

Jeremy Hare

NASA Goddard Space Flight Center, 8800 Greenbelt Rd, Greenbelt, MD 20771

(724) 875-1946

jeremy.hare@nasa.gov

website: <https://jhare.net/>

EDUCATION

Ph.D. in Physics, 2012-2018, The George Washington University, Washington D.C.

Dissertation Title: *Search, Identification, and Study of Galactic Compact Objects: Methods, Environments, and Populations*

MPhil in Physics, May 2017, The George Washington University, Washington D.C.

B.S. in Physics, April 2011, University of Pittsburgh, Pittsburgh, PA
Graduated Cum Laude

B.S. in Applied Mathematics, April 2011, University of Pittsburgh, Pittsburgh, PA
Graduated Cum Laude

POSITIONS HELD

NASA Postdoctoral Fellow: October 2019-Current

NASA Goddard Space Flight Center, Greenbelt, MD

NuSTAR Post-Doctoral Researcher: September 2018-September 2019

University of California, Berkeley, Berkeley, CA

Graduate Research Assistant: May 2014-September 2018

The George Washington University, Washington, D.C.

Graduate Teaching Assistant, August 2012-May 2014

The George Washington University, Washington, D.C.

Graduate Student Intern, June 2013-August 2013

NASA Goddard Space Flight Center, Greenbelt, Maryland

RESEARCH EXPERIENCE

Multi-wavelength studies of pulsars, unidentified GeV/TeV sources, and high mass gamma-ray binaries, November 2013-September 2018

The George Washington University, Washington, D.C.

Advisor- Oleg Kargaltsev, Ph.D.

Multi-wavelength studies of unidentified Fermi gamma-ray sources, June 2013-August 2013

NASA Goddard Space Flight Center, Greenbelt, Maryland

Advisor- John Hewitt, Ph.D.

Experimental Nuclear Physics, June 2012-July 2012

Johannes Gutenberg University of Mainz, Mainz, Germany

Advisor- William Briscoe, Ph.D.

REFEREED PUBLICATIONS

First Author:

Hare, J., Halpern, J. P., Tomsick, J. A., Thorstensen, J. R., Bodaghee, A., Clavel, M., Krivonos, R., Mori, K., “Chandra, NuSTAR, and Optical Observations of the Cataclysmic Variables IGR J17528-2022 and IGR J20063+3641” *submitted to ApJ* (Sept. 2020)

Hare, J., Tomsick, J. A., Buisson, D. J. K., Clavel, M., Gandhi, P., Garcia, J. A., Grefenstette, B. W., Walton, D. J., Xu, Y., “NuSTAR observations of the Transient Galactic Black Hole Binary Candidate Swift J1858.6–0814: a new sibling of V404 Cyg and V4641 Sgr?” *ApJ*, 890, 57 (Feb. 2020)

Hare, J., Kargaltsev, O., Pavlov, G., Beniamini, P., “Evolution of the extended X-ray emission from the PSR B1259-63/LS 2883 binary in the 2014-2017 binary cycle” *ApJ*, 882, 74 (Sept. 2019)

Hare, J., Halpern, J., Clavel, M., Grindlay, J., Rahoui, F., Tomsick, J., “Chandra, MDM, Swift, and NuSTAR observations confirming the SFXT nature of IGR J19498+2534” *ApJ*, 878, 15 (June 2019)

Hare, J., Volkov, I., Kargaltsev, O., Younes, G., Rangelov, B., “XMM-Newton and Chandra observations of the unidentified Fermi-LAT source 3FGL J1016.5-6034: A young pulsar with a nebula?” *ApJ*, 875, 107 (Apr. 2019)

Hare, J., Kargaltsev, O., & Rangelov, B., “Chandra X-ray Observatory and Hubble Space Telescope observations of the intermediate-age cluster GLIMPSE-C01” *ApJ*, 865, 33 (Sept. 2018)

Hare, J., Kargaltsev, O., Pavlov, G. G., Rangelov, B., & Volkov, I., “Chandra Observations of the Field Containing HESS J1616-508” *ApJ*, 841, 81 (Jun. 2017)

