

**SHIRLEY WEISHI LI**

Fermi National Accelerator Laboratory  
 PO Box 500, MS 106, Batavia, IL 60510

E-mail: shirleyl@fnal.gov  
<http://shirleyli-phys.github.io/>

**Employment**

---

Fermi National Accelerator Laboratory Postdoctoral Research Associate, Theoretical Physics Department	2020 –
SLAC National Accelerator Laboratory Postdoctoral Research Associate, Theoretical Particle Physics Group	2017 – 2020

**Education**

---

The Ohio State University Ph.D. in Physics Advisor: Prof. John F. Beacom	2017
The Ohio State University B.S. with Summa Cum Laude in Physics Advisor: Prof. Richard J. Furnstahl	2011

**Awards**

---

APS Dissertation Award in Nuclear Physics	2019
APS Finalist in Outstanding Doctoral Thesis Award in Astrophysics Competition	2018
OSU Bunny and Thomas Clark Graduate Student Scholarship	2017
Louise B. Vetter Research Award (sponsored by Phi Kappa Phi)	2016
OSU Presidential Fellowship	2016 – 2017
OSU Hayes Graduate Research Forum Talk Award	2016 – 2017
OSU Department of Physics Smith Senior Awards	2011
OSU Department of Physics Smith Junior Awards	2010
OSU Undergraduate Research Office Summer Research Fellowship	2010

**Journal Articles**

---

17. “Exciting Prospects for Detecting Late-Time Neutrinos from Core-Collapse Supernovae”  
**Shirley W. Li**, Luke F. Roberts, John F. Beacom  
 accepted for publication in PRD [arXiv:2008.04340] [Selected as Editors’ Suggestion](#)
16. “Current and Future Neutrino Oscillation Constraints on Leptonic Unitarity”  
 Sebastian A. R. Ellis, Kevin J. Kelly, **Shirley W. Li**  
 accepted for publication in JHEP [arXiv:2008.01088]
15. “Simulating Hadron Test Beams in Liquid Argon”  
 Alexander Friedland, **Shirley W. Li**  
 Phys. Rev. D 102, 096005 (2020) [arXiv:2007.13336]
14. “Leptonic Unitarity Triangles”  
 Sebastian A. R. Ellis, Kevin J. Kelly, **Shirley W. Li**  
 accepted for publication in PRD [arXiv:2004.13719]

