

Dr. Abdus Salam Sarkar

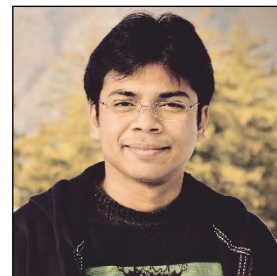
Ph.D (2D materials and Heterostructures)
Postdoctoral researcher
Institute of Electronic Structures and Lasers
Foundation for Research and Technology Hellas
Heraklion, Crete, Greece

Email: salam@iesl.forth.gr

Ph. +30 6987012117, office :- +30 2810391323

<https://sites.google.com/view/abdussalamsarkar/home>

https://scholar.google.co.in/citations?hl=en&user=MA9R-OMAAAAJ&view_op=list_works&sortby=pubdate



RESEARCH EXPERIENCE

- Synthesis of layered two-dimensional (2D) graphene derivatives and transition metal mono- and di- chalcogenides.
- Mixed dimensional Van der Waals heterostructures.
- Optical and structural characterization of semiconductors using photoluminescence (PL), high resolution transmission electron microscopy (HRTEM) and atomic force microscopy (AFM).
- Optical spectroscopy and microscopy (Raman spectroscopy) with cryogenic system.
- Optoelectronic devices fabrication and characterizations (Solar cells).

EDUCATION

Indian Institute of Technology Mandi (IIT), School of Basic Sciences, India

Qualification: Doctor of Philosophy (**Ph.D**) in Physics (2D materials and organic electronics)

Title of thesis: Emerging Two-Dimensional Materials and their van der Waals Heterostructures: Chemical Exfoliation to Device Applications.

Examination Result: 8.5 CGPA

University of Delhi, Department of Physics and Astrophysics, India

Qualification: Master of Science (**M.Sc**) in Physics

Dissertation: *Metal-Oxide thin film deposition for gas sensors application.*

University of Calcutta, Kolkata, India

Qualification: Bachelor of Science (**B.Sc**) in Physics

EMPLOYMENT BACKGROUND

Sep 2018 –present	Post-Doctoral Researcher (Physicist), Institute of Electronic Structures and Laser (IESL), Foundation for Research and Technology-Hellas (FORTH), Crete, Greece 70013
Nov 2017 – July 2018	Researcher, School of Engineering, Indian Institute of Technology Mandi, India.
2012 – 2017	PhD student, Indian Institute of Technology Mandi, India.
2014 – 2017	Senior Research Fellowship from Ministry of Human Research Development, Govt. of India.
2012 – 2014	Junior Research Fellowship from Ministry of Human Research Development, Govt. of India.

PROJECTS

April 2015 – Jan 2016 *Engineering chemical structure to improve device efficiency: novel organic polymers/macromolecules and their nanocomposites for photovoltaic applications*

Oct 2010 – April 2011

M.Sc Dissertation, *Metal-Oxide thin film deposition for gas sensors application*, University of Delhi, New Delhi, India.

Mentor: Prof. Vinay Gupta

TECHNICAL SKILL

- Material synthesis of two-dimensional (2D) graphene and beyond graphene materials (MoS₂, MoSe₂, WS₂, WSe₂ and SnS) and their organic/2D materials heterostructures.
- Homemade low temperature (upto LN₂) set up and I-V measurements using Keithley 2400, 2182A and 6221.
- Spectroscopy (absorption and photoluminescence) and time resolved spectroscopy (Time correlated single photon counting).
- Temperature dependent Raman spectroscopy, Raman PL.
- Microscopic techniques (Optical, AFM, SEM, TEM and Confocal microscopy).
- Solar simulator, Glove box and spin coater.
- Thermal evaporator and sputtering system.
- Fabrication of various organic electronic devices (solar cells, Schottky diode, hybrid memory device)
- I-V & C-V Characterization by Keithley SCS 4200.
- Ultrafast pump-probe spectroscopy (partially).

