). Understanding the mechanisms of radiation belt dropouts observed by Van Allen Probes. *Journal of Geophysical Research: Space Physics*, 122. <https://doi.org/10.1002/2017JA024487>.
  14. Zhao, H., Baker, D. N., Califf, S., Li, X., Jaynes, A. N., Leonard, T., Spence, H. E. (2017). Van Allen probes measurements of energetic particle deep penetration into the low L region ( $L < 4$ ) during the storm on 8 April 2016. *Journal of Geophysical Research: Space Physics*, 122. <https://doi.org/10.1002/2017JA024558>.
  15. Zhao, H., D. N. Baker, A. N. Jaynes, X. Li, S. R. Elkington, S. G. Kanekal, H. E. Spence, A. J. Boyd, C.-L. Huang, and C. Forsyth (2017), On the relation between radiation belt electrons and solar wind parameters/geomagnetic indices: Dependence on the first adiabatic invariant and  $L^*$ , *J. Geophys. Res. Space Physics*, 122, doi:10.1002/2016JA023658.
  16. Li, L. Y., J. Yu, J. B. Cao, J. Y. Yang, X. Li, D. N. Baker, G. D. Reeves, and H. Spence (2017), Roles of whistler mode waves and magnetosonic waves in changing the outer radiation belt and the slot region, *J. Geophys. Res. Space Physics*, 122, 54315448, doi:10.1002/2016JA023634.

17. Selesnick, R. S., Baker, D. N., Kanekal, S. G., Hoxie, V. C., & Li, X. (2018). Modeling the proton radiation belt with Van Allen Probes Relativistic Electron-Proton Telescope data. *Journal of Geophysical Research: Space Physics*, 123. <https://doi.org/10.1002/2017JA024661>
18. Schiller, Q., W. Tu, A. F. Ali, X. Li, H. C. Godinez, D. L. Turner, S. K. Morley, and M. G. Henderson (2017), Simultaneous event-specific estimates of transport, loss, and source rates for relativistic outer radiation belt electrons, *J. Geophys. Res. Space Physics*, 122, doi:10.1002/2016JA023093.
19. Sarris, T. E., X. Li, M. Temerin, H. Zhao, S. Califf, W. Liu, and R. Ergun (2017), On the relationship between electron flux oscillations and ULF wave-driven radial transport, *J. Geophys. Res. Space Physics*, 122, doi:10.1002/2016JA023741.
20. Li, X., D. N. Baker, H. Zhao, K. Zhang, A. N. Jaynes, Q. Schiller, S. G. Kanekal, J. B. Blake, and M. Temerin (2017), Radiation belt electron dynamics at low L (<4): Van Allen Probes era versus previous two solar cycles, *J. Geophys. Res. Space Physics*, 122, doi:10.1002/2017JA023924.
21. Zhang, K. (grad student), X. Li, Q. Schiller, D. Gerhardt, H. Zhao, and R. Millan (2017), Detailed characteristics of radiation belt electrons revealed by CSSWE/REPTile measurements: Geomagnetic activity response and precipitation observation, *J. Geophys. Res. Space Physics*, 122, doi:10.1002/2017JA024309.
22. Sarris, E. T., and Xinlin Li (2017) Geomagnetic activity and local time dependence of the distribution of ultra low-frequency wave power in azimuthal wavenumbers, *m. Ann. Geophys.*, 35, 629638, 2017 [www.ann-geophys.net/35/629/2017/](http://www.ann-geophys.net/35/629/2017/)doi:10.5194/angeo-35-629-2017
23. Zhao H (grad student), Li X, Baker DN, Claudepierre SG, Fennell JF, Blake JB, Larsen BA, Skoug RM, Funsten HO, Friedel RHW. "Ring current electron dynamics during geomagnetic storms based on the Van Allen Probes measurements." *JOURNAL OF GEOPHYSICAL RESEARCH-SPACE PHYSICS*. 121 (4) (April 01, 2016): 3333-3346.
24. Sarris TE, Li X. "Calculating ultra-low-frequency wave power of the compressional magnetic field vs. L and time: multi-spacecraft analysis using the Van Allen probes, THEMIS and GOES." *ANNALES GEOPHYSICAE*. 34 (6) (January 01, 2016): 565-571.
25. Yang YY, Shen C, Dunlop M, Rong ZJ, Li X, Angelopoulos V, Chen ZQ, Yan GQ, Ji Y. "Storm time current distribution in the inner equatorial magnetosphere: THEMIS observations." *JOURNAL OF GEOPHYSICAL RESEARCH-SPACE PHYSICS*. 121 (6) (June 01, 2016): 5250-5259.
26. Baker DN, Jaynes AN, Kanekal SG, Foster JC, Erickson PJ, Fennell JF, Blake JB, Zhao H, Li X, Elkington SR. "Highly relativistic radiation belt electron acceleration, transport, and loss: Large solar storm events of March and June 2015." *JOURNAL OF GEOPHYSICAL RESEARCH-SPACE PHYSICS*. 121 (7) (July 01, 2016): 6647-6660.
27. Califf S (grad student), Li X, Wolf RA, Zhao H, Jaynes AN, Wilder FD, Malaspina DM, Redmon R. "Large-amplitude electric fields in the inner magnetosphere: Van Allen Probes observations of subauroral polarization streams." *JOURNAL OF GEOPHYSICAL RESEARCH-SPACE PHYSICS*. 121 (6) (June 01, 2016): 5294-5306.

28. Kanekal SG, Baker DN, Fennell JF, Jones A, Schiller Q, Richardson IG, Li X, Turner DL, Califf S, Claudepierre SG. "Prompt acceleration of magnetospheric electrons to ultrarelativistic energies by the 17 March 2015 interplanetary shock." *JOURNAL OF GEOPHYSICAL RESEARCH-SPACE PHYSICS*. 121 (8) (August 01, 2016): 7622-7635.
29. Xiang Z, Ni B, Zhou C, Zou Z, Gu X, Zhao Z, Zhang X, Zhang X, Zhang S, Li X. "Multi-satellite simultaneous observations of magnetopause and atmospheric losses of radiation belt electrons during an intense solar wind dynamic pressure pulse." *Annales Geophysicae*. 34 (5) (2016): 493-509.
30. Li L. Y., Yu J, Cao JB, Wang ZQ, Yu YQ, Reeves GD, Li X. "Effects of ULF waves on local and global energetic particles: Particle energy and species dependences." *Journal of Geophysical Research: Space Physics* (2016).
31. Ni B, Zou Z, Li X, Bortnik J, Xie L, Gu X. "Occurrence characteristics of outer zone relativistic electron butterfly distribution: A survey of Van Allen Probes REPT measurements." *Geophysical Research Letters*. 43 (11) (June 16, 2016): 5644-5652.
32. Foster JC, Erickson PJ, Baker DN, Jaynes AN, Mishin EV, Fennel JF, Li X, Henderson MG, Kanekal SG. "Observations of the impenetrable barrier, the plasmopause, and the VLF bubble during the 17 March 2015 storm." *JOURNAL OF GEOPHYSICAL RESEARCH-SPACE PHYSICS*. 121 (6) (June 01, 2016): 5537-5548.
33. Schiller Q, Kanekal SG, Jian LK, Li X, Jones A, Baker DN, Jaynes A, Spence HE. "Prompt injections of highly relativistic electrons induced by interplanetary shocks: A statistical study of Van Allen Probes observations." *Geophysical Research Letters* (2016).
34. Selesnick RS, Baker DN, Jaynes AN, Li X, Kanekal SG, Hudson MK, Kress BT (2016), Inward diffusion and loss of radiation belt protons, *JOURNAL OF GEOPHYSICAL RESEARCH-SPACE PHYSICS*. 121 (3) (March 01, 2016): 1969-1978.
35. Liu, Wenlong, Weichao Tu, Xinlin Li, Theodore Sarris, Yuri Khotyaintsev, Huishan Fu, Hui Zhang, Quanqi Shi (2016), On the calculation of electric diffusion coefficient of radiation belt electrons with in situ electric field measurements by THEMIS, *Geophysical Research Letter*, 43 (3) (February 16, 2016): 1023-1030.
36. Mason, James P., T. N. Woods, A. Caspi, P. C. Chamberlin, C. Moore, A. Jones, R. Kohnert, X. Li, S. Palo, S. C. Solomon (2016), Miniature X-Ray Solar Spectrometer (MinXSS) A Science-Oriented, University 3U CubeSat, *Journal of Spacecraft and Rockets*, 53 (2) (March 01, 2016): 328-339.
37. Liu, Xiu, W. Liu, J. B. Cao, H. S. Fu, J. Yu, X. Li (2016), Dynamic plasmopause model based on THEMIS measurements, *J. Geophys. Res. Space Physics*, 10,54310,556, doi:10.1002/2015JA021801.
38. Kanekal, S. G., ..., X. Li ..., et al. (2015), Relativistic electron response to the combined magnetospheric impact of a coronal mass ejection overlapping with a high-speed stream: Van Allen Probes observations, *J. Geophys. Res. Space Physics*, 120, 76297641, doi:10.1002/2015JA021395

39. Ni, Binbin, ... X. Li (2015) Variability of the pitch angle distribution of radiation belt ultrarelativistic electrons during and following intense geomagnetic storms: Van Allen Probes observations, *J. Geophys. Res. Space Physics*, 120, 4863-4876, DOI: 10.1002/2015JA021065 Published: JUN 2015.
40. Zhao, H. (grad student), X. Li, et al. (2015), The evolution of ring current ion energy density and energy content during geomagnetic storms based on Van Allen Probes measurements, *J. Geophys. Res. Space Physics*, 120, 74937511, doi:10.1002/2015JA021533.
41. Dai, L., ..., X.Li, ... et al. (2015), Near-Earth injection of MeV electrons associated with intense dipolarization electric fields: Van Allen Probes observations, *Geophys. Res. Lett.*, 42, doi:10.1002/2015GL064955.
42. Jaynes, A. N., ..., X. Li, ... et al. (2015), Source and seed populations for relativistic electrons: Their roles in radiation belt changes, *J. Geophys. Res. Space Physics*, 120, doi:10.1002/2015JA021234.
43. Temerin, M., and X. Li (2015), The Dst index underestimates the solar cycle variation of geomagnetic activity, *J. Geophys. Res. Space Physics*, 120, doi:10.1002/2015JA021467.
44. Blum LW, Halford A, Millan R, Bonnell JW, Goldstein J, Usanova M, Engebretson M, Ohnsted M, Reeves G, Singer H, Clilverd M., and X. Li (2015), Observations of coincident EMIC wave activity and duskside energetic electron precipitation on 18-19 January 2013. *GEOPHYSICAL RESEARCH LETTERS* 42(14):5727-5735 28 Jul 2015
45. Li, X., R. S. Selesnick, D. N. Baker, A. N. Jaynes, S. G. Kanekal, Q. Schiller, L. Blum, J. Fennell, and J. B. Blake (2015), Upper limit on the inner radiation belt MeV electron intensity, *J. of Geophysical Res.*, 120(2):1215-1228 1 Feb 2015.
46. Lauren Blum (grad student), Xinlin Li, and Mick Denton, Rapid MeV electron precipitation as observed by SAMPEX/HILT during high speed stream driven storms, *J. of Geophysical Res.*, 120, doi:10.1002/2014JA020633.
47. Shen C., G. Zeng, X. Li, and Z. J. Rong, Evolution of the Storm Magnetic Field Disturbance around Earths Surface and the Associated Ring Current as Deduced from Multiple Ground Observatories, *J. Geophys. Res.*, 120(1):564-580 1 Jan 2015.
48. Shen C., Y. Y. Yang, Z. J. Rong, X. Li, M. Dunlop, C. M. Carr, Z. X. Liu, D. N. Baker, Z. Q. Chen, Y. Ji, G. Zeng (2014), Direct calculation of the Ring Current distribution and magnetic structure seen by Cluster during Geomagnetic Storms, *J. Geophys. Res.*, 119, doi:10.1002/2013JA019460.
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53. H. Zhao (grad student), X. Li, J. B. Blake, J. F. Fennell, S. G. Claudepierre, D. N. Baker, A. N. Jaynes, and D. M. Malaspina (2014), Characteristics of pitch angle distributions of hundreds of keV electrons in the slot region and inner radiation belt, *J. Geophys. Res. Space Physics*, 119, doi:10.1002/2014JA020386.
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**Peer-Refereed Monographs or Peer-Refereed Conference Proceedings Papers** (The full contents of each paper were reviewed by two referees):

