

# **Dr. Daniel Ryan Wik | Curriculum Vitae**

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PDF version of CV: <http://www.astro.utah.edu/~wik/cv.pdf>

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## **Research Interests and Experience**

Dr. Wik's research includes investigations of inverse Compton scattering in galaxy clusters and starburst galaxies, the effects of cluster mergers on intracluster gas and their cosmological implications, the X-ray binary populations of galaxies, dark matter searches, and the X-ray background. He is an observational X-ray astronomer with extensive experience carrying out observatory data calibration and analysis tool development, who also has some background in computer simulations and instrumentation.

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## **Research Positions**

- 2023-present: Associate Professor, University of Utah
  - 2017-2023: Assistant Professor, University of Utah
  - 2013-2017: Assistant Research Scientist, Johns Hopkins University, at NASA/GSFC
  - 2010-13: NASA Postdoctoral Position (NPP) Fellow at Goddard Space Flight Center
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## **Education**

- 2010: Ph.D. Astronomy, University of Virginia (UVa), Charlottesville, VA
    - Dissertation Title: "Inverse Compton Scattering in Galaxy Clusters"
    - Advisor: Craig Sarazin
  - 2006: M.Sc. Astronomy, University of Virginia, Charlottesville, VA
  - 2003: B.Sc. Astrophysics (Minor: Mathematics), Ohio University, Athens, OH
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## **Awards and Honors**

- 2019: Students' Choice Award for the best Undergraduate Seminar (Spring)
- 2017: NASA Special Act Team Award for the GSFC Hitomi Science Team
- 2017: NASA RHG Exceptional Achievement for Science Award for the Hitomi Instrument Teams
- 2016: NASA Exceptional Public Achievement Medal for developing the *NuSTAR* background model
- 2015: NASA Group Achievement Award (*NuSTAR* Project Team)
- 2014: NASA Group Achievement Award (*NuSTAR* Science Team)
- 2010: NASA Postdoctoral Program Fellowship
- 2010: AAS/HEAD Travel Grant
- 2009-10: UVa Graduate School of Arts & Sciences Dissertation-Year Fellowship
- 2007-10: Virginia Space Grant Consortium, Graduate Aerospace Research Fellowship
- 2007-8: DuPont Fellowship from University of Virginia Graduate School of Arts & Sciences
- 2006: University Graduate Teaching Assistant Award, University of Virginia

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## Successful Observing and Funding Proposals

Amounts in **bold** are external funding to Utah, totaling **\$1.85M** since 2017

- 2023: *NuSTAR*, Budget PI, “All the Luminous X-ray binaries in M31: Hard X-ray Demographics and Binary Population Synthesis Applications,” 825 ks, **\$124,471**
- 2023: *NuSTAR*, Budget PI, “Probing the Sharp Radio Edge of Abell 2255,” 110 ks, **\$60,303**
- 2023: *NuSTAR*, Co-I, “Capturing the Double Radio Relic System, ZwCl 1856.8, within the *NuSTAR* Field of View”, 240 ks
- 2023: *NuSTAR*, Co-I, “Confirming the first X-ray detection of Inverse Compton in a galaxy group with *NuSTAR*”, 375 ks, C priority
- 2022: *XRISM*, PI, “Hard Bandpass Extension of *XRISM* Cluster Observations with *NuSTAR* and *XMM-Newton*,” **\$123,288**
- 2022: *Chandra*, Budget PI, “Confirming the First [Fe X]-selected Black Hole Candidates in Dwarf Galaxies,” 151 ks, **\$101,740**
- 2022: *NuSTAR*, PI, “Galaxy Cluster Temperatures: Solving the *Chandra-XMM-Newton* Temperature Discrepancy,” 220 ks, C priority **\$20,000**
- 2022: *NuSTAR*, Co-I (Budget PI), “The Fascinating Merger of Abell 3266,” 200 ks, B priority **\$94,469**
- 2022: *NuSTAR*, Co-I, “ZWCL 1856.8: Capturing a Double Radio Relic in the *NuSTAR* Field of View,” 30 ks, A priority
- 2021: *NuSTAR*, Co-I (Budget PI), “CL0217+70: A Late Stage Galaxy Cluster Merger and its Tell-tale Radio Halo,” 180 ks, **\$77,493**
- 2020: *NuSTAR*, Co-I (Budget PI), “Constraining the Nature of Dark Matter with CIZA 0107.7+5408,” 165 ks, C priority, **\$20,000**
- 2020: *NuSTAR*, Co-I (Budget PI), “Pre-merger Dynamics of Abell 3395,” 129 ks, C priority, **\$20,000**
- 2020: *NuSTAR*, PI, Accurate Galaxy Cluster Temperatures: a Legacy Dataset with *Chandra*, *XMM-Newton*, AND *XRISM*, 604 ks, **\$117,292**
- 2020: *NuSTAR*, PI, Accurate Cluster Temperatures and Inverse Compton Emission in Abell 2319, 132 ks, **\$67,512**
- 2020: *NuSTAR/HEASARC* Software Development Grant, PI, “Converting the *NuSTAR* NuSKYBGD IDL Software to Python and Expanding its Capabilities,” **\$49,506**
- 2020: College of Science Seed Grant, PI, “Finding Shock Waves in the Largest Objects in the Universe,” \$15,000
- 2019: *XMM-Newton*, Co-I, “Excavating a dinosaur in the Ophiuchus Cluster,” 169 ks
- 2019: NASA ADAP, PI, “The cluster gas surrounding *NuSTAR*-observed AGN,” **\$220,532**
- 2019: *NuSTAR*, Co-I (Budget PI), “Mapping the Temperature Structure of the Complex Hot Merging Galaxy Cluster MACS J0717,” 165 ks, **\$71,994**
- 2019: *NuSTAR*, Co-I, “A *NuSTAR-XMM* Survey of NGC 55: a holistic view of a low metallicity X-ray binary population,” 400 ks
- 2018: NASA ADAP, PI, “Mapping the Most Energetic Electrons in Extended Galaxy Clusters with *NuSTAR*: Setting the Stage for *XARM*,” **\$252,340**
- 2018: *Chandra*, PI, “Complex Merging in Abell 2345: Characterizing Multiple Potential Shock Fronts,” 210 ks, **\$85,210**
- 2018: *Chandra*, Co-I, “The Giant Elliptical Galaxy in our Backyard: the Resolved 1-30 keV X-ray Binary Population of Maffei 1,” 115 ks
- 2018: *NuSTAR*, PI, “Mapping the temperature structure across two shocks in the massive merging cluster Abell 2146,” 220 ks, **\$71,489**
- 2018: *NuSTAR*, PI, “Toward a Better Census of Black Holes and Neutron Stars in the Disk of M31,” 150 ks, C priority, **\$10,000**
- 2018: *NuSTAR*, Co-I, “A Measurement of the 0.3–30 keV Spectrum of the Low-Metallicity Galaxy VV114,” 200 ks
- 2017: *XMM-Newton*, PI, “The Structure of the Violent Merger in PLCKESZ G200.9-28.2,” 48 ks,

