Dr. Shivang Tripathi

Faculty
Indian Institute of Information Technology-Ranchi,
Contact No.: +1-808-205-7062; +91-9626065668
shivang@hawaii.edu; tripathi.shivang@gmail.com
https://scholar.google.co.in/citations?user=cqgViJ4AAAAJ&hl=en
https://www.linkedin.com/in/shivang-tripathi-11561418/
https://orcid.org/0000-0003-0918-8743
Scopus Author ID: 56234506-300

Web of Science ResearcherID
S-2004-2019

PROFESSIONAL EXPERIENCE

01-2020 – 05-2024: **Postdoctoral Research Fellow** in Varner Laboratory for Instrumentation Development, University of Hawai'i at Mānoa, HI, USA

- Operation, maintenance, & upgrade of iTOP detector in Belle2 experiment, Superkek Japan.
- Firmware, Software for the HEP detector readout electronics

EDUCATIONAL BACKGROUND

2013 – 2019: **Ph.D.**, Engineering Sciences, Homi Bhabha National Institute, Mumbai, India
Title: Study of SiC-based neutron detector for applications in the harsh environment of Fast Reactors.
Supervisor: Prof. Dr. K. Devan, Head RND, IGCAR, Kalpakkam
2007 – 2011: **B. Tech.** –Electronics & Communication Engineering, LPU, Punjab, India

2005 – 2007: **Intermediate**, Maharaja Inter College, Ayodhya, U.P. Board, India
2004 – 2005: **High School**, Maharaja Inter College, Ayodhya, U.P. Board, India

AWARDS, SCHOLARSHIPS & FELLOWSHIPS

2020-2024 Instrumentation Innovation Research Fellowship by Uni. Of Hawaii
2013-2019 Scholarship: Research Fellowship by D. A. E., Govt. of India
2016 Qualified national level Graduate Aptitude Test in Engineering (GATE)
2014 Qualified national level Graduate Aptitude Test in Engineering (GATE)

RESEARCH EXPERIENCES

Major focus of the research

- Design & Development of the integrated readout electronics for the High Energy Physics experiments such as BELLE-II and Electron-Ion Collider (EIC).
- *Firmware* & *Software* development for the Xilinx FPGAs such as SP6, Zynq SoC, PYNQ, etc.
- Neutron transport and interaction in matter study using Monte-Carlo tool GEANT4
- Modeling and Simulation of Silicon Carbide based semiconductor devices in TCAD

Research achievements

- Developed FW for SiREAD-ASIC based DC capable of processing 64 channels of 256-anode MAPMT.
- Developed a model for planar and 3D-stacked of semiconductor neutron detector using GEANT4
- Developed a model for irradiation effect study in SiC-based devices using TCAD
- Effect of neutron, proton, gamma, electron-irradiation on the electrical behavior of the SiC devices

Research interest

- Readout electronics development including PCB design, Firmware & associated Software
- Particle transport and interaction study using Monte-Carlo toolkit
- Wide band-gap semiconductor modeling and simulation using TCAD

Analytical & Technical skills

Programming Skills
VHDL, Verilog, Python
Semiconductor Simulation tools
SILVACO TCAD (ATLAS, DECKBUILD, DEVEDIT, Victory 3D)
EDA Tools
Xilinx Vivado , Vitis, ISE, ChipScope, Altium Designer
Monte-Carlo techniques
Geant4, SRIM, TRIM, ROOT, DD4Hep
Other tools/technology worked with
C, C++, TCL-tk, MATLAB, Sci-Linux, Origin, Modelsim, Cadence (Virtuoso)

OTHER SCIENTIFIC ACTIVITIES

- ✦ Member of **TOP detector group in BELLE-II experiment (SuperKEK, Japan)**
- ✦ Former member of eRD-14 (EIC-PID consortium, Brookhaven National Laboratory, U.S.A)
- ✦ **IEEE** Member
- ✦ Online Certification (2021) from **University of Pennsylvania** in **Data Analysis using Python.**
- ✦ Conducted GEANT4 workshop for BARC Trainees
- ✦ July 2011 – Dec 2011: Internship in DKOP Labs Pvt. Ltd.
  Project: Design and Simulation of 10 GB Ethernet Transmitter using Verilog

LIST of SCIENTIFIC PUBLICATIONS & PRESENTATIONS

Publications

1. Shivang Tripathi, Chandrakant Upadhyay, C. P. Nagaraj, A. Venkatesan, K. Devan **(2019)** *The performance simulation of the LiH-SiC-based Fast Neutron Detector for harsh environment monitoring using Geant4 and TCAD.* Nucl. Intrum. Methods Phys. Res. A, **916** (2019) 246-256. https://doi.org/10.1016/j.nima.2018.10.202.

