

# Curriculum Vitae

## Adam M. Avison

### Personal Information

#### Contact:

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#### Education & Qualifications:

- Ph. D., 2007-2010, "Methanol Masers and the Environments of Massive Star Formation"  
Jodrell Bank Centre for Astrophysics,  
University of Manchester, Manchester
- MPhys (Hons), 2003-2007, Physics with Astrophysics  
University of Manchester, Manchester
- A-level, 2001-2003, Math, Physics, Biology (A, A, A)  
Greenhead College, Huddersfield, West Yorkshire

#### Appointments Held:

2010-Present: **ALMA Support Scientist, Post-Doctoral Research Associate,**  
**[User support 75% FTE : Research 25% FTE]**  
UK ALMA Regional Centre Node, Jodrell Bank Centre for Astrophysics,  
University of Manchester

#### Impact in the last 5 years (2016-2020):

- Lead developer and manager of the ALMA Observation Support Tool, which has conducted 13,969 simulated observations for an international ALMA users base (in 35 unique countries) over the last 5 years.
- 2 first author papers (23 citations), 15 co-author papers (195 citations)
- Supported 75 ALMA projects (73 UK PIs, 2 international).
- Contributed to the increase of the ALMA user base by organising/co-organising and tutoring at 8 ALMA workshops (112 attendees) at institutes around the UK.
- Quality Assurance assessment of ALMA data for 29 projects, ensuring data meet the PIs requirements and to ensure their timely inclusion in the ALMA Archive.

#### Primary Research Activities [0.25FTE]:

- Leading work on the characteristics of molecular outflows [1]<sup>1</sup>, dust, maser [16] and free-free [23] emission from forming high-mass stars, using data from ALMA, the ATCA and APEX telescopes.
- Leading (TEMPO project, see below) and collaborating (SQUALO project and [4,9,14]) on the collapse and fragmentation of star-forming clouds.
- Expertise in the simulation of interferometric observation data in the sub-mm and radio e.g. [12,17,35].

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<sup>1</sup> Numbers in square brackets refer to papers listed in 'Publication list'.

- Member of the JBCA Sun, Stars and Galaxies (SSG) group and the Galactic star formation sub-group.

***User Support Duties [0.75FTE]:***

- ***ALMA Observation Support Tool (OST):***  
Lead developer and manager of the **ALMA OST**, an online ALMA simulator provided by the University of Manchester to the international ALMA user community. Since activation in 2011 the OST has completed over 26,070 simulations, for users in 42 countries and is **listed as primary resource by the Joint ALMA Observatory** (see [almascience.eso.org](http://almascience.eso.org)).
- ***ALMA User Support:***  
**Primary contact scientist for 104 ALMA projects since 2011 (100 UK, 4 international)**, assisting with proposal preparation, data processing and analysis. *Projects I have been primary contact scientist for have led to 36 publications by the PI (or student/post-doc thereof) and 89 papers total.*
- ***ALMA Quality Assurance:***  
Responsible for data processing and assessment of observations taken with ALMA for projects I am contact for (and others upon request) to ensure it is of science ready quality for inclusion in the international ALMA Archive. I have processed data for **47 unique ALMA projects** (with multiple observations assessed in many of these), these data have gone on to be used in 89 publications.
- ***ALMA Workshops and Tutorials:***  
Organiser and tutor for ALMA Workshops and Tutorials at various institutes around the UK (Durham, Cardiff, UCLan, UCL and Manchester), educating the UK astronomy community on acquiring, processing and analysing ALMA data. To date, these events have had **over 200 attendees** contributing to the increased usage of ALMA in the UK.
- ***UK ALMA Regional Centre Node Newsletter:***  
Author of the monthly UK ARC Node newsletter which has an **international readership of 103 subscribers**.
- ***Public Outreach:***  
Presenting, leading, organising outreach events. Developing presentations and demonstrations for use in outreach. UK ALMA outreach events have reached thousands of members of the public since 2011, see *Outreach and Public Engagement* section for full details.
- ***Software development:***  
Development and testing of software related to the ALMA telescope (both inhouse and external software). Currently developing LumberJack, software to locate regions on molecular line emission in ALMA spectra. **The LumberJack software has been adopted for use by the international collaboration ATOMIUM of over 40 members.**
- ***Professional Outreach:***  
Attendance at national and international conferences to promote the UK ARC Node and the University of Manchester. Lead organisation of UK ALMA community days and organising exhibitions at the annual National Astronomy Meetings.

***About ALMA and the UK ARC Node:***

The Atacama Large Millimetre/sub-mm Array (ALMA) is the world's largest, most complex and expensive (€1.2Billion) telescope in operation. It is the premiere instrument for astronomical observations in the mm / sub-mm and operates as an international collaboration between the European Southern Observatory (ESO), National Radio Astronomical Observatory (NRAO, USA), East Asia (via Japan and Taiwan) and the Republic of Chile.

