

## Jeremy Hare

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### 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.**, Tomsick, J. A., Buisson, D. J. K., 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?” *Submitted to ApJ*

**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:**

Jiachen, J., Tomsick, J. A., **Hare, J.**, Fabian, A. C., Parker, M. L., Reynolds, C. S., “Corono-Disk Interplay in the Hard State of GX 339-4 Suzaku and NuSTAR Spectral Analysis” *Submitted to MNRAS*

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” *Submitted to ApJ*

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”, arXiv:1910.02855, *Accepted for publication in the ApJ*

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”, As-

tronomische Nachrichten, 335, 301, (Mar. 2014)

#### NON-REFEREED PUBLICATIONS

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

#### 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”

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

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**

Haven Vu, 2019 (Undergraduate at UC Berkeley)

Corrine Hall, 2016-2017 (High school student now an undergraduate at M.I.T.)

## **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