Indian Institute of Technology Delhi

School of Interdisciplinary Research (SIRe)

SIRe Project Number

2022-01-32

(will be assigned by SIRe)

PhD Project

Project Details	
Project Title	Energy harvesting using triboelectric nanogenerator
Project Summary	Harvesting electrical energy from mechanical vibration is always a matter of great interest. Triboelectric effect, one of the oldest effect known to mankind, has recently emerged in the last decade as a potential and promising energy harvesting mechanism by which energy can be harnessed by friction between any two dissimilar materials. Here in this project we would like to explore harnessing energy by the friction of different materials mostly using 2D materials and functional polymers. We would also like to investigate the method of charge generation by surface probe techniques and explore its opportunities in Internet of things (IoT) based devices.

PhD Supervisors

Role	**Faculty**	**Academic Unit in IITD and JNU**	**Email ID**
Supervisor 1	Prof. Ankur Goswami	Materials Science and Engineering, IITD	agoswami@mse.iitd.ac.in
Supervisor 2	Prof. Poonam Agarwal	School of Computer & Systems Sciences, JNU, New Delhi	poonamgoel@mail.jnu.ac.in

Project requirements (Student qualifications, experience required, etc.)

- Candidate should have the qualification of B.Tech in Electrical, Electronics, Mechanical, Materials Engineering, Or in MSc. in Physics, Electronics. He/She should be JRF (CSIR/UGC) qualified.
- Candidate with any prior knowledge on instrument interfacing by LabView, Python related software, or experience on electric motors, materials synthesis or experience in nanofab will be given preference although not mandatory.

Source of funding (IRD/FITT Project details, if any)

- Students applying for this position should be qualified UGC/CSIR JRF or GATE. Students should ensure the fellowship from external funding agency either govt. (such as DST, UGC, CSIR etc.) or private.
- Consumables and contingency will be provided from both PI and CO-PI's projects.

Role of Faculty Members involved:

In the proposed project two faculty members (Prof. Goswami and Prof. Agarwal) have few overlap areas of research, and have broad complementary expertise. For example, both the faculties have experience in MEMS device fabrication and characterization. However, Dr. Ankur Goswami's expertise is largely in processing of materials, characterizations of materials (HRXRD, SEM, TEM and various modules of AFM such EFM, KPFM, MFM, conducting mapping) and transport measurements whereas Prof. Agarwal's experience is in modeling, packaging, circuit designing and power management. The students assigned for this project will have access to both MSE, IITD and SCSS, JNU department and various central facilities of IITD and JNU.