User support for ALMA is conducted through ALMA Regional Centres (ARCs), one in each

executive. The European ARC has seven Nodes in different member states. At the UK ARC Node we are responsible for supporting UK based astronomers (and international astronomers upon request) using the ALMA telescope, with my primary roles detailed above. *My role is split 75% FTE User Support : 25% FTE Research, in a given 5 year period this equates to 3.75 years User support time and 1.25 years Research.*

**Professional memberships:**

- Institute of Physics, MInstP, 2003-Present
- Royal Astronomical Society, 2009-Present

## Research Contributions

**Impact in the last 5 years (2016-2020):**

- 2 first author papers (23 citations), 15 co-author papers (195 citations).
- 804 citations to all publications in last 5 years
- 2 invited colloquia presentations at external institutes.
- 8 conference contributions (6 international, 2 national).
- Leading 2 projects in the international collaboration ALMAGAL technical working group, managing the work of teams of international colleagues.
- Awarded travel grant from RadioNet consortium to facilitate students attending an ALMA workshop in Dublin.
- Mentorship (scientific/technical) to 3 University of Manchester PhD students (2 completed, 1 on-going), 1 MSc student.
- Supervision of 2 MPhys students.
- Contribution to international report presenting the science case for new ALMA receiver hardware.

**Publication History:**

Peer Reviewed output<sup>2</sup> (values as of 04/01/2021):

Career:

Total Publications: 36 (4 first author)

Total Citations: 1452

H-index: 17

Past 5 Years(2016-2020):

Total Publications: 15 (2 first author)

Total Citations (to all publications): 804

H-index: 16

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<sup>2</sup> Values from NASA Astrophysics Data System Abstract Service, <https://ui.adsabs.harvard.edu/> the primary publication and citation statistic source for the Astronomical literature.

### **Publication list:**

*Summary:* 36 peer-reviewed articles, 4 first author, 14 significant contributions papers, 16 long term collaboration papers, 3 student led papers where I have had a role in the mentorship/scientific or technical development of the first author, 7 conference proceedings (1 as first author). 3 papers with >50 citations and 6 with >100 citations.

#### **Key:**

Each publication is numbered (value in square brackets, as used throughout the CV), followed by a number of symbols which indicate my contribution to that paper. These symbols have the following meanings:

$\alpha$  = First author paper.

$\beta$  = Significant co-author, meaning contributed significantly to the paper or analysing, calibrating, imaging the observational data or providing simulations which the paper is based on. Each of these papers has a short summary of my contribution after the paper information.

$\gamma$  = Involved with the mentorship of student first author.

$\delta$  = Methanol Multibeam (MMB) related papers. I am a member of the MMB collaboration and contributed to that project and these publications both scientifically and as a part of the data analysis and observation teams. To date this collaboration has produced **16 publications with 989 total citations**.

$\phi$  = Conference proceedings.

Papers with >50 citations are coloured **green** and papers with >100 citations are coloured **purple**. All papers appear in peer-reviewed journals. Conference proceedings are assessed by the conference Scientific Organising Committee.

### **Peer-reviewed articles and Conference Proceedings**

#### **2021 (In Press)**

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[1]  $\alpha$  : Avison A. et al., *Continuity of accretion from clumps to Class 0 high-mass protostars in SDC335*. Accepted for publication in A&A, 2021, pre-print arXiv:2012.08948.

#### **2020**

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[2]  $\beta, \gamma$  : Jones, B. M. et al., *The evolutionary status of protostellar clumps hosting class II methanol masers*. 2020, MNRAS, 493, 2015-2041.

(Scientific input to the final paper, analysis assistance and mentorship of the first author.)

[3]  $\beta, \gamma$  : Andriantsaralaza, M. et al., *CO in the C1 globule of the Helix nebula with ALMA*, 2020, MNRAS, 491 758-772.

(Data calibration and processing as well as tuition of the lead author in data analysis and exploration techniques.)

#### **2019**

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[4]  $\beta$  : Barnes, A. T. et al., *Young massive star cluster formation in the Galactic Centre is driven by global gravitational collapse of high-mass molecular clouds*. 2019, MNRAS 486 283-303.

(Scientific input to the final paper, data reduction and analysis assistance and tuition to the first author.)

[5]  $\phi$  : Starrfield et al., *ALMA studies of CK VUL (1670) imply that it is the consequence of a white dwarf-brown dwarf merger*, 2019. American Astronomical Society, HEAD meeting #17, id.112.30

## 2018

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- [6]  $\beta$  : Eyres, S. P. S., *ALMA reveals the aftermath of a white dwarf-brown dwarf merger in CK Vulpeculae*, 2018, MNRAS 481 4931-4939.  
(Data calibration and imaging, interferometric/ALMA technical expertise).
- [7]  $\beta$  : Lykou, F. et al., *The curious case of II Lup: a complex morphology revealed with SAM/NACO and ALMA*, 2018, MNRAS 480 1006-1021.  
(Data calibration and imaging, interferometric/ALMA technical expertise).
- [8]  $\beta$  : van Hoof, P. A. et al., *The Real-Time Evolution of V4334 Sgr*. 2018, Galaxies, vol. 6, issue 3, p.79.  
(Data calibration and imaging, interferometric/ALMA technical and data analysis expertise).
- [9]  $\beta$  : Williams, G. M. et al., *Gravity drives the evolution of infrared dark hubs: JVLA observations of SDC13*, 2018, Astronomy & Astrophysics, 613, A11, 26 pp.  
(Scientific and interferometric data analysis and imaging expertise, particularly combining interferometric with single dish radio observations).
- [10]  $\delta$  : Breen, S. L. et al., *The 6-GHz Multibeam Maser Survey - III. Comparison between the MMB and HOPS*. 2018, MNRAS, 474 3898-3911.
- [11]  $\phi$  : Cunningham, N. et al., *Exploring the Nature of MMB sources: A Search for Class I Methanol Masers and their Outflows*, 2018, Proceedings of the International Astronomical Union, IAU Symposium, Volume 336