1. Li, X., R. S. Selesnick, H. Zhao, D. N. Baker, J. B. Blake, and M. A. Temerin (2019), Source, Loss, and Transport of Energetic Particles Deep Inside Earth's Magnetosphere ( $L < 4$ ), AGU Monograph, in press.
2. Schiller, Q. (grad student), D. Gerhardt, L. Blum, X. Li, S. Palo (2014), Design and scientific return of a miniaturized particle telescope onboard the Colorado Student Space Weather Experiment (CSSWE) CubeSat, 35th IEEE Aerospace Conference, 8.1102.
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12. Li, X., A. A. Chan, M. K. Hudson, and I. Roth (1991), Ring Current Ion Interaction with Micropulsations During the Recovery Phase of Geomagnetic Storms, *AGU Monograph 'Magnetospheric Substorms*, edited by J. Kan, 64, 469.

#### **Book Chapters:**

1. Li, X. (2013) Recent Advances in Space Weather Forecast Using Solar Wind as Input in *Advances in Space Physics*, page 309-335, Edited by Wing Ip, Zhenxing Liu, and Jiankui Shi, Publisher: Science in China Press, Beijing, China Year: 2013, ISBN 978-7-03-038623-6.
2. Li, X. (1998) Rapid Formation of New Radiation Belts due to Interplanetary Shocks in *Recent development in Space Physics*, page 48-85, Edited by Baowei Lui, Wing Ip, Zhenxing Liu, Publishers: Science in China Press, Beijing, China Year: 2001, ISBN 7-03-008998-7.

#### **Non-Refereed Papers on Conference Proceedings and Newsletters:**

1. Li, X., Drew Turner, Weichao Tu, and Cora Randall, Energetic Particles from a highly Inclined Constellation (EPIC), White paper to Academy of Science/Research Council/Decadal Survey 2010.
2. Elkington, S. and X. Li, MORE/ORBITALS: An international mission to advance radiation belt science, White paper to Academy of Science/Research Council/Decadal Survey 2010.
3. Kanekal, S. G., ... X. Li., ..., Heliospheric Particle Explorer: Advancing our Understanding of Magnetospheric, Solar Energetic Particle, and Cosmic Ray physics, White paper to Academy of Science/Research Council/Decadal Survey 2010.
4. Li, X. and M. Temerin (2004), Real-time solar wind data from ACE make accurate forecasts of magnetic storms a reality, ACE News # 86-Nov. 15, 2004.
5. Sarris, T. (postdoc) and X. Li (2004), Test-particle simulation of the injection region of energetic particles associated with substorms, Proceedings of the 7th International Conference on Substorms, ISSN 0782-6079, page 228-231.
6. Li, X. (2002), Radiation Belt Electrons and Substorm Injections, International Conference on Substorms-6 Proceedings, Ed. by R. M. Winglee, page 305.
7. Li, X. (2000), Modeling Particle Injections–Test Particle Simulations, Proc. of the Fifth International Conference on Substorms, 369, ESA.
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9. Kamide, Y., J.-H. Shue, X. Li, et al. (1998), Internally and externally triggered substorms: A case study of the January 10, 1997 events, Substorm-4 Proceedings, Edited by S. Kokubun and Y. Kamide, page 305-308.
10. Mason, G. M., ..., X. Li, et al., SAMPEX: NASA's First Small Explorer Satellite, 1998 IEEE Aerospace Conference, paper 006, review copy, 1998.

11. Li, X., M. K. Hudson, J. B. Blake, I. Roth, M. Temerin, and J. R. Wygant (1996), Observation and Simulation of the Rapid Formation of a New Electron Belt, *AIP Conference Proceedings*, 383, edited by G. D. Reeves, 109.
12. Hudson, M. K., A. Kotelnikov, X. Li, et al. (1996), Modeling formation of new radiation belts and response of ULF oscillations following March 24, 1991 SSC, *AIP Conference Proceedings*, 383, edited by G. D. Reeves, 119.
13. Baker, D. N., ..., X. Li, et al. (1996), An assessment of space environmental conditions during the recent Anik E1 spacecraft operational failure, *ISTP Newsletter*, 6, No. 2, 8.
14. Li, X., H. R. Lewis, J. LaBelle, T.-D. Phan, and R. Treumann, Velocity Moments of the Ion Distribution Function and Empirical Closure Relations in the Earth's Magnetosheath, *Proc. 1995 Cambridge Symposium/Workshop on Multiscale Phenomena in Space Plasmas*, edited by T. Chang, 311, 1995.
15. Hudson, M. K., A. Chan, X. Li, and I. Roth, Ring Current ion Interaction with Pc 5 Micropulsations, *Physics of Space Plasmas, SPI Conf. Proc. and Rep. Series*, 10, 263, 1991.

**Invited talks at professional conferences and seminars at various institutes (contributed talks are not listed here):**

1. **Yes, a 60-year-old mystery in space physics resolved, thanks to our first CubeSat (CSSWE) measurements**, a Seminar given at at NOAA/Space Weather Prediction Center (SWPC) on 26 July 2018 (invited by Dr. Hazel Bain).
2. **The Sources for the Inner Radiation Belt-Revisited**, an INVITED talk given at the conference on Fundamental Physical Processes in Solar-Terrestrial Research and Their Relevance to Planetary Physics, at Kona, Hawaii, on 9 January 2018 (invited by Prof. Hui Zhang).
3. **Colorado Student Space Weather Experiment (CSSWE)**, an INVITED Talk given at Boulder Solar Day at NCAR on 15 March 2018 (invited by Dr. Derek Lamb).
4. **CubeSat: Inner Radiation Belt Experiment (CIRBE)**, an INVITED presentation on the project at NSF GEM workshop in Santa Fe, NM, on 21 June 2018 (invited by Dr. Weichao Tu).
5. **Quantitative Assessment of CRAND Contribution to the Relativistic Electrons in the Inner Belt and Slot Region**, an INVITED talk given at URSI meeting at Gran Canaria, Spain (Canary Islands) on 30 May 2018 (invited by Prof. Wen Li).
6. **Identification and Quantification of Cosmic-Ray Albedo Neutron Decay (CRAND) Contribution to the Relativistic Electrons in the Inner Belt and Slot Region**, an INVITED keynote talk given a Space Weather Conference at Mohe, China, hosted by National Space Science Center on 20 August 2018 (invited by Dr. Siqin Liu).

7. **How would a 60-year-old mystery in space physics be resolved, based on a student CubeSat (CSSWE) measurement?**, A seminar given at Wuhan University of China on 5 Feb 2018 (invited by Prof. Binbin Ni).
8. **Yes, a 60-year-old mystery in space physics resolved, thanks to our first CubeSat (CSSWE) measurements**, a keynote Seminar given at National Space Science Center, Chinese Academy of Sciences, Beijing, on 20 April 2018 (invited by Dr. Chi Wang).
9. **Yes, a 60-year-old mystery in space physics resolved, thanks to our first CubeSat (CSSWE) measurements**, invited by Maria Usanova, given at LASP, U. of Colorado at Boulder, 18 Jan 2018.
10. **CubeSat: Inner Radiation Belt Experiment (CIRBE)**. Invited by Takeshi SAKANOI, given at Asia Oceania Geosciences Society (AOGS), Singapore, 10 August 2017.
11. **What have we learned about the energetic particle dynamics in the inner belt and slot region from Van Allen Probes and CSSWE missions?** Invited by Sebastian Bourdarie, given at European Geophysical Union (EGU) in Vienna, Austria, 24 April 2017.
12. **Two Generations of CubeSat in University of Colorado to Address Heliospheric Physics**. Colloquium, invited by Joe Lemaire, given at Royal Belgian Institute for Space Aeronomy (IASB-BIRA), Brussels, Belgium, 13 April 2017.
13. **Two Generations of CubeSat in University of Colorado to Address Heliospheric Physics**, per invitation of Weichao Tu, Department of Physics, University of West Virginia, 23 February 2017.
14. Seminar given in Wuhan University of China on October 17th of 2016, per invitation of Binbin Ni, entitled: **Two Generations of CubeSat in University of Colorado to Address Heliospheric Physics**
15. Seminar given at the Department of Physics and Astronomy of Dartmouth College on May 27th of 2016, per invitation of Mary Hudson, entitled: **What have learned about the Inner Radiation Belt From Van Allen Probes and CSSWE Missions?**
16. Seminar given at NOAA/SWPC on November 10th of 2016, per invitation of Eric Adamson, entitled: **What have we learned about the inner radiation belt and slot region from Van Allen Probes and CSSWE missions?**
17. Seminar given on August 26th of 2016 at the National Space Science Center, Chinese Academy of Science, in Beijing, per invitation of Chi Wang, entitled: **Renewed Understanding of the Inner Radiation Belt Particle Dynamics**.
18. Invited (by Jacob Bortnik) talk given at Versim and Radiation Belt workshop at Hermanus, South Africa on September 22nd of 2016, entitled: **What have we learned about the inner radiation belt from DEMETER, Van Allen Probes, and CSSWE missions?**

