

# WP3.1 Training - Astronomical / Engineering Schools

This activity will foster the skills needed for exploitation of European radio astronomy facilities by researchers worldwide. It will enable radio astronomers to take advantage of global best practices and research opportunities and help newcomers to radio astronomy to learn current state-of-the-art techniques, and encourage them to stay in the field. The events are aimed at astronomers and engineers in order to communicate, and indeed develop techniques needed to plan observations, reduce and interpret data from present and next-generation facilities. This ensures that there will be sufficient experts in the market to support their communities in making use of new opportunities (ALMA, EHT and SKA, and the other rapidly-evolving RadioNet facilities).

## Guidelines on the level of support

The Support Requests, circulated every 6 months, and the forms sent to successful applicants, contain full details of the funding conditions, including a report template. The total budget for this workpackage is 150k Euro over 4 years, and in order to ensure a fair distribution we adopt the following guidelines (although any requests will be considered within the rules of allowable expenditure):

- About half or less of the total cost of an event will be supported, and the level of support will not exceed the equivalent of 30 Euro per attendee per day (not necessarily spent individually).
- Specific amounts are earmarked for named deliverable events such as the European Radio Interferometry Schools, Radio-focussed Solar events and hands-on Single dish Schools, see the [workpackage description](#).
- In other cases the amount allocated will not normally exceed a few K Euro.
- In most cases, the larger part of support allocated is used to enable the attendance of participants, but it can also be used, for example, to invite radio-specialist tutors to a general school.
- Events must be openly advertised and accessible to the entire community, although the imposition of transparent selection criteria is acceptable.

We welcome informal inquiries; please contact the workpage leader [a.m.s.richards@manchester.ac.uk](mailto:a.m.s.richards@manchester.ac.uk) or the RadioNet office.

## Teaching Material

The teaching materials, including the lecture notes, tutorial guides and datasets used for the school are archived on the school website, which provides an additional route for the transfer of knowledge to students that were unable to attend the school and will form the basis for the material used at future events. Web resources are also listed below:

1. **ALMA community days and workshops** - these are partly based on tools, data and material

available via the ALMA science portal and CASA guides, additional material at [Community Days 2017](#) and [ALMA conference](#)

2. **VLBI tools in CASA** - these have now been released in [CASA 5.3](#)
3. **ASTA** - advanced software tools are curated by individual ARC nodes (see [listing of tools](#) and [links to ARCNodes](#). Presentations are [here](#)
4. **Self-calibration and advanced imaging** talks and tutorial materials are [here](#)
5. **ERIS** talks and tutorials [ERIS 2017](#), [ERIS 2019](#) which form an introductory radio interferometry course. [ERIS manual for organizers](#)
6. **Submillimetre Single-dish Data Reduction and Array Combination Techniques** materials have been published via Zenodo and are available under [link](#)
7. **LOFAR** materials are at [5th LOFAR Data Processing School](#) and [High resolution Surveying with International LOFAR](#)
8. **IRAM**-led schools provide mm-wave [interferometry](#) and [single dish](#) teaching materials.
9. The **Dublin interferometry data processing school** [scripts and data](#) are especially relevant for e-MERLIN and ALMA.
10. The **CESRA** materials are at [2018 school](#)

## Supported training events

| Event |                                     |               |                                                                       | Organiser                 |                    | EVENT                  |
|-------|-------------------------------------|---------------|-----------------------------------------------------------------------|---------------------------|--------------------|------------------------|
| No    | Date                                | Place/Country | Event Title                                                           | Organiser                 | Place/Country      | Report                 |
| 25    | 2-6.11.2020<br>Virtual              | Dwingeloo/NL  | Interactive CASA VLBI workshop                                        | JIV-ERIC                  | Dwingeloo/NL       |                        |
| 24    | September 2020 -<br>CANCELLED       | Dwingeloo/NL  | 6th LOFAR data processing school                                      | ASTRON                    | Dwingeloo/NL       | CANCELLED              |
| 23    | 24-28.8.2020<br>CANCELLED           | Prague/CZ     | CESRA Summer School                                                   | Czech Academy of Sciences | Prague/CZ          | CANCELLED              |
| 22    | 24-26.6.2020 -<br>virtual           | Dwingeloo/NL  | <a href="#">LOFAR Polarization Busy Days</a>                          | Dwingeloo/NL              | virtual meeting    |                        |
| 21    | 22-26.6.2020<br>CANCELLED           | Rome/IT       | Introduction to RA                                                    | INAF                      | Rome/IT            | CANCELLED              |
| 20    | 24-29 May 2020<br>POSTPONED to 2021 | Turku/FI      | North-European Radio Astronomy School                                 | UTU                       | Solvalla, Espoo/FI | CANCELLED              |
| 19    | 8-9.4.2020<br>POSTPONED             | Glasgow/UK    | Sub-Second structures in low frequency solar radio observation        | UNIGLAS                   | Glasgow/UK         | POSTPONED              |
| 18    | 2020 Virtual November               | Lisbon/PT     | Exploiting Archives for RA in SKA ERA                                 | PACE                      | PT                 |                        |
| 17    | 2-6 March 2020                      | OBSPARIS/FR   | <a href="#">Summer School Spectrum Management for Radio Astronomy</a> | STIAS                     | Stellenbosch/SA    | <a href="#">Report</a> |

