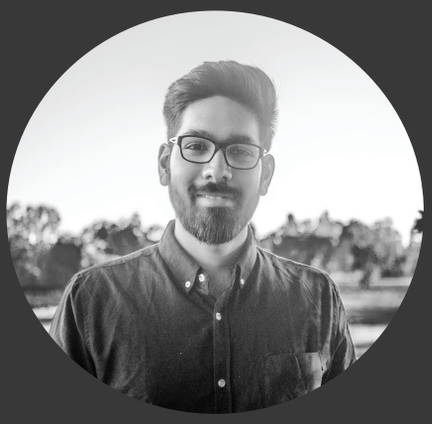

ADITYA PARTHASARATHY MADAPUSI

CONTACT

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COMPUTING SKILLS

ASTRONOMY

PSRCHIVE *(ADVANCED)*

TEMPO2 *(ADVANCED)*

TEMPONEST *(ADVANCED)*

ENTERPRISE *(INTERMEDIATE)*

LANGUAGES

PYTHON *(ADVANCED-EXPERT)*

C/C++ *(INTERMEDIATE)*

SQLITE *(INTERMEDIATE)*

SUPERCOMPUTERS

OZSTAR HERCULES PAWSEY

SLURM/PBS APIs *(INTERMEDIATE)*

EDUCATION

April 2016 - 2019
Swinburne University of Technology, Australia

DOCTOR OF PHILOSOPHY (ASTROPHYSICS)

Thesis title: Characterizing noise on various timescales in pulsar timing observations.

Supervisors: Prof. Matthew Bailes, Dr. Willem van Straten, Dr. Simon Johnston, Dr. Ryan Shannon, Dr. Stefan Oslowski

2009 - 2013
Anna University, Chennai, India

BACHELORS OF INSTRUMENTATION AND CONTROL ENGINEERING

Thesis title: Implementation of Maximum Power Point Tracking Algorithm for Solar Powered Systems.

Supervisors: Ramasubramanian.R & Dr. S.Uma

2007-2009
Narayana Junior College, India

HIGHER SECONDARY SCHOOL

Secured 'A' grade (first class with distinction)
Scored 100% in Mathematics

RESEARCH EXPERIENCE

January 2020 - Present
Max-Planck Institute for Radio astronomy

POSTDOCTORAL RESEARCHER

My expertise is in Bayesian inference techniques used in the search for gravitational waves using pulsar timing arrays. I manage and develop the pulsar data analysis pipeline for the MeerKAT radio telescope.

April 2016 - 2019
Swinburne University of Technology, Australia

POSTGRADUATE RESEARCH STUDENT

My PhD in Astrophysics was focussed on understanding timing noise and pulsar spin-down in young radio pulsars using novel Bayesian inference techniques and in understanding the effects of jitter noise in millisecond pulsars. **I am also extensively involved in the commissioining, data analysis and scheduling for MeerTime**, the pulsar timing project with the MeerKAT radio telescope.

June 2015 - August 2015
Swinburne University of Technology, Australia

PRE-PHD SCHOLAR

My project was focussed on characterizing the transient properties of polarized radio pulsar emission on very short timescales using novel statistical techniques to improve the sensitivity of pulsar timing observations.

February 2014 - March 2015
Raman Research Institute, Bangalore, India

VISITING SCHOLAR / PROJECT ASSISTANT

Surface metrology of Radio telescopes: Laser distance measurement technique for a Mills Cross fan beam radio telescope. I worked on the design and development of a software for 2D map reconstruction of a fan beam radio telescope.

October 2013 - January 2014
Defence Research and Development Organization, India

VISITING STUDENT

Worked on my Bachelor thesis project which explored a design method for the implementation of a maximum power point tracking algorithm for solar powered systems. Code was developed in MATLAB.