## 2017

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- [12]  $\beta$  : Healy, F. et al., *Multi-epoch radio imaging of  $\gamma$ -ray Nova V959 Mon.*, 2017, MNRAS, 469, 3976-3983.  
(Provided significant effort in generating accurate eMERLIN simulations, which allow for the analysis conducted in this paper).
- [13]  $\delta$  : Green, J. A. et al., *The 6-GHz multibeam maser survey - II. Statistical analysis and Galactic distribution of 6668-MHz methanol masers*. 2017, MNRAS, 469, 1383-1402.
- [14]  $\beta$  : Henshaw, J. D. et al., *Unveiling the Early-Stage Anatomy of a Protocluster Hub with ALMA*. 2017, MNRAS Letters, 464, L31-L35.  
(ALMA data analysis expertise leading to the creation of publication worthy data/astronomical images).
- [15]  $\phi$  : Van de Steene, G. C. et al., *The very fast evolution of Sakurai's object*, 2017, IAU Symposium Volume 323, pp. 380-381

## 2016

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- [16]  $\alpha, \delta$  : Avison, A. et al., *Excited-state hydroxyl maser catalogue from the methanol multibeam survey - I. Positions and variability*. MNRAS, 461, 136-155
- [17]  $\beta, \gamma$  : McGuire, C. et al., *The structure and early evolution of massive star forming regions - Substructure in the infrared dark cloud SDC13*. 2016, Astronomy & Astrophysics, 594, A118, 13 pp.  
(Provided significant effort in generating SMA telescope simulations, which are used in the analysis conducted in this paper).
- [18]  $\delta$  : Breen, S. L. et al., *12.2-GHz methanol maser Methanol Multibeam follow-up catalogue - IV. Longitude range  $20^\circ$ - $60^\circ$* . 2016, MNRAS, 459, 4066-4087
- [19]  $\beta$  : Geach, J. et al., *ALMA observations of Lyman-alpha Blob 1: halo sub-structure illuminated from within*. 2016, Astrophysical Journal, 832, id. 37, 7 pp.  
(ALMA data analysis, combination and processing expertise).

## 2015

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[20]  $\beta$  : McDonald, I. et al., *ALMA reveals sunburn: CO dissociation around AGB stars in the globular cluster 47 Tucanae*. 2015, MNRAS, 453, 4324-4336

[21]  $\delta$  : Breen, S. L. et al., *The 6-GHz methanol multibeam maser catalogue - V. Galactic longitudes  $20^\circ$ - $60^\circ$* . 2015, MNRAS 450 4109-4136

[22] **ALMA Partnership; (248 authors).** *The 2014 ALMA Long Baseline Campaign: An Overview*. 2015, Astrophysical Journal Letters, 808, L1.  
(Member of the international ALMA team).

[23]  $\alpha$  : Avison, A. et al., *Tightening the belt: Constraining the mass and evolution in SDC335*. 2015, Astronomy & Astrophysics, Volume 577, A30, 10 pp.

[24]  $\phi$  : Fuller, G. A., *Filaments and Massive Clumps: Probing The Initial Conditions for Massive Star Formation*, 2015, IAU General Assembly, Meeting #29, id.2257928

[25]  $\phi$  : Fuller, G. A., *Identifying the Initial Conditions for the Formation of Stellar Clusters*, 2015, IAU General Assembly, Meeting #29, id.2257306

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## 2014

[26]  $\delta$  : Breen, S. L. et al., *12.2-GHz methanol maser Methanol Multibeam follow-up catalogue - III. Longitude range  $10^\circ$  - $20^\circ$* . 2014, MNRAS 438, 3368-3382

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## 2013

[27]  $\beta$  : Peretto, N. et al., *Global collapse of molecular clouds as a formation mechanism for the most massive stars*. 2013, Astronomy & Astrophysics, Volume 555, id.A112, 10 pp.

[28]  $\delta$  : Gallaway, M. et al., *The mid-infrared environments of 6.7 GHz methanol masers from the Methanol MultiBeam Survey*. 2013, MNRAS, 430, 808-821

[29]  $\alpha$  : Avison, A. & George, S.J., *A graphical tool for demonstrating the techniques of radio interferometry*. 2013, European Journal of Physics, Vol. 34 Issue 1. pp. 7.

