



# Sagnik Dasgupta

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## EDUCATIONAL QUALIFICATIONS

### Bachelore of Science (Research)

Aug 2014 — Present

Indian Institute of Science, Bangalore

### Senior Secondary Schooling

Apr 2010 — Mar 2012

Chettinad Vidyashram, Chennai

Score: 93.4%

## FIELDS OF INTERESTS

- Carbon Based materials (Experience in graphene)
- Crystallography
- Photovoltaics (Experience in multijunction thin film Si solar cells and Si heterojunction cells)
- Characterization

## RESEARCH PROJECTS

### Characterisation of DLC Thin Films Synthesized by PECVD

June 2014 — July 2014

Indira Gandhi Centre for Atomic Research, Kalpakkam, India

Dr. M Kamruddin

A Short introductory project on the synthesis of DLC thin films by the process of PECVD and methods of its characterisation including Raman Spectroscopy and SEM.

### Electrochemical Delamination of CVD grown Graphene

May 2015 — July 2015

Indian Institute of Science, Bangalore, India

Prof. Srinivasan Raghavan

Graphene, CVD grown on copper, needs to be transferred onto other substrates. In this project, I have looked into various methods of carrying out such transfers, in particular, electrochemical methods. One such method involves electrolysis of water and the subsequent generation of hydrogen bubbles between the graphene/PMMA stack and the copper substrate resulting in the graphene being mechanically delaminated from the copper. A bubble free method was also briefly explored.

### Piezoresistive strain sensors

May 2016 — July 2016

Indian Institute of Science, Bangalore, India

Prof. Srinivasan Raghavan

This project involves the fabrication strain gauges using both metal thin films and using graphene. Gold thin films were sputtered on to triangular cantilevers made of PTFE and were loaded at the tip to impart strain. Change in resistance was measured as a function of strain. For graphene, the CVD grown graphene was transferred on to a similar triangular substrate with four gold contact pads sputtered on. Later wires were attached using silver epoxy and measurements were made on a Keithley 2450 SMU.

### An experimental overview of Photovoltaics

May 2017 — July 2017

IEK-5 (Photovoltaics), Forschungszentrum Jülich, Germany

Dr. Friedhelm Finger

This project involved exploration of various aspects of photovoltaics. Solar cell parameters for multi-junction thin film silicon solar cells were analysed over variation of angle of incident radiation and their efficiencies were compared. Further, the voltage generated by these cells were used on an electrolytic water splitting device to extract hydrogen gas. Using reference annual solar spectrum data, average photon energy was calculated and used to estimate the annual hydrogen production from these solar cells. On a second part of the project, the nature and quality of passivation of c-Si surfaces by a-Si:H was analysed for silicon heterojunction solar cells. This was done by calculation of the microstructural factor from the ratio of areas of the 2000  $\text{cm}^{-1}$  and 2100  $\text{cm}^{-1}$  peaks in the Raman Spectrum. Further comparisons were made to the spectra in the same range under FTIR. This served as an exposure to different techniques in spectroscopy, and ways to optimise signal to noise ratio.

## OTHER ACADEMIC ACTIVITIES

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### Term Papers

- Analysis of Loads and Stresses on Bicycle Frames **April 2016**
- Polymer-Ceramic Composites for Sensors **April 2017**

## AWARDS

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**KVPY Fellowship** **2013**  
Kishore Vaigyanik Protsahan Yojna

**NTSE Scholarship** **2010**  
National Talent Search Examination

## SKILLS

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### Soft Skills

- Public Speaking
- Teaching
- Presenting
- Event Oragnisation

### Programming Languages

- C/C++
- Bash
- Matlab (Basics and Signal Processing)
- HTML+CSS+JS

### Technical skills

- Microscopy
- Raman Spectroscopy
- Graphene Delamination
- Solar cell performance analysis

## HOBBIES

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- Smartphone Photography
- Cycling
- Swimming
- Android Modding
- Web Development (HTML, CSS, JS)