19. Invited (by Sebastien Bourdarie) talk at EGU on April 20th of 2016, entitled: **Penetration Depths of Energetic Electrons and Ions into the Inner Magnetosphere and Their Contributions to the Ring Current Energy Content**,
20. Invited (by Kanako Seki) talk given at an International Workshop held in Nagoya University, Japan, on March 22nd of 2016, entitled: **Recent Advances in Understanding Radiation Belt Dynamics in the Earths Inner Zone and Slot Region**.
21. Seminar given at LASP as Friends of Magnetospheres (FOM) series on Feb 23rd of 2016, per invitation of Allison Jaynes, entitled: **What have learned about the Inner Radiation Belt From Van Allen Probes and CSSWE Missions?**
22. Seminar given at LASP on Jan 29th of 2016 as the PI training series for Junior scientists, per invitation of Associate Director for Science, Bruce Jakosky, entitled: **How to manage a CubeSat mission**.
23. **Renewed Understanding of the Radiation Belt and Ring Current Particle Dynamics**, a seminar given at Beihuan University, Beijing, China, July, 2015. *Wenlong Liu*
24. **Renewed Understanding of the Radiation Belt and Ring Current Particle Dynamics**, a seminar given at National Space Science Center, Academy of Science, Beijing, China, July, 2015. *Chao Shen*
25. **Generations of CubeSat in University of Colorado to Address Heliospheric Physics**, a seminar given at Wuhan University, Wuhan, China, March, 2015. *Binbin Ni*
26. **Generations of CubeSat in University of Colorado to Address Heliospheric Physics**, an INVITED talk given at AOGS, Singapore, August, 2015. *Andrew Yau*
27. **Renewed Understanding of Relativistic Electrons in the Inner Belt**, an INVITED talk given at International Workshop on Energetic Particle Processes of the near-Earth Space 17-23 May 2015 Paris, France. *Jean Francios Ripoll*
28. **Recent Advancements of Understanding of Relativistic Electrons in the Inner Belt**, an INVITED talk given at the Meeting of Americas, Montreal, Canada, May, 2015. *Shri Kanekal*
29. **Dynamics of Relativistic Electrons During Non-Storm Times**, an INVITED talk given at Geospace-2014 meeting at Rhodes, Greece, September, 2014. *Yannis Daglis*
30. **Three Generations of CubeSat in University of Colorado to Address Heliospheric Physics**, an INVITED talk given at COSPAR, Moscow, August, 2014. *Frdric Auchre*.
31. **Science Results and Lessons Learned from CubeSat: Colorado Student Space Weather Experiment (CSSWE)**, an INVITED talk given at COSPAR, Moscow, August, 2014. *Vincent Maget*
32. **Science Results from CubeSat: Colorado Student Space Weather Experiment (CSSWE)**, an INVITED talk given at AOGS, Sapporo, Japan, July, 2014. *Qiugang Zong*

33. **Status update on Colorado Student Space Weather Experiment (CSSWE)**, an INVITED talk at Van Allen Probes Science Work Group Meeting at APL, March, 2014. *Barry Mauk*
34. **Three Generations of CubeSat in University of Colorado to Address Heliospheric Physics**, a Seminar given at Air Force Research Lab, Albuquerque, NM, Nov 12, 2014. *Richard Selesnick*
35. **Three Generations of CubeSat in University of Colorado to Address Heliospheric Physics**, a Colloquium given at Department of Physics and Astronomy of Dartmouth College, September 26th, 2014. *Mary Hudson*
36. **CSSWE CubeSat- from Concept to Reality and its International impact**, a seminar given at Beihang University, China, July, 2014. *Jinbin Cao*
37. **CSSWE CubeSat- from Concept to Reality and its International impact**, a seminar given at Xi'an Technological University, China, June, 2014. *Yuhou Zhao*
38. **CSSWE CubeSat- from Concept to Reality and its International impact**, a seminar given at Peking University, China, June, 2014. *Suiyan Fu*
39. **Achievements and New Prospects of Our CubeSat Missions**, a seminar given at National Space Science Center of Chinese Academy of Sciences, June, 2014. *Chao Shen*
40. **Relativistic Electron and Proton Telescope integrated little telescope (REPTile), its design, manufacture, calibrations pre-flight and post-flight**, a seminar given at National Space Science Center of Chinese Academy of Science, Jan. 2014. *Yueqiang Sun*
41. **Tiny Satellite and its Big Impact**, a seminar about our CubeSat mission given at National Space Science Center of Chinese Academy of Science, Jan. 2014. *Yueqiang Sun*
42. **Colorado Student Space Weather Experiment (CSSWE) CubeSat Mission: a Success in Education, Engineering, and Science**, an INVITED plenary talk given at Global Chinese Space Weather Conference, Guilin, China, 11 November 2013. *Xueshang Feng*
43. **Tiny Satellite and its Big Impact**, a seminar given at Baoshan Institute, Yunnan, China, 6 November 2013. *Xinqi Li*
44. **New Science Results from Van Allen Probes (aka Radiation Belt Storm Probes) Mission**, an INVITED talk given at THE 2nd ASIA-OCEANIA SPACE WEATHER ALLIANCE WORKSHOP, Kunming, China, 4 November 2013. *Siqin Liu*
45. **Yes, solar wind controls geomagnetic activity! But to what extent?** a seminar given at LASP FOM (Friends of Magnetosphere), 22 October 2013. *Rob Wilson*



46. **Colorado Student Space Weather Experiment (CSSWE) CubeSat Mission: a Success in Education, Engineering, and Science**, a presentation given to the EAB (external advisory board) of Dept. of Aerospace Engineering Sciences, CU/Boulder, 18 October 2013. *Penny Axelrad*
47. **MinXSS: Miniature X-ray Solar Spectrometer- A Three-Axis Stabilized CubeSat for Conducting Solar Physics**, a seminar given at University of Science and Technology of China, Hefei, 11 October 2013. *Quanming Lu*
48. **Colorado Student Space Weather Experiment (CSSWE) CubeSat Mission: a Success in Education, Engineering, and Science**, a seminar given at University of Science and Technology of China, Hefei, 10 October 2013. *Quanming Lu*
49. **Van Allen Probe Mission (formerly known as Radiation Belt Storm Probes Mission)**, a seminar given at KASI (Korea Astronomy and Space Science Institute), Daejeon, Korea, 14 August 2013. *Junga Hwang*
50. **Colorado Student Space Weather Experiment (CSSWE) CubeSat Mission: a Success in Education, Engineering, and Science**, a seminar given at KARI (Korea Aerospace Research Institute), Daejeon, Korea, 14 August 2013. *Yu Yi*
51. **MinXSS: Miniature X-ray Solar Spectrometer- A Three-Axis Stabilized CubeSat for Conducting Solar Physics**, a seminar given at School of Space Research, Kyung Hee University, Korea, 13 August 2013. *Minhwan Jang*
52. **Van Allen Probe Mission (formerly known as Radiation Belt Storm Probes Mission)**, a seminar given at School of Space Research, Kyung Hee University, Korea, 12 August 2013. *Minhwan Jang*
53. **Colorado Student Space Weather Experiment (CSSWE) CubeSat Mission: a Success in Education, Engineering, and Science**, a seminar given at School of Space Research, Kyung Hee University, Korea, 12 August 2013. *Minhwan Jang*
54. **New results from the Colorado CubeSat and comparison with Van Allen Probes data**, an INVITED talk given at AOGS, Brisbane, Australia, June 2013. *Toni Lui*
55. **Colorado Student Space Weather Experiment (CSSWE) CubeSat Mission: a Success in Education, Engineering, and Science**, an INVITED plenary talk given at GEM workshop, Snowmass, Colorado, June 2013. *David Sibeck*
56. **New results from the Colorado CubeSat and comparison with Van Allen Probes data**, an INVITED talk given at Meeting of Americas, Cancun, Mexico, May 2013. *Weichao Tu*
57. **First Results from Colorado Student Space Weather Experiment (CSSWE): Energetic Particle Distribution in Near Earth Environment**, an INVITED talk given at *Space Weather Week*, Boulder, Colorado, on 16 April 2013. *Howard Singer*

58. **Science Results from Colorado Student Space Weather Experiment (CSSWE): Energetic Particle Distribution in Near Earth Environment**, an INVITED talk at EGU, Vienna, April 2013. *Ioannis Daglis*
59. **Telescope Measurements of Energetic Particles: from PET to REPT to REPTile**, a seminar given at Space Science Group at Caltech, on 1 April 2013. *Richard Mewaldt*
60. **Small Mission (CSSWE) Big Impact on Space Weather Research**, an INVITED talk given to Deep Space Exploration Society, Boulder, Colorado, on 16 March 2013. *Wayne Green*
61. **Small Mission (CSSWE) Big Impact on Space Weather Research**, a seminar given at NOAA/SWPC on 28 Feb 2013.
62. **Our First CubeSat Mission: Concept to Reality and Impact**, a seminar given at LASP, U. of Colorado at Boulder on 24 Jan 2013. *Andrew Colette*
63. **Colorado Student Space Weather Experiment (CSSWE) CubeSat Mission: a Success in Education, Engineering, and Science**, a seminar given at NCAR/HAO on 16 Jan 2013. *Mark Miesch*
64. **On the RBSP Mission and its Role in the Study of Relativistic Electron Energization**, an INVITED talk given at AOGS, Melbourne, Australia, on 15 August 2012. *Yuto Katoh*
65. **Colorado Student Space Weather Experiment (CSSWE): Differential Flux Measurements of Energetic Particles in a Highly Inclined Low Earth Orbit**, an INVITED talk given at AOGS, Melbourne, Australia, on 15 August 2012. *Andrew Yau*.
66. **Colorado Student Space Weather Experiment**, a seminar talk given at National Center of Space Weather, Chinese Academy of Sciences, in Beijing, on 1 June 2012. *Chi Wang*
67. **Current status of forecasting relativistic electrons at geosynchronous orbit and renewed understanding of the correlation between solar wind parameters and the enhancement of relativistic electrons** given at National Space Science Center, Chinese Academy of Science, Beijing, on 7 May 2012. *Siqin Liu*
68. **The best is yet to come: our CubeSat is to be launched in August**, a colloquium given at the Dept of Physics and Astronomy of Dartmouth College, on 30 March 2012. *Mary Hudson*
69. **Influence of Solar Wind on the Inner Magnetosphere: solar wind speed and magnetic field on the radiation belt electrons at geosynchronous orbit**, an INVITED talk at Inner Magnetosphere Conference at UCLA, on 21 March 2012. *Tuija Pulkkinen*
70. **CubeSat: Colorado Student Space Weather Experiment (CSSWE)**, INVITED talk at GEM Workshop, Santa Fe, on 29 June 2011. *Charles Swenson*

