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# ASMITA BHANDARE

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## 🔍 RESEARCH INTERESTS .....

Formation and evolution of stars, protostellar disks, and planets

Numerical simulations

Linking theoretical models to observations

## 📄 POSITIONS .....

- Postdoctoral researcher  
Universitäts-Sternwarte München (USM), Munich, Germany November 2023 - present  
*Advisor:* Prof. Dr. Til Birnstiel
- Postdoctoral researcher  
Centre de Recherche Astrophysique de Lyon (CRAL), Lyon, France 2020 - 2023  
*Advisors:* Dr. Benoît Commerçon and Prof. Dr. Guillaume Laibe

## 🎓 EDUCATION .....

- **Ph.D. in Astronomy**  
Max Planck Institute for Astronomy (MPIA), Heidelberg, Germany 2016 - 2020
- **Master of Science in Astrophysics**  
Argelander Institute for Astronomy (AIfA), University of Bonn, Germany 2013 - 2015
- Master of Science in Physics (*discontinued the 2-year program to move to Bonn, Germany*)  
Fergusson College, University of Pune, India 2012 - 2013
- **Bachelor of Science in Physics**  
Fergusson College, University of Pune, India 2009 - 2012

## 📁 RESEARCH EXPERIENCE .....

*Ph.D. Thesis:* Numerical simulations of star and disk formation 2016 - 2020  
*Advisors:* Prof. Dr. Thomas Henning (MPIA), Prof. Dr. Rolf Kuiper (University of Tübingen), Dr. Christian Fendt (MPIA)

*Master Thesis:* Investigation of the effects of stellar encounters on protoplanetary disk size 2014 - 2015  
*Advisor:* Prof. Dr. Susanne Pfalzner (Max Planck Institute for Radio Astronomy, Bonn, Germany)

*Summer internship:* X-ray emission from the Active Galactic Nuclei: H1821+643 2013  
*Advisor:* Prof. Dr. Gulab Chand Dewangan (Inter-University Centre for Astronomy and Astrophysics, Pune, India)

*Bachelor Thesis:* Exoplanet Transit Studies of WASP-12 b and HAT-P-7 b 2011 - 2012  
*Advisor:* Dr. Firoza Sutaria (Indian Institute of Astrophysics, Bangalore, India)

## 📁 EXPERTISE .....

- Numerical tools: Radiation magneto-hydrodynamics grid codes (PLUTO, RAMSES), N-body codes
- Programming: Python, C, C++, HTML
- Softwares and Tools:  $\text{\LaTeX}$ , Git, Jupyter Notebook, Atom, Vim, PyCharm
- Operating Systems: macOS, Linux, Windows

## 🏛️ TEACHING EXPERIENCE .....

- Tutor for the Advanced Laboratory Course on “CCD photometry in modern astronomy” SS 2018
- Tutor for the Advanced Laboratory Course on “Photometry of Star Clusters” SS 2014, WS 2015
- Tutor for the course on “The physics of dense stellar systems” by Prof. Pavel Kroupa SS 2014

## ★ OBSERVING EXPERIENCE .....

Exoplanet transit observations using:

- 1.23 m telescope, Calar Alto Observatory, Spain (for Project EDEN) 10 nights
- MPG / ESO 2.2m, La Silla, Chile 5 nights
- 2m Himalayan Chandra Telescope, Indian Astronomical Observatory, Hanle, Ladakh 2 nights

## 📄 PUBLICATIONS .....

Lead author:

- **Bhandare A.**, Commerçon B., Laibe G., Flock M., Kuiper R., Henning Th., Mignone A., and Marleau G-D., “*Mixing is easy: new insights for cosmochemical evolution from pre-stellar core collapse*”, 2024, A&A, arXiv: 2404.09257
- **Bhandare A.**, Kuiper R., Henning Th., Fendt C., Flock M., and Marleau G-D., “*Birth of convective low-mass to high-mass second Larson cores*”, 2020, A&A, 638, A86
- **Bhandare A.** and Pfalzner S., “*DESTINY: Database for the effects of stellar encounters on disks and planetary systems*”, 2019, Computational Astrophysics and Cosmology, 6: 3
- **Bhandare A.**, Kuiper R., Henning Th., Fendt C., Marleau G-D., and Kölligan A., “*First core properties: From low- to high-mass star formation*”, 2018, A&A, 618, A95
- **Bhandare A.**, Breslau A., and Pfalzner S., “*Effects of inclined star-disk encounter on protoplanetary disk size*”, 2016, A&A, 594, A53

