

## ASHWIN KUMAR KARNAD

✉ [ashwin-kumar.karnad@mpsd.mpg.de](mailto:ashwin-kumar.karnad@mpsd.mpg.de)   ✉ [ashwinkumar.k.rao@gmail.com](mailto:ashwinkumar.k.rao@gmail.com)  
🌐 Webpage: [ashwinschronicles.github.io](https://ashwinschronicles.github.io)   🐙 Github : [iamashwin99](https://github.com/iamashwin99)

### Education

---

2022     BITS - PILANI UNIVERSITY, INDIA  
          *Int. MSc. Physics and B.E Electronics and Instrumentation (Dual Major) CGPA - 7.71 / 10.0*

2017     VVS GJ PU COLLEGE, MYSORE - CLASS 12<sup>th</sup>  
          *KSEB Board. Marks : Physics - 100%, Chemistry - 96 %, Mathematics 99%*

2015     DEMONSTRATION SCHOOL - CLASS 10<sup>th</sup>  
          *CBSE Board. 9.8/10 CGPA*

All India Rank in competitive examinations: TOEFL (score) 106/120, NGPE- Top 30, KVPY-55, UGC -CSIR NET 67

### Interests

---

- Experimental and computational condensed matter physics (magnetism and superconductivity).
- Instrument design, Electrical drive system, Interfacing sensors with microcontrollers, Power management.
- Solving real-world problems using Distributed Ledger Technology and Neuromorphic Computing.

### Relevant Work Experience

---

2022-23     *Research Software Engineer, MPI FOR THE STRUCTURE AND DYNAMICS OF MATTER, Hamburg.*  
          Worked on Computational Scientific support, massively parallel HPC codes and HPC infrastructure maintenance, Postopus: a python package for POSTprocessing of OctoPUS simulations.

### Projects and Experiences

---

#### Past Projects

- Studying the effect of high spin orbit coupling material in Josephson Junctions, at *Superconductivity lab, NISER, Bhubaneswar, India.*
- Design of a cryogenic probe for transport measurements at *Superconductivity lab, NISER, Bhubaneswar, India.*
- Design and Simulation of Battery Management System Algorithms for Electric Vehicle Applications. *Kaynes Technology India Pvt Limited, Mysore, India.*
- Simulation of IR seeker missiles and its counter measure in *Defence Avionics Research Establishment - DRDO, Bangalore, India.*

- **GrayBlock Power:** Decentralized financing of energy projects via smart contracts written on public blockchains. (Worked as software developer and project coordinator)
- **Team Imitato:** Designing an exosuit to control a humanoid that can be beneficial in reaching in-accessible and non-human conditions. (Worked as Electronics, Communication and Haptics Control head)
- **A Novel Stove Stand:** Designed and built a contraption to harness electricity (about 20W) from the otherwise wasted heat energy produced while burning LPG gas for cooking. It also reduced the cooking time.
- **Pressure sensitive mat:** A mat that can sense touch, enabling the determination of different poses such as Running, Jumping, one leg hop etc.. ( Worked in electronics and algorithm design ).
- Past electronics team member of **Hyperloop India** and **Project Kratos**.

For more completed projects visit my web page, [ashwinschronicles.github.io](https://ashwinschronicles.github.io)

## Ongoing Projects

- **comfybikes.de:** A simple and smart app that helps you find the optimal saddle height for your bike using image detection techniques.

## Articles and Publications

---

- Senapati, T., **Karnad, A.K.** & Senapati, K. Phase biasing of a Josephson junction using Rashba–Edelstein effect. **Nature Communications** 14, 7415 (2023)
- Presented a paper entitled “Algorithms in ancient Indian Mathematics and Astronomy” at “National Conference on Ancient Indian Knowledge: Science and Technology 2018”, *National Council of Educational Research and Training, New Delhi*.
- “Gravitational waves really exist!”. *Dream 2047 (Vigyanprasar)*, 18(7): 28–29, Apr. 2016.
- Review articles on scientific and hobbyist instruments on [element14.com](https://element14.com)

## Honors and Awards

---

2023	1st place, Rad-Daten-Hackathon: worked on comfybikes.de an app to suggest optimal saddle height for your bike using image detection.
2022	1st place, COMPAR EU hackathon: Created an AI-based solution for a data platform which helps patients manage their serious chronic illness.
2019	National top 30 in NGPE-19 exam (Graduate physics exam with 11372 candidates).
2019	3 <sup>rd</sup> place in Open CBR Hackathon organised by University of Leeds.
2018	Awarded Kishore Vaigyanik Protsahan Yojana (KVPY) 2017 <b>Fellowship by Govt. of India</b> .

- 2018      Offered Innovation in Science Pursuit for Inspired Research (INSPIRE) 2017 Scholarship by Govt. of India.
- 2016      Awarded ISCA Travel award by Infosys Foundation.
- 2014-16   Participated in 103<sup>rd</sup> Indian Science Congress held at Mysore, India (2016); IRIS science fair organised by Intel at Delhi, India (2016); Rashtriya Kishore Vaigyanik Sammelan of 102<sup>nd</sup> Indian Science Congress held at Mumbai, India (2015); 41<sup>st</sup> Jawaharlal Nehru National Science Exhibition at Chandigarh (2014) (Presenting the device stated as “A Novel Stove Stand”).

## Relevant Coursework

---

**Physics :** • Quantum Mechanics I&II • Non-Linear Dynamics • Solid State Physics • Atomic and molecular Physics • Nuclear and Particle Physics • Quantum Information and Computing • Quantum Information Theory • Electromagnetic theory I&II • Classical Mechanics • Statistical Mechanics

**Electronics :** • Analog and Digital circuits • Microelectronics • Microprocessors and interfacing • Digital circuits • Electric Machines • Signals and Systems • Control Systems • Digital Image Processing • Modern Control Systems • Analog and Digital VLSI design • Transducers and measurement techniques • Electronics instruments & instrumentation technology • Object Oriented Programming

## Skills

---

**Computational:** • Python (pytest, numpy, pandas, xarray, plotting libraries) • Shell • Git • LabVIEW • Matlab • JavaScript • L<sup>A</sup>T<sub>E</sub>X • C++ • Verilog • 3D CAD modeling (Onshape, Fusion 360) • PCB Design (Eagle CAD)

**Instrumentation:** • Photolithography • DC Magnetron sputtering • Physical Property Measurement System (DCR and VSM) • SEM, FIB and GIS

## List of Referees

---

1. PROF. KARTIKESWAR SENAPATI  
Associate Professor  
School of Physical Sciences  
National Institute of Science Education and Research,  
Bhubaneswar – 752050, Odisha, India.  
Email: kartik@niser.ac.in  
(MASTERS THESIS SUPERVISOR)
2. PROF. HANS FANGOHR  
Head - SSU Computational Science  
Max Planck Institute for Structure and Dynamics of Matter  
Luruper Chaussee 149  
22761 Hamburg, Germany  
Email: hans.fangohr@mpsd.mpg.de  
(CURRENT SUPERVISOR)
3. DR. DHAVALA SURI  
Assistant Professort  
Centre for Nano Science and Engineering (CeNSE),  
Indian Institute of Science,  
Bangalore, Karnataka, India.  
Email: dsuri@iisc.ac.in  
(RESEARCH MENTOR)