

# Shyam Harimohan Menon

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🌐 <https://shm-1996.github.io>

🔗 [shm-1996](#)

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## Work & Research Experience

- Sep. 2023 – **Postdoctoral Researcher (Joint Rutgers-Flatiron Postdoctoral Fellow)**,  
Present Dept. of Physics and Astronomy, Rutgers University, NY/NJ, USA  
Advisors: Blakesley Burkhart & Rachel Somerville
- May 2018 – **Summer Research Scholar**,  
August 2019 University of Tübingen,  
Tübingen, Germany  
Project title: Impact of ionising radiation on the turbulent ISM  
Advisor: Dr. Rolf Kuiper
- May 2017 – **MITACS Globalink Summer Internship**,  
August 2017 University of Western Ontario,  
London, Canada  
Project title: Numerical Magneto-hydrodynamic simulations with the Athena code  
Advisor: Prof. Shantanu Basu

## Education

- Oct. 2019 – **Doctor of Philosophy, Astronomy & Astrophysics**,  
Sep 2023 Research School of Astronomy & Astrophysics, Australian National University,  
Canberra, Australia  
Thesis title: [The interplay of star formation and radiation feedback in the ISM](#)  
*Awarded the most outstanding astronomy PhD thesis in Australia in 2023-2024*  
Advisors: A/Prof. Christoph Federrath & Prof. Mark Krumholz
- Aug. 2014 – **Integrated Bachelor and Master of Technology (Hons.), Engineering Physics**,  
May 2019 Department of Physics, Indian Institute of Technology (BHU),  
Varanasi, India  
Thesis title: [HI Fragmentation in the Turbulent Interstellar Medium](#)  
Advisor: A/Prof. Prasun Dutta

## Honors & Grants

- July 2024 Charlene Heisler Prize,  
*Awarded by the Astronomical Society of Australia for the most outstanding PhD thesis accepted by an Australian university*
- Feb 2023 Joint Rutgers-Flatiron Postdoctoral Fellowship
- Feb 2023 CCAPP Postdoctoral Fellowship (declined)
- Feb 2023 CITA National Fellowship (declined)
- Oct 2021 ANU Olin J Eggen Research Award (\$2500 AUD),  
*Awarded to a PhD student for excellence in research*
- Oct 2022 Vice-Chancellors Travel Grant (\$1500 AUD)

March 2022 RSAA Travel Grant (\$7000 AUD)  
 Oct 2019 ANU PhD Scholarship (\$29000 AUD p.a.)  
 Oct 2019 ANU RSAA Supplementary Research Scholarship (\$ 2500 AUD p.a.)  
 August 2018 Graduate Aptitude Test in Engineering (GATE) Postgraduate Scholarship  
 May 2018 Eberhard Karls Universität Tübingen Summer Research Stipend  
 May 2017 Mitacs Globalink Research Internship Award  
 April 2013 Kishore Vaigyanik Protsahan Yojana (KVPY) Scholarship

## Students Mentored

### 2 PhD students + 3 undergrad

Jan 2025 – **Thummim Mekuria, CCA Predoc Project (PhD student at UC Santa Cruz),**  
 May 2025 *Project title: The Feedback-Matter Interplay in High-z Compact Starbursts*  
 Jan 2025 – **Avi Chen, PhD student, Rutgers University (co-supervising),**  
 present *Project title: Role of Radiative Feedback in Population III Star Formation*  
 Jan 2025 – **Frances Mathias, Undergraduate, Rutgers University,**  
 present *Project title: Stochasticity in Stellar Population Synthesis*  
 March 2024 – **Dhaval Sai Srinivas, BS-MS student at IISER-Kolkata,**  
 present *Project title: The escape fraction of ionising photons in turbulent media*  
 Jan – March 2022 **Hank Hua, undergraduate student at ANU (co-supervised),**  
 present *Project title: Effects of spiral arms on the Two Point Correlation Function*

## Teaching Experience

Oct 2022 **Guest Lecture, ASTR 4012 – Astrophysical Gas Dynamics,**  
*Guest Lecture on The Physics of Radiation Hydrodynamics*  
 Feb 2022 – **Teaching Assistant, ASTR 1003 – Astronomy & Space,**  
 present *Respond to student queries on the course forum and assist in tutorials*  
 Aug – Dec 2018 **Teaching Assistant, PHY 1002 – Introduction to Engineering Electromagnetics,**  
*Duties involved one tutorial session per week and assistance in preparing tutorials for this undergraduate course*  
 Jan – May 2018 **Teaching Assistant, PHY 304 – Computational Physics,**  
*Duties involved one laboratory session per week, assisting students in implementing numerical methods and recipes taught in theory classes.*  
 March 2022 – **Tutor, Canberra Tutors – High School Mathematics and Physics,**  
 present *Conduct private tutorial sessions for grade 11 & 12 students for their physics and mathematics coursework..*

