IIT (ISM) • Dhanbad • asit (at) iitism.ac.in

Curriculum Vitae

Asit Kumar Kar

Associate Professor,
Department of Applied Physics,
Indian Institute of Technology (Indian School of Mines),
Dhanbad - 826004, Jharkhand.
Email: asit (at) iitism.ac.in

Education

- Ph.D., Condensed Matter Physics (Expt.): **Indian Institute of Technology Kharagpur** 2001
- M.Sc., Physics: **Visva Bharati University**, Shantiniketan 1992
- B.Sc. Honours, Physics: **University of Calcutta** 1989

Professional Experience

Associate Professor Jun., 2011 – Present
Indian Institute of Technology (Indian School of Mines), Dhanbad

Assistant Professor Jun., 2008 – Jun., 2011
Indian School of Mines, Dhanbad

Postdoctoral Research Fellow Feb., 2008 – Jun., 2008
Raja Ramanna Centre for Advanced Technology, Indore

Postdoctoral Research Associate Mar., 2006 – Jun., 2007
Rensselaer Polytechnic Institute, Troy, New York, USA

Postdoctoral Research Associate Oct., 2001 – Feb., 2006
University of Alabama in Huntsville, USA

Postdoctoral Junior Researcher Feb., 2000 – Oct., 2001
National Institute for Materials Science, Nagoya \ Tsukuba, Japan

Senior Research Fellow Sep., 1999 – Feb., 2000
Indian Institute of Technology, Kharagpur

Research Experience

- Synthesis and characterization of nanomaterials and thin films for various applications:

- Polymers, blends, composites: Polyaniline, polypyrrole;
- Cadmium selenide, cuprous oxide nanostructured thin films;
- Zinc oxide, Titanium dioxide nanostructures;
- Diamond like Carbon (DLC) nanocomposite thin films;

- Niobium thin films for applications in RF cavities of accelerators;
- Assembly and studies of oblique angle deposited nanowires (3D nanostructures, nanosculptured film);
- Microcantilever based microelectromechanical (MEMS) array sensor devices for the detection of physical, chemical and biological agents and phenomena;
- Self-assembly of supramolecular harmonic structures and studies on nanometre-scale quantum interaction between electrons and electromagnetic fields for single molecular photonic devices;
- Nanolithography by STM – creation of nanostructures on metallic thin film and molecular nanowires on semiconducting surface;
- Effect of microstructure on the colossal magnetoresistive properties of manganite thin films;
- Semiconductor thin films of Telluride, Selenides and Indium tin oxide.

Teaching Experience

Indian Institute of Technology (Indian School of Mines) Dhanbad, Department of Physics:

Courses	Programme	Semesters
Advanced Condensed Matter Physics	M.Sc. III, B.Tech. (Engineering Physics) VII	Monsoon 2022-23
Advanced Mathematical Methods in Physics	JRF	Winter 2018-19, 2019-20
Applied Optics (Shared)	B.Tech. (Engineering Physics) IV, Integrated M.Tech. (Applied Geophysics) IV	Winter 2017-18
Characterization Techniques	B.Tech. (Engineering Physics) VIII	Winter 2020-21, 2021-22
Condensed Matter Physics	M.Sc. III	Monsoon 2013-14
Fundamentals of Solid State Physics	Integrated M.Sc. V	Monsoon 2008-09, 2009-10, 2010-11, 2011-12, 2012-13.
Innovative Experimental Methods in Physics (Shared)	Integrated M.Sc. VI	Winter 2009-10
Laser and Holography (Shared)	M.Sc. III	Monsoon 2008-09, 2009-10
Materials Characterization (Shared)	JRF	Monsoon 2015-16, 2018-19, Winter 2019-20
Physics (Shared)	B.Tech. I/II (Common)	Monsoon 2014-15, 2015-16; 2016-17, 2017-18; Winter 2014-15, 2015-16; 2016-17, 2017-18; Summer 2013-14, 2014-15, 2015-16, 2016-17, 2017-18.
	BE I/II (Foreign students, Mining Engineering)	Monsoon 2014-15, Winter 2014-15 Summer 2014-15;

