# BRIAN A. CLARK

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## RESEARCH PROFILE

Experimental astrophysics PhD candidate at The Ohio State University and National Science Foundation Graduate Research Fellow, working with the Askaryan Radio Array (ARA). Interested in ultra-high energy neutrino astronomy, specifically the construction, simulation, and data analysis of radio-based Antarctic neutrino telescopes.

## EDUCATION

**The Ohio State University**, Columbus, Ohio USA — 2014-2019 (Expected)
Ph.D. in Physics–Advisor: Prof. Amy Connolly
Master of Science in Physics, June 2016

**Washington University in St. Louis**, St. Louis, Missouri USA — 2010-2014
Bachelor of Arts in Physics, *Cum Laude*–Advisor: Prof. Henric Krawczynski

## AWARDS

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|---|---|
| National Science Foundation Graduate Research Fellowship | 2016-2019 |
| APS Divison of Astrophysics Travel Award | 2017 |
| OSU Graduate Enrichment Fellowship | 2014-2015 |
| WUSTL Undergraudate Physics Research Fellow | Summer 2011 |

## EXPERIENCE

**The Ohio State University**, Columbus, OH USA — **August 2014 - present**
*Ph.D. Student*, Ultra-High Energy Neutrino Astrophysics

- Active developer in the simulation, hardware, and analysis efforts in Askaryan Radio Array (ARA) collaboration to detect ultra-high energy, extra-galactic neutrinos.
- Lead and directed the mechanical and electrical systems integration of three new neutrino detecting stations, including the management of a six person team of junior students.
- Built and tested printed circuit boards for megahertz RF signal conditioning and power distribution, monitoring, and control.
- Deployed to Antarctica for five weeks to lead the commissioning and calibration of five neutrino detecting stations; performed rapid, high quality on site assessment of instrument performance.
- Developed new frequency and time-series analysis techniques to analyze radio emission from solar flares in the ARA prototype; this is the first extraterrestrial emission observed by the array.

## PUBLICATIONS

3. "Observation of Reconstructable Radio Emission Coincident with an X-Class Solar Flare in the Askaryan Radio Array Prototype Station."
   P. Allison et. al. for the ARA Collaboration (incl. **B. A. Clark** as corresponding author)
   To Be Submitted to Journal of Astroparticle Physics (2018).

2. "Measurement of the real dielectric permittivity $\epsilon_r$ of glacial ice."
   P. Allison et. al. for the ARA Collaboration (incl. **B. A. Clark**)
   Submitted to the Journal of Glaciology (2017). [arXiv:1712.03301]

1. "Analyzing the Data from X-ray Polarimeters with Stokes Paramters."
   F. Kislat, **B. Clark**, M. Bielicke, H. Krawczynski.
   Astroparticle Physics Vol 68 Pg 45-51 (2015). [arXiv:1409.6214]

## SCIENTIFIC TALKS (1 Invited, 8 Contributed)

9. Talk, OSU Physics Summer Seminar Series, Columbus OH. 2018/06/26
   *Ultra-High Energy Neutrino Astrophysics with Radio-Based Detectors.*

8. Talk, OSU CCAPP Seminar, Columbus OH. 2018/05/22
   *The Askaryan Radio Array: Detector Status and Prospects for Using Directional Reconstruction in Point-Source Searches.*

7. Talk, APS April Meeting 2018, Columbus OH. 2018/04/16
   *Directional Reconstruction as a Means of Lowering Thresholds for Point-Source Searches in the Askaryan Radio Array.*

6. Talk, TeVPA 2017, Columbus OH. 2017/08/11
   *The Askaryan Radio Array: Current Status and Future Plans.*

5. Talk, APS April Meeting 2017, Washington DC. 2017/01/31
   *Observation of Reconstructable Radio Waveforms from Solar Flares with Askaryan Radio Array.*

4. Invited Talk, College of Wooster Physics Department Colloquium, Wooster OH. 2016/10/04
   *Ultra-High Energy Neutrino Astrophysics with Radio Detectors.*

3. Talk, Computing in High Energy Astropart. Phys. Research 2016, Columbus OH. 2016/05/26
   *Machine Learning Prospects in Trigger Thresholds for High Energy Radio Neutrino Astronomy.*

2. Talk, OSU Physics Summer Seminar Series, Columbus OH. 2016/04/23
   *Trigger Thresholds in High Energy Neutrino Astronomy.*

1. Talk, Ohio Section of the APS Spring 2016 Meeting, Dayton OH. 2016/04/09
   *Ultra-High Energy Neutrino Astrophysics with the Askaryan Radio Array (ARA).*

## RELEVANT SKILLS

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| Programming | C++, C, Python, BASH |
| Mechanical/Electrical | Surface mount soldering, power distribution, RF signal conditioning |

## TEACHING

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| TA Training Facilitator, University Center for the Advancement of Teaching, OSU | August 2016 |
| Teaching Assistant, "Astronomy 1143: Stars, Galaxies, and Cosmology, OSU | Spring 2016 |
| Teaching Assistant, "Physics 1251: E&M, Optics, and Quantum Mechanics", OSU | Fall 2015 |

## OUTREACH AND SERVCE

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| Physics Climate and Diversity Committee, OSU | January 2017-present |
| Coordinator for ASPIRE Workshop for High School Girls, OSU | July 2015-present |
| Volunteer Judge, Ohio State Science Day | 2015-present |
| Talk, Columbus Science Pub | May 2018 |
| Talk, The Wellington School, Columbus, OH | April 2018 |
| Officer, Physics Graduate Student Council, OSU | October 2014-May 2017 |

## MENTORSHIP

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| **Graduate Students:** | Lauren Ennesser, Keith McBride, Andrés Medina, Julie Rolla, Jorge Torres-Espinosa |
| **Undergraduate Students:** | Ian Best, Suren Gourapura, Hannah Hassan, Spoorthi Nagasmudram, Victoria Niu, Jude Rajasekera, Lucas Smith, Jason Torok |
| **High School Students:** | Addison Hartman, Natalie Keyes |