

COLIN J. BURKE

PERSONAL

Citizenship: United States and Canada (dual)
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EDUCATION

University of Illinois at Urbana-Champaign *in progress*
Ph.D. Astronomy
Advisor: Professor Xin Liu
Purdue University, West Lafayette May 2018
B.S. Physics
Minor in Astronomy
Certificate of learning beyond the classroom

RESEARCH & PROFESSIONAL EXPERIENCE

Graduate Research December 2018 - Present
Department of Astronomy, University of Illinois at Urbana-Champaign

- Advisor: Professor Xin Liu
- Time series analysis of active galactic nuclei (AGN) variability with DES and TESS.
- Discovery and observational studies of AGN in dwarf galaxies.

R&D Intern, Space and Missile Systems June 2018 - August 2018
Engility Corporation (currently SAIC) June 2017 - August 2017

- Developed computational models and simulations for communications and remote sensing satellites for US government customers.

Undergraduate Research Assistant February 2014 - May 2018
Department of Physics and Astronomy, Purdue University

- Advisor: Professor John R. Peterson
- Developer of internal image simulation code, *PhoSim*, for LSST and JWST.

AWARDS

Illinois Graduate Survey Science Fellow 2019 - 2021
National Center for Supercomputing Applications & Department of Astronomy, University of Illinois at Urbana-Champaign

Teacher Ranked as Excellent Spring 2019
University of Illinois at Urbana-Champaign

Richard W. King Award 2016 - 2017
Department of Physics and Astronomy, Purdue University

- Recognizes excellence in research at the undergraduate junior and senior level.

PUBLICATIONS

First-Author Publications

- **C. J. Burke**, Y. Shen, O. Blaes, C. Gammie, K. Horne, Y.-F. Jiang, X. Liu, I. McHardy, C. W. Morgan, S. Scaringi, Q. Yang. “A fundamental variability timescale in accretion disks.” Submitted to Science (2021).
- **C. J. Burke**, X. Liu, Y.-C. Chen, Y. Shen, H. Guo “On the AGN Nature of Broad Balmer Emission in Four Low-Redshift Metal-Poor Galaxies.” *MNRAS* 504, 534 (2021).
- **C. J. Burke**, Y. Shen, Y.-C. Chen, S. Scaringi, C.-A. Faucher-Giguere, X. Liu, Q. Yang. “Optical Variability of the Dwarf AGN NGC 4395 from the Transiting Exoplanet Survey Satellite.” *ApJ* 899, 136 (2020).
- **C. J. Burke**, V. F. Baldassare, X. Liu, R. J. Foley, Y. Shen, A. Palmese, H. Guo, K. Herner, T. M. C. Abbott, M. Agüena, S. Allam, S. Avila, E. Bertin, D. Brooks, A. Carnero Rosell, M. Carrasco Kind, J. Carretero, L. N. da Costa, J. De Vicente, S. Desai, P. Doel, T. F. Eifler, S. Everett, J. Frieman, J. Garca-Bellido, E. Gaztanaga, D. Gruen, R. A. Gruend, J. Gschwend, G. Gutierrez, D. L. Hollowood, K. Honscheid, D. J. James, E. Krause, K. Kuehn, M. A. G. Maia, F. Menanteau, R. Miquel, F. Paz-Chinchón, A. A. Plazas, E. Sanchez, B. Santiago, V. Scarpine, S. Serrano, I. Sevilla-Noarbe, M. Smith, M. Soares-Santos, E. Suchyta, M. E. C. Swanson, G. Tarle, D. L. Tucker, T. N. Varga (DES Collaboration). “The Curious Case of PHL 293B: A Long-lived Transient in a Metal-poor Blue Compact Dwarf Galaxy.” *ApJ Letters* 894, L5 (2020).
- **C. J. Burke**, P. D. Aleo, X. Liu, J. R. Peterson, G. H. Sembroski, Y.-C. Chen, Y.-Y. Lin. “Deblending and Classifying Astronomical Sources with Mask R-CNN Deep Learning.” *MNRAS* 490, 3952 (2019).
- **C. J. Burke**, J. R. Peterson, E. Egami, J. M. Leisenring, G. H. Sembroski, Marcia J. Rieke. “PhoSim-NIRCam: photon-by-photon image simulations of the James Webb Space Telescope’s near-infrared camera.” *JATIS* 5(3), 038002 (2019).

