

# Daniel Finstad

DEPARTMENT OF PHYSICS  
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## EDUCATION

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**PhD Candidate, Department of Physics**  
Syracuse University  
Advisor: Prof. Duncan Brown

*Aug 2016 - Aug 2021*

**Bachelor of Arts in Physics**  
**Bachelor of Arts in Applied Mathematics**  
University of California, Berkeley

*2013-2015*

**Associate of Science in Physics**  
Long Beach City College

*2010-2013*

## PHD RESEARCH

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- Bayesian inference analyses of gravitational-wave signals from neutron star and black hole binaries; constraining the nuclear equation of state using neutron star mergers.
- Development of fast likelihood evaluation methods to rapidly identify and localize future potential multimessenger sources
- Code development for PyCBC - open software for analyzing gravitational-wave data <https://github.com/gwastro/pycbc>.

## COMPUTATIONAL EXPERIENCE

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### Programming Languages and Platforms

**Proficient:** Python, C, Bash, jupyter, HDF5

**Substantial Knowledge:** Fortran, MATLAB, Mathematica, XML, IDL

### High-Throughput and Parallel Computing

HTCondor, Open Science Grid, Pegasus, OpenMP, MPI

- Proficient at running software on highly parallel and high-throughput computing clusters.
- Substantial experience in developing software and scientific workflows for parallel computing and designed to be run on high-throughput clusters.

## Code/Data Sharing and Management

Github, Gitlab, Zenodo, Bitbucket, Docker, Singularity, Globus

- Proficient at using these platforms for building, maintaining, reviewing, transferring, and publishing version-controlled code and data generated in large collaborative projects.

## Software

**Maintainer:** PyCBC

**Analyses and simulations with:** PyCBC, MESA, EMCEE, Dynesty, Astropy

## HONORS, AWARDS, AND FELLOWSHIPS

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<b>Research Excellence Doctoral Funding Fellowship</b> , Syracuse University	2020-2021
– Awarded to 30 graduate students across 16 departments	
<b>STEM Fellowship</b> , Syracuse University	2018-2019
<b>NSF PAARE Fellowship</b> , Syracuse University	2017-2018

## PUBLICATIONS

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Short author papers – first author: 3, contributing author: 1.

### Short Author - Refereed and Preprints:

3. **Daniel Finstad**, Duncan A. Brown, *Fast Parameter Estimation of Binary Mergers for Multimessenger Followup*, arXiv:2009.13759 (2020), Accepted by Astrophysical Journal Letters.
2. Soumi De, **Daniel Finstad**, James M. Lattimer, Duncan A. Brown, Edo Berger, Christopher M. Biwer, *Tidal Deformabilities and Radii of Neutron Stars from the Observation of GW170817*, Phys. Rev. Lett., 121, 091102 (2018). [302 citations]
  - **Data release:** <https://github.com/sugwg/gw170817-common-eos>
1. **Daniel Finstad**, Soumi De, Duncan A. Brown, Edo Berger, Christopher M. Biwer, *Measuring the Viewing Angle of GW170817 with Electromagnetic and Gravitational Waves*, Astrophys. J. Lett. 860, L2(2018). [40 citations]
  - **Data release:** <https://github.com/sugwg/gw170817-inclination-angle>

### Short Author - In Preparation:

1. **Daniel Finstad**, Duncan A. Brown et al., *Prospects for Precise Equation of State Measurements from Advanced LIGO and Cosmic Explorer* (2021).

### LIGO Scientific Collaboration Publications:

Following are publications to which I have contributed as a member of the collaboration from Sep 2016 to Jan 2018

2. B. P. Abbott et al., *GW170817: Observation of gravitational waves from a binary neutron star inspiral*, Phys. Rev. Lett., 119, 161101 (2017).
1. B. P. Abbott et al., *Multi-messenger observations of a binary neutron star merger*, Astrophys. J. Lett., 848,2 (2017).

## PRESENTATIONS

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### American Physical Society April Meeting

Denver, Colorado, USA

*Using Gravitational Waves to Observe the Black Hole Mass Gap due to Pair-Instability Supernovae*

April 2019

### Eastern Gravity Meeting

Brooklyn, New York, USA

*Measuring the viewing angle of GW170817 with electromagnetic and gravitational waves*

May 2018

## PROFESSIONAL DEVELOPMENT

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### Data Science at Scale Internship

Los Alamos National Laboratory

Summer Internship

Summer 2019

### MESA (Modules for Experiments in Stellar Astrophysics) Summer School

University of California, Santa Barbara

Summer School

Aug 2018

### Neutron Star Merger Summer School

Facility for Rare Isotope Beams, Michigan State University

Summer School

May 2018

## MENTORING

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Co-mentored Syracuse University undergraduate student Laurel White (Physics major) on gravitational-wave data analysis research projects. Tools and techniques involved: Bayesian inference, cluster computing, python, bash.

Fall 2020

## PAST RESEARCH EXPERIENCE

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### Research Assistant

UC Berkeley Space Sciences Lab (Advisor: Prof. Andrew Howard)

*Data analysis software development:*

*Optical fiber characterization for radial velocity measurements using Keck Planet Finder*

Spring 2016

### Research Student

UC Berkeley Space Sciences Lab (Advisor: Dr. Ed Wishnow)

*Infrared interferometer instrumentation at Mt. Wilson Observatory*

2015