Aman Chokshi

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ADS Publication List

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Education

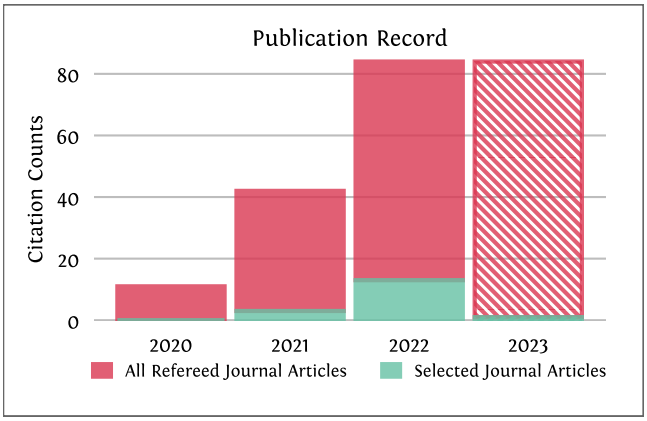
2019 -2024	Doctor of Philosophy in Astrophysics **Advisors**: Rachel Webster, Bart Pindor, Nichole Barry	University of Melbourne
June 2018	Master of Science in Physics [Distinction]	Pondicherry University
June 2015	Bachelor of Science in Physics [Exemplary]	Loyola College

Research Topics & Skills

Observational Cosmology ▪ Epoch of Reionisation ▪ Radio Astronomy ▪ Interferometers ▪ Instrumental Simulations ▪ Foreground Simulation ▪ Precision Beam Modelling ▪ Widefield Radio Imaging ▪ Polarisation ▪ Satellite Dynamics ▪ High-Redshift Mergers ▪ Square Kilometre Array (SKA) ▪ Murchison Widefield Array (MWA) ▪ South Pole Telescope (SPT) ▪ James Webb Space Telescope (JWST)

Fourier, Bayesian, Power Spectrum Analysis ▪ Supercomputing (HPC, HTC) ▪ Software Development ▪ System Admin ▪ Observatory Management ▪ Independent Problem Solving ▪ Instrumentation ▪ Cryogenics ▪ Machining ▪ In-situ Electronic/Mechanical Testing ▪ High Amperage/Voltage Systems

Publication Summary



h-index	6[1]
i10-index	5[1]
International collaboration	75% of papers[2]
First or second author	3 (17 citations[1])
Contributing author	6 (202 citations[1])
Invited talks	3
Contributed talks, posters	5, 7
School colloquiums	8

[1] Accessed from NASA ADS, November, 2023
[2] Accessed from Scival, November, 2023

Research Experience

current
Melbourne
Australia

PhD at the University of Melbourne [Resumed]

Interferometric Effects of Deformed Beams: Epoch of Reionisation Power Spectra
Investigate effects deformed beams have on Epoch of Reionisation science. We demonstrate a $\geq$100 reduction of spectral leakage in the sensitive measurement modes, if precise beam models are considered. [Chokshi et al. 2023, in prep]
Advisors: Rachel Webster, Nichole Barry

Recovery of Cosmological 21cm Non-Gaussianities with the SKA
Explore the prospects of detecting EoR non-gaussianities in the context of complex foregrounds, instrumental noise and realistic beam models for the SKA, using the Wavelet Scattering Transform and higher-order stats.
Advisors: Brad Greig, Bart Pindor

Trainwreck mergers at $z \approx 3$ and resolve SED Modelling with JWST
Study extreme tidal interactions and starbursting at $z \approx 3$. The combined 40 bands of the ZFOURGE and JADES surveys provide an excellent lever-arm for resolved SED modelling.
Advisor: Anshu Gupta

2021-2022
South Pole
Antarctica

Winterover at South Pole Telescope [Leave of Absence from PhD]

Detection of Thermal Emission from Low-Earth Satellites at Millimeter Wavelengths
Explore the impact of satellite mega-constellations on pristine South Pole skies. Thermal emission is detected in the millimeter band with the South Pole Telescope, revealing

some of the brightest objects in mm-sky. [A. Foster, **A. Chokshi**, et al. in Prep]
PIs: John Carlstrom, Brad Benson

2019-2021 Melbourne Australia
PhD at the University of Melbourne
Interferometric Effects of Deformed Beams: Depolarisation & Rotation Measure
Quantify the origin & extent of instrumental polarization leakage arising from deformed beams in interferometers. [Chokshi et al. 2023, in prep]
Advisors: Rachel Webster, Nichole Barry

Satellite Measurements of MWA Beams
Dual-polarized satellite measurements of 14 MWA beam-patterns. Explored how in-situ beam models differ from numerical simulations - critical to Epoch of Reionisation science. [Chokshi et al. 2021b, 2021a; 10, 2 citations]
Advisors: Rachel Webster, Nichole Barry, Bart Pindor