Hare, J., Rangelov, B., Sonbas, E., Kargaltsev, O., & Volkov, I. “Multi-wavelength study of HESS J1741-302” *ApJ*, 816, 2 (Jan. 2016)

Contributing Author:

Buisson, D. J. K., Altamirano, D., Bult, P., Mancuso, G. C., Gver, T., Jaisawal, G. K., **Hare, J.**, Albayati, A. C., Arzoumanian, Z., Castro Segura, N., Chakrabarty, D., Gandhi, P., Guillot, S., Homan, J., Gendreau, K. C., Jiang, J., Malacaria, C., Miller, J. M., zbey Arabac?, M., Remillard, R. Strohmayer, T. E., Tombesi, F., Tomsick, J. A., Vincentelli, F. M., Walton, D. J. “Discovery of thermonuclear (Type I) X-ray bursts in the X-ray binary Swift J1858.6-0814 observed with NICER and NuSTAR” *accepted for publication in MNRAS*, 2020arXiv200903334B, (Sept. 2020)

Shaw, A. W., Heinke, C. O., Mukai, K., Tomsick, J. A., Doroshenko, V., Suleimanov, V. F., Buisson, D. J. K.; Gandhi, P., Grefenstette, B. W., **Hare, J.**, Jiang, J., Ludlam, R. M., Rana, V., Sivakoff, G. R. “Measuring the masses of magnetic white dwarfs: A NuSTAR Legacy Survey” *MNRAS* (Aug. 2020)

Klingler, N., Yang, H., **Hare, J.**, Kargaltsev, O., Pavlov, G. G., Posselt, B., “Chandra Monitoring of the J1809-1917 Pulsar Wind Nebula and Its Field” 2020arXiv200809200K , *accepted for publication in the ApJ* (Aug. 2020)

Mori, K., An, H., Feng, Q., Malone, K., Prado, R. R., Schutt, Y. E., Dingus, B. L., Gotthelf, E. V., Hailey, C. J., **Hare, J.**, Kargaltsev, O., Mukherjee, R., “Multiwavelength Observations of 2HWC J1928+177: Dark Accelerator or New TeV Gamma-Ray Binary?” *ApJ*, 897, 129 (July 2020)

Xu, Y., Harrison, F. A., Tomsick, J. A., **Hare, J.**, Fabian, A. C., Walton, D. J., “Evidence for Disk Truncation at Low Accretion States of the Black Hole Binary MAXI J1820+070 Observed by NuSTAR and XMM-Newton” *ApJ* 893, 42 (April 2020)

Xu, Y., Harrison, F. A., Tomsick, J. A., Walton, D. J., Barret, D., Garcia, J. A., **Hare, J.**, Parker, M. L., ”Studying the reflection spectra of the new black hole X-ray binary candidate MAXI J1631-479 observed by NuSTAR: A variable broad iron line profile” *ApJ*, 893, 30 (April 2020)

Tomsick, J. A., Bodaghee, A., Sylvain, C., Clavel, M., Fornasini, F. M., **Hare, J.**, Krivonos, R., Rahoui, F., Rodriguez, J., “Chandra Observations of High-energy X-Ray Sources Discovered by INTEGRAL” *ApJ*, 889, 53 (Jan. 2020)

Clavel, M., Tomsick, J. A., **Hare, J.**, Krivonos, R., Mori, K., Stern, D., “NuSTAR observations of the unidentified INTEGRAL sources: constraints on the Galactic population of HMXBs”, *ApJ*, 887, 32 (Dec. 2019)

Arumugasamy, P., Kargaltsev, O., Posselt, B., Pavlov, G., **Hare, J.**, “Possible phase-dependent absorption feature in the x-ray spectrum of the middle-aged PSR J0659+ 1414” *ApJ*, 869, 97 (Dec. 2018)

Pannuti, T. G., Rho, J., Kargaltsev, O., Rangelov, B., Kosakowski, A. R., Winkler, F., Keohane, J. W., **Hare, J.**, & Ernst, S., “CTIO, ROSAT HRI, and Chandra ACIS Observations of the Archetypical Mixed-morphology Supernova Remnant W28 (G6.4-0.1)” *ApJ*, 839, 59 (Apr. 2017)