## Synergistic Activities

May 2022 – **Member, PHANGS Collaboration,**  
 present *Working with the PHANGS collaboration on quantifying how star formation is distributed in galaxies.*  
 Feb 2022 – **Chair, Seminars Committee, RSAA,**  
 present *Heading the seminars team; responsible for organising, hosting and inviting speakers for colloquia*

- July 2021 – **Reviewer: ApJ, ApJL, MNRAS, J. Comput. Phys., JOAA, Open Journal of present Astrophysics,**  
*Papers Reviewed: 8*
- Sept 2020 – **Member of Seminars Committee, RSAA,**  
 Feb 2022 *Hosted >30 external colloquia and seminars at RSAA*
- Oct 2020 – **Organiser, Star Formation Journal Club, RSAA,**  
 present *Established, and led a fortnightly journal club at RSAA discussing recent arXiv papers broadly in star formation*
- Jan **Member, Astronomical Society of Australia (ASA),**  
 2020–present *Active student member of the ASA, and its theoretical astrophysics working group ANITA.*
- Jan **Student Representative, Work, Health & Safety Committee, RSAA,**  
 2020–present *Formally representing the student cohort in ensuring a safe and healthy workplace.*
- Sep 2021 – **Standard Mental Health First Aider (MHFA),**  
 present *Accredited MHFA by Mental Health First Aid Australia*

## Publications

**18 refereed publications: 8 first-author, 4 second-author, 6 collaborator (ADS Listing)**

1. [Bursts of star formation and radiation-driven outflows produce efficient LyC leakage from dense compact star clusters \[9 Citations\]](#)  
**Menon, S.H.**, Burkhart, B., Somerville, R.S., Thompson, T.A., Sternberg, A. 2024, *ApJ*, submitted
2. [The Interplay between the Initial Mass Function and Star Formation Efficiency through Radiative Feedback at High Stellar Surface Densities \[25 Citations\]](#)  
**Menon, S.H.**, Lancaster, L., Burkhart, B., Somerville, R.S., Dekel, A., Krumholz, M.R. 2024, *ApJL*, 967, 12
3. [Outflows Driven by Direct and Reprocessed Radiation Pressure in Massive Star Clusters \[34 Citations\]](#)  
**Menon, S.H.**, Federrath, C. & Krumholz, M.R. 2023, *MNRAS*, 521, 5160
4. [Infrared Radiation Feedback Does Not Regulate Star Cluster Formation \[19 Citations\]](#)  
**Menon, S.H.**, Federrath, C. & Krumholz, M.R. 2022, *MNRAS*, 517, 1313
5. [VETAM: A scheme for radiation hydrodynamics with adaptive mesh refinement using the variable Eddington tensor method \[20 Citations\]](#)  
**Menon, S.H.**, Federrath, C., Krumholz, M.R., Kuiper, R., Wibking, B.D, Jung, M., 2022, *MNRAS*, 512, 401
6. [The dependence of the hierarchical distribution of star clusters on galactic environment \[15 Citations\]](#)  
**Menon, S.H.**, Grasha, K., Elmegreen, B.G., Federrath, C., Krumholz, M.R., Calzetti, D., Sánchez, N., Linden, S.T., Adamo, A., Messa, M., Cook, D.O., Dale, D.A., Grebel, E.K., Fumagalli, M., Sabbi, E., Johnson, K.E., Smith, L.J., Kennicutt, R.C., 2021, *MNRAS*, 507, 5542
7. [On the compressive nature of turbulence driven by ionizing feedback in the pillars of the Carina Nebula \[31 Citations\]](#)  
**Menon, S.H.**, Federrath, C., Klaassen, P., Kuiper, R., Reiter, M., 2021, *MNRAS*, 500, 1721
8. [On the turbulence driving mode of expanding H II regions \[28 Citations\]](#)  
**Menon, S.H.**, Federrath, C., Kuiper, R., 2020, *MNRAS*, 493, 4643
9. [Planets and planetesimals at cosmic dawn: Vortices as planetary nurseries \[1 Citation\]](#)  
 Eriksson, L.E.J, **Menon, S.H.**, Carrera, D., Lyra, W., Burkhart, B. 2025, *MNRAS*, submitted
10. [Magnetic fields limit the mass of Population III stars even before the onset of protostellar radiation feedback](#)

