

## ASHWIN KUMAR KARNAD

### Contact

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### Education

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- 2022      BITS - PILANI UNIVERSITY, KK BIRLA GOA CAMPUS  
*Int. MSc. Physics and B.E Electronics and Instrumentation (Dual Major) CGPA - 7.5/10.0*
- 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, ComedK - 113, KCET - 592.

### Interests

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

### Relevant Work Experience

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

### Projects and Experiences

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#### 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)
- Determination of temperature of stars by analysing images obtained from a simple camera.
- **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, Rightward-leftward movement, 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.

## Articles and Publications

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- Phase biasing of a Josephson junction using Rashba-Edelstein effect. Senapati, T., **Karnad, A.** & Senapati, K. ( Accepted in **Nature Communications** #NCOMMS-23-17614B )
- “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

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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 <i>organised by University of Leeds</i> .
2018	Presented a paper entitled “Algorithms in ancient Indian Mathematics and Astronomy” at “National Conference on Ancient Indian Knowledge: Science and Technology”, <i>National Council of Educational Research and Training, New Delhi</i> .
2018	Awarded Kishore Vaigyanik Protsahan Yojana (KVPY) 2017 Fellowship by <i>Govt. of India</i> .

- 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      Participated in IRIS science fair organised by Intel at Delhi, India.
- 2015      Participated in Rashtriya Kishore Vaigyanik Sammelan of 102<sup>nd</sup> Indian Science Congress held at Mumbai, India.
- 2014      Participated in 41<sup>st</sup> Jawaharlal Nehru National Science Exhibition at Chandigarh (Presenting the device stated as “A Novel Stove Stand”).

### Relevant Coursework

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**Physics :** • Electromagnetic theory I&II • Classical Mechanics • Statistical Mechanics • 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 • Nanotechnology and Nanosensors, Part1&2 - Israel Institute of Technology (Coursera)

**Electronics :** • Microelectronics • Microprocessors and interfacing • Digital circuits • Electric Machines • Introduction to Data Science in Python-University of Michigan (Coursera) • 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

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

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

### List of Referees

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1. PROF. KARTIKESWAR SENAPATI  
Associate Professor  
School of Physical Sciences  
National Institute of Science Education and Research,  
Bhubaneswar – 752050, Odisha, India.  
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2. DR. DHAVALA SURI  
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Centre for Nano Science and Engineering (CeNSE),  
Indian Institute of Science,  
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3. PROF. RAM SHANKER PATEL

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*Department of Physics*

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