

Brian Walko Grefenstette  
*Curriculum Vitae*

**Address:**

California Institute of Technology  
Space Radiation Laboratory  
290-17

1200 East California Blvd  
Pasadena, CA 91125

**Office: (626) 395-8037    Mobile: (650) 387-3951**

**Citizenship:** United States

**Email:** [bwgref@srl.caltech.edu](mailto:bwgref@srl.caltech.edu)

**Research Interests**

High-energy processes in astrophysics, atmospheric physics, and space physics.  
Instrumentation development, calibration, and implementation.

**Education**

2009    Ph.D., Physics, University of California, Santa Cruz

    Dissertation Title: *Satellite Observations of Terrestrial Gamma-ray Flashes*

2007    M.S., Physics, University of California, Santa Cruz

2004    B.S., Physics, Stanford University

    Departmental Honors and Concentration in Astrophysics

**Work Experience**

**9/09 – curr    Postdoctoral Researcher**

    Space Radiation Laboratory, California Institute of Technology

- Member of the Nuclear Spectroscopic Telescope ARray (*NuSTAR*) Instrument Team.
- Responsible for the design and implementation of the calibration experiments for the X-ray detectors for *NuSTAR*.
- Responsible for data processing and data management for the ground-based calibration effort.
- Responsible for the analysis, visualization, and interpretation of calibration data.

**6/09 – 9/09 Postdoctoral Researcher**

    Physics Department and Santa Cruz Institute for Particle Physics,  
    University of California, Santa Cruz

- Development, calibration, and implementation of a suite of detectors for the remote sensing of X-ray and gamma-ray emission from lightning for the Airborne Detector for Energetic Lightning Emission (ADELE).

- Flight operations, data processing, and data management for the ADELE flights.
- Production of science papers based on the ADELE data and previous satellite observations of energetic emission from thunderstorms.

9/05 – 6/09 Graduate Student Researcher  
 Physics Department and Santa Cruz Institute for Particle Physics,  
 University of California, Santa Cruz

- Data reduction and analysis of on-orbit satellite data for both atmospheric and astrophysical observations.
- Understanding of the on-orbit operation of satellites for observation of extreme data.

9/04 – 9/05 Teaching Associate  
 Physics Department and Astronomy Department,  
 University of California, Santa Cruz

6/02 – 6/04 Student Research Assistant  
 Physics Department, Stanford University

6/03 – 6/04 Teaching Associate  
 Physics Department, Stanford University

6/00 – 8/00 Science and Engineering Apprenticeship Program  
 U.S. Naval Observatory, Washington, DC

6/99 – 8/99 Science and Engineering Apprenticeship Program  
 U.S. Naval Observatory, Washington, DC

### **Fellowships and Awards**

2008 Chancellor's Dissertation Year Fellowship  
 2007 Outstanding Student Paper Award, American Geophysical Union Fall Meeting  
 2002, 2003 Summer Research Fellow, Stanford University

### **Professional Societies**

American Geophysical Union  
 Society of Photo-Optical Instrumentation Engineers (SPIE)

### **Programming Environments/Languages**

IDL, MATLAB, FORTRAN, C, Mathematica, Unix/Linux, MacOS, Windows

## Refereed Publications

Pre-prints available upon request.

“The Nuclear Spectroscopic Telescope Array (*NuSTAR*)”, Harrison, F. for the *NuSTAR* Team, *Proceedings of the SPIE*, Volume 7732, pp. 77320S-77320S-8 (2010)

“Terrestrial gamma ray flashes correlated to storm phase and tropopause height”, Smith, D. M.; Hazelton, B. J.; Grefenstette, B. W.; Dwyer, J. R.; Holzworth, R. H.; Lay, E. H., *Journal of Geophys. Res.*, 115, A00E49, (2010)

“Estimation of the fluence of high-energy electron bursts produced by thunderclouds and the resulting radiation doses received in aircraft”, Dwyer, J. R.; Smith, D. M.; Uman, M. A.; Saleh, Z.; Grefenstette, B.; Hazelton, B.; Rassoul, H. K., *Journal of Geophys. Res.*, 115, D09206, (2010)

“High-energy electron beams launched into space by thunderstorms,” Dwyer, J.R., Grefenstette, B.W., and Smith, D.M. *Geophys. Res. Lett.*, 35, L02815 (2008)

