Sangeeta

Nanofluidics lab
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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.) — *Indian Institute of Technology, Gandhinagar, India*
PHYSICS — *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.) — *Miranda House, University of Delhi, India*
PHYSICS (HONS.) — *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 ad 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 — *Vivekanand Sr Sec School, Rewari, Haryana, India*
CENTRAL BOARD OF SECONDARY EDUCATION (CBSE) — *Jun.2015 - May.2016*

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

Secondary School Examination — *Vivekanand Sr Sec School, Rewari, Haryana, India*
CENTRAL BOARD OF SECONDARY EDUCATION (CBSE) — *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. *IIT-Gandhinagar, India*
- Showcase of Sabarmati Bridge Fellowship research. *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

1. **Dr. Gopinadhan Kalon**,
   Assistant Professor,
   Physics and materials engineering, IIT-Gandhinagar.
   Email: gopinadhan.kalon@iitgn.ac.in
   Tel: +91-9337953400
   Web page: https://iitgn.ac.in/faculty/phy/fac-gopinadhan

2. **Prof. Arup Lal Chakraborty**,
   Professor,
   Electrical Engineering, IIT-Gandhinagar.
   Email: arup@iitgn.ac.in
   Web page: https://www.photonicsensorslab.com