Dr. Brian J. Williams
Curriculum Vitae

Contact Information

Work Address:	NASA Goddard Space Flight Center Code 662 Greenbelt, MD 20771
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Education

August 2004- May 2010 **Ph.D., Physics**
North Carolina State University, Raleigh, NC
Minor: Interdisciplinary - Astronomy, Mathematics, Nuclear Physics
Dissertation: Supernova Remnants as a Probe of Dust Grains in the ISM

Ph.D. Advisors: Dr. Stephen Reynolds and Dr. Kazimierz Borkowski

August 2000 - May 2004 **B.S., Physics**
Florida State University, Tallahassee, FL
Minor: Mathematics

Positions Held

September 2020 – present Chief Scientist, NASA Physics of the Cosmos (PCOS) Program Office

May 2018 – present Research Astrophysicist, NASA Goddard Space Flight Center
NASA Project Scientist, X-ray Imaging and Spectroscopy Mission (XRISM)

Feb 2017 – May 2018 Support Scientist, Space Telescope Science Institute, Baltimore, MD.

April 2015 – Feb 2017 Research Scientist, X-ray Astrophysics Laboratory, NASA Goddard Space Flight Center / Universities Space Research Association, Greenbelt, MD.

April 2012 – April 2015 NASA Postdoctoral Program Fellow, NASA Goddard Space Flight Center, Greenbelt, MD. Advisor: Robert Petre

Fall 2010 – March 2012 Postdoctoral Research Associate, N.C. State University, Raleigh, N.C.

Summer 2010, 2011	Physics Instructor, N.C. State University, Raleigh, N.C.
Fall 2010	Adjunct Professor, Meredith College, Raleigh, N.C.
Jan. 2005 – May 2010	Graduate Research Assistant, N.C. State University, Raleigh, N.C.
Aug. 2004 – May 2005	Graduate Teaching Assistant, N.C. State University, Raleigh, N.C.

Publications

These publications may all be viewed in my personal library on ADS, here:

https://ui.adsabs.harvard.edu/public-libraries/vVrAYKDjS62REABr-rZ7vA

Total refereed papers, as of March 2022: ~70
h-index, as of March 2022: 26

First Author Refereed Journal Articles

(14) **B.J. Williams**, Katsuda, S., Cumbee, R., Petre, R., Raymond, J.C., Uchida, H. *RGS Observations of Ejecta Knots in Tycho's Supernova Remnant*, 2020, ApJ, 898, 51

(13) **B.J. Williams**, W.P. Blair, K.J. Borkowski, P. Ghavamian, S.P. Hendrick, K.S. Long, R. Petre, J.C. Raymond, A. Rest, S.P. Reynolds, R. Sankrit, I.R. Seitenzahl, P.F. Winkler. *The Expansion of the Young Supernova Remnant 0509-68.7 (N103B)*, 2018, ApJ, 865, 13

(12) **B.J. Williams,** J.W. Hewitt, R. Petre, T. Temim. *A Deep X-ray View of the Synchrotron-Dominated Supernova Remnant G330.2+1.0,* 2018, ApJ, 855, 118

(11) **B.J. Williams**, N.M. Coyle, H. Yamaguchi, J. Depasquale, I.R. Seitenzahl, J.W. Hewitt, J.M. Blondin, K.J. Borkowski, P. Ghavamian, R. Petre, S.P. Reynolds. *The Three-dimensional Expansion of the Ejecta from Tycho's Supernova Remnant*, 2017, ApJ, 842, 28

(10) **B.J. Williams,** L. Chomiuk, J.W. Hewitt, J.M. Blondin, K.J. Borkowski, P. Ghavamian, R. Petre, S.P. Reynolds. *An X-ray and Radio Study of the Varying Expansion Velocities in Tycho's Supernova Remnant,* 2016, ApJ, 823, 32

(9) **B.J. Williams** & O.D. Fox. *SOFIA Observations of SN 2010jl: Another Non-Detection of the 9.7-micron Silicate Dust Feature*, 2015, ApJL, 808, 22

(8) **B.J. Williams**, B. Rangelov, O. Kargaltsev, G.G. Pavlov. *Magnesium-rich Ejecta in the SNR G284.3-1.8 Around the High-Mass Gamma-Ray Binary 1FGL J1018.6-5856*, 2015, ApJL, 808, 19