2018 Sydney Australia
Internship at Macquarie University
Study of Galactic Cirrus with the Huntsman Telescope
Disentangled Galactic cirrus from discrete sources to explore the diverse star-formation mechanism in the ISM via a Power Spectrum analysis of simulated data.
Advisor: Lee Spitler [report]

2017 Kodaikanal India
Master's Thesis at the Indian Institute of Astrophysics
Hα Spectroscopy of Solar Prominences
Explored the dynamics of Hydrogen trapped in helical prominences.
Advisor: K. Nagaraju [thesis]

2015 Bangalore India
Bachelor's Thesis at the Raman Research Institute
Characterisation of a broadband antenna for the Epoch of Recombination
Verified prototype beam model for Cosmic Microwave Background expt.
Advisor: Ravi Subrahmanyan [thesis]

Field Experience

2021-2022 **South Pole Telescope Winterover**
Responsible for the operation and maintenance of the South Pole Telescope. Limited access to internet, limited resources, high altitude (10,000+ ft), and temperatures which can drop below -70C. Monitor data quality in real-time, problem solve any hardware or software issues, generate reports and communicate with telescope PIs.

2020 **Duty Astronomer at the Australia Telescope Compact Array**
Ensure the safety of the ATCA array for a week, preliminary data checks, monitor the weather, and assist observers. Conducted remotely due to COVID-19.

2020 **Repair of Lightning Damage to Satellite Experiment at MWA**
Returned to the Murchison Radio-Astronomy Observatory (MRO) in remote Western Australia to repair lightning damage to my satellite beam measurement experiment.

2019 **Build & Deploy Satellite beam experiment at MWA**
A one week visit to the MRO to build a set of reference antennas and install satellite receivers into existing MWA receivers. Preliminary data check of 14 dual-polarized MWA antennas and setup observation schedule for the next year.

2018 **Assist in Setup of SARAS 2 in the Himalayas**
Helped deploy the SARAS 2 (Shaped Antenna measurement of the background RAdio Spectrum) global 21cm experiment in a remote Himalayan high altitude desert.

2018 **Testing of the 0.7m GROWTH Telescope at the Indian Astronomical Observatory**
Spent a week testing the GROWTH Robotic telescope at the Indian Astronomical Observatory (IAO), Hanle, to obtain some of the first commissioning images.

2017 **Solar Spectroscopy at the Kodaikanal Solar Observatory (KSO)**
Observed and analysed solar spectroscopic data with the Kodaikanal Tunnel Telescope.

2015 **Antenna Characterization at the Gauribidanur Radio Observatory**
Directional and frequency characterization of a disk-cone antenna for CMB expt. developed by the Raman Research Institute, at their Gauribidanur radio-quiet site.

Grants, Awards & Prizes

2023 MWA Decadal Meeting: Best Poster runner-up prize

2022 Antarctic Service Medal (NSF & USAP)

2021	Laby PhD Travelling Scholarship Taking telescopes to remote indigenous schools	10,000 AUD deferred due to COVID-19
2021	Astronomical Society of Australia Student Challenge Estimate Carbon Emission, runner-up prize	200 AUD
2020	MWA Project Meeting: Best Presentation runner-up prize	
2019-2023	CSIRO Astronomy and Space Sci. Student Program Travel Grant	5,000 AUD per year
2019-2023	Melbourne Research Scholarship	31,200 AUD per yer
2019	Australian Govt. Research Training Program (RTP) Fee Offset	175,991 AUD
2018	Pondicherry University Department of Physics Scholarship	20,000 Rs
2015	Rev. Fr. Albert Muthumalai Gold Medal. Loyola College	
2013	Indian Institute of Technology Robotics competition winner Fastest line-following robot across 50 teams from South India	
2011	Karnataka state school science exhibition winner Audio transmission via modulated lasers	

Teaching Experience

2019-2021	Undergraduate Lab Demonstrator at Melbourne Uni First-year physics & astronomy courses
2020	Python tutor at the Kathmandu Astrophysics School 45 hours over 9 weeks
2019-2021	Telescopes in Schools Volunteer; Victoria, Australia Teacher training & student outreach
2017	Astrophotography Workshop at Pondicherry University Developed and led a workshop on astrophotography and observing

Talks & Workshops

Invited

2023	Auroras & Astronomy: A Year at the South Pole x 3	Uni. Melbourne, CSIRO, RRI

Contributed

Sept 2021	Implications of Beam Models on Epoch of Reionisation	ASTRO3D
July 2021	Calibrating Radio Telescopes with Satellites	Australian Math Science Inst
July 2020	Dual polarization MWA beam-patterns using satellites	MWA Project Meeting
Sept 2019	MWA Beam Measurements with Satellites	Drone & Satellite Workshop
May 2017	Hα Spectroscopy of Solar Prominences	Indian Inst. of Astrophysics

