

# Vishal Gajjar

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<b>Research Interest</b>	Search for Intelligent life in the Universe; Pulsars; Magnetars; Fast Radio Burst; Radio Transients; Large-scale surveys; Machine Learning; Digital instrumentation for radio astronomy
<b>Academic Positions</b>	<b>Academic Researcher</b> Breakthrough Listen, UC Berkeley, USA, 2021 – current <b>Post-doctoral Fellow</b> Breakthrough Listen, UC Berkeley, USA, 2018 – 2021 <b>Templeton post-doctoral fellow</b> , Space Science Lab, UC Berkeley, USA, 2016 – 2018 <b>West-light post-doctoral fellow</b> , Xinjiang Astronomical observatory, China, 2014 – 2016
<b>Education</b>	<b>Doctor of Philosophy (Physics)</b> , TIFR, Mumbai, India, 2014 <b>Master of Science (Physics Major)</b> , TIFR, Mumbai, India, 2009 <b>Bachelor of Engineering (Electronics and Communication)</b> , S. S. Engineering College, Bhavnagar University, Bhavnagar, India, 2005
<b>Publication Record</b>	I am author and co-author of <b>96 publications</b> (42 refereed journals), with around 1600 citations and an <b>h-index of 20</b> including <b>five</b> publications in <b>Nature</b> and <b>Nature Astronomy</b> . A full list of my publications can be found at NASA ADS
<b>Grants and Fellowships</b>	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)
<b>Teaching</b>	<b>Courses taught to undergraduates (non-credit)</b> <i>Data analysis using MATLAB</i> (Pune, India 2009) <i>Radio Astronomy basics with 4-meter antenna</i> (Pune, India, 2010–2012) <i>Are we alone in the Universe?</i> (Pune, India, 2010) <i>Radio Pulsars</i> (University of California, Berkeley, 2017–2022 ) <i>Fast Radio Bursts</i> (University of California, Berkeley, 2020; Pune, India, 2021) <b>Teaching Assistant</b> <i>Statistical techniques in data analysis</i> (Pune, India, 2011) <i>Stellar Astrophysics</i> (Pune, India, 2010)
<b>Selected Academic Services</b>	Expert reviewer for multi-year National Research Grant, <b>National Science Center, Poland</b> , 2021 Panel Member of <b>National Science Foundation (NSF) AST proposal review</b> , Washington DC, USA, 2019 <b>SOC</b> member of Penn State University SETI symposium, Penn State University, PA, USA, 2022 <b>SOC</b> member for a special session, COSPAR 2020, Sydney, Australia, 2020 <b>Reviewer</b> for GMRT and ASTROSAT proposals <b>Organizer</b> of weekly SETI meeting at the Department of Astronomy, UC Berkeley, 2016 – 2019 <b>Reviewer</b> of numerous papers from ApJ, ApJ Letters, MNRAS, and Astrophysics and Space Science <b>SOC</b> member of the annual science day, GMRT, India, 2009 – 2011 <b>SOC</b> member for the 13 <sup>th</sup> <i>Young Astronomers meet</i> , Physical Research Laboratory, Ahmadabad, India, 2010

<b>News coverage</b>	<p><b>Press Conference</b>  <b>Panel member</b> and speaker for a press conference on <i>Peering Deeper Into the Lair of the Repeating Fast Radio Burst</i> at the <b>231st American Astronomical Society</b> meeting, Washington DC, USA, 2018.  <b>Other Media activities (see gajjarvishal.com)</b>          Interviewed by numerous TV, radio and print media (CBS, KRON4, BBC, CNET, space.com, Times of India, The Better India, Daily Californian and others) and appeared in around 60 media articles (National Geographic, Forbes, Newsweek, Huffpost, Telegraph, The guardian, New Scientist, Gizmodo, Smithsonian.com, The Independent and others).</p>
<b>Instrumentation and Commissioning</b>	<p><b>Lead</b> real-time multi-beam commensal transient detection system at FAST, China  <b>Lead</b> the commissioning of high-time resolution and polarization capabilities for Breakthrough Listen digital instrument at the GBT, USA  <b>Lead</b> transient detection pipeline development for BL program (SPANDAK) utilizing ML candidate verification  <b>Co-lead</b> the commissioning of BL digital hardware at e-MERLIN/JBO, UK  <b>Lead</b> for the full refurbishing and commissioning operation of 4-meter dish antenna for radio astronomy school, NCRA, Pune, India  <b>Lead</b> the commissioning of BL digital hardware at International LOFAR stations at Ireland and Sweden</p>
<b>Observation Experience</b>	<p>More than <b>400 hours</b> 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)  <b>PI and Co-PI</b> of 10 accepted observing proposals with the Giant Meterwave Radio Telescope (India)  <b>PI and Co-PI</b> of six accepted observing proposals with the Green Bank Radio Telescope (USA)</p>
<b>Mentoring</b>	<p><b>Current Graduate students</b>          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  <b>Previous Graduate students</b>          Zhang, Yunfan G., PhD Candidate UC Berkeley, USA, 2017-2018          Li, Shiyu, PhD Candidate, NAOJ, China, 2017-2018          Niu, Chen-hui, PhD Candidate, CAS, China, 2017-2018          Wen, Zhi-Gong, Staff XAO, China, 2014-2016  <b>Mentored undergraduate students : 20</b></p>
<b>Selected Invited talks and Departmental Colloquia</b>	<p><b>Guest lecturer</b> NCRA-IUCAA Radio Astronomy Winter School, Pune, 2021  <b>Colloquium</b> at Penn State University, State College, PA, USA, November 2021  <b>Colloquium</b> at National Center for Radio Astrophysics, Pune, India. October 2021.  <b>Invited talk</b> at the conference <i>EHT and Galactic Center Pulsars</i>, Paris Observatory, June 2020  <b>Invited speaker</b> at 235th American Astronomical Society, Hawaii, USA, January 2020.  <b>Invited member</b> at KISS Technosignatures Workshop, California Institute of Technology (Caltech), Pasadena, USA, March 2019.  <b>Invited talk</b> at the Xinjian Astronomical Observatory, Urumqi, China, November 2019.  <b>Invited talk</b> at the Kavli Institute for Theoretical Sciences, Beijing, November 2019.  <b>Colloquium</b> at National Center for Radio Astrophysics, Pune, India. December 2018.  <b>Colloquium</b> at National Center for Radio Astrophysics, Pune, India, December 2017.  <b>Invited member</b> at the Breakthrough Discuss symposium, USA, 2017-2021.</p>

**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: 96,  
Refereed: 42  
h-index: 21)**

Student led publications are marked with \*

\*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 authors), 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 authors); **Gajjar, V.**; (88 authors), 2014  
**A&A**, 570, 16  
*The LOFAR pilot surveys for pulsars and fast radio transients*
- Roy N., Mathur S., **Gajjar V.** and Patra N. N., 2013  
**MNRAS Letters**, 436, L94,  
*Stringent constraints on the HI spin temperature in two z < 3 Damped Lyman- $\alpha$  systems from redshifted 21 cm absorption studies*
- Gajjar, V.**; Joshi B. C.; and Kramer M., 2012  
**MNRAS**, 424, 1197,  
*Survey of nulling pulsars using the Giant Meterwave Radio Telescope*