| Event |                     |                       |                                                                   | Organiser                            |                      | EVENT                  |
|-------|---------------------|-----------------------|-------------------------------------------------------------------|--------------------------------------|----------------------|------------------------|
| No    | Date                | Place/Country         | Event Title                                                       | Organiser                            | Place/Country        | Report                 |
| 16    | 21-25.10.2019       | Dwingeloo/NL          | LOFAR solar and space weather KSP busy week, Solar KSP home pages | ASTRON                               | Dwingeloo/NL         | <a href="#">Report</a> |
| 15    | 7-11.10.2019        | Gothenburg/SE         | ERIS                                                              | CHALMERS                             | Gothenburg/SE        | <a href="#">Report</a> |
| 14    | 6-13.9.2019         | Granada/ES            | 9. IRAM 30m Summer School and lectures                            | IRAM                                 | Granada/ES           | <a href="#">Report</a> |
| 13    | 1-5.10.2018         | IRAM/FR               | 10th Millimetre Interferometry School                             | IRAM Grenoble                        | FR                   | <a href="#">Report</a> |
| 12    | 10-12.09.2018       | Dublin/IR             | Interferometric Data Processing Workshop for eMERLIN & ALMA       | UMAN                                 | UK                   | <a href="#">Report</a> |
| 11    | 10-14.09.2018       | Royal Obs./BE         | CESRA Summer School                                               | Royal Obs. Belgium                   | Brussels             | <a href="#">Report</a> |
| 10    | 17-21.09.2018       | ASTRON/NL             | LOFAR data processing school                                      | ASTRON                               | Dwingeloo/NL         | <a href="#">Report</a> |
| 9     | 19-23.03.2018       | Lotenz Centre, Leiden | High-resolution surveying with international LOFAR                | UOXF                                 | Leiden/NL            | <a href="#">Report</a> |
| 8     | 15.-16.03.2018      | Garching/DE           | APEX & ALMA Single-dish training workshop                         | ESO                                  | Garching/DE          | <a href="#">Report</a> |
| 7     | 16-21.10.2017       | ASTRON/JIVE/NL        | ERIS2017                                                          | ASTRON                               | Dwingeloo/NL         | <a href="#">Report</a> |
| 6     | 11-13.12.2017       | Bologna/IT            | Self-calibration and advances imaging workshop-Ed Fomalont        | INAF                                 | Bologna/IT           | <a href="#">Report</a> |
| 5     | 5-7.12.2017         | Lisbon/PT             | ALMA Data Processing Workshop                                     | Portuguese ALMA Centre for Expertise | Lisabon              | <a href="#">Report</a> |
| 4     | 28-30.11.2017       | Gothenburg/SE         | ASTA-Advanced Software Tools for ALMA                             | OSO                                  | Onsala/SE            | <a href="#">Report</a> |
| 3     | 2.-6.10.2017        | Dwingeloo/NL          | Introducing VLBI tools in CASA                                    | JIV-ERIC                             | Dwingeloo/NL         | <a href="#">Report</a> |
| 2     | 3-4.4 & 7.4.2017    | Torun/PL & Prague/CZ  | Joint preCycle 5 ALMA workshop                                    | Czech Academy of Science & UMK       | Prague/CZ & Torun/PL | <a href="#">Report</a> |
| 1     | 27-28.3 & 03.4.2017 | Bonn/DE & Bern/CH     | ALMA Community Days 2017                                          | Uni Bonn                             | Bonn/DE              | <a href="#">Report</a> |

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