



**DEPARTMENT OF
PHYSICS**

FACULTY



PROFESSOR Dr. MOHAN NARAYAN

Associate Professor

PROFILE AND ACCOMPLISHMENTS SO FAR

EDUCATIONAL QUALIFICATIONS :

B.Sc. (Mumbai, 1988), M.Sc. (Mumbai, 1990), Ph.D. (Madras, 1999)

FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES

RESEARCH INTERESTS:
Member of the Board of Studies in Physics at University of Mumbai
Member of ISTE (Indian Society for Technical Education)

Member of the Board of Studies in Physics at Ramnarain Ruia College (Autonomous)

HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE-SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):

Phenomenological Consequences of Neutrino masses and Oscillations. Effect on Solar, Atmospheric and Long Baseline experiments. Connecting neutrino parameters to Gravity via effective Planck operators. Possible signals of CPT violations in neutrino Physics.

PUBLICATIONS (PEER REVIEWED) SO FAR: 29

PATENTS : NA

CONFERENCE

PROCEEDINGS/PAPERS: NA

SEMINARS/LECTURES/

ORATIONS DELIVERED: 05

PH.D.S AWARDED AS

SINGLE/ CO-GUIDE: NA

MASTERS AWARDED AS

SINGLE/ CO-GUIDE: NA

H-INDEX : 10

CITATIONS: 350

SUBJECTS TAUGHT DURING 2016-17

Under Graduate

Subject	Class	Sem.
General Physics Lab.	F. Y. B. Tech.	II

Post Graduate

Subject	Class	Sem.
Quantum Mechanics I & II	M. Sc. (Physics)	I & II
Classical Mechanics	M. Sc. (Physics)	I
Molecular Quantum Mechanics & Group Theory	M. Sc. (Physics)	III

RESEARCH INTERESTS :

Theoretical High Energy Physics, Molecular dynamics, Chemical Engineering Thermodynamics.

RESEARCH STUDENTS

CURRENTLY WORKING :

P.D.F.- RA -
Ph.D. (Tech.) - Ph.D.(Sc) 02
M.Tech. - M.Chem.Eng -
M.Tech. - M.Chem.Eng- M.Sc
- Others (if any) -

RESEARCH PUBLICATIONS:

International- 01
National- 01
Peer-reviewed- Conference proceeding-

Books-

PATENTS:

International - 0

Indian -

SPONSORED PROJECTS

: Government- 0

Private- 0

PROFESSIONAL

ACTIVITIES (MEMBERSHIP
OF IMPORTANT
COMMITTEES):

Member of the Board of Studies

in Physics at University of
Mumbai

Member of ISTE (Indian
Society for Technical
Education)

POSTDOCTORAL/PH.D. STUDENTS' RESEARCH PROJECTS (NAME OF STUDENTS, PREVIOUS INSTITUTE, TITLE) :

No.	Research Scholar	Previous Institution	Project	Supervisor
1	Kasturirangan Siddharth	University of Mumbai	x-ray spectroscopy of highly charged ions & plasma	Dr. Mohan Narayan
2	Ghoderao Pradnya Prabhakar	University department of Physics, University of Pune	Advanced cubic equations of state for fluids and fluid mixtures.	Dr. Mohan Narayan

DETAILS OF NATIONAL AND INTERNATIONAL COLLABORATIONS

Dr. Vishvanath Dalvi, Dept. of Chemical Engg., ICT

Dr. Bipin Koranga, Dept. of Physics, Kirori Mal College, University of Delhi

PUBLICATIONS

No.	Title and authors	Journal	Vol. No.	Pages	Year
1	A four – parameter cubic equation of state for pure compounds and mixtures Pradnya Ghoderao, V. H. Dalvi, M Narayan	Chemical Engineering Science	190	173-189	2018

MEMBERSHIP OF IN-HOUSE COMMITTEES : UGPC & PGPC Member of TA ICT.