**\$50,843**

- 2017: NSF, PI, "SnowCluster 2018: The Physics of Galaxy Clusters" conference support, **\$20,500**
- 2017: *Chandra*, Co-I, "A Possible First Detection of Inverse Compton Emission from a Galaxy Cluster," 350 ks
- 2017: *Chandra*, Co-I, "One of a Handful in the Universe: Confirming a Wolf-Rayet X-ray Binary Candidate in NGC 253," 160 ks
- 2017: *NuSTAR*, PI, "Toward a Better Census of Black Holes and Neutron Stars in the Disk of M31," 200 ks, **\$61,990**
- 2017: *NuSTAR*, PI, "The Merger-Minihalo Connection in the Ophiuchus Cluster: a Smoking Gun?," 110 ks, **\$48,016**
- 2017: *NuSTAR*, Co-I, "Monitoring X-ray Binaries in the M31 Bulge with *NuSTAR*"
- 2016: NASA ADAP, PI, "The Definitive *NuSTAR* Measurement of the Unresolved Cosmic X-ray Background," \$213,856 (**\$177,943**)
- 2016: *XMM-Newton*, Co-I, "A Coordinated *XMM-Newton* and *NuSTAR* Survey of the HMXB Population in M33"
- 2016: *Chandra*, PI, "A Violent merger in the cluster PLCKESZ G200.9-28.2: Relic formation caught in action?," 150 ks, **\$61,090**
- 2016: *NuSTAR*, PI, "What a Shock! Constraining the Heating Mechanism in Abell 665," 200 ks, **\$50,362**
- 2016: *NuSTAR*, Co-I, "The NuSTAR View of the Shocked Region in Abell 754," 100 ks
- 2016: *NuSTAR*, Co-I, "The Hard X-ray Pulsar Candidate that may Dominate M31 at E>25 keV: *NuSTAR-XMM* Observations of the M31 Bulge," 100 ks
- 2015: *Chandra*, Co-I, "0.5-30 keV Monitoring of the M31 Disk with *Chandra* and *NuSTAR*," 25 ks
- 2015: *NuSTAR*, PI, "Unambiguously Detecting Non-thermal and Shocked Gas in Abell 2163," 115 ks, \$42,739 **\$29,705**
- 2015: *NuSTAR*, Co-I, "Binaries in the M31 Bulge: A Hard X-ray View of Old Stellar Populations," 100 ks
- 2015: *NuSTAR*, Co-I, "Monitoring the X-ray Binary Populations of the M31 Disk with *NuSTAR*," 300 ks
- 2014: *XMM-Newton*, PI, "The Scorpius Galaxy Cluster: Mapping a Merger in a Newly Discovered 9 keV Cluster," 112 ks
- 2014: *Chandra*, Co-I, "PKS B1400-33 and Abell S753: A Very Bright Radio Relic in a Poor Cluster," 94 ks
- 2014: *Chandra*, Co-I, "Thermal and (or?) Relativistic Matter in the Brightest Cluster Radio Relic," 200 ks
- 2013: *XMM-Newton*, Co-I, "PKS B1400-33 and Abell S753: A Very Bright Radio Relic in a Poor Cluster," 136 ks
- 2012: *XMM-Newton*, Co-I, "Merger Activity and Radio Emission Within and Between Abell 2061 and 2067," 45 ks
- 2012: *GMRT*, Co-I, "Low frequency follow-up of the first radio halo in a Planck cluster," 10 hrs
- 2012: *GMRT*, Co-I, "Confirming a radio relic in a new Planck cluster", 16 hrs
- 2011: *XMM-Newton*, PI, "Clumping, Contamination, or Equilibrium in the Outskirts of Abell 1689?", 100 ks, \$70,845
- 2010: *XMM-Newton*, PI, "Completing the XMM Legacy Mosaic of the Perseus cluster," 90 ks
- 2009: *XMM-Newton*, PI, "The Double Relic Cluster A2345: A Dramatic Off-axis Merger," 80 ks
- 2008: *Suzaku*, Co-I, "Hard X-ray Inverse Compton Emission from the Radio Relic & the Dynamics of the Merging Subgroup in the Coma Cluster," 161 ks
- 2008: *Suzaku*, Co-I, "PKS B1400-33 & Abell S753: A Very Bright Radio Relic in a Poor Cluster," 120 ks
- 2008: *Chandra*, PI, "A Merger Shock Front due to Subcluster Infall in Abell 2061?," 32 ks, \$36,365
- 2008: *XMM-Newton*, PI, "Unraveling the Merger States of Abell 2345 & 2254," 61 ks
- 2008: *Suzaku*, PI, "Properties of the Merger & Radio Source Interaction in the Cygnus A Cluster," 45 ks, \$8,995
- 2007: *XMM-Newton*, Co-I, "*XMM-Newton* Observation of the NW Merger Shock and Radio Relic in Abell 3667," 53 ks
- 2007: *XMM-Newton*, PI, "Merger Activity In & Between Abell 2061 & 2067," 30 ks
- 2006: *Suzaku*, Co-I, "Nailing Down the Hard X-ray Inverse Compton Emission from the Radio Halo in the Coma Cluster," 180 ks