(7) **B.J. Williams,** K.J. Borkowski, S.P. Reynolds, P. Ghavamian, J.C. Raymond, K.S. Long, W.P. Blair, R. Sankrit, P.F. Winkler, S.P. Hendrick. *Spitzer Observations of the Type Ia Supernova Remnant N103B: Kepler's Older Cousin?* 2014, ApJ, 790, 139

(6) **B.J. Williams**, K.J. Borkowski, P. Ghavamian, J.W. Hewitt, S.A. Mao, R. Petre, S.P. Reynolds, & J.M. Blondin. *Azimuthal Density Variations Around the Rim of Tycho's Supernova Remnant*, 2013, ApJ, 770, 129

(5) **B.J. Williams**, K.J. Borkowski, S.P. Reynolds, P. Ghavamian, W.P. Blair, K.S. Long, & R. Sankrit. *Dust in a Type Ia Supernova Progenitor: Spitzer Spectroscopy of Kepler's Supernova Remnant*, 2012, ApJ, 755, 3.

(4) **B.J. Williams**, W.P. Blair, J.M. Blondin, K.J. Borkowski, P. Ghavamian, K.S. Long, J.C. Raymond, S.P. Reynolds, J. Rho, & P.F. Winkler. *RCW 86: A Type Ia Supernova in a Wind-blown Bubble*, 2011, ApJ, 741, 96.

(3) **B.J. Williams**, K.J. Borkowski, S.P. Reynolds, P. Ghavamian, J.C. Raymond, K.S. Long, W.P. Blair, R. Sankrit, R.C. Smith, S. Points, P.F. Winkler. *Dusty Blastwaves of Two Young LMC Supernova Remnants: Constraints on Postshock Compression*, 2011, ApJ, 729, 65.

(2) **B.J. Williams**, K.J. Borkowski, S.P. Reynolds, J.C. Raymond, K.S. Long, J.A. Morse, W.P. Blair, P. Ghavamian, R. Sankrit, S.P. Hendrick, R.C. Smith, S. Points, P.F. Winkler. *Ejecta, Dust, and Synchrotron Radiation in B0540-69.3: A More Crab-Like Remnant than the Crab*, 2008, ApJ, 687, 1054

(1) **B.J. Williams**, K.J. Borkowski, S.P. Reynolds, W.P. Blair, P. Ghavamian, S.P. Hendrick, K.S. Long, J.C. Raymond, R. Sankrit, R.C. Smith, S. Points, P.F. Winkler. *Dust Destruction in Fast Shocks of Core-Collapse Supernova Remnants in the Large Magellanic Clouds*, 2006, ApJL, 652, 33.

Other Publications

- T. Temim, **B.J. Williams**, L. Lopez. *The Many Faces of Supernova Remnants*, 2015, Chandra News, Issue 22, Published by the Chandra X-ray Center

- **B.J. Williams**, T. Temim. *Infrared Emission from Supernova Remnants: Formation and Destruction of Dust*, 2016, Springer Handbook of Supernovae. Review article.

Mentoring

Dr. Adrien Picquenot, Postdoc, 2021 - present

Dr. Ben Guest, Postdoc, 2020 - present

Sadie Coffin, Post-Baccalaureate researcher, NASA GSFC, 2020-2021

Dr. Toshiki Sato, RIKEN Special Postdoctoral Fellow, NASA GSFC, 2018-2020.

Nina Coyle, University of Chicago. NASA summer internship program, 2014.

Aaron Tran, University of California-Berkeley. NASA summer internship program, 2014.

Total Science PI Funding

$154,000	Chandra Guest Observer Program, 2020
$70,210	Chandra Guest Observer Program, 2020
$54,413	Hubble Guest Observer Program, 2019
$184,260	Chandra Guest Observer Program, 2019
$40,539	Hubble Guest Observer Program, 2017
$64,272	XMM-Newton Guest Observer Program, 2017
$50,752	XMM-Newton Guest Observer Program, 2016
$46,620	Hubble Guest Observer Program, 2015
$148,500	Chandra Guest Observer Program, 2015
$42,107	NASA Astrophysics Data Analysis Program, 2014
$52,225	XMM-Newton Guest Observer Program, 2014
$8,000	SOFIA Guest Observer Program, 2014
$64,091	Chandra Guest Observer Program, 2013
$32,225	Herschel Guest Observer Program, 2012
$61,879	NASA Astrophysics Data Analysis Program, 2012
$200,751	NASA Astrophysics Data Analysis Program, 2010
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$1,274,844	**TOTAL**