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## 2012

[30]  $\delta$  : Breen, S. L. et al., *12.2-GHz methanol maser Methanol Multibeam follow-up catalogue - II. Longitude range  $186^\circ$ - $330^\circ$* . 2012, MNRAS, 426, 2189-2207

[31]  $\delta$  : Breen, S. L. et al., *12.2-GHz methanol maser Methanol Multibeam follow-up catalogue - I. Longitude range  $330^\circ$ - $0^\circ$* . 2012, MNRAS, 421, 1703-1735

[32]  $\delta$  : Green, J. A. et al.; *The 6-GHz methanol multibeam maser catalogue - IV. Galactic Longitudes  $186^\circ$  -  $330^\circ$  including the Orion-Monoceros region*. 2012, MNRAS, 420, 3108-3125

[33]  $\phi$  : Green, J. A. et al., *Tracing major structures of the inner Galaxy with 6.7-GHz methanol masers*, 2012, Assembling the Puzzle of the Milky Way, EPJ Web of Conferences, Volume 19, id.06007

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## 2011

[34]  $\delta$  : Caswell, J. L. et al., *The 6-GHz methanol multibeam maser catalogue - III. Galactic Longitudes  $330^\circ$  to  $345^\circ$* . 2011, MNRAS, 417, 1964-1995.

[35]  $\beta$  : Heywood, I, Avison, A. & Williams, C.J., *The ALMA Observation Support Tool*. to appear in the proceedings of Astronomy with Megastructures: Joint Science with the E-ELT and SKA. (Since its initial release in 2011 developed by I. Heywood, I have been solely responsible for the management and development of the OST. For more information on the OST see User Support Duties under Appointments held).

[36]  $\delta$  : Breen, S. L. et al., *Statistical Properties of 12.2 GHz Methanol Masers Associated with a*

*Complete Sample of 6.7 GHz Methanol Masers*. 2011, *Astrophysical Journal* 733, 80.

[37]  $\delta$  : Green, J. A. et al., *Major Structures of the Inner Galaxy Delineated by 6.7 GHz Methanol Masers*. 2011 *Astrophysical Journal*, 773, id. 27, 17 pp.

[38]  $\phi$  : Avison, A., *Compact HII regions toward Methanol Maser traced sources of Massive Star Formation*. 2011. The 41st Young European Radio Astronomers Conference, id.5

## 2010

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[39]  $\delta$  : Green, J. A. et al., *The 6-GHz methanol multibeam maser catalogue - II. Galactic Longitudes 6° to 20°*. 2010, *MNRAS*, 426, 2189-2207

[40]  $\delta$  : Caswell, J. L. et al., *The 6-GHz methanol multibeam maser catalogue - I. Galactic Centre region, longitudes 345° to 6°*. 2010, *MNRAS*, 404, 1029-1060

## 2009

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[41]  $\delta$  : Green, J. A. et al., *Star-formation masers in the Magellanic Clouds: A multibeam survey with new detections and maser abundance estimates*. 2009, *IAU Symposium* 256, 227-232.

[42]  $\delta$  : Green, J. A. et al., *The 6-GHz multibeam maser survey - I. Techniques*. *MNRAS* 392, 783-794.

[43]  $\phi$  : Green, J. A. et al., *Star-formation masers in the Magellanic Clouds: A multibeam survey with new detections and maser abundance estimates*, 2009, *Proceedings of the International Astronomical Union, IAU Symposium, Volume 256*

### **Non peer reviewed output:**

- Contribution to the science case ESO report for a new ALMA receiver band 'The Science Case for ALMA Band 2 and Band 2+3'. – Fuller et al 2016. **Hardware based on these science cases now in development.**
- Contribution to the ALMA End-to-End User Experience committee report to the international ALMA Integrated Science Operators Team, detailing recommendations to improve the user's experience working with ALMA, 2020.
- Section contributions to the CASA User's Committee annual report, providing feedback and recommendations to the CASA developers to guide planning of future developments/work effort based on user feedback. Reports submitted to the National Radio Astronomy Organisation (NRAO, USA). 2018-2020.
- Image contributions to the textbook 'Introduction to Radio Astronomy: 4<sup>th</sup> Edition'. – Burke, Graham-Smith, Wilkinson, 2019.

### **Invited Talks:**

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|----------------|---|
| 19 Mar 2020    | Invited Seminar, Cardiff University, UK ( <i>postponed due to COVID-19 lockdown</i> ).        |
| 06 Dec 2017    | Invited Colloquium, University of Central Lancaster, UK.                                      |
| 16-18 Nov 2015 | Invited Tutor, International Young Astronomers School, Paris, France.<br><b>51 attendees.</b> |
| 02 Sep 2015    | Invited Colloquium, Australia Telescope National Facility, Sydney, Australia.                 |
| 20 Feb 2014    | Invited Colloquium, University of Bristol, UK.  |
| 18 Dec 2012    | Invited Colloquium, ESO Santiago, Chile.  |

### **Conference Contributions:**

*Summary:* 14 oral presentations, 4 poster presentations. In all cases, excluding EU ARC All-hands/retreats, presentations are awarded based on a submitted abstract to the conference organisers. For EU ARC All-hands/retreats presentations were requested by the conference organisers.