2. Shivang Tripathi, Chandrakant Upadhyay, C. P. Nagaraj, A. Venkatesan, K. Devan **(2019)**, *Effect of electron and proton irradiation on the electrical characteristics of the SiC-based fast neutron detectors.* Journal of Instrumentation **14** P02002. https://doi.org/10.1088/1748-0221/14/02/P02002

3. Shivang Tripathi, Chandrakant Upadhyay, C. P. Nagaraj, A. Venkatesan, K. Devan **(2018)** *Towards radiation hard converter materials for SiC-based Fast Neutron Detectors.* Journal of Instrumentation **13** P05026. https://doi.org/10.1088/1748-0221/13/05/P05026.

4. Shivang Tripathi, Chandrakant Upadhyay, C. P. Nagaraj, K. Devan, A. Venkatesan, K. Madhusoodanan **(2017)** *Investigation of enhancement in planar fast neutron detector efficiency with stacked structure using Geant4.* Nucl. Sci. Tech. **28**:154. https://doi.org/10.1007/s41365-017-0315-7

5. EIC Collaboration **(2022)**, *Science Requirements and Detector Concepts for the Electron-Ion Collider: EIC Yellow Report*, Nuclear Physics A **1026**, 122447. https://doi.org/10.1016/j.nuclphysa.2022.122447

6. EIC Collaboration **(2022)**, *CORE -- a COmpact detectoR for the EIC*, arXiv:2209.00496 [physics.ins-det].

7. BELLE2 Collaboration **(2022)**, *Snowmass 2021 White Paper on Upgrading SuperKEKB with a Polarized Electron Beam: Discovery Potential and Proposed Implementation,* arXiv:2205.12847 [physics.acc-ph].

Book Chapters

1. Shivang Tripathi, *et al.*, *Investigation of Perylene as a Converter Material for Fast Neutron Detection and Spectroscopy Using GEANT4 Monte Carlo Simulations*. **(2018)** In: Konkani A., Bera R., Paul S. (eds) Advances in Systems, Control and Automation. Lecture Notes in Electrical Engineering, vol. 442. Springer, Singapore. https://doi.org/10.1007/978-981-10-4762-6_18

Workshop/Conference

1. Shivang Tripathi, C. Upadhyay *et al*. **(2018)** *Effect of gamma irradiation on the electrical characteristics of SiC based FNDs.* RSM-MSENM-2018, HBNI, IGCAR, India (Oral presentation)
2. C.P. Nagaraj, Shivang Tripathi *et al. Silicon carbide (SiC) neutron detector for power range neutron flux monitoring In:* IAEA Technical meeting on modern neutron detection. Vienna, Austria, Sep 4-8, **2017** (Oral presentation)
3. Shivang Tripathi, C. Upadhyay *et al*. **(2018)** *LiH-SiC based Fast Neutron Detector for harsh environment.* IARPIC-2018, BARC Mumbai, India (Oral presentation)
4. Shivang Tripathi, C. Upadhyay *et al*. **(2017)** *TCAD assisted analysis of Silicon Carbide based Fast Neutron Detector for nuclear applications.* 12th IEEE NMDC-2017, Singapore (Oral presentation)
5. Shivang Tripathi, C. Upadhyay *et al*. **(2016)** *Investigation of perylene as a converter material for fast neutron detection using Geant4 monte-carlo simulations.* ETAEERE-2016, India (Oral presentation)
6. Shivang Tripathi, C. Upadhyay *et al*. **(2015)** *Geant4 simulations of semiconductor detectors (SiC) for fast neutron spectroscopy*, IEEE-INDICON-2015, India (Oral presentation). https://doi.org/10.1109/INDICON.2015.7443467
7. J. Itokazu, Shivang Tripathi, *et al.* **(2022)** *Progress in the Development of the Third Generation Hawaii Muon Beamline*, IEEE-NSS MIC RTSD-2022, Milano, Italy.