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- 2006: *Suzaku*, Co-I, “Hard X-ray Inverse Compton Emission & a Merger Shock Associated with the Brightest Known Radio Relic in Abell 3667,” 135 ks

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## Department & Community Service

- *NuSTAR* User’s Committee, chair, 2020-present
- Graduate Admissions Coordinating Committee (chair and member), 2022-present
- Development Committee (chair), 2023-present
- Equity, Diversity, & Inclusion (EDI) Committee (chair and member), 2019-2023
- College of Science EDI Executive Committee, 2022-2023
- Multimessenger Astrophysics Faculty Search Committee, 2022-2023
- Teaching Excellence Committee, 2020-2021, 2022-2023
- Postdoctoral Affairs, 2020-2021
- Astronomy Computational Faculty Search Committee, 2020-2021
- College of Science Dean Search Committee, 2018-2019
- Astro Data Science Faculty Search Committee, 2018-2019
- Astro Task Force, 2017-present
- Colloquium committee member, 2018-2020
- Graduate Admissions committee member, 2017-2018
- HEAP Seminar committee member, 2017-2018, 2021-2022
- SnowCluster 2018: The Physics of Galaxy Clusters SOC & LOC member, March 18-22, Snowbird, UT
- Served on proposal review panels for NSF AAG grants, NASA ADAP grants, the Netherlands Organisation for Scientific Research, and *Suzaku*, *Chandra*, and *Swift* Guest Observer programs
- Referee for the Astrophysical Journal, MNRAS, Research Notes of the AAS, SPIE/JATIS, and Experimental Astronomy
- Lobbied Congress on behalf of the AAS on Congressional Visits Day, 2011 & 2012

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## Refereed Publications

Myself and contemporaneous student/postdoc names in bold

1. “The NuSTAR View of Perseus: the ICM and a Peculiar Hard Excess,” **Creech, S.**, **Wik, D. R.**, Rossland, S., Tümer, A., Wong, K., Walker, S. A. 2024, ApJ, accepted, arXiv:2401.16616
2. “ZWCL 1856.8: A rare double radio relic system captured within NuSTAR and Chandra field of view,” Tümer, A., **Wik, D. R.**, Schellenberger, G., Miller, E. D., Bautz, M. W. 2024, ApJ, accepted, arXiv:2312.06020
3. “The Hydrostatic Mass of A478: Discrepant Results from Chandra, NuSTAR, and XMM-Newton,” **Potter, C.**, **Tümer, A.**, **Wang, Q. H. S.**, **Wik, D. R.**, Maughan, B. J., Schellenberger, G. 2023, ApJ, 958, 112
4. “The high energy X-ray probe: resolved X-ray populations in extragalactic environments,” Lehmer, B. D., Garofali, K., Binder, B. A., Fornasini, F., Vulic, N., Zezas, A., Hornschemeier, A., Lazzarini, M., **Moon, H.**, Venters, T., **Wik, D. R.**, Yukita, M., Bachetti, M., García, J. A., Grefenstette, B., Madsen, K., Mori, K., Stern, D. 2023, FrASS, 10, 1293918
5. “Wavelet-based image decomposition method for NuSTAR stray light background studies,” Mukhin, A., Krivonos, R., Vikhlinin, A., Grefenstette, B., Madsen, K., **Wik, D. R.** 2023, JATIS, 9, 048001
6. “NuSTAR Observations of Abell 665 and 2146: Constraints on Nonthermal Emission,” **Rojas Bolívar, R. A.**, **Wik, D. R.**, **Tümer, A.**, Gastaldello, F., Hlavacek-Larrondo, J., Nulsen, P., Vacca, V., Madejski,