Professional Activity

Member, American Astronomical Society (AAS)
Member, American Physical Society (APS)
Member, High Energy Astrophysics Division of the AAS
Referee, *The Astrophysical Journal*
Referee, *Astronomy & Astrophysics*
Referee, *Monthly Notices of the Royal Astronomical Society*
Referee, *Publications of the Astronomical Society of Japan*

Colloquia/Seminars

March 2022	Colloquium, Pittsburgh/Carnegie Mellon
March 2022	Seminar, Harvard-Smithsonian Center for Astrophysics
February 2022	Colloquium, University of California, Irvine
September 2021	Colloquium, George Washington University
September 2020	Colloquium, University of Arizona/Steward Observatory
November 2017	Seminar, Johns Hopkins University Dept. of Physics and Astronomy
October 2015	Seminar, Rutgers University Physics Dept.
March 2014	Seminar, University of Delaware Dept. Of Physics and Astronomy
August 2013	Colloquium, Astrophysics Science Division, NASA GSFC
February 2013	Colloquium, Towson University, Dept. Of Physics, Chemistry, and Geoscience
October 2012	Colloquium, SOFIA Science Center, NASA Ames, Mountain View, CA
September 2012	Seminar, Yale Center for Astronomy and Astrophysics
November 2011	Colloquium, N.C. State University Physics Department
March 2011	Seminar, Space Telescope Science Institute, Baltimore, MD

March 2011	Seminar, NASA GSFC
July 2010	Seminar, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA

Conference Talks

March 2022	High-Energy Astrophysics Division Meeting, Pittsburgh, PA
January 2021	AAS Winter Meeting, Virtual world
April 2020	APS April Meeting, Virtual world
January 2020	AAS Winter Meeting, Honolulu, HI
December 2019	20 Years of Chandra Science Symposium, Boston, MA
October 2019	XMM-Newton 20th Anniversary Goddard Symposium, GSFC
July 2019	XCalibur: Next Generation X-ray Spectroscopy, Winchester, UK
June 2019	An Odyssey in Space After Stellar Death, Crete, Greece
April 2019	The Deaths and Afterlives of Stars, Baltimore, MD
April 2019	The Space Astrophysics Landscape for the 2020s and Beyond
March 2019	High-Energy Astrophysics Division Meeting, Monterey, CA
January 2019	AAS Winter Meeting (canceled due to US government shutdown), Seattle, WA
September 2018	International Workshop on Astronomy and Relativistic Astrophysics, Peru
March 2018	Science with Precision Astrometry, Baltimore, MD
February 2018	Observational Signatures of Type Ia SNe III, Leiden, Netherlands
December 2017	Deciphering the Violent Universe, Playa del Carmen, Mexico
August 2017	High-Energy Astrophysics Division Meeting, Sun Valley, ID
January 2017	AAS Winter Meeting, Grapevine, TX
August 2016	COSPAR General Assembly (canceled), Istanbul, Turkey
June 2016	An Odyssey in Space After Stellar Death, Crete, Greece
January 2016	AAS Winter Meeting, Kissimmee, FL
July 2015	IAU General Assembly, Honolulu, HI
May 2015	Fifty-One Ergs, Raleigh, NC
November 2014	15 Years of Science with Chandra, Boston, MA
August 2014	Supernovae in the Local Universe, Australia
June 2014	The X-ray Universe, Dublin, Ireland
June 2014	AAS Summer Meeting, Boston, MA
September 2013	Observational Signatures of Type Ia SNe, Leiden, Netherlands
May 2013	Fifty-One Ergs, Raleigh, NC
May 2013	The Fast and the Furious, Madrid, Spain
November 2012	Dust in Core-Collapse SNe, Ascona, Switzerland
October 2012	Nature's Particle Accelerators, Annapolis, MD
August 2012	Cosmic Kaleidoscope, Kruger, South Africa
March 2012	Mass Loss Return from Massive Stars, Baltimore, MD
January 2010	AAS Winter Meeting, Washington, D.C.

