Ayan Acharyya

Contact Information

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Research Interests

Galaxy evolution, Chemical evolution - gas phase metallicity, ISM properties, translating simulations to mock observables.

Education

Australian National University, Canberra, Australia; September 2015–Fenruary 2020 (expected)
PhD

- Thesis title: *Chemical evolution of the Universe across the cosmic time*
- Advisors: Prof. Lisa Kewley, Prof. Mark Krumholz, A/Prof. Christoph Federrath.

Indian Institute of Technology Kharagpur, India August 2010– April 2015
Integrated Bachelors and Masters of Science

- Thesis title: *Simulating HII bubble around quasars to be used for matched filter technique in redshifted 21cm maps*
- Advisor: Prof. Somnath Bharadwaj

Work and Academic Experience

Australian National University, Canberra, Australia. 2017–Present
Outreach Assistant: Organise outreach stargazing and Mount Stromlo Observatory site tours for public, school and private groups.

University of Manitoba, Winnipeg, Canada. May–July 2014
MITACS Research Scholar: Project title "Colorizing the dance of galaxies" with Dr. Jayanne English. This involved simulating galaxies spanning diverse morphologies with a MATLAB based code 'Ferret'.

Indian Institute of Technology Gandhinagar, India. May–July 2013
Summer Research Scholar: "Black Hole Kinematic" with Dr. Sudipta Sarkar. I used Mathematica to investigate the evolution of the event horizon of a Schwarzschild Black Hole under small perturbations in the mass.

Indian Institute of Technology Kharagpur, India. January–April 2013
Summer Research Scholar: "Z Scan based non linear optical characterization of nano-materials" with Prof. Prasanta K. Datta.

Bhabha Atomic Research Centre, Mumbai, India. May–July 2012
Summer Research Scholar: "Small Angle Neutron Scattering Studies of Biological Systems in Solution" with Dr. Vinod K. Aswal.

Awards and Grants

- 2019: RSAA student travel grant $4000
- 2019: Astronomical Society of Australia (ASA) student travel award $1000
- 2019: ANU Vice Chancellor's travel grant $1500
- 2017: Olin J Eggen Research Award 2017 at RSAA, ANU
- 2015: ANU PhD Scholarship (International) and RSAA Research Supplementary Scholarship
- 2014: MITACS Globalink Research Internship award
- 2014: Visiting Students Programme at Tata Institute of Funamental Research(TIFR) Mumbai, India (declined)
- 2014: NCTU Elite Internship Programme, Taiwan (declined)
- 2014: Charpak Fellowship for summer project in France (declined)
- 2013: Visiting Students Research fellowship (Indian Institute of Technology Gandhinagar)
- Second-best poster award in the Theme Meeting on Ultrafast Science UFS 2013, IIT Kharagpur
- 2012: Visting Students Research (Indian Academy of Sciences)

Observing Experience

- 6 nights total on Keck/ESI, from Keck HQ at Waimea, Hawaii. I was co-I on two out of the three observing proposals.
- 1 night on ANU 2.3m telescope: WiFeS spectrograph.

Technical Skills

- **Programming Languages (skill level)**: C/C++ (basic), Python (proficient), IDL (moderate).
- **Technical Softwares**: Mathematica, MATLAB, IRAF, LaTeX, `yt`, analysis of `hdf5` and `fits` file.

Talks

Conferences (Contributed talks)

- **American Astronomical Society (AAS) 2019** "Testing new rest-frame optical & UV diagnostics on lensed galaxy at z∼1.7" *Seattle, USA;* January 2019
- **AAS 2019** "Determining effects of telescope resolution on metallicity gradient with synthetic observations of galaxy simulations" *Seattle, USA;* January 2019
- **Australian National Institute for Theoretical Astrophysics (ANITA)** *Perth, Australia;* February 2018
- **5th Annual GMT Community Science Meeting** *New York, USA;* July 2017
- **ASA Annual Science Meeting** *Canberra, Australia;* July 2017
- **Mount Stromlo Student Seminars** *Canberra, Australia;* December 2015

Colloquia

- **Universidad Nacional Autonoma de Mexico** (Contributed) *Mexico City;* September 2019
- **University of Texas at Austin** (Contributed) *Austin, USA;* September 2019
- **Ohio State University** (Contributed) *Columbus, USA;* September 2019
- **New York University** (Contributed) *New York City, USA;* September 2019
- **Space Telescope Science Institute** (Contributed) *Baltimore, USA;* September 2019
- **Sri Venkateswara College of Engineering** (Invited) *Chennai, India;* March 2019
- **Vellore Institute fo Technology** (Invited) *Vellore, India;* March 2019
- **R V College of Engineering** (Invited) *Bengaluru, India;* March 2019
- **Leiden Observatory** (Contributed) *Leiden, Netherlands;* September 2018
- **Max Planck Institute for Astronomy** (Contributed) *Heidelberg, Germany;* September 2018
- **Institue for Theoretical Astrophysics** (Contributed) *Heidelberg, Germany;* September 2018
- **Indian Institute of Technology** (Contributed) *Kharagpur, India;* December 2016
- **National Centre for Radio Astrophysics** (Contributed) *Pune, India;* December 2016

