Sriram Sankar

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INTERESTS

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

FORMAL EDUCATION

UNIVERSITY OF CAPE TOWN

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
I've dabbled with:
MySQL • HTML5/CSS3 • Hugo (JAMSTACK)
Slurm • Docker/Singularity
Astronomy tools:
Astropy • CASA • SoFiA2 • SlicerAstro
CARTA • 3DBarrolo • scousepy
VPFIT • 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 in SAAO to bring staff and students together for outreach related activities.

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

RESEARCH EXPERIENCE

SOUTH AFRICAN ASTRONOMICAL OBSERVATORY (SAAO)

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

- Funded by **SALT-SAAO Prize MSc Scholarship 2021**
- Studying the baryon cycle in interacting galaxies in two groups using high resolution, high sensitivity HI 21cm observations with MeerKAT (MeerChoirs: 2020 OPT).
- Interferometric data reduction, imaging, parametrization, kinematic modelling, 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 gas thought to be tracing the multi-phase 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

- **MeerRings**: MeerKAT program to study Collisional Ring Galaxies (CRGs)
  PI & Technical Lead - 2022 open time proposal for spectral line and continuum observations of **14 CRGs**. Total on source integration time: **84 hours**
- **MeerChoirs**: MeerKAT program 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: **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**

CONFERENCES

- Short talk on the **neutral gas kinematics in two Choir groups** at What Matters Around Galaxies (WMAG) - Sep 2022, The Alps, Italy
- **Short talk on the impact of group environments on galaxy evolution.** at the Annual Conference of South African Institute of Physics (SAIP - Jul 2022, Virtual
- **Short talk on the Barton Cycle** at the Annual Conference of African Astronomical Society (AfAS) - Mar 2022, Cape Town

OTHER 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.
- Organiser for the fortnightly **Extragalactic Discussion Group**
  Initiated and organized the extragalactic discussion group for researchers at SAAO and UCT

Open Night Volunteer:
Regularly volunteered for SAAO open nights and organized stargazing sessions, talks, and tours

COURSEWORK

CLASSES AUDITED [2]

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 at FISAT** with a small community of volunteers.

MECHFISAT | Founding Captain

Aug 2017 – Aug 2018 | FISAT, Kerala
Set up a department portfolio and library website **mechfisat.com**. 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.

[2] No credits

- 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.
- 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 Jaipur, India as part of ASME E-fest Asia Pacific 2017.
- Presented in Tampa, Florida and **published as part of ASME**

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