# BRIAN GREFENSTETTE

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## Experience

**Research Scientist** **10/2016 - Present**
Space Radiation Lab, California Institute of Technology, Pasadena, CA

- Project Scientist for the *UltraViolet EXplorer* (*UVEX*), a NASA Astrophysics Medium Explorer satellite successfully proposed to NASA for the 2021 MIDEX call (2020-present)
  - Helped lead the development of the UVEX Step 1 and Step 2 proposals to NASA, lead author of the "Instrument" section of the UVEX proposal as well as many appendices.
  - Developed end-to-end instrument simulator / exposure time calculator for UVEX
  - Interfaced with the UVEX Science Team to development science requirements and maintain the science margins throughout the proposal process
  - Led weekly payload meetings for the development of the UVEX instrument
  - Interfaced with spacecraft systems engineering team to ensure that the payload-science interface satisfied the UVEX requirements
- Principal Mission Scientist for the *Nuclear Spectroscopic Telescope ARray* (*NuSTAR*), a NASA Astrophysics Small Explorer satellite
  - Responsible for maintaining the data analysis pipelines and state-of-health monitoring for the *NuSTAR* instrument
  - *NuSTAR* Calibration Team lead, including developing procedures and tools to monitor many aspects of the *NuSTAR* calibration products
  - Developed and maintained community-facing content for the *NuSTAR* astronomical community and provided technical support for proposers and the science user base
  - Co-author of the successful 2018 and 2021 *NuSTAR* Senior Review proposals to NASA to extend the *NuSTAR* mission
  - Mentored many Summer Undergraduate Research Fellow (SURF) students through summer research projects
  - Lead developer for the `nustar-gen-utils` python package and example Jupyter notebooks to streamline and increase the accessibility of *NuSTAR* data analysis
  - Lead for the "NuSTAR Search for INteresting Gamma-ray Signals (NuSTAR SINGS)" project to leverage the data from the *NuSTAR* anti-coincidence shields as a gamma-ray burst (GRB) detector
  - Co-lead for the *NuSTAR* Media outreach along with *NuSTAR* Project Scientist Dan Stern

  - Co-wrote and developed graphics for many of the *NuSTAR* media releases
  - Performed critical science analyses and published papers in Nature, Science, SPIE Proceedings, and the Astrophysical Journal

- Principal Investigator for the "StrayCats" program to leverage existing *NuSTAR* stray light observations to enhance the science return of the mission via NASA ADAP grant 80NSSC19K1023 (grant total $265k)
- Principal Investigator for "Advanced Solid State Pixel Detectors for Future High Energy X-ray Missions" via NASA APRA grant 80NSSC22K0390 (grant total $1.1M)
- Many successful *NuSTAR* Guest Observer Proposals as either a PI or a Co-I

**Staff Scientist** **10/2012 - 10/2016**
Space Radiation Lab, California Institute of Technology, Pasadena, CA

- Principal Mission Scientist for the *Nuclear Spectroscopic Telescope ARray* (*NuSTAR*)
  - Responsible for developing and maintaining the data analysis pipelines and state-of-health monitoring for the *NuSTAR* instrument.
  - for X-ray detector development and Cubesat/Smallsat applications.
  - Developed and maintained community-facing content for the *NuSTAR* astronomical community and provided technical support for proposers and the science user base.
  - Co-author of the successful 2014 and 2016 *NuSTAR* Senior Review proposals to NASA to extend the *NuSTAR* mission.
  - Performed critical science analyses and published papers in Nature, Science, SPIE Proceedings, and the Astrophysical Journal.

**Postdoctoral Scholar** **9/2009 - 10/2012**
Space Radiation Lab, California Institute of Technology, Pasadena, CA

- Instrument Scientist for the *NuSTAR* X-ray telescope's hard X-ray camera.
  - Developed state-of-health monitoring scripts for the *NuSTAR* instrument during ground integration and testing as well as during in-orbit checkout.
  - Organized and led the *NuSTAR* Data Analysis Working Group.
  - Developed data analysis screening techniques for the selection of flight detectors based on laboratory testing.
  - Developed and implemented the calibration plan for the *NuSTAR* hard X-ray detectors.
  - Prototyped and developed the *NuSTAR* Data Analysis Software (NuSTARDAS) used by the science community.
  - Technical liason from the instrument team to all *NuSTAR* Science Working Groups during development and early in-orbit science phases.
  - Produced conference proceeding papers and presented the results at conferences.