## COURSES TAKEN

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### **Semester 1**

**Aug 2014 — Dec 2014**

- *Introductory Physics I: Mechanics, Oscillations and Waves (2:1)*
- *Analysis and Linear Algebra I (3:0)*
- *Organismal Biology and the Molecular Basis of Life (2:1)*
- *Physical Principles of Chemistry (Quantum Chemistry) (2:1)*
- *Algorithms and Programming (2:1)*
- *Ways of Knowing: Cultural Analysis, Ethnographic Methods, Historical Analysis and Textual Analysis (3:0)*

### **Semester 2**

**Jan 2015 — Apr 2015**

- *Introductory Physics II: Electricity, Magnetism and Optics (2:1)*
- *Analysis and Linear Algebra II (3:0)*
- *Microbiology, Molecular Biology and Genetics (2:1)*
- *Basic Inorganic Chemistry (2:1)*
- *Introduction to Electrical and Electronics Engineering (2:1)*
- *Ways of Seeing: Literature, Visual Arts, Films (3:0)*

### **Semester 3**

**Aug 2015 — Dec 2015**

- *Introductory Physics III: Thermal and Modern Physics (2:1)*
- *Introduction to Material Science (2:0)*
- *Probability and Statistics (3:0)*
- *Cell Biology, Immunology and Neurobiology (2:1)*
- *Basic Organic Chemistry (2:1)*
- *Introduction to Earth and its Environment (2:0)*
- *Ways of Doing: Mapping Science-Society Relationships (3:0)*

### **Semester 4**

**Jan 2016 — Apr 2016**

- *Materials Thermodynamics (3:0)*
- *Structure of Materials (2:1)*
- *Mechanical Behaviour of Materials (3:0)*
- *Thermochemical and biological energy recovery from biomass (3:0)*
- *Fundamentals of Climate Science (2:1)*
- *Mapping India through the Folk Art (1:0)*

### **Semester 5**

**Aug 2016 — Dec 2016**

- *Materials Kinetics (3:0)*
- *Mechanical Characterisation of Materials (1:1)*
- *Semiconductor Devices and Circuits (3:0)*
- *Corrosion (3:0)*
- *Material Synthesis (3:0)*
- *Polymer Science and Engineering (3:0)*
- *Journalism for Scientists (1:0)*

## **Semester 6**

**Jan 2017 — Apr 2017**

- *Functional Properties of Materials (3:0)*
- *Introduction to Materials Processing (2:1)*
- *Introduction to Materials Manufacturing (2:1)*
- *Organic Electronics (3:0)*
- *Introduction to Biomaterials (3:0)*
- *Introduction to Electrochemical Engineering (3:0)*
- *Introduction to Governance (1:0)*

## **Semester 7**

**Aug 2017 — Dec 2017**

- *Solar Energy: Advanced Materials and Devices (3:0)*
- *Digital Signal Processing (3:0)*
- *Defects in Materials (3:0)*
- *Functional Property Characterisation Laboratory (0:1)*
- *Entrepreneurship, Ethics and Societal Impact (1:0)*

## **REFERENCES**

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### **Dr. Friedhelm Finger**

Materials and Solar Cells

Institute of Energy and Climate Research - 5 (Photovoltaics)

Forschungszentrum Jülich

E-Mail: [f.finger@fz-juelich.de](mailto:f.finger@fz-juelich.de)

Website: [http://www.fz-juelich.de/iek/iek-5/EN/Forschung/Abteilung%20MS/Ab\\_MS\\_node.html](http://www.fz-juelich.de/iek/iek-5/EN/Forschung/Abteilung%20MS/Ab_MS_node.html)

### **Prof. Uwe Rau**

Director

Institute of Energy and Climate Research - 5 (Photovoltaics)

Forschungszentrum Jülich

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### **Prof. T.A.Abinandanan**

Materials Engineering

Indian Institute of Science

E-Mail: [abinand@materials.iisc.ernet.in](mailto:abinand@materials.iisc.ernet.in)

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