COMPUTING SKILLS

OTHER SOFTWARE

ADOBE PACKAGES *(ADVANCED)* (LIGHTROOM, PHOTOSHOP)

MATLAB & SIMULINK *(INTERMEDIATE)*

RASPBERRY PI & ARDUINO *(INTERMEDIATE)*

CONTAINERIZATION *(INTERMEDIATE)*

SHELL SCRIPTING *(INTERMEDIATE)*

GUI DEVELOPMENT *(INTERMEDIATE)*

COLLABORATIONS

- MEMBER OF THE INTERNATIONAL PULSAR TIMING ARRAY (**IPTA**), THE PARKES PULSAR TIMING ARRAY (**PPTA**) AND THE EUROPEAN PULSAR TIMING ARRAY (**EPTA**).
- **MEERTIME**: PULSAR TIMING KEY SCIENCE PROJECT USING THE MEERKAT RADIO TELESCOPE.
- ACTIVELY WORK WITH THE **FERMI** AND **NICER** COLLABORATIONS.
- MEMBER OF THE **TRAPUM** PULSAR SEARCH AND THE MAX-PLANCK GALACTIC PLANE SURVEY (**MGPS**) COLLABORATION.
- PREVIOUS MEMBER OF THE UTMOST COLLABORATION FOR THE REFURBISHMENT OF THE UTMOST TELESCOPE AND THE SEARCH FOR PULSARS AND FRBS
- INVOLVED WITH THE DEEPER WIDER FASTER (DWF) COLLABORATION FOR SHADOWING AND THE RAPID FOLLOW UP OF TRANSIENTS

POSITIONS

- FORMER OZGRAV AFFILIATE
- CSIRO ATNF CO-SUPERVISED STUDENT (2016-2019)
- SOC MEMBER FOR EPTA 2021
- FORMER PHD STUDENT REPRESENTATIVE AT CAS, SWINBURNE
- MEMBER OF THE S.O.C FOR IPTA 2018 AND ASA HARLEY WOOD SCHOOL 2017

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OBSERVING EXPERIENCE

- Over 100 hours of observing experience with the Murriyang/Parkes and Molonglo radio telescopes.
- Experience in pulsar timing, radio polarimetry and FRB searches.
- Actively involved in observing and timing pulsars with the MeerKAT radio telescope.
- Extensively involved in the development of automatic scheduling algorithms for MeerKAT, Parkes and Molonglo radio telescopes.
- Co-investigator on > 5 proposals with Parkes.
- Co-investigator on a pulsar timing proposal with Effelsberg.

SOFTWARE DEVELOPMENT

MEERPIPE

Primary developer of the pulsar timing data analysis pipeline for MeerTime. This software is still in active development and is extensively used for processing the pulsar timing data from the MeerKAT radio telescope. Meerpipe is written to be modular and extensible. It interacts with a database system and also communicates with SLACK for real-time updates.

Code repository: *https://github.com/aparthas3112/meerpipe*

PULSAR TIMING USING BAYESIAN INFERENCE

Developed an automatic cluster-aware pulsar timing pipeline based on the principles of Bayesian inference for studying a large sample of young energetic radio pulsars.

Code repository: *https://bitbucket.org/aparthas/p574_software/src/master/*

TEMPONEST

Develop and provide support for a Bayesian pulsar timing package widely used in the pulsar timing community for gravitational wave background searches using pulsar timing arrays.

Code repository: *https://github.com/aparthas3112/TempoNest*

MEERSCHED

One of the primary developers of the interactive and automatic scheduling tools for MeerTime. These tools use path minimizing algorithms to generate an optimal source list for efficient observing. Currently being used for scheduling MeerTime observations.

Code repository: *https://bitbucket.org/meertime/meertime_scheduler/src/master/ (private)*

MENTORING AND TEACHING

INTERNATIONAL PULSAR TIMING ARRAY MEETINGS

Developed and gave tutorials on using various pulsar software to international PhD students and postdoctoral researchers at IPTA meetings 2017 to 2021.

SOUTH AFRICAN PULSAR TIMING WORKSHOP 2021

Gave lectures and tutorials to over 150 international students.
https://www.sarao.ac.za/courses/meerkat-pulsar-timing-workshop/

TEACHING ASSISTANT - DISCOVERING THE UNIVERSE

Teaching assistant for two semesters at Swinburne University of Technology.

