

CONTACT	Personal Website: <a href="https://litingxiao.github.io">https://litingxiao.github.io</a> Email: <a href="mailto:lxiao@caltech.edu">lxiao@caltech.edu</a> LinkedIn: <a href="https://www.linkedin.com/in/litingxiao/">https://www.linkedin.com/in/litingxiao/</a>
HIGHLIGHTS	Consistent and strong academic performance. Have been developing large-scale data analysis projects in Python for physics research for the past 8 years, mainly in weak signal detection and astrophysical inference. Frequently communicated progress and results to colleagues. Independent passion projects in machine learning. Volunteered as a leader in Gravitational Wave Open Data Workshop and CaJAGWR Seminar Series. Mentored undergraduate students for summer research projects.
SKILLS	<ul style="list-style-type: none"> <li>• Areas: Signal Processing; Statistical Inference; Data Science; Machine Learning</li> <li>• Computing: <b>Python</b> (NumPy, SciPy, pandas, scikit-learn, TensorFlow, PyTorch), MATLAB, BASH, Condor, L<sup>A</sup>T<sub>E</sub>X, C, Java, SQL, JavaScript</li> <li>• Languages: English (<i>full professional</i>), Mandarin Chinese (<i>native</i>)</li> </ul>
EDUCATION	<p><b>California Institute of Technology</b> (Caltech), Pasadena, CA      <i>2016 – Present</i>  <b>Ph.D. candidate, Physics</b>; M.S., Physics, 2020 (<b>GPA: 4.1/4.0</b>)</p> <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>• <b>Relevant coursework:</b> Probability Models; Statistical Inference; Bayesian Statistics; Learning Systems; Machine Learning &amp; Data Mining</li> </ul> <p><b>University of Virginia</b> (UVA), Charlottesville, VA      <i>2011 – 2015</i>          B.A., High Distinction, Astronomy-Physics; B.A., Mathematics (<b>GPA: 3.8/4.0</b>)</p> <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: <b>Echols Scholar</b>; Member of National Physics Honor Society – <b>Sigma Pi Sigma</b>; 2015 UVA International Studies Office Award for Academic Excellence; 2014 UVA Outstanding Undergraduate Physics Research Award; 2014 – 2015 and 2013 – 2014 UVA Physics Department Mitchell Scholarship</li> </ul> <p><b>Joseph Fourier University</b>, Grenoble, France      <i>Jun – Jul 2012</i>          Summer, Bachelor Summer Program – Physics Large Scale Facilities</p>
PHD RESEARCH HIGHLIGHTS	<ul style="list-style-type: none"> <li>• Leading algorithmic development efforts in mapping anisotropies in the Stochastic Gravitational-wave Background in distinct frequency bands</li> <li>• Developing novel improvements for streamline detection pipeline PYCBC and operating it to detect gravitational waves (GWs) from compact binary coalescences</li> <li>• Vetting and characterizing exceptional GW events during LIGO observing runs, resulting in Gravitational-Wave Transient Catalogs for the astronomy community</li> <li>• Developing and operating the Bayesian inference module BILBY for GW science</li> <li>• Summer Detector Exploration Fellowship: implemented a real-time Kalman filter for optimal thermo-optical aberration estimates in LIGO optics; enhanced detector calibration of optics suspension cavity lengths; tuned the LIGO Livingston detector for commissioning towards Observing Run 3</li> <li>• <b>The Nobel Prize in Physics in 2017</b> was awarded to three LIGO founders: Rainer Weiss (MIT), Kip S. Thorne (Caltech), Barry C. Barish (Caltech)</li> </ul>
COMPUTING PROJECTS	<ul style="list-style-type: none"> <li>• <b>Shakespearean Sonnet Generator</b>: Built and trained Recurrent Neural Networks (RNNs) and Hidden Markov Models (HMMs) to generate sonnets of Shakespeare's writing style</li> </ul>

PAST  
RESEARCH  
EXPERIENCE

- **High Frequency Price Prediction:** Built and trained a Deep Neural Network (DNN) to predict future price movements using high frequency market orders
- Sept 2015 – Jun 2016, *Research Assistant:* Assessed trigger efficiencies of the Higgs Boson search using Monte Carlo simulations in the the Compact Muon Solenoid Experiment for the upgraded Large Hadron Collider running at 13 TeV at CERN (Physik-Institut der Universität Zürich, Zürich, Switzerland)
- Jan – May 2015, *Undergraduate Research Assistant:* Followed 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 (UVA Department of Astronomy, Charlottesville, VA)
- Jun – Sept 2014, *Summer Undergraduate Research Fellow:* Expanded the GW search parameter space in the GstLAL analysis pipeline, evaluated its sensitivity via simulations in anticipation of Advanced LIGO, and incorporated timing analysis for future optimization (LIGO Laboratory at Caltech, Pasadena, CA)
- Aug 2013 – May 2014, NASA-UVA JefferSat Cosmic Ray Mission *Science Investigator:* Designed and implemented the ground and payload data handling and transmission hardware and software for cosmic ray measurements at  $\sim 124,000$  feet to improve the NASA NAIRAS model (UVA Department of Mechanical and Aerospace Engineering, Charlottesville, VA)
- Mar 2013 – Jan 2014, *Undergraduate Research Assistant:* Formulated, deployed and evaluated an algorithm to reconstruct muon tracks and separate muon signals from cosmic ray background efficiently in search for energetic neutrinos from dark matter annihilation at the solar core in the NO $\nu$ A Experiment (Fermilab, Batavia, IL)

SELECTED  
PUBLICATIONS

- [1] A Bayesian Ranking Statistic to Find High-mass Black Holes in LIGO data, in preparation, *A. Vajpeyi, ..., L. Xiao.*
- [2] Realtime search for compact binary mergers in Advanced LIGO and Virgo’s third observing run using PYCBC Live, arXiv: 2008.07494, *T. D. Canton, ..., L. Xiao.*
- [3] Bayesian inference for compact binary coalescences with BILBY: Validation and application to the first LIGO–Virgo gravitational-wave transient catalogue, MNRAS Vol. 499, Iss. 3 (2020), *I. M. Romero-Shaw, ..., L. Xiao.*
- [4] The GstLAL Search Analysis Methods for Compact Binary Mergers in Advanced LIGO’s Second and Advanced Virgo’s First Observing Runs, arXiv:1901.08580, *S. Sachdev, ..., L. Xiao.*
- [5] GWTC-2: Compact Binary Coalescences Observed by LIGO and Virgo During the First Half of the Third Observing Run, arXiv:2010.14527, *LIGO Scientific Collaboration and Virgo Collaboration*
- [6] 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), *LIGO Scientific Collaboration and Virgo Collaboration.*
- [7] Sensitivity and Performance of the Advanced LIGO Detectors in the Third Observing Run, Phys. Rev. D 102, 062003 (2020), *LIGO Instrument Science List.*