

# Vikram Ravi

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<b>Education</b>	<b>Ph.D., University of Melbourne</b> 2011 - 2014 <i>Thesis title:</i> Evincing the histories of the cosmic supermassive black hole and galaxy populations with gravitational waves. <i>Advisors:</i> Prof. Stuart Wyithe, Dr. George Hobbs (CSIRO Astronomy and Space Science). <b>B.Sc. in Physics (first class honours).</b> 2006 - 2009 <i>Honors thesis:</i> Stellar radio transients from brown dwarfs to pulsars (supervised by Prof. Dayal Wickramasinghe) <i>Exchange program to the University of California, Berkeley (Fall 2008)</i>
<b>Research Interests</b>	<i>Compact objects and time-domain astrophysics:</i> fast radio bursts, binary supermassive black holes, pulsars, jetted transients and X-ray binaries, tidal disruption events, stellar and sub-stellar activity. <i>The dark and diffuse universe:</i> astrophysical searches for dark matter decay/annihilation, circum-galactic medium, exotic structures in the ionized ISM. <i>Emergent astronomical techniques:</i> unknown time-domain signals, wide-field and wide-bandwidth centimeter-wavelength radio astronomy, fast optical detectors, radio/mm/IR interferometry.
<b>Grants, Awards &amp; Honors</b>	<b>PI, Ultra-Wide Band Spectro-Radiometry (\$400k)</b> 2019-21 (Caltech and JPL President's and Director's Fund) <b>Co-PI, Deep Synoptic Array (\$5.3M)</b> 2018-23 NSF Mid-Scale Innovations Program <b>Project Scientist, Deep Synoptic Array prototype (\$300k)</b> 2016-17 (Caltech and JPL President's and Director's Fund) <b>PI, NRAO ngVLA funded community study (\$9k)</b> 2016-17 <b>Stefano Braccini Thesis Prize</b> 2016 (awarded by the Gravitational Wave International Committee) <b>Charlene Heisler Thesis Prize</b> 2016 (awarded by the Astronomical Society of Australia) <b>Kavli Fellow</b> 2015 (invited speaker at Kavli Frontiers of Science Symposium, Makassar, Indonesia) <b>John Stocker Postgraduate Scholarship</b> 2011 <b>Australian Postgraduate Award</b> 2011 <b>Runner up, Bok Honours Thesis Prize</b> 2009
<b>Research Positions</b>	<b>Assistant Professor of Astronomy</b> 2019-present California Institute of Technology <b>Clay Postdoctoral Fellow</b> 2018-2019 Center for Astrophysics   Harvard & Smithsonian <b>Millikan Postdoctoral Scholar in Astronomy</b> 2015-2018 California Institute of Technology

- Research Staff** 2014-2015  
Swinburne Institute of Technology (supervisor: Prof. Matthew Bailes)  
Worked on Molonglo Observatory Synthesis Telescope upgrade
- Junior Specialist** 2010-2011  
Space Sciences Laboratory, University of California, Berkeley.  
(supervisor: Prof. Charles Townes)  
Systems engineer and researcher with Infrared Spatial Interferometer
- Research Assistant** 2009-2010  
CSIRO Astronomy and Space Science, Australia (supervisor: Prof. Dick Manchester)  
Worked on gamma-ray and radio pulsar emission mechanisms.
- Summer Vacation Student** 2007-2008  
CSIRO Astronomy and Space Science, Sydney (supervisor: Dr. George Hobbs)  
Worked on radio pulsar glitches.
- Research Assistant** 2007  
Australian National University (supervisor: Dr. Ken Baldwin)  
Cold atom imaging and spectroscopy in Bose-Einstein condensate lab.

<b>Teaching &amp; Advising</b>	<b>Graduate Research Advisor</b>	
	Chris Bochenek (Caltech)	2019-
	Ge (Wendy) Chen (Caltech)	2019-
	Nitika Yadlapalli (Caltech)	2019-
	<b>Undergraduate Research Advisor</b>	
	Kovi Rose (Hebrew University of Jerusalem, Caltech)	2017
	Julian Sanders (Caltech)	2017
	Huan Yan Qi (Caltech)	2016
	<b>Guest lecturer</b>	
	Relativistic Astrophysics (Caltech: Ay/Ph104)	2016
Astronomical Measurements and Instrumentation (Caltech: Ay122b)	2017-18	
<b>Tutor / teaching assistant</b>		
Special relativity and quantum mechanics (UMelb: PHYC20010)	2012-14	
First-year mathematics (ANU: MATH1013, MATH 1014)	2009	

**Publication history & talks** I am an author of 73 publications (60 accepted to refereed journals), with over 2800 citations and an  $h$ -index of 30. I am the lead author of 24 publications in total (20 refereed), including two lead-author papers in the journal *Science*, one in *Nature*, and one in *Nature Astronomy*.  
A full listing of my publications on NASA ADS can be found at <https://ui.adsabs.harvard.edu/public-libraries/S0LBTeAgT76HOkq4muKitQ>

19 major departmental colloquia at institutions in Australia, Canada, China, Germany, India, Netherlands, USA. 19 invited presentations at international conferences in Australia, Canada, France, Greece, Indonesia, Israel, Netherlands, Thailand, USA. See attached listing.