ADITYA PARTHASARATHY MADAPUSI

SCIENCE OUTREACH

- Organized the Astrolight festivals at Scienceworks , 2018 and 2016
- Former outreach member for OzGrav
- Astronomer in Residence for CAASTRO in Uluru - 2017
- Organizer for the Pint of Science festival, 2017 in Melbourne
- Astronomy outreach at Swinburne Open Days - 2016, 2017 and 2018
- Astroguide at Stargazing festival - 2017
- Participated in "Scientist in School" program - 2017
- A core member of the AstroTours program at Swinburne for over 3 years

REFERENCES

- **PROFESSOR. DR. MICHAEL KRAMER**

DIRECTOR, MAX PLANCK INSTITUTE FOR RADIO ASTRONOMY (MPIFR)

PROFESSOR FOR ASTROPHYSICS AT THE UNIVERSITY OF MANCHESTER

AUF DEM HUGEL, 69, BONN, GERMANY

EMAIL: MKRAMER@MPIFR-BONN.MPG.DE

- **PROFESSOR. MATTHEW BAILES**

DIRECTOR, ARC CENTRE OF EXCELLENCE FOR GRAVITATIONAL WAVE DISCOVERY (OZGRAV)

ARC LAUREATE FELLOW

CENTRE FOR ASTROPHYSICS & SUPERCOMPUTING
SWINBURNE UNIVERSITY OF TECHNOLOGY

EMAIL : MBAILES@SWIN.EDU.AU

- **DR. SIMON JOHNSTON**

SENIOR RESEARCH SCIENTIST

CSIRO ASTRONOMY AND SPACE SCIENCE

EMAIL: SIMON.JOHNSTON@CSIRO.AU

PUBLICATIONS

I have **three published** first-author papers and have contributed to **> 35** refereed publications. I have outlined details below.

I am also one of two **lead corresponding** authors in the paper that developed and demonstrated the first-ever Gamma-ray pulsar timning array (published in the journal **Science**).

Scan for my publications

http://bitly.ws/mJ6r

Publications related to pulsar timing arrays:

1. I **lead the noise-analysis team** for the European Pulsar Timing Array collaboration and am one of the key contributors towards the gravitational wave background analysis.

2. I am an active member of the International Pulsar Timing Array collaboration.

Publications related to MeerTime:

1. I am the **lead developer** of the pulsar data analysis pipeline for MeerTime and do the data analysis for most of the recorded data. I am part of the *builder's list* for MeerTime.

2. I have also **contributed significantly** to the scientific aspects of many papers and am one of the main co-authors.

Publications related to NICER mass-measurments:

I contributed towards the **Bayesian analysis of radio data** that helped provide meaningful priors to the NICER X-ray analysis for neutron star mass measurements.

Publications related to other collaborations:

1. I am a part of the TRAPUM pulsar search collaboration with MeerKAT and develop the pulsar timing pipeline for newly discovered pulsars.

2. I am also a part of the Parkes Young Pulsar Timing collaboration and have actively contributed towards many science papers (including two first-author papers as part of my PhD thesis).

3. I was an active contributor to the UTMOST collaboration that uses the Molonglo radio telescope.

4. I was also a part of the Deeper Wider Faster collaboration for fast-transient searches.

ADITYA PARTHASARATHY MADAPUSI

MEETINGS AND PRESENTATIONS

I have given talks, lectures and developed tutorials for a number of international conferences and workshops listed below:

2022 PHAROS meeting, Rome (May)

2022 EPTA Meeting (March) - Lead Organiser

2021 EPTA Meeting (December) - **SOC** member

2021 MeerTime Pulsar Timing Workshop, South Africa, Virtual - **SOC**

2021 AMALDI Conference, Virtual

2021 International Pulsar Timing Array (IPTA), Virtual

2020 EPTA Meeting (December)

2019 PPTA/OzGrav Workshop

2019 International Pulsar Timing Array (IPTA), India

2018 OzGrav retreat, Perth

2018 OzGrav Inference workshop, Monash University: Inference in Pulsar Timing - **SOC**

2018 International Pulsar Timing Array (IPTA) meeting, New Mexico - **SOC**

2018 FRB conference, Swinburne University of Technology

2017 SearchSoft conference, Cape Town: New PPTA FRB

2017 CSIRO Radio astronomy school, Narrabri

2017 International Pulsar Timing Array Meeting, France

2017 Parkes Pulsar Timing meeting, Parkes : Future of Pulsar timing with Parkes

2017 Harley Wood School - **SOC**

2016 CAASTRO Retreat, Perth

2016 Colloquium talk at Auckland University of Technology

2016 Harley Wood School 2016