

Arkabhabha Sarangi, Ph.D.

Assistant Professor
Indian Institute of Astrophysics

<https://www.arkasarangi.com/>
e-mail: arkabhabha.sarangi@iiap.res.in

I study evolved stars, specifically transients such as stellar outbursts and supernova explosions, and their role in the life cycle of cosmic dust in the universe. I am currently a lead investigator on several James Webb Space Telescope projects related to supernova dust.

Academic Positions

Assistant Professor **Jul 2024 – Present**
Indian Institute of Astrophysics,
Bangalore, India

Assistant Professor, Researcher **Nov 2019 – Jun 2024**
Niels Bohr Institute, DARK division,
University of Copenhagen, Denmark

Research Associate **Apr 2015 – Oct 2019**
NASA Goddard Space Flight Center, Astrophysics Science Division
Code 665, Greenbelt, Maryland, United States
Supervisor: **Dr. Eli Dwek**

Doctor of Philosophy (Ph.D. Astronomy) **Nov 2010 – Nov 2014**
University of Basel, Switzerland
Thesis adviser: **Dr. Isabelle Cherchneff**
Thesis title: Dust formation and evolution in the ejecta of core-collapse supernovae
Grade: **summa cum laude** (Highest Distinction)

Master of Science (M.Sc Physics) **Jul 2008 – Aug 2010**
Indian Institute of Technology Bombay, Mumbai, India
Master's Thesis: Professor. S. H. Patil, CPI: 8.6/10

Bachelor of Science (B.Sc Physics) **Aug 2005 – Jun 2008**
Presidency College Kolkata
Score: 73.4% [First Class] (rank: 6th/approx.4000)

Visiting Researcher

Affiliated Visiting Professor **Jun 2024 – Present**
Niels Bohr Institute, DARK division, Copenhagen, Denmark

Affiliated Visiting Professor **Aug 2021 – Present**
Chalmers Institute of Technology, Gothenburg, Sweden

Scholastic Achievements

- Won the ANRF Advanced Research Grant (ARG) 2025
- Supervisor of three PhD students (ongoing), and one postdoc - Aman Kumar, Sujit Das, Muskan Shaw; Dr. Pritam Banerjee
- Delivered over 14 invited talks in international conferences.
- Winner of 6 JWST GO proposals as Co-I in JWST cycle 1, 2, 3 program.
- Press release - Discovery of large mass of dust in extragalactic supernovae: NASA Webb (<https://webbtelescope.org/>); News article on achievements and discoveries published by Indian Newspaper *Anandabazar Patrika* on Sunday July 16, 2023.
- Written 2 book chapters in the book ‘Supernovae’, Springer, Space Science Reviews Series.
- Reviewer of 19 articles and 2 proposals (Journals: MNRAS, ApJ, Science Advances)
- Won The NASA Astrophysics Theory Proposal (ATP) grant, 2017
- Awarded the Swiss National Science Foundation (SNSF) Early Career Mobility Grant, 2015
- Organizer of 4 international conferences: (a) Kavli Summer Program in Astrophysics – Cool Frontiers : Exploring Dust and Ice in the Cosmos, Virginia, USA, 2025 (b) Conference: Origin and Fate of Cosmic Dust, Gothenburg, Sweden, 2023 (c) European Astronomical Society Annual meeting (EWASS), Session SS6, Liverpool, UK, 2018 (d) Conference: Dust in core-Collapse supernovae near & far, Ascona, Switzerland, 2012.
- Public outreach: *youtube-live: Science beyond books* for high school and college freshers, 2021
- Delivered an introductory astronomy course “The journey of Astronomy” at the Online teaching platform ‘tritiyoparisar’ based in India, Sep - Dec 2021
- Completed course: ‘Introduction to University Pedagogy’ at Copenhagen University, and obtained a certification on ‘Leading for Equity, Diversity and Inclusion in Higher Education’, from the University of Michigan
- Artist-scientist collaboration in Copenhagen, Arka Sarangi (me) and artist Cecilie Falkenstrom created an artwork titled ‘Made of Stardust’, based on scientific data, being displayed in Copenhagen centre, Sifs Plads.

Reviewer

- The Astrophysical Journal (ApJ) - 6 articles • Science Advances - 1 article
- Monthly Notices of the Royal Astronomical Society (MNRAS) - 14 articles
- Distributed Research utilizing Advanced Computing (DiRAC) - Proposal review

Teaching & Assistantship

- Gravitational Dynamics and Galaxy Formation • Journey of Astronomy and its Branches
- Symmetries and Fields • Electrodynamics • Astrophysics and Cosmology
- Classical Mechanics • General relativity • Thermodynamics

International Collaborators

- Comic dust group at the Chalmers University, Sweden (affiliated at visiting researcher)
- JWST – Dust in supernovae, Part of the Transient Science Team, STScI, Baltimore
- Part of Zwicky Transient Facility team
- Several individual collaborations across universities and research groups.

