



Project Details

Project Title	Energy harvesting and sensing using Triboelectric Nanogenerator and Droplet motion
Project Summary (Minimum 500 and maximum 2000 characters)	In the era of green energy harnessing, electrical energy from mechanical vibration is indispensable. Triboelectric effect, one of the oldest effects known to mankind, has recently emerged in the last decade as a potential and promising energy harvesting mechanism where energy can be harnessed by friction between any two dissimilar materials. Further harnessing energy is not only restricted to solid-solid interfaces but it also prevalent in solid-liquid interfaces. Here in this project, we would like to explore energy harnessing by the friction of solid liquid interfaces. This would allow not only harvesting energy but also can give information related to pH parameter of the droplet which has potential applications in pH sensor and water quality monitoring. 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.

Ph.D. Supervisors

Role	Faculty	Academic Unit in IITD/Institute/University	Email ID (Official)
Supervisor 1	Prof. Dhiman Mallick	EE, IITD	dhiman@ee.iitd.ac.in
Supervisor 2	Prof. Ankur Goswami	DMSE, IITD	agoswami@mse.iitd.ac.in

Project requirements (Student qualifications, experience required, etc)

Candidate should have the qualification of B.Tech in Electrical, Electronics, Mechanical, Materials Engineering, Polymer Sci & Technology, Textile Engineering, Or in MSc. in Physics, Physical Chemistry, Electronics. Students qualified CSIR/UGC JRF are strongly encouraged to apply. Candidates with any prior knowledge on instrument interfacing by LabView, Python related software, or experience on electric motors, materials synthesis or experience in nanofabrication will be given preference although not mandatory.

Source of fellowship/funding

(CSIR/UGC/DBT/ICMR/ICAR/NEET-PG/DST-INSPIRE/IRD/FITT Project details, if any)

- Candidate with his/her own fellowship/ institute fellowship

Role of Faculty Members involved:

In the proposed project two faculty members (Prof. Mallick and Prof. Goswami) have few overlap areas of research, and have broad complementary expertise. For example, both the faculties have experience in materials characterizations. However, Prof. Mallick's experience and expertise is in functional material integration, MEMS and microfluidics devices, electrical characterization etc. Prof. Ankur Goswami's expertise is largely in materials synthesis and micro/nano-fabrication, nanomechanical devices characterizations, characterizations of materials (HRXRD, SEM, and various modules of AFM such as EFM, KPFM, MFM, conducting mapping) and electrical transport measurements. The student assigned for this project will have access to both EE and DMSE departmental facilities and various central facilities of IITD.