

Sriram Sankar

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INTERESTS

Extragalactic astrophysics, baryon cycle, gas kinematics, galaxy environments, galaxy evolution & dynamics

FORMAL EDUCATION

UNIVERSITY OF CAPE TOWN

MSc. Astronomy | 2021-23
Cape Town, South Africa

MAHATMA GANDHI UNIVERSITY

B.Tech Mechanical Engr. | 2014-18
Kottayam, Kerala, India

TECHNICAL SKILLS

Programming:

Python • IDL/GDL • C/C++ • Bash • SQL

Workflow:

slurm • Docker/Singularity • git • VSC
AWS • Zotero

Selected Astronomy tools:

CASA • Caracal • SoFiA2 • SlicerAstro
CARTA • 3DBarolo • Cloudy • Gizmo
yt • Astropy • spectral-cube • GaussPy+

Web technologies:

HTML5/CSS3 • JAMSTACK • WordPress

Open Source Contributions:

baygaud-PI, yt_astro_analysis

OBSERVING TRAINING

SALT Shadow Program:

Shadowed a SALT Astronomer for a week.

SAAO 1.9m Training:

Underwent training to observe with the SpUpNIC spectrograph.

TUTORING

AST3003S: Galactic and Extragalactic Astrophysics; third year course taught by Prof. Patrick Woudt

OUTREACH

Outreach Volunteers Club:

Started a club at SAAO for staff and students interested in outreach activities.

RESEARCH EXPERIENCE

TEL AVIV UNIVERSITY (TAU)

Visiting Research Student | Aug - Sep 2023 | Tel Aviv, Israel

Supervisor: [Dr. Jonathan Stern](#)

- Exploring the formation of warps and anomalous gas due to misaligned accretion resulting from cooling flows in the Circumgalactic Medium.
- The methods include analytical calculations, idealized hydrodynamic simulations, and comparison with observations.

SOUTH AFRICAN ASTRONOMICAL OBSERVATORY (SAAO)

MSc. Student | Feb 2021 – July 2023 | Cape Town, South Africa

Supervisors: [Dr. Moses Mogotsi](#) & [Prof. Matthew A. Bershad](#)

- Funded by [SALT-SAAO Prize MSc Scholarship 2021](#)
- **Thesis:** [Kinematics of neutral hydrogen in interacting galaxies in two groups from the MeerChairs survey](#). I characterized the kinematics of tidal tails & bridges, warped discs, and anomalous gas in interacting galaxies.
- Proposal writing, interferometric data reduction, kinematic modelling, Gaussian decomposition of emission lines, multi-dimensional data analysis and visualisation, etc.

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY (IIST)

Project Student | Jan 2019 – Jan 2021 | Trivandrum, Kerala

Supervisor: [Prof. Anand Narayanan](#)

- Analyzed five oxygen-rich systems at $1.3 > z > 0.6$ along a single sightline using archival HST (COS, STIS, FOS) and Keck/HIRES data. The objective was to study multi-phase gas expected to inhabit the Circumgalactic Medium.
- Reported a multi-phase weak-Mg II analogue absorber, likely tracing an overdense region.
- UV/optical spectral data reduction and analysis, ionization modelling, database mining etc.

REFEREED PUBLICATIONS

- Sameer, J.C. Charlton, G.G. Kacprzak, A. Narayanan, **S. Sankar**, P. Richter, B.P. Wakker, N.M. Nielson, C.W. Churchill. [“Probing the physicochemical properties of the Leo Ring and the Leo I group”](#) MNRAS 510 (Mar 1, 2022): 5796-5820.
- **S. Sankar**, A. Narayanan, B.D. Savage, V. Khaire, B.E. Rosenwasser, J.C. Charlton, and B.P. Wakker. [“Physical conditions of five O VI absorption systems towards PG 1522 + 101”](#) MNRAS 498 (Sep 1, 2020): 4864-86.
- J. Pradeep, **S. Sankar**, T.M. Umasree, A. Narayanan, V. Khaire, M. Gebhardt, Sameer, and J.C. Charlton. [“Solar-metallicity gas in the extended halo of a galaxy at \$z \sim 0.12\$ ”](#) MNRAS 493, no. 1 (Mar 21, 2020): 250-66.

TELESCOPE TIME

- **MeerRings:** 2023 open time **MeerKAT program** to study Collisional Ring Galaxies (CRGs). **PI & Technical Lead** - Number of targets: **7 CRGs**. Total time awarded: **50 hours**
- **MeerChairs:** 2022 open time **MeerKAT program** to study the effect of group environment on galaxy evolution. **Co-I** - Number of targets: **8 groups**. Total B time awarded: **50 hours**
- **SALTChairs:** 2021 semester 2 **RSS/SALT program** to study ionized gas in 2 Choir groups. **PI** - Total P1 time awarded: **21.4 hours**

RECENT PRESENTATIONS

- Colloquium talk on **anomalous gas safari: insights from MeerKAT’s view of galaxy interactions** at SAAO - July 2023, Cape Town
- Talk on **looking for anomalous gas in interacting galaxies** at the meeting of the [SKA Pathfinder HI Survey Coordination Committee \(PHISCC\)](#) - March 2023, Cape Town
- Lunch talk on the **neutral gas kinematics of interacting galaxies in two groups at Kapteyn, University of Groningen** - Sep 2022, Dwingeloo, The Netherlands
- Short talk on the **neutral gas kinematics of interacting galaxies in a group** at [What Matters Around Galaxies \(WMAG\)](#) - Sep 2022, The Alps, Italy

Open Night Volunteer:

Regularly volunteered to organize stargazing sessions, talks, and tours

Visitor's Centre Exhibition:

Prepared the script for an exhibition on the history of astronomy in South Africa.

