Curriculum Vitae

Research Experience

University of Ferrara and INFN, PhD Student

Jan 2020 - Present

- Currently a member of the JEDI Collaboration dedicated to measuring the Electric Dipole Moment of charged particles using storage rings.
- Working on Optimization of Spin Coherence Time (SCT) of charged particles at a prototype Storage Ring for Electric Dipole Moment Measurements.
- Used data-driven approach to optimize chromaticities to find maximum SCT.
- Successfully implemented parallelization framework using shell scripting on BMad accelerator simulation program.
- Jointly contributing to the development of a Tracking Hodoscope for JEDI's High Precision Polarimeter.

Defence Research and Development Organization, Research Fellow

Dec 2017 – Dec 2019

- Worked on development of Lightweight Radiation Shielding for applications in Nuclear Defence.
- Responsible for creation of a Geant4 simulation environment to characterize shielding against Galactic Cosmic Rays and Van-Allen Belt protons.
- Successfully incorporated the MIRD Human Phantom and BON GCR model to estimate expected dose-rates to astronauts inside an Orbital Re-entry Vehicle.

University of Glasgow, Postgraduate Researcher

June 2016 – Aug 2016

- Worked on Exotic mesons and glue ball searches at a future Electron Ion Collider, to be built at Jefferson Labs.
- Created an algorithm in ROOT to Generate Monte-Carlo meson production events according to a theorized e-p interaction model, and simulate its detection based on the design parameters of the MEIC ultra-forward detection systems.
- Performed analysis of the simulation results and suggested expected yields and required improvements in the current detector design to increase chances of discovery.

Bhabha Atomic Research Centre, Project Trainee

Feb 2015 – June 2015

- Worked on the Simultaneous Determination of diffusion coefficients of hydrogen and deuterium in Zr – 2.5% Nb alloy using Hot Vacuum Extraction - Quadrupole Mass Spectrometry (HVE-QMS).
- Performed device operation, data collection and organization, calculation of results (using MATLAB) as well as routine and maintenance activities

Bhabha Atomic Research Centre, Project Trainee

June 2014 – Aug 2014

- Worked on the Non-destructive determination of isotopic composition of uranium samples through passive gamma spectrometry.
- Created a streamlined algorithm in MATLAB to accept spectral data from the MCA and produce the estimated value of isotopic composition, possibly saving many hours of manual calculation.
- Also worked on an additional project on Quantitative assay of rare-earth elements in samples of fly-ash using neutron activated gamma spectrometry.

Variable Energy Cyclotron Centre, Project Trainee

July 2013 – Aug 2013

- Worked on the Gamma spectrometric study of iodine isotopes obtained in alpha induced fission of uranium.
- Performed irradiation of a Uranium sample with a 40MeV alpha beam and measured high resolution spectra from the short-lived fission isotopes using a HPGe 'Clover' detector and coincidence circuits.

Teaching and Additional Work Experience

The Great Eastern Institute of Maritime Studies, Faculty of Physics

Oct 2017 – Dec 2017

- Worked as a visiting faculty to teach Trainee Navigating Officer Course (TNOC) students intermediate level concepts in physics.
- Responsible for creating a lesson plan with presentations and student notes, conducting continuous assessments and designing the mid-term exam question paper for the students based on the pattern prescribed by the International Maritime Organization.

Voyage Aerospace, Software Developer

July 2014 – Jan 2016

- Worked on the Design and development of essential software components for autonomous Unmanned Aerial Vehicles.
- Created a 'flight-panel' GUI for continuous monitoring of remote-controlled as well as autonomous aerial robots using OpenCV.
- Created an integrated three-dimensional path planning algorithm in C++ which determines the most efficient and low-cost path to traverse a given geographical terrain.

Education

University of Glasgow, MSc Physics: Nuclear Technology

2017

Thesis: Exotic mesons and glue ball searches at a future Electron Ion Collider

Honours: Degree passed with Merit (GPA: 15.77 of 22)

Amity University, BTech Nuclear Science and Technology

2015

Thesis: Simultaneous determination of diffusion coefficients of hydrogen and deuterium in Zr-2.5% Nb alloy using hot vacuum extraction

Honours: Degree passed in First Division (GPA: 7.56 of 10)

List of Publications

"Simulation and Optimization of the Spin Coherence Time of Protons in a Prototype EDM Ring"
12th International Particle Accelerator Conference: 771-773 (DOI: 10.18429/JACoW-IPAC2021-MOPAB239) 2021

"Three-dimensional D algorithm for incremental path planning in uncooperative environment"*
IEEE Conference Publications: 431-435 (DOI: 10.1109/SPIN.2016.7566733) 2016

"Obstacle Size and Proximity Detection Using Stereo Images for Agile Aerial Robots"
IEEE Conference Publications: 437-442 (DOI: 10.1109/SPIN.2015.7095261) 2015

"Non-destructive determination of isotopic composition of uranium"
IAEA INIS (Reference No: 46089721) 2015

"Navigation Error Reduction in Swarm of UAV's"
IJDIWC 4(4): 493-498 (DOI: 10.17781/P001346) 2014

"Moving object tracking from moving platforms"
IEEE Conference Publications: 85-89 (DOI: 10.1109/SPIN.2014.6776927) 2014

Declaration

The undersigned, pursuant to and for the purposes of articles 46 and 47 and aware of the criminal sanctions provided for in article 76 of Presidential Decree 28 December 2000, n. 445 in the event of falsification of documents and false declarations, declares that the information contained in this curriculum vitae corresponds to the truth.

The undersigned declares to be informed, pursuant to legislative decree n.196 / 2003 and GDPR 679/16 - "European regulation on the protection of personal data" that the personal data collected will also be processed with IT tools exclusively in the scope of the procedure for which this declaration is made and for all related obligations.

RAHUL SHANKAR