

# **Tejaswi Venumadhav Nerella**

Assistant Professor, Department of Physics  
Broida Hall  
University of California, Santa Barbara  
Santa Barbara, CA 93106-9530

# **Curriculum Vitae**

Contact:  
Phone: +1 (626) 826-3571  
email: teja@ucsb.edu

## **Education**

### **California Institute of Technology**

Ph.D. in Physics,  
*Advisor:* Christopher Hirata

2010-2015

### **Indian Institute of Technology, Kanpur**

M.Sc (Integrated) in Physics

2005-2010

## **Academic Honors**

Sloan Research Fellowship  
Alfred P. Sloan Foundation

2023

Hellman Family Faculty Fellowship  
Society of Hellman Fellows

2023

John Bahcall Fellowship  
Institute for Advanced Study

2019

Schmidt Fellowship  
Institute for Advanced Study

2015 - 2018

Robert A. Millikan Fellowship  
California Institute of Technology

2010

International Fulbright Science and Technology Award  
Bureau of Education and Cultural Affairs, U.S. Department of State

2010

President's Gold Medal for the best academic performance in  
the graduating class in all disciplines, IIT Kanpur

2010

General Proficiency Medal for the best academic performance in  
the graduating class in Physics, IIT Kanpur

2010

Summer Undergraduate Research Fellowship  
California Institute of Technology

2007, 2008

Academic Excellence Award  
IIT Kanpur

2007, 2008, 2009, 2010

Silver Medal, 36th International Physics Olympiad

2005

KVPY Fellowship  
Department of Science and Technology, Govt. of India

2004

NTSE Fellowship  
National Council of Educational Research and Training, Govt. of India

2003

## **Work Experience**

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<b>Assistant Professor</b> University of California, Santa Barbara	Jul 2020-present
<b>Visiting Professor</b> International Center for Theoretical Sciences, Bangalore	2020-present
<b>Member</b> Institute for Advanced Study, Princeton	Sep 2015-Jul 2020
<b>Associate</b> International Center for Theoretical Sciences, Bangalore	2019-2020
<b>Graduate Student</b> California Institute of Technology, Pasadena <i>Advisor:</i> Christopher M. Hirata	Sep 2010-Aug 2015
<b>Visiting Scientist</b> Max-Planck-Institut für Physik komplexer Systeme, Dresden <i>Advisor:</i> Roderich Moessner	May-August 2009
<b>Summer Undergraduate Research Fellow</b> California Institute of Technology, Pasadena <i>Advisor:</i> Re'em Sari	May-August 2008
<b>Summer Undergraduate Research Fellow</b> California Institute of Technology, Pasadena <i>Advisor:</i> Andrew Lange	May-August 2007

## **Professional Service**

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- Referee for the *Astrophysical Journal Letters*
- Referee for *Astroparticle Physics*
- Referee for the *Astrophysical Journal*
- Referee for *Monthly Notices of the Royal Astronomical Society Letters*
- Referee for *Monthly Notices of the Royal Astronomical Society*
- Referee for *Physical Review D*
- Panel reviewer for ERC, BSF, NSF
- Organizer of Prospects in Theoretical Physics 2025 program on *Gravitational Waves from Theory to Observation* URL: <https://www.ias.edu/pitp-2025-details>
- *Organizer of the 2025 KITP Program:* Stellar-Mass Black Holes at the Nexus of Optical, X-ray, and Gravitational Wave Surveys URL: <https://www.kitp.ucsb.edu/activities/stellarbh25>
- Organizer of the 2025 KITP Conference: *The Lifecycle of Stellar Black Holes* URL: <https://www.kitp.ucsb.edu/activities/stellarbh-c25>

## Publication Highlights

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Total h-index: 31

Top five cited published papers (not counting  $n^{\text{th}}$  author papers):

