ASHWIN KUMAR KARNAD

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🌐 *Webpage: ashwinschronicles.github.io*   ⭕ *Github: 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 12th
	KSEB Board. Marks : Physics - 100%, Chemistry - 96 %, Mathematics 99%
2015	DEMONSTRATION SCHOOL - CLASS 10th
	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. (Worrked 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

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

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	3rd place in Open CBR Hackathon *organised by University of Leeds.*
2018	Awarded Kishore Vaigyanik Protsahan Yojana (KVPY) 2017 **Fellowship by *Govt. of India*.**

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 103rd Indian Science Congress held at Mysore, India (2016); IRIS science fair organised by *Intel* at Delhi, India (2016); Rashtriya Kishore Vaigyanik Sammelan of 102nd Indian Science Congress held at Mumbai, India (2015); 41st 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 •LaTeX • 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)