Sonbas, E., Rangelov, B., Kargaltsev, O., Dhuga, K. S., **Hare, J.** & Volkov, I., “X-ray Sources in the Dwarf Spheroidal Galaxy Draco” *ApJ*, 821, 54 (Apr. 2016)

Pavlov, G. G., **Hare, J.**, Kargaltsev, O., Rangelov, B., & Durant, M., “An extended X-ray object ejected from the PSR B1259-63/LS 2883 binary” *ApJ*, 806, 2 (Jun. 2015)

Rangelov, B., Posselt, B., Kargaltsev, O., Pavlov, G. G., **Hare, J.**, & Volkov, I., “Multiwavelength Study of the Northeastern Outskirts of the Extended TeV Source HESS J1809193”, *ApJ*, 796, 34 (Nov. 2014)

Kargaltsev, O., Pavlov, G. G., Durant, M., Volkov, I., & **Hare, J.**, “The Dynamic X-Ray Nebula Powered by the Pulsar B1259-63”, *ApJ*, 784, 124 (Apr. 2014)

Kargaltsev, O., Rangelov, B., **Hare, J.**, & Pavlov, G. G. “Chandra imaging of gamma-ray binaries”, *Astronomische Nachrichten*, 335, 301, (Mar. 2014)

NON-REFEREED PUBLICATIONS

Buisson, D. J. K., **Hare, J.**, Guver, T., Altamirano, D., Gendreau, K. C., Arzoumanian, Z., Bult, P. M., Strohmayer, T. E., Castro Segura, N., Garcia, Javier A., Remillard, R. A., Tomsick, J. A., Chenevez, J., Jaiswal, G. K., Ozbey Arabaci, M., Vincentelli, F., Homan, J., Guillot, S., Wolff, M. T., Chakrabarty, D. Ng, M., “NICER and NuSTAR detections of Type I bursts and periodic dips in Swift J1858.6-0814” *The Astronomer’s Telegram*, 13563 (March 2020)

Tomsick, J. A., Garcia, J., Fabian, A., Walton, D., Jiang, Ji., Fuerst, F., Buisson, D., Shaw, A., **Hare, J.**, Bachetti, M., Connors, R., Gandhi, P., Xu, Y. “A NuSTAR Observation of MAXI J0637-430: A New X-ray Transient and Likely Black Hole X-ray Binary” *The Astronomer’s Telegram*, 13270 (November 2019)

Pavlov, G. G., **Hare, J.**, & Kargaltsev, O., “High-speed Ejecta from the Gamma-ray Binary PSR B1259-63/LS 2883” 2019, arXiv:1903.00781 (Mar. 2019)

Hare, J., Gandhi, P., Paice, J. A., & Tomsick, J., “NuSTAR shows continued X-ray activity of Swift J1858.6-0814 in an unusual spectral state” 2019, *The Astronomer’s Telegram*, 12512 (Feb. 2019)

JOURNAL REFEREE

MNRAS 2019-Current

ApJ 2020-Current

Peer Review Panels

NASA Neil Gehrels Swift Observatory Cycle 16 panel

NASA Fermi Gamma-ray observatory Cycle 13 panel
NASA NICER Cycle 2 panel
NASA Chandra X-ray Observatory Cycle 22 panel

INVITED TALKS

Hare, J., “*High-mass gamma-ray binaries in X-rays: PSR B1259-63 and others*”, Columbia high-energy astrophysics group seminar (Mar. 2018)

CONFERENCES & PRESENTATIONS

Hare, J., Tomsick J., Garca, J., Walton, D., Fuerst, F., Shaw, A., Clavel, M., Fabian, A., Harrison, F., Fryer, C., Miller, J., Parker, M., Pottschmidt, K., Xu, Y., Wilms, J., “The black hole transient Swift J1858.6-0814: a new V404 Cyg analog?” Poster at the 17th HEAD meeting (Mar. 2019)