SEMINARS/LECTURES/CONFERENCES/SYMPOSIA/WORKSHOPS/SUMMER OR WINTER TRAINING SCHOOLS ATTENDED/ORAL OR POSTER PRESENTATIONS:

Particle Physics: A bird's eye view. Talk delivered at UGC Refresher Course for college teachers at Jhunjhunwala college, Mumbai



Prof. R. R. Deshmukh

Professor

PROFILE AND ACCOMPLISHMENTS SO FAR

EDUCATIONAL

QUALIFICATIONS :

B.Sc. (Pune, 1991), M.Sc. (N. M. U. Jalgaon, 1994), B.Ed. (Mumbai, 1995) Ph.D. (Mumbai, 2002)

FELLOWSHIPS/

MEMBERSHIPS OF

PROFESSIONAL BODIES

- General Advisory Committee for Research and Liaison of Bombay Textile Research Association (BTRA), LBS Marg, Ghatkopar (W), Mumbai – 400 086
- Advisory Committee member of International conference on materials and characterization techniques held during Dec 14-16 at VIT, Vellore, India.
- Member, Board of Studies in Physics, BATU, Lonere
- Research Recognition Committee, BATU, Lonere.
- Member, Expert Committee in Physics, Nagpur University, Nagpur.
- Membership of Editorial Boards with name of journal and agency:

International J of Materials Science and Applications, Science Publishing Group, USA.
International J of Chemical and Physical Sciences.

- Member UGPC / PGPC, ICT
- Academic Council, ICT
- Member HOD Council, ICT

HIGHLIGHTS OF RESEARCH WORK DONE AND IT'S IMPART (MAXIMUM TWO SINGLE-SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):

(A) Plasma Processing of Polymeric materials:

Low temperature plasma has attracted attention of Scientist and Researchers to convert inexpensive polymer in to a valuable product. Since the temperature of RF and DC glow discharge plasma is just around room temperature, it is the most suitable technique to modify most of the polymer surfaces, without affecting their bulk properties. Plasma is a one-step dry process, it does not require disposal of polluted water like wet chemistry. Therefore it is environment friendly and has many other advantages over other processes of surface modification. One can control plasma chemistry just by controlling plasma process parameters suitably. It is possible to

attach certain functional groups such as Hydroxyl, Carboxyl, carbonyl, amine etc on nano particles or onto the polymer surfaces for further use in biomedical applications. Plasma functionalized nano particles can form covalent bonding in polymer composites, thus enhancing its mechanical and thermal properties.

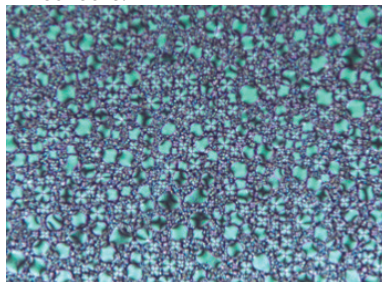
It is also possible to make super hydrophobic surfaces using fluorocarbon plasma. Polymers having low surface energy have poor adhesion properties, can be subjected to plasma treatment to enhance these properties. Our group at Physics Department has successfully shown that gaseous plasma treatment can enhance surface energy of polymers and textile materials. Polymer surface activation have opened window for pervaporation membranes. Plasma processing can also be used for functionalization of nano materials for various applications.

(B) Polymer Dispersed Liquid Crystals.

Liquid crystals are familiar as the basis of the multi-billion dollar flat

panel display industry. Over the years, liquid crystal research has transformed into a truly interdisciplinary area. Liquid crystal displays (LCDs) are experienced in most portable electronic equipments, large display systems, photonics devices etc. due to the inherent optical anisotropy of LCs, it has attracted attention in exploring the unique electro- optical effect of the polymer / LC composite film. At UICT, we are working in the area of polymer dispersed liquid crystal (PDLC) composite films. We have productively studied the electro-optical properties for different compositions of polymers, their co-polymers and different nematic liquid crystals. We showed that the electro-optical properties help us to select the proper composition for their use in displays, light shutters, and in non-display applications also. We have systematically carried out the temperature

dependence of these properties and the results help us to apply them in the field of temperature sensors.