71. **CubeSat: Colorado Student Space Weather Experiment (CSSWE)**, INVITED talk at NASA/RBSP/Science Working Group meeting at APL, on 24 May 2011. *Robyn Millan*
72. **Behavior of MeV Electrons at Geosynchronous Orbit During the Last two Solar Cycle ==; Renewed Understanding**, INVITED talk at International Symposium From Solar Storm to Geomagnetic Storm, Shanghai, on 9 May 2011. *Q. G. Zong*
73. **Radiation Belt Electrons in the Magnetosphere**, INVITED review talk at Workshop on Inner Magnetosphere Dynamics, Beijing, on 6 May 2011. *Chao Shen*
74. **The Behavior of MeV Electrons at Geosynchronous Orbit During the Last two Solar Cycles: Renewed Understanding of the External Driver**, Seminar given at LASP, University of Colorado at Boulder, on 1 March 2011. *Stefan Eriksson*
75. **Determining the loss of radiation belt electrons: What measurements and models are required?(What will our CubeSat do?)**, Seminar given at Dept. of Aerospace Engineering Sciences, University of Colorado at Boulder, on 3 November 2010. *Jeff Forbes*
76. **CubeSat: Colorado Student Space Weather Experiment**, Seminar given at Peking University, Beijing, August 31, 2010. *Suiyan Fu*
77. **Determining the Loss of Radiation Belt Electrons: What Measurements and Models are Required?** Seminar given at The Center for Space Science and Applied Research, Chinese Academy of Sciences, Beijing, August 31, 2010. *Shen Chao*
78. **Energetic electrons in the central plasmasheet and ULF in the inner magnetosphere: CLUSTER and THEMIS observations**, INVITED talk, at CLUSTER 10th Anniversary Workshop at CORFU, Greece, September of 2010. *Matt Taylor*
79. **Quantify the precipitation loss of radiation belt electrons observed by SAMPEX and Introduction of the USA NSF CubeSat Program**, at Chinese Space Weather Meeting in Shanghai, July 28-Aug 2, 2010. *Fengsi Wei*
80. **Long term observation of solar wind, inner magnetosphere, and radiation belt electrons**, at “ERG, SCOPE and Beyond” workshop at JAXA, ISAS (Sagamihara Campus), Japan, 2-5 Nov., 2009. *Yoshizumi Miyoshi*
81. **NASA Radiation Belt Storm Probe Mission**, at “ERG, SCOPE and Beyond” workshop at JAXA, ISAS (Sagamihara Campus), Japan, 2-5 Nov., 2009. *Yoshizumi Miyoshi*
82. **Latest Advancement on Space Weather Prediction**, at the Second International Space Weather Conference in Nanjing, China, October 17-21, 2009. *Chuanyi Tu*
83. **Variability of radiation belt electrons at Earth**, at European Planetary Science Congress, Potsdam, Germany, Sept., 2009. *Nicolas Andrew*

84. **Space Weather: why do we care?** Seminar given at Peking University, Beijing, May 20, 2009. *Lun Xie*
85. **Challenges in Space Weather**, Seminar given at The Center for Space Science and Applied Research, Chinese Academy of Sciences Beijing, May 21, 2009. *Shen Chao*
86. **Forecast of Relativistic Electron Flux at Geosynchronous Orbit With and Without Solar Wind Input**, at EGU, April 2009. *Norma Crosby*
87. **THEMIS, NASA's First Five Spacecraft Constellation Mission**, LASP Public Lecture, April 7, 2009. *Erin Wood*
88. **THEMIS Mission, a miracle! (low cost and high science return)**, Seminar given at LASP, September 11, 2008. *Phil Chamberlin*
89. **THEMIS Mission, a miracle! (low cost and high science return)**, Seminar given at The Center for Space Science and Applied Research, Chinese Academy of Sciences Beijing, July 10, 2008. *Shen Chao*
90. **Energetic Particle Injections Observed by THEMIS and Other Satellites**, AOGS (Asia Oceania Geosciences Society), June 17, 2008, Busan, Korea. *Xiaohua Deng*
91. **Quantitative Forecast of Relativistic Electron Flux at GEO Based on Measured Energetic Electron Flux Only**, Seminar given at The Center for Space Science and Applied Research, Chinese Academy of Sciences Beijing, March 31, 2008. *Shen Chao*
92. **Predicting Relativistic Electron Flux at GEO Based on Local Electron Flux only and/or Solar Wind Measurements**, Seminar given at Peking University, Beijing, March 28, 2008. *Lun Xie*
93. **What THEMIS can do for inner magnetospheric sciences during its extended mission phase**, THEMIS team meeting, Dec. 15 of 2007, at U. of California at Berkeley. *David Sibeck*
94. **Challenge in Space Weather**, at the 3rd Chinese CAWSES Space Weather Symposium, Aug. 7-10, 2007, Guiyang, China. *Xueshang Feng*
95. **Prediction of the Dst and AL Indices Using Solar Wind Parameters**, at the 3rd Chinese CAWSES Space Weather Symposium, Aug. 7-10, 2007, Guiyang, China. *Xueshang Feng*
96. **Simulating Radial Diffusion of Outer Radiation Belt Electrons**, AOGS, Aug. 2, 2007, Bangkok, Thailand. *Mei-Ching Fok*
97. **THEMIS' Contribution to Radiation Belt Sciences**, at the pre-THEMIS Launch Science Meeting, Radisson Resort at the Port, Cape Canaveral Florida, 2/13-14/07. *David Sibeck*
98. **Real-time forecast, how do we deal with real-time data gaps?** Workshop on Issues Regarding Real-Time Forecast, LASP, 2/8/07. *Michael Gehmeyr*

99. **THEMIS' Contribution to Radiation Belt Study**, THEMIS science workshop, Space Sciences Lab, UC Berkeley, December 15, 2006. *David Sibeck*
100. **The Role of Radial Transport in Accelerating Radiation Belt Electrons**, Seminar given at NCAR/HAO on December 6, 2006. *Mike Wiltberger*
101. **Radial transport in energizing radiation belt electrons in the magnetosphere**, COSPAR 36th, Beijing, China, July 16-23, 2006. *Obara*
102. **Sun, Solar Wind, and Geomagnetic Storms**, Western Pacific Geophysics Meeting, Beijing, July, 2006. *Jie Zhang*.
103. **On the relation between plasmasphere and outer Radiation belt electrons**, Western Pacific Geophysics Meeting, Beijing, July, 2006. *Mei-Ching Fok*.
104. **Relation Between Plasmasphere and Outer Radiation Belt**, Seminar given at The Center for Space Science and Applied Research, Chinese Academy of Sciences Beijing, 11 May, 2006. *Shen Chao*
105. **Solar Wind and Geomagnetic Storms**, International Living With a Star (ILWS) Workshop on "The Solar Influence on the Heliosphere and Earth's Environment: Recent Progress and Prospects," Goa, India, Feb. 19-24, 2006. *David Sibeck*.
106. **Magnetospheric Responses to the Solar Events**, The International Space Weather Conference, Macau, China, Nov. 21-25, 2005. *Jiusheng Yao*.
107. **Solar Wind Variations and Magnetospheric Responses**, The International Space Weather Conference, Macau, China, Nov. 21-25, 2005. *Fengsi Wei*
108. **Modeling of the deep inward transport of radiation belt electrons during Oct-Nov magnetic storms of 2003**, seminar given at Peking University, Beijing, 3 August, 2005. *Suiyan Fu*
109. **Modeling of the deep inward transport of radiation belt electrons during Oct-Nov magnetic storm of 2003**, Asia Oceania Geosciences Society Meeting, Singapore, 20-24 June, 2005. *Mei-Ching Fok*
110. **The Global Interactions Between the Solar Wind and Magnetosphere**, Asia Oceania Geosciences Society Meeting, Singapore, 20-24 June, 2005. *Suiyan Fu*
111. Seminar given at LASP magnetospheric group, **Energetic electrons, 50keV - 6MeV, at geosynchronous orbit: their responses to solar wind variations**, 15 February, 2005. *Yi-Jiun Su*
112. **Acceleration of Relativistic Electrons during Recurrent Storms**, AGU Chapman Conference on "Corotating Solar Wind Streams and Recurrent Geomagnetic Activity" in Manaus, Brazil, 6-12 February 2005. *Robert McPherron*

113. **Variations of Radiation Belt Electrons as a Function of Solar Wind: Their Prediction and Physical Mechanisms**, Asia Oceania Geosciences Society, Singapore, July 5-9, 2004. *Mannuel Grande*
114. **The Predictability of the Magnetosphere and Space Weather**, Asia Oceania Geosciences Society, Singapore, July 5-9, 2004. *Wing Simon*
115. **Predicting Radiation Belt Electron Fluxes and Space Weather Implications**, Spring AGU, Montreal, Canada, May 17-21, 2004. *S. G. Kanekal*
116. **The Predictability of the Earth's Magnetosphere and Space Weather Implication**, Seminar Given at Space Weather Laboratory, Chinese Academy of Sciences, Beijing, May 17, 2004. *Chao Shen*
117. Jan. 22, 2004, Seminar given at LASP, **The Predictability of the Magnetosphere and Space Weather**. *Laila Andersson*
118. Nov. 6, 2003, Seminar given at Space Environment Center, NOAA, Boulder, **Predictability of the Magnetosphere**. *Doug Biesecker*
119. April 6-11, 2003, EGS-EGU-AGU, Nice, France. **Enhanced physical understanding based on prediction of relativistic electrons using solar wind as input**. *Manuel Grande*
120. March 25-29, 2003, Advanced Research Workshop on Effects of Space Weather on Technology Infrastructure (ESPRIT), on the island of Rhodes, Greece. **Radiation Belt Forecasting**. *Yannis Daglis*
121. Jan. 6-8, 2003, Relativistic Electron Workshop at Maui, Hawaii. **Current Status of the Theory and Modeling of Radiation Belt Electrons in the Magnetosphere**. *J. B. Blake*
122. Oct. 28-29, 2002, GOES Energetic Particle Workshop at NOAA/SEC Boulder, Colorado. **Requirements for High-energy Electron Measurements**. *J. Mazur*
123. Oct. 10, 2002, Huntsville 2002, Astrophysical Particle Acceleration in Geospace and Beyond, at Chattanooga, Tennessee. **Acceleration of Relativistic Electrons in the Earth's Magnetosphere**. *J. Horwitz*
124. July 9-12, 2002 Western Pacific Geophysical Meeting, Wellington, New Zealand. **Long Term and Short Term forecast of Radiation Belt Electrons**. *Steve Curtis*
125. March 25-29, 2002, The Sixth International Conference on Substorms (ICS-6) University of Washington, Seattle, Washington. **Influence and Signatures of Energetic Particles in Substorm Development**. *R. Winglee*
126. Feb. 14, 2002, Seminar given at LASP, **SUN-EARTH CONNECTION: Quantitative Prediction of Radiation Belt Electrons in the Earth's Magnetosphere Based on Solar Wind Measurements**. *Greg Kopp*