Peer reviewed publication

ORCID id: <https://orcid.org/0000-0002-9820-679X>

Google Scholar: <https://scholar.google.com/citations?user=qwoidhEAAAAJ&hl=en&oi=ao>

All the peer-reviewed publications, peer-reviewed book chapters and peer-reviewed conference papers are in chronological order. **Total Citation: 1313.**

1. “Fading Echoes of Interaction: Probing Centuries of Mass-Loss in Four Old Type II In Supernovae”, Elizabeth Hillenkamp, Raphael Baer-Way, Poonam Chandra, Arkaprabha Sarangi, Roger Chevalier et al. *The Astrophysical Journal*, Submitted, January 2026
<https://doi.org/10.48550/arXiv.2601.19891>
2. “Type Iax supernovae as a source of iron-rich silicate dust”, Aman Kumar & Arkaprabha Sarangi *The Astrophysical Journal*, Accepted, January 2026
<https://doi.org/10.48550/arXiv.2511.15349>
3. “Stochasticity in Stellar Yields Reflected in Theoretical Dust Mass Estimates Across All Type II Supernova Progenitors”, Archana Purushothaman, Arkaprabha Sarangi, & Jeena S K *The Astrophysical Journal*, submitted, 2025
<https://doi.org/10.48550/arXiv.2508.12933>
4. “Dance to Demise: How Massive Stars May Form a Dense Circumstellar Shell Before Explosion”, Sutirtha Sengupta, Das Sujit, & Arkaprabha Sarangi, *The Astrophysical Journal*, in final review, 2025
<https://iopscience.iop.org/article/10.3847/1538-4357/ae129c>
5. “Two Decades of Dust Evolution in SN 2005af through JWST, Spitzer, and Chemical Modeling”, Arkaprabha Sarangi, Szanna Zsiros et al., *The Astrophysical Journal*, in final review, 2025
<https://iopscience.iop.org/article/10.3847/1538-4357/ae0645>
6. “JWST/MIRI detects the dusty SN1993J about 30 years after explosion”, Tamas Szalai, Szanna Zsiros, Jacob Jencson et al., *Astronomy & Astrophysics*, vol. 697, pg A132, 2025
<https://www.aanda.org/articles/aa/abs/2025/05/aa51470-24/aa51470-24.html>
7. “Radiative-transfer models for dusty Type II supernovae”, Luc Dessart, D John Hillier, Arkaprabha Sarangi, *Astronomy & Astrophysics*, vol. 698, pg A293, 2025
https://www.aanda.org/articles/aa/full_html/2025/06/aa55161-25/aa55161-25.html

8. “A Multiwavelength Autopsy of the Interacting Type II_n Supernova 2020ywx: Tracing Its Progenitor Mass-loss History for 100 Yr Before Death”, Raphael Baer-Way, Poonam Chandra et al., *The Astrophysical Journal*, vol. 983, pg 101, 2025
<https://iopscience.iop.org/article/10.3847/1538-4357/adc00a>
9. “Accurate sticking coefficient calculation for carbonaceous dust growth through accretion and desorption in astrophysical environments”, D. Bossion, A. Sarangi, S. Aalto et al. *Astronomy & Astrophysics*, vol. 692, pg A249, 2024
<https://www.aanda.org/articles/aa/abs/2024/12/aa52362-24/aa52362-24.html>
10. “Observations of Newly Formed Dust in the Cold, Dense Shell of the Type II_n SN 2005ip”, M. Shahbandeh, O. Fox, T. Temim, E. Dwek, A. Sarangi, et al. *The Astrophysical Journal*, vol. 985, pg 262, 2025
<https://iopscience.iop.org/article/10.3847/1538-4357/adce77/meta>
11. “SN 2021foa: The “Flip-Flop” Type II_n / Ib_n supernova”, Farias et al. *The Astrophysical Journal*, vol. 977, pg 152, 2024
<https://iopscience.iop.org/article/10.3847/1538-4357/ad8cd3>
12. “Serendipitous detection of the dusty Type IIL SN 1980K with JWST/MIRI”, S. Zsíros, et al. *Monthly Notices of the Royal Astronomical Society*, 2023
<https://academic.oup.com/mnras/article/529/1/155/7612265>
13. “JWST Discovery of Dust Reservoirs in Nearby Type IIP Supernovae 2004et and 2017eaw”, M. Shahbandeh, A. Sarangi, et al. *Monthly Notices of the Royal Astronomical Society*, vol. 523, issue 4, pg 6048, 2023
<https://academic.oup.com/mnras/article/523/4/6048/7213984>
14. “The Young Supernova Experiment Data Release 1 (YSE DR1): Light Curves and Photometric Classification of 1975 Supernovae”, P. Aleo et al. *The Astrophysical Journal Supplement Series*, vol. 266, issue 1, id: 9, 2023
<https://iopscience.iop.org/article/10.3847/1538-4365/acbfba>
15. “Formation, Distribution, and IR emission of Dust in the Clumpy Ejecta of Type II-P Core-collapse Supernovae, in Isotropic and Anisotropic Scenarios”, A. Sarangi, *Astronomy & Astrophysics*, vol. 668, A57, 2022
https://www.aanda.org/articles/aa/full_html/2022/12/aa44391-22/aa44391-22.html
16. “Dust Production in a Thin Dense Shell in Supernovae with Early Circumstellar Interactions”, A. Sarangi & Slavin, J., *The Astrophysical Journal*, vol. 933, issue 1, id: 89, 2022
<https://iopscience.iop.org/article/10.3847/1538-4357/ac713d>
17. “The Infrared Echo of SN2010jl and its Implications For Shock Breakout Characteristics”, E. Dwek, A. Sarangi, R. Arendt, T. Kallman, D. Kazanas & O. Fox *The Astrophysical Journal*, vol. 917, issue 2, id: 84, 2021
<https://iopscience.iop.org/article/10.3847/1538-4357/ac09ea>
18. “The Young Supernova Experiment: Survey Goals, Overview, and Operations”, D. Jones, et al., *The Astrophysical Journal*, vol. 908, issue 2, id: 143, 2021
<https://iopscience.iop.org/article/10.3847/1538-4357/abd7f5>
19. “Dust formation in AGN winds”, A. Sarangi, E. Dwek & D. Kazanas, *The Astrophysical Journal*, vol. 885, id 126, 2019
<https://iopscience.iop.org/article/10.3847/1538-4357/ab46a9>