Liquid crystal display technology would benefit from reduced switching times and driving voltages. For this purpose, very recently we have demonstrated the potential of dichroic dye-doped PDLC (DPDLC) films. Novel concepts involved in photopolymerization and opto-electronic behavior of DPDLCs have been explored. We have succeeded in optimizing dye content in these devices to obtain promising materials with minimum threshold and high contrast for display applications without the use of

polarizers. Future research may see the advent of exploring Polymer Stabilized liquid crystal devices, phase modulators, optical retarders, twisted LC devices, using ferroelectric, antiferroelectric, bent-core nematics etc. The research would also be focused on developing improved LC alignment for liquid crystal display device applications.

PUBLICATIONS (PEER REVIEWED) SO FAR: 92 / 6 book chapters
PATENTS : 01
CONFERENCE PROCEEDINGS/PAPERS: 01
SEMINARS/LECTURES/ORATIONS DELIVERED: 02
PH.D.S AWARDED AS SINGLE/ CO-GUIDE: 05
MASTERS AWARDED AS SINGLE/ CO-GUIDE: 04
H-INDEX : 20
CITATIONS: 1529
SUBJECTS TAUGHT DURING 2016-17 or 2017-18:

Under Graduate		
Subject	Class	Sem.
General Physics Laboratory	F. Y. B. Chem. Engg.	I
General Physics Laboratory	F. Y. B. Tech.	II
Applied Physics I	F. Y. B. Chem. Engg.	I
Applied Physics I	F. Y. B. Tech.	I
Applied Physics II	F. Y. B. Chem. Engg.	II
Applied Physics II	F. Y. B. Tech.	II

Post Graduate		
Subject	Class	Sem.
Analytical Techniques I	M. Sc. (Physics)	II
Analytical Techniques II	M. Sc. (Physics)	III
Physical Methods of Analysis	M. Tech	
Instrumental Methods of Analysis	M. Sc. (Text. Chemistry)	

RESEARCH INTERESTS :

Plasma Technology, Polymer Physics, Functionalization of nanoparticles, Molecular tailoring of surfaces using plasma for biomedical applications, textile physics, Electro-optical properties of Polymer Dispersed Liquid Crystals, Polymer nano – composite materials, Dissociation of the dye molecule using photoelectron chemical method.

RESEARCH STUDENTS CURRENTLY WORKING :

P.D.F.- RA -
Ph.D. (Tech.) - Ph.D.(Sc) 02
M.Tech. - M.Chem.Eng -
M.Tech. - M.Chem.Eng- M.Sc
- Others (if any) -

RESEARCH PUBLICATIONS:

International- 08
National-

Peer-reviewed-
Conference proceeding-

Books-
PATENTS:

International - 0
Indian - 0

SPONSORED PROJECTS

: Government- 0
Private- 0

PROFESSIONAL ACTIVITIES (MEMBERSHIP OF IMPORTANT COMMITTEES):

POSTDOCTORAL/PH.D. STUDENTS' RESEARCH PROJECTS :

No.	Research Scholar (Beginning with Last name)	Previous Institution	Project	Supervisor
1	Singh Ravi	University department of physics, University of Mumbai	Synthesis and characterization of plasma functionalized polymer Nano composites	Dr. R. R. Deshmukh
2	Trimukhe Ajinkya Mahadev	University of Mumbai	Functionalization of materials by plasma processing synthesis and characterization of polymer nano composites for bio medical applications	Dr. R. R. Deshmukh
3	Nimbekar Ashish	University of Mumbai	Synthesis and characterization of different polymeric composites using various methods and their applications	Dr. R.R. Deshmukh
4	Ambre Manoj G.		Preparation of Naural Fibres Reinforced Composite Particles separates from cotton	Dr. R.R. Deshmukh
5	Kambli Nishant Digamber		Extraction of fibres from Cornhusk (Maize Cob Sheath) and its Applications in Textiles	Dr. R.R. Deshmukh

DETAILS OF SPONSORED PROJECTS – GOVERNMENT AND PRIVATE:

I. Government Agencies:		
Sponsor	DST	
Title	Studies in surface sterilization of spices using non-thermal processes	
Duration	2 years	
Total amount	26 lakhs 48 thousand	
Principal Investigator	Dr. R. R. Deshmukh	
Research Fellows		
II. Private agencies:		
Sponsor	BIR Horizons pvt. Ltd.	
Title	Effect of Plasma Processing on surface Properties and Dyeability of Textile Material”	
Duration	2 years	
Total amount	8 Lakhs	
Principal Investigator	Dr. R. R. Deshmukh	
Research Fellows		

DETAILS OF NATIONAL AND INTERNATIONAL COLLABORATIONS

Dr. K. Navneetha Pandiyaraj, Dept. of Physics, SSIET, Coimbatore.

