

Ayan Acharyya

CONTACT INFORMATION	Bloomberg Center for Physics and Astronomy Johns Hopkins University, 3400 N. Charles Street, Baltimore MD 21218, USA	Homepage: https://ayanacharyya.github.io/ ✉ E-mail: aachary9@jhu.edu Tel: (+1) 443-529-4809 Github: https://github.com/ayanacharyya
RESEARCH INTERESTS	Galaxy evolution, Chemical evolution - gas phase metallicity, ISM properties, translating simulations to mock observables.	
POST-PHD EXPERIENCE	Johns Hopkins University , Baltimore, USA. January 2021–present <i>Assistant Research Scientist</i> : Post-doctoral researcher with the FOGGIE group. This involves using Enzo to produce cosmological zoom-in simulations of galaxies and developing my own tools (Github link) for creating mock data products.	
EDUCATION	Australian National University , Canberra, Australia; September 2015–September 2020 PhD <ul style="list-style-type: none">• Thesis title: <i>Chemical evolution of the Universe across the cosmic time</i>• 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 <ul style="list-style-type: none">• Thesis title: <i>Simulating HII bubble around quasars to be used for matched filter technique in redshifted 21cm maps</i>• Advisor: Prof. Somnath Bharadwaj	
RESEARCH EXPERIENCE	University of Manitoba , Winnipeg, Canada. May–July 2014 <i>MITACS Research Scholar</i> : 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 <i>Summer Research Scholar</i> : “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 <i>Summer Research Scholar</i> : “Z Scan based non linear optical characterization of nano-materials” with Prof. Prasanta K. Datta.	
	Bhabha Atomic Research Centre , Mumbai, India. May–July 2012 <i>Summer Research Scholar</i> : “Small Angle Neutron Scattering Studies of Biological Systems in Solution” with Dr. Vinod K. Aswal.	
AWARDS AND GRANTS	<ol style="list-style-type: none">12. 2019: RSAA student travel grant \$400011. 2019: Astronomical Society of Australia (ASA) student travel award \$100010. 2019: ANU Vice Chancellor’s travel grant \$15009. 2017: Olin J Eggen Research Award 2017 at RSAA, ANU8. 2015: ANU PhD Scholarship (International) and RSAA Research Supplementary Scholarship7. 2014: MITACS Globalink Research Internship award6. 2014: Visiting Students Programme at Tata Institute of Fundamental Research(TIFR) Mumbai, India (declined)5. 2014: NCTU Elite Internship Programme, Taiwan (declined)4. 2014: Charpak Fellowship for summer project in France (declined)3. 2013: Visiting Students Research fellowship (Indian Institute of Technology Gandhinagar)	

2. Second-best poster award in the Theme Meeting on Ultrafast Science UFS 2013, IIT Kharagpur
1. 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.

SUCCESSFUL
OBSERVING
PROPOSALS AS
CO-I

- *CO Kinematics at Cosmic Noon: Timing the Redistribution of Metals Around Galaxies*, ALMA/Band3 (Cycle 8), PI: Dr. Raymond Simons
- *Unwrapping the epoch of reionization through analogs at cosmic noon*, VLT/XSHOOTER (Cycle P108), PI: Dr. Anshu Gupta
- *Rest-frame Ultraviolet spectroscopy of Two Lensed Galaxies at $z=1.4$* , Keck/ESI (2016B), PI: Dr. Fuyan Bian
- *Galaxy Feedback in two lensed galaxies at $z=1.4$* , Keck/ESI (2016B), PI: Dr. Jane Rigby

TECHNICAL
SKILLS

- **Programming Languages (skill level):** C/C++ (basic), Python (proficient), IDL (moderate).
- **Technical Softwares:** Mathematica, MATLAB, IRAF, L^AT_EX

TALKS

*Conferences
(Contributed
talks, 9)*

9. **Space Telescope Science Institute, Discovery Seminar series** “Mockulus reparo” — to fix the effects on metallicity gradient measurements due to our insufficient “seeing” *Baltimore, USA; May 2022*
8. **Johns Hopkins University** “Mockulus reparo” — to fix the effects on metallicity gradient measurements due to our insufficient “seeing” *Baltimore, USA; September 2021*
7. **Chemical Abundances in Gaseous Nebulae** ”Abundances from UV spectra at high-redshift” *virtual; May 2021*
6. **American Astronomical Society (AAS) 2019** ”Testing new rest-frame optical & UV diagnostics on lensed galaxy at $z\sim 1.7$ ” *Seattle, USA; January 2019*
5. **AAS 2019** ”Determining effects of telescope resolution on metallicity gradient with synthetic observations of galaxy simulations” *Seattle, USA; January 2019*
4. **Australian National Institute for Theoretical Astrophysics (ANITA)** *Perth, Australia; February 2018*
3. **5th Annual GMT Community Science Meeting** *New York, USA; July 2017*
2. **ASA Annual Science Meeting** *Canberra, Australia; July 2017*
1. **Mount Stromlo Student Seminars** *Canberra, Australia; December 2015*