- G., Sun, M., Sarazin, C. L., Sanders, J., Caprioli, D., Grefenstette, B., Westergaard, N. J. 2023, ApJ, 954, 76
7. "Multiwavelength Characterization of the High Mass X-ray Binary Population of M33," Lazzarini, M., Hinton, K., Shariat, C., Williams, B., Garofali, K., Dalcanton, J., Durbin, M., Antoniou, V., Binder, B., Eracleous, M., Vulic, N., Yang, J., **Wik, D.**, Gasca, A., Kuauhtzin, Q. 2023, ApJ, 952, 114
  8. "Measuring the Cosmic X-ray Background in 3-20 KeV with Straylight from *NuSTAR*," **Rossland, S.**, **Wik, D.**, Grefenstette, B., Cappelluti, N., Civano, F., Gastaldello, F., Gilli, R., Harrison, F., Hornschemeier, A., Hickox, R., Krivonos, R., Madsen, K., Molendi, S., Ptak, A., Stern, D., Zoglauer, A. 2023, AJ, 166, 20
  9. "Gas clumping in the outskirts of galaxy clusters, an assessment of the sensitivity of STAR-X," **Norseth, C. T.**, **Wik, D. R.**, ZuHone, J. A., Miller, E. D., Bautz, M. W., McDonald, M., 2023, RASTI, 2, 607
  10. "Long-exposure *NuSTAR* constraints on decaying dark matter in the Galactic halo," Roach, B., **Rossland, S.**, Ng, K., Perez, K., Beacom, J., Grefenstette, B., Horiuchi, S., Krivonos, R., **Wik, D.** 2023, PhRvD, 107, 023009
  11. "The *NuSTAR* and *Chandra* View of CL 0217+70 and Its Tell-tale Radio Halo," **Tumer, A.**, **Wik, D.**, Zhang, X., Hoang, D., Gaspari, Ma., van Weeren, R., Rudnick, L., Stuardi, C., Mernier, F., Simionescu, A., **Rojas Bolivar, R.**, Kraft, R., Akamatsu, H., de Plaa, J. 2023, ApJ, 942, 79
  12. "A systematic comparison of galaxy cluster temperatures measured with *NuSTAR* and *Chandra*," Wallbank, A. N., Maughan, B. J., Gastaldello, F., **Potter, C.**, **Wik, D. R.** 2022, MNRAS, 517, 5594
  13. "StrayCats. II. An Updated Catalog of NuSTAR Stray Light Observations," Ludlam, R. M., Grefenstette, B. W., Brumback, M. C., Tomsick, J. A., Buisson, D. J. K., Coughenour, B. M., Mastrosario, G., **Wik, D.**, Krivonos, R., Jaodand, A. D., Madsen, K. K. 2022, ApJ, 934, 59
  14. "The *NuSTAR*, *XMM-Newton*, and *Suzaku* view of Abell 3395 at the intercluster filament interface," **Tumer, A.**, **Wik, D.**, Gaspari, M., Akamatsu, H., Westergaard, N., Tombesi, F., Ercan, N. 2022, ApJ, 930, 83
  15. "Young black hole and neutron star systems in the nearby star-forming galaxy M33: the NuSTAR view," **Yang, J.**, **Wik, D.**, Lehmer, B., West, L., Williams, B., Maccarone, T., Ptak, A., Yukita, M., Vulic, N., Walton, D., Garofali, K., Antoniou, V. 2022, ApJ, 930, 64
  16. "Extending the Baseline for SMC X-1's Spin and Orbital Behavior with *NuSTAR* Stray Light," Brumback, McKinley C., Grefenstette, Brian W., Buisson, Douglas J. K., Bachetti, Matteo, Connors, Riley, García, Javier A., Jaodand, Amruta, Krivonos, Roman, Ludlam, Renee, Madsen, Kristin K., Mastrosario, Guglielmo, Tomsick, John A., **Wik, Daniel** 2022, ApJ, 926, 187
  17. "*NuSTAR* measurement of the cosmic X-ray background in the 3-20 keV energy band," Krivonos, R., **Wik, D.** Grefenstette, B., Madsen, K., Perez, K., **Rossland, S.**, Sazonov, S., Zoglauer, A., 2021, MNRAS, 502, 3966
  18. "StrayCats: A catalog of NuSTAR Stray Light Observations," Grefenstette, B., Ludlam, R., Thompson, E., Garcia, J., Hare, J., Jaodand, A., Krivonos, R., Madsen, K., Mastrosario, G., Slaughter, C., Tomsick, J., **Wik, D.**, Zoglauer, A., 2021, ApJ, 909, 30
  19. "*NuSTAR* Observations of Abell 2163: Constraints on Non-thermal Emission," **R. Rojas Bolivar, D. Wik**, S. Giacintucci, F. Gastaldello, A. Hornstrup, N. Westergaard, G. Madejski, 2021, ApJ, 906, 87
  20. "On the X-Ray Spectral Energy Distributions of Star-forming Galaxies: The 0.3-30 keV Spectrum of the Low-metallicity Starburst Galaxy VV 114," Garofali, K., Lehmer, B., Basu-Zych, A., West, L., **Wik, D.**, Yukita, M., Vulic, N., Ptak, A., Hornschemeier, A., 2021, ApJ, 903, 79
  21. "*NuSTAR* Tests of Sterile-Neutrino Dark Matter: New Galactic Bulge Observations and Combined Impact," Roach, Brandon M., Ng, Kenny C. Y., Perez, Kerstin, Beacom, John F., Horiuchi, Shunsaku, Krivonos, Roman, **Wik, Daniel R.**, 2020, PhRvD, 101, 103011