Dr. Varsha Kelkar - Mane, Department of Bio-tech, University of Mumbai.

Professor N.V. Bhat, BTRA, Mumbai.

Professor R. Dabrowski, Institute of Chemistry, Military University of Technology, Wrsaw 00-908, Poland.

Professor R. B. Timmons, University of Texas, Arlington, USA.

Professor U. S. Annapure, ICT, Mumbai.

PUBLICATIONS

No.	Title and authors	Journal	Vol. No.	Pages	Year
1	<u>Physico-chemical properties of low-pressure plasma treated black gram</u> Chaitanya Sarangapani, R Yamuna Devi, Rohit Thirumdas, Ajinkya M Trimukhe, Rajendra R Deshmukh, Uday S Annapure	LWT-Food Science and Technology IF:3.27	79	102-110	2017
2	Effect of processing parameters on the deposition of SiO _x -like coatings on the surface of polypropylene films using glow discharge plasma assisted polymerization for tissue engineering applications K Navaneetha Pandiyaraj, A Arun Kumar, MC Ramkumar, S Uday Kumar, P Gopinath, Pieter Cools, N De Geyter, R Morent, M Bah, S Ismat Shah, Pi-Guey Su, RR Deshmukh	Vacuum IF:1.69	143	412-422	2017

3	<u>Disparity in hydrophobic to hydrophilic nature of polymer blend modified by K₂Ti₆O₁₃ as a function of air plasma treatment</u> E Dhanumalayan, Ajinkya M Trimukhe, RR Deshmukh, Girish M Joshi	Progress in Organic Coatings IF:2.68	111	371-380	2017
4	Atmospheric pressure non-thermal plasma assisted polymerization of poly (ethylene glycol) methylether methacrylate (PEGMA) on low density polyethylene (LDPE) films for enhancement of biocompatibility MC Ramkumar, K Navaneetha Pandiyaraj, A Arun Kumar, PVA Padmanabhan, P Cools, N De Geyter, R Morent, S Uday Kumar, V Kumar, P Gopinath, SK Jaganathan, RR Deshmukh	Surface and Coatings Technology IF:2.36	329	55-67	2017
5	<u>Synthesis and characterization of microcrystalline cellulose powder from corn husk fibres using bio-chemical route</u> Nishant D Kambli, V Mageshwaran, Prashant G Patil, Sujata Saxena, Rajendra R Deshmukh	Cellulose IF:3.50	24,12	5355-5369	2017
6	<u>Modification of starch using low pressure radio frequency air plasma</u> Sidhant Banura, Rohit Thirumdas, Amritpal Kaur, RR Deshmukh, US Annapure	LWT IF:3.27	89	719-724	2018
7	Evaluation of mechanism of cold atmospheric pressure plasma assisted polymerization of acrylic acid on low density polyethylene (LDPE) film surfaces: Influence of various gaseous plasma pretreatment MC Ramkumar, K Navaneetha Pandiyaraj, A Arun Kumar, PVA Padmanabhan, S Uday Kumar, P Gopinath, A Bendavid, Pieter Cools, Nathalie De Geyter, Rino Morent, RR Deshmukh	Applied Surface Science IF:3.38	439	991-998	2018
8	Influence of operating parameters on development of polyethylene oxide-like coatings on the surfaces of polypropylene films by atmospheric pressure cold plasma jet-assisted polymerization to enhance their antifouling properties KN Pandiyaraj, MC RamKumar, A Arun Kumar, PVA Padmanabhan, AM Trimukhe, RR Deshmukh, P Cools, R Morent, N De Geyter, V Kumar, P Gopinath, SK Jaganathan	Journal of Physics and Chemistry of Solids IF:2.048			2018

