# 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

### 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 | 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 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**
  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 [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 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@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