“Thunderstorm characteristics associated with RHESSI identified terrestrial gamma ray flashes”, Splitt, M. E.; Lazarus, S. M.; Barnes, D.; Dwyer, J. R.; Rassoul, H. K.; Smith, D. M.; Hazelton, B.; Grefenstette, B.W., *Journal of Geophys. Res.*, 115, A00E38, (2010)

“The First RHESSI Terrestrial Gamma-ray Flash Catalog”, Grefenstette, B. W., Smith, D. M., Hazelton, B. J., and Lopez, L. I., *Journal of Geophys. Res.*, 114, A02314, (2009)

“The spectral dependence of terrestrial gamma-ray flashes on source distance”, Hazelton, B. J., Grefenstette, B. W., Smith, D. M., Dwyer, J.R., Shao, X.M., Cummer, S. A., Chronis, T., Lay, E.H., and Holzworth, R. H., *Geophys. Res. Lett.*, 36, L01108 (2009)

“Time evolution of terrestrial gamma ray flashes”, Grefenstette, B. W., Smith, D. M., Dwyer, J. R., and Fishman, G. J., *Geophys. Res. Lett.*, 35, L06802, (2008)

## Conference Presentations and Non-refereed Publications

\*oral presentations

“First results from the Airborne Detector for Energetic Lightning Emissions (ADELE)”, Smith, D. M.; Dwyer, J. R.; Grefenstette, B.; Hazelton, B. J.; Martinez-McKinney, F.; Zhang, Z.; Lowell, A.; Kelley, N. A.; Splitt, M. E.; Lazarus, S. M.; Ulrich, W.; Rassoul, H.; Schaal, M.; Saleh, Z. H.; Cramer, E.; Shao, X.; Ho, C.; Cummer, S. A.; Lu, G.; Blakeslee, R. *AGU Fall Meeting*, San Francisco, (2009)

“An overview of the first RHESSI catalog of terrestrial gamma-ray flashes (TGFs) and the influence of the tropopause height on the detection efficiency of TGFs” Grefenstette, B.; Smith, D. M.; Hazelton, B. J.; Dwyer, J. R., *AGU Fall Meeting*, San Francisco, (2009)

“Positron production during relativistic runaway processes associated with thunderstorms”, Dwyer, J. R.; Smith, D. M.; Rassoul, H.; Cramer, E. S.; Schaal, M.; Saleh, Z. H.; Grefenstette, B.; Hazelton, B. J.; Splitt, M. E.; Lazarus, S. M.; Fishman, G. J.; Briggs, M. S.; Connaughton, V. *AGU Fall Meeting*, San Francisco, (2009)

\*“Spectroscopy of the BATSE TGFs with the LADs”, Grefenstette, B. W.; Smith, D. M.; Hazelton, B. J.; Dwyer, J. R., *URSI Radio Science Meeting*, Boulder, (2009)

“Comparison of thunderstorm systems that produce or lack RHESSI identified terrestrial gamma ray flashes”, Splitt, M. E.; Barnes, D. E.; Dwyer, J. R.; Rassoul, H.; Lazarus, S. M.; Smith, D. M.; Cramer, E. S.; Schaal, M.; Saleh, Z. H.; Ulrich, W.; Grefenstette, B.; Hazelton, B. J. *AGU Fall Meeting*, San Francisco, (2009)

“Modeling RHESSI TGFs as a distribution in source altitude, distance, beaming direction and luminosity” Hazelton, B. J.; Smith, D. M.; Grefenstette, B.; Dwyer, J. R.; Lay, E. H.; Holzworth, R. H., *AGU Fall Meeting*, San Francisco, (2009)

“Thunderstorm top characteristics of RHESSI identified terrestrial gamma-ray flashes”, Splitt, M. E.; Lazarus, S. M.; Dwyer, J. R.; Rassoul, H.; Smith, D. M.; Hazelton, B. J.; Grefenstette, B. W., *AGU Fall Meeting*, San Francisco, (2008)

“The high-energy radiation dose received aboard aircraft exposed to a terrestrial gamma-ray flash”, Dwyer, J. R., Smith, D.M., Grefenstette, B. W., Hazelton, B. J., *AGU Fall meeting*, San Francisco, (2008)

“The Airborne Detector for Energetic Lightning Emissions (ADELE)”, Smith, D.M., Hazelton, B. J., Grefenstette, B. W., Martinez-McKinney, F., Zhang, Z. Y., *Workshop on Coupling of Thunderstorms and Lightning Discharges to Near-Earth Space*, University of Corte, Corsica, France (2008)