AWARDS & ACHIEVEMENTS

2017	International travel grant award from Science & Education Research Board (SERB), Department of Science & Technology (DST), Govt. of India
2017	Best Oral Presentation award in “Conference on the Spectroscopy of Emerging Functional Materials (SEFM 2017)” India
2017	Best Oral Presentation award in “Science & Innovation Seminar” in IIT Mandi Hostel day celebration, IIT Mandi, India
2017	Best Poster Presentation award in research fair Anusandhan, IIT Mandi, India
2014	Senior Research Fellowship from Ministry of Human Research Development, Govt. of India
2012	Junior Research Fellowship from Ministry of Human Research Development, Govt. of India
2012	Qualified Graduate Aptitude Test in Engineering (GATE), India
2011	National Merit Scholarship in M.Sc (Physics), Govt. of West Bengal, India

RESEARCH PUBLICATIONS

1. **A. S. Sarkar**, A. Mushtaq and S. K. Pal, Liquid exfoliation of electronic grade ultrathin tin(II) sulfide (SnS) with intriguing optical response, in press, *npj 2D Materials and Applications*, **2019**, (*IF= awaiting*).
2. R. Ray, **A. S. Sarkar**, and S. K. Pal, Improving Carrier Transport in Polymer Films by Incorporating MoS₂ Nanosheets, *Under review*, **2019**.
3. R. Ray, **A. S. Sarkar**, and S. K. Pal, Improving Performance and Moisture Stability of Perovskite Solar Cells through Interface Engineering with Polymer-2D MoS₂ Nanohybrid, *Solar Energy*, **2019**, 193, 95-101 (*IF= 4.67*).
4. S. Dutt*, **A. S. Sarkar***, T. Vats*, S. K. Pal and P. F. Siril, Electrical and Optical properties of Polyaniline-Graphene nanocomposites synthesized using swollen liquid crystals as soft templates, Under review (***Equal contribution**).
5. **A. S. Sarkar**, A. D. Rao, A. K. Jagdish, A. Gupta, C. K. Nandi, P. C Ramamurthy and S. K. Pal, Facile embedding of gold nanostructures in the hole transporting layer for efficient polymer solar cells, *Org. Electron.* **2018**, 54, 148-153 (*IF=3.39*).
6. Q. Shi, S. Ghosh, **A. S. Sarkar**, P. Kumar, Z. Wang, S. K. Pal, T. Pullerits, and K. J. Karki, Variation in the Photocurrent Response due to Different Emissive States in Methylammonium Lead Bromide Perovskites, *J. Phys. Chem. C.* **2018**, 122, 3818-3823 (*IF= 4.53*).
7. **A. S. Sarkar** and S. K. Pal, Phonon Shift in Chemically Exfoliated WS₂ Nanosheet, *AIP Conf. Proc.*, **2018**, 1942, 090046.
8. **A. S. Sarkar** and S. K. Pal, A van der Waals p-n Heterojunction based on Polymer-2D Layered MoS₂ for Solution Processable Electronics, *J. Phys. Chem. C.* **2017**, 121, 21945-21954 (*IF= 4.53*).
9. **A. S. Sarkar** and S. K. Pal, Electron-Phonon Interaction in Organic/2D–Transition Metal Dichalcogenide Heterojunctions: A Temperature Dependent Raman Spectroscopic Study, *ACS Omega*, **2017**, 2, 4333-4340 (*IF=2.54*).
10. A. Mushtaq, S. Ghosh, **A. S. Sarkar** and S. K. Pal, Multiple Exciton Harvesting at Zero-Dimensional/Two-Dimensional Heterostructures, *ACS Energy Lett.*, **2017**, 2, 1879-1885 (*IF= 16.31*).