- *Your CASA User committee needs you!* Oral presentation, EU ARC All-hands, Czech Republic, October 2018
- *Tracing the evolution of high-mass protostars with ALMA: Fragmentation and clustering properties.* Oral presentation, Tracing the Flow Conference, Windermere, July 2018.
- *Uncovering the evolution of high-mass protostars with ALMA.* Oral presentation, European Week of Astronomy and Space Science, Liverpool, April 2018
- *The continuum (and chemical) properties of a luminosity limited ALMA sample of MYSOs: Steps toward tracing evolution,* Oral presentation, EU ARC All-hands, Netherlands, September 2017.
- *The continuum (and chemical) properties of a luminosity limited ALMA sample of MYSOs: Steps toward tracing evolution,* Oral presentation, Northern Star Formation Meeting, Liverpool John Moores University, September 2017.
- *Molecular outflows and other animals within the high mass star forming region SDC335,* Oral presentation, Northern Star Formation Meeting, University of Leeds, September 2016.
- *The ALM OST,* Oral presentation, EU ARC All-hands, Netherlands, October 2016.
- *The ALMA observation support tool: The first five years,* Poster presentation, Half a Decade of ALMA conference, Indian Wells, California, USA, September 2016.
- *Constraining the mass and evolution of massive protostars in SDC335,* Oral presentation, Soul of High-Mass Star Formation Meeting, Puerto Varas, Chile, March 2015.
- *Constraining the mass of massive protostars in SDC335,* Oral presentation, RAS National Astronomy Meeting, University of Portsmouth, June 2014.
- *Exploring the kinematics of methanol maser from the Methanol MultiBeam survey,* Poster presented at RAS National Astronomy Meeting, University of St. Andrews, July 2013.
- *The ALMA Observation Support Tool: Before Cycle 2* Oral presentation, EU ARC Retreat, Sabhal Mor Ostaig, Isle of Skye, June 2013.
- *Exploring the kinematics of methanol maser from the Methanol MultiBeam survey,* Poster presented at Modern Radio Universe, Bonn, Germany, April 2013.
- *The ALMA Observation Support Tool: An Early Science Review* Poster presented at First Science with ALMA Conference, Puerto Varas, Chile, Dec. 2012.
- *Simulations: New features in the OST,* Oral presentation, EU ARC Retreat, Desenzano, Italy, Feb. 2012.
- *The ALMA Observation Support Tool,* Oral presentation, Following the Photons conference, Royal Observatory Edinburgh, Oct. 2011
- *Compact HII regions toward Methanol Maser traced sources of Massive Star Formation,* Oral presentation, 41<sup>st</sup> Young European Radio Astronomers Conference, University of Manchester, July 2011
- *Probing Sites of Massive Star Formation: The Methanol MultiBeam Survey,* Oral presentation at RAS National Astronomy Meeting, University of Glasgow, April 2010.

### **Grants:**

- RadioNet (730562-WP3.1): Financial Support grant awarded from the RadioNet project for the training event "Interferometric Data Processing Workshop for eMERLIN & ALMA" 10-12 Sept 2018, Dublin, Ireland. Award value: €2400.00.



### **Supervision of research students:**

*Summary:* For Students registered at the University of Manchester I have provided mentorship (scientific/technical) to 3 University of Manchester PhD students (2 completed, 1 on-going), 1 MSc student. Additionally, I have supervised 4 MPhys Students and co-supervised a further 2.

Beyond the University of Manchester, I have had a direct impact on the post-graduate education of numerous PhD students from external institutes through workshops, tutorials and dedicated training visits as part of my User Support Role at the UK ARC Node. See e.g. *Conference and Workshop Organisation below for more details of these.*

### **Organisation, promotion and/or management of research:**

*Summary:* Through participation in several collaborations, I am responsible for organising and managing the research efforts of myself and others, for example leading 2 teams in a significant international collaboration and coordinating the data processing team in another collaboration.

### **Ongoing Collaborations:**

2020 – Present *Containerised Imaging (PERCIVAL)*. JBCA + Cambridge Collaboration of 10 members.

**Current Role:** I am leading the development of a web based interface to a suite of “containerised” radio interferometry data imaging processors to be hosted on high-specification Grid computing facilities.

**Outputs:** The project is in progress and the initial web interface is online for testing within the collaboration. Roll out of the facility is expected in early to mid-2020.

The “Containerised Imaging” project is a JBCA led project seeking to lowering the barriers for the UK ALMA and eMERLIN userbase in accessing and using high-end Grid computing resources to image the most extreme (in terms of computing requirement) radio interferometric data, such as large scale mosaics spectral line data.

2019 – Present *ALMAGAL*. **International collaboration of >70 astronomers.**

**Current Role:** *Lead of two projects* in the technical working group, managing 4-8 colleagues in the development and testing of data processing and imaging to create the projects final products.

**Outputs:** Code I developed is the basis for the image data processing, currently being deployed on supercomputers in Germany and Italy.

ALMAGAL an ALMA Large Program, observing over 1000 star forming regions in the Milky Way the data from which will have significant immediate and legacy scientific impact. ALMAGAL is one of only 14 Large Programs ever awarded time by ALMA.