Successful PI Proposals

Deep Observations of the LMC SNR 0519-69.0, Chandra X-ray Observatory, 2020, Budget amount **$154K**

Tycho's SNR: A New Era, Chandra X-ray Observatory, 2020, Budget amount **$70K**

A Tale of Two Remnants: A Comparative Study of the Young Ia SNRs 0509-67.5 and 0519-69.0, 2019, Chandra X-ray Observatory / Hubble Space Telescope, **Budget $184K (Chandra), $54K (Hubble)**

Measuring the Deceleration of a Supernova Remnant Shock Wave Using High-Precision Astrometry, 2017, Hubble Space Telescope, Budget **$41K**

RGS Observations of Peculiar Knots in Tycho's SNR, XMM-Newton Observatory, 2016, ESA, Budget amount **$64K**

Observations of PKS 1209-51/52: A Cygnus Loop Sibling?, XMM-Newton Observatory, 2016, ESA, Budget amount **$51K**

N103B: A Type Ia Remnant with Circumstellar Interaction... Kepler's Older Cousin?, Chandra X-ray Observatory / Hubble Space Telescope, 2015, NASA, Budget amount **$149K (Chandra), $46K (Hubble)**.

Suzaku Observations of G189.6+3.3: An SNR Companion to IC 443?, 2014, NASA Astrophysics Data Analysis Program, **Science PI – B.J. Williams**, Budget PI – R. Petre, **$42K**

Observations of G189.6+3.3: An SNR Companion to IC 443?, Suzaku, 2014, JAXA, PI – **B.J. Williams**

Gas-Phase Abundance Variations from Dust Grain Sputtering in an SNR Shock, XMM-Newton Observatory, 2013, ESA, **Science PI – B.J. Williams**, Budget PI – R. Petre, **$52K**

XMM-Newton Observations of G330.2+1.0, XMM-Newton Observatory, 2013, ESA, no funding.

Dynamics of a Type Ia SNR: Proper Motions in Tycho, Chandra X-ray Observatory, 2013, NASA, Science PI **– B.J. Williams,** Budget PI – R. Petre, **$64K**

The Composition of Dust in a Type IIn Supernova, SOFIA, 2013, NASA, **Science PI – B.J. Williams**, Budget PI – R. Petre, **$8K**

A Multiwavelength Study of Tycho's Supernova Remnant, 2012, NASA Astrophysics Data Analysis Program, **Science PI – B.J. Williams**, Budget PI – R. Petre, **$62K**

Herschel imaging of SNR G292.0+1.8: Cas A's older cousin?, Herschel Space Observatory, 2011, ESA, **Science PI – B.J. Williams**, Budget PI – P. Ghavamian, **$32K**

Galactic Supernova Remnants in the Infrared: An Archival Survey with Spitzer's MIPS and IRS, 2009, NASA Astrophysics Data Analysis Program, **Science PI – B.J.** Williams, PI – K.J. Borkowski, **$201K**

Press Coverage

RCW 86: "*NASA Telescopes Help Solve Ancient Supernova Mystery*,"
http://www.nasa.gov/mission_pages/spitzer/news/spitzer20111024.html

SN 1006: "*X-Ray View of a Thousand-Year-Old Cosmic Tapestry,*"

http://chandra.harvard.edu/photo/2013/sn1006/

N103B: "*New Suspect Identified in Supernova Explosion,*"
http://www.nasa.gov/jpl/spitzer/supernova-20140604/

3C 397: "*Suzaku Studies Supernova 'Crime Scene,' Shows a Single White Dwarf to Blame,*"
http://www.nasa.gov/content/goddard/suzaku-studies-supernova-crime-scene-shows-a-single-white-dwarf-to-blame

Tycho's Supernova Remnant: "*Chandra Movie Captures Expanding Debris From a Stellar Explosion,*"
http://chandra.si.edu/photo/2016/tycho/

Perseus Cluster: *"Hitomi Mission Charts Hot Winds of a Galaxy Cluster for the First Time"*
http://www.nasa.gov/feature/goddard/2016/hitomi-mission-charts-hot-winds-of-a-galaxy-cluster-for-the-first-time

Tycho's Supernova Remnant: "*A 3D View of a Supernova Remnant,"* AAS Nova
http://aasnova.org/2017/06/14/a-3d-view-of-a-supernova-remnant/

Astronomy Picture of the Day:
http://apod.nasa.gov/apod/ap130423.html
http://apod.nasa.gov/apod/ap111110.html
http://apod.nasa.gov/apod/ap160601.html

Teaching Experience

Summer 2011, 2010 — **PY 299 - Introductory Quantum Mechanics.**
NCSU, Raleigh, NC.
Developer and instructor for introductory course in quantum physics for junior/senior-level undergraduate physics majors.

