

# Kartik Rajan Neralwar

## Curriculum Vitae

### Education

- 07/2021–Present **Ph.D. student**, International Max Planck Research School (IMPRS), *Universität Bonn*, research performed at *Max Planck Institute for Radio Astronomy (MPIfR)*, Germany  
Thesis: “Understanding the effects of stellar feedback on ISM using STARFORGE simulation”; advisors: Dr. Dario Colombo; Prof. Dr. Karl Menten, Prof. Dr. Pavel Kroupa; expected submission in June 2025.
- 09/2018–01/2021 **Master of Science (Astrophysics)**, *Universität Bonn*, Germany  
Thesis: “The SEDIGISM survey: Morphology of molecular clouds”; advisors: Dr. Dario Colombo; Prof. Dr. Karl Menten, Prof. Dr. Pavel Kroupa.
- 07/2015–06/2018 **Bachelor of Science (specialisation in Physics)**, *Fergusson College*, Pune, India  
Thesis: “Finding observational proxies for the forces acting during the initiation stage of Coronal Mass Ejections (CMEs)”; advisors: Dr. K. Sasikumar Raja and Prof. Dr. Prasad Subramanian at IISER Pune

### Experience

#### Teaching and Tutoring

- 06/2024–09/2024 **Co-organiser and speaker**, DEEP LEARNING IN ASTROPHYSICS *workshop series*, Regionales Rechenzentrum der Universität zu Köln, Germany  
Co-organised two workshops on Deep Learning in Astrophysics and gave lectures on the topics "Introduction to Deep Learning" and "A simplified view of neural networks".
- 09/2023–02/2024 **Tutor**, STATISTICAL METHODS FOR ASTROPHYSICS AND COSMOLOGY, University of Bonn, Germany  
Tutored the course astro8506: Statistical methods for astrophysics and cosmology for M.Sc. Astrophysics.
- 05/2016–04/2017 **Fellow**, SCIENCE EDUCATION INITIATIVE (SEI), Pune, India  
Taught science and mathematics to students in grade 5 in a government school in Pune. Trained fellow inductees at Science Education Initiative (SEI) in basic physics.

#### Outreach

- 2016–2018 **Member**, *Astro club*, Fergusson College, Pune, India  
Organised students' seminars, exhibitions and poster presentations related to astronomy as a member of Astro Club.
- 02/2017 & 02/2018 **Volunteer**, **National Science Day**, *IUCAA*, Pune, India  
Presented a poster on "The Multiwavelength Observations of the Sun" (Year 1) and gave a talk on Galileo Galilei's life and work (Year 2) to general public.

#### Telescope observations

- 2021-2022 **Atacama Pathfinder EXperiment (APEX)**, OBSERVER, Atacama, Chile  
Assisted the operators at the single-dish (sub-)millimeter telescope in collecting data for multiple projects.

#### Internship

Auf dem Hügel 69 – 53121 Bonn, Germany

+49 (0)228-525-468 • [✉ kneralwar@mpifr-bonn.mpg.de](mailto:kneralwar@mpifr-bonn.mpg.de)

[🌐 kartik-neralwar.github.io/](https://github.com/kartik-neralwar) • [🆔 0000-0003-3205-4460](https://orcid.org/0000-0003-3205-4460)

05/2016–08/2016 **Summer Intern, Dr. K. Sasikumar Raja, IISER, Pune, India**  
Design and characterisation of a low-frequency log-periodic dipole antenna (LPDA) to monitor radio transient emissions from the solar corona using high-frequency structure simulator (HFSS).

---

## Oral and Poster Presentations

- 07/2023 Oral presentation and poster on **Identification of stellar wind signatures in the Milky Way using the CASI-3D CNN algorithm** at National Astronomical Meetings, Cardiff, UK and at the European Astronomical Society meeting, Krakow, Poland, respectively.
- 06/2022 Poster on **A machine oriented hunt for feedback in Milky Way** at From Stars to Galaxies II, Sweden.
- 02/2020 Poster on **Morphological classification of molecular clouds** at APEX 2020 meeting, Schloss Ringberg, Tegernsee, Kreuth.
- 06/2019 Paper presentation on **An intuitive 3D map of the Galactic warp's precession traced by classical Cepheids** at AlfA, Bonn, Germany.
- 02/2016 Poster on **Maunder Minimum** at the National Conference 'Frontiers in Physics' at Pune.

