

CONTACT	<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> (Detailed contact omitted for privacy. Available upon request.)	
SKILLS	<b>Areas:</b> Data Science, Machine Learning, Statistical Inference, Signal Processing <b>Computing:</b> Python, MATLAB, BASH, Condor, C, Java, SQL, Vim, L <sup>A</sup> T <sub>E</sub> X <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>2016 – Present</i> Ph.D. candidate, Physics; M.S., Physics, 2020 (GPA: 4.1/4.0) <ul style="list-style-type: none"> <li>• Graduate research assistant at the LIGO Laboratory at Caltech</li> <li>• Thesis advisor: Prof. Alan J. Weinstein</li> <li>• Minor: Computational Science and Engineering</li> <li>• Relevant coursework: Learning Systems; Machine Learning and Data Mining; Bayesian Statistics and Data Analysis; Computational Cameras; Probability Models</li> </ul> <b>University of Virginia</b> (UVA), Charlottesville, VA <i>2011 – 2015</i> B.A., High Distinction, Astronomy-Physics; B.A., Mathematics (GPA: 3.8/4.0) <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 (<i>Journal Ref: ApJ (2019) 873 124</i>)</li> <li>• Honors: UVA Echols Scholar; Member of National Physics Honor Society – Sigma Pi Sigma; 2015 UVA International Studies Office Award for Academic Excellence; 2014 UVA Outstanding Undergraduate Physics Research Award; 2013 – 2014 and 2014 – 2015 UVA Physics Department Mitchell Scholarship</li> </ul> <b>Université Joseph Fourier</b> , Grenoble, France <i>Jun – Jul 2012</i> Summer, Bachelor Summer Program – Physics Large Scale Facilities	
PHD RESEARCH HIGHLIGHTS	<ul style="list-style-type: none"> <li>• Developing novel improvements for streamline detection pipeline PyCBC and operating the pipeline to detect gravitational waves (GWs) 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 science</li> <li>• Developing a rapid GW waveform generation model ROMAN with deep learning</li> <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 LIGO Observing Run 3</li> <li>• Mentored three Caltech LIGO SURF students in summer, 2019</li> <li>• <i>The Nobel Prize in Physics in 2017</i> was awarded to three LIGO founders: Rainer Weiss (MIT), Kip S. Thorne (Caltech), Barry C. Barish (Caltech)</li> </ul>	
PAST RESEARCH HIGHLIGHTS	<b>Experimental High Energy Physics with the CMS Detector at the LHC</b> , Physik-Institut der Universität Zürich, Zürich, Switzerland <i>Research Assistant</i> <i>Sept 2015 – Jun 2016</i> <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</li> <li>• <i>The 2013 Nobel Prize in Physics</i> was awarded to Francois Englert and Peter Higgs after the discovery of the Higgs Boson at the LHC at CERN</li> </ul> <b>The Occurrence of Compact Groups of Galaxies through Cosmic Time</b> , UVA Department of Astronomy, Charlottesville, VA <i>Undergraduate Research Assistant</i> <i>Jan – May 2015</i>	

- 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

**Searching for Gravitational Waves from the Coalescence of High-mass Black Hole Binaries**, LIGO Laboratory at Caltech, Pasadena, CA

*Summer Undergraduate Research Fellow (SURF)*

*Jun – Sept 2014*

- Developed data analysis pipeline software in search for gravitational waves produced in the coalescence of binary black holes
- Included the population of spinning black holes in the analysis pipeline for Advanced LIGO, improved upon previous non-spinning searches in Initial LIGO
- Expanded the search parameter space and analyzed simulations to evaluate the pipeline search sensitivity
- Performed detailed timing analysis of the pipeline for future optimization work regarding sensitivity and timeliness

**NASA-UVA JefferSat Cosmic Ray Mission**, UVA Department of Mechanical and Aerospace Engineering, Charlottesville, VA

*Science Investigator*

*Aug 2013 – May 2014*

- Adapted the existing JefferSat CubeSat balloon satellite design to accommodate one spectrometer for cosmic ray measurements at  $\sim 124,000$  feet in the atmosphere
- Integrated onboard power system, thermal insulation system, and navigation system within the payload structural and high-altitude environmental limitations
- Designed and implemented both the ground and the payload data handling and communication hardware and software
- Measurements were used to validate and improve the NASA NAIRAS model for predicting commercial flight crew and passenger exposure to cosmic radiation

**Identification of Upward-going Muons for an Indirect Dark Matter Search in the NO $\nu$ A Experiment**, Fermilab, Batavia, IL

*Undergraduate Research Assistant*

*Mar 2013 – Jan 2014*

- Searched for energetic neutrinos originating from dark matter annihilation at the solar core using the NO $\nu$ A Far Detector at Fermilab
- Designed and implemented an algorithm to reconstruct muon tracks and separate muon signals from cosmic rays efficiently
- 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

SELECTED  
PUBLICATIONS

- [1] *T. D. Canton, ..., L. Xiao*, Realtime search for compact binary mergers in Advanced LIGO and Virgo’s third observing run using PyCBC Live. arXiv: 2008.07494.
- [2] *I. M. Romero-Shaw, ..., L. Xiao*, Bayesian inference for compact binary coalescences with BILBY: Validation and application to the first LIGO–Virgo gravitational-wave transient catalogue, arXiv: 2006.00714.
- [3] *S. Sachdev, ..., L. Xiao*, The GstLAL Search Analysis Methods for Compact Binary Mergers in Advanced LIGO’s Second and Advanced Virgo’s First Observing Runs, arXiv:1901.08580.
- [4] *LIGO Scientific Collaboration and Virgo Collaboration*, GWTC-1: A Gravitational-Wave Transient Catalog of Compact Binary Mergers Observed by LIGO and Virgo during the First and Second Observing Runs, Phys. Rev. X 9, 031040 (2019).
- [5] *LIGO Instrument Science List*, Sensitivity and Performance of the Advanced LIGO Detectors in the Third Observing Run, Phys. Rev. D 102, 062003 (2020).