

EVAN J. ARENA

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RESEARCH INTERESTS

Theoretical astrophysics and cosmology, including general relativity, gravitational lensing, modified gravity, large-scale structure, 21 cm cosmology, dark energy, inflation, dark matter, radio astronomy, and gravitational waves.

EDUCATION

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| Drexel University Ph.D. Student of Physics | 2018 – Present |
| Stony Brook University B.S. in Physics and Astronomy/Planetary Sciences <i>Cum Laude</i> <i>Departmental Honors in Physics</i> | 2013 – 2017 |

POSITIONS HELD

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| Drexel University <i>Graduate Research Assistant and CoAS Dean's Fellow</i> Department of Physics | 2018 – Present |
| Stony Brook University and Brookhaven National Laboratory <i>Research Assistant</i> SBU Department of Physics & Astronomy and BNL Department of Physics | 2015 – Present |
| Brookhaven National Laboratory <i>Intern</i> Department of Physics | 2012 – 2013 |

AWARDS AND HONORS

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| <i>Drexel University Graduate College Teaching Assistant Excellence Award</i> , Drexel University | 2020 |
| <i>Sigma Xi Scientific Research Honor Society Member</i> , Drexel University | 2019 |
| <i>College of Arts and Sciences (CoAS) Dean's Fellowship</i> , Drexel University | 2018 |
| <i>Sigma Pi Sigma National Physics Honor Society Member</i> , Stony Brook University | 2017 |
| <i>Presidential Scholarship</i> , Stony Brook University | 2013 |

RESEARCH HISTORY

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| 2018 – Present | Gravitational Lensing Study of the second-order weak gravitational lensing effect known as Flexion. |
| 2015 – Present | Low redshift 21 cm intensity mapping Cosmological parameter and modified gravity forecasts for a general 21 cm cosmology experiment, member of the DOE Cosmic Visions Dark Energy 21 cm Working Group, and design and construction of the radio telescope used for the 21 cm Baryon Mapping eXperiment at Brookhaven National Laboratory. |

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| 2013 | Gravitational Waves Proposed a new method for the indirect detection of gravitational waves via precision stellar redshift measurement. |
| 2012 | Modified Newtonian Dynamics Investigated the plausibility of Modified Newtonian Dynamics on a local scale based on rotation curves of the Milky Way. |

PROFESSIONAL ACTIVITIES AND SERVICE

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| Working Groups | Member of the DOE Cosmic Visions Dark Energy 21 cm Working Group |
| Collaborations | Member of the Large Synoptic Survey Telescope Dark Energy Science Collaboration (LSST-DESC) |

TEACHING

Drexel University

Teaching Assistant (Recitation and Lab Instructor)

PHYS 100, *Preparation for Engineering Studies*

PHYS 152, *Introductory Physics I*

PHYS 154, *Introductory Physics III*

Winter 2020, Winter 2019

Spring 2020, Spring 2019

Fall 2019, Fall 2018

Stony Brook University

Lecturer

Della Pietra High School Applied Math Program

Spring 2017

CONFERENCES AND TALKS

Contributed Talks

“Hybrid analytic image modeling and image moments approach to gravitational lensing”

Research talk to incoming graduate students, Drexel University

17 Sep. 2019

“Observation of gravitational waves through precision stellar redshift measurement”

High School Research Program conference, Brookhaven National Laboratory

16 Aug. 2013

Poster Presentations

“Hybrid analytic image modeling and image moments approach to gravitational lensing”

First-year graduate student presentations, Drexel University

11 Jun. 2019

“Dark matter and its alternatives”

High School Research Program conference, Brookhaven National Laboratory

27 Nov. 2012

REFEREED PUBLICATIONS

1. Fabritius, J. M., **Arena, E. J.**, Goldberg, D. M. “*Shape, Color, and Distance in Weak Gravitational Flexion*”, Submitted to MNRAS, (2020)

CONFERENCE PROCEEDINGS, SCIENCE BOOKS, WHITE PAPERS

3. Ahmed, Z., Alonso, D., Amin, M. A., Ansari, R., **Arena, E. J.**, Bandura, K., Battaglia, N., Blazek, J., Bull, P., Castorina, E., Chang, T.-C., Connor, L., Davé, R., Dillon, J. S., Dvorkin, C., van Engelen, A., Ferraro, S., Flauger, R., Foreman, S., Frisch, J., Green, D., Holder, G., Jacobs, D., Johnson, M. C., Karagiannis, D., Kaurov, A. A., Knox, L., Liu, A., Loverde, M., Ma, Y.-Z., Masui, K. W., McClintock, T., Meerburg, P. D., Moodley, K., Münchmeyer, M., Newburgh, L. B., Ng, C., Nomerotski, A., O’Connor, P., Obuljen, A., Padmanabhan, H., Parkinson, D., Prochaska, J. X., Rajendran, S., Rapetti, D., Saliwanchik, B., Schaan, E., Sehgal, N., Shaw, J. R., Sheehy, C., Sheldon, E., Shirley, R., Silverstein, E., Slatyer, T., Slosar, A., Stankus, P., Stebbins, A., Timbie, P., Tucker, G. S., Tyndall, W., Villaescusa-Navarro, F., Wallisch, B., and

- White, M., “*Packed Ultra-wideband Mapping Array (PUMA): A Radio Telescope for Cosmology and Transients*”, ArXiv e-prints (2019) [[arXiv:1907.12559](#)]
2. Ahmed, Z., Alonso, D., Amin, M. A., Ansari, R., **Arena, E. J.**, Bandura, K., Beardsley, A., Bull, P., Castorina, E., Chang, T.-C., Davé, R., Dillon, J. S., van Engelen, A., Ewall-Wice, A., Ferraro, S., Foreman, S., Frisch, J., Green, D., Holder, G., Jacobs, D., Karagiannis, D., Kaurov, A. A., Knox, L., Kuhn, E., Liu, A., Ma, Y.-Z., Masui, K. W., McClintock, T., Moodley, K., Münchmeyer, M., Newburgh, L. B., Nomerotski, A., O’Connor, P., Obuljen, A., Padmanabhan, H., Parkinson, D., Perdereau, O., Rapetti, D., Saliwanchik, B., Sehgal, N., Shaw, J. R., Sheehy, C., Sheldon, E., Shirley, R., Silverstein, E., Slatyer, T., Slosar, A., Stankus, P., Stebbins, A., Timbie, P., Tucker, G. S., Tyndall, W., Villaescusa-Navarro, F., and Wulf, D., “*Research and Development for HI Intensity Mapping*”, ArXiv e-prints (2019) [[arXiv:1907.13090](#)]
 1. Cosmic Visions 21 cm Collaboration, Ansari, R., **Arena, E. J.**, Bandura, K., Bull, P., Castorina, E., Chang, T.-C., Foreman, S., Frisch, J., Green, D., Karagiannis, D., Liu, A., Masui, K. W., Meerburg, P. D., Newburgh, L. B., Obuljen, A., O’Connor, P., Shaw, J. R., Sheehy, C., Slosar, A., Smith, K., Stankus, P., Stebbins, A., Timbie, P., Villaescusa-Navarro, F., and White, M., “*Inflation and Early Dark Energy with a Stage II Hydrogen Intensity Mapping experiment*”, ArXiv e-prints (2018) [[arXiv:1810.09572](#)]