---

## Professional Development and Training

- 08/2023 **Carl-Zeiss-Stiftung-Summer-School 2023**, Heidelberg, Germany
- 05/2023 **AI for Science - Bootcamp with NVIDIA**, Max Planck Computation and Data Facilities, Germany, (attended online)
- 01/2023 **Machine learning in Python with scikit-learn**, FUN-MOOC, France Université Numérique, Online course
- 11/2022 **Python for HPC workshop**, Max Planck Computation and Data Facilities, Germany, (attended online)
- 10/2022 **ASTRO HACK WEEK 2022 workshop**, Heidelberg, Germany, (attended online)
- 11/2021 **IAA Severo Ochoa Advanced School on Star Formation**, Granada, Spain
- 08/2017 **Python Programming: A Concise Introduction**, Coursera, Wesleyan University, Online course
- 05/2017 **Programming for Everybody (Getting Started with Python)**, Coursera, University of Michigan, Online course
- 04/2017 **Confronting The Big Questions: Highlights of Modern Astronomy**, Coursera, University of Rochester, Online course

---

## Collaborations

SEDIGISM “**Structure, Excitation and Dynamics of the Inner Galactic Interstellar Medium**” is a 84 deg<sup>2</sup> spectroscopic survey of the inner Galactic disc in the 2-1 transitions of <sup>13</sup>CO(2-1) and C<sup>18</sup>O(2-1) observed using the APEX telescope.  
“sedigism.mpifr-bonn.mpg.de”

Auf dem Hügel 69 – 53121 Bonn, Germany

☎ +49 (0)228-525-468 • ✉ [kneralwar@mpifr-bonn.mpg.de](mailto:kneralwar@mpifr-bonn.mpg.de)

🌐 [kartik-neralwar.github.io/](https://kartik-neralwar.github.io/) • 🆔 0000-0003-3205-4460

2/3

OGHReS “**Outer Galaxy High Resolution Survey**” is a 100 deg<sup>2</sup> APEX legacy survey of the outer Galactic disc in the 2-1 transitions of CO, <sup>13</sup>CO(2-1) and C<sup>18</sup>O(2-1) in the 1 mm window. “[sedigism.mpifr-bonn.mpg.de/oghres/](https://sedigism.mpifr-bonn.mpg.de/oghres/)”

STARFORGE The “**Star Formation in Gaseous Environments**” Project is a multi-institution initiative to develop cutting-edge computer simulations of star formation, and to use them to tackle some of the biggest questions in star formation: “[users.flatironinstitute.org/~mgrudic/starforge](https://users.flatironinstitute.org/~mgrudic/starforge)”

---

## Observing programs

- Co-I of the APEX observing program M9513C\_113, “Shaping the ISM: filaments and bubbles in the outer Galaxy” (PI: D. Colombo)

---

## Computer skills

Programming PYTHON 2 & 3, BASH

Packages tensorflow, pytorch, yt, scikit-learn, astrodendro, pandas, matplotlib, seaborn

Astrophysical Software RADMC-3D, Common Astronomy Software Applications (CASA), High Frequency Structure Simulator (HFSS), Modules for Experiments in Stellar Astrophysics (MESA)

Others Slurm data scheduler, wandb.ai

---

## Supervision of students

Internship “*CASI-3D U-Net for <sup>13</sup>CO Bubbles Prediction*”

Candidate Rushil R. Malode

Supervisors K. R. Neralwar, D. Colombo

Period June 2024 – July 2024

Internship “*Identification of Stellar Feedback features in STARFORGE Simulation*”

Candidate Suryansh Patidar

Supervisors D. Colombo, K. R. Neralwar

Period May 2024 – June 2024

---

## Languages

- Marathi (mother-tongue)
- Hindi
- English
- German (B1)