Colloquiua

June 2023	Widefield & Planetary Astrophotography	Uni. Melbourne
Sept 2022	Satellite in SPT-3G Data (with A. Foster)	CMB-S4 RFI Working Group
Dec 2021	South Pole Telescope Science Lecture	South Pole Station
July 2021	Satellite Measurements of MWA Beam Models	Macquarie Uni.
May 2021	Implication of Beam Models on Epoch of Reionisation	Uni. Melbourne (GOSS)
Mar 2021	Backyard Planetary Astrophotography in Lockdown	Uni. Melbourne

Workshops

July 2021	Bayesian stats, modern neural networks & Monte Carlo	AMSI Statistics Winter School
June 2021	Code optimisation, profiling, timing & parallelisation	ANITA Green-Computing School
Jan 2020	Analytical modelling, simulations, observations, data reduction & statistical inference	First Billion Year School
Nov 2019	ML, AI, Deep learning & Remote sensing Hackathon: created an affordable drone LIDAR system, collaboration b/w astronomers and marine biologists to monitor the recovery of biomass after wildfires	X-Sensing Conference
Sept 2019	Interdisciplinary use of drone & satellite data - bushfires, deforestation, tracking shark & satellite beam modelling	Drone & Satellite Workshop

Media, Photography & Personal Projects

2022
- Spaghettification EP12: Go South, Skies Are Clearer There
- F-Stop Collaborate EP 267: Aman Chokshi Photography from the South Pole
- Space.com: South Pole's never-ending night and daily auroras

2020
- ASTRO3D in the Home YouTube Series: Explore the Night Sky & Backyard Astronomy

2019-2022 NASA Astronomy Picture of the Day [APOD]
- Little Planet South Pole: Auroras at Dawn
- South Pole Lunar Eclipse and Auroras over the South Pole Telescope
- South Pole Solar Eclipse over the South Pole Telescope
- Triangulum Galaxy and Meteor Train

2018 Arduino Star Tracker
Designed and built a portable star tracker with an Arduino and Laser cut mechanical components. Enabled long exposures of deep sky objects without stars trailing. [report]

2012 Low Cost Wheelchair for India
Designed and built a light, low-cost wheelchair over 3 months with a ~200 AUD budget. Presented the design to the state government for further development. [report]

Selected Publications †

† 1. **A. Chokshi**, J. L. B. Line, N. Barry, D. Ung, D. Kenney, A. McPhail, A. Williams, R. L. Webster
Dual Polarization Measurements of MWA Beampatterns at 137 MHz
2021, Monthly Notices of the Royal Astronomical Society, 502, 2
10 citations

† 2. **A. Chokshi**, J. L. b. Line and B. McKinley
EMBERS: Experimental Measurement of BEam Responses with Satellites
2021, Journal of Open Source Software, 5, 55
2 citations

† 3. N. Barry, **A. Chokshi**
The Role of the Instrumental Response in 21 cm Epoch of Reionization Power Spectrum Gridding Analyses
2022, The Astrophysical Journal, 929, 1
5 citations

Other Publications

† 4. *Radio fossils, relics, and haloes in Abell 3266: cluster archaeology with ASKAP-EMU and the ATCA*
C. J. Riseley,E. Bonnassieux, T. Vernstrom, T. J. Galvin, **A. Chokshi** ... et al [24 authors]
2022, Monthly Notices of the Royal Astronomical Society, 515, 2
12 citations

† 5. *Epoch of reionization power spectrum limits from Murchison Widefield Array data targeted at EoR1 field*
M. Rahimi, B. Pindor, ... **A. Chokshi** ... et al. [31 authors]
2021, Monthly Notices of the Royal Astronomical Society, 508, 4
18 citations

6. *Constraining the 21 cm brightness temperature of the IGM at z = 6.6 around LAEs with the murchison widefield array*
C. M. Trott, C. H. Jordan, ... **A. Chokshi** ... et al. [32 authors]
2021, Monthly Notices of the Royal Astronomical Society, 507, 1
3 citations

† 7. *A new MWA limit on the 21 cm power spectrum at redshifts 13-17*
S. Yoshiura, B. Pindor, ... **A. Chokshi** ... et al. [32 authors]
2021, Monthly Notices of the Royal Astronomical Society, 505, 4
27 citations

8. *The impact of tandem redundant/sky-based calibration in MWA Phase II data analysis*
Z. Zheng, J. C. Pober, ... **A. Chokshi**, ... et al. [30 authors]
2020, Publications of the Astronomical Society of Australia, 37
9 citations

9. *Deep multiredshift limits on Epoch of Reionization 21 cm power spectra from four seasons of Murchison Widefield Array observations*
C. M. Trott, C. H. Jordan, ... **A. Chokshi**, ... et al. [36 authors]
2020, Monthly Notices of the Royal Astronomical Society, 493, 4
133 citations