	BE II (Foreign students, Petroleum Engineering)	Winter 2017-18; Summer 2017-18.
Physics I (Shared)	Preparatory I	Monsoon 2008-09, 2009-10, 2010-11, 2011-12, 2012-13;
	BE Foundation Course I (Foreign students, Mining Engineering)	Monsoon 2013-14
Physics Practical / Laboratory (Shared)	M.Phil./ Integrated M.Tech. (Applied Geophysics)/ M.Sc./ Integrated M.Sc./ B.Tech. (Common)/ Preparatory	Monsoon 2008-09 onwards
Physics of Nanomaterials	M.Sc. IV	Winter 2009-10, 2010-11, 2011-12, 2012-13.
Plasma and Space Physics	M.Sc. IV	Winter 2014-15
Plasma Physics	Integrated M.Sc. VI	Winter 2009-10, 2010-11, 2011-12, 2012-13, 2013-14
Research Methodology (Shared / Full)	JRF	Monsoon 2018-19, 2019-20
Science and Technology of Thin Film	M.Sc. III	Monsoon 2013-14
Theoretical Physics (Shared)	JRF	Winter 2018-19
Vacuum and Thin Film Technology / Thin Film Technology / Thin Film and Vacuum technology	M.Sc. III / B.Tech. (Engineering Physics) VII	Monsoon 2018-19, 2019-20, 2020-21, 2021-22; Summer 2019-20

University of Alabama in Huntsville, Physics Department, USA:

Electronics (Lecture and Laboratory)	B.S.	Fall 2004

Indian Institute of Technology, Kharagpur, Department Physics and Meteorology:

Physics Laboratory	M.Sc., B.Tech.	1994 – 2000
Physics Tutorial	Preparatory	1994

Supervisory

On research, project and training:

Ph.D.	M.Phil.	Int. M.Sc.	M.Sc.		B.Tech.		Summer Training
Thesis	**Dissertation**	**Dissertation**	**Report**	**Dissertation**	**Report**	**Dissertation**	**M.Sc.**
9	5	3	11	18	4	1	1

Seminar Organised

- Organising secretary, "*National Seminar on Nanomaterials and Their Applications*", 10-11 February, 2011 (NANOMAT-2011); Department of Applied Physics, Indian School of Mines, Dhanbad.

Specialisation

Experimental micro and nanoscience

Research Interests

Nanoscience and technology; Thin film; Scanning Probe Microscopy; Molecular electronics & photonics; Microcantilever sensors.

Technical Skills

- Synthesis of nanomaterials
- Synthesis of thin films and nanostructures – PVDs (Thermal, E-beam, Flash, Oblique angle), Sputtering (DC and RF magnetron), Electrochemical, Chemical;
- Scanning Probe Microscopy (UHV VT STM, BEEM, Photon STM, AFM, Magnetoresistive STM, MFM, Conducting AFM, LFM);
- Four probe electric and magnetic measurements (variable temperature);
- Vibrating sample magnetometer;
- Spectrophotometer;
- Microcantilever sensor systems (optical, piezoresistive);
- Vacuum techniques;
- Instrumental development;
- Data acquisition, computer programming and interfacing; LabVIEW, VEE Pro, SoftWIRE;
- Electronic circuit and PCB design;
- Analytical: Fractal, SEM, TEM, HRTEM, TED, EDAX, EELS, XRD, XRR.

National Scholarships

- **Council of Scientific and Industrial Research (CSIR)**: Senior Research Fellowship, 1997
- **Graduates' Aptitude Test for Engineers (GATE)**: Research Fellowship, 1994
- **National Eligibility Test (NET)**: Junior Research Fellowship and eligibility for Lectureship, University Grant Commission **(UGC)**, 1993

Others

- Authored and co-authored 65 articles in national and international journals, 18 articles in conference / workshop proceedings and 94 conference / workshop presentations
- Delivered 24 contributory and invited talks / lectures