11. **A. S. Sarkar**, V. Kalyani, K. E. Gonsalves, C. P. Pradeep and S. K. Pal, Ion mediated Charge Carrier Transport in a Novel Radiation Sensitive Polyoxometalate-Polymer Hybrid, *RSC Adv.*, **2016**, 6, 44838 (Communication) (IF= 3.84).
12. S. Ghosh, M. Ghosh, P. Kumar, **A. S. Sarkar**, S. K. Pal, Quenching of the Excitonic Emission of ZnO Quantum Dots Due to Auger-Assisted Hole Transfer to CdS Quantum Dots, *J. Phys. Chem. C*, **2016**, 120, 27717-27723 (IF= 4.53).
13. **A. S. Sarkar** and S. K. Pal, Exponentially Distributed Trap-Controlled Space Charge Limited Conduction in Graphene Oxide Films, *J. Phys. D: Appl. Phys.*, **2015**, 48, 445501 (IF= 2.77).
14. V. Kalyani, V. S. V. Satyanarayana, **A. S. Sarkar**, A. Kumar, S. K. Pal, S. Ghosh, K. E. Radiation Sensitive Hybrid Polymer Based on Mn-Anderson Polyoxometalate Cluster and a UV Active Organic Monomer: Synergistic Effects Lead to Improved Photocurrent in Photoresponse Device, *RSC Adv.*, **2015**, 5, 36727-36731 (Communication) (IF= 3.84).

ORAL PRESENTATIONS

1. **A. S. Sarkar**, “*Liquid Exfoliation of Ultrathin Electronic Grade Tin (II) Sulfide (SnS)*”, *Contributed talk*, Graphene 2019, 25th – 28th June, 2019, Rome, Italy.
2. **A. S. Sarkar**, “*Emerging Two-Dimensional Materials and Their Mixed Dimensional van der Waals Heterostructures for Optoelectronics*” *Invited open seminar*, Institute of Electronic Structures and Lasers, Foundation for Research and Technology Hellas (FORTH), 27th August, 2018, Crete, Greece.
3. **A. S. Sarkar**, “*Emerging Two-Dimensional Materials and their van der Waals Heterostructures: Chemical Exfoliation to Device Applications*”, *Open seminar*, 23rd February, 2018, IIT Mandi, India.
4. **A. S. Sarkar** and S. K. Pal, “*Photophysical Properties of Emerging Two-Dimensional Materials and Their van der Waals Heterostructures*”, *Spectroscopy of Emerging Functional Materials 2017 (SEFM 2017)*, 9th - 10th October 2017, IIT Mandi, India. (Won best oral Presentation)
5. **A. S. Sarkar** and S. K. Pal, “*Solution Processable Transition Metal Dichalcogenides: A Prospective for Organic Electronic Applications*”, *Hostel day*, 12th March, 2017, Indian Institute of Technology Mandi, H.P, India. (Won best oral Presentation)
6. **A. S. Sarkar** and S. K. Pal, “*Nanoscale Organic/2D-MoS₂ Heterojunctions for Organic Optoelectronics*” 9th *International Conference on Materials for Emerging Technologies (ICMAT 2017)*, 18th - 23th June, 2017, Suntec Convention Centre, Singapore.
7. **A. S. Sarkar** and S. K. Pal, “*Temperature dependent Raman spectroscopy of chemically modified few-layer MoS₂*” *International Conference of Young Researchers on Advanced Materials (IUMRS-ICYRAM 2016)*, 11th - 15th December 2016, Indian Institute of Science, Bangalore, India.
8. **A. S. Sarkar** and S. K. Pal, “*Polymer Grafted-MoS₂ for Heterojunction Photovoltaic Application*”, *Anushandan*, 4th March, 2016, Indian Institute of Technology Mandi, H.P, India.
9. **A. S. Sarkar** and S. K. Pal, “*Journey Towards Third Generation Nanostructured Solar Cells*” *Advance Materials Research Centre Symposium*, 29th - 30th June 2015, Indian Institute of Technology Mandi, H.P, India.

