

SUMEET KULKARNI

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EDUCATION

Doctor of Philosophy (Ph.D.) Candidate, Physics & M. Ed., Science Curriculum and Instruction

The University of Mississippi

📅 August 2017 – Present 📍 Oxford, Mississippi

Bachelor of Science & Master of Science (Integrated B.S.-M.S.)

Indian Institute of Science Education and Research (IISER)

📅 Aug 2012 – May 2017 📍 Pune, India

RESEARCH INTERESTS

Gravitational Wave Astrophysics

The Nobel-prize winning first detection of gravitational waves in 2015 by the LIGO-Virgo collaboration that I'm a part of renewed our understanding of neutron stars and black holes in the universe. In my thesis, I am using computational simulations to study the population properties merging compact objects in order to figure out how and where they formed, the dynamics of their collision, what happens after they collide.

PUBLICATIONS

1. Astrophysics:

- **Sumeet Kulkarni**, Surendra Padamata, and Anuradha Gupta (2022). *Recoil Velocity of Binary Neutron Star Merger Remnants*. URL: <https://arxiv.org/abs/2210.06357>.
- Johnson-McDaniel, Nathan K., **Sumeet Kulkarni**, and Anuradha Gupta (July 2022). "Inferring spin tilts at formation from gravitational wave observations of binary black holes: Interfacing precession-averaged and orbit-averaged spin evolution". In: *Phys. Rev. D* 106 (2), p. 023001. DOI: 10.1103/PhysRevD.106.023001. URL: <https://link.aps.org/doi/10.1103/PhysRevD.106.023001>.
- Singhal, Akshat and others including **Sumeet Kulkarni** (Aug. 2021). "Deep co-added sky from Catalina Sky Survey images". In: *Monthly Notices of the Royal Astronomical Society* 507.4, pp. 4983–4996. ISSN: 0035-8711. DOI: 10.1093/mnras/stab2246. URL: <https://doi.org/10.1093/mnras/stab2246>.
- Kentaro Mogushi, **Sumeet Kulkarni** et al. (June 2021). "NNETFIX: an artificial neural network-based denoising engine for gravitational-wave signals". In: *Machine Learning: Science and Technology* 2.3, p. 035018. DOI: 10.1088/2632-2153/abea69. URL: <https://doi.org/10.1088/2632-2153/abea69>.
- **Sumeet Kulkarni**, Khun Sang Phukon, et al. (May 2019). "Random projections in gravitational wave searches of compact binaries". In: *Phys. Rev. D* 99 (10), p. 101503. DOI: 10.1103/PhysRevD.99.101503. URL: <https://link.aps.org/doi/10.1103/PhysRevD.99.101503>.

Contribution to LIGO-Virgo Collaboration Papers

- The LIGO Scientific Collaboration, The Virgo Collaboration, and The KAGRA Collaboration (2021). "Tests of General Relativity with GWTC-3". In: DOI: 10.48550/arxiv.2112.06861
- The LIGO Scientific Collaboration, The Virgo Collaboration, and The KAGRA Collaboration (2021). "GWTC-3: Compact Binary Coalescences Observed by LIGO and Virgo During the Second Part of the Third Observing Run". In: DOI: 10.48550/arXiv.2111.03606

2. Physics Education:

- **Sumeet Kulkarni** and Brooke A. Whitworth, "Podcasts in Science Classrooms: Storytelling for All Ears!", *The Physics Teacher* 60, 419-421 (2022) URL: <https://doi.org/10.1119/5.0038642>

AWARDS AND FELLOWSHIPS

- AAAS Mass Media Fellowship at *The Los Angeles Times*
- American Physical Society (APS) Distinguished Student award (April 2022)
- APS Division of Gravity (DGRAV) Student Travel Award (April 2022)
- 3-Minute Thesis - First-place winner, Doctoral category at the University of Mississippi 3MT, 2021.
- Outreach Fellow at the LIGO Livingston Science Education Center (Spring 2022)

PROGRAMMING SKILLS

Python: Numpy, Scipy, Astropy, Pandas, Matplotlib

GWPy

PyCBC

BAYESTAR

GIT

JSON

Machine Learning: Scikit-learn, Tensorflow

Database Management (MySQL)

\LaTeX

LANGUAGES

English

Marathi

Hindi

French



TEACHING EXPERIENCE

Teaching Assistant, Astronomy

📅 August 2017-May 2021

- **Astronomy 103/4** Taught introductory astronomy labs comprising mostly non-STEM majors. The labs had an emphasis on teaching over grading.
- Guided Astrophotography sessions for Honors students using the 17-inch telescope and professional-grade imaging equipment at the Kennon Observatory, University of Mississippi.

SCIENCE WRITING

Positions

- AAAS Mass Media Fellow, **The Los Angeles Times** (June - August 2022)
Pitched and reported on 11 science stories over a period of 10 weeks for the LA Times' science desk. Conducted interviews of over 30 scientists from a variety of backgrounds including academics, students, medical doctors, patients, a state assemblymember, and even Bill Nye, the Science Guy! Link to all of my LAT stories: <https://www.latimes.com/people/sumeet-kulkarni>
- Author and Editor, **Astrobites** (January 2020-present)
I am a regular author for Astrobites, a team of astronomy graduate students who write and edit science summaries of new research papers aimed at undergraduate students. Link to all posts: <https://astrobites.org/author/skulkarni/>
- Science Journalism Intern, **India Bioscience** (Summer 2019)
I got introduced to the craft of science writing and wrote 3 News articles and 2 Features during this 3-month remote internship with India's leading life sciences communication outlet. Link to all articles: <https://indiabioscience.org/authors/SumeetKulkarni>
- Editor, **LIGO Magazine** (December 2020-present)
As part of the team of editors for the bi-annual magazine of the LIGO Scientific Collaboration, I commission and edit stories about science as well as the social and professional aspects of life in a big collaboration spanning over 18 countries worldwide.

