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| CONTACT<br>INFORMATION        | <b>Personal Webpage:</b> <a href="https://litingxiao.github.io">https://litingxiao.github.io</a> <b>Email:</b> <a href="mailto:lxiao@caltech.edu">lxiao@caltech.edu</a><br><b>Mailing Address:</b> 1200 E. California Blvd., MC 100-36 <b>Cell:</b> +1 (626) 360-5841<br>Pasadena, CA 91125, USA  |
| RESEARCH<br>INTERESTS         | Gravitational wave physics/astrophysics/cosmology, black hole astrophysics, gravitational wave data analysis with machine learning, astrophysical inference with Bayesian statistics  |
| SKILLS                        | <b>Areas:</b> Data Science, Machine Learning, Signal Processing, Statistical Inference, Parallel Algorithms<br><b>Computing:</b> Python, MATLAB, SQL, C/C++, ROOT, BASH, Condor, Java, JavaScript, Vim editor, L <sup>A</sup> T <sub>E</sub> X<br><b>Languages:</b> English ( <i>full professional proficiency</i> ), Mandarin Chinese ( <i>native</i> )  |
| EDUCATION                     | <b>California Institute of Technology</b> (Caltech), Pasadena, CA <i>Sept 2016 – Present</i><br>Ph.D. student in Physics (GPA: 4.0); Advisor: Prof. Alan J. Weinstein <ul style="list-style-type: none"> <li>Graduate research assistant at the LIGO Laboratory at Caltech</li> <li>Relevant coursework: Learning Systems; Machine Learning and Data Mining; Bayesian Statistics and Data Analysis; Statistical Inference</li> </ul> <b>University of Virginia</b> (UVA), Charlottesville, VA <i>Aug 2011 – May 2015</i><br>B.A. with High Distinction, Astronomy-Physics; B.A., Mathematics (GPA: 3.75) <ul style="list-style-type: none"> <li>Senior Theses: (1) Probing the Orbital Lifetime and Stability in Kepler Multi-planet Extrasolar Systems; (2) The Occurrence of Compact Groups of Galaxies through Cosmic Time</li> </ul> <b>Université Joseph Fourier</b> , Grenoble, France <i>Jun – Jul 2012</i><br>Summer, Bachelor Summer Program – Physics Large Scale Facilities  |
| PHD<br>RESEARCH<br>HIGHLIGHTS | <ul style="list-style-type: none"> <li>Implemented a real-time Kalman filter for optimal thermo-optical aberration estimates in the Thermal Compensation System of the LIGO Livingston detector</li> <li>Improved the calibration of suspension cavity lengths of the LIGO Livingston detector</li> <li>Performed a range of measurements to characterize the LIGO Livingston detector for commissioning towards Observing Run 3</li> <li>Developing novel features for streamline detection pipeline PyCBC and operating the pipeline to detect gravitational waves (GW) from compact binary coalescences</li> <li>Characterizing exceptional compact binary coalescence events during observing runs</li> <li>Developing the Bayesian inference module BILBY for GW astrophysical inference</li> <li>Developing a rapid gravitational waveform generation algorithm ROMAN, and a rapid Bayesian parameter estimation module PERCIVAL using Deep Learning</li> <li>Developing the gravitational wave cosmology pipeline GWCosmo</li> </ul> |
| SELECTED<br>PUBLICATIONS      | [1] <i>LIGO Scientific Collaboration and Virgo Collaboration</i> , GWTC-1: A Gravitational-Wave Transient Catalog of Compact Binary Mergers Observed by LIGO and Virgo during the First and Second Observing Runs, <i>Phys. Rev. X</i> 9, 031040 (2019).<br>[2] <i>S. Sachdev, ..., L. Xiao</i> , The GstLAL Search Analysis Methods for Compact Binary Mergers in Advanced LIGO’s Second and Advanced Virgo’s First Observing Runs, arXiv:1901.08580.<br>[3] <i>D. Mukherjee, ..., L. Xiao</i> , The GstLAL template bank for spinning compact binary mergers in the second observation run of Advanced LIGO and Virgo, arXiv:1812.05121.<br>[4] <i>C. D. Wiens, T. V. Wenger, P. Tzanavaris, K. E. Johnson, S.C. Gallagher, L. Xiao</i> , The Occurrence of Compact Groups of Galaxies Through Cosmic Time, <i>ApJ</i> (2019) 873 124.  |

- [5] *LIGO Scientific Collaboration and Virgo Collaboration*, GW170817: Observation of Gravitational Waves from a Binary Neutron Star Inspiral, Phys. Rev. Lett. 119 161101 (2017).
- [6] *L. Xiao, A. J. Weinstein, T. G. F. Li, S. Sachdev*, Searching for Gravitational Waves from the Coalescence of High-mass Black Hole Binaries, AJUR, Vol.12, Iss. 3, p.77-103, (2015).

