Announcement: The SARAO / Breakthrough Listen MeerKAT Grand Tour data science workshop [January 15 to 21 2023, Rhodes University - in person]

The South African Radio Astronomy Observatory (SARAO), in collaboration with the Centre for Radio Astronomy Techniques and Technologies (RATT), the Breakthrough Listen initiative, the MeerTime collaboration and the Transient Array Radio Telescope consortium are pleased to announce the MeerKAT Grand Tour data science workshop to be held at Rhodes University (in-person) the week of 15 to 21 January 2023.

The MeerKAT Grand Tour student workshop aims to give prospective and current MSc students an overview of MeerKAT data reduction in a series of hands-on practicals to be hosted at Rhodes University. We aim to give new students exposure to a wide range of topics, including:

- Electronics and receivers using the L-band Transient Array Radio Telescope (TART) stationed at Rhodes University. Students will get to visit the instrument and discuss the workings of the front-end electronics and calibration that is directly applicable to understanding the core concepts in the design of the MeerKAT receiver, digitization and correlation chain. The TART sessions will include a hands-on session with TART visibility data to be viewed and snapshot-imaged to monitor transitory Global Navigation Satellite constellations.
- Continuum imaging. The workshop will discuss a range of continuum science topics for MeerKAT and teach prospective students the basics of interferometric calibration and imaging. This will expand upon the TART data session with subsets of MeerKAT visibility data. Students will be exposed to direction independent and dependent toolsets that are generally needed to produce science-analysis-ready MeerKAT images.
- Pulsar timing with MeerTime. We will discuss the exciting field of pulsar astronomy and provide students the opportunity to analyse filterbank data captured with the Pulsar Timing User Supplied Equipment (PTUSE) backend used for high precision timing by the MeerTime project. Students will be using the commonly-used software stacks to analyse pulsar data, including Psrchive, and conduct pulsar timing using Tempo2 and Temponest.
- The Breakthrough Listen project and MeerKAT's Search for Extraterrestrial Intelligence. In recent years MeerKAT has joined the world-wide network of instruments searching the skies for signs that we are not alone. We will dive into the scientific reasoning behind the SETI programme and the digital signals processing techniques being employed to analyse filterbank data taken with the Breakthrough Listen User Supplied Equipment (BLUSE) backend of the MeerKAT telescope.

Note: in this workshop we will not spend substantial time reintroducing the theory concepts introduced in the online 2021 African Radio Interferometry Winter School (ARIWS - see our e-learning portal for video and practical material to be viewed prior to the workshop). Instead, these sessions will be largely Q&A sessions and practical hands-on sessions focused on MSc students starting in 2023, as well as supporting MSc students in their final year who may wish to pursue further studies. Applications received from existing PhD students will be considered on a case-by-case basis. Our hope is that students will also use the opportunity to network with their peers and build long-lasting research relationships.

Requirements to apply:

- Intention to pursue MSc studies in 2023 at, and existing MSc students registered at, South African tertiary institutions with connections to supporting astronomy (through e.g. science, engineering, signal processing techniques or High Performance Computing engagement). Applications from PhD students may be

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considered on a case-by-case basis if well-motivated. We welcome cross-disciplinary applications - this includes, but is not limited to, Astronomy/Astrophysics/Physics programmes, Engineering programmes, Computer Science and Mathematics and Applied Mathematics.

- A short motivation letter (max 1 page) from your supervisor / prospective supervisor stating your intended field of research
- A short letter detailing your current work (max 1.5 pages). You do not need to include results of ongoing work
- A short CV (max 1 page) with relevant skills and experience
- Review, prior to the workshop, of relevant material on the SARAO e-learning portal (and/or equivalent material from sister institutions).
- Please have an electronic copy of your passport or SA ID ready for travel purposes

Rhodes University will provide prepaid student lodging and catering. Domestic flights and ground transport between Makhanda / Grahamstown and Gqeberha / Port Elizabeth will be provided by SARAO. Workshop to be held at Rhodes University Centre for Continued Education from January 15 to 21, 2023. Spaces are limited - we look forward to hearing from you soon!

Closing date: 13 November 2022 23:59 SAST.

Apply here (you will be redirected to a Google form)

For more information contact
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Partner institutions / collaborations

NRF National Research Foundation | SARAO South African Radio Astronomy Observatory

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