For a complete list of my writing clips, visit my webpage at <https://sumeetkul.github.io/writing>

SCIENCE COMMUNICATION & OUTREACH

Oxford Science Café

📅 December 2018-present

📍 Oxford, MS, USA

- Co-organizer of the Oxford Science Cafe: monthly public talks and conversations about science for the local community in Oxford, and the only event of its kind in north Mississippi.
- Roles: Emceeing for the main event, identifying and inviting speakers, securing funds, publicity.

Ssippin' Science Podcast

📅 March 2020-present

📍 Podcastland

- Producer and host of *Ssippin' Science*, in which we share the Oxford Science cafe talks with a broader audience in the form of interviews and soundbites; Available to listen on **Spotify**, **Apple Podcasts** or **Google Podcasts**.

Winner, 3MT®

📅 October 2021

📍 University of Mississippi

- Won first place in the Doctoral Category of the 3-Minute Thesis competition organized by the University of Mississippi Graduate School.

Conference on Science Communication (Comscicon)

📅 September 2019-March 2021

📍 College Park MD, Athens GA

- Comscicon is a series of workshops focused on the communication of complex and technical concepts organized by graduate students, for graduate students
- Selected to attend (i) Comscicon-AIP at the American Institute of Physics (September 2019), (ii) Comscicon-Atlanta (March 2020), (iii) Comscicon-SciWri at the National Association for Science Writers (NASW, October 2021).
- **Chaired** the 6-member organizing committee for the regional **Comscicon-Atlanta** (conducted virtually in March 2021); designed panels and workshops for graduate students interested in science communication across the southeastern USA.

University Outreach

📅 August 2017 - present

📍 University of Mississippi

- **Spooky Physics Night:** Dressed up in nerdy costumes and presented fun, spooky physics demos to kids every Halloween night at the UM Department of Physics.
- **Astronomy Open House:** Conducted star-gazing and planet-hunting sessions for the monthly open house at the Kennon observatory, The University of Mississippi.

Invited Talks

- The British Council's *Cafe Scientifique*: 'The Rise of Artificial Intelligence in Astronomy' at the British Library, Pune. Cafe Scientifique provides a unique forum for the discussion of scientific issues in a way that is much more relaxed, informal and accessible than a public lecture. (January 5, 2018)

CONFERENCE CONTRIBUTED TALKS AND POSTERS

1. American Physical Society (APS) Meeting, 2019

📅 April 2022

📍 New York, NY

- Contributed talk about binary neutron star recoil velocities: Abstract
- **American Physical Society (APS) Meeting, 2019**

📅 April 2019

📍 Denver, CO

- Contributed talk with the latest results from the NNETFIX project: Abstract

2. American Physical Society (APS) Meeting, 2018

📅 April 2018 📍 Columbus, OH

- Presented a poster with initial results of NNETFIX: Abstract

3. 14th Edoardo Amaldi Conference on Gravitational Waves

📅 June 2021 📍 Virtual

- Presented a poster on *Inferring Binary Black Hole Spin Tilts at Formation with Gravitational Wave Observations*

4. Mississippi Academy of Sciences (MAS) annual meeting

📅 August 2021 📍 Biloxi, MS

- Contributed talk on *Inferring Binary Black Hole Spin Tilts at Formation with Gravitational Wave Observations*

5. University of Mississippi Graduate Research Symposium

📅 March 2022 📍 Oxford, MS

- Presented my Astrophotography pictures for the Creative Achievement category

6. Computational Challenges in Gravitational Wave Astrophysics Workshop

📅 January 2019 📍 University of California, Los Angeles

- Studied various computational tools and techniques applied in Gravitational Wave data analysis

7. GROWTH school on Multi-Messenger Astrophysics

📅 August 2019 📍 San Diego, CA

- Understood and implemented various tools to analyze EM follow-up data in the optical, x-ray and radio wavelengths
- Learned new tools used for early parameter estimation and generation of LIGO-Virgo skymaps.

LIGO Scientific Collaboration Meetings

• LIGO Detector characterization Noise sprint

📅 August 2018 📍 LIGO Hanford, WA

• LIGO Open Data Workshop

📅 March 2018 📍 Pasadena, CA

• LIGO Detector characterization annual meeting

📅 January 2018 📍 LIGO Livingston, LA

• ICTS Summer School on Gravitational Waves

📅 July 2017 📍 Bengaluru, India

ASTROPHOTOGRAPHY

- Pictures of the Milky Way, the Moon, the Planets and other starscapes clicked by me were displayed in a dedicated exhibit at the University of Mississippi Library from February-June 2022. eGrove: https://egrove.olemiss.edu/jdw_exhibits/31/.
 - Astrophotography portfolio: <https://sumeet-astrophoto.myportfolio.com/>
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