EVAN J. ARENA

Ph.D. Candidate \diamond Deptartment of Physics \diamond Drexel University Disque Hall, Office No. 808 \diamond 32 S. 32nd St. \diamond Philadelphia, PA 19104, USA $+1 \cdot (516) \cdot 383 \cdot 4817 \diamond$ evan.james.arena@drexel.edu

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

Drexel University Ph.D. Student of Physics M.S. in Physics	2018 - Present 2020
Stony Brook University B.S. in Physics and Astronomy/Planetary Sciences Cum Laude	2017
Departmental Honors in Physics	
POSITIONS HELD	

\mathbf{P}

OSITIONS HELD	
Drexel University Graduate Research Assistant and CoAS Dean's Fellow Department of Physics	2018 – Present
Stony Brook University and Brookhaven National Laboratory Research Assistant SBU Department of Physics & Astronomy and BNL Department of Physics	2015 – Present
Brookhaven National Laboratory Intern Department of Physics	2012 - 2013

AWARDS AND HONORS

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

$\mathbf{R}\mathbf{I}$

RESEARCH HISTORY		
2018 – Present	Gravitational Lensing Developing a novel method for measuring 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.	

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

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 Collabo-

ration (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

REFEREED PUBLICATIONS

1. Fabritius, J. M., **Arena, E. J.**, Goldberg, D. M. "Shape, Color, and Distance in Weak Gravitational Flexion", Submitted to MNRAS, (2020) [arXiv:2006.03506]

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]
- 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]

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]

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

SOFTWARE DEVELOPED

A tool for measuring weak gravitational flexion. Publicly available code written in Python. https://github.com/DrexelLenser/Lenser

21cmMG

A suite for probing modified gravity with 21 cm cosmology. Publicly available code written in Python. https://github.com/evanjarena/21cmMG

Fisher21cm

Fisher forecast for a general 21 cm experiment. Publicly available code written

in Python. https://github.com/evanjarena/Fisher21cm