**Graduate Student Researcher / Postdoctoral Scholar** **9/2004 - 9/2009**
Santa Cruz Institute for Particle Physics, UC-Santa Cruz, Santa Cruz, CA

- Designed, developed, implemented, and flew the Airborne Detector for Energetic Lightning Emission (ADELE) instrument (2007 - 2009).
- Designed and implemented the ADELE mechanical design for flight on the National Center for Atmospheric Research thunderstorm-chasing aircraft.
- Developed real-time data analysis, data management, and data archiving strategies for ADELE.
- Performed data analysis of archival astrophysics data, including the merging of complex and disjoint geophysical and astrophysical data sets.
- Performed science analyses, published papers, and presented the results at conferences.

# Education

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| 2009 | Ph.D. Physics | University of California, Santa Cruz |
| 2007 | M.S. Physics | University of California, Santa Cruz |
| 2004 | B.S. Physics | Stanford University |
| | | Departmental Honors and Concentration in Astrophysics |

# Awards

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| 2016 | NASA Group Achievement Award: *NuSTAR* Galactic Plane Survey Team |
| 2016 | NASA Group Achievement Award: *NuSTAR* Extra-galactic Survey Team |
| 2015 | NASA Group Achievement Award: *NuSTAR* Pipeline Development Team |
| 2015 | NASA Group Achievement Award: *NuSTAR* Project |
| 2014 | NASA Group Achievement Award: *NuSTAR* Science Team |
| 2014 | NASA Group Achievement Award: *NuSTAR* Operations Team |
| 2013 | NASA Group Achievement Award: *NuSTAR* Instrument Team |
| 2013 | NASA Group Achievement Award: *NuSTAR* Science Commissioning Team |
| 2008 | UC-Santa Cruz Chancellor's Dissertation Year Fellowship |
| 2007 | Outstanding Student Paper Award, American Geophysical Union Fall Meeting |

# Programming Languages/Environments

python, IDL, shell scripting, perl, Matlab, FORTRAN, C, Unix/Linux, macOS, Windows, MicroSoft Project

# Refereed Publications

A full list of refereereed publications is available via this ADS Search Query.

As of 2024-05-21 this returns 154 refereed papers (does not include SPIE proceedings) with an h-index of 56. Selected papers are listed below.

Harrison, F. A., et al. "The Nuclear Spectroscopic Telescope Array (NuSTAR) High-energy X-Ray Mission" (2013), ApJ, 770, 103

Risaliti, G., H. et al., "A rapidly spinning supermassive black hole at the centre of NGC 1365" (2013), Nature, 494, 449

Grefenstette, B. W., et al., "Asymmetries in core-collapse supernovae from maps of radioactive $^{44}$Ti in Cassiopeia A" (2014), Nature, 506, 339

Bachetti, M., et al.,"An ultraluminous X-ray source powered by an accreting neutron star" (2014), Nature, 514, 202

Boggs, S., et al., "$^{44}$Ti gamma-ray emission lines from SN1987A reveal an asymmetric explosion", Boggs et al., Science 348(6), 670–671 (2015)

Madsen, S., et al., "Calibration of the NuSTAR High-energy Focusing X-ray Telescope" (2015), ApJ, 220, 1, 8, 16 pp. (2015)

Grefenstette, B. W. et al. "StrayCats: A Catalog of NuSTAR Stray Light Observations" (2021), ApJ, 909, 1, 30

Margutti, R. et al. "An Embedded X-Ray Source Shines through the Aspherical AT 2018cow: Revealing the Inner Workings of the Most Luminous Fast-evolving Optical Transients" (2019), ApJ, 872, 1, 18

Grefenstette, B. W. et al. "NuSTAR Non-Xray Background" (2022), JATIS, 8, 047001

Grefenstette, B. W., et al. "Early Hard X-Rays from the Nearby Core-collapse Supernova SN 2023ixf" (2023), ApJ, 952, 1, L3