

Sangeeta

Nanofluidics lab

Indian Institute of Technology-Gandhinagar, Gujarat, India - 382355.

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Work Experience

Sabarmati Bridge Fellow: Aug. 2022 - Jul. 2023

Supervisor: Dr. Gopinadhan Kalon

RESEARCH ASSISTANT, NANOFLUIDICS LAB

Physics and Materials Engineering, IIT-GN

- **Project 1**
 - Investigation of surface interactions of water molecules with 2-dimensional membranes using gravimetric experiments.
 - Surface and channel modifications in 2-dimensional membranes to observe the variation in solid-liquid interactions.
 - Energy harvesting mediated by the molecular interactions with nanostructured carbon material.
- **Project 2**
 - Electrochemical intercalation behaviors of selected ions into Graphene and its derivatives.
 - Investigation of the forces involved in the interactions of ions and molecules.
 - Improving the anti-fouling performance of the electrochemically intercalated membranes.

Research Experience

Summer Project: May 2022 - Jul. 2022

Guide: Dr. Gopinadhan Kalon

Physics and Materials Engineering, IIT-GN

- Focus on stability of 2-dimensional membranes for blue-energy generation
- Involves membrane fabrication, electrode fabrication and ion-transport experiments.
- Includes contact angle measurements to understand the wettability phenomenon of membrane surfaces.

Project: Jul. 2021 - May 2022

Guide: Dr. Baradhwaj Coleppa

Physics Discipline, IIT-GN

- To understand the diffusion movement of enzymes in presence of catalysts.
- Theoretical investigation of the phenomenon inducing the enhanced diffusion of enzymes and the reactions involved in the process.
- Effects of catalytic turnover on the enzyme activity.

Minor Project: Jan. 2021 - Mar. 2021

Guide: Dr. Krishna Kanti Dey

Physics Discipline, IIT-GN

- Extensive study of the efficiency of solar cell
- Effect of inclination & orientation of panels, temperature, climatic conditions, latitude of the place.
- Calculation of maximum power point tracking (MPPT) for specific conditions.

Project: Oct. 2020 - Nov. 2020

Guide: Dr. Prasanna B Venkatesh

Physics Discipline, IIT-GN

- Applications of Fourier Transform in circuit analysis.
- Variation in the application with respect to different circuit components.

Reading Project: Mar. 2018 - Apr. 2018

Guide: Dr. Nandini

Department of Physics, University of Delhi

- Comparative study of traditional methods and alternative renewable methods of energy harvesting.

Minor Project: Nov 2017 - Dec. 2017

Guide: Prof. Monika Tomar

Department of Physics, University of Delhi

- Foot step power generation using piezoelectric sensors
- Use of piezoelectric transducer circuit to generate voltage.

Research Interests

- Graphene and its derivatives.
- 2D material based membranes.

- Water, ion and gas transport.
- Microfluidics and Nanofluidics.
- Energy harvesting and energy storage.

Education

Masters of Science (M.Sc.)

PHYSICS

Indian Institute of Technology, Gandhinagar, India

Aug. 2020 - May 2022

- CPI = 8.31/10 (First Class)
- **Major Courses:** Condensed Matter Physics, Tools of Experimental Physics, Physics of two-dimensional materials, Methods of Experimental Physics, Lasers, Mathematical Methods of Physics-I, Classical Electrodynamics, Quantum Mechanics-I & II, Classical Mechanics, Statistical Mechanics.
- **Computational Courses:** Introduction to Computing-Python, Computational Physics.

Bachelor of Science (B.Sc.)

PHYSICS (HONS.)

Miranda House, University of Delhi, India

Jul. 2016 - May 2019

- CPI = 8.095/10 (First Class)
- **Major Courses:** Mathematical Physics-I & II, Advanced Mathematical Physics, Mechanics, Electricity and Magnetism, Electromagnetic Theory, Waves and Optics, Thermal Physics, Digital Systems and Applications, Analog Systems and Applications, Elements of Modern Physics, Quantum Mechanics and Applications, , Nuclear and Particle Physics, Solid State Physics, Statistical Mechanics.
- **Minor Courses:** Basic Instrumentation Skills, Renewable Energy and Energy Harvesting, Communication System, Calculus, Linear Algebra, Chemistry Course- I & II.

Senior School Certificate Examination

CENTRAL BOARD OF SECONDARY EDUCATION (CBSE)

Vivekanand Sr Sec School, Rewari, Haryana, India

Jun.2015 - May.2016

- Percentage = 95% (First Class).
- Major Courses: Physics, Chemistry, Mathematics.
- Minor Courses: English, Music.

Secondary School Examination

CENTRAL BOARD OF SECONDARY EDUCATION (CBSE)

Vivekanand Sr Sec School, Rewari, Haryana, India

Jun.2013 - May.2014

- CGPA = 9.8/10 (First Class).
- Courses: English, Hindi, Mathematics, Science.

Workshops & Webinars

- **IIT- Gandhinagar:** Two-Dimensional Materials Based Devices and Their Applications.
- **IIT- Gandhinagar:** Smart Synthesis of Carbon Nanomaterial Along with the Production of High Value Added Fuel from Waste Plastic.
- **APS Publications:** Accounts of Materials Research: Materials Innovation for a Sustainable Future.
- **SUNCAT Session-Stanford University:** Theoretical X-ray Spectroscopy and Activity & Stability of Bimetallic Catalysts.

Skill Sets

Experimental Skills

- Proficient in Membrane fabrication, Ion Transport, Electrochemical Work station measurements, XRD, Optical microscope, Contact angle measurement.
- Familiar with Thermal evaporator, TEM, SEM and CVD synthesis, Lithography.

Software/Computational Skills

- Languages: C++, Python, Scilab, Matlab.
- Software: OriginPro, Zotero, Autodesk Inventor, MS Office, Familiar with Labview.

Languages

- Proficient in English and Hindi.
- Familiar with German.

Achievements

Fellowships

- Sabarmati Bridge Fellowship *IIT-Gandhinagar, India*
 - 1 among 7 students selected for pre-doctoral research fellowship out of entire 2021-2022 batch of IIT- GN.

POSTER PRESENTATIONS

- Summer Research Internship Program.
- Showcase of Sabarmati Bridge Fellowship research.

IIT-Gandhinagar, India
IIT-Gandhinagar, India

STANDARD TEST QUALIFICATIONS

- 2020-Joint Admission Test for M.Sc. (JAM)
- 2022- Graduate Aptitude test (GATE)

EXTRACURRICULAR ACTIVITIES

- Committee member, Women Empowerment Cell, Miranda House, University of Delhi.
 - Organized seminars & Workshops.
- Member of basketball team, Vivekanand Sr Sec School.

References

Dr. Gopinadhan Kalon,
Assistant Professor,
Physics and materials engineering, IIT-Gandhinagar.

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Prof. Monika Tomar,
Professor,
Department of Physics, University of Delhi.

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