



# Sagnik Dasgupta

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## EDUCATIONAL QUALIFICATIONS

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### Bachelor of Science (Research) - Major in Material Science

Aug 2014 — Present

Indian Institute of Science, Bangalore

### Senior Secondary Schooling

Apr 2010 — Mar 2012

Chettinad Vidyashram, Chennai

Score: 93.4%

## FIELDS OF INTERESTS

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- Carbon Based materials (Experience in graphene delamination and strain sensors)
- Crystallography
- Semiconductor Devices (Experience in multijunction thin film Si solar cells and Si heterojunction cells)
- Characterization

## RESEARCH PROJECTS

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### 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 Juelich, 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
- Polymer-Ceramic Composites for Sensors

April 2016

April 2017

## AWARDS

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### KVPY Fellowship - 99.72th percentile

2013

#### Kishore Vaigyanik Protsahan Yojna

The Kishore Vaigyanik Protsahan Yojana (KVPY) is an on-going National Program of Fellowship in Basic Sciences, initiated and funded by the Department of Science and Technology, Government of India, to attract exceptionally highly motivated students for pursuing basic science courses and research career in science. Selection of the students is made from those studying in XI standard to 1st year of any undergraduate Program in Basic Sciences in Mathematics, Physics, Chemistry and Biology having aptitude for scientific research. Special groups / Committees are set up at IISc to screen the applications and conduct an aptitude test at various centres in the country. Based on the performance in the aptitude test, short-listed students are called for an interview which is the final stage of the selection procedure. For receiving a fellowship, both aptitude test and interview marks are considered. (Adapted from website of the KVPY)

### JEE Advanced (formerly IITJEE) - 99.43rd percentile

2014

#### Joint Entrance Examination - Advanced

Joint Entrance Examination – Advanced (JEE-Advanced) is an annual engineering college entrance examination in India. It is conducted by one of the seven zonal IITs. It has a very low admission rate (about 9,369 in 479,651 in 2012; which is around 1.95%)[2], and was thus recognised as one of the toughest examinations in the world. The current admission rate in 2017 is around 0.92% in IITs (about 11,000 out of 1,200,000 who applied for JEE Main) (Adapted from Wikipedia)

### WBJEE - 99.86th percentile

2014

#### West Bengal Joint Entrance Examination

West Bengal Joint Entrance Examination or the WBJEE is a state-government controlled centralized test, conducted by the West Bengal Joint Entrance Examinations Board for admission to many private and governmental medical and engineering institutions in West Bengal. The test is taken after the 12th grade for admission to graduation (also known as Bachelors) courses. The exam can be taken by those who studied Pure Science stream in plus two level with the specific subjects tested in the examination, which are Physics, Chemistry, Mathematics and Biology. Every year approximately 3 lakh people take the examination. (Adapted from Wikipedia)

### NTSE Scholarship

2010

#### National Talent Search Examination

The National Talent Search Examination (NTSE) is a National Level scholarship program in India to identify and nurture talented students. It honours and helps talented students by providing financial assistance in the form of a monthly scholarship for the entire Academic Career. Students studying in Class X (formerly Class VIII) are eligible to appear for the selection process. As it is organized by an official body (NCERT), it is widely regarded as the most prestigious examination at high school level in India. There is a two-stage selection process for award of scholarship. For Stage - I, selection will be done by States/UTs through the written examination. Each State/Union Territory has been allotted a quota to recommend a specific number of candidates for the Stage - II examination. Students who qualify Stage - I will be eligible to appear for Stage - II examination conducted by NCERT. (Adapted from [fiitjee.com](http://fiitjee.com))

## SKILLS

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### Soft Skills

- Public Speaking
- Teaching
- Presenting
- Event Organisation
- Team Leading

## 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**

Head

Materials and Solar Cells

Institute of Energy and Climate Research - 5 (Photovoltaics)

Forschungszentrum Juelich

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

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**Prof. Uwe Rau**

Director

Institute of Energy and Climate Research - 5 (Photovoltaics)

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Chair

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