Hare, J., Kargaltsev, O., Bettina P., Pavlov, G., Volkov, I., “X-ray emission from AR Scorpii”, Poster at the 17th HEAD meeting (Mar. 2019)

Hare, J., Kargaltsev, O., Rangelov, B., Pavlov, G., Posselt, B., & Volkov, I., “Searching for compact objects within X-ray catalogs using Machine Learning” Dissertation Talk at 233rd AAS meeting (Jan. 2019)

Hare, J., Kargaltsev, O., Rangelov, B., “A multi-wavelength study of the massive GLIMPSE-C01 cluster with the Hubble Space Telescope and Chandra X-ray Observatory” 231st AAS meeting (Jan. 2018)

Hare, J., Kargaltsev, O., Rangelov, B., Pavlov, G., Posselt, B., & Volkov, I., “Multiwavelength classification of Galactic X-ray sources using machine-learning” 231st AAS meeting (Jan. 2018)

Hare, J., Kargaltsev, O., Pavlov, G., “Chandra monitoring of high-velocity ejecta from high-mass gamma-ray binary LS 2883/PSR B1269-63” Cosmic Accelerators Conference (Nov. 2017)

Hare, J., Kargaltsev, O., Rangelov, B., Pavlov, G., Posselt, B., Volkov, I., “A Machine-learning approach to classification of X-ray sources”, 16th High Energy Astrophysics Division Meeting (Aug. 2017)

Hare, J., Kargaltsev, O., Pavlov, G., “Peculiar plasma ejections from the high mass gamma-ray binary PSR B1259-63”, Variable Galactic Gamma-Ray Sources (IV) (Jul. 2017)

Hare, J., Kargaltsev, O., Rangelov, R., Townsley, L., Broos, P., “Chandra X-ray Observatory and Hubble Space Telescope Observations of the Cluster Glimpse-C01”, JWST Proposal Preparation Workshop information (May 2017)

Hare, J., Rangelov, B., Kargaltsev, O., Volkov, I., & Pavlov, G. G., “A Multi-Wavelength Machine Learning Approach to Classify Unidentified X-ray Sources”. The George Washington University Research Days 2017 (Apr. 2017)

Hare, J., Kargaltsev, O., Pavlov, G., Rangelov, B., Volkov, I., Hall, C., “Using Machine Learning to Uncover the Nature of TeV Sources”, Fermi-Veritas-HAWC Workshop (Mar. 2017)

Hare, J., Kargaltsev, O., Rangelov, B., Pavlov, G. G., Volkov, I., & , “Searching for Unique Objects in X-ray Catalogs using Machine Learning”, Detecting the Unexpected (Feb. 2017)

Hare, J., Kargaltsev, O., Rangelov, B., Pavlov, G. G., Volkov, I., & , “Application of Machine-learning Techniques to Understand the Nature of X-ray and Gamma-ray Sources” 2016, IAU Symposium #325 on Astroinformatics (Oct. 2016)

Hare, J., Rangelov, B., Kargaltsev, O., Volkov, I., & Pavlov, G. G., “Machine-learning approach to multi-

wavelength classification of high-energy sources”. *Statistical Challenges in Modern Astronomy VI* (Jun. 2016)

Hare, J., Kargaltsev, O., Pavlov, G. G., & Rangelov B., “Extended X-ray object ejected from the PSR B1259-63/LS 2883 binary”, *Sixth International Fermi Symposium* (Nov. 2015)

Hare, J., Rangelov, B., Kargaltsev, O., Volkov, I., & Pavlov, G. G., “Applying machine-learning to understand the nature of gamma-ray sources”, *IAU General Assembly*, 22, (Aug. 2015), #2258368

Hare, J., Rangelov, B., Kargaltsev, O., Volkov, I., & Pavlov, G. G., “Unveiling the Nature of High Energy Sources Using Machine Learning”. DC/MD/VA Astrophysics Summer Meeting for Graduate Students (Jun. 2015)

