

# Sriram Sankar

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## INTERESTS

extragalactic astrophysics, cosmology,  
gas kinematics, multi-phase baryon cycle,  
galaxy evolution & dynamics

## FORMAL EDUCATION

### UNIVERSITY OF CAPE TOWN

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

### FEDERAL INSTITUTE OF SCIENCE AND TECHNOLOGY

B.Tech Mechanical Engr. | 2014-18  
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 • 3DBarolo • 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 | May 2021 – Present | Cape Town, South Africa

**Supervisors:** Dr. Moses Mogotsi & Prof. Matthew A. Bershady

- Funded by **SALT-SAAO Prize MSc Scholarship 2021**
- Thesis focusing on:** The neutral gas kinematics in two groups with varying levels of interactions; using high resolution, high sensitivity HI 21cm observations with MeerKAT.
- Proposal writing, interferometric data reduction, imaging, analysis, kinematic modelling, machine-learning assisted Gaussian decomposition of spectral lines, long-slit optical spectroscopic data reduction, etc.

### INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY (IIST)

Project Student | Nov 2018 – 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.
- Spectral data reduction and analysis, visualization, ionization modelling, database querying 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

- MeerChoirs: MeerKAT proposal** to study environmental effects in groups  
**Co-I** - 2022 open time proposal for spectral line and continuum observations of **8 groups**.  
Total **on-source integration time awarded: 40 hours**
- SALTChoirs: SALT program** to study ionized gas in 2 Choir groups  
**PI** - 2021 Semester 2 RSS/SALT program for spectroscopic characterisation of member galaxies in 2 Choir groups. Total **P1 exposure time awarded: 21.4 hours**

## RECENT PRESENTATIONS

- Lunch talk on the **neutral gas kinematics of interacting galaxies in 2 groups** at **Kapteyn Astronomical Institute, University of Groningen** - Sep 2022, 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
- Short talk on the **Baryon Cycle in groups with varying levels of interactions** at the **Annual Conference of 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**  
As the student representative, I helped with organising writing circles, social events, catch-up meetings, observation training, 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<sup>1</sup>

#### 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.

- 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 actively 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, Dwingaloo, 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 virtual school 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

- An attempt 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 closed loop production systems.

### 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 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@sao.nrf.ac.za](mailto:m.mogotsi@sao.nrf.ac.za)

SALT Astronomer, Southern African Large Telescope,  
South African Astronomical Observatory, Cape Town, South Africa

**Prof. Matthew A. Bershadsky** | [mab@sao.ac.za](mailto:mab@sao.ac.za)

Research Chair (SARCHI), South African Astronomical Observatory,  
Adjunct Professor, University of Cape Town, Cape Town, South Africa

**Prof. Petri Vaisanen** | [petri@sao.ac.za](mailto:petri@sao.ac.za)

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

**Prof. Anand Narayanan** | [anand@iist.ac.in](mailto:anand@iist.ac.in)

Professor, Indian Institute of Space Science and Technology, Kerala, India



<sup>1</sup> No credits