22. "Discovery of a giant radio fossil in the Ophiuchus galaxy cluster," Giacintucci, S., Markevitch, M., Johnston-Hollitt, M., **Wik, D. R.**, Wang, Q. H. S., Clarke, T. E., 2020, ApJ, 891, 1
23. "The Galactic Bulge Diffuse Emission in Broadband X-Rays with *NuSTAR*," Perez, Kerstin, Krivonos, Roman, **Wik, Daniel R.**, 2019, ApJ, 884, 153
24. "Neutron Stars and Black Holes in the Small Magellanic Cloud: The SMC *NuSTAR* Legacy Survey," Lazzarini, M., Williams, B. F., Hornschemeier, A. E., Antoniou, V., Vasilopoulos, G., Haberl, F., Vulic, N., Yukita, M., Zezas, A., Bodaghee, A., Lehmer, B. D., Maccarone, T. J., Ptak, A., **Wik, D.**, Fornasini, F. M., Hong, Jaesub, Kennea, J. A., Tomsick, J. A., Venters, T., Udalski, A. Cassity, A., 2019, ApJ, 884, 2
25. "An *ALMA+ACA* measurement of the shock in the Bullet Cluster," Di Mascolo, Luca, Mroczkowski, Tony, Churazov, Eugene, Markevitch, Maxim, Basu, Kaustuv, Clarke, Tracy E., Devlin, Mark, Mason, Brian S., Randall, Scott W., Reese, Erik D., Sunyaev, Rashid, **Wik, Daniel R.**, 2019, A&A 628, A100
26. "A joint *XMM-NuSTAR* observation of the galaxy cluster Abell 523: Constraints on inverse Compton emission," Cova, F., Gastaldello, F., **Wik, D. R.**, Boschin, W., Botteon, A., Brunetti, G., Buote, D. A., De Grandi, S., Eckert, D., Ettori, S., Feretti, L., Gaspari, M., Ghizzardi, S., Giovannini, G., Girardi, M., Govoni, F., Molendi, S., Murgia, M., Rossetti, M., Vacca, V., 2019, A&A 628, A83
27. "New constraints on sterile neutrino dark matter from *NuSTAR* M31 observations," Ng, Kenny C. Y., Roach, Brandon M., Perez, Kerstin, Beacom, John F., Horiuchi, Shunsaku, Krivonos, Roman, **Wik, Daniel R.**, 2019, PhRvD, 99, 083005
28. "Constraints on the number of X-ray pulsars in IC 10 from a deep *XMM-Newton* observation," **Yang, J.**, Laycock, S. G. T., **Wik, D. R.**, 2019, AN, 340, 62
29. "Evolution of high-mass X-ray binaries in the small magellanic cloud," **Yang, J.**, **Wik, D. R.**, Zezas, A., Laycock, S. G. T., Hong, J., Xu, R., 2019, AN, 340, 46
30. "On the Nature of the X-Ray Emission from the Ultraluminous X-Ray Source, M33 X-8: New Constraints from *NuSTAR* and *XMM-Newton*," West, L., Lehmer, B., **Wik, D.**, **Yang, J.**, Walton, D., Antoniou, V., Haberl, F., Hornschemeier, A., Maccarone, T., Plucinsky, P., Ptak, A., Williams, B., Vulic, N., Yukita, M., Zezas, A., 2018, ApJ, 869, 111
31. "Evidence for Rapid Adiabatic Cooling as an Origin of the Recombining Plasma in the Supernova Remnant W49B Revealed by *NuSTAR* Observations," Yamaguchi, H., Tanaka, T., **Wik, D.**, Rho, J., Bamba, A., Castro, D., Smith, R., Foster, A., Uchida, H., Petre, R., Williams, B., 2018, ApJL, 866, L35
32. "*NuSTAR* Detection of Nonthermal Bremsstrahlung from the Supernova Remnant W49B," Tanaka, T., Yamaguchi, H., **Wik, D.**, Aharonian, F., Bamba, A., Castro, D., Foster, A., Petre, R., Rho, J., Smith, R., Uchida, H., Uchiyama, Y., Williams, B., 2018, ApJL, 866, L26
33. "Anti-correlation between X-ray luminosity and pulsed fraction in the Small Magellanic Cloud pulsar SXP 1323," **Yang, J.**, Zezas, A., Coe, M., Drake, J., Hong, J., Laycock, S., **Wik, D.**, 2018, MNRAS Letters, 479, 1
34. "Black Holes and Neutron Stars in Nearby Galaxies: Insights from *NuSTAR*," Vulic, N., Hornschemeier, A. E., **Wik, D. R.**, Yukita, M., Zezas, A., Ptak, A. F., Lehmer, B. D., Antoniou, V., Maccarone, T. J., Williams, B. F., Fornasini, F. M., 2018, ApJ, 864, 150
35. "Non-thermal X-rays from colliding wind shock acceleration in the massive binary Eta Carinae," Hamaguchi, K., Corcoran, M., Pittard, J., Sharma, N., Takahashi, H., Russell, C., Grefenstette, B., **Wik, D.**, Gull, T., Richardson, N., Madura, T., Moffat, A., 2018, Nature Astronomy, 2, 731
36. "Young Accreting Compact Objects in M31: The Combined Power of *NuSTAR*, *Chandra*, and *Hubble*," Lazzarini, M., Hornschemeier, A. E., Williams, B. F., **Wik, D.**, Vulic, N., Yukita, M., Zezas, A., Lewis, A. R., Durbin, M., Ptak, A., Bodaghee, A., Lehmer, B. D., Antoniou, V., Maccarone, T., 2018, ApJ, 862, 28