1. **Venumadhav, T.**, Zackay, B., Roulet, J., Dai, L., Zaldarriaga, M., (2020), Physical Review D, 101, 083030  
Title: New binary black hole mergers in the second observing run of Advanced LIGO and Advanced Virgo  
Citation count: 371
2. Zackay, B., **Venumadhav, T.**, Dai, L., Roulet, J., Zaldarriaga, M., (2019), Physical Review D, 100, 023007  
Title: Highly spinning and aligned binary black hole merger in the Advanced LIGO first observing run  
Citation count: 195
3. Olsen, S., **Venumadhav, T.**, Mushkin, J., Roulet, J., Zackay, B., Zaldarriaga, M., (2022), Physical Review D, 106, 043009  
Title: New binary black hole mergers in the LIGO-Virgo O3a data  
Citation count: 191
4. **Venumadhav, T.**, Zackay, B., Roulet, J., Dai, L., Zaldarriaga, M., (2019), Physical Review D, 100, 023011  
Title: New search pipeline for compact binary mergers: Results for binary black holes in the first observing run of Advanced LIGO  
Citation count: 182
5. Zackay, B., Dai, L., **Venumadhav, T.**, Roulet, J., Zaldarriaga, M., (2021), Physical Review D, 104, 063030  
Title: Detecting gravitational waves with disparate detector responses: Two new binary black hole mergers  
Citation count: 153

## Refereed Publications

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1. Hegade K. R., A., Kwon, K.J., **Venumadhav, T.**, Yu, H., Yunes, N., (2026), Physical Review Letters, 136, 071401  
Title: Relativistic and Dynamical Love Numbers
2. Cheung, M.H.Y., Wadekar, D., Mehta, A.K., Islam, T., Roulet, J., Berti, E., **Venumadhav, T.**, Zackay, B., Zaldarriaga, M., (2026), Physical Review D, 113, 023003  
Title: Searching for intermediate mass ratio binary black hole mergers in the third observing run of LIGO-Virgo-KAGRA
3. Mehta, A.K., Wadekar, D., Anantpurkar, I., Roulet, J., **Venumadhav, T.**, Islam, T., Mushkin, J., Zackay, B., Zaldarriaga, M., (2025), Physical Review D, 112, 124023  
Title: Binary black hole population inference combining confident and marginal events from the IAS-HM search pipeline
4. Perera, A., Zackay, B., **Venumadhav, T.**, (2025), The Astrophysical Journal Supplement Series, 281, 4  
Title: A New Search Pipeline for Short Gamma-Ray Bursts in Fermi/GBM Data—A 50% Increase