Co-author:

- Leclerc A., Jezequel L., Perez N., **Bhandare A.**, Laibe G., and Delplace P., “*The Exceptional Ring of buoyancy instability in stars*”, 2023, Physical Review Research, L012055
- Lin CL. et al. (including **Bhandare A.**), “*EDEN: Flare Activity of the Nearby Exoplanet-hosting M Dwarf Wolf 359 Based on K2 and EDEN Light Curves*”, 2021, The Astronomical Journal, 162, 11
- Pfalzner S., Aizpuru Vargas L., **Bhandare A.**, and Veras D., “*Significant interstellar object production by close stellar flybys*”, 2021, A&A, 651, A38
- Rosen A. L., Offner S. S. R., Sadavoy S. I., **Bhandare A.**, Vázquez-Semadeni E., and Ginsburg A., “*Zooming in on Individual Star Formation: Low- and High-mass Stars*”, 2020, Space Science Reviews, 216, 62
- Zhao B. et al. (including **Bhandare A.**), “*Formation and Evolution of Disks Around Young Stellar Objects*”, 2020, Space Science Reviews, 216, 43
- Gibbs A. et al. (including **Bhandare A.**), “*EDEN: Sensitivity Analysis and Transiting Planet Detection Limits for Nearby Late Red Dwarfs*”, 2020, The Astronomical Journal, 159, 169
- The ‘Oumuamua ISSI team, “*Natural History of ‘Oumuamua*”, 2019, Nature Astronomy, 3, 594-602
- Pfalzner S., **Bhandare A.**, Vincke K., and Lacerda P., “*Outer solar system possibly shaped by a stellar fly-by*”, 2018, ApJ, 863, 45
- Pfalzner S., **Bhandare A.**, and Vincke K., “*Did a stellar fly-by shape the planetary system around Pr 0211 in the cluster M 44?*”, 2017, A&A, 610, A33
- Pfalzner S. et al. (including **Bhandare A.**), “*Observational constraints on star cluster formation theory. I. The mass-radius relation*”, 2016, A&A, 586, A68

## 🏆 ACHIEVEMENTS AND AWARDS .....

- Best poster prize at “The Early Phase of Star formation (EPoS) 2018: Archetypes” in Ringberg, Germany 2018
- Honourable mention for the poster presented at “Star formation from cores to clusters” in Santiago, Chile 2017
- First prize for a lecture competition organized by the Indian Physics Association 2013
- Second best poster prize at the “17th National Space Science Symposium” in Tirupati, India 2012
- Successfully got over 10 follow-up observations of known near-Earth objects allowing further refinements to their orbit calculations during the “All India Asteroid Search Campaign (AIASC)” as part of the International Asteroid Search Campaign 2010
- Contributed to the International Meteor Organization (Visual Meteor shower observations), under an Indian Space Research Organization (ISRO) project 2010 - 2012

## 👤 ORGANIZATIONAL RESPONSIBILITIES .....

- Member of the LOC for “The Physics of Star Formation: From Stellar Cores to Galactic Scales” (Star@Lyon), Lyon, France 2023
- Weekly journal club co-organizer at the CRAL 2021 - 2023
- Volunteered as a session host at the European Astronomical Society (EAS) Annual Meeting 2021
- Member of the LOC for “The Early Phase of Star formation (EPoS) 2020: Insights from Dynamics”, Ringberg, Germany - *Cancelled due to COVID-19* 2020
- MPIA Student Representative 2017 - 2019
- IMPRS Student Representative 2016 - 2019
- Member of the LOC & SOC for the Heidelberg-Harvard workshop “The physics of star formation” 2018
- Editorial Board Member for the monthly newsletter “Dimensions” published by the Astro Club at the Department of Physics, Fergusson College, Pune, India 2010 - 2012
- Member of the LOC for “Frontiers in Physics” - a yearly seminar at Fergusson College 2009 - 2013

## ⇒ EDUCATION AND PUBLIC OUTREACH .....

- Engaged in education and science outreach activities as an Associate Scientist at the IAU Office of Astronomy for Education in Heidelberg, Germany 2021 - present
- Volunteered as a mentor for the Supernova Foundation 2021 - present
- Volunteered as a pen-pal for the “Letters to a Pre-Scientist” program 2019 - 2023
- Member of the SOC & LOC for the 4th Shaw-IAU workshop on Astronomy for Education 2022
- Member of the SOC & LOC for the 3rd Shaw-IAU workshop on Astronomy for Education 2021
- Member of the LOC for the IAU Offices Family Meeting 2021
- Organized the Max Planck Day Science Slam 2018
- Organized and volunteered for several public outreach programs in India 2007 - 2013