13. “Lepton-Nucleus Cross Section Measurements for DUNE with the LDMX Detector”  
Artur M. Ankowski, Alexander Friedland, **Shirley W. Li**, Omar Moreno, Philip Schuster, Natalia Toro, Nhan Tran  
Phys. Rev. D 101, 053004 (2020) [arXiv:1912.06140]
12. “The Generalized Infrared Structure of the Gluon Propagator”  
**Shirley W. Li**, Peter Lowdon, Orlando Oliveira, Paulo J. Silva  
Phys. Lett. B 803, 135329 (2020) [arXiv:1907.10073]
11. “Dark Sector Equilibration During Nucleosynthesis”  
Asher Berlin, Nikita Blinov, **Shirley W. Li**  
Phys. Rev. D 100, 015038 (2019) [arXiv:1904.04256]
10. “Developing the MeV Potential of DUNE:  
Detailed Considerations of Muon-Induced Spallation and Other Backgrounds”  
Guanying Zhu, **Shirley W. Li**, John F. Beacom  
Phys. Rev. C 99, 055810 (2019) [arXiv:1811.07912]
9. “Understanding the Energy Resolution of Liquid Argon Neutrino Detectors”  
Alexander Friedland, **Shirley W. Li**  
Phys. Rev. D 99, 036009 (2019) [arXiv:1811.06159]
8. “DUNE as the Next-Generation Solar Neutrino Experiment”  
Francesco Capozzi, **Shirley W. Li**, Guanying Zhu, John F. Beacom  
Phys. Rev. Lett. 123, 131803 (2019) [arXiv:1808.08232]
7. “Dark Kinetic Heating of Neutron Stars and An Infrared Window On WIMPs, SIMPs, and Pure Higgsinos”  
Masha Baryakhtar, Joseph Bramante, **Shirley W. Li**, Tim Linden, Nirmal Raj  
Phys. Rev. Lett. 119, 131801 (2017) [arXiv:1704.01577]
6. “Using HAWC to Discover Invisible Pulsars”  
Tim Linden et al. (*incl.* **Shirley W. Li**)  
Phys. Rev. D 96, 103016 (2017) [arXiv:1703.09704]
5. “Echo Technique to Distinguish Flavors of Astrophysical Neutrinos”  
**Shirley W. Li**, Mauricio Bustamante, John F. Beacom  
Phys. Rev. Lett. 122, 151101 (2019) [arXiv:1606.06290]
4. “Tagging Spallation Backgrounds with Showers in Water-Cherenkov Detectors”  
**Shirley W. Li**, John F. Beacom  
Phys. Rev. D 92, 105033 (2015) [arXiv:1508.05389]
3. “Spallation Backgrounds in Super-Kamiokande Are Made in Muon-Induced Showers”  
**Shirley W. Li**, John F. Beacom  
Phys. Rev. D 91, 105005 (2015) [arXiv:1503.04823]
2. “First Calculation of Cosmic-Ray Muon Spallation Backgrounds for MeV Astrophysical Neutrino Signals in Super-Kamiokande”  
**Shirley W. Li**, John F. Beacom  
Phys. Rev. C 89, 045801 (2014) [arXiv:1402.4687]
1. “The Similarity Renormalization Group with Novel Generators”  
**Shirley W. Li**, E. R. Anderson, R. J. Furnstahl  
Phys. Rev. C 84, 054002 (2011) [arXiv:1106.2835]

## Working Group Reports

---

3. “Snowmass 2021 LoI: Neutrino-Induced Shallow- and Deep-Inelastic Scattering”  
arXiv:2009.04285
2. “Neutrino Non-Standard Interactions: A Status Report”  
arXiv:1907.00991
1. “Supernova Physics at DUNE”  
arXiv:1608.07853