127. Jan. 3, 2002, Seminar given at the Department of Aerospace Engineering Sciences of University of Colorado, **Quantitative Prediction of Radiation Belt Electrons in the Earth's Magnetosphere Based on Solar Wind Measurements** *Charbel Farhat.*
128. June 28, 2001, Seminar given at the Department of Geophysics, Peking University, Beijing, **Sun-Earth Connection.** *Z. Pu*
129. June 27, 2001, Seminar given at Center for Space Science and Applied Chinese Academy of Sciences, Beijing. **Sun-Earth Connection.** *Chao Shen*
130. June 27, 2001, Seminar given at Center for Space Science and Applied Research, Chinese Academy of Sciences, Beijing. **Quantitative Prediction of Radiation Belt Electrons in the Earth's Magnetosphere Based on Solar Wind Measurements.** *Chao Shen*
131. July 24-27, 2001, International Space Environment Conference 2001: Radiation Belt Science and Technology (ISEC 2001), at Queenstown, New Zealand. **Long Term Measurements of MeV Electrons by SAMPEX and Quantitative Prediction of MeV Electrons at Geostationary Orbit Using Solar Wind as the Only Input.** *Anthony Chan*
132. April 9-11, 2001, ISTP workshop, at APL, Maryland. **Quantitative Prediction of Radiation Belt Electrons in the Earth's Magnetosphere Based on Solar Wind Measurements.** *D. N. Baker*
133. March 28, 2001, Invited Seminar Speaker on **Quantitative Prediction of Radiation Belt Electrons at Geostationary Orbit Based on Solar Wind Measurements** at Solar Terrestrial Environment Lab at University of Nagoya, Japan. *Y. Kamide*
134. March 14, 2001, AGU Chapman Conference on Storm-Substorm Relationship at Lonavala, India. **Quantitative Prediction of Radiation Belt Electrons at Geostationary Orbit Based on Solar Wind Measurements.** *S. Sharma*
135. Nov. 10, 2000, Seminar given at Center For Integrated Plasma Studies (CIPS)/U. of Colorado on **Quantitative Prediction of MeV Electrons at Geostationary Orbit on the Basis of Solar Wind Measurements.** *Chet Nieter*
136. Oct. 19, 2000, Seminar given at Space Environment Center/NOAA on **Quantitative Prediction of MeV Electrons at Geostationary Orbit on the Basis of Solar Wind Measurements.** *Tom Detman*
137. Sept. 28, 2000, COSPAR-Colloquium, Space Weather Study Using Multi-point Techniques, at Taipei, Taiwan, **Predicting MeV Electron Variations at Geosynchronous Orbit From a Physics-based Diffusion Model Using Solar Wind as the Only Input.** *J. Chao*
138. Aug. 31, 2000, Seminar given at LASP/U. of Colorado on **Quantitative Prediction of MeV Electrons at Geostationary Orbit on the Basis of Solar Wind Measurements.** *Amanda Hendrix*

139. May 19, 2000, International Conference on Substorms-5 at St. Petersburg, Russia. **Modeling Particle Injections–Test Particle Simulations.** *Dick Wolf*
140. April, 29, 2000, EGS 2000 at Nice France, **Energetic Particle Dynamics in the Earth’s Magnetosphere.** *Manuel Grande*
141. Nov. 23, 1999, Invited Seminar Speaker on **Energetic Particle Dynamics in the Earth’s Magnetosphere**, University of Alaska, Fairbanks. *A. R. Chowdhury*
142. Nov. 22, 1999, Invited Guest Lecturer on **The Mystery of Dispersionless Injection of Energetic Particles Associated With Magnetospheric Substorms**, University of Alaska. *A. R. Chowdhury*
143. June 21, 1999, NSF/GEM Workshop at Snowmass, Colorado, **Rapid Enhancements of Relativistic Electrons Deep in the Magnetosphere During the May 15, 1997 Magnetic Storm.** *Geoff Reeves*
144. June 22, 1999, NSF/GEM Workshop at Snowmass, Colorado, **Simulation of energetic particle injections due to interplanetary shock impact and substorm on Aug. 26, 1998.** *Mary Hudson*
145. Jan. 18, 1999, Relativistic Electron Workshop, Maui, Hawaii, **REVIEW Talk: Outer Radiation Belt Electrons.** *J. B. Blake*
146. Jan. 14, 1999, Space Environment Center/NOAA, Boulder, Colorado, **Dispersionless Injections and Drift Echoes of Energetic Particles Associated With Magnetospheric Substorms.** *Rodney Vierek*
147. Nov. 5, 1998, LASP, University of Colorado, Boulder, **Dispersionless Injections and Drift Echoes of Energetic Particles Associated With Magnetospheric Substorms.** *Dan Baker*
148. Nov. 3, 1998, IGPP, University of California, Los Angeles, **Dispersionless Injections and Drift Echoes of Energetic Particles Associated With Magnetospheric Substorms.** *Bob McPherron*
149. Oct. 25, 1998, Sixth Huntsville Modeling Workshop, Guntersville, Alabama, **REVIEW Talk: Recent Radiation Belt Enhancements.** *Bob Hoffman*
150. Sept. 24, 1998, ISTP European Science Workshop/The Inner Magnetosphere Session, **Keynote Address: Initial Enhancements of Relativistic Electrons in the Magnetosphere in Response to Solar Wind.** *Howard Singer and Geoff Reeves*
151. June 17, 1998, NSF/GEM Workshop at Snowmass, Colorado, **Simulation of Dispersionless Injections and Subsequent Drift Echos of Energetic Electrons Associated with Substorms.** *J. Birn*
152. June 16, 1998, NSF/GEM Workshop at Snowmass, Colorado, **TUTORIAL Talk: Radiation Belt Electrons: Current Understanding and Remaining Problems.** *Geoff Reeves*
153. June 15, 1998, NSF/GEM Workshop at Snowmass, Colorado, **Differences and causes of the initial enhancements of relativistic electrons during different storms.** *Geoff Reeves*



154. June 19, 1997, NSF/GEM Workshop at Snowmass, Colorado, **Source of Relativistic Electrons in the Magnetosphere: Present Knowledge and Remaining Questions.** *Mary Hudson*
155. June 18, 1997, NSF/GEM Workshop at Snowmass, Colorado, **Energetic electron injections into the inner magnetosphere during January 10-11, 1997 magnetic cloud event.** *Geoff Reeves*
156. March 7, 1997, Air Force Research Laboratory, Hanscom Field, MA 01731, **Source of Relativistic Electrons in the Magnetosphere: Present Knowledge and Remaining Questions.** *Greg Ginet*
157. March 6, 1997, Princeton Plasma Physics Laboratory, **Present Understanding of Radiation Belt Electrons in the Magnetosphere and Remaining Problems.** *Frank Cheng*
158. March 4, 1997, **Radiation Belt Electrons in the Magnetosphere: Present Knowledge and Remaining Problems.** *John Wygant*
159. Jan. 22, 1997, LASP, University of Colorado, **Solar Wind and Relativistic Electrons in the Earth's Magnetosphere.** *Dan Baker*
160. June 26, 1996, NSF/GEM Workshop at Snowmass, Colorado, **Solar Wind Effects on Relativistic Electrons in the Magnetosphere.** *Geoff Reeves*
161. May 7, 1996, Space Environment Center/NOAA, Boulder, Colorado, **The Source, Loss, Energization, and Transport of Relativistic Electrons in the Magnetosphere.** *Terry Onsager*
162. April 16, 1996, COSPAR Colloquium at Beijing, **Multi-Satellite Observations of the Outer Zone Electron Variation During the 1-10 November 1993.** *R. L. Xu*
163. March 7, 1996, Data Workshop for the National Space Weather Event, Nov. 3-4, 1993 magnetic storm, **Correlation between solar wind condition with enhancement of relativistic electrons in the magnetosphere.** *John Freeman*
164. March 6, 1996, Department of Space Physics and Astronomy, Rice University, **Formation of Radiation Belts in the Magnetosphere.** *Anthony Chan*
165. March 4, 1996, Front Range Branch AGU Annual Meeting, **Solar Wind Effects on Relativistic Electrons in the Magnetosphere.** *Dan Baker.*
166. Jan. 11, 1996, NSF/GEM GGCM Campaign/SEC Space Weather Workshop, Boulder, Colorado, **Rapid Loss of Outer Zone Electrons.** *Mary Hudson*
167. Oct. 18, 1995, Workshop on Radiation Belts: Model & Standards, Brussels, Belgium, Oct. 17-20, 1995, **Simulation of the Rapid Formation of a New Electron Radiation Belt During March 24, 1991 SSC.** *Joe Lemaire*
168. Oct. 5, 1995, LASP, University of Colorado, **New Radiation Belts in the Magnetosphere.** *Dan Baker*

169. May 15, 1995, Department of Physics, University of Alberta, Edmonton, Canada, **Formation of Radiation Belts in the Magnetosphere.** *Gordon Rostoker.*
170. Feb. 24, 1995, Cambridge Symposium-Workshop, Feb. 20-25, 1995-Bermuda, **Characteristics of Velocity Moments of the Ion Distribution Function in the Earth's Magnetosheath.** *Tom Chang*
171. Feb. 17, 1995, Physics Department, Auburn University, Auburn, Alabama, **New Radiation Belts in the Magnetosphere.** *Steve Knowlton*
172. Oct. 27 PM, 1994, High Altitude Observatory, NCAR, Boulder, Colorado, **New Radiation Belts in the Magnetosphere.** *Paul Song*
173. Oct. 27 AM, 1994, Space Environment Laboratory, NOAA, Boulder, Colorado, **Observation and Simulation of the Rapid Formation of a New Electron Radiation Belt During March 24, 1991 SSC.** *Howard Singer*
174. Oct. 25, 1994, Space and Atmospheric Sciences Division, Los Alamos National Laboratory, **Formation of New Radiation Belts During the March 24, 1991, SSC.** *Michelle Thomsen*
175. Aug. 15, 1994, Taos Workshop on the Earth's Trapped Particle Environment, **Observation and Simulation of the Rapid Formation of a New Electron Radiation Belt During March 24, 1991 SSC.** *Geoff Reeves*
176. July 26, 1994, Western Pacific Geophysics Meeting, Hongkong, **Field-Aligned Energization of Ions by Ponderomotive Force.** *Tom Chang*
177. June 3, 1994, Workshop at Goddard Space Flight Center, **Simulation and Observation of Particle Energization During the March 24, 1991 SSC.** *David Stern*
178. Dec. 14, 1993, Air Force Research Laboratory (former AFGL), Hanscom Field, MA 01731, **Simulation of the Prompt Creation of the New Radiation Belt during the March 24, 1991 SSC.** *Greg Ginet*
179. Nov. 12, 1993, Herzberg Institute of Astrophysics, National Council of Canada, Ottawa, **Simulation of the Prompt Creation of the New Electron Radiation Belt during the March 24, 1991 SSC.** *Brian Whalen*
180. Oct., 1992, Institute for the Study of Earth, Oceans and Space, University of New Hampshire, **Ponderomotive Effects on Ion Acceleration in the Auroral Zone.** *Phill Isenberg*
181. Aug., 1992, Lockheed Palo Alto Research Laboratories, **Ponderomotive Effects on Ion Acceleration in the Auroral Zone.** *Dan Murphy*
182. April, 1992, Center for Space Physics, Rice University, **Ring Current Oxygen Ion Interaction with Micropulsations.** *Pat Reiff*