Outreach

- **Mount Stromlo Observatory Space Squad** (Invited) *Canberra, Australia;* April 2019
- **Physics in the Pub** (Invited) *Canberra, Australia;* October 2018

Posters

- **IAU Focus Meeting** *Vienna, Austria;* August 2018
- **ASA Annual Science Meeting** *Melbourne, Australia;* July 2018
- **DAE-BRNS Theme Meeting on Ultrafast Science** *Kharagpur, India;* 2013

Mentoring Experience

Currently mentoring two high-school students for their 'ACT Science Mentors' Project, on "Cepheid Variables" and "Eclipsing binaries" respectively, on the MSATT telescope at Mount Stromlo Observatory. I am responsible for teaching them the relevant physics and mathematics as well as help them with the data analysis and report writing.

Professional Experience

- Organiser of **GEARS3D group meeting** at RSAA 2018–Present
- Active member at **Mount Stromlo Observatory outreach team** 2017–Present
- OC member of the **ASTRO3D Student Retreat** May 2019
- LOC member of the **Harley Wood School of Astronomy** July 2017
- PhD student representative on the **RSAA Education Committee** June 2016 - February 2017
- LOC/SOC member of the **Mount Stromlo Student Seminars** December 2016
- LOC member of the **DAE-BRNS Theme meeting on Ultrafast Science**, Kharagpur 2013

References

Prof. Lisa J. Kewley
Australian National University
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Prof. Mark R. Krumholz
Australian National University
E-mail: mark.krumholz@anu.edu.au

A/Prof. Christoph Federrath
Australian National University
E-mail: christoph.federrath@anu.edu.au

Dr. Jane R. Rigby
NASA Goddard Space Flight Centre
E-mail: jane.r.rigby@nasa.gov

Publications

1. **Acharyya, A.**, Kewley, L. J., Rigby, J. R., Byler, N., Bayliss, M., et al. *Metallicities of 15 lensed galaxies at* $1.5 \lesssim z \lesssim 4$ *based on rest-frame UV diagnostics*, (in prep).
2. **Acharyya, A.**, Krumholz, M. R., Federrath, C., Kewley, L. J., & Sharp, R. *Quantifying the effects of spatial resolution and noise on galaxy metallicity gradients*, (Submitted to MNRAS, Sep 2018), Link to Dropbox.
3. **Acharyya, A.**, Kewley, L. J., Rigby, J. R., Bayliss, M., Bian, F., Nicholls, D., Federrath, C., Kaasinen, M., Florian, M., & Blanc, G. A. *Rest-frame UV and optical emission line diagnostics of ionized gas properties: a test case in a star-forming knot of a lensed galaxy at z 1.7* (2019), MNRAS, 488, 5862.
4. Rigby, J. R., Bayliss, M. B., Chisholm, J., Bordoloi, R., Sharon, K., Gladders, M. D., Johnson, T., Paterno-Mahler, R., Wuyts, E., Dahle, H., & **Acharyya, A.** *The Magellan Evolution of Galaxies Spectroscopic and Ultraviolet Reference Atlas (MegaSaura). II. Stacked Spectra* (2018), ApJ, 853, 87.
5. Andreoni, I., Ackley, K., Cooke, J., **Acharyya, A.**, Allison, J. R., et al., *Follow Up of GW170817 and Its Electromagnetic Counterpart by Australian-Led Observing Programmes* (2017), PASA, 34, e069.
6. Bayliss, M. B., Sharon, K., **Acharyya, A.**, Gladders, M. D., Rigby, J. R., Bian, F., Bordoloi, R., Runnoe, J., Dahle, H., Kewley, L., Florian, M., Johnson, T., & Paterno-Mahler, R. *Spatially Resolved Patchy Ly Emission within the Central Kiloparsec of a Strongly Lensed Quasar Host Galaxy at z=2.8* (2017), ApJL, 845, L14.
7. Mondal, R., Bharadwaj, S., Majumdar, S., Bera, A., & **Acharyya, A.** *The effect of non-Gaussianity on error predictions for the Epoch of Reionization (EoR) 21-cm power spectrum.* (2015), MNRAS, 449, L41.