## Scientific Presentations (50 invited talks)

---

- |     |  |         |
|-----|--|---------|
| 74. | Invited Talk, Niels Bohr Institute Astroparticle Seminar, Online                         | 11/2020 |
| 73. | Invited Talk, MIT Nuclear & Particle Theory Seminar, Online                              | 10/2020 |
| 72. | Invited Talk, DUNE Collaboration Meeting, Online   | 09/2020 |
| 71. | Invited Talk, Penn State University High Energy Physics Seminar, Online                  | 09/2020 |
| 70. | Plenary Talk, Mini-Workshop on Neutrino Theory, Online                                   | 09/2020 |
| 69. | Invited Talk, University of Minnesota High Energy Physics Seminar, Online                | 09/2020 |
| 68. | Invited Talk, SNEWS-All, Online  | 09/2020 |
| 67. | Invited Talk, Network in Neutrinos, Nuclear Astrophysics, and Symmetries, Online         | 07/2020 |
| 66. | Poster, Neutrino 2020, Online  | 06/2020 |
| 65. | Invited Talk, LBNL Particle Theory Seminar, Online                                       | 06/2020 |
| 64. | Talk, Brookhaven Neutrino Theory Virtual Seminar, Online                                 | 06/2020 |
| 63. | Invited Talk, CERN Theory BSM Forum, Online  | 05/2020 |
| 62. | Invited Talk, UC Irvine Joint Particle Seminar, Irvine, CA                               | 03/2020 |
| 61. | Invited Talk, Arthur B. McDonald Institute Astroparticle Seminar, Kingston, ON           | 02/2020 |
| 60. | Invited Talk, Carleton University Particle Seminar, Ottawa, ON                           | 02/2020 |
| 59. | Talk, Neutrinos from the Lab to the Cosmos, Seattle, WA                                  | 01/2020 |
| 58. | Invited Talk, TRIUMF Theory Group Seminar, Vancouver, BC                                 | 11/2019 |
| 57. | Invited Talk, Texas A&M Mitchell Institute Seminar, College Station, TX                  | 11/2019 |
| 56. | Invited Talk, APS Division of Nuclear Physics Meeting, Arlington, VA                     | 10/2019 |
| 55. | Invited Talk, Topics in Cosmic Neutrino Physics, Batavia, IL                             | 10/2019 |
| 54. | Talk, International Cosmic Ray Conference, Madison, WI                                   | 07/2019 |
| 53. | Talk, Precision Investigations of the Neutrino Sector, Menlo Park, CA                    | 07/2019 |
| 52. | Invited Talk, University of Oregon Institute for Theoretical Science Seminar, Eugene, OR | 06/2019 |
| 51. | Invited Talk, NTN Workshop on Neutrino Non-Standard Interactions, St. Louis, MO          | 05/2019 |
| 50. | Invited Talk, SUSY 2019, Corpus Christi, TX  | 05/2019 |
| 49. | Plenary Talk, Conference on Science at the SURF, Rapid City, SD                          | 05/2019 |
| 48. | Invited Talk, LCTP Spring Symposium, Ann Arbor, MI                                       | 04/2019 |
| 47. | Invited Talk, Bay Area Particle Theory Seminar, San Francisco, CA                        | 03/2019 |
| 46. | Invited Talk, Electron-Nuclear Scattering Prospects at S30XL, Menlo Park, CA             | 03/2019 |
| 45. | Invited Talk, Physics Opportunities in the Near DUNE Detector Hall, Batavia, IL          | 12/2018 |
| 44. | Invited Talk, UPenn Experimental Particle Physics Seminar, Philadelphia, PA              | 10/2018 |
| 43. | Invited Talk, NUFACT 2018, Blacksburg, VA  | 08/2018 |
| 42. | Invited Talk, Fermilab Theory Seminar, Batavia, IL                                       | 06/2018 |
| 41. | Invited Talk, UC Davis Joint Theory Seminar, Davis, CA                                   | 06/2018 |
| 40. | Invited Talk, Caltech High Energy Physics Seminar, Pasadena, CA                          | 05/2018 |
| 39. | Invited Talk, LBNL Institute for Nuclear and Particle Astrophysics Seminar, Berkeley, CA | 05/2018 |
| 38. | Invited Talk, Rising Stars in Physics Workshop, Boston, MA                               | 04/2018 |
| 37. | Invited Talk, APS April Meeting, Columbus, OH  | 04/2018 |
| 36. | Invited Talk, Arizona State University Cosmology Seminar, Tempe, AZ                      | 04/2018 |
| 35. | Invited Talk, SLAC Elementary Particle Physics Seminar, Menlo Par, CA                    | 01/2018 |