## Highlights:

*Invited reviews to open two FRB conferences (Weizmann Institute of Science, Israel; FRB2019, Amsterdam, Netherlands)*

*Plenary speaker on pulsar timing arrays, 12th Amaldi Conference on Gravitational Waves, Pasadena, USA (2017).*

*Invited speaker on FRBs, CIFAR Cosmology & Gravity Theme Meeting, Whistler, Canada (2016).*

*Invited speaker on astrophysics at the Kavli Frontiers of Science Symposium in Makassar, Indonesia (2015).*

Numerous other institutional seminars, contributed conference presentations.

<b>Professional Service</b>	<b>NSF AST Committee of Visitors</b>	2019
	<b>NRAO proposal review panel</b>	2017-2019
	<b>NSF review panel</b>	2016
	<b>Caltech Optical Observatories TAC</b>	2016
	<b>GMRT proposal reviewer</b>	2016
	Parkes Pulsar Timing Array steering committee	2013, 2015
	Australia Telescope User's Committee	2012-2013
	<b>Referee</b>	
	<i>The Astrophysical Journal</i>	
	<i>Monthly Notices of the Royal Astronomical Society</i>	
<i>Astrophysics and Space Science</i>		
Co-organizer of Pasadena Area Postdoc Retreat	2015-2017	
Co-organizer of International Pulsar Timing Array meeting	2012	
Co-organizer of CSIRO ATNF student symposium.	2012	
<b>Professional Outreach &amp; Diversity Activities</b>	Mentor for Harvard CfA Science Research Mentoring Program	2018-19
	Los Angeles Astronomy on Tap speaker	2018
	Cerro Coso Community College astronomy lecture (Bishop CA).	2017
	Caltech Freshman Summer Research Institute mentor	2017
	<i>Research supervisor for incoming Caltech freshman from under-represented or under-served backgrounds.</i>	
	KXSC radio Squamish Science Hour	2017
	Lecturer, USC Engineering honors program	2017
	Palomar Observatory Greenway Lecturer	2016-2017
	Blue Dot program, North State Public Radio	2016
	University of Melbourne Telescopes in Schools project	2012-2015
	<i>Ran an after-school astronomy program for students in low socio-economic areas near Melbourne.</i>	
	Facilitator with Pulse@Parkes project	2009-2015
	Lecturer, Mt. Burnett Astronomical Society	2014

<b>Observing experience</b>	<p>Arecibo Observatory <i>PI (10 hr)</i></p> <p>MMT Observatory <i>PI (2 nights)</i></p> <p>W. M. Keck Observatory <i>PI (1 night), 7 nights on other projects</i></p> <p>Palomar Observatory Hale Telescope <i>PI of own-instrument program (3 nights), 4 nights on other projects</i></p> <p>Parkees Observatory <i>PI of 4 programs, totaling approx. 200 hr</i></p> <p>Australia Telescope Compact Array <i>PI of 6 programs, totaling approx. 300 hr</i></p> <p>Jansky Very Large Array <i>PI of 5 DDT programs (16 hr)</i></p> <p>Extensive experience with other optical and high-energy observatories (Gemini, NOAO Blanco Telescope, Swift), and experimental facilities (Infrared Spatial Interferometer, Molonglo Observatory, Deep Synoptic Array)</p>
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<b>In the media</b>	<p>Several radio and print-media interviews, and articles written for the popular media. One piece by me in The Conversation has gathered over 30,000 reads. Presenter of numerous public lectures.</p>
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### Departmental colloquia

1. Center for Astrophysics | Harvard & Smithsonian Clay Lecture, May 9, 2019. *Fast Radio Bursts.*
2. CIERA Astrophysics Seminar, April 9, 2019. *Fast Radio Bursts.*
3. ASTRON Colloquium, November 29, 2018. *Radio-wavelength searches for the basis of dark matter.*
4. NRAO Socorro Colloquium, February 23, 2018. *Radio-wavelength searches for the basis of dark matter.*
5. Shanghai Astronomical Observatory Seminar, October 27, 2017. *The ten-element prototype of the Deep Synoptic Array (DSA-10) for FRB localization*
6. Caltech Astronomy Colloquium, October 26, 2016. *Fast Radio Bursts from Across the Universe?*
7. UCLA Physics and Astronomy Colloquium, October 20, 2016. *Fast Radio Bursts from Across the Universe?*
8. Swinburne Centre for Astrophysics and Supercomputing Colloquium, June 9, 2016. *Do Fast Radio Bursts Originate at Cosmological Distances?*
9. University of Melbourne Astrophysics Seminar, June 8, 2016. *Do fast radio bursts originate at cosmological distances?*
10. Arecibo Observatory Colloquium, May 23, 2016. *The Fast Radio Burst Zoo.*
11. Stanford KIPAC Seminar, May 3, 2016. *Fast radio bursts.*
12. Fermilab Astrophysics Seminar, February 22, 2016. *Pulsar timing limit on gravitational waves necessitates re-assessment of binary supermassive black hole population*
13. McGill Space Institute Seminar, February 2, 2016. *A tale of two fast radio bursts*
14. JPL Astrophysics lunch seminar, September 28, 2015. *Gravitational-wave limit forces re-think of supermassive black hole evolution*

15. Monash Centre for Astrophysics Colloquium, March 24, 2015. *Binary supermassive black hole evolution rethought.*
16. Albert Einstein Institute (Golm) Colloquium, June 12, 2014. *Astrophysical predictions for gravitational waves from binary SMBHs / Fast radio bursts following short GRBs.*
17. Curtin Institute for Radio Astronomy Colloquium, May 29, 2014. *Choose your own adventure! - Fast radio bursts.*
18. CSIRO Astronomy and Space Science Colloquium, May 21, 2014. *What gravitational-wave observations can tell us about the super-massive black hole population of the Universe.*
19. TIFR Bombay Astrophysics Seminar, February 17, 2012. *Gravitational wave astrophysics with pulsar timing arrays.*

### Invited presentations at international conferences

1. FRB2019: Fast Radio Bursts and their Possible Neutron-Star Origins, Amsterdam, Netherlands, February 18-20, 2019. Opening review on *What we know about FRBs.*
2. Workshop on Fast Radio Bursts, Weizmann Institute of Science, Israel, December 3-13, 2018. Opening review on *Observations of Fast Radio Bursts.*
3. The Power of Faraday Tomography — Towards 3D Mapping of Cosmic Magnetic Fields, Miyazaki, Japan, May 28 - June 2, 2018. *FRB measurements of circum- and inter-galactic magnetic fields.*
4. FRB2018: Finding and Understanding Fast Radio Bursts, Melbourne, Australia, February 14-16, 2018. *Imagining, and realizing, the ultimate FRB instrument.*
5. The Edoardo Amaldi Conference on Gravitational Waves, Pasadena, CA, July 9-14, 2017. Plenary talk on *Pulsar timing and gravitational waves.*
6. Developing the ngVLA Science Program Workshop, Socorro, NM, June 26-29, 2017. *How the ngVLA can enable gravitational-wave science.*
7. Workshop on Fast Radio Bursts, Montreal, Canada, June 13-15, 2017. *Localizing the brightest FRBs.*
8. The Labyrinth of the Unexpected, Kerastari, Greece, May 29 - June 3, 2017. *Fast Radio Burst Philately.*
9. Hot-wiring the Transient Universe V, Philadelphia, PA, October 10-14, 2016. *The hottest transients in the Universe.*
10. Gravitational-wave Astronomy Meeting in Paris (GRAMPA), Paris, France, August 29 - September 2, 2016. *Pulsar timing arrays: spanning the chasm between GW source theory and observation.*
11. Boutiques & Experiments 2016, Pasadena, CA, July 21-23, 2016. *DSA-10.*
12. 21st International Conference on General Relativity and Gravitation, New York City, NY, July 10-15, 2016. *Predictions for the GWB from binary SMBHs given PTA constraints.*
13. CIFAR Cosmology & Gravitation Theme Meeting, Whistler, CA, March 30 - April 2, 2016. *Ultra-bright fast radio bursts.*
14. Boutiques & Experiments 2015, Pasadena, CA, August 28-29, 2015. *Molonglo: Refurbished & Resurgent.*
15. Kavli Frontiers of Science Indonesian-American Symposium, Makassar, Indonesia, July 28-31, 2015. *Using a Galaxy-Sized Telescope to Rethink Supermassive Black Hole Evolution.*

16. International Pulsar Timing Array Science Meeting, Banff, Canada, June 23-27, 2014. *Vikram's Thoughts on Interpreting GWB Constraints.*
17. Extreme Astrophysics in an Ever-Changing Universe, Ierapetra, Greece, June 16-20, 2014. *Choose your own adventure! - Fast radio bursts.*
18. International Pulsar Timing Array Science Meeting, Krabi, Thailand, June 23-28, 2013. *The surprising effects of SMBH binary eccentricities and environmental interactions on the GWB.*
19. Evolutionary Map of the Universe Meeting, Pasadena, CA, August 23-25, 2010. *Identifying radio stars.*