183. Mar., 1992, Institute for the Study of Earth, Oceans and Space, University of New Hampshire, **Loss of Ring Current  $O^+$  Ions due to Interaction with Pc 5 Waves.** *Phill Isenberg*
184. Feb., 1992, Space Sciences Laboratory, University of California, Berkeley, **Loss of Ring Current  $O^+$  Ions due to Interaction with Pc 5 Waves.** *Bob Lin*

**Research Funding Received as PI:** (for the following grants in which I am the PI. Unless specified, there are no funded co-investigators, 100% of the funds are for myself and my research group)

1. NASA/LWS program  
Title: Quantitative Forecasts and Specifications of Outer Radiation Belt Electrons Based on Solar Wind Conditions  
\$407,119.00, with \$140K subcontracted to Computational Physics Institute (CPI). 05/01/2019-04/30/2021.
2. NASA/H-TIDES/LCAS  
Title: CubeSat: Inner Radiation Belt Experiment (CURBE)  
\$4M, with \$230K subcontracted to Air Force Research Lab. 08/13/2018-08/12/2022.
3. NASA/NESSF  
Title: Characterizing the role of innermost plasmopause location in determining the initial enhancements of outer belt electrons (keV to MeV)  
\$45,000, 9/1/18-8/31/19 (to support grad student Lengying Khoo)
4. NASA/NESSF  
Title: Quantifying the Precipitation Loss of Energetic Electrons in the Radiation Belt  
\$45,000, 9/1/18-8/31/19 (to support grad student Kun Zhang)
5. NASA/Guest Investigator program  
Title: On the Effectiveness of Inward Radial Diffusion in the Energization of Outer Belt Electrons - Based on Data from the Van Allen Probes and THEMIS Missions  
\$160,000, 07/01/17 - 06/30/20
6. NASA/NESSF  
Title: Electric field signatures of 10s to 100s keV electron injections deep into the inner magnetosphere  
\$60,000, 9/1/15-5/31/17 (to support grad student Sam Califf)
7. NSF/Base Program  
Title: Analysis and Modeling of the Data from CubeSat Colorado Student Space Weather Experiment  
\$345,000, 07/15/15-07/14/18.

8. NASA/HGI program  
Title: On The Precipitation Loss of Outer Belt Electrons  
\$329,958, 2/1/15-1/31/18.
9. CU/LASP Internal Seed Grant  
Title: System Engineering Study for a technology demonstration mission to L5  
electron and proton telescope) for NSF CubeSat  
\$50,000, 3/01/14-12/31/14.
10. NASA/Guest Investigator Program  
Title: Formation and decay of the inner radiation belt  
\$80,516, 2/01/14-1/31/17.
11. NASA/NESSF program  
Title: Sudden Enhanced Precipitation Loss of Radiation Belt Electrons  
\$60,000, 9/1/12-8/31/14 (This is for my graduate student Lauren Blum)
12. NSF/National Space Weather Program  
Title: COLLABORATIVE RESEARCH: Advancing Radiation Belt Forecasting With Data Assimilation and Machine Learning  
\$170,000 5/1/12-4/30/15.
13. NSF/CubeSat Program  
Title: CubeSat: Colorado Student Space Weather Experiment  
\$998,484 (\$195,418 is allocated to Dept. of Aerospace Engineering Sciences for Dr. Palo, a Co-PI on this project), 1/01/10-5/31/14.
14. NSF/Base Program  
Title: Acceleration of Radiation Belt Electrons: in situ vs inward radial transport  
\$302,300, 4/01/09-3/31/14.
15. NASA/Guest Investigator Program  
Title: Energetic Electron Dynamics in the Magnetosphere  
\$338,849, 5/01/09-4/30/14.
16. NASA/LWS TR&T Program  
Title: Loss of Outer Radiation Belt Electrons, a high priority of LWS/RBSP mission.  
\$274,618, 5/07/09-6/07/13.
17. NSF/GEM Program  
Title: Phase Space Density Gradient of Energetic Electrons at Geosynchronous Orbit During Sharp Solar Wind Pressure Enhancements  
\$154,025, 6/01/09-5/31/11.

18. CU/LASP Internal Seed Grant  
Title: Spaceflight Instrument Development: Miniaturizing REPT (relativistic electron and proton telescope) for NSF CubeSat  
\$15,000, 1/15/08-12/31/08.
19. NSF/Base Program  
Title: Quantification of Radial Diffusion in Energizing MeV Electrons in the Magnetosphere  
\$244,398, 3/31/06-4/1/09.
20. NSF/National Space Weather Program  
Title: Quantitative Forecast and Specification of Radiation Belt Electrons  
\$267,557, 7/15/05-7/14/09.
21. NASA/Living With a Star Program  
Title: Dynamics of Radiation Belt Electrons Associated with Solar Wind Variations  
\$223,871, 5/01/03-4/30/07.
22. NSF/Base Program supplement fund for supporting a graduate student  
Title: Source of Radiation Belt Electrons.  
\$30,000, 9/1/04–1/31/06.
23. NSF/Base Program  
Title: Source of Radiation Belt Electrons.  
\$228,730, 2/1/03–1/31/07.
24. NASA NRA-01-SEC-041  
Title: Solar Wind Fluctuations and Their Consequences on the Magnetosphere  
\$255,737, 3/1/01 - 2/28/05.
25. NASA/Living With a Star Program/EPO supplement fund, 75% for supporting Co-I: Emily CoBabe-Ammann of LASP and 25% sub-contracted to NASA/Langely Center.  
\$45,000, 5/01/03-4/30/06.
26. NSF/GEM Program  
Title: Detailed study of the magnetic storms selected for GEM Inner Magnetosphere and Storms Campaign  
\$150,000, 6/1/01–5/31/04.
27. NASA NRA-99-OSS-01  
Title: Energization and Loss of Outer Radiation Belt Electrons.  
\$23,000, 7/15/03-7/14/04.

28. NASA NRA-99-OSS-01  
Title: Energization and Loss of Outer Radiation Belt Electrons.  
\$127,578, 7/15/00-7/14/03.
29. NSF/GEM, ATM-9901085  
Title: Energetic Particle Dynamics During Geomagnetic Storms and Magnetospheric Substorms  
(supplement fund for undergraduate research experiences)  
\$5,000, 10/1/00-9/30/01.
30. NSF/GEM, ATM-9901085  
Title: Energetic Particle Dynamics During Geomagnetic Storms  
and Magnetospheric Substorms.  
\$123,070, 10/1/99-9/30/02.
31. NSF/Base Program  
Title: Source of Radiation Belt Electrons.  
\$122,311, 10/1/99-9/30/02.
32. NASA NRA-98-OSS-01  
Analyzing the Loss, Energization, and Transport of Energetic Electrons in the Magnetosphere.  
\$40,500, 5/15/99-5/14/00.
33. Lockheed Martin  
Title: Modeling of energetic ion dynamics associated with substorms.  
\$15,000, 1/1/98-12/31/98.
34. NASA NRA-95-OSS-01  
Analyzing the Loss, Energization, and Transport of Energetic Electrons in the Magnetosphere.  
\$233,900, 5/15/96-5/14/99.
35. NSF/GEM  
Title: Modeling Energetic Particle Injections During Geomagnetic Storms and Magnetospheric Substorms  
(supplement fund for undergraduate research experiences).  
\$5,000, 6/15/97-6/14/98.
36. NSF/GEM  
Title: Modeling Energetic Particle Injections During Geomagnetic Storms and Magnetospheric Substorms.  
\$100,087, 6/15/96-6/14/99.

**Research Funding Received as Co-I:**

1. NASA/LWS/RBSP/Energetic Particle, Composition, and Thermal Plasma (ECT) instrument suite, PI: Harlan Spence; Institute PI: Dan Baker.  
\$14,953,478 + unknow amount for FY 2017-2018, 12/1/06-10/31/18. I was helping to develop the relativistic electron and proton telescope (REPT) and am now involved with data analysis and modeling.
2. NASA/LWS/RBSP/Electric Field Instrument (EFI), PI: John Wygant; Institute PI: Bob Ergun.  
\$3,903,075 + unknow amount for FY 2017-2018, 12/1/06-10/31/18. I was helping to specify the measurement requirement in order to achieve the definitive science objectives and am now involved with data analysis and modeling.
3. NASA/MIDEX, Time History of Events and Macroscale Interactions During Substorms (THEMIS), PI: Vassili Angelopoulos; Institute PI: Robert Ergun.  
\$3,288,598, 6/15/02–9/30/19. My current portion of the funding has been for partially supporting a graduate student, or a research associate, and part of my summer salary.
4. NASA/Heliophysics/Geospace Science/Transport of radiation belt electrons via magnetospheric ULF waves in a realistic geomagnetic field, PI: Scot Elkington  
\$539,397, 3/1/09-2/28/13.
5. CU Engineering Excellence Fund/A Vertically Integrated Picosatellite Design Laboratory for Projects Based Learning, PI: Scott Palo  
\$29,657, 2010-2011.
6. NASA/LWS/RBSP/Mission of Opportunity Radbelt Explorer (MORE), PI: Dan Baker  
\$1.5 Million, 12/1/06-12/31/09, for phase A study. As the Deputy-PI, I led the task of completing the Science Requirement Document (SRD).
7. NASA/UNEX, Inner Magnetosphere Explorer (IMEX), PI: John Wygant  
\$293,961, 10/15/98–10/31/01, for Phase A study. My basic duty was to attend the weekly meeting with engineers to bridge between the science requirements and engineering feasibility. The project was cancelled after Phase A study due to the uncertainties of the launch vehicle.
8. NASA/SMEX, Solar, Anomalous, and Magnetospheric Particle Explorer (SAMPEX), PI: Dan Baker  
\$1,351,519, 8/15/94–8/31/07. Funding received so far is \$1,301,519 and the rest (50K) covered up to 8/31/07. My portion of the funding varied year to year, ~\$10k-60k/yr. Now the NASA/SAMPEX flight mission was already ended but the data are still being analyzed.

**Research Funding Received as a Team Member:**

1. NSF/Center for Integrated Space Weather Modeling (CISM), PI: Dan Baker,  
\$4,608,900, 8/1/03–7/31/12. My portion of the funding varies year to year, ~\$30k-80k/yr.

