

# MWA Pulsar and Fast Transient Science Working Group Policy

Version	Date	Comments	Initial
0.1	11/07/2022	Initial draft	RB, CJR

## Background

The MWA Pulsar and Fast Transient (PFT) science working group (SWG) is a relatively new SWG that came into existence following its formalisation process in 2021. PFT SWG members are primarily interested in a wide range of science streams enabled by the Voltage Capture System (VCS) functionality and associated suite of software and processing pipelines. The science areas include (but not limited to): pulsars, fast radio bursts (FRBs), passive radar, cosmic ray detection, some areas of Solar science, and atmospheric phenomena such as lightning that require high-time resolution data or data products. The current members of the PFT SWG are listed in Appendix A.

## Scope

This policy applies to PFT members who may wish to publish science or instrumentation or any related improvements based on data obtained as part of an MWA “guaranteed time” observing proposal (pertaining to PFT science) while those data are within the MWA proprietary period. Raw data that are still proprietary are subject to the project-wide MWA publication policy (see MWA Board 2013a). This policy covers the publication of scientific data, algorithms, technical issues, software and system descriptions. As with all SWG policies, this policy will be reviewed periodically. Publication matters not explicitly covered here should be referred to the PFT SWG Chair, who will then consult the MWA Principal Scientist for advice on handling them.

## Organisation of the PFT Science Working Group

Considering the relatively small size and close-knit nature of current membership and activities, we have adopted following management structure for PFT SWG:

- Chair
- Software Lead
- Pulsar science coordinator
- FRB science coordinator

The current occupants of these positions are chosen by nomination and largely include members who are committed to establishing the functioning of the SWG in the early stages. The tenure of each position is nominally for a period of 2-3 years. Beyond this period, new members will be either nominated or elected into the roles, or current occupants will be re-elected or nominated. As per the MWA SWG Policy, new Chairs will be approved by the MWA Board before taking up the role. In view of the current small size of the PFT SWG membership, it is permitted for one person to occupy more than one position in the PFT management structure. Current occupants of these positions are listed in Appendix B.

In terms of membership count, the MWA PFT team is perhaps the smallest of all MWA SWGs, however the science streams that are potentially enabled by the VCS functionality span a large range. Hence, the role of the PFT SWG Management team is to coordinate the related activities and efforts within each of the PFT science themes, and across them. The science theme leads will coordinate the effort for their respective areas, and work with the Chair and the Software Lead to achieve this. The chair will be responsible for coordinating science which does not fall into these three categories, or otherwise delegating the responsibility to one of the three coordinators. The group will coordinate a range of activities including: observing proposals seeking guaranteed MWA observing time; student proposals governed by the MWA Student policy; science publication proposals based on data within the scope of this policy; and any other related publications that may involve a close involvement of SWG or key members. The group will attempt to resolve any disputes or conflicts which might arise, and will consult the MWA Principal Scientist for advice as may be necessary.

### **Membership of the PFT SWG**

In an effort to encourage the membership of this new group, we have adopted a fairly straightforward procedure. In principle, an expression of interest for involvement in PFT related science or a demonstrated interest (e.g. through involvement in publications) from either staff or students who are either MWA members or MWA Associate members, or those who are actively collaborating in some of the ongoing projects (e.g. the SMART survey), are eligible to be members of the PFT SWG. The current application process involves sending an email request to the Chair, noting their rationale for inclusion, and consideration by the SWG management.

### **Guaranteed time observing proposals**

For each of the PFT science areas, the necessary coordination effort is put in to develop and submit observing proposals. The coordination is utmost important here given the limited (and modest) amount of observing time that can be supported within the resource constraints of VCS (owing to the large data rates and storage and processing needs). While all SWG members are welcome to conceive or propose science projects to pursue their research interests, and may even request for inclusion in proposals led by other members of the team, it is critical that the proposal effort is coordinated across the SWG given the inherent limitations of the VCS resources and underlying expectation of support in terms of software and/or processing.

## **Student Projects**

The PFT SWG imposes no additional requirements for student projects beyond what are stipulated by the MWA Project (MWA Student Policy, [www.mwatelescope.org/index.php/team](http://www.mwatelescope.org/index.php/team)). PFT SWG members are encouraged to follow the process prescribed by the MWA Project to register projects by undergraduate and/or postgraduate students. Upon request, the PFT SWG Chair, in consultation with the Software Lead and other members of the SWG Management team, will provide a recommendation to the MWA Principal Scientist on the appropriateness of specific PFT student proposals.

## **Science Project Proposals**

Projects likely to result in two or more publications, or that may require telescope time over a period of two years or longer, are referred to as large science projects in the context of PFT SWG, considering a need to support and process substantial amounts of VCS data to enable the proposed science. The G0057 (the SMART survey) project is a good example. Science project proposals can be made to the respective science theme lead with a copy to the Chair and Software Lead at any time. The science proposals will be discussed in the SWG meetings, and will be shared across the SWG. The MWA Principal Scientist will be periodically updated with all related developments. These science proposals are expected to be followed up through targeted publications, or renewed, within two years. Principal investigators of accepted science projects will be requested by the respective coordinators to provide a project update every 6-12 months, in the PFT SWG meetings and/or at MWA Project Meetings. The PFT SWG members are encouraged (but not required) to submit a project proposal even if they plan to use any data outside the proprietary window.