COURSEWORK

CLASSES AUDITED¹

UCT - NASSP Master's 2021

Extragalactic Astronomy
Radio Interferometry

IIST - Master's 2019

Introduction to Astronomy
Cosmology
Galaxies and Extragalactic Astronomy

Other

Quantum Mechanics
Statistical Mechanics

UNDERGRADUATE

Aerospace Engineering
Gas Dynamics and Jet Propulsion
Heat and Mass Transfer
Fluid Mechanics and Thermodynamics
Engineering Physics
Engineering Mathematics (5 Semesters)

LEADERSHIP AND

VOLUNTEERING

TEDXFISAT | Founding Organizer
Feb 2018 - Oct 2018 | FISAT, Kerala
Planned and organized a TEDx event.

MECHFISAT | Founding Captain
Aug 2017 - Aug 2018 | FISAT, Kerala
Set up a department portfolio and library website. Trained a team of 50 students in various aspects of website building and content marketing.

ASME FISAT STUDENT SECTION | Chairman
Aug 2017 - Aug 2018 | FISAT, Kerala
Organized various events and activities in connection with ASME. Conducted several induction programs for nascent sections across the state.

OTHER EXPERIENCE

Graphic Designing, Creative Writing,
Website Development, Event Management



¹ No credits

- Short talk on the **Baryon Cycle in groups with varying levels of interactions** at the **Annual Conference of the South African Institute of Physics (SAIP)** - Best MSc Oral Presentation Prize in the Astrophysics division - Jul 2022, Virtual
- Short talk on the **Baryon Cycle** at the **Annual Conference of African Astronomical Society (AfAS)** - Mar 2022, Cape Town

SCHOOLS & WORKSHOPS

- **ERIS 2022: European Radio Interferometry School**
Week long summer school in September, 2022 at ASTRON, Dwingeloo, Netherlands.
- **Spectroscopy Tools Workshop by STScI**
4 day virtual workshop in late March, 2022 that introduced the functionalities of various open-source spectroscopic analyses tools.
- **ARIWS 2021: African Radio Interferometry Winter School**
Week long virtual interferometry school in late June, 2021.
- **ESCAPE summer school**
Week long virtual school in June, 2021 on project development and data science for astrophysical research.
- **Fundamental of Gaseous Halos Workshop by KITP**
2 month virtual workshop from Jan 11 to Mar 5 2021 on theoretical and observational aspects of the Circumgalactic Medium.

OTHER ACTIVITIES

- Organiser for the fortnightly **Extragalactic Discussion Group**. - Initiated and organized the extragalactic discussion group for researchers at SAAO and UCT
- SAAO postgrad **Student Representative**. - Helped with organising writing circles, social events, meetings, and other student activities.
- Championed the **Green SAAO Sustainability Movement at SAAO**. - Worked with site management to implement a sustainable **waste management system**. Initiated **campaigns for optimal resource utilization**. Introduced **climate change communication** to outreach activities.

PAST PROJECTS

PET-CNT NANOCOMPOSITE | Team Lead
Feb 2018 - Aug 2018 | FISAT, Kerala
Thesis Guide: Dr. Rejeesh C R

- Attempted to recover the structural stability after iterations of plastic recycling through reinforcement with Carbon Nanotubes (CNTs). The project was intended as a step towards a closed-loop production system with additive manufacturing.

GROWING CNT USING TRI-METALLIC CATALYST | Project Student
Jan 2018 | Tata Institute of Fundamental Research (TIFR), Hyderabad
Guide: Dr. T. N. Narayanan

- Grew CNTs using a tri-metallic catalyst (Co-Ni-Fe) and characterised them with Scanning Electron Microscope and Raman Spectroscopy.

EXOSKELETAL IMMOBILIZER | Team lead
Mar 2017 - Dec 2017 | FISAT, Kerala

- 3D printed fracture cast equipped with adjunct modalities to facilitate faster healing presented in Tampa, Florida and **published as part of ASME IMECE**.

REFERENCE

Dr. Moses Mogotsi | m.mogotsi@sao.ac.za

SALT Astronomer, South African Astronomical Observatory, Cape Town, South Africa

Prof. Petri Vaisanen | petri@sao.ac.za

Director, South African Astronomical Observatory, Cape Town, South Africa

Prof. Matthew A. Bershady | mab@astro.wisc.edu

Professor, Department of Astronomy, University of Wisconsin-Madison, Madison, WI, USA