Vishal Gajjar

SETI Institute, Mountain View, USA, 94043
gajjarvishal.com | (+1) 510-813-2274 | vishalg@berkeley.edu

Research Interest

Search for Intelligent life in the Universe; Pulsars; Magnetars; Fast Radio Burst; Radio Transients; Large-scale surveys; Machine Learning; Digital instrumentation for radio astronomy

Work experience

Astronomer, SETI Institute, Mountain View, USA, 2023 – current
Visiting Scholar, Breakthrough Listen, UC Berkeley, USA, 2023 – current
Academic Researcher, Breakthrough Listen, UC Berkeley, USA, 2021 – 2023
Post-doctoral Researcher, Breakthrough Listen, UC Berkeley, USA, 2018 – 2021
Templeton Fellow, Space Science Lab, UC Berkeley, USA, 2016 – 2018
West-light Fellow, Xinjiang Astronomical observatory, China, 2014 – 2016

Education

Doctor of Philosophy (Physics), TIFR, Mumbai, India, 2014
Master of Science (Physics Major), TIFR, Mumbai, India, 2009
Bachelor of Engineering (Electronics and Communication), S. S. Engineering College, Bhavangar University, Bhavnagar, India, 2005

Publication Record

I am author and co-author of **106 publications** (46 refereed journals), with more than 2300 citations and an **h-index of 21** including **five** publications in **Nature** and **Nature Astronomy**. A full list of my publications can be found at NASA ADS

Grants and Fellowships

Templeton post-doctoral fellow, UC Berkeley, USA, 2016 - 2018 ($200,000 USD)
West-Light Funding, Chinese Academy of Science, China, 2014 ($30,000 USD)
Young Scientist Award, URSI, Istanbul, Turkey, 2014 ($2000 USD)
IAU Grant to attend the General assembly in Beijing, China, 2012 ($3000 USD)
Senior Research Fellowship at the NCRA, India, 2009-2014 ($20,000 USD)
ASTRON summer school, Dwingeloo, Neatherlands, 2010 ($3000 USD)
Junior Research Fellowship at the NCRA, India, 2007-2009 ($2500 USD)

Teaching

Courses taught to undergraduates (non-credit)
Fast Radio Bursts (University of California, Berkeley, 2020; Pune, India, 2021)
Radio Pulsars (University of California, Berkeley, 2017–2022)
Are we alone in the Universe? (Pune, India, 2010)
Radio Astronomy basics with 4-meter antenna (Pune, India, 2010–2012)
Data analysis using MATLAB (Pune, India 2009)
Future courses with prepared curriculum
Data Science with Astronomy (sample curriculum attached)
Are we alone in the Universe?
Teaching Assistant (credit courses)
Statistical techniques in data analysis (Pune, India, 2011)
Stellar Astrophysics (Pune, India, 2010)

Media coverage

Press Conference
Panel member and speaker for a press conference on *Peering Deeper Into the Lair of the Repeating Fast Radio Burst* at the **231st American Astronomical Society** meeting, Washington DC, USA, 2018.
Other Media activities (see gajjarvishal.com)
CNN, BBC, CBS, KRON4, CNET, space.com, Times of India, National Geographic, Forbes, Newsweek, Huffpost, Telegraph, The guardian, New Scientist, Gizmodo, Smithsonian.com, The Independent and many more (>60) media appearances.

Selected Academic Services	**National Level Grant Reviewer** Expert reviewer for multi-year National Research Grant, National Science Center, Poland, 2021 Panel Member of National Science Foundation (NSF) AST proposal review, Washington DC, USA, 2019 **Editorial board memberships** Frontiers in Astronomy and Space Sciences, 2023 **Journal Reviewer** ApJ; ApJ Letters; MNRAS; Astrophysics and Space Science **Scientific Organizing Committee memberships** Penn State University SETI symposium, Penn State University, PA, USA, 2022 COSPAR 2020, Sydney, Australia, 2020 Annual science day, GMRT, India, 2009 – 2011 13^{th} *Young Astronomers meet*, Physical Research Laboratory, Ahmadabad, India, 2010 **Telescope Time Proposal Reviewer** GMRT; ASTROSAT **Organizer** of weekly SETI meeting at the Department of Astronomy, UC Berkeley, 2016 – 2019 **35+ Recommendation letters** written for graduate and undergraduate students
Instrumentation and Commissioning	**Lead** real-time multi-beam commensal transient detection system at FAST, China **Lead** the commissioning of high-time resolution and polarization capabilities for Breakthrough Listen digital instrument at the GBT, USA **Lead** transient detection pipeline development for BL program (SPANDAK) utilizing ML candidate verification **Co-lead** the commissioning of BL digital hardware at e-MERLIN/JBO, UK **Lead** for the full refurbishing and commissioning operation of 4-meter dish antenna for radio astronomy school, NCRA, Pune, India **Lead** the commissioning of BL digital hardware at International LOFAR stations at Ireland and Sweden
Observation Experience	More than **400 hours** of combined observing experience with the Green Bank Telescope (USA), the Parkes radio telescopes (Australia), Sardinia Radio Telescope (Italy), and the Giant Meterwave Radio Telescope (India) **PI and Co-PI** of 10 accepted observing proposals with the Giant Meterwave Radio Telescope (India) **PI and Co-PI** of six accepted observing proposals with the Green Bank Radio Telescope (USA)
Mentoring	**Current Graduate students** Owen Johnson, Trinity College, Dublin, Ireland, 2022 – current Sand, Ketan, PhD Candidate, McGill University, Canada, 2021 - current Suresh, Akshay, PhD Candidate, Cornell University, Ithica, NY, USA, 2021 - current Perez, Karen, PhD Candidate University of Columbia, USA, 2019 - current **Previous Graduate students** Zhang, Yunfan G., PhD Candidate UC Berkeley, USA, 2017-2018 Li, Shiyu, PhD Candidate, NAOC, China, 2017-2018 Niu, Chen-hui, PhD Candidate, CAS, China, 2017-2018 Wen, Zhi-Gong, Staff XAO, China, 2014-2016 **Mentored undergraduate students : 20**
Selected Invited talks and Departmental Colloquia	**Invited speaker** University of Trieste, Trieste, Italy, October 2022 **Invited speaker** Penn State University SETI seminar, State College, PA, USA, September 2022 **Guest lecturer** NCRA-IUCAA Radio Astronomy Winter School, Pune, 2021 **Colloquium** at Penn State University, State College, PA, USA, November 2021 **Colloquium** at National Center for Radio Astrophysics, Pune, India. October 2021. **Invited talk** at the conference *EHT and Galactic Center Pulsars*, Paris Observatory, June 2020

Invited speaker at 235th American Astronomical Society, Hawaii, USA, January 2020.
Invited member at KISS Technosignatures Workshop, California Institute of Technology (Caltech), Pasadena, USA, March 2019.
Invited talk at the Xinjian Astronomical Observatory, Urumqi, China, November 2019.
Invited talk at the Kavli Institute for Theoretical Sciences, Beijing, November 2019.
Colloquium at National Center for Radio Astrophysics, Pune, India. December 2018.
Colloquium at National Center for Radio Astrophysics, Pune, India, December 2017.
Invited member at the Breakthrough Discuss symposium, USA, 2017-2021.
Invited talk at TIFR sponsored science popularization event, Mumbai, 2012
Invited talk at *A for Astronomy seminar series*, Western Regional Instrumentation Centre (WRIC), Mumbai, India, 2012
Invited seminar at the Department of Physics & Astronomy, University of Manchester, UK, 2012

Publications in *Nature*

Peter X. Ma.; Cherry Ng; Leandro R.; (6 co-authors); **Gajjar, V.** et al. 2022
Nature Astronomy (accepted)
The first deep-learning search for technosignatures of 820 nearby stars

Li, D.; (12 authors); **Gajjar, V.**; (18 authors), 2021
Nature 598, 267
A bimodal burst energy distribution of a repeating fast radio burst source

Michilli, D.; Seymour, A.; Hessels, J. W. T.; Spitler, L. G.; **Gajjar, V.**; (29 authors), 2018
Nature, 553, 182
An extreme magneto-ionic environment associated with the fast radio burst source FRB 121102

Sheikh, S.; (6 authors); **Gajjar, V.**; (10 authors), 2021
Nature Astronomy, 5, 1153
Analysis of the Breakthrough Listen signal of interest blc1 with a technosignature verification framework