in the Number of Detections

5. Mushkin, J., Roulet, J., Zackay, B., **Venumadhav, T.**, Ivashtenko, O., Wadekar, D., Mehta, A.K., Zaldarriaga, M., (2025), Physical Review D, 112, 104025  
Title: Sampler-free gravitational wave inference using matrix multiplication
6. Islam, T., **Venumadhav, T.**, (2025), Physical Review D, 112, 104039  
Title: Post-Newtonian theory-inspired framework for characterizing eccentricity in gravitational waveforms
7. Jana, S., Kapadia, S.J., **Venumadhav, T.**, More, S., Ajith, P., (2025), Physical Review Letters, 135, 111402  
Title: Probing the Nature of Dark Matter Using Strongly Lensed Gravitational Waves from Binary Black Holes
8. Islam, T., **Venumadhav, T.**, Mehta, A.K., Anantpurkar, I., Wadekar, D., Roulet, J., Mushkin, J., Zackay, B., Zaldarriaga, M., (2025), Physical Review D, 112, 044070  
Title: Data-driven extraction, phenomenology, and modeling of eccentric harmonics in binary black hole merger waveforms
9. Islam, T., **Venumadhav, T.**, (2025), Physical Review D, 111, L081503  
Title: Universal phenomenological relations between spherical harmonic modes in nonprecessing eccentric binary black hole merger waveforms
10. Mehta, A.K., Olsen, S., Wadekar, D., Roulet, J., **Venumadhav, T.**, Mushkin, J., Zackay, B., Zaldarriaga, M., (2025), Physical Review D, 111, 024049  
Title: New binary black hole mergers in the LIGO-Virgo O3b data
11. Jana, S., J Kapadia, S., **Venumadhav, T.**, More, S., Ajith, P., (2024), Classical and Quantum Gravity, 41, 245010  
Title: Strong-lensing cosmography using third-generation gravitational-wave detectors
12. Wadekar, D., **Venumadhav, T.**, Mehta, A.K., Roulet, J., Olsen, S., Mushkin, J., Zackay, B., Zaldarriaga, M., (2024), Physical Review D, 110, 084035  
Title: New approach to template banks of gravitational waves with higher harmonics: Reducing matched-filtering cost by over an order of magnitude
13. Chia, H.S., Edwards, T.D.P., Wadekar, D., Zimmerman, A., Olsen, S., Roulet, J., **Venumadhav, T.**, Zackay, B., Zaldarriaga, M., (2024), Physical Review D, 110, 063007  
Title: In pursuit of Love numbers: First templated search for compact objects with large tidal deformabilities in the LIGO-Virgo data
14. Roulet, J., Mushkin, J., Wadekar, D., **Venumadhav, T.**, Zackay, B., Zaldarriaga, M., (2024), Physical Review D, 110, 044010  
Title: Fast marginalization algorithm for optimizing gravitational wave detection, parameter estimation, and sky localization
15. Wadekar, D., **Venumadhav, T.**, Roulet, J., Mehta, A.K., Zackay, B., Mushkin, J., Zaldarriaga, M., (2024), Physical Review D, 110, 044063  
Title: New search pipeline for gravitational waves with higher-order modes using mode-by-mode filtering
16. Roulet, J., **Venumadhav, T.**, (2024), Annual Review of Nuclear and Particle Science, 74, 207  
Title: Inferring Binary Properties from Gravitational-Wave Signals
17. Yu, H., Roulet, J., **Venumadhav, T.**, Zackay, B., Zaldarriaga, M., (2023), Physical Review D, 108, 064059  
Title: Accurate and efficient waveform model for precessing binary black holes
18. Jana, S., Kapadia, S.J., **Venumadhav, T.**, Ajith, P., (2023), Physical Review Letters, 130, 261401  
Title: Cosmography Using Strongly Lensed Gravitational Waves from Binary Black Holes
19. Yu, H., Weinberg, N.N., Arras, P., Kwon, J., **Venumadhav, T.**, (2023), Monthly Notices of the Royal Astronomical Society, 519, 4325  
Title: Beyond the linear tide: impact of the non-linear tidal response of neutron stars on gravitational waveforms from binary inspirals

20. Roulet, J., Olsen, S., Mushkin, J., Islam, T., **Venumadhav, T.**, Zackay, B., Zaldarriaga, M., (2022), Physical Review D, 106, 123015  
Title: Removing degeneracy and multimodality in gravitational wave source parameters
21. Olsen, S., **Venumadhav, T.**, Mushkin, J., Roulet, J., Zackay, B., Zaldarriaga, M., (2022), Physical Review D, 106, 043009  
Title: New binary black hole mergers in the LIGO-Virgo O3a data
22. Chia, H.S., Olsen, S., Roulet, J., Dai, L., **Venumadhav, T.**, Zackay, B., Zaldarriaga, M., (2022), Physical Review D, 106, 024009  
Title: Signs of higher multipoles and orbital precession in GW151226
23. Olsen, S., Roulet, J., Chia, H.S., Dai, L., **Venumadhav, T.**, Zackay, B., Zaldarriaga, M., (2021), Physical Review D, 104, 083036  
Title: Mapping the likelihood of GW190521 with diverse mass and spin priors
24. Roulet, J., Chia, H.S., Olsen, S., Dai, L., **Venumadhav, T.**, Zackay, B., Zaldarriaga, M., (2021), Physical Review D, 104, 083010  
Title: Distribution of effective spins and masses of binary black holes from the LIGO and Virgo O1-O3a observing runs
25. Zackay, B., Dai, L., **Venumadhav, T.**, Roulet, J., Zaldarriaga, M., (2021), Physical Review D, 104, 063030  
Title: Detecting gravitational waves with disparate detector responses: Two new binary black hole mergers
26. Zackay, B., **Venumadhav, T.**, Roulet, J., Dai, L., Zaldarriaga, M., (2021), Physical Review D, 104, 063034  
Title: Detecting gravitational waves in data with non-stationary and non-Gaussian noise
27. Roulet, J., **Venumadhav, T.**, Zackay, B., Dai, L., Zaldarriaga, M., (2020), Physical Review D, 102, 123022  
Title: Binary black hole mergers from LIGO/Virgo O1 and O2: Population inference combining confident and marginal events
28. Huang, Y., Haster, C.J., Roulet, J., Vitale, S., Zimmerman, A., **Venumadhav, T.**, Zackay, B., Dai, L., Zaldarriaga, M., (2020), Physical Review D, 102, 103024  
Title: Source properties of the lowest signal-to-noise-ratio binary black hole detections
29. **Venumadhav, T.**, Zackay, B., Roulet, J., Dai, L., Zaldarriaga, M., (2020), Physical Review D, 101, 083030  
Title: New binary black hole mergers in the second observing run of Advanced LIGO and Advanced Virgo
30. Dai, L., Kaurov, A.A., Sharon, K., Florian, M., Miralda-Escudé, J., **Venumadhav, T.**, Frye, B., Rigby, J.R., Bayliss, M., (2020), Monthly Notices of the Royal Astronomical Society, 495, 3192  
Title: Asymmetric surface brightness structure of caustic crossing arc in SDSS J1226+2152: a case for dark matter substructure
31. Samsing, J., **Venumadhav, T.**, Dai, L., Martinez, I., Batta, A., Lopez, M., Ramirez-Ruiz, E., Kremer, K., (2019), Physical Review D, 100, 043009  
Title: Probing the black hole merger history in clusters using stellar tidal disruptions
32. Zackay, B., **Venumadhav, T.**, Dai, L., Roulet, J., Zaldarriaga, M., (2019), Physical Review D, 100, 023007  
Title: Highly spinning and aligned binary black hole merger in the Advanced LIGO first observing run
33. Kaurov, A.A., Dai, L., **Venumadhav, T.**, Miralda-Escudé, J., Frye, B., (2019), The Astrophysical Journal, 880, 58  
Title: Highly Magnified Stars in Lensing Clusters: New Evidence in a Galaxy Lensed by MACS J0416.1-2403
34. **Venumadhav, T.**, Zackay, B., Roulet, J., Dai, L., Zaldarriaga, M., (2019), Physical Review D, 100, 023011

- Title: New search pipeline for compact binary mergers: Results for binary black holes in the first observing run of Advanced LIGO
35. Roulet, J., Dai, L., **Venumadhav, T.**, Zackay, B., Zaldarriaga, M., (2019), Physical Review D, 99, 123022  
 Title: Template bank for compact binary coalescence searches in gravitational wave data: A general geometric placement algorithm
36. Dai, L., **Venumadhav, T.**, Kaurov, A.A., Miralda-Escudé, J., (2018), The Astrophysical Journal, 867, 24  
 Title: Probing Dark Matter Subhalos in Galaxy Clusters Using Highly Magnified Stars
37. **Venumadhav, T.**, Dai, L., Kaurov, A., Zaldarriaga, M., (2018), Physical Review D, 98, 103513  
 Title: Heating of the intergalactic medium by the cosmic microwave background during cosmic dawn
38. Kaurov, A.A., **Venumadhav, T.**, Dai, L., Zaldarriaga, M., (2018), The Astrophysical Journal, 864, L15  
 Title: Implication of the Shape of the EDGES Signal for the 21 cm Power Spectrum
39. Hirata, C.M., Mishra, A., **Venumadhav, T.**, (2018), Physical Review D, 97, 103521  
 Title: Detecting primordial gravitational waves with circular polarization of the redshifted 21 cm line. I. Formalism
40. **Venumadhav, T.**, Dai, L., Miralda-Escudé, J., (2017), The Astrophysical Journal, 850, 49  
 Title: Microlensing of Extremely Magnified Stars near Caustics of Galaxy Clusters
41. **Venumadhav, T.**, Oklopčić, A., Gluscevic, V., Mishra, A., Hirata, C.M., (2017), Physical Review D, 95, 083010  
 Title: New probe of magnetic fields in the prereionization epoch. I. Formalism
42. Gluscevic, V., **Venumadhav, T.**, Fang, X., Hirata, C., Oklopčić, A., Mishra, A., (2017), Physical Review D, 95, 083011  
 Title: New probe of magnetic fields in the pre-reionization epoch. II. Detectability
43. Dai, L., **Venumadhav, T.**, Sigurdson, K., (2017), Physical Review D, 95, 044011  
 Title: Effect of lensing magnification on the apparent distribution of black hole mergers
44. **Venumadhav, T.**, Cyr-Racine, F.Y., Abazajian, K.N., Hirata, C.M., (2016), Physical Review D, 94, 043515  
 Title: Sterile neutrino dark matter: Weak interactions in the strong coupling epoch
45. **Venumadhav, T.**, Chang, T.C., Doré, O., Hirata, C.M., (2016), The Astrophysical Journal, 826, 116  
 Title: A Practical Theorem on Using Interferometry to Measure the Global 21-cm Signal
46. **Venumadhav, T.**, Hirata, C., (2015), Physical Review D, 91, 123009  
 Title: Stability of small-scale baryon perturbations during cosmological recombination
47. **Venumadhav, T.**, Zimmerman, A., Hirata, C.M., (2014), The Astrophysical Journal, 781, 23  
 Title: The Stability of Tidally Deformed Neutron Stars to Three- and Four-mode Coupling
48. Venumadhav, T., Haque, M., Moessner, R., (2010), Physical Review B, 81, 054305  
 Title: Finite-rate quenches of site bias in the Bose-Hubbard dimer

## Preprints on the Arxiv

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1. Islam, T., **Venumadhav, T.**, Wadekar, D., (2026), arXiv:2601.18986  
 Title: Progenitor of the recoiling super-massive black hole RBH-1 identified using HST/JWST imaging
2. Maity, K.N., Jana, S., **Venumadhav, T.**, Barsode, A., Ajith, P., (2025), arXiv:2512.15168  
 Title: Strong lensing cosmography using binary-black-hole mergers: Prospects for the near future
3. Islam, T., **Venumadhav, T.**, Mehta, A.K., Wadekar, D., Roulet, J., Anantpurkar, I., Mushkin, J., Zackay, B., Zaldarriaga, M., (2025), arXiv:2509.20556

- Title: Data-driven extraction and phenomenology of eccentric harmonics in eccentric spinning binary black hole mergers
4. Wadekar, D., Pimpalkar, A., Ho-Yeuk Cheung, M., Wandelt, B., Berti, E., Mehta, A.K., **Venumadhav, T.**, Roulet, J., Islam, T., Zackay, B., Mushkin, J., Zaldarriaga, M., (2025), arXiv:2507.08318  
 Title: Improving gravitational wave search sensitivity with TIER: Trigger Inference using Extended strain Representation
  5. Abhishek Hegade K., R., Kwon, K.J., **Venumadhav, T.**, Yu, H., Yunes, N., (2025), arXiv:2507.10693  
 Title: Relativistic and Dynamical Love
  6. Schiff, J., **Venumadhav, T.**, (2025), arXiv:2506.16517  
 Title: Primordial magnetic fields and modified recombination histories
  7. Islam, T., **Venumadhav, T.**, Mehta, A.K., Anantpurkar, I., Wadekar, D., Roulet, J., Mushkin, J., Zackay, B., Zaldarriaga, M., (2025), arXiv:2504.12420  
 Title: gwharmonic: first data-driven surrogate for eccentric harmonics in binary black hole merger waveforms
  8. Kwon, K.J., Yu, H., **Venumadhav, T.**, (2025), arXiv:2503.11837  
 Title: Resonance locking: radian-level phase shifts due to nonlinear hydrodynamics of \$g\$-modes in merging neutron star binaries
  9. Mehta, A.K., Wadekar, D., Roulet, J., Anantpurkar, I., **Venumadhav, T.**, Mushkin, J., Zackay, B., Zaldarriaga, M., Islam, T., (2025), arXiv:2501.17939  
 Title: Significant increase in sensitive volume of a gravitational wave search upon including higher harmonics
  10. Kwon, K.J., Yu, H., **Venumadhav, T.**, (2024), arXiv:2410.03831  
 Title: Resonance Locking of Anharmonic \$g\$-Modes in Coalescing Neutron Star Binaries
  11. Wadekar, D., Roulet, J., **Venumadhav, T.**, Mehta, A.K., Zackay, B., Mushkin, J., Olsen, S., Zaldarriaga, M., (2023), arXiv:2312.06631  
 Title: New black hole mergers in the LIGO-Virgo O3 data from a gravitational wave search including higher-order harmonics
  12. Islam, T., Roulet, J., **Venumadhav, T.**, (2022), arXiv:2210.16278  
 Title: Factorized Parameter Estimation for Real-Time Gravitational Wave Inference
  13. Dai, L., Zackay, B., **Venumadhav, T.**, Roulet, J., Zaldarriaga, M., (2020), arXiv:2007.12709  
 Title: Search for Lensed Gravitational Waves Including Morse Phase Information: An Intriguing Candidate in O2
  14. Coleman, M.S.B., **Venumadhav, T.**, Zackay, B., (2019), arXiv:1903.04978  
 Title: Gravitational-wave-moderated Accretion: The Case of ES Ceti
  15. Haris, K., Mehta, A.K., Kumar, S., **Venumadhav, T.**, Ajith, P., (2018), arXiv:1807.07062  
 Title: Identifying strongly lensed gravitational wave signals from binary black hole mergers
  16. Zackay, B., Dai, L., **Venumadhav, T.**, (2018), arXiv:1806.08792  
 Title: Relative Binning and Fast Likelihood Evaluation for Gravitational Wave Parameter Estimation
  17. Dai, L., **Venumadhav, T.**, Zackay, B., (2018), arXiv:1806.08793  
 Title: Parameter Estimation for GW170817 using Relative Binning
  18. Dai, L., **Venumadhav, T.**, (2017), arXiv:1702.04724  
 Title: On the waveforms of gravitationally lensed gravitational waves

## N-th Author Papers

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1. Raaijmakers, G., et. al., (2021), The Astrophysical Journal, 922, 269  
 Title: The Challenges Ahead for Multimessenger Analyses of Gravitational Waves and Kilonova: A Case Study on GW190425
2. Weltman, A., et. al., (2020), Publications of the Astronomical Society of Australia, 37, e002  
 Title: Fundamental physics with the Square Kilometre Array

3. Doré, O., et. al., (2014), arXiv e-prints  
Title: Cosmology with the SPHEREX All-Sky Spectral Survey

## Talks and Presentations

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1. Invited theory colloquium, Tata Institute of Fundamental Research, Mumbai. 2025
2. Invited talk, Current Themes in Astrophysics and Particle Physics, NBIA, Copenhagen. 2025
3. Invited seminar, International Center for Theoretical Sciences, Bangalore. 2025
4. Invited review talk, APS Global Physics Summit 2025, Anaheim. 2025
5. Invited seminar, Weinberg Institute, University of Texas, Austin. 2025
6. Invited seminar, City University of Hong Kong, Hong Kong. 2025
7. Invited plenary talk, IAS Program on Fundamental Physics, HKUST, Hong Kong. 2025
8. Invited DGRAV seminar, APS DGRAV (online). 2024
9. Invited theory colloquium, Tata Institute of Fundamental Research, Mumbai. 2024
10. Invited talk, 21st Century Cosmology: tensions, anomaly and new physics, Ashoka University, Sonipat. 2024
11. Invited talk, XGMDC, Penn State University, PA. 2024
12. Invited seminar, IIT Hyderabad, Hyderabad. 2023
13. Invited talk, RESCEU-NBI Workshop on Gravitational-Wave Sources, Tokyo. 2023
14. Invited talk, International Conference on Gravitation and Cosmology (ICGC), Guwahati. 2023
15. Invited talk, Gravitational waves in the desert, Ein Gedi, Israel<sup>1</sup>. 2023
16. Invited talk, Gravitational Wave Physics and Astronomy Workshop, Melbourne. 2022
17. Invited Astrophysics seminar, International Center for Theoretical Sciences, Bangalore. 2022
18. Invited Astrophysics seminar, Raman Research Institute, Bangalore. 2022
19. Invited Astrophysics seminar, Indian Institute of Science, Bangalore. 2022
20. Invited talk at the ISSI (International Space Science Institute) Workshop on Strong Gravitational Lensing (virtual). 2022
21. Invited talk at the SRITP workshop on "EM counterparts to GW sources" at the Weizmann Institute, Rehovot. 2022
22. Invited talk at the KITP conference titled "Storming the Gravitational Wave Frontier". 2022
23. Invited Panelist at the APS April Meeting on the panel Data Analysis in Astrophysics (virtual). 2021
24. Invited Astrophysics Colloquium, Massachusetts Institute of Technology. 2020
25. Invited Cosmology seminar (virtual), CERN. 2020
26. Invited Seminar, CITA, Toronto. 2020
27. Invited Talk, Gravitational wave searches and parameter estimation in the era of detections, Schloss Ringberg. 2020
28. Invited Seminar, Indian Institute of Technology, Mumbai. 2020
29. Invited Seminar, Tata Institute of Fundamental Research, Mumbai. 2019
30. Invited Talk, Frank N. Bash Symposium, UT Austin. 2019
31. Talk, Gravitational Wave Physics and Astronomy Workshop, Tokyo. 2019
32. Invited Talk, Black Holes and Neutron Stars with Gravitational Waves, YITP, Kyoto. 2019
33. Invited Colloquium, Black Hole Initiative, Harvard. 2019
34. Invited panelist, The Future of Gravitational-Wave Astronomy, Bangalore. 2019

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<sup>1</sup>Postponed

35. Invited Seminar, International Centre for Theoretical Sciences, TIFR.	2019
36. Invited Seminar, Princeton Gravity Initiative, Princeton.	2019
37. Invited Seminar, Albert Einstein Institute, Potsdam.	2019
38. Invited Seminar, Center for Cosmology and Particle Physics, NYU.	2019
39. Invited Seminar, Astronomy and Astrophysics, UC Santa Barbara.	2019
40. Invited Colloquium, Department of Physics, UC Santa Barbara.	2019
41. Invited panelist, Physics and Astrophysics at the eXtreme, IUCAA, Pune.	2018
42. Invited talk, Thermal history of the Universe at intermediate redshift: progress with 21cm absorption measurements, CERN.	2018
43. Talk, Shedding Light on the Dark Universe with Extremely Large Telescopes, UCLA.	2018
44. Invited Cosmology seminar, JHU, Baltimore.	2017
45. Invited Seminar, CITA, Toronto.	2017
46. Talk, Fundamental Physics with the Square Kilometer Array, Mauritius.	2017
47. Invited talk, Tianlai Collaboration Meeting, Fermilab, Batavia.	2016
48. Invited talk, CMB Spectral Distortions From Cosmic Baryon Evolution, RRI, Bengaluru.	2016
49. Invited seminar, International Centre for Theoretical Sciences, TIFR.	2016
50. Invited cosmology seminar, Perimeter institute.	2016
51. Cosmology lunch, joint w/ IAS and Princeton University.	2016
52. Astrophysics informal seminar, IAS.	2016
53. Seminar, Inter University Center for Astronomy and Astrophysics, Pune.	2015
54. Seminar, National Center for Radio Astronomy, Pune.	2015
55. Talk, The Primordial Universe after Planck, IAP, Paris.	2014
56. Seminar, McGill University, Montreal.	2014
57. Seminar, CITA, Toronto.	2014
58. ITC Seminar, Harvard University, Boston.	2014
59. Cosmology lunch, joint w/ IAS and Princeton University.	2014
60. Talk, Theoretical Astrophysics in Southern California (TASC), UCSD, San Diego.	2014
61. Special seminar, KICP, University of Chicago.	2014
62. Cosmology Lunch talk, CCAPP, Ohio State University, Columbus.	2014
63. Poster, Gravitational Wave Physics and Astronomy Workshop (GWPAW) at IUCAA, Pune.	2013
64. Seminar, Inter University Center for Astronomy and Astrophysics, Pune.	2013
65. Talk, Theoretical Astrophysics in Southern California (TASC), Carnegie Observatories, Pasadena.	2012
66. Poster, Summer school on cosmology, ICTP, Trieste.	2012

## References

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Matias Zaldarriaga  
 Richard Black Professor  
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 1 Einstein Drive  
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Marc Kamionkowski  
 William R. Kenan, Jr. Professor of Physics and  
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Penn State University  
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