37. “*Hitomi* (ASTRO-H) X-ray Astronomy Satellite,” Takahashi, T., Kokubun, M., Mitsuda, K., et al. 2018, Journal of Astronomical Telescopes, Instruments, and Systems, 4, 021402
38. “Solar abundance ratios of the iron-peak elements in the Perseus cluster,” *Hitomi* Collaboration, 2017, Nature, 551, 478
39. “Discovery of a radio relic in the low mass, merging galaxy cluster PLCK G200.9-28.2,” Kale, R., **Wik, D. R.**, Giacintucci, S., Venturi, T., Brunetti, G., Cassano, R., Dallacasa, D., de Gasperin, F. 2017, MNRAS, 472, 940
40. “On the absence of radio haloes in clusters with double relics,” Bonafede, A., Cassano, R., Brüggen, M., Oglean, G. A., Riseley, C. J., Cuciti, V., de Gasperin, F., Golovich, N., Kale, R., Venturi, T., van Weeren, R. J., **Wik, D. R.**, Wittman, D. 2017, MNRAS, 470, 3465
41. “Identification of the Hard X-ray Source Dominating the  $E > 25$  keV Emission of the Nearby Galaxy M31,” Yukita, M., Ptak, A., Hornschemeier, A., **Wik, D.**, Maccarone, T. J., Pottschmidt, K., Zezas, A., Antoniou, V., Ballhausen, R., Lehmer, B. D., Lien, A., Williams, B., Baganoff, F., Boyd, P. T., Enoto, T., Kennea, J., Page, K. L., Choi, Y. 2017, ApJ, 838, 47
42. “*Hitomi* Constraints on the 3.5 keV Line in the Perseus Galaxy Cluster,” Hitomi Collaboration (Aharonian et al.) 2017, ApJ, 837, 15
43. “The Distribution of Radioactive  $^{44}\text{Ti}$  in Cassiopeia A,” Grefenstette, Brian W., Fryer, Chris L., Harrison, Fiona A., Boggs, Steven E., DeLaney, Tracey, Laming, J. Martin, Reynolds, Stephen P., Alexander, David M., Barret, Didier, Christensen, Finn E., Craig, William W., Forster, Karl, Giommi, Paolo, Hailey, Charles J., Hornstrup, Alan, Kitaguchi, Takao, Koglin, J. E., Lopez, Laura, Mao, Peter H., Madsen, Kristin K., Miyasaka, Hiromasa, Mori, Kaya, Perri, Matteo, Pivovaroff, Michael J., Puccetti, Simonetta, Rana, Vikram, Stern, Daniel, Westergaard, Niels J., **Wik, Daniel R.**, Zhang, William W., Zoglauer, Andreas 2017, ApJ, 834, 19
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## **Invited Colloquia, Seminars, & Workshops**

1. 2022: Department Colloquium at Howard University
  2. 2021: Astronomy Group Seminar at Ohio University
  3. 2021: Department Colloquium at SUNY Brockport
  4. 2021: High Energy Physics Seminar at the Harvard-Smithsonian Center for Astrophysics
  5. 2020: APS Four Corners Meeting
  6. 2020: Astronomy Seminar at Iowa State University
  7. 2019: "Galaxy Cluster Science with the FORCE mission," FORCE Workshop, NASA GSFC
  8. 2019: Department Colloquium at Idaho State University
  9. 2018: APS Four Corners Meeting Invited Plenary Speaker
  10. 2018: Galaxies and Cosmology Seminar at the Harvard-Smithsonian Center for Astrophysics
  11. 2017: Department Colloquia at the University of Oklahoma, University of North Dakota, and University of Alabama
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## **Conference Proceedings & Presentations**

1. "Galaxy Cluster Temperatures from *NuSTAR*, *Chandra*, and *XMM-Newton*," 2023, 15th IACHEC Meeting, Seeblick Pelham, Germany
2. "Excess Hard Emission in the Heart of the Virgo Cluster seen with *NuSTAR*," 2023, High Energy Astrophysics Division (HEAD) Meeting #20, Kona, HI
3. "Hard Bandpass Extension and Cross-Calibration with PV *XRISM* Observations of the Coma Cluster," 2022, XRISM Science Workshop, Tsukuba, Japan
4. "Characterizing the Hard X-ray Binary Population of M31," 2022, *NuSTAR* Science Meeting 2022: Ten Years of the High Energy Universe in Focus, Cagliari, Italy
5. "The NuSTAR Perspective on the Chandra/XMM-Newton Temperature Discrepancy in Galaxy Clusters," 2022, IACHEC, Spring Virtual Workshop
6. "Characterizing the Hard X-ray Binary Population of the Disk of M31," 2022, High Energy Astrophysics Division (HEAD) Meeting #19, Monterey, CA
7. "When Galaxy Clusters Collide: Recent Results from the *NuSTAR* and *Chandra* X-ray Observatories," APS Four Corners Meeting Invited Speaker and Session Chair, Albuquerque, NM (virtual), October 23rd, 2020
8. "The X-ray Background Emission of the Galactic Center and Bulge with *NuSTAR*," 2020, Kuznetsova, E., Krivonos, R., Perez, K., Wik, D., Astronomical Society of the Pacific Conference Series (ASPCS): New Horizons in Galactic Center Astronomy and Beyond, arXiv:2008.12393
9. High Energy Astrophysics Division (HEAD) Meeting #18 (September 13-17, 2020, Tucson, AZ; would have presented, but conference cancelled due to COVID-19)
10. "Heating and Acceleration at Galaxy Cluster Shocks: Insights from *NuSTAR*," 2019, X-ray Universe 2019, Bologna, Italy