## TALKS AND POSTER PRESENTATIONS .....

- Talk: “Mixing is easy: new insights on gas-dust dynamics during star and disk formation”  
@ SPiCE workshop, Sendai, Japan March 2024
- Talk: “Gas and dust dynamics during protostellar collapse”  
@ (Virtual) PROMETHEE workshop III, Lyon, France November 2023
- Talk: “Mixing is easy: new insights from pre-stellar core collapse for cosmochemical evolution”  
@ The formation of protoplanetary disks (DISKBUILD Meeting IV), Treilles, France November 2023
- Poster: “Unravelling the effects of gas and dust dynamics during protostellar collapse”  
@ Magnetohydrodynamical flows in young circumstellar disks, Ringberg, Germany October 2023
- Poster: “Unravelling the effects of gas and dust dynamics during protostellar collapse”  
@ The Physics of Star Formation: From Stellar Cores to Galactic Scales (Star@Lyon), France June 2023
- Talk: “Resolving dust pockets in young protostellar disks”  
@ DISKBUILD Meeting III, Nancy, France May 2023
- Poster: “Unravelling the effects of gas and dust dynamics during protostellar collapse”  
@ Protostars and Planets VII, Kyoto, Japan April 2023
- Talk: “Unravelling the birth of stars and protostellar disks”  
@ (Virtual) Computational Astrophysics Seminar, University of Duisburg-Essen, Germany January 2023
- Talk: “Unravelling the birth of stars and protostellar disks”  
@ PROMETHEE workshop II, Grenoble, France November 2022
- Talk: “Unravelling the birth of stars and protostellar disks”  
@ CRAL Internal Seminar, Lyon, France September 2022
- Talk: “The interplay of gas and dust dynamics during star and disk formation”  
@ (Virtual) Planet and binary formation in gravitationally unstable protoplanetary disks in the high-resolution era, Leicester, UK September 2022
- Talk: “Unravelling the birth of stars and protostellar disks”  
@ University Observatory Munich Colloquium, Munich, Germany July 2022
- Talk: “Unravelling the birth of stars and protostellar disks”  
@ MPE-CAS Journal Club, Munich, Germany July 2022
- Talk: “Zooming in on star and disk formation”  
@ (Virtual) 24th Meeting on Research in Astronomy at IASBS, Zanjan, Iran June 2022
- Talk: “The interplay of gas and dust dynamics during star and disk formation”  
@ DISKBUILD Meeting I, Paris, France May 2022
- Poster: “The interplay of gas and dust dynamics during star and disk formation”  
@ The Early Phase of Star formation (EPoS) 2022: Insights from Dynamics, Ringberg, Germany April 2022
- Talk: “Birth of convective protostars”  
@ (Virtual) PROMETHEE workshop I, Grenoble, France November 2021
- Talk: “Zooming in on star and disk formation”  
@ Königstuhl Colloquium, MPA, Heidelberg, Germany October 2020
- Talk: “Zooming in on star and disk formation”  
@ (Virtual) Annual Meeting of the German Astronomical Society 2020 September 2020
- Talk: “Zooming in on star and disk formation”  
@ Astro-colloquium, Institute for Astronomy and Astrophysics, Tübingen, Germany January 2020
- Talk: “Zooming in on the early stages of star and disk formation”  
@ Stars, Planets, & ISM seminar, Department of Astronomy, UT Austin, USA November 2019
- Talk: “Zooming in on the early stages of star and disk formation”  
@ Stars & Planets seminar, CfA, Cambridge, MA, USA November 2019