2. ESA&NASA/CLUSTER/RAPID, PI at CU: Dan Baker  
\$951,237, 1/1/02–12/16/10. My portion of this funding varies year to year, ~\$5k-60k/yr.
3. NASA/Polar/CEPPAD, PI: Dan Baker  
\$1,067,000, 1/15/02–7/31/08. My portion of the funding varies year to year, ~\$5k-20k/yr.

### **TEACHING**

Taught ASEN 3113 (Thermodynamics and Heat Transfer) alone (for lecture and design lab), 191 students, in Fall 2018.

Taught ASEN 3113 (Thermodynamics and Heat Transfer) alone, 150 students, in Fall 2017.

Taught ASEN 3113 (Thermodynamics and Heat Transfer) alone, 100 students, in Fall 2015.

Taught ASEN 5335 Aerospace Environment in the Spring of 2015.

Taught ASEN 4018 (senior design) for 2014-2015.

Taught ASEN 5018-6028: Spaceflight Hardware Design (I&II) since Fall of 2010, until Fall of 2014.

Taught ASEN 3113 (Thermodynamics and Heat Transfer) alone, 88 students in Fall 2012 and 101 students in 2015.

Taught ASEN 4018 (senior design) for 2010-2012.

Taught ASEN 3113 (Thermodynamics and Heat Transfer) alone, 79 students in Fall 2008.

Created (with Prof. Palo) a new two-semester graduate course, ASEN 5519-6519: Spaceflight Hardware Design, which was taught in Spring and Fall of 2007 (course rating 5.9 and instructor rating 5.9). This course was taught again (with a different hardware project) in Spring (course rating 3.9 and instructor rating 4.6), Fall of 2008 and 2009, Spring of 2010.

Developed and taught (Fall 06) ASEN 5050: Space Flight Dynamics (course rating 4.5 and instructor rating 4.4)

Developed and taught (Fall 01, Spring 03; 07; 15) ASEN 5335.

Revamped and taught (Fall 02, Spring 03, 04, 05, 06) ASEN 4010: Introduction to Space Dynamics (course rating B-, A, B+, B+, B and instructor rating B, A, B+, B+, B).

Developed and taught (Fall 05) ASEN 3113: Thermodynamics and Heat Transfer (Course rating B+ and instructor rating A).

Taught (Fall 03, 04) ASEN 2002: Introduction to Thermodynamics and Aerodynamics (course rating B+, B and instructor rating A, B).

**Ph.D. supervision completed**



Daniel Moorer (co-supervised with Dan Baker), 6/00, “Modeling High-Energy Electron Flux in the Outer Radiation Belt”, Dept. of Aerospace Engineering Sciences, University of Colorado at Boulder.

Theodore Sarris (co-supervised with N. Tsaggas), 6/03, “Energization of Hot Plasma Populations in Dynamic Magnetic Fields”, Dept. of Electronic Engineering, Demokritus University of Thrace, Xanthi, Greece.

Lun Xie (co-supervised with Z. Y. Pu), 01/05, “Research on the Multiscale Dynamics of the Radiation Belt”, Dept. of Geophysics, Peking University, Beijing, China.

Jennifer Gannon (Primary Advisor), 12/05, “Energetic Electron Dynamics in the Magnetosphere,” Dept. of Physics, University of Colorado at Boulder.

Wenlong Liu (co-supervised with Suiyan Fu), 12/06, “The variations of  $N^+$  in the ring current during magnetic storms,” School of Earth and Space Sciences Peking University, Beijing, China.

Edward Burin des Roziers (Primary Advisor), 5/09, Dept. of Aerospace Engineering Sciences.

Drew Turner (Primary Advisor), 12/10, Dept. of Aerospace Engineering Sciences.

Weichao Tu (Primary Advisor), 5/11, Dept. of Aerospace Engineering Sciences.

Rob Redmond (Primary Academic Advisor), 5/12, Dept. of Aerospace Engineering Sciences.

Bingxian Luo (Primary Research Advisor), 5/12, The National Space Science Center, Chinese Academy of Sciences, Beijing.

Lauren Blum (Primary Advisor), 6/14, Dept. of Aerospace Engineering Sciences.

Quintin Schiller (Primary Advisor), 8/15, Dept. of Aerospace Engineering Sciences.

Hong Zhao (Primary Advisor), 12/15, Dept. of Aerospace Engineering Sciences.

James Mason (Primary Academic Advisor), 5/16, Dept. of Aerospace Engineering Sciences.

Sam Califf (Primary Advisor), 11/16, Dept. of Aerospace Engineering Sciences.

**Ph.D. supervision in progress**

Kun Zhang (expected in 2019, Primary Advisor), Dept. of Aerospace Engineering Sciences.

Leng Ying Khoo (expected in 2021, Primary Advisor), Dept. of Aerospace Engineering Sciences.

Jonathan Darnell (expected in 2021, Primary Academic Advisor), Dept. of Aerospace Engineering Sciences.

Elise Rimsa (expected in 2023, Primary Advisor), Dept. of Aerospace Engineering Sciences.

### **M.S. supervision completed**

Sierra M. Flynn, 11/17, Dept. of Aerospace Engineering Sciences.

Edward Burin des Roziers, 12/05, Dept. of Aerospace Engineering Sciences.

Austin Barker, June of 2005. Austin was going for his Ph.D. degree (he passed Ph.D. preliminary exam and was preparing for his Ph.D. comprehensive exam). Unfortunately he died on 28 May 2005 from a rock climbing accident. He was awarded a posthumous M.S. degree.

Weichao Tu, 5/08, Dept. of Aerospace Engineering Sciences.

Drew Turner, 5/08, Dept. of Aerospace Engineering Sciences.

Michael Klapetzky, 1/10, Dept. of Aerospace Engineering Sciences.

Dongwon Lee, 5/10, Dept. of Aerospace Engineering Sciences.

Quintin Schiller, 12/11, Dept. of Aerospace Engineering Sciences.

Ian Barry, 5/13, Dept. of Aerospace Engineering Sciences.

Samantha Liner, 5/14, Dept. of Aerospace Engineering Sciences.

### **Served on the Ph.D. thesis committee of the following students in addition to those mentioned above**

Niescja E. Turner (Ph.D. in 6/00)

Joshua Rigler (Ph.D. in 9/04)

Kim Cierpik (Ph.D. in 5/05)

Phil Chamberlin (Ph.D. in 12/05)

Brian Poller (Ph.D. in 5/09)

David Gerhardt (Ph.D. in 1/14)

Ethan Peck(Ph.D. in 11/14)

Leela O'Brien (Ph.D. in 05/17)

Alex Barrie (Ph.D. in 05/18).

### **Postdoctoral supervision**

Zheng Xiang, 3/18-

Allison Jaynes, 2/13-12/15  
 Bingxian Luo, 12/12-3/13  
 Weichao Tu, 5/11-1/12  
 Wenlong Liu, 4/07-9/10  
 Theodore Sarris, 6/03-11/06.

## **SERVICE**

### **Service to the Research Community**

- Per invitation of Geological Society of America, presented our work, published in Nature, at the exhibit at Capital Hill sponsored by the Coalition of National Science Funding (CNSF). Our exhibition entitled: "Yes, a 60-year-old mystery in space physics resolved, thanks to our student satellite" was well attended by Congressmen, Congressional staff members, NSF leaders, and others.
- Chaired a NASA-review panel, working inside a hotel near Washington DC for 4 days with another dozen of reviewers, and completed the task professionally.
- As co-conveners of the AGU Chapman Conference on Radiation Belt Dynamics, we also proposed to have special issue of JGR to publish results relevant to the Conference topic. Our proposal was accepted and all co-conveners act as a guest editor for this special JGR issue in 2018.
- Served as a co-convener for AGU Chapman Conference in 2018, on Radiation Belt Dynamics. Each Co-convener wrote one chapter of the proposal and pre-proof read one other chapter of the proposal. We also had several tele-conferences and many email exchanges to discuss how to run this conference effectively, which commenced in early March of 2018 in Portugal, with over 120 participants. The meeting has been a great success.
- Served as a co-convener for a special session in AOGS 2019: New Perspectives on Earths Inner Magnetosphere from Multipoint Satellite Observations and Data-ingestive Modeling. AOGS 2019 is to be held in Singapore in July.
- Served as the leading convener for a special session in AOGS 2018: The Responses of Earths Inner Magnetosphere to Extreme Solar Events.
- Served as a co-convener proposed for a special session in Fall AGU 2017: Radiation belt dynamics in the Earth's inner zone and slot region. The proposed session was combined with another session.
- Served as a co-convener for a special session in Fall AGU 2016: Radiation belt dynamics in the Earth's inner zone and slot region.
- Chaired a NASA review panel in November of 2016 in Washington DC, which lasted four days.
- Co-Chaired a special oral session and poster session in Fall AGU on December 15th, 2016.
- Wrote numerous letters in 2016-2017 for colleagues who applies for faculty jobs and who were reviewed for tenure.
- Served on the Program Advisory Committee for Space Physics Research Facility (SPRF) being built at Harbin Institute of Technology (HIT), China. The activity of 2015 included traveling there for 3 days and worked with other committee members to complete the required Review Report.

- Served as a co-convenor for a proposed AGU Chapman Conference in 2017, on Radiation Belt Dynamics. Each Co-convenor wrote one chapter of the proposal and pre-proof read one other chapter of the proposal. The proposal has been accepted by AGU. The Chapman Conference is scheduled to commence in early March of 2018.
- Served as a co-convenor for a special session in Fall AGU 2015: Radiation belt dynamics in the Earth's inner zone and slot region.
- Served as a local co-convenor for the L5 Consortium Meeting, which was held at LASP during 2-4 December 2014.
- Served on LANL/IGPPS external review board, meeting at LANL during June 10-11, 2013, numerous proposals were reviewed prior to the on-site meeting.
- Served on NASA/Heliophysics Roadmap committee, the charge is to construct a strategic plan, based on the Decadal Survey, to guide the implementation of critical science in the NASA/heliophysics program. We have had numerous in-person meetings and telecons since 2012, and continue.
- Served as an Editor for JASS (Journal of Astronomy and Space Sciences), an official journal of the Korean Space Science Society, 2014 -
- Served on Editorial Committee of J. of Chinese Space Sciences, 2008-2014. The duties included to recommend suitable papers submitting to the journal, to review some manuscripts as a referee, to make suggestions to improve the editorial work, etc.
- Served as an Associate Editor for Journal of Geophysical Physics, JGR, (Space Physics), 2008-2014. As part of the duty, reviewed a great number of controversial manuscripts, meaning that the authors and one of the two reviewers have irreconcilable opinions about the manuscript.
- Team member on NASA/LWS/RBSP "Tiger Team", a splinter group to do focused work on providing an objective set of criteria (based on mapping to the Radiation Belt science objectives and approaches used to bring closure to those objectives) for deciding what the RBSP orbit should be. Weekly telecon and "homework assignments" for over a month (May-June of 2007).
- Served as the Co-chair of the organization committee for the 2nd International Space Weather Conference, 17-21 October 2009, Nanjing, China, and delivered the conference closing speech.
- Team member of NASA Magnetospheric Constellation Science and Technology Definition Team, 2003-2004. One of the Team's responsibilities is to determine a set of compelling science objectives and an orbital strategy for the magnetospheric constellation mission, which will consist of 30 to 80 Nano-satellites to investigate various aspects of magnetospheric dynamics.
- Served on NASA/Geospace Proposal Review Panel, 2010, 2011, 2013, 2016.
- Served on NSF/GEM Proposal Review Panel, 2011, 2013.
- Served as a co-convenor for CLUSTER-THEMIS Science Workshop held at LASP, during 1-5 October 2012.
- Served on Program Committee for THEMIS Science Workshop held at LASP, 23-25 March 2009.
- Co-convened the Inner Magnetosphere Session in Joint CLUSTER/THEMIS workshop, at University of New Hampshire, Sept 22-26, 2008.
- Served as a co-convenor for a special session entitled: Inner Magnetospheric Dynamics, 2013 Asian

Oceanic Geophysical Society Assembly.

- Lead-convener for a special session entitled: Storm-dependent Inner Magnetospheric Dynamics, in 2008 Asian Oceanic Geophysical Society Assembly.
- Served in review panel for NSF National Space Weather Program in 2007.
- Co-convener a special session: Acceleration of Radiation Belt Electrons: Inward Radial Transport vs. in situ Energization, for Fall American Geophysical Union (AGU) meeting, 5-10 December 2005.
- Co-convener a special session: Responses of Earth's space environment to Solar Events, in Global Chinese Aerospace Weather Science Meeting, Macau, 21-25 November 2005.
- Co-convener a special session: Magnetospheric Response to Extreme Solar Events, in AOGS (Asia Oceania Geosciences Society) annual meeting, Singapore, 20-24 June 2005.
- Served on NASA/SEC/Solar Terrestrial Probe/Magnetospheric Constellation Science and Technology Study and Definition Team, 1999-2004.
- Served as the study scientist (with John Wygant) in 2004 for NASA/SEC/Road Map/Inner Magnetospheric Constellation Mission. In collaboration with NASA engineers, we investigated a range of possible mission configurations to satisfy cost cap (\$300M).
- Served on student-paper evaluation committee of AGU (2003, 2004, 2008, 2010).

**Reviewer for:**

NASA Sun-Earth Connection/Guest Investigator/Living With a Star proposals

NASA/SR&T proposals

National Science Foundation Base Program and Geophysical Environment Modeling proposals

National Space Weather Program

Journal of Geophysical Research – Space Physics

Journal of Geophysical Research – Atmospheric Physics

Journal of Atmospheric and Solar-Terrestrial Physics

Geophysical Research Letters

Annales Geophysicae

Earth, Planets and Space

Science of China

Advanced Geophysics

Advanced Plasma Physics

One chapter in book: Jupiter - The Planet, Satellites and Magnetosphere.

Reviewed and proof-read two chapters of Space Weather classnotes of Prof. Knipp of Air Force Academy in 2006.

**Service to the University**

- Served on the Campus Transportation Committee, which met 5 times and completed its final report to the Provost, 2010.
- Participated in a meeting on 1/27/06 about Provost initiative in international education, focusing on enhancing CU's visibility in China and recruiting good graduate students from China.

### **Service to the College and Graduate School**

- Served on the Blue Ribbon Committee on Department-Institute Relations, 2012.
- Served in Undergraduate Education Council of College of Engineering and Applied Sciences, 2007-2008.
- Participated in a meeting on 9/7/06 hosted by Graduate School Dean (Susan Avery) on China Initiative, enhance collaboration between CU graduate programs and several Chinese Universities.

### **Service to the Department**

- Served on the post tenure review committee for Prof. Scott Palo (2018).
- Served on the post tenure review committee for Prof. Hanspeter Schaub (2018).
- Served on the evaluation committee for the Prof. Bob Marshal's re-appointment (2018).
- Served on on the evaluation committee for the re-appointment of Dr. Jelliffe Jackson of Aero Dept (2015-2016).
- Served as the Chair of PUEC for the promotion of Prof. HP Schaub to the rank of full professor.
- Served on Undergraduate Student Committee, 2012-2013
- Served on Graduate Student Committee, 2008-2012
- Served on the post-tenure review committee for Prof. W. Emery, 2012.
- Served on AERO Graduate Curriculum Committee, 2002-2008.
- Served as AERO K. D. Wood Colloquium Chair in 2009, responsible for inviting appropriate speakers (Prof. Jakosky of LASP and Prof. Harlan Spence of UNH) for speaking at K. D. Wood Colloquium.
- Served on Undergraduate Teaching Curriculum Committee of Dept. of Aerospace Engineering Sciences, 2006-2010.
- Served on the search committee of Senior Instructor of Dept. of Aerospace Engineering Sciences, 2007-2008.
- Served on AERO graduate student recruit and curricular committee, 2007-2008.
- Participated in two meetings in 2006 and 2007 between LASP and AERO about the Initiative for Hands-On Education and Research (proposed by AERO, led by Lee Peterson). The purpose of the meetings was to make best use of LASP facilities and engineering experience to enhance the training for space for the graduate students. Other participants: Dan Baker, Lee Peterson, Mike McGrath, Scott Palo.
- Served as the formal AERO department representative to the planetary graduate student admissions committee, 2004-2006.

### **Service to LASP**

- Served on the promotion committee for Dr. Hong Zhao to RS-II (2018-2019)
- Served on the Promotion committee for Dr. Xiaohua Fang to RS-III (2018-2019).
- Served on the search/evaluation committee for hiring Dr. Steve Schwartz as a RS-III in 2017 (Dr. Schwartz joined LASP in early Jan of 2018).
- Served on the search committee for hiring a business analyst/grant manager in early 2017. Amy Jarboe was hired and started to work at LASP in middle of 2017.
- Served on the search/evaluation committee for hiring Dr. Phil Chamberlain as a RS-III in 2017. Dr.

Chamberlain will join LASP in late 2018.

- Served on the merit evaluation committee of LASP tenured and tenure-track faculty members, 2013-2015.
- Served on on the evaluation committee for the promotion of Dr. Allison Jayne of LASP to RS-II (2015)
- Served on the search committee for faculty positions (CCLDAS) at LASP jointed with AERO, APS, and Physics, 2009-2010. The search was successful, both offers were accepted and the candidates came on board in 2011.
- Served on Evaluation Committee of LASP for Dr. Wenlong Liu's promotion from Scientist-I to Scientist-II, 2010.
- Served on Evaluation Committee of LASP for Dr. Peter Delamere's promotion from Scientist-II to Scientist-III, 2009.
- Served as the group leader for space physics for the Research Associate (RA) evaluations of LASP in 2007-2008, going through every RA's file and talking in person to every RA in space physics discipline (total 12) and attended meetings with other group leaders and LASP management to decide their merit raise.
- Served as a red-team reviewer on proposal HPAC (Heliophysical Pathways to Atmospheric Coupling), 2007-2008.
- Organize a LASP seminar given by Dr. Paul Graf on Recurring Surprises in PI-led Space Missions, June 1, 2007.
- Served as Evaluation Committee Chair for Dr. Shri Kanekal's promotion from Scientist-II to Scientist-III, 2007-2008.
- Served as Evaluation Committee Chair for Dr. Scot Elkington's promotion from Scientist-II to Scientist-III, 2007-2008.
- Served in Evaluation Committee for Dr. Michael Gehmeyr for transfer from the PRA career track to the Research Scientist career track, 2007.
- Served on LASP Executive Committee from 2002-2007.
- Served on promotion committee for T. E. Sarris of LASP to be promoted from Scientist-I to Scientist-II in 2006.
- Served on LASP Executive Committee, 2003-2007.
- Served on promotion committee for two young scientists of LASP to be promoted from Scientist-I to Scientist-II in 2004-2005.
- Organize a series of AERO/LASP technology seminar in 2002. Arranged AERO faculty members: Steve Nerem, Lee Peterson, Penny Axelrad, and Dale Lawrence to give technology seminars to LASP engineers and scientists, also arranged Mike McGrath, director of LASP engineer division, to give a talk at AERO describing 'Instrument and Spacecraft Engineering at LASP' to ASE faculty and students.
- Served on LASP Education and Public Out Reach Committee, 2002-2010.
- Served on LASP graduate student curriculum committee, 2002.
- Served on AERO/LASP Cooperation Committee, 2002-2005.
- Served on LASP faculty search committee for the National Science Foundation funded solar and

space faculty position in 2005.

- Served as the Chair of promotion committee for a young scientist of LASP to be promoted from Scientist I to Scientist II in 2004.

#### **Outreach Activities:**

- Answered phone calls and emails to news median reporters in December of 2017 regarding the publication of our recent *Nature* paper.

- Gave a LASP Public Lecture about CubeSat: Our First Student CubeSat Mission: From Concept to Reality and Impact, Boulder public on 1/22/14.

- Gave a LASP Public Lecture about NASA's THEMIS mission to Boulder public on 4/7/09.

- Gave a general non-technical talk about NASA's THEMIS mission to all LASP employees on 3/2/07.

- In late January of 2007 (before THEMIS' launch), responded to e-mail inquiries and talked on the phone to a freelance journalist, Margaret Putney, for Geotimes doing a story on the THEMIS mission to look at and study the northern lights and particularly discussed the following questions: So what do we know about the northern lights? What don't we know? So are we trying to answer all those questions about what we don't know? Do the lights really disrupt cell phones or is that a myth? Where will this research lead us? What do you personally hope to learn from this mission?

- Gave a presentation about LASP sciences to a 12-person delegation from the Malaysian Space Agency on 15 Feb 2006.

- As a scientist guest speaker at Monarch K-8 on 15 September 2005, I discussed with 6th grade students when/how I was intrigued to choose science as my career, what education is needed to become a scientist, what I do at work, and beginning and high end salaries for scientists in general.

- Wrote a feature article published in EOS newspaper: The Predictability of the Magnetosphere and Space Weather, a feature article in EOS, AGU, Step. 16, 2003. Such a feature article brings more attention to the relevance of Sun-Earth Connection research to other disciplines.

- Gave a science talk about the solar system to a 3<sup>rd</sup> grade class in Monarch Public School, Louisville, Colorado, 2003.

- Discussed solar activities and their consequences on Earth's space environment with Colorado 9 news reporter, Amanda Martin, before she went on TV reporting the Oct-Nov, 2003 solar flares and magnetospheric storm events.

- Exchanged e-mail discussions with a Science News reporter, Ron, about solar activities and their consequences on Earth's space environment before they published an article about the Oct-Nov. 2003 solar flares and magnetospheric storms.