2019 – Present *Star Formation in QUIescent and Luminous Objects (SQUALO)*. Anglo-Italian collaboration of > 10 members.

**Current Roles:** *Leading* the data reduction team and the molecular outflow search.

**Outputs:** Work in progress.

SQUALO is an ALMA survey of 13 infrared selected star forming regions, with the goal of assessing their protostellar properties such as molecular outflow characteristics and fragmentation properties.

2015 – Present *Tracing Evolution in Massive Protostellar Objects (TEMPO)*. European collaboration of > 20 members.

**Current Roles:** *Leading* work on dust continuum and cloud fragmentation properties and led the data calibration and imaging effort.

**Outputs:** 2 papers in prep, Avison, A et al. & Asabre Frimpong, N et al. Plus the PhD thesis work of Asabre Frimpong.

TEMPO is an ALMA survey of 37 star forming cores which span a range of evolutionary stages with the goal of uncovering the changing chemical and fragmentation properties over time, something only possible with the ALMA telescope.

2007 – Present *Methanol MultiBeam (MMB) Survey*. Anglo-Australian collaboration of 24 members.

**Current Roles:** *Leading the work on excited Hydroxyl maser as tracers of magnetic fields.*

**Outputs:** *To date **16 publications (989 total citations)**. I appear as first author of 1 and co-author on the remaining 15 papers.*

The MMB survey used the Parkes and ATCA telescopes to survey the whole Galactic Plane for methanol and excited hydroxyl (exOH) masers, the former a signpost of high-mass star formation, the latter a probe of local magnetic fields.

## Academic and Professional Standing

### **Impact in the last 5 years (2016-2020):**

- Invited appointments on two international advisory panels.
- Current Vice Chair and incoming Chair of one international advisory panel.
- Head of the Local Organising Committee of the international high-mass star formation conference “Tracing the Flow”, which attracted 120 international academics to the UK, including world leaders in the field. This event was University of Manchester ‘branded’ increasing the Universities reputation within this community.
- Invited appointment to Australia Telescope National Facility Time Allocation Committee Readership role.
- Contributed to the organisation and successful running of 12 conferences/workshops. As lead organiser of 5 and as a member of Local Organising Committee (LOC) for a further 7, with > 400 attendees.
- Competitive travel grant secured to provide funding for students to attend meeting in Dublin.

### **Professional Advisory:**

- **CASA Users Committee member, 2018-Present, 2020 Vice Chair, Incoming Chair 2021.**  
*Invited appointment to international advisory panel by European Southern Observatory.*

I was appointed to the Common Astronomy Software Applications (CASA) Users Committee by invitation of the European ALMA Regional Centre at ESO, as one of two EU representatives to this international committee, owing to my breadth of knowledge of the CASA software and large experience with users of the software and their requirements. ***In 2020, I was elected by committee members to the role of Vice-Chair and will assume the role of Chair of the committee in March 2021.***

**CASA has >4000 users world-wide** and is the primary software used to process and analyse data from the world's leading radio/sub-mm interferometric array telescopes (ALMA, JVLA, e-MERLIN and in the future potentially the SKA). The committee is charged with providing feedback from our colleagues in the research user community on the on capabilities, usability, reliability and performance of CASA, advising the CASA development team in the user perspective on these matters to inform development priorities.

- **ALMA End-to-end User Experience Working Group, 2019-2020.**

*Invited appointment to international advisory panel by working group chair.*

The ALMA E2E User experience working group is an international working group created at the request Integrated Science Operators Team of the ALMA telescope. The group was charged with reviewing the experience (from proposal preparation to data delivery) of the ALMA telescope userbase (numbering nearly 10,000 registered users) to identify any issues and suggest improvements when necessary.

I joined the WG at the request of the group's chair based upon my long experience in working as a support astronomer and contact scientist for ALMA telescope users.

- **SKA 'Our Galaxy' Working Group, 2015-Present**

*Member of SKA working group, advising the SKA telescope on requirements for Galactic astronomy.*

I am a member of the SKA 'Our Galaxy' working group, one for several working groups, which advise the SKA organisation on the requirements for given science cases on the design of the SKA. In my role in this working group, I have advised on the importance of the implementation of the higher frequency ranges considered by the SKA designer to Galactic star-formation community.

- **Australia Telescope National Facility (ATNF) Time Allocation Committee (TAC) Reader, (2020-2023)**

*Invited Appointment to the ATNF TAC Reader team by TAC Executive Officer.*

Recently appointed to the ATNF TAC Reader role owing to my scientific knowledge and experience with ATNF Telescope Facilities. **My role includes the scientific assessment and scoring of telescope observing proposals** submitted to the ATNF prior to the TAC meeting at which observing time is competitively awarded.

- **e-MERLIN Proposal Referee, (2012-2017,2019)**

*Acted as a referee for e-MERLIN telescope proposals during many recent proposal cycles, upon the request of the e-MERLIN Time Allocation Committee organisers.*

### **Conference and Workshop Organisation:**

*Summary:* I have contributed to the organisation and successful running of 21 conferences/workshops. As lead organiser of 5 and as a member of Local Organising Committee (LOC) for 9 and as a tutor or assistant in the remaining 7. These conferences and workshops have had over 750 total attendees since 2013.