20. “The Evolution of Dust Opacity in Core Collapse Supernovae and the Rapid Formation of Dust in Their Ejecta”, E. Dwek, A. Sarangi, & R. G. Arendt, *The Astrophysical Journal Letters*, 871, L33, 2019
<https://iopscience.iop.org/article/10.3847/2041-8213/aaf9a8>
21. “Dust in Supernovae and Supernova Remnants I: Formation Scenarios”, A. Sarangi, M. Matsuura & E. Micelotta, *Space Science Reviews, Springer*, Volume 214, Issue 3, id: 63, 2018, Book Chapter
<https://link.springer.com/article/10.1007%2Fs11214-018-0492-7>
22. “Dust in Supernovae and Supernova Remnants II: Processing and Survivals” , E. Micelotta, M. Matsuura & A. Sarangi, *Space Science Reviews, Springer*, Volume 214, Issue 3, id: 53, 2018, Book Chapter
<https://link.springer.com/article/10.1007%2Fs11214-018-0484-7>
23. “Delayed Shock-induced Dust Formation in the Dense Circumstellar Shell Surrounding the Type II In Supernova SN 2010jl”, A. Sarangi, E. Dwek & R. G. Arendt, *The Astrophysical Journal*, 859, 66, 2018
<https://iopscience.iop.org/article/10.3847/1538-4357/aabfc3>
24. “New Insights on What, Where, and How Dust Forms in Evolved Stars”, I. Cherchneff & A. Sarangi *The B[e] Phenomenon: Forty Years of Studies, ASP Conference Series* 508, 57, 2017
http://www.aspbooks.org/a/volumes/article_details/?paper_id=37983
25. “Dust formation in the oxygen-rich AGB star IK Tauri”, D. Gobrecht, I. Cherchneff, A. Sarangi, J. M. C. Plane & S. T. Bromley, *Astronomy & Astrophysics*, 585, A6, 2016
https://www.aanda.org/articles/aa/full_html/2016/01/aa25363-14/aa25363-14.html
26. “Condensation of Dust in the Ejecta of Type II-P Supernovae”, A. Sarangi & I. Cherchneff, *Astronomy & Astrophysics*, 575, A95, 2015
<https://www.aanda.org/articles/aa/abs/2015/03/aa24969-14/aa24969-14.html>
27. “The Chemically Controlled Synthesis of Dust in Type II-P Supernovae”, A. Sarangi & I. Cherchneff, *The Astrophysical Journal*, 776, 107, 2013
<https://iopscience.iop.org/article/10.1088/0004-637X/776/2/107>
28. “Dust Formation in the Inner Wind of the Oxygen-rich AGB Star IK Tau”, D. Gobrecht, I. Cherchneff & A. Sarangi, *Astronomical Society of the Pacific Conference Series* vol. 497, 321, 2015
<http://aspbooks.org/custom/publications/paper/497-0321.html>
29. “IR and Sub-mm fluxes of SN1987A Revisited: when moderate dust masses suffice”, A. Sarangi & I. Cherchneff, *Proceeding of the International Astronomical Union Symposium Volume 296*, pp. 392-394, 2014
<http://articles.adsabs.harvard.edu/full/2014IAUS..296..392S>
30. “Molecules and Dust in the Ejecta of Type II-P Supernovae”, I. Cherchneff & A. Sarangi, *Proceeding of the International Astronomical Union Symposium Volume 296*, pp. 151-154, 2014
<http://articles.adsabs.harvard.edu/full/2014IAUS..296..151C>
31. “Condensation of Dust in Supernova Ejecta”, A. Sarangi & I. Cherchneff, *Proceedings of The Life Cycle of Dust in the Universe: Observations, Theory, and Laboratory Experiments (LCDU2013) Proceedings of the Science*, id. 91, 2013
<https://pos.sissa.it/207/091/>

Please find the updated list at ORCID for papers those are now in review.