BOOK AND BOOK CHAPTERS :

BOOK CHAPTER:

No.	Author(s)	Title	Editor	Publisher	Place	Year	Page
1	R. R. Deshmukh, A. M. Trimukhe, K.N.Pandeyaraj, A. Tripathi	Advances in Biomaterials for Biomedical Applications (Plasma surface modification of biomaterials for biomedical)	A. Tripathi, J. S. Melo	Springer		2017	
2	R. R. Deshmukh, K. Deshmukh, G. M. Joshi, A. Sharma, S. Arora, R. Tibrawala, S. Kalinathan	Functionalized Engineering Materials and their Applications (Study of Morphology and Electrical Properties of Pure and Hybrid Polymer Composites)	S. Thomas, N. Kalarikkal, Pious C. V., Z. Ahmad, J. T. Haponiuk	CRC Press		2016	
3	R. R. Deshmukh, K. Deshmukh, M. B. Ahmad, S. K.K. Pasha, P. R. Bhagat, K.Chidambaram,	Biopolymer Composites in Electronics (Biopolymer Composites with High Dielectric Performance: Interface Engineering)	K. K. Sadasivuni, D. Ponnamma, John-John	Elsevier Publisher		2016	
4	R. R. Deshmukh	Liquid Crystalline Polymers: Volume 2--Processing and Applications (Electro-optic and Dielectric Responses in PDLC Composite Systems)		Springer		2015	
5	N. V. Bhat R. R. Deshmukh	Plasma Technologies for Textile & Apparel (Plasma processing of textiles to enhance	S.K. Nema, P.B. Jhala	Woodhead Publishing	India	2014	
6	N. V. Bhat, R. R. Deshmukh	Textile Dyeing (Pre-treatments of Textiles Prior to Dyeing: Plasma Processing)	Ira S. Krull, Sebastiano D'Amico	Intech			



Prof. (Mrs.) V. D. Deshpande

Professor

PROFILE AND ACCOMPLISHMENTS SO FAR

EDUCATIONAL QUALIFICATIONS :

M.Sc. (Delhi, 1978), M.Phil. (Delhi, 1980), Ph.D. (Delhi, 1986)

FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES

HIGHLIGHTS OF RESEARCH WORK DONE AND IT'S IMPACT (MAXIMUM TWO SINGLE-SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):

PUBLICATIONS (PEER REVIEWED) SO FAR: 23

PATENTS : 01

CONFERENCE

PROCEEDINGS/PAPERS: 03

SEMINARS/LECTURES/ ORATIONS DELIVERED: 01

PH.D.S AWARDED AS SINGLE/ CO-GUIDE: 07

MASTERS AWARDED AS SINGLE/ CO-GUIDE: 05

H-INDEX : 06

CITATIONS: 87

SUBJECTS TAUGHT DURING 2016-17 or 2017-18:

Under Graduate

Subject	Class	Sem.
Applied Physics I	F. Y. B. Chem. Engg.	I
Applied Physics I	F. Y. B. Tech.	I
Colour Physics & Colour Harmony	S. Y. B. Tech.	IV
Colour Physics & Colour Harmony Lab	S. Y. B. Tech.	IV

Post Graduate

Subject	Class	Sem.
Colour Science	M. Sc. (Physics)	IV

RESEARCH INTERESTS :

Polymer nanocomposites, Polymer blends: Crystallization kinetics, Mechanical and optical properties, study of dielectric behavior, Orientation behavior, structure-property relationship; Colour Physics: Colour assessment of dyed textiles; Assessment of the effect of the background on the colour perception; Polymer embedded nano-drug delivery; background

on the colour perception; Polymer embedded nano-drug delivery

RESEARCH STUDENTS CURRENTLY WORKING :

P.D.F.- RA -
Ph.D. (Tech.) - Ph.D.(Sc) 05
M.Tech. - M.Chem.Eng -
M.Tech. - M.Chem.Eng- M.Sc
- Others (if any) -

RESEARCH PUBLICATIONS:

International- 03
National-
Peer-reviewed-
Conference proceeding- 03

Books-

PATENTS:

