

Welcome to the latest issue of the **NASSP** newsletter. The aim of this publication is to keep all our colleagues and collaborators abreast of NASSP developments as well as creating a forum for commentary and discussion from individual nodes. Contributions, news and suggestions are most welcome, please forward these to NASSP-UKZN. **This newsletter is prepared by NASSP-UKZN.**

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NASSP Mission and Vision

To empower South African and foreign African students **to embark upon PhD studies in astrophysics and space science** by providing them with the necessary skills, knowledge and inspiration. By harnessing national expertise and resources and taking advantage of global network, **NASSP is committed to produce graduates whose qualifications are**

internationally competitive and locally applicable. The programme will promote diversity and transformation while growing the next generation of graduate astronomers and space scientists who can enter and contribute to the South African work force, where mathematical skills and a command of research methods will be advantageous.

To create human capacity in astronomy and space science, particularly in under-represented communities, and to build a cohort of scientists at the core of an international network of African astronomers, space scientists and citizens, who are bonded by the common experience of schooling, interlinked both professionally and personally and able to make a major contribution to the transformation of society.

News from NASSP nodes

High Energy Stereoscopic System (H.E.S.S.) Shifts

I (*Marcel van der Westhuizen*) did a shift at the High Energy Stereoscopic System (H.E.S.S. Telescope) located in the Khomas region of Namibia from 19 June to the 1st of July as part of the DWF (Deeper Wider Faster) 2019 campaign.



H.E.S.S. is a system of imaging atmospheric Cherenkov telescopes dedicated to observing the most violent and extreme phenomena of the universe in very high energy gamma-rays (in the

photon energy range of 0.03 to 100 TeV). H.E.S.S. consists of four 12 meter mirror telescopes as well as the H.E.S.S. II 28 meter mirror telescope which is currently the largest Cherenkov telescope ever built. My role as a shifter at the site was to help with the newly initiated moonlight observations which have been introduced to increase the observation window of the telescopes. Several observational runs during moonlight conditions were done to test how the telescopes react to various moonlight conditions. The results from these tests will be used to optimize the telescopes for future moonlight observations and therefore maximize the observation window.

National/international school

Fermi Summer School

Lenté Dreyer from the NWU node in Potchefstroom participated in the ninth annual series of the Fermi Summer School, held at the University of Delaware in the United States of America.



Picture: Group photo of the Fermi Summer School 2019 participants in Delaware, USA.

The Fermi Gamma-ray Space Telescope has initiated an era of very broad energy coverage in the gamma-ray band. The combination of the Fermi Gamma-ray Burst Monitor (GBM) and Large Area Telescope (LAT) provide observations of gamma-ray bursts and transients

in the energy range from 8 keV to larger than 300 GeV. The combination of Fermi-LAT and ground-based gamma-ray observatories currently allows us to probe the high-energy emission from astrophysical sources over at least five orders of magnitude, including the previously unexplored territory energy ranges from 10 GeV to 100 GeV.

The Fermi Summer School emphasizes the analysis of data from Fermi through lectures and hands-on workshops. Students spend time working directly with experts in instrumentation, analysis, theory and modelling to develop and extend their own research projects. Topics range across the gamma-ray band from Fermi's GBM up to the highest energies observed by the LAT and beyond to very high energies observed by ground-based gamma-ray telescopes.

SANSA Space Weather Camp

(Atlegang Molokwane)

Applying for the SANSA Space Weather camp was one of the best decisions I have made in my life. Not only did it give me the opportunity to go abroad, it also exposed me to people of different cultures and helped me to deepen my knowledge about space science.



We had to spend two weeks in Germany and the other two weeks in South Africa at SANSA Space Science in Hermanus. All four weeks of the camp were amazing, it had a lot of lectures which were expected and a lot of fun activities, which was not expected but I'm grateful they were there. Half of the projects were experimental and the other half was theoretical, luckily one of the projects I got were experimental and also fun to do.

Alumni**Reikantseone Diretse (NASSP-UCT Honours 2018)**

Photo: Reikantseone Diretse in front of the MeerKAT observation of GRB190114C (encircled) in the IDIA Visualisation Lab.

Reikantseone Diretse, a NASSP-UCT Honours 2018 alumni participated in the study detailing the first ever detection of highest energy photons from a long gamma ray burst. Study published on 21 November 2019 in the most prestigious science journal **Nature**. (<https://www.nature.com/articles/s41586-019-1754-6>).

Gamma ray bursts are the most energetic explosions in the Universe. They are very transient, lasting only several seconds during which they emit very high energy photons, i.e gamma rays. The energy released in these events can only be accounted for by the cataclysmic death of a massive star, or a merger of two compact objects, e.g. two neutron stars. The explosive and short lived event is followed by a long lasting afterglow, especially at radio wavelengths.

Reikantseone Diretse, together with Prof Patrick Woudt, were part of the MeerKAT team that contributed to the multi-wavelength study of a recently discovered gamma ray burst, GRB190114C. The gamma ray burst was detected at teraelectronvolt energies by the Major Atmospheric Gamma Imaging Cherenkov (MAGIC) telescope in the Canary Islands on 14 January 2019, after which a global collaboration on the study of this enigmatic source was officiated. This was the most powerful explosion

in that the energies recorded were a trillion times more energetic than visible light, and 100 times more intense than the brightest known source of TeV energies, the Crab Nebula.

“The recording of TeV energies for GRB190114C and its continued monitoring with radio telescopes such as MeerKAT helps us to untangle the high energy astrophysics of these exciting transient events. Being part of such a discovery was ecstatic and highly motivating,” Diretse commented.

Reikantseone is a first year Master of Science in Astronomy student at UCT. His study is supported by a postgraduate scholarship from the Inter-University Institute for Data Intensive Astronomy (IDIA), a partnership between UCT, the University of the Western Cape and the University of Pretoria. The research cloud computing infrastructure of IDIA has contributed towards the fast analysis of the MeerKAT observations of GRB190114C. For his masters research, Reikantseone continues to monitor the radio afterglow of the GRB190114c event using MeerKAT in the Karoo.

Exploring the physics of planetary Environment.

Adila Wamisho Tire (Former NASSP Master Degree student and current Ph.D degree) and Prof. Sivakumar Venkataraman has attended the summer school on Exploring the physics of planetary Environment, held at KTH Royal Institute of Technology, Stockholm from 13 to 22 August 2019. Adila is registered for his Ph.D under his supervision and jointly with Dr. Roelf Botha from HARTRAO.

General news

Astro Lab Training workshop



Astro Lab Training workshop was held at University of Venda from 18-22 Nov 2019. It is jointly facilitated with NASSP. There were about 50 delegates presented and aim is to train the young graduates and staff on Astronomy using virtual laboratory environment

UKZN Atmospheric research group



UKZN Atmospheric research group has recently installed a Astronomical telescope and planned to make a simultaneous observation together with Portable LiDAR. The aim is to rectify the atmosphere/astronomical effects in both the field of science.

Atmospheric dynamics and Space-atmosphere interaction



Atmospheric Remote sensing education and training (ATM-RESET) - UKZN has organized a training workshop entitled “Atmospheric dynamics and Space-atmosphere interaction” and held between 17-19 September 2019

NASSP Honours and Masters Projects 2020

Information for potential project supervisors

Projects must be submitted in PDF format via the automated web portal, which <https://www.star.ac.za/available-projects>

On the front page of the project submission please provide the details outlined below on any projects that you wish to be considered by the students.

Note : All these project submission is for NASSP consideration and does not constitute for the specific node or university requirements.

Note: Projects with insufficient description might not be published on the website.

1. Level of the projects, i.e. Honours or Masters
2. Name of primary supervisor
3. Institution of supervisor
4. Name of co-supervisor (if appropriate)
5. Institute of co-supervisor (if appropriate)
6. Project title
7. Description of project, including what will be expected of the student, the anticipated outcomes, and any special qualifications required (maximum 500 words). Please also

stipulate if any specific skills are required (eg, computational skills).

8. Contact details of supervisor and co-supervisor

9. Master degree detailed project may be preferably provided in the attachment.

Note: Supervisors for MSc projects who are not directly associated with a NASSP partner university, e.g. those at SANSA, SAAO, or SARAO, will require a co-supervisor (or “formal” supervisor) to deal with the university formalities. If you have a university collaborator who can actively assist with the scientific supervision of the student that would be ideal. Please note that, depending on an individual university’s policy, it might not be possible for non-university staff to formally act as the main-supervisor. In these cases, however, individuals are still regarded by NASSP as being the main supervisor.

You do not need a co-supervisor for an honours project, provided you have an appointment at a NASSP partner university or national facility or at SANSA, SAAO or SARAO. Depending upon the geographic location of the student, it may however be advisable to appoint one at the student’s university.

You may submit up to 3 different projects at Honours and up to 3 Masters projects. Honours and Masters projects must be submitted separately depends upon the node specific. It is noted here that UKZN does not have Master degree course work, thus it is required that degree completion based only on their research work.

Proposal has to be provided in detail. We appreciate that the supervisor guides the student to prepare the proposal in detail about 6-10 pages. If you have already informed the students the project details (specifically for UKZN where the Master degree students need to register from the beginning of the year), you may complete the details in NASSP website for our record. You are required to provide MSc projects that have the potential to be converted into PhD projects. The same may apply for Honour’s degree student project, as the topic may further expected

to attract them for master degree level in the following year.

This information will be provided by the deadline to the students who will be asked to notify the NASSP administrator by email, by the date specified, with their choice of three projects (from different supervisors) that they would like to do together with their order of preference, if any.

Contact us!!!

We look forward to receiving contributions and feedback from nodes and partners for our next newsletter.

Please email: nassp@ukzn.ac.za or nassp.ukzn@gmail.com

Tentative date for next newsletter to be released by April 2020.