Hare, J., Rangelov, B., Posselt, B., Kargaltsev, O., & Pavlov, G. G., “The Dynamic X-ray Nebula Powered by the Pulsar B1259-63” and “Chandra and Suzaku Observations of Two Galactic TeV Sources”. DC/MD/VA Astrophysics Summer Meeting for Graduate Students (Jul. 2014)

Hare, J., Rangelov, B., Posselt, B., and Kargaltsev, O., & Pavlov, G. G., “Chandra and Suzaku observations of two galactic TeV sources”. *American Astronomical Society Meeting Abstracts*, 223, (Jan. 2014), 153.21

Hare, J., Rangelov, B., Posselt, B., and Kargaltsev, O., & Pavlov, G. G., “Chandra and Suzaku observations of two galactic TeV sources”. The George Washington University Research Days 2014 (Apr. 2014)

Hare, J., Rangelov, B., Kargaltsev, O., Volkov, I., & Pavlov, G. G., “The Cosmic Snail: Spiral Structure from the Intra-Binary Shock of the Gamma-Ray Binary B1259-63”. DC/MD/VA Astrophysics Summer Meeting for Graduate Students (Jun. 2013)

Hare, J., Rangelov, B., Kargaltsev, O., Volkov, I., & Pavlov, G. G., “The Cosmic Snail: Spiral Structure from the Intra-Binary Shock of the Gamma-Ray Binary B1259-63”. The George Washington University Research Days 2013 (Apr. 2013)

PROFESSIONAL DEVELOPMENT

JWST Proposal Preparation Workshop information, May, 2017

Space Telescope Science Institute, Baltimore, Maryland

- Learned how to plan and create observations for JWST using APT
- Learned how to use the exposure time calculator and other proposal planning tools

User Training in JWST Data Analysis II, November, 2016

Space Telescope Science Institute, Baltimore, Maryland

- Learned about the specifications and uses of the instruments on JWST
- Learned how to use some of the preliminary software packages available for JSWT and played with simulated data

The 4th Annual DC/VA/MD Summer Astrophysics Meeting, July, 2016

The George Washington University, Washington, D.C.

- Organized the annual conference for local graduate and undergraduate astrophysics students
- Chaired the conference

Summer School in Statistics for Astronomers, 2015

Pennsylvania State University, State College, Pennsylvania

- Attended detailed statistics courses taught by both statisticians and astronomers
- Learned how to use the R statistics software package
- Learned how to properly integrate statistics into astronomy

NRAO Community Day at the Space Telescope Science Institute, April 2015

Space Telescope Science Institute, Baltimore, Maryland

- Learned about some NRAO facilities and how they work (VLA and ALMA)
- Practiced reducing data with the CASA software

Astro Hack Week, September, 2014

University of Washington, Seattle, Washington

- Hacked on a python version of Machine Learning pipeline
- Learned how to use the Sci-Kit Learn python package and applied it to our Chandra data set

Cottrell Scholars Collaborative National Teaching Assistant Workshop, May, 2014

Georgia Institute of Technology, Atlanta, Georgia

- Discussed and developed plans (e.g., mentoring programs) to assist TAs in becoming more impactful in the classroom at GWU

Future Faculty Program, Fall, 2013

The George Washington University, Washington, D.C.

- Weekly workshops on learning and implementing different innovative pedagogical techniques
- Focused on active learning

Fermi Summer School, May 2013 - June, 2013

University of Delaware Conference Center, Lewes, DE

- Sponsored by NASA Goddard Space Flight Center
- Learned how to download and analyze Fermi Large Area Telescope (LAT) data
- Specific workshops on special techniques for analyzing Fermi LAT data

GWU Physics Department Colloquium, August 2012-Present

The George Washington University, Washington, D.C.