34.	Invited Talk, Livermore Nuclear and Chemical Sciences Colloquium, Livermore, CA	11/2017
33.	Invited Talk, LBNL Particle Theory Seminar, Berkeley, CA	11/2017
32.	Plenary Talk, NNN17, Coventry, UK	10/2017
31.	Invited Talk, TeV Particle Astrophysics Conference, Columbus, OH	08/2017
30.	Invited Talk, New Directions in Dark Matter and Neutrino Physics, Waterloo, Canada	07/2017
29.	Talk, OSU CCAPP Summer Seminar, Columbus, OH	06/2017
28.	Talk, Baryon and Lepton Number Violation Workshop, Cleveland, OH	05/2017
27.	Invited Talk, IceCube Particle Astrophysics Symposium, Madison, WI	05/2017
26.	Invited Talk, SLAC Neutrino Workshop, Menlo Park, CA	03/2017
25.	Invited Talk, Supernova at Hyper-Kamiokande, Tokyo, Japan	02/2017
24.	Talk, Frontiers in Nuclear Astrophysics meeting, East Lansing, MI	02/2017
23.	Invited Talk, WIPAC Seminar, Madison, WI	12/2016
22.	Plenary talk, NNN16, Beijing, China	11/2016
21.	Invited Talk, OSU Nuclear Theory Seminar, Columbus, OH	10/2016
20.	Invited Talk, Penn State University High Energy Physics Seminar, State College, PA	10/2016
19.	Invited Talk, Michigan State University NSCL Theory Seminar, East Lansing, MI	09/2016
18.	Talk, Flavor Observations with Supernova Neutrinos, Seattle, WA	08/2016
17.	Talk, OSU CCAPP Summer Seminar, Columbus, OH	07/2016
16.	Talk, Phenomenology 2016, Pittsburgh, PA	05/2016
15.	Talk, APS April Meeting, Salt Lake City, UT	04/2016
14.	Invited Talk, FroST 2016, Batavia, IL	03/2016
13.	Invited Talk, SN@DUNE, Blacksburg, VA	03/2016
12.	Talk, PIKIO, Cincinnati, OH	02/2016
11.	Poster, NNN15, Stony Brook, NY	10/2015
10.	Talk, Nu@Fermilab, Batavia, IL	07/2015
9.	Talk, Conference on the Intersections of Particle and Nuclear Physics, Vail, CO	05/2015
8.	Talk, IceCube Particle Astrophysics Symposium, Madison, WI	05/2015
7.	Talk, OSU CCAPP Summer Seminar, Columbus, OH	06/2014
6.	Poster, Neutrino 2014, Boston, MA	06/2014
5.	Talk, APS April Meeting, Savannah, GA	04/2014
4.	Talk, APS Division of Nuclear Physics Meeting, Newport Beach, CA	10/2012
3.	Talk, OSU Physics Summer Talk Series, Columbus, OH	08/2012
2.	Poster, APS Division of Nuclear Physics Meeting, Santa Fe, NM	11/2010
1.	Poster, OSU Fall Undergraduate Research Day Student Poster Forum, Columbus, OH	10/2010

### Summer Schools

---

SLAC Summer Institute: Shining Light on Dark Matter member of group selected for best student project	2014
Tri-Institute Summer School on Elementary Particles	2013

### Teaching Experience

---

Teaching Assistant, Physics 1250, Mech, Thermo, Waves, OSU	2012 – 2013
Grader, Physics 834, Mathematical Methods, OSU	2011

### Research Advising Experience

---

Guanying Zhu (graduate student at OSU)

**Service**

---

DPF Program Committee 2020 – 2023

Referee for Astroparticle Physics, Journal of High Energy Physics, Journal of Physics G: Nuclear and Particle Physics, The Astronomical Journal, Universe

**Outreach**

---

Conference Experience for Undergraduates Mentor, APS DNP meeting, Crystal City, VA 2019

Volunteer, SAGE-S Summer Camp, Menlo Park, CA 2018

Lecturer, Young Scholars Program, Columbus, OH 2016

Volunteer, “Astro Camp”, Columbus, OH 2016

Volunteer Judge, State Science Day, Columbus, OH 2014 – 2017

Volunteer Judge, OSU Denman Undergraduate Research Forum 2016 – 2017

Talk, “How to Give a Scientific Talk”, ASPIRE CAMP, OSU 2015, 2017

Volunteer Judge, OSU Natural and Mathematical Sciences Undergrad Research Forum 2015

Blog article, “My first conference talk experience”, Blog “A day in the life...”, OSU 2012

Demonstrator, “My Quantum Mom” at COSI, Columbus, OH 2011

**Collaborations**

---

DUNE

**References**

---

Prof. John Beacom  
Department of Physics and Astronomy  
The Ohio State University  
beacom.7@osu.edu

Prof. Michael Peskin  
Theory Group  
SLAC National Accelerator Laboratory  
mpeskin@slac.stanford.edu

Prof. Kendall Mahn  
Department of Physics and Astronomy  
Michigan State University  
mahn@msu.edu

Dr. Alexander Friedland  
Theory Group  
SLAC National Accelerator Laboratory  
alexfr@slac.stanford.edu

Prof. Luke Roberts  
National Superconducting Cyclotron Laboratory  
Michigan State University  
robertsl@nscl.msu.edu

Dr. Pedro Machado  
Theoretical Physics Department  
Fermilab  
pmachado@fnal.gov