“Spectroscopy of the BATSE TGFs with the LADs”, Grefenstette, B. W.; Smith, D. M.; Hazelton, B. J.; Dwyer, J. R., *AGU Fall Meeting*, San Francisco (2008)

\*“High Energy Secondary Electron Beams produced by Terrestrial Gamma-ray Flashes”, Grefenstette, B. W., Dwyer, J. R., Smith, D. M., *Workshop on Coupling of Thunderstorms and Lightning Discharges to Near-Earth Space*, University of Corte, Corsica, France (2008)

“The spectral dependence of TGFs on source distance”, Hazelton, B. J.; Grefenstette, B. W.; Smith, D. M.; Dwyer, J. R.; Lay, E. H.; Holzworth, R. H.; Shao, X.; Chronis, T., *AGU Fall Meeting*, San Francisco, (2008) and *URSI Radio Science Meeting*, Boulder, (2009)

\*“A reanalysis of the time evolution and spectroscopy of the BATSE TGFs”, Grefenstette, B. W., Smith, D. M., Dwyer, J. R., and Fishman, G. J., *AGU Fall Meeting*, San Francisco, CA (2007) and *National Radio Science Meeting*, Boulder, CO (2008)

“Unusual RHESSI TGFs: Electron Beams and Others”, Smith, D. M.; Dwyer, J. R.; Grefenstette, B. W.; Hazelton, B. J.; Yair, Y.; Bor, J.; Lay, E. H.; Holzworth, R. H., *AGU Fall Meeting*, San Francisco, (2007)

“Energetic electron beams injected into the magnetosphere by terrestrial gamma-ray flashes”, Dwyer, J. R., Grefenstette, B. W., Smith, D.M., *AGU Fall Meeting*, San Francisco, (2007)

“Spectral Analysis of Terrestrial Gamma-ray Flashes from BATSE”, Grefenstette, B. W., Smith, D. M., Fishman, G. J., and Dwyer, J. R., *AGU Fall Meeting*, San Francisco, CA (2006)

“The Anomalous Terrestrial Gamma-ray Flash of 17 January 2004”, Smith, D. M.; Grefenstette, B. W.; Splitt, M.; Lazarus, S. M.; Rassoul, H. K.; Coleman, L. M.; Dwyer, J. R.; Lay, E. H.; Holzworth, R. H.; Cohen, M. B.; Said, R.; Inan, U. S.; Chronis, T. G.; Takahashi, Y., *AGU Fall meeting*, San Francisco, (2006)

“VLF-Inferred Characteristics of Lightning Associated with Terrestrial Gamma Ray Flashes”, Cummer, S. A.; Smith, D. M.; Grefenstette, B. W.; Stanley, M. A. *AGU Fall Meeting*, San Francisco, CA (2006)

“Status of RHESSI Observations of Terrestrial Gamma-ray Flashes”, Smith, D. M.; Grefenstette, B. W.; Dwyer, J. R.; Cummer, S. A.; Lay, E. H.; Holzworth, R. H.; Chronis, T. G.; Cohen, M. B.; Said, R. *AGU Fall Meeting*, San Francisco, CA (2006)

“ADELE: an Airborne Instrument to Detect Relativistic Runaway”, Hazelton, B. J.; Grefenstette, B. W.; Smith, D. M.; Dwyer, J. R., *AGU Fall Meeting*, San Francisco, (2006)

“Joint Observations of Terrestrial Gamma-ray Flashes and Transient Luminous Events with RHESSI and ISUAL”, Grefenstette, B. W. , Smith, D. M., Frey, H., and Mende, S., *AGU Fall Meeting*, San Francisco, CA (2005)

“Terrestrial Gamma-Ray Flashes: Statistical and Individual Properties from RHESSI”,

Smith, D. M.; Grefenstette, B. W.; Lopez, L. I.; Lin, R. P.; Cummer, S. A.; Holzworth, R. H.; Lay, E. H. *AGU Fall Meeting*, San Francisco, CA (2005)

“Outburst Evolution and Pulse Period of 1A 0535+262”, Smith, D. M.; Hazelton, B.; Coburn, W.; Boggs, S. E.; Fivian, M.; Hurford, G. J.; Hudson, H. S.; Grefenstette, B.; Gilmore, R., *The Astronomer’s Telegram*, **557**, (2005)