Contributing-Author Publications

- A. Palmese, M. Fishbach, **C. J. Burke**, J. T. Annis, X. Liu. “Do LIGO/Virgo black hole mergers produce AGN flares? The case of GW190521 and prospects for reaching a confident association.” Submitted to *ApJ* (2021).
- H. Guo, J. Peng, K. Zhang, **C. J. Burke**, X. Liu, M. Sun, S. Wang, M. Kong, Z. Sheng, T. Wang, Z. He, M. Gu. “High-redshift Extreme Variability Quasars from Sloan Digital Sky Survey Multi-Epoch Spectroscopy.” *ApJ* 905, 52 (2020).
- H. Guo, **C. J. Burke**, X. Liu, K. A. Phadke, K. Zhang, Y.-C. Chen, C. Lidman, Y. Shen, R. A. Gruendl, C. Lidman, Y. Shen, E. Morganson, M. Agüena, S. Allam, S. Avila, E. Bertin, D. Brooks, A. Carnero Rosell, D. Carollo, M. Carrasco Kind, M. Costanzi, L. N. da Costa, J. De Vicente, S. Desai, P. Doel, T. F. Eifler, S. Everett, J. Garcia-Bellido, E. Gaztanaga, D. W. Gerdes, D. Gruen, J. Gschwend, G. Gutierrez, S. R. Hinton, D. L. Hollowood, K. Honscheid, D. J. James, K. Kuehn, M. Lima, M. A. G. Maia, F. Menanteau, R. Miquel, A. Möller, R. L. C. Ogando, A. Palmese, F. Paz-Chinchón, A. A. Plazas, A. K. Romer, A. Roodman, E. Sanchez, V. Scarpine, M. Schubnell, S. Serrano, M. Smith, M. Soares-Santos, N. E. Sommer, E. Suchyta, M. E. C. Swanson, G. Tarle, B. E. Tucker, T. N. Varga (DES Collaboration). “Dark Energy Survey Identification of a low-mass Active Galactic Nucleus at Redshift 0.82 from Optical Variability.” *MNRAS* 496, 3636 (2020).
- F. J. Sánchez, C. W. Walter, H. Awan, J. Chiang, S. F. Daniel, E. Gawiser, T. Glanzman, D. P. Kirkby, R. Mandelbaum, A. Slosar, W. M. Wood-Vasey, Y. AlSayyad, **C. J. Burke**, S.

W. Digel, M. Jarvis, T. Johnson, H. Kelly, S. Krughoff, R. H. Lupton, P. J. Marshall, J. R. Peterson, P. A. Price, G. Sembroski, B. Van Klaveren, M. P. Wiesner, B. Xin. “The LSST DESC Data Challenge 1: Generation and Analysis of Synthetic Images for Next Generation Surveys.” [MNRAS 497, 210 \(2020\)](#).

- J. R. Peterson, E. Peng, **C. J. Burke**, G. Sembroski, J. Cheng. “Deformation of Optics for Photon Monte Carlo Simulations.” [ApJ 873, 98 \(2019\)](#).