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| MENTORSHIP                     | <ul style="list-style-type: none"><li>• Caltech LIGO SURF student, Mahlet Shiferaw. <i>Summer 2019</i></li><li>• Caltech LIGO SURF student, Phoebe McClincy. <i>Summer 2019</i></li><li>• Caltech LIGO SURF student, Sierra Garza. <i>Summer 2019</i></li></ul>   |
| PAST<br>RESEARCH<br>HIGHLIGHTS | <p><b>Experimental High Energy Physics with the CMS Detector at the LHC</b>, Physik-Institut der Universität Zürich, Zürich, Switzerland<br/><i>Research Assistant</i> <i>Sept 2015 – Jun 2016</i></p> <ul style="list-style-type: none"><li>• Analyzed trigger efficiencies of the CMS Higgs searches using Monte Carlo simulations for the upgraded LHC running at 13 TeV (<i>C/C++</i>, <i>ROOT</i>)</li></ul> <p><b>The Occurrence of Compact Groups of Galaxies through Cosmic Time</b>, UVA Department of Astronomy, Charlottesville, VA<br/><i>Undergraduate Research Assistant</i> <i>Jan – May 2015</i></p> <ul style="list-style-type: none"><li>• Studied the population of “compact groups of galaxies” and the population of galaxies within compact groups at different epochs in the evolution of the universe using the Millennium Simulation</li></ul> <p><b>Searching for Gravitational Waves from the Coalescence of High-mass Black Hole Binaries</b>, LIGO Laboratory at Caltech, Pasadena, CA<br/><i>Undergraduate Research Assistant</i> <i>Jun – Sept 2014</i></p> <ul style="list-style-type: none"><li>• Developed data analysis pipeline software in search for gravitational waves produced in the coalescence of binary black holes</li><li>• Included the population of spinning black holes in the analysis pipeline for Advanced LIGO, improved upon previous non-spinning searches in Initial LIGO</li><li>• Expanded the search parameter space and analyzed simulations to evaluate the pipeline search sensitivity</li><li>• Performed detailed timing analysis of the pipeline for future optimization work regarding sensitivity and timeliness</li></ul> <p><b>NASA-UVA JefferSat Cosmic Ray Mission</b>, UVA Department of Mechanical and Aerospace Engineering, Charlottesville, VA<br/><i>Science Investigator</i> <i>Aug 2013 – May 2014</i></p> <ul style="list-style-type: none"><li>• Adapted the existing JefferSat CubeSat balloon satellite design to accommodate one spectrometer for cosmic ray measurements at <math>\sim 124,000</math> feet in the atmosphere</li><li>• Integrated onboard power system, thermal insulation system, and navigation system within the payload structural and high-altitude environmental limitations</li><li>• Designed and implemented both the ground and the payload data handling and communication hardware and software</li><li>• Measurements were used to validate and improve the NASA NAIRAS model for predicting commercial flight crew and passenger exposure to cosmic radiation</li></ul> <p><b>Identification of Upward-going Muons for an Indirect Dark Matter Search in the NO<math>\nu</math>A Experiment</b>, Fermilab, Batavia, IL<br/><i>Undergraduate Research Assistant</i> <i>Mar 2013 – Jan 2014</i></p> <ul style="list-style-type: none"><li>• Searched for energetic neutrinos originating from dark matter annihilation at the solar core using the NO<math>\nu</math>A Far Detector at Fermilab</li><li>• Designed and implemented an algorithm to reconstruct muon tracks and separate muon signals from cosmic rays efficiently (<i>C/C++</i>, <i>ROOT</i>, <i>Grid computing</i>)</li></ul> |

HONORS,  
FELLOWSHIPS,  
& AWARDS

- Generated and ran simulations to evaluate the sensitivity of the search algorithm
- Performed electronics testing and liquid scintillator leak testing and helped assembly of the NO $\nu$ A Near Detector
- University of Virginia Echols Scholar
- Member of Sigma Pi Sigma, National Physics Honor Society
- 2015 UVA International Studies Office Award for Academic Excellence
- 2014 UVA Public Day: invited to showcase two of my research projects
- 2014 UVA Outstanding Undergraduate Physics Research Award
- 2014 – 2015 UVA Physics Department Mitchell Scholarship
- 2013 – 2014 UVA Physics Department Mitchell Scholarship
- 2013 UVA Undergrad Physics Research Symposium: 3rd Place in oral presentation
- University of Virginia Dean's List 7/8 Semesters

TALKS &  
POSTERS**Talks**

- Searching for Gravitational Waves from the Coalescence of High-mass Black Hole Binaries  
- 2014 Caltech SURF Summer Seminar Series at LLO, Livingston, LA *Aug 2014*
- Identification of Upward-going muons for NO $\nu$ A Dark Matter Searches  
- 2013 80th Annual Meeting of SESAPS, Bowling Green, KY *Nov 2013*
- NO $\nu$ A Dark Matter Searches Triggering  
- 2013 July NO $\nu$ A Collaboration Meeting, Lemont, IL *Jul 2013*

**Posters**

- Searching for Dark Matter with the NO $\nu$ A Neutrino Telescope  
- 2014 National Collegiate Research Conference, Boston, MA *Jan 2014*  
- 2013 80th Annual Meeting of SESAPS, Bowling Green, KY *Nov 2013*

**Conferences**

- 2015 APS Conference for Undergraduate Women in Physics at the North Carolina Research Triangle, Duke University, Durham, NC *January 2015*
- 2014 National Collegiate Research Conference, Harvard University, Boston, MA *January 2014*
- 2013 80th Annual APS Southeastern Section Meeting, Western Kentucky University, Bowling Green, KY *November 2013*
- 2013 July NO $\nu$ A Collaboration Meeting, Argonne National Laboratory, Lemont, IL *July 2013*