11. "Broadband, spatially-resolved temperature constraints in galaxy clusters," 2019, Astrophysics of hot plasma in extended X-ray sources XMM-Newton Workshop, Madrid, Spain
12. "Heating and Acceleration at Galaxy Cluster Shocks: Insights from *NuSTAR*," 2019, High Energy Astrophysics Division (HEAD) Meeting #17, Monterey, CA
13. "A Figure of Merit for X-ray Survey Missions," Wik et al., 2018, SPIE Meeting, Austin, TX
14. "Electron Heating at Galaxy Cluster Shocks: Insights from *NuSTAR*," 2018, SnowCluster: the Physics of Galaxy Clusters, Snowbird, UT
15. "Electron Heating at Galaxy Cluster Shocks: Insights from *NuSTAR*," 2017, High Energy Astrophysics Division (HEAD) Meeting #16, Sun Valley, ID
16. "Electron Heating at Galaxy Cluster Shocks: Measuring Shock Temperatures with *NuSTAR*," 2017, Clusters of Galaxies: Physics and Cosmology, Bern, Switzerland
17. "Inverse Compton Searches at Hard X-ray Energies with *NuSTAR*," 2017, Diffuse Synchrotron Emission in Clusters of Galaxies - What is Next?, Leiden, Netherlands
18. "Characterizing the First Galaxy Clusters at the Epoch of their Formation with *STAR-X*," 2017, ESO Early stages of Galaxy Cluster Formation, Garching, Germany
19. "Heating and Acceleration of Galaxy Cluster Shocks: Insights from *NuSTAR*," 2017, Marseille Cosmology Conference, Aix en Provence, France
20. "Electron Heating at Galaxy Cluster Shocks: Measuring the Temperature of the Bullet Cluster Shock with *NuSTAR*," 2017, American Astronomical Society Meeting #229, Grapevine, TX
21. "Galaxy Clusters with *NuSTAR* and *HEX-P*," 2016, *NuSTAR* Science Meeting, Pasadena, CA
22. "A New Deep, Hard X-ray Survey of M31," 2016, High Energy Astrophysics Division (HEAD) Meeting #15, Naples, FL
23. "NuSTAR Legacy Survey of Local Group Galaxies," 2016, High Energy Astrophysics Division (HEAD) Meeting #15 (Town Hall Talk), Naples, FL
24. "A New Deep, Hard X-ray Survey of M31: Monitoring Black Hole and Neutron Star Accretion States in the XRB Population of our Nearest Neighbor," 2016, American Astronomical Society Meeting #227, Kissimmee, FL
25. "The *NuSTAR* Galaxy Cluster Program and Recent Results," 2015, Astroparticle View of Galaxy Clusters, Hiroshima, Japan
26. "*NuSTAR* Observations of Galaxy Clusters," 2015, Snowcluster, Snowbird, UT
27. "The *NuSTAR* Galaxy Cluster Program and Recent Results," 2014, 8th Korean Astrophysics Workshop on Astrophysics of High-Beta Plasma in the Universe, Jeju Island, Korea
28. "*NuSTAR* Observations of Galaxy Clusters," 2015, American Astronomical Society Meeting #225, Seattle, WA
29. "Discovery of a Nearby, Massive Galaxy Cluster Behind the Galactic Bulge with the *XMM-Newton* Observatory," 2014, The X-ray Universe 2014, Dublin, Ireland
30. "The Bullet Cluster: The Power of Hard X-rays to Constrain Cluster Merger Physics," 2014, *NuSTAR* Science Meeting, Columbia, NY
31. "Starburst Galaxy NGC 253 in a Hard (X-ray) Light: Resolving its Emission with *NuSTAR*," 2014, American Astronomical Society Meeting #223, Washington, DC

32. "NuSTAR's Hard Look at the Bullet Cluster: First Results," 2013, High Energy Astrophysics Division (HEAD) Meeting #13, Monterey, CA
33. "NuSTAR's Hard Look at the Bullet Cluster: First Results," 2013, Snowcluster, Snowbird, UT
34. "Current Results from Observations of the Bullet Cluster," 2013, NuSTAR Science Team Meeting, Pasadena, CA
35. "NuSTAR's Hard Look at Clusters and Relics: Bullet Cluster First Results," 2013, American Astronomical Society Meeting #221
36. "XMM-Newton Mosaic of the Perseus Clusters: Surface Brightness Fluctuations Confirm Clumping?," 2012, Energetic Astronomy, Annapolis, MD
37. "Searching for Non-thermal X-rays in the Brightest X-ray and Radio Galaxy Clusters," 2012, American Astronomical Society Meeting #219, Austin, TX
38. "Clumping in Cluster Outskirts: Measuring their Statistical Signature with XMM-Newton," 2011, SZX Huntsville, Huntsville, AL
39. "Cluster Cosmology: Is the ICM in HSE?," 2011, Alpine Cosmology Conference, Austrian Alps
40. "Toward measuring the size-scale of clumping in the outskirts of clusters," Wik, D. R., 2011, A New Era for SZ Science, Santander, Spain
41. "Swift BAT Search for Non-thermal Emission in HIFLUGCS Clusters," 2011, Non-thermal Phenomena in Colliding Galaxy Clusters, *Memorie della Società Astronomica Italiana*, 82, 523
42. "Impact of Mergers on the Intracluster Medium of Galaxy Clusters," 2010, American Astronomical Society Meeting #215, Washington, DC
43. "The Nature of Extended Hard X-ray Emission from the Coma Cluster as Observed by the Swift BAT," 2010, High Energy Astrophysics Division (HEAD) Meeting #11, Kona, Hawaii
44. "The Merger Dynamics of the Cygnus A Cluster: Direct Detection of the Subcluster Infall Velocity," Wik, D. R. & Sarazin, C. 2010, in The Energetic Cosmos: from *Suzaku* to Astro-H, JAXA-SP-09-008E, ed. K. Makishima (Tokyo: JAXA), 88, Otaru, Japan
45. "XMM-Newton, Suzaku, & Swift Limits on Non-thermal Hard X-ray Emission in the Coma Cluster," 2009, New Paths in Studies of Galaxy Clusters, Bavaria, Germany
46. "The Continued Search for Non-thermal Hard X-ray Emission in the Coma and Abell 3667 Galaxy Clusters," 2008, High Energy Astrophysics Division (HEAD) Meeting #10, Los Angeles, CA
47. "A *Suzaku* Search for Non-thermal Emission at Hard X-ray Energies in the Coma Cluster," 2007, *Suzaku* X-ray Universe Meeting, San Diego, CA
48. "The Effect of Galaxy Cluster Mergers on Observations of the Sunyaev-Zel'dovich Effect," 2006, High Energy Astrophysics Division (HEAD) Meeting #9, San Francisco, CA
49. "Classifying Serendipitous Sources for the ChaMP," 2002, American Astronomical Society Meeting #201, Seattle, WA
50. "Brown Dwarfs in the NOAO Deep Wide Field Survey," 2001, American Astronomical Society Meeting #199, Washington, DC
51. "A Rapidly Evolving Loose Group of Galaxies," 2001, American Astronomical Society Meeting #199, Washington, DC