International - 0
Indian - 0

POSTDOCTORAL/PH.D. STUDENTS' RESEARCH PROJECTS (NAME OF STUDENTS, PREVIOUS INSTITUTE, TITLE) :

No.	Research Scholar (Beginning with Last name)	Previous Institution	Project	Supervisor
1	Dubey Satish Chandra	Jhunjhunwala college, Mumbai	Study of Paints and Their Coatings on various Substrates for Solar Thermal Applications	Prof. V. D. Deshpande
2	Gaonkar Amita	University of Mumbai	Morphological mechanical and thermal behavior of reorganized polyethylene terephthalate and its Nano composites	Prof. V. D. Deshpande
3	Murudkar Vrishali Vijaykumar	Pune University, Fergusson College.	"Physical and mechanical properties of polysiloxane Nano composites"	Prof. V. D. Deshpande
4	Singh Arvind R	University of Mumbai	Preparation of Polymer nanocomposites using Carbon nanotubes and surface modified Carbon nanotubes	Prof. V. D. Deshpande
5	Nikam Pravin		"Studies in polymer / metal oxide nanocomposites"	Prof. V. D. Deshpande

DETAILS OF SPONSORED PROJECTS – GOVERNMENT AND PRIVATE:

I. Government Agencies:		
Sponsor	BARC/DAE	
Title	Development and characterization of selective coating for enhancement of radiation absorption of solar receivers	
Duration	3 years	
Total amount	1.2 crores	
Principal Investigator	Prof. (Mrs.) V. D. Deshpande	
Research Fellows	Mr. Satishchandra Dubey	

DETAILS OF NATIONAL AND INTERNATIONAL COLLABORATIONS
PUBLICATIONS

No.	Title and authors	Journal	Vol. No.	Pages	Year
1	<u>Thermal and tensile properties of alumina filled PET nanocomposites</u> Nikam, P.N., Deshpande, V.D.	AIP Conference Proceedings	1953	090058	2018
2	<u>Study of nano mechanical properties polydimethylsiloxane (PDMS)/MWCNT composites</u> Murudkar, V., Gaonkar, A., Deshpande, V.D., Mhaske, S.T.	AIP Conference Proceedings	1953	09555	2018
3	<u>Melt rheological properties of nucleated PET/MWCNT nanocomposites</u> Gaonkar, A., Murudkar, V., Deshpande, V.D.	AIP Conference Proceedings	1953	050001	2018
4	<u>Evaluation of thermal transitions in Poly (butylene terephthalate)/15A MMT nanocomposites: Nonisothermal experiments and modelling using isoconversional methods</u> Kalkar, A.K., Deshpande, V.D., Purkar, B.R.	Thermochimica Acta	660	23-36	2018
5	<u>Nonisothermal crystallization kinetics of nylon 66/LCP blends</u> Jape, S.P., Deshpande, V.D.	Thermochimica Acta	655	1-12	2017
6	<u>Morphology, crystallization and melting behaviour of poly(trimethylene terephthalate)/thermotropic liquid crystalline polymer blends</u> Deshpande, V.D., Jape, S.P.	Journal of Thermal Analysis and Calorimetry IF:1.74	128(3)	1479-1493	2017
7	Evaluation of mechanism of cold atmospheric pressure plasma assisted polymerization of acrylic acid on low density polyethylene (LDPE) film surfaces: Influence of various gaseous plasma pretreatment MC Ramkumar, K Navaneetha Pandiyaraj, A Arun Kumar, PVA Padmanabhan, S Uday Kumar, P Gopinath, A Bendavid, Pieter Cools, Nathalie De Geyter, Rino Morent, RR Deshmukh	IF:1.74	128(3)	1479-1493	2017
8	Influence of operating parameters on development of polyethylene oxide-like coatings on the surfaces of polypropylene films by atmospheric pressure cold plasma jet-assisted polymerization to enhance their antifouling properties KN Pandiyaraj, MC RamKumar, A Arun Kumar, PVA Padmanabhan, AM Trimukhe, RR Deshmukh, P Cools, R Morent, N De Geyter, V Kumar, P Gopinath, SK Jaganathan	Journal of Physics and Chemistry of Solids IF:2.048			2018



Dr. Neetu Jha
UGC Assistant Professor

PROFILE AND ACCOMPLISHMENTS SO FAR

EDUCATIONAL QUALIFICATIONS :

Ph.D.

FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES

- i) Materials Research Society
- ii) Society of Materials Chemistry

HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE-SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):

1. **Nanomaterial based fuel cell electrocatalyst:** Pt nanoparticles based catalyst supported on carbon nanostructures are synthesized and analyzed for its oxygen reduction reaction (ORR) activity using electrochemical techniques. We are also looking at the effect of catalyst support on fuel cell performance. Change in property of catalyst support has been found to have a profound effect on the cell performance.

Our research group deals with detailed study of the low temperature fuel cell electrocatalyst.

2. **Graphene Synthesis using solar radiation :** Graphene oxide is being synthesized at room temperature and ambient conditions using modified hummers method. Then natural source of light for rapid, chemical free and low temperature method is being used for high throughput production of graphene by exfoliation of graphite oxide was using focused solar radiation. The simple method of preparation holds promise for easy scalability of cost effectiveness for huge practical applications.
3. **Carbon Based samples for heavy metal removal:** The adsorption of metal ions from aqueous solution has been studied with the variation in the degree of functionalization of the graphene samples. It was observed that increasing oxygen functionalities amplifies the uptake of metal ions.

4. **Supercapacitor cell:** Two electrode supercapacitor cells are fabricated using highly conducting and porous carbon nanomaterials for charge storage studies. Our research focus is on the development of carbon nanocomposites for increase in charge storage property. Capacitors are known to possess very high power density but it's energy density is limited. Hence along with the charge storage we also focus on enhancing the energy density of capacitors.

PUBLICATIONS (PEER REVIEWED) SO FAR: 37

PATENTS : 04

CONFERENCE

PROCEEDINGS/PAPERS: 10

SEMINARS/LECTURES/ ORATIONS DELIVERED: 00

PH.D.S AWARDED AS SINGLE/ CO-GUIDE: 01

MASTERS AWARDED AS SINGLE/ CO-GUIDE: 05

H-INDEX : 13

CITATIONS: 730

SUBJECTS TAUGHT:

Under Graduate		
Subject	Class	Sem.
General Physics Laboratory	F. Y. B. Chem. Engg.	I
General Physics Laboratory	F. Y. B. Tech.	II
Post Graduate		
Subject	Class	Sem.
Nanotechnology, Nanomaterials and Its Applications	M. Tech. Green Technology	
NanoScience	M.Sc. (Physics)	IV
General Physics Laboratory	M. Sc. (Physics)	I

RESEARCH INTERESTS :

Carbon Nanotubes, Graphene, Fuel Cell electrocatalyst, Energy storage supercapacitors and Electrochemical Sensors

RESEARCH STUDENTS**CURRENTLY WORKING :**

Ph.D. (Tech.) - 1
Ph.D.(Sc) - 3
M.Tech. - 1
M.Chem.Eng - 0
M.Sc - 0 Others (if any) -

RESEARCH PUBLICATIONS:

International- 04

PATENTS:

International - 0 Indian - 0

SPONSORED PROJECTS:

Government- 1 Private- 0

SPECIAL AWARDS/HONORS:**UNDERGRADUATE STUDENTS' SEMINARS/PROJECTS/HOME PAPERS:****SEMINARS**

No.	Name of the Student	Topic
1	Goyal Pranav	Electrocatalyst for PEM Fuel Cell

RESEARCH PROJECTS**PH.D. (TECH)**

No.	Research Scholar	Previous Institution	Project	Supervisor
1	Ahirrao Dinesh J.	North Maharashtra Jalagaon University	Development of Pseudocapacitors for Charge Storage	Dr. Neetu Jha

PH.D. (SCIENCE)

No.	Research Scholar	Previous Institution	Project	Supervisor
1	Mohanapriya K.	Anna University	Carbon based nanostructured materials for energy storage and capacitive deionization of water applications	Dr. Neetu Jha
2.	Kireeti Kumar	Nagajurn University	Development of nanomaterials based electrocatalyst for polymer electrolyte membrane fuel cell	Dr. Neetu Jha

