#### DARA Unit 4 - Online Training 2021

# L1 - Introduction & course overview

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# WITH RADIO ASTRONOMY

















### **Before we start - the code of conduct**

- providing an environment where all are treated with respect and dignity, free from discrimination, bullying, harassment or victimisation
- applies to all.
- possible.

• This course will promote an **inclusive and non-discriminatory** nature. We are dedicated to

• Harassment of any group or individual with regards to age, disability, ethnicity, gender, religion, sexual orientation, physical appearance or political opinion will not be tolerated. This code

• If you experience any breach of these rules please let the tutors (remote or local), as soon as



#### Overview

- 1. Aims of this unit
- 2. Schedule
- 3. Support
- 4. Thank you!



#### Aims of this unit

#### In the simplest terms, this unit will help you go from **interferometer** to...





### Aims of this unit



#### ... to science-ready images like this!



#### In more complex terms...

This course will cover the basics of radio interferometry and data reduction through lectures and workshops. These will cover the following topics,

- Introduction / refresh of UNIX and Python / CASA
- Fundamentals of radio interferometry
- Continuum data calibration & imaging
- Self calibration
- Spectral lines data
- Error recognition
- Image analysis
- Writing your own telescope proposals





### By the end of this unit

- - Flagging
  - Calibration +
  - + Imaging
- Appreciate the applications of interferometry to astronomy research
- Have a knowledge of the tools used to reduce and analyse radio interferometry data
- Understand the telescope proposal, observing and data reduction process.

• (Begin to) Understand the basic principles of radio interferometry data reduction including



#### **Benefits of this unit to you**

- Hands on experience with radio data which will be similar to the data received with the African VLBI Network.
- Prime experience to get involved with SKA (VLBI astronomers will be vital to SKA phase 2
- Programming experience is invaluable in many job areas e.g. finance, software development etc etc.
- Signals processing can be applied to electronic engineering and hardware development.
- Finally, there are lots of SKAO jobs/career opportunities.

- SKA outstations HartRAO Large Satellite Antennas
- Possible newbuilds





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#### Lecture 1 - Introduction & course overview



#### Possible newbuilds



#### Schedule

- The schedule is flexible and may be adjusted by your local tutors. In short, you will cover the following,
- A two week (10 days) course comprising of multiple different components mainly,
  - 18 pre-recorded lectures by experts across the world
  - 5 workshops giving you hands-on experience in data-reduction and telescope proposal writing +
  - Multiple science talks by world-leading researchers on current advances in astronomy.





### Your support network

- With the current COVID-19 situation, we have expanded the DARA support network which you can use to answer any queries you may have. These include,
  - Your local tutors (either in-person or virtually). 1.
  - 2. The live Q&A sessions (at 13:30 UTC daily) with remote tutors and other countries.
  - 3. Slack app instant messaging through slack which is attended by both local and remote tutors.



#### 3. Support

### Lines of communication

If you have a question, we advise you to follow these lines of communication.

**Check the slack** Your question may have been answered already!

Local tutors. Your tutors are experienced and in many cases they will be able to help

**Fellow students** You are working on the same tutorials, ask questions and post solutions to each other

- Whenever you have a question, it'd be really appreciated if you could provide as much you may have inputted.
- We will talk a little more about these steps in the following slides.

Live Q&A If it cannot be answered, save it for the live Q&A with the remote tutors

**Contact remote tutors** If it cannot be answered, or we run out of time on the Q&A, post it to the Slack and a remote tutor will respond

information as possible e.g. the error message, step within the tutorial and any modifications





### **Slack channe**

- This can be used for multiple purposes:
  - We'll post notices and information via #dara-u4-training channel
  - You should use for communications between yourselves including countries to ask questions or post solutions (e.g via #tutors-and-students channel)
  - Questions that can't be answered within your cohort or by other cohorts can be relayed to remote tutors and lecturers at anytime via your local tutors (using #local-and-virtual channel). These will be answered when remote tutors are available.
  - Questions or discussion topics for Live 'zoom' Q&A session (daily at 1330UTC) should be posted in advance to the #live-questions-and-answers channel.
  - One of the first actions today is for all students to install and join the slack group (https:// join.slack.com/t/dara-u4/shared\_invite/zt-prfifrlc-~HZB2ikVJw9sKJUSAKMIIA - see also information pack via local tutors.





## Live daily Q&A session

#### • These are **each day at 13:30-14:00 UTC.**

- These will happen daily, and are the ideal opportunity for you to ask questions of the lecturers and panels of remote experts.
- Typically each day 3-4 experts will be online via zoom for a joint video call with you all
- All countries are invited to join
- Questions or topics can either be pre-posted to the slack channel (#live-questions-and-answers), or asked by using the chat function in zoom, or via 'raise-hand' in zoom.
- A schedule of which experts will be available in which session will be posted via the slack channel.
- Please follow good Zoom behaviour be muted when not speaking and so forth.



### Thank you!!

In no particular order these include: James Chibueze, Leah Morabito, Joe Callingham, Sonia Anton, Imogen Whittam, James Allison, Katie Hesterley, Olga Bayandina, Zsolt Paragi, Miora Andriantsaralaza, Willice Obonyo, Naomi Asbre Frimpong, Anita Richards, Robert Laing, Adam Avison, Ann Njeri, Tom Muxlow, Catherine Walsh, Dhanya Nair, Katharine Johnston, Emmanuel Proven-Adzri, Benedicta Woode, Alex Akoto-Danso, Naftalik Kimani, Isaac Mutie, Gift Sichone, Saul Phiri, Miriam Nyamai, Claudio Paulo, Mziynda Mnqibisa, David Williams, Alasdair Thomson, Emmaniel Bempon-Manful, Johannes Allotey, Autumn Sykes, Melvin Hoare, Rob Beswick, Jack Radcliffe and many more....

Lastly and most importantly ... thank you all for your participation and enthusiasm...

 Many people have contributed to this creation and the running of this course, including the lecturers, local and remote tutors. Plus numerous institutes that have supported their time.

Over 40 individuals from >20 institutes and 13 countries have contributed in different ways.