- Poster: “Early stages of star and disk formation”  
@ Harvard-Heidelberg workshop on Star Formation: Linking Observations and Simulations,  
CfA, Cambridge, MA, USA November 2019
- Talk: “Zooming in on the early stages of star and disk formation”  
@ Fachbeirat 2019, MPIA, Heidelberg, Germany November 2019
- Talk: “Early stages of star and disk formation”  
@ ITA blackboard colloquium, Heidelberg, Germany July 2019
- Poster: “Early stages of star and disk formation”  
@ Zooming in on Star Formation, Nafplio, Greece June 2019
- Talk: “Earliest stages of star and disk formation”  
@ Star formation workshop, International Space Science Institute (ISSI), Bern, Switzerland May 2019
- Talk: “From molecular cores to hydrostatic cores”  
@ The physics of star formation: Gas flows from Milky Way cloud scales to protostellar disks,  
a Heidelberg-Harvard workshop, MPIA, Heidelberg, Germany December 2018
- Talk: “From molecular cores to hydrostatic cores”  
@ Centre de Recherche Astrophysique de Lyon (CRAL), Lyon, France November 2018
- Poster: “Early stages of low- to high-mass star formation”  
@ The Wonders of Star Formation, Edinburgh, Scotland September 2018
- Poster: “First core properties: from low- to high-mass star formation”  
@ The Olympian Symposium 2018, Mount Olympus, Greece May 2018
- Poster and Talk: “From molecular cloud cores to hydrostatic cores”  
@ The Early Phase of Star formation (EPoS) 2018: Archetypes, Ringberg, Germany May 2018
- Talk: “From clouds to cores”  
@ PSF coffee, MPIA, Heidelberg, Germany April 2018
- Poster: “First core lifetime from low-mass to high-mass star formation”  
@ SPF2: Star and Planet Formation in the Southwest, Oracle, Arizona, USA March 2018
- Talk: “First core lifetime from low-mass to high-mass star formation”  
@ ISM day, Hamburg Observatory, Germany February 2018
- Poster: “Numerical simulations of low-mass star formation”  
@ Star formation from cores to clusters, Santiago, Chile March 2017
- Talk: “Effects of inclined star-disk encounter on protoplanetary disk size”  
@ PSF coffee, MPIA, Heidelberg, Germany September 2016
- Poster: “Effects of star-disk encounters on protoplanetary disks”  
@ DGG conference, Münster, Germany March 2016
- Poster: “Effects of star-disk encounters on protoplanetary disks”  
@ The Formation of the Solar System II, Berlin, Germany June 2015
- Poster: “Study of Transiting Exoplanets WASP-12 b and HAT-P-7 b”  
@ National Student Symposium on Physics, Chandigarh, India February 2013
- Poster: “Study of Transiting Exoplanet - WASP-12 b”  
@ The 17th National Space Science Symposium, Tirupati, India February 2012

## OTHER CONFERENCES, WORKSHOPS AND SUMMER SCHOOLS .....

- DISKBUILD Meeting II  
@ CRAL, Lyon, France December 2022
- MIAPP program: Gaps, Rings, Spirals, and Vortices: Structure formation in planet-forming disks  
@ Munich Institute for Astro- and Particle Physics (MIAPP), Munich, Germany October 2021
- European Astronomical Society (EAS) Annual Meeting  
@ (*Virtual*) Leiden University/Leiden Observatory, The Netherlands June-July 2021

- PLUTO symposium  
@ (*Virtual*) Torino University, Italy June 2021
- “From prestellar cores to solar nebulae II”  
@ (*Virtual*) Institute Pascal, Paris, France May 2021
- Invited “Young scientist” for a workshop on the interstellar object 1I/‘Oumuamua  
@ ISSI in Bern, Switzerland November 2018
- NBIA summer school on “Astrophysical plasmas - from planets to galaxies”  
@ Niels Bohr Institute, Copenhagen, Denmark August 2017
- “Physics of star formation: Milky Way and Beyond”, a Heidelberg-Harvard workshop  
@ Max Planck Institute for Astronomy, Heidelberg, Germany November 2016
- “Exoplanets in Lund 2015”  
@ Lund Observatory, Sweden May 2015
- “The Formation of the Solar System”  
@ Max Planck Institute for Radio Astronomy, Bonn, Germany May 2014
- Vacation Students Programme  
@ Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India Summer 2013
- Summer School organized by the Indian Institute of Astrophysics (IIA), Bangalore, India  
@ Kodaikanal Observatory Summer 2012
- 12th PLANEX workshop on “Exploration of Asteroids and Comets” organized by  
PLANEX, Physical research laboratory (PRL), Ahmedabad, India  
@ Mt. Abu, Rajasthan, India January 2012
- Summer Internship Programme  
@ Indian Institute of Astrophysics, Bangalore, India Summers 2011 and 2012
- “Frontiers in Physics” - a yearly seminar series  
@ Fergusson College, Pune, India 2009 - 2013