Fall 2010 — **PHY 211 - General Physics I**.
Meredith College, Raleigh, NC
Adjunct faculty and instructor for two sections of introductory classical mechanics.

Fall 2010 — **PHY 241 – General Physics I Laboratory**.
Meredith College, Raleigh, NC
Adjunct faculty and instructor for two sections of classical mechanics lab.

Fall 2009 – Spring 2010 — **PY 411/412 – Classical Mechanics I-II**.
NCSU, Raleigh, NC
Supplementary Instructor, as part of PY 885, Doctoral Supervised Teaching, under the guidance of Dr. Stephen Reynolds. Prepared and gave approximately 12 lectures during the year.

Fall 2004 - Spring 2005 — **PY 205 - Physics for Engineers and Scientists**.
NCSU, Raleigh, NC

Graduate Teaching Assistant for laboratory sections of PY 205.

Leadership and Outreach Activities

Guest Blogger, *Blueshift,* NASA's Astrophysics blog
On two occasions, I have written guest blog posts for *Blueshift* (http://asd.gsfc.nasa.gov/blueshift/), NASA's Astrophysics blog. One post was on the physics of supernova remnants (http://asd.gsfc.nasa.gov/blueshift/index.php/2013/02/22/brians-blog-a-look-into-the-building-blocks-of-life/), while the other was about my observing run on *SOFIA*, NASA's airborne observatory (http://asd.gsfc.nasa.gov/blueshift/index.php/2014/09/05/sofia-ride/).

American Astronomical Society Liaison, Congressional Visits Day, 2013
I was part of a delegation of about a dozen astronomers from all over the country selected to visit Capitol Hill over a two-day period to meet with Congressional members and staffers about federal funding for astronomy. I prepared the "leave-behind" sheet for the group to distribute in all meetings.

Panelist, "Ask an Astrophysicist" website, 2012 – 2017
NASA GSFC runs a web service called "Ask an Astrophysicist," where anyone from anywhere in the world can write us with their questions. I serve along with about a dozen as part of a rotating cast of astronomy experts who provide answers to these questions.

State Event Leader, North Carolina Science Olympiad, 2009 – 2011
The North Carolina Science Olympiad is a branch of the nationwide team science competition for elementary, middle, and high school students. I was the North Carolina Event Leader for the middle and high school astronomy events. I wrote, administered, and judged the test at the statewide competition.

Public Outreach Liaison, NCSU Astrophysics, 2006 – 2012
I was the contact person for public and school requests for guest speakers from the NCSU astrophysics research group. I have presented dozens of astronomy talks to students all levels, on topics from the moon to the accelerating universe. I have served as a science fair judge on several occasions.

Coordinator, NCSU Astronomy Open House, 2006 – 2012
I coordinated and ran the semi-annual Astronomy Open House that attracted well over 100 people each semester to our astronomy lab teaching site for an evening of physics demonstrations and stargazing on our university-owned telescopes.

Honors, Awards, and Achievements

October 2020	NASA Early Career Achievement Medal
October 2011	NASA Postdoctoral Program Fellowship
July 2011	"Early Career" Travel Grant, High Energy Astrophysics Division of the American Astronomical Society
March 2009	First Place, NCSU Graduate Research Symposium, Physical and Mathematical Sciences Division. Presentation entitled, "*Supernova Remnants as a Probe of Dust Grains in the*

	Interstellar Medium"
May 2004	Perfect scores on GRE Math (800) and Writing (6.0).
April 2004	High Scholarship in Physics, Florida State University
April 2004	Elected as a member of Sigma Pi Sigma, the National Physics Honor Society
August 2000-May 2004	Florida Academic Scholars Bright Futures Scholarship- Full academic scholarship for undergraduate education at FSU
August 2000-May 2004	Florida State University Honors Program Scholarship
October 1999	Perfect score on SAT Math (800)