POSTER PRESENTATIONS

1. *Annual Meeting on Physics of Strongly Correlated Electron Systems*, 2nd-4th April, 2018, IIT Mandi, H.P, India.
2. *62nd DAE-SSPS*, 26-30th December 2017, Bhaba Atomic Research Centre, Mumbai, India.
3. *2017MRS Fall Meeting and Exhibits*, 26th -1st December 2017, Boston, Massachusetts, USA.
4. *Spectroscopy of Emerging Functional Materials 2017 (SEFM 2017)*, 9th - 10th October 2017, IIT Mandi, India.
10. *Anushandan*, 4th March 2017, Indian Institute of Technology Mandi, H.P, India. (Won best poster presentation)
5. *International Conference on Advances in Nanomaterials and Nanotechnology (ICANN-2016)*, 4th and 5th, November 2016, Jamia Millia Islamia, New Delhi, India.
6. *International Conference on Hybrid and Organic Photovoltaics (HOPV16)*, 28th June - 1st July 2016, Swansea University, United Kingdom.
7. *18th International Workshop on Physics of semiconductor Devices (IWPSD-2015)*, 7th -10th Dec 2015, IISC Bangalore, India.
8. *Challenges in Organic Materials and Supramolecular Chemistry (ISACS 18)*, 19th - 21st Nov 2015, IISC Bangalore, India.
9. *8th India Singapore Symposium in Condensed Matter Physics*, 25th - 27th February 2015, IIT Kanpur, U.P, India.
10. *Anushandan*, 20th June 2014, Indian Institute of Technology Mandi, H.P, India.
11. *17th International workshop on the physics of semiconductor devices (IWPSD 2013)*, December 10-13th, 2013 in Amity University, Noida.

12. *National symposium on Nano-biotechnology*, December 2013, IIT Mandi.

BOOKS/GENERAL ARTICLES

1. Article published on “**Current status in organic photovoltaics**” in Issue-II of IIT Mandi magazine *ESSENT*-2016. (<https://students.iitmandi.ac.in/files/Essent%201.2.pdf>)

TEACHING RESPONSIBILITIES

Teaching assistantship 2012-2017, IIT Mandi: assisted in academic activities such as experimental laboratory courses, took tutorials, conducted examinations and developed teaching materials like notes and assignments for the core academic programs of IIT Mandi. Specially, the Ph.D. course works, B.Tech (Theory and Lab course) and M.Sc/M.Tech (Theory and Lab course).

SERVICES & MANAGERMENTS

1. Reviewer for international journal **Royal Society of Chemistry**, ‘*Nanoscale*’ (impact factor 7.76).
2. Technical Symposium Assistant in **2017MRS Fall Meeting**, 26th November to 1st December, 2017, Boston, Massachusetts, USA.
3. Core team member of “**Society for Collaborative Research and Innovation**”, November 2016 to November 2017, Indian Institute of Technology Mandi, H.P, India.
4. “**Health Services Advisory Board member (PG Students representative)**”, February 2016 - February 2018, Indian Institute Technology Mandi, H.P, India.
5. “**General Secretary**”, September 2016 to August 2017, Dashir Hostel, Indian Institute of Technology Mandi, H.P, India.

MEMBERSHIP AND PROFESSIONAL BODIES

1. Associate Member of “**Royal Society of Chemistry (AMRSC)**”, January 2016 to present, UK.
2. Member of “**American Chemical Society (ACS)**”, Since 2010 to present, USA.
3. Member of “**Materials Research Society (MRS) USA**”, January 2017 to present, USA.
4. Member of “**Materials Research Society (MRS) Singapore**”, June 2017 to June 2019, Singapore.

PERSONAL DETAILS

Date of Birth: 17th November 1987

Place of Birth: Lat Mirzapur, W.B, India

Nationality: Indian

Gender/Marital status: Male/Unmarried

Languages known: English, Bengali (mother language) and Hindi (write & speak).

Interests and Activities: Reading, playing badminton, volley ball, short trip etc.

REFERENCES

Prof. Emmanuel Stratakis

Research Director Institute of Electronic Structure and Lasers Foundation for Research and Technology Hellas and University of Crete, Heraklion, Crete, Greece 70013.

Email: stratak@iesl.forth.gr

Tel: +30 2810 391274

<http://www.iesl.forth.gr/People/person.aspx?Id=64>

Prof. Suman Kalyan Pal, Dean of students (Ph.D supervisor)

School of Basic Sciences, Indian Institute of Technology Mandi, Kamand Campus, Mandi, H.P-175005, India

Email: suman@iitmandi.ac.in

Tel: +91-9459528125

<http://faculty.iitmandi.ac.in/~suman/>

Dr. Mahesh Kumar (Senior Scientist)

CSIR-National Physical Laboratory, New Delhi, India

E-mail: kumarm1@nplindia.org
<http://kumarm.webs.com/>