Smith, S.; (5 authors); **Gajjar, V.**; (10 authors), 2021
Nature Astronomy, 5, 1148
A radio technosignature search towards Proxima Centauri resulting in a signal-of-interest

Selected Refereed Publications (Total: 106, Refereed: 46 h-index: 21)

Student led publications are marked with * (full list here)

*Suresh, A., Cordes, J. M., Chatterjee, S., **Gajjar, V.** et al. 2022,
ApJ, 933, 121
4-8 GHz Fourier-domain Searches for Galactic Center Pulsars

*Sand, K. R., Faber, J. T., **Gajjar, V.**, et al. 2022,
ApJ, 932, 98
Multiband Detection of Repeating FRB 20180916B

Gajjar, V; LeDuc, Dominic.; Chen, Jiani; Siemion, A. P. V. et al., 2022
ApJ, 932, 98
Searching for Broadband Pulsed Beacons from 1883 Stars Using Neural Networks

Gajjar, V; Perez, K. I.; Siemion, A. P. V.; (17 authors), 2021
AJ, 162, 22
The Breakthrough Listen Search For Intelligent Life Near the Galactic Center. I.

*Traas, R.; Croft, S.; **Gajjar, V**; (10 authors), 2021
ApJ, 161, 286
The Breakthrough Listen Search for Intelligent Life: Searching for Technosignatures in Observations of TESS Targets of Interest

Pilia, M.; Burgay, M.; Possenti, A.; Ridolfi, A.; **Gajjar, V.**; Corongiu, A.; (31 authors), 2020
ApJ Letters, 896, L40
The Lowest-frequency Fast Radio Bursts: Sardinia Radio Telescope Detection of the Periodic FRB 180916 at 328 MHz

Price, D. C.; Foster, G.; Geyer, M.; van Straten, W.; **Gajjar, V.**; (28 authors), 2019
MNRAS, 486, 3636
A fast radio burst with frequency-dependent polarization detected during Breakthrough Listen observations

*Zhang Y. G..; **Gajjar, V.**; Foster G.; Siemion, A. P. V.; Cordes, J.; Law, C.; Wang Y., 2018
ApJ, 866, 18
Fast Radio Burst 121102 Pulse Detection and Periodicity: A Machine Learning Approach

Gajjar, V. Siemion, A. P. V.; (31 authors), 2018
ApJ, 863, 9
Highest-frequency detection of FRB 121102 at 4-8 GHz using the Breakthrough Listen Digital Backend at the Green Bank Telescope

Hessels, J. W. T; (13 authors); **Gajjar, V.**; (11 authours), 2019
ApJ Letters, 876, 14
FRB 121102 Bursts Show Complex Time-Frequency Structure

Gajjar, V.; Yuan, J. P.; Yuen, R.; Wen, Z. G.; Liu, Z. Y.; Wang, N., 2017
ApJ, 850, 15
On Nulling, Drifting, and Their Interactions in PSRs J1741-0840 and J1840-0840

Enriquez, J. Emilio; Siemion, Andrew; Foster, Griffin; **Gajjar, V.**; (9 authors), 2017
ApJ, 849, 104
The Breakthrough Listen Search for Intelligent Life: 1.1-1.9 GHz Observations of 692 Nearby Stars

*Wen, Z. G.; Wang, N.; Yuan, J. P.; Yan, W. M.; Manchester, R. N.; Yuen, R.; **Gajjar, V.**, 2016
A&A, 592, 127
Investigation of nulling and subpulse drifting properties of PSR J1727-2739

Gajjar, V.; Joshi B. C.; Kramer M.; Karuppusamy R. and Smith R., 2014
ApJ, 797, 18
Frequency independent quenching of pulsed emission

Gajjar, V.; Joshi B. C.; Geoffrey W., 2014
MNRAS, 439, 221
On the long nulls of PSRs J1738−2330 and J1752+2359

Coenen, Thijs; (10 authours); **Gajjar, V.**; (88 authors), 2014
A&A, 570, 16
The LOFAR pilot surveys for pulsars and fast radio transients

Gajjar, V.; Joshi B. C.; and Kramer M., 2012
MNRAS, 424, 1197,
Survey of nulling pulsars using the Giant Meterwave Radio Telescope