3.	Shakeel Rahman	North Maharashtra Jalagaon University	Synthesis of CdSe quantum dot and its hybrid photocatalyst for hydrogen evolution from water under visible light	Dr. Neetu Jha
4.	Sukruta Pethe	University of Pune	Generation of Steam by Solar Energy Using Nanoparticles of Graphene Oxide and Applications of the same	Dr. Neetu Jha

M.SC. (CHEMISTRY)(BY RESEARCH)

No.	Research Scholar	Previous Institution	Project	Supervisor
1	Shital Rajwadkar	UDCT, Jalgaon	Determination of Arsenic using electrochemical method	Dr. Neetu Jha

DETAILS OF SPONSORED PROJECTS – GOVERNMENT AND PRIVATE

I. Government Agencies:		
Sponsor	DST Inspire	
Title	Development of Pt alloy based electrocatalyst for fuel cell	
Duration	5 Yrs	
Total amount	35 Lakh	
Principal Investigator	Dr. Neetu Jha	
Research Fellows		

DETAILS OF NATIONAL AND INTERNATIONAL COLLABORATIONS

- Dr. Shubra Singh, Anna University, Tamil Nadu
- Dr. Ashish Mishra, B.H.U., UP.
- Dr. Shaijumon M. M., IISER, Trivandrum.
- Prof. S. Ramaprabhu, IIT Madras, Chennai

PUBLICATIONS

No.	Title and authors	Journal	Vol. No.	Pages	Year
1	<u>Functionality modification of SWCNT for improved methanol oxidation reaction</u> Kota VMK Kireeti, Neetu Jha	Nanotechnology (IEEE-NANO), 2017 IEEE 17th International Conference on		630-631	2017
2	<u>Preparation of ZnO nanoribbon-MWCNT composite film and its application as antimicrobial bandage, antibacterial filter and thermal IR camouflage material</u> Prasad Upasani, TV Sreekumar, VG Gaikar, Neetu Jha	Bulletin of Materials Science IF: 0.870	40,4	865-876	2017
3	<u>Surface tailored single walled carbon nanotubes as catalyst support for direct methanol fuel cell</u> Kota VMK Kireeti, Neetu Jha	Journal of Power Sources IF:6.945	364	392-399	2017
4	<u>Preparation of ZnO/MWCNT/PP composite film and its application as multifunctional protective film</u> Prasad Upasani, TV Sreekumar, VG Gaikar, Neetu Jha	Polymer Composites IF:1.86	39,1	157-170	2018
5	<u>Carbon fabric based solar steam generation for waste water treatment</u> MW Higgins, AR Shakeel Rahman, Rami Reddy Devarapalli, Manjusha V Shelke, Neetu Jha	Solar Energy IF:4.76	159	800-810	2018
6	<u>Highly crumpled solar reduced graphene oxide electrode for supercapacitor application</u> K Mohanapriya, Dinesh J Ahirrao, Neetu Jha	American Institute of Physics Conference Series	1942,5		2018
7	<u>Synthesis of metal free ultrathin graphitic carbon nitride sheet for photocatalytic dye degradation of Rhodamine B under visible light irradiation</u> Shakeelur Rahman, Bilal Momin, Uday S Annapure, Neetu Jha	AIP Conference Proceedings	1942,1	120017	2018
8	<u>Bulk to nanostructured vanadium pentaoxide-nanowires (V₂O₅-NWs) for high energy density supercapacitors</u> Dinesh J Ahirrao, Neetu Jha	AIP Conference Proceedings	1942,1	140066	2018

9	<u>Non-platinum metal-organic framework based electro-catalyst for promoting oxygen reduction reaction</u> Dipanwita Das, Vrushali Raut, Kota VMK Kireeti, Neetu Jha	AIP Conference Proceedings	1942,1	140049	2018
10	<u>Development of an enzyme free glucose sensor based on copper oxide-graphene composite by using green reducing agent ascorbic acid</u> Yogesh Pandit Palve, Neetu Jha	AIP Conference Proceