

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 • 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 | Feb 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 | 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.
- 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 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 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 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

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

Prof. Matthew A. Bershady | 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

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



¹ No credits