## **Publications**

### **1 General**

All PFT SWG papers making use of proprietary MWA data must derive from work based on an accepted PFT science project proposal by the SWG. As per the MWA data access policy, the raw MWA data (in this case VCS data archives) has a proprietary period of 18 months. The higher-order data products (e.g. beam-formed data products produced by the SMART pipeline, and are made available via data release) derived from raw data by the PFT SWG members do not have any proprietary period associated with them. Paper proposals submitted within 18 months of the data collection are subject to the standard MWA publication policy. The PFT SWG imposes no additional requirements in terms of publication policy.

### **2 MWA publications**

The MWA publication policy (MWA Board 2013a) requires that any papers using proprietary MWA data need to be led by an Individual Member of the MWA Project or a student

supervised by such a team member. These papers will need to have been through the project proposal procedure as outlined above.

The MWA publication policy requires that once serious work has commenced on a publication related to a science proposal (submitted during the proprietary period of the raw data), but well before a draft paper is available, a publication proposal be circulated to MWA members. The final paper should be distributed to MWA members within a year of the publication proposal. When a paper is ready to be submitted for publication, in addition to the steps above two further MWA policy steps need to be completed: collaboration review and final review. These are detailed in the MWA publication policy. The MWA publication policy might also mandate the inclusion of MWA builders list as co-authors, including appropriate citations of the MWA system description, and listing appropriate acknowledgments. The latest MWA publication policy should be consulted for updated information and requirements. Any disputes or variances are to be adjudicated by the PFT SWG Chair prior to referral to the MWA Principal Scientist.

### **3 Publication of MWA data after the proprietary period**

In the case of publications proposed after the raw data have ceased to be proprietary, the PFT SWG imposes no additional publication policy. However, given the underlying expectation in terms of software and processing support required for extracting science from VCS archives, there is general expectation of professional courtesy from the PI of the proposal, by informing the PFT SWG of the project's existence and then the progress updates at periodic intervals.

### **4 Policy for Papers based on publicly released data products**

For papers based on any higher-order publicly released data (e.g. beamformed data from the SMART survey project), members of the SWG are encouraged to follow the project and paper proposal route to ensure no duplication of effort and also to ensure the best science outcomes can be drawn by leveraging the scientific and technical expertise across the SWG.

### **5 Builders List & Authorship**

The PFT SWG imposes no formal builders list or a requirement of inclusion of PFT SWG members to be included as co-authors. However, considering that enabling VCS science necessitates a significant amount of time commitment from the key developers, or members who can provide support in the form of software maintenance and further improvements, we encourage this to be recognised through inclusion of relevant members in publications following within the first 1-2 years of any core development (e.g. VCSBeam). All publications should cite major system or software description papers (e.g. Tremblay et al. 2015 for VCS; Ord et al. 2019 and/or McSweeney et al. 2020 for tied-array beamformer, etc). This will be reviewed periodically and might change in the future. All PFT publications need to comply with the MWA publication policy.

### **Acknowledgements**

No additional acknowledgments are required beyond those stated in the MWA publication policy.

## References

- MWA Board (2013a): MWA Publication Policy [www.mwatelescope.org/index.php/team](http://www.mwatelescope.org/index.php/team)
- MWA Board (2013b) MWA Student Policy, [www.mwatelescope.org/index.php/team](http://www.mwatelescope.org/index.php/team)
- Wayth, R.B. et al. (2018), PASA, 35, 33
- Beardsley et al. (2019), PASA, 36, 50B

## Appendix A:

MWA PFT SWG Members (as of 2022 June)

1. Ramesh Bhat, Curtin University, Australia
2. Shi Dai, WSU, Australia
3. Brendan Hennessy, Curtin University, Australia
4. Clancy James, Curtin University, Australia
5. Parul Janagal, Indian Institute of Technology, Indore, India
6. David Kaplan, UWM, USA
7. Dilpreet Kaur, Curtin University, Australia
8. Sam McSweeney, Curtin University, Australia
9. Bradley Meyers, UBC, Canada
10. Ian Morrison, Curtin University, Australia
11. Divya Oberoi, National Centre for Radio Astrophysics, India
12. Steve Ord, CSIRO ATNF, Australia
13. Susmita Sett, Curtin University, Australia
14. Ryan Shannon, Swinburne University, Australia
15. Marcin Sokolowski, Curtin University, Australia
16. Nicholas Swainston, Curtin University, Australia
17. Willem van Straten, Auckland University, New Zealand
18. Steven Tremblay, NRAO, USA
19. Mengyao Xue, NAOC, China
20. Zhongli Zhang, SHAO, China

## Appendix B:

MWA SWG Management team

1. Chair – Ramesh Bhat
2. Software Lead – Sam McSweeney
3. Pulsar science theme lead – Ramesh Bhat
4. FRB science theme lead – TBD
5. Other science theme lead – TBD