## **Professional Societies**

- 2003-present: Sigma Xi Scientific Research Society
  - 2003-present: Phi Beta Kappa Society
  - 2001-present: American Astronomical Society
  - 2009-present: High Energy Astrophysics Division, AAS
  - 2002-2003: Sigma Pi Sigma National Physics Honor Society
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## **Teaching Experience**

- Spring 2023 & 2024: ASTR 6410: Introduction to Astronomy Research, University of Utah
  - Fall 2020 & 2021: ASTR/PHYS 2500 (now 3070): Foundations of Astronomy, University of Utah
  - Spring 2020: ASTR/PHYS 5590: High Energy Astrophysics, University of Utah
  - Fall 2018 & 2019 & 2022 & 2023: ASTR/PHYS 1060: The Universe, University of Utah
  - Spring 2018 & 2019 & 2021: ASTR/PHYS 4080: Introduction to Cosmology, University of Utah
  - Summer 2008: ASTR 348: Introduction to Cosmology, University of Virginia
  - 2003-4: Oral English Teacher at Private Boarding Schools, Grades 6-12, in Suzhou & Mianyang, China
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## **Students and Postdocs Supervised**

- 2024-present: Sumitra Dhileepkumar, Undergrad
  - 2024-present: Emma Robinson, Undergrad
  - 2023-present: Fiona Lopez, Undergrad (Summer REU Program)
  - 2022-present: Sunny Rasmussen, Undergrad
  - 2022-present: Eliza Diggins, Undergrad
  - 2021-present: Samantha Creech, Grad Student
  - 2021-present: Christian Norseth, Undergrad / Grad Student
  - 2020-2022: Mick (Maya) Wagner, Undergrad
  - 2020-present: Cicely Potter, Grad Student
  - 2020-2022: Nathan Richardson, Undergrad
  - 2019-present: Hannah Moon (Fritze), Grad Student
  - 2019-2022: Aysegul Tumer, Postdoc
  - 2019-2022: Qian Wang, Postdoc
  - 2018-2021: Vivek Vankayalapati, Undergrad
  - 2017-present: Randall Rojas-Bolivar, Grad Student / Postdoc
  - 2017-2023: Steve Rossland, Grad Student / Postdoc
  - 2020-2021: Anna Stephens, Undergrad
  - 2019: Vivian Carvajal, Summer REU program
  - 2019: Sage Yeager, Undergrad
  - 2019-2020: Chandler Bass, Undergrad
  - 2019-2020: Logan Kelley, Undergrad, Senior Honors Thesis advisor: "Weighing Abell 2029: How Different Assumption Change a Galaxy Cluster's Mass"
  - 2018-2019: Sarina Etheridge, Grad Student, completed MS degree
  - 2017-2019: Jun Yang, Postdoc
  - 2017-2018: Cole Takasuki, Undergrad, Senior Honors Thesis advisor: "Benchmarking of the Active Shielding Particle Pusher with Theoretical Models"
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## Public Outreach & Education

- September 2023: Idaho Astronomical Society, “Observing the Universe in X-rays,” Bruneau Dunes State Park, ID
- April 2023: Osher Guest Lecturer
- March 2023: Astronomy on Tap Salt Lake City, “Anecdotes on the design, calibration, and science of the *NuSTAR* X-ray Observatory”
- March 2022: Utah Humanities Community Conversations panelist, discussing the topic “UFOs and Extra-terrestrial Intelligent Life: Do We Believe?”
- September 2019: “Reflections on 20 Years of *XMM-Newton’s* X-ray Astronomy” NASA-produced YouTube video, one of the interviewees featured
  - <https://www.youtube.com/watch?v=aqxutnKohck>
- August 2019: Utah Astronomy Club Public Talk
  - <https://the-nightly-news.com/blog/blog-87-secrets-of-the-high-energy-x-ray-universe>
  - <https://www.deseret.com/2019/9/2/20841051/joe-bauman-utah-scientists-daniel-wik-helps-unlock-x-ray-secrets-of>
- July 2018: Interview on Utah Public Radio:
  - <http://www.upr.org/post/nasas-nustar-telescope-enables-scientists-learn-about-cosmic-rays>
- Fall 2017, Spring & Fall 2019, Spring 2021, Fall 2022: Undergraduate Seminar Talk
- July 2018: REU Program Research Talk
- Taft-Nicholson Center Public Talk (2017, 2019, 2022) and Guest Lecturer (2018)
- 2014-2017: NASA AskAstro responder
- October 2012: Interview on NASA’s Blueshift Podcast
- Fall 2011: National Capital Astronomers Public Talk
- Spring 2005 & Fall 2007: Charlottesville Astronomical Society Public Talk
- Fall 2007: Jefferson Institute for Lifelong Learning Public Talk