Conference Proceedings & White Papers

- J. Peterson, G. Sembroski, **C. Burke**, C. Remocaldo; A. Dutta, G. Jernigan. “PhoSim: A Comprehensive Observational Simulation Tool for Precision Astronomy.” [AAS Meeting Abstracts #223 \(2019\)](#)
- D. Thomas, S. M. Kahn, F. B. Bianco, Z. Ivezić, C. M. Raiteri, A. Possenti, J. R. Peterson, **C. J. Burke**, R. D. Blum, G. H. Jacoby, S. B. Howell, G. Madejski. “Unveiling the Rich and Diverse Universe of Subsecond Astrophysics through LSST Star Trails.” [LSST Cadence Optimization White Paper \(2018\)](#)

APPROVED OBSERVING PROGRAMS

Gemini North 8-meter Telescope

- **C. J. Burke (PI)**, X. Liu et al. “Testing the AGN Nature of a Nearby Star-Forming Knot.” 1.1 hours with GMOS. 2021A-FT-108.
- **C. J. Burke (PI)**, X. Liu et. al. “Origin of the extreme broad emission in three metal-poor galaxies.” 2.3 hours with GMOS. 2020A-FT-204.
- V. Baldassare (PI), **C. J. Burke**. “Investigating the nature of broad Balmer emission in the blue compact dwarf galaxy PHL 293B.” 0.5 hours with GMOS. 2019B-DD-109.

Blanco 4-meter Telescope

- D. Thomas (PI), S. Kahn, K. L. Smith, R. Blum, Ž. Ivezić, **C. J. Burke**. “Probing Short Duration Stellar Variability with Star Trail Images of Four K2 Fields.” 0.5 nights on DECam. 2019A-0345.

WIYN 3.5-meter Telescope

- J. R. Peterson (PI), G. H Sembroski, **C. J. Burke**, K. Graves, M. Geckler. “Weak Lensing in Clusters of Galaxies with *PhoSim*.” 1 night on ODI. 2018B-0374.
- J. R. Peterson (PI), G. H Sembroski, E. Peng, **C. J. Burke**. “Weak Lensing in Clusters of Galaxies with *PhoSim*.” 5 nights on ODI. 2017B-0824.

Very Large Array

- **C. Burke (PI)**, X. Liu, H. Guo, K. Nyland, J. Vieira, Y.-C. Chen. “Pilot Follow-Up of Variability-Selected IMBH from the Dark Energy Survey.” 5.07 hours. VLA/20A-132.
- **C. Burke (PI)**, X. Liu, H. Guo, K. Nyland, Y.-C. Chen. “Radio Properties of a Variability-Selected Dwarf AGN from the Dark Energy Survey.” 5.07 hours. VLA/20B-334.
- **C. Burke (PI)**, X. Liu, H. Guo, Y. Shen, Y.-C. Chen. “A 30,000 solar mass black hole in a star-forming dwarf galaxy.” 5.01 hours. VLA/20A-525.

Multi-Element Radio Linked Interferometer Network (e-MERLIN)

- Y.-C. Chen (PI), **C. J. Burke**. “A strong radio jet lunched from the merger of supermassive black holes.”

TALKS

Contributed Talks

- *New Faces of Black Holes* conference, Joint Space-Science Institute (2019).

Invited Talks

- MINERVA Seminar, Paris Observatory (May 2021; Remote).

PROFESSIONAL SERVICE

Referee for *Astronomy & Astrophysics*, *Monthly Notices of the Royal Astronomical Society*.

TEACHING & OUTREACH

Teaching Assistant: ASTR 122: Stars and Galaxies (Spring 2019; Ranked as excellent teacher)

Teaching Assistant: ASTR 350: Big Bang, Black Holes, and the Universe (Fall 2018)

Secured thousands of dollars in grant money for purchase and distribution of 10,000 solar eclipse glasses to schools and libraries near Purdue's campus in 2017

Co-taught middle school physics in joint Purdue–Jiangsu Second Normal University service learning trip to Nanjing, China (May 2017)

Purdue Astronomy Club (Vice President 2016 - 2017; Outreach Coordinator 2016 - 2017)

Volunteer, Purdue Physics and Astronomy Outreach (2015 - 2018)