9-13 Nov 2020      **ALMA 2020 Virtual Workshop for New Postgraduate Students**  
Co-organiser. 'Virtual'/ University of Manchester. – Session organisation and content creation and tutoring.

6 Nov 2020      **JBCA Symposium**

- LOC. *'Virtual'/University of Manchester*. – Session chair, logistics, booking, presentation organisation.
- 26 Mar 2019 **UK ALMA Community Day: Cycle 7 Preparation**  
**Lead Organiser.** *University of Manchester*. – Registration, bookings and logistics, social, event content.
- 10-12 Sept 2018 **Interferometric Data Processing Workshop for eMerlin & ALMA: Dublin**  
**Lead Organiser and lead of funding proposal.** *Dublin, Ireland*. -, creation of workshop content and curation, registration management, advertisement, financial support evaluation, scheduling and logistics.
- 2-6 July 2018 **Tracing the Flow: Galactic Environments and the Formation of Massive Stars**  
**Head of the Local Organising Committee (LOC).** *Windermere, UK*.  
- “Tracing the Flow” was an international astronomy conference focussed on the formation of massive stars. This was the 5<sup>th</sup> instalment in a widely regarded series of conferences on this topic. The **conference attracted 120 international academics including world leading experts** in this research area. **The conference was organised as a University of Manchester event, furthering the University’s standing in this research field.**  
URL: <http://almaost.jb.man.ac.uk/meetings/TtF/>
- As head of the LOC, my contributions to this conference were, liaison with the venue, creating and maintaining the conference website, management of the other LOC members, the primary contact point with all participants, organisation of the SOC meetings and implementation of their meeting outcomes.
- 3-6 Jul 2017 **National Astronomy Meeting Session: “Connecting Scales of Galactic Star Formation in Theory and Observation”**  
**Co-Lead Organiser.** *University of Hull*. Proposed session, session chair, abstract review and talk awarding.
- 21-25 Nov 2016 **ALMA "Bring Your Own Data" Workshop**  
**Lead Organiser.** *University of Manchester*. – Event lead, creation of workshop content, advertisement, registration, logistics and provisions.
- 23 Mar 2016 **ALMA cycle 4 Northern Star formation meeting**  
**Lead Organiser.** *University of Manchester*. – Event content, advertisement, registration.
- 03 Nov 2015 **JBCA Symposium**  
LOC. *University of Manchester*. – Session chair, logistics, booking, presentation organisation.
- 30-31 Mar 2015 **UK ALMA Science Meeting 2015**  
Organiser. *University of Manchester*. - Registration, logistics, general queries, presentation.
- 29 Oct 2014 **JBCA Symposium**  
LOC. *University of Manchester*. – Session chair, logistics, booking, presentation organisation.
- 13 Oct 2014 **ALMA Community Day: Cardiff.**  
Co-Organiser. *Cardiff University* – Event content, planning and general queries.
- 30 Oct 2013 **JBCA Symposium**  
LOC. *University of Manchester*. – Session chair, logistics, booking, presentation organisation.
- 26–30 Mar 2012 **UK-Germany National Astronomy Meetings Session: “Evolution with ALMA - first science results on the cool universe”**

**Co-Lead Organiser.** *University of Manchester.* Proposed session, session chair, abstract review and talk awarding

### **Contributions to workshops/tutorials**

01 Nov 2013	<b>London ALMA Community Days</b> <i>University College London, London</i> – Tutorial and software demonstration
02-03 Sep 2013	<b>Durham ALMA Community Days.</b> <i>University of Durham, Durham.</i> - Tutorial and software demonstration
27-28 May 2013	<b>Science with ALMA Band 2 Workshop.</b> <i>Bologna, Italy.</i> – General organisation assistance.
14-17 Jan 2013	<b>Solar ALMA Workshop.</b> <i>University of Glasgow, Glasgow</i> – Tutorial and software demonstration
19 Oct 2011	<b>UCL ALMA Workshop.</b> <i>University College London, London</i> – Tutorial and software demonstration
06-08 Jun 2011	<b>Preparing for ALMA Early Science.</b> <i>University of Manchester, Manchester</i> – Hands on assistance
14–16 Dec 2010	<b>UK ARC Community Days.</b> <i>University of Manchester, Manchester</i> – Hands on assistance

### **Leadership and Management roles**

*Note:* Below are listed my service and leadership roles within the JBCA and University of Manchester. I have external Leadership and Management Roles as the Vice Chair of the CASA UC (see Professional Advisory) and in international research collaborations (see ALMAGAL, SQUALO under On-going Collaborations).

