LITING XIAO
Resume

CONTACT   Personal Webpage: https://litingxiao.github.io   Email: lxxiao@caltech.edu
(Detailed contact omitted for privacy. Available upon request.)

HIGHLIGHTS   Consistent and strong academic record. Have been developing large-scale data analysis projects in Python for physics research for the past 8 years, mainly in 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
- Areas: Research; Signal Processing; Statistical Inference; Machine Learning
- Computing: **Python** (NumPy, SciPy, pandas, scikit-learn, TensorFlow, PyTorch), MATLAB, BASH, Condor, LaTeX, C, Java, SQL, JavaScipt
- Languages: English (*full professional*), Mandarin Chinese (*native*)

EDUCATION

California Institute of Technology (Caltech), Pasadena, CA   *2016 – Present*

Ph.D. candidate, Physics; M.S., Physics, 2020 **(GPA: 4.1/4.0)**
- Graduate research assistant at the LIGO Laboratory at Caltech
- Thesis advisor: Prof. Alan J. Weinstein
- Minor: Computational Science and Engineering
- Relevant coursework: Learning Systems; Machine Learning and Data Mining; Intro to Probability Models; Bayesian Statistics and Data Analysis; Algorithms (planned); Statistical Inference (planned)

University of Virginia (UVA), Charlottesville, VA   *2011 – 2015*

B.A., High Distinction, Astronomy-Physics; B.A., Mathematics **(GPA: 3.8/4.0)**
- 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 (*Journal Ref: ApJ (2019) 873 124*)
- Honors: **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

Université Joseph Fourier, Grenoble, France   *Jun – Jul 2012*

Summer, Bachelor Summer Program – Physics Large Scale Facilities

PHD RESEARCH HIGHLIGHTS
- Developing novel improvements for streamline detection pipeline PYCBC and operating it to detect gravitational waves (GWs) from compact binary coalescences
- Vetting and characterizing exceptional GW events during LIGO observing runs, resulting in Gravitational-Wave Transient Catalogs for the astronomy community
- Developing and operating the Bayesian inference module BILBY for GW science
- 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
- **The Nobel Prize in Physics in 2017** was awarded to three LIGO founders: Rainer Weiss (MIT), Kip S. Thorne (Caltech), Barry C. Barish (Caltech)

COMPUTING PROJECTS
- Shakespearean Sonnet Generator: Built and trained Recurrent Neural Networks (RNNs) and Hidden Markov Models (HMMs) to generate sonnets of Shakespeare's writing style
- High Frequency Price Prediction: Built and trained a Deep Neural Network (DNN) to predict future price movements using high frequency market orders

PAST
RESEARCH
EXPERIENCE

- 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 ∼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 NOνA 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, arXiv: 2006.00714, *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*.