- Colloquial talks given by distinguished speakers on a variety of topics in physics

PRESS RELEASES

- “PSR B1259-63: Pulsar Punches Hole In Stellar Disk”, NASA/CXC Media Release, July 2015

APPROVED OBSERVING AND ARCHIVAL PROGRAMS

Principle Investigator, XMM-Newton Cycle 16, “Bright X-ray counterparts of galactic 3FGL sources”

NICER and NuSTAR TOO of Swift J1858.6-0814 in the non-flaring state (PI: Hare)

Co-Investigator, Chandra Cycle 22, “Magnetosphere-PWN Connection: Resolving the X-ray PWN around the MeV PSR J1849-0001” (PI: Kargaltsev)

Co-Investigator, Chandra Cycle 22, “Survey of Gamma-ray Pulsars” (PI: Rangelov)

Co-Investigator, Chandra Cycle 22, “The High Velocity Ejecta from a Gamma-ray Binary” (PI: Pavlov)

Co-Investigator, NASA ADAP, “Multiwavelength Identification of Galactic High-Energy Sources” (PI: Kargaltsev)

Co-Investigator, XMM-Newton AO 19 “External and internal heating in the old pulsar PSR B0950+08” (PI: Pavlov)

Co-Investigator, NICER Cycle 1, “Is the brightest serendipitous NuSTAR source an UCXB and AMXP?” (PI:Tomsick)

Co-Investigator, Chandra Cycle 20, “X-ray ejecta after the strongest gamma-ray flare in the PSR B1259-63/LS 2883 binary ” (PI: Pavlov)

Co-Investigator, Chandra Cycle 20, “The intermediate-age cluster GLIMPSE-C01” (PI: Rangelov)

Co-Investigator, Chandra Cycle 20, “Discovering compact objects in intermediate age clusters” (PI: Kargaltsev)

Co-Investigator, Chandra Cycle 20, “The Pulsar Wind Nebula of PSR J1016-5857” (PI: Klingler)

Co-Investigator, Chandra Cycle 19, “Discovering extended sources in Chandra images” (PI: Kargaltsev)

Co-Investigator, Chandra Cycle 19, “Revealing pulsars hidden in the 3rd Fermi Catalog” (PI: Rangelov)

Co-Investigator, Chandra Cycle 18, “Mysterious ejecta from a high-mass gamma-ray binary” (PI: Pavlov)

Co-Investigator, XMM-Newton Cycle 17, “HAWC source 2HWC J1928+177: A unique gamma-ray binary emitting 100 TeV photons?” (PI: Mori)

Co-Investigator, XMM-Newton Cycle 16, “Snap-shot survey of INTEGRAL sources in the Galactic plane” (PI: Kargaltsev)

Co-Investigator, XMM-Newton Cycle 15, “Sleuthing for compact objects accreting from the interstellar medium” (PI: Kargaltsev)

Co-Investigator, XMM-Newton Cycle 15, “Snap-shot Survey of Fermi Pulsar Candidates” (PI: Kargaltsev)

Co-Investigator, HST DDT, “Optical counterpart of high-speed ejecta from the gamma-ray binary LS 2883” (PI: Pavlov)

STUDENT SUPERVISION

Hui Yang, 2019-Current (GWU Graduate Student) Haven Vu, 2019 (Undergraduate at UC Berkeley)
Corrine Hall, 2016-2017 (High school student)

VOLUNTEER EXPERIENCE

Cal Day

Space Sciences Lab, Berkeley, CA

- Led tours of Space Sciences lab
- Discussed ongoing research at Space Sciences Lab with the general public

Astronomy Festival on the National Mall, June, 2014, 2015, 2016, 2017, and 2018

The National Mall, Washington, D.C.

- Sponsored by Hofstra University
- Demonstrated models of astrophysical systems to the general public

Astronomy on Tap 2017

DC9, Washington, D.C.

- Volunteered to help setup/run the event in the D.C. area

PROFESSIONAL Societies

American Astronomical Society
American Physical Society

HONORS & AWARDS

Gus W. Weiss Prize for Outstanding Student in Physics 2017

Department of Physics, The George Washington University, Washington, D.C.

2nd Place Physics/Mathematics Poster, GWU Research Days Poster Competition 2017

Columbian College of Arts and Sciences, The George Washington University, Washington, D.C.

Outstanding Graduate Teaching Assistant Award 2014

Department of Physics, The George Washington University, Washington, D.C.

REFERENCES

Available Upon Request