- Sharda,P., **Menon, S.H.**, Gerasimov, R., Bromm, V., Burkhart, B., Haemmerle, L., Van Veenen, L., Wibking, B.D.2025, *MNRAS Letters*, submitted
11. [Population III star formation in the presence of turbulence, magnetic fields and ionizing radiation feedback \[11 Citations\]](#)  
Sharda,P. & **Menon, S.H.** 2024, *MNRAS*, submitted
  12. [First extragalactic measurement of the turbulence driving parameter: ALMA observations of the star-forming region N159E in the Large Magellanic Cloud \[20 Citations\]](#)  
Sharda, P., **Menon, S.H.**, Federrath, C., Krumholz, M. R., Beattie, J. R., Jameson, K. E., Tokuda, K., Burkhart, B., Crocker, R. M., Law, C. J., Seta, A., Gaetz, T. J., Pingel, N. M., Seitzenzahl, I. R., Sano, H., and Fukui, Y., 2022, *MNRAS*, 509, 2180

## Seminars and Conference Talks

- April 2025 **Contributed Talk: Escape of Lyman radiation from galactic labyrinths, Crete, Greece**
- Aug 2024 **Invited Talk: Cosmic Dawn Revealed by JWST, Kavli Institute of Theoretical Physics**
- April 2024 **Contributed Talk: STScI Spring Symposium, Baltimore**
- March 2024 **Invited Talk: ISM Salon, CCA Flatiron Institute**
- March 2024 **Invited Talk: Radiation Transport in Astrophysics, Heidelberg**
- Feb. 2024 **Contributed Talk: Building Galaxies From Scratch, Vienna**
- July 2023 **Colloquium: Tata Institute of Fundamental Research, Mumbai**
- July 2023 **Seminar: Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune**
- Nov. 2022 **CIERA Theory Seminar, Northwestern University**
- Nov. 2022 **CCAPP Seminar, Ohio State University**
- Nov. 2022 **Lars Hernquist Group Meeting, Centre for Astrophysics, Harvard**
- Nov. 2022 **RandoAstro Seminar, Canadian Institute of Theoretical Astrophysics**
- Oct. 2022 **Coffee Seminar, Institute of Advanced Studies**
- Oct. 2022 **Galread Seminar, Princeton University**
- Oct. 2022 **Cosmology Seminar, MPA Garching**
- Aug. 2022 **Contributed Talk - Star Formation in Different Environments, Quy Nhon, Vietnam**
- July 2022 **Contributed Talk - A Holistic View of Stellar Feedback and Galaxy Evolution, Ascona**
- July 2022 **Planet and Star Formation (PSF) Seminar - Max-Planck-Institut for Astronomy, Heidelberg**
- June 2022 **Invited Seminar - Centre de Recherche Astrophysique de Lyon (CRAL)**
- June 2022 **Star Formation Seminar - CEA, Saclay**
- June 2022 **Poster - From Stars to Galaxies II, Gothenburg**
- June 2022 **Contributed Talk - NBIA Workshop on Radiation Transfer in Astrophysics, Copenhagen**
- Dec. 2021 **Invited Colloquium, Indian Institute of Astrophysics, Bangalore**
- Nov. 2021 **Contributed Talk, IAU Symposium 362 - The Predictive Power of Computational Astrophysics**

- May 2021 **Contributed Talk, ISM 2021, Beirut - Structure, Characteristic Scales, and Star Formation**
- Feb. 2021 **Contributed Talk, Australian National Insitute for Theoretical Astrophysics science workshop**
- Sept. 2020 **Contributed Talk, Annual meeting of the Astronomische Gesellschaft, Germany**
- March 2020 **Invited Talk, Modelling High-Mass Stellar Feedback Workshop, Tübingen, Germany**
- Jan. 2020 **Australian National Insitute for Theoretical Astrophysics science workshop**

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### Relevant Skills

**Languages:**, English, Malayalam, Tamil, Hindi, Sanskrit

**Programming Experience:**, C, C++, Fortran, Python, Mathematica, Bash

**Codes/Softwares:**, FLASH, PLUTO, PETSc, Hypre, Athena, yt, CUDA

**Voluntary Training:**, Mental Health First Aid, Understanding and Responding to Sexual Violence