#### **Service and Leadership the JBCA and the University of Manchester**

- **JBCA Star Formation Group Meeting Organiser, 2020-Present.**  
I am the chair and organiser of the weekly meeting of Galactic star formation researchers within the JBCA, scheduling the meetings and leading the discussion amongst the staff and students in the group.
- **Jodrell Bank Centre for Astrophysics Colloquium Organisation Committee, 2017-2019**  
As a member of the JBCA colloquium team (of 3-5 people) I was responsible for inviting, accommodating and engaging with invited speakers to the JBCA. The colloquium series invites national and international experts to share their research within the department at the weekly colloquium.
- **JBCA Symposium Organiser, 2013 – 2015, 2020.**  
The JBCA Symposium is an annual event which includes all members of the JBCA (>100 people) showcasing their current research. For these events I was one of a small group (3-5) of organisers responsible for managing, booking and hosting/chairing the event.
- **Postdoctoral representative to the JBCA Division, 2011-2014**
- **JBCA Internal Seminar Organiser, 2009-2010, Lead Organiser.**  
I was lead organiser of the department's internal seminar

### **Knowledge and Technology Transfer**

- Creation of the 'Pynterferometer' a Python based GUI used to demonstrate the fundamentals of radio interferometry at public outreach events and in postgraduate training schools. Notably the Pynterferometer has been used at the European Radio Interferometry

School (ERIS) and at Development in Africa with Radio Astronomy (DARA) training schools.  
[www.jb.man.ac.uk/pynterferometer](http://www.jb.man.ac.uk/pynterferometer)

## Outreach and Public Engagement

*Summary:* 5 invited outreach talks, organiser of 6 events including lead (Manchester) organiser of ALMA display at Royal Society Summer Science exhibition event with 11,000 attendees.

Demonstrator/explainer at 12 additional outreach events.

### Regular Outreach activities

- **The Jodcast:** I have acted as producer, editor and presenter for the “Jodcast”, a monthly Astronomy Podcasts produced by members of the Jodrell Bank Centre for Astrophysics. I have been involved with this podcast for the past 11 years. The Jodcast has a listenership of over 4000 people.
- **ALMA Outreach:** The UK ARC Node regularly undertakes public outreach events, of which I regularly participate and organise.
- **JBCA Outreach committee member.**

### Invited Outreach Talks

09 Nov 2017 *Lovell Lecture*, Jodrell Bank Discovery Centre. (>150 attendees).  
09 July 2017 *BlueDot festival*, Jodrell Bank. (>150 attendees).  
25 Mar 2016 *Panel Discussion*, Eastercon, Manchester. (>70 attendees).  
06 Feb 2014 *Huddersfield Women’s Institute*, Huddersfield. (Approx. 20 attendees).  
03 Jan 2014 *Huddersfield Astronomical Society*, Huddersfield. (Approx. 20 attendees).

### Organisation of Outreach Events

14-15 Apr 2018 *Science X*, Trafford Centre, Manchester. Organiser of ALMA content at JBCA stand.  
22-23 Apr 2017 *Science X*, Trafford Centre, Manchester. Organiser of ALMA content at JBCA stand.  
14 Mar 2017 *Eureka!*, Halifax. **Lead organiser** of outreach event at children’s museum for British Science Week.  
23-24 Apr 2016 *Science Extravaganza*, Trafford Centre, Manchester. Organiser of ALMA content at JBCA stand.  
14-16 Aug 2014 *Worldcon*, London. Co-organiser and participation in ALMA stand at Sci-fi convention.  
2-6 Jul 2012 *Royal Society Summer Science Exhibition*. Royal Society, London. **Manchester Lead organiser** (co-lead with Cambridge). Event attracted **over 11,000 visitors**.

### Other Outreach Events Attended

21 May 2019 *Pint of Science*, Beer Nouveau, Manchester. Hands-on demonstrator at ALMA display.  
20 Oct 2018 *Manchester Science Spectacular*, University of Manchester, Manchester. Hands-on demonstrator at ALMA display.  
29 Oct 2016 *Manchester Science Spectacular*, University of Manchester, Manchester. Hands-on demonstrator at ALMA display.  
24 Jul 2016 *BlueDot Festival*, Jodrell Bank Observatory, Cheshire. Demonstrator at JBCA display.  
25-28 Mar 2016 *Eastercon 2016*, Manchester Central, Manchester, UK. Demonstrator at Radio Astronomy stand at Sci-fi convention.

25 Oct 2015 *Manchester Science Spectacular*, University of Manchester, Manchester. Hands-on demonstrator at ALMA display.

30 Aug 2013 *Jodrell Bank Live*, Jodrell Bank Observatory, Cheshire. Demonstrator at JBCA display.

23 Feb 2013 Saturday Science, Museum of Science and Industry, Manchester. Hand-on ALMA demonstration.

27 Oct 2012 *Manchester Science Spectacular*, University of Manchester, Manchester. Hands-on demonstrator at ALMA display.

27 Jan 2012 *Museum of Science and Industry / Stargazing Live event*. Museum of Science and Industry, Manchester. JBCA display demonstrator.

2 Jul 2011 *Jodrell Bank Live*, Jodrell Bank Observatory, Cheshire. Demonstrator at JBCA display.

15 Jun 2011 *Lunar Eclipse event*, Museum of Science and Industry, Manchester. Demonstrator at JBCA display.