Colloquia (13)

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

<i>Outreach (2)</i>	2. Mount Stromlo Observatory Space Squad (Invited) <i>Canberra, Australia; April 2019</i>
	1. Physics in the Pub (Invited) <i>Canberra, Australia; October 2018</i>
<i>Posters (3)</i>	3. IAU Focus Meeting <i>Vienna, Austria; August 2018</i>
	2. ASA Annual Science Meeting <i>Melbourne, Australia; July 2018</i>
	1. DAE-BRNS Theme Meeting on Ultrafast Science <i>Kharagpur, India; 2013</i>
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.
SERVICES	7. Over 30 stargazing tours as Outreach Assistant at Mount Stromlo Observatory outreach team 2017–Present
	6. Organiser of GEARS3D group meeting at RSAA 2018–Present
	5. OC member of the ASTRO3D Student Retreat May 2019
	4. LOC member of the Harley Wood School of Astronomy July 2017
	3. PhD student representative on the RSAA Education Committee June 2016 - February 2017
	2. LOC/SOC member of the Mount Stromlo Student Seminars December 2016
	1. 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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A/Prof. Christoph Federrath

Australian National University

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Prof. Mark R. Krumholz

Australian National University

E-mail: mark.krumholz@anu.edu.au

Dr. Jane R. Rigby

NASA Goddard Space Flight Centre

E-mail: jane.r.rigby@nasa.gov

14. Lehner N., Kopenhafer C., O’Meare J. M., Howk C., Fumagalli M., Prochaska J. X., **Acharyya, A.**, O’Shea, B., et al. *KODIAQ-Z: Metallicity of the cool intergalactic and circumgalactic gas at $2.2 \lesssim z \lesssim 3.6$* (in prep).
13. Grasha K., Chen Q. H., Battisti A., **Acharyya, A.**, Ridolfo S., et al. *Metallicity and pressure variations of HII regions in the TYPHOON spiral galaxies: NGC 1566, NGC 2835, NGC 3521, NGC 5068, NGC 5236, and NGC 7793* (Submitted to MNRAS).
12. Florian M., Rigby J. R., **Acharyya, A.**, Sharon, K., Gladders, M. D., Kewley, L. J., et al. *Spatial Variation in Strong Line Ratios and Physical Conditions in Two Strongly-Lensed Galaxies at $z 1.4$* (2021), ApJ, 916, 50.
11. Sharda, P., Krumholz, M. R., Wisnioski, E., **Acharyya, A.**, Federrath, C., & Forbes, J. C. *On the origin of the mass-metallicity gradient relation in the local Universe* (2021), MNRAS, 504, 53.
10. Sharda, P., Krumholz, M. R., Wisnioski, E., Forbes, J. C., Federrath, C., & **Acharyya, A.** *The physics of gas phase metallicity gradients in galaxies* (2021), MNRAS, 502, 5935.
9. Rigby J. R., Florian M., **Acharyya A.**, Bayliss, M. B., Gladders, M. D., et al. *A Comparison of Rest-frame Ultraviolet and Optical Emission-Line Diagnostics in the Lensed Galaxy SDSS J1723+3411 at Redshift $z=1.3293$* (2021), ApJ, 908, 154.
8. Byler, N., Kewley, L., Rigby, J., **Acharyya, A.** Berg, D., Bayliss, M., and Sharon, K. *A comparison of UV and optical metallicities in star-forming galaxies* (2020), ApJ, 893, 1.
7. **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).
6. **Acharyya, A.**, Krumholz, M. R., Federrath, C., Kewley, L. J., & Sharp, R. *Quantifying the effects of spatial resolution and noise on galaxy metallicity gradients*, (2020), MNRAS, 495, 3819.
5. Kewley, L. J., Nicholls, D. C., Sutherland, R., Rigby, J. R., **Acharya, A.**, Dopita, M. A., Bayliss, M. B. *Theoretical ISM Pressure and Electron Density Diagnostics for Local and High-redshift Galaxies* (2019), ApJ, 880, 24.
4. **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 ionised gas properties: a test case in a lensed galaxy at $z 1.7$* (2019), MNRAS, 488, 5862.
3. 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.
2. 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 α Emission within the Central Kiloparsec of a Strongly Lensed Quasar Host Galaxy at $z=2.8$* (2017), ApJL, 845, L14.
1. 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.