Sriram Sankar

Email: sriram@saao.ac.za
Web: sriramsankar.netlify.app

INTERESTS

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

FORMAL EDUCATION

UNIVERSITY OF CAPE TOWN

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

MAHATMA GANDHI UNIVERSITY

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

SKILLS

Programming:
Python • IDL/GDL • C/C++ • Bash • SQL
Workflow:
slurm • Docker/Singularity • git
Web technologies:
HTML5/CSS3 • Hugo (JAMSTACK) • WordPress • Netlify
Selected Astronomy tools:
Astropy • CASA • SoFiA2 • SlicerAstro CARTA • 3DBarrolo • PySpecKit • Cloudy

TUTORING

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

OBSERVING TRAINING

SALT Shadow Program:
Shadowed a SALT Astronomer for a week.

SAAO 1.9m Training:
Underwent training to observe with the SpUpNIC spectrograph.

OUTREACH

Outreach Volunteers Club:
Started a club at SAAO for staff and students interested in outreach activities.

Open Night Volunteer:
Regularly volunteered to organize stargazing sessions, talks, and tours

RESEARCH EXPERIENCE

SOUTH AFRICAN ASTRONOMICAL OBSERVATORY (SAAO)

MSc Student | Feb 2021 – Present | Cape Town, South Africa
Supervisors: Dr. Moses Mogotsi & Prof. Matthew A. Bershady

- Funded by **SALT-SAAO Prize MSc Scholarship 2021**
- **Thesis:** Kinematics of neutral hydrogen in interacting galaxies in two groups from the MeerChoirs survey. In the two groups featuring varying levels of interactions, we characterize the kinematics of the tidal tails & bridges, warped discs, and anomalous gas.
- 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 | Aug 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.
- Studied a multi-phase weak-Mg II analog absorber, potentially 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 proposal** to study Collisional Ring Galaxies (CRGs). **PI & Technical Lead** - Number of targets: **13 CRGs**. Total time requested: **97.5 hours**
- **MeerChoirs**: 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**
- **SALTChoirs**: 2021 semester 2 **RSS/SALT program** to study ionized gas in 2 Choir groups. **PI** - Total P1 time awarded: **21.4 hours**

RECENT PRESENTATIONS

- 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 2 groups** at **Kapteyn Astronomical Institute, University of Groningen** - Sep 2022, Dwingeloo, 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
- 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

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.

Visitor's Centre Exhibition:
Prepared the script for an exhibition showcasing the history of Astronomy and the role of South Africa.

COURSEWORK

CLASSES AUDITED [1]

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 with the help of a small community of volunteers.

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, Content Marketing, Event Management, Music Production.

[1] No credits

- 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.
- Volunteer for **Astronomers for planet Earth**
  I take part in A4E activities where possible. My main project is to curate the **Advocate for Institutional Change** page in the website.

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.

PAST PROJECTS

PET-CNT NANOCOMPOSITE | Team Lead

Feb 2018 – Aug 2018 | FISAT, Kerala
Thesis Guide: Dr. Rejeesh C R

- Attempted at recovering the structural stability after successive iterations of plastic recycling through reinforcement with Carbon Nanotubes (CNTs).
- Output could potentially be supplied as filament for additive manufacturing. The project was intended to be a step in the direction of setting up a closed loop production system.

GROWING CNT USING TRI-METALLIC CATALYST | Project Student

Jan 2018 | Tata Institute of Fundamental Research (TIFR), Hyderabad
Guide: Dr. T. N. Narayanan

- Experimented with a tri-metallic catalyst (Co-Ni-Fe) to obtain a good yield of CNT. Use of bimetallic catalysts are common for the synthesis of CNTs but a tri-metallic catalyst had not yet been reported at the time.
- Characterisation of the synthesised CNTS were done using Scanning Electron Microscope (SEM) 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@saao.nrf.ac.za
SALT Astronomer, Southern African Large Telescope,
South African Astronomical Observatory, Cape Town, South Africa

Prof. Matthew A. Bershady | mab@saao.ac.za
Research Chair (SARChI), South African Astronomical Observatory,
Adjunct Professor, University of Cape Town, Cape Town, South Africa

Prof. Petri Vaisanen | petri@saao.ac.za
Director, South African Astronomical Observatory, Cape Town, South Africa

Prof. Anand Narayanan | anand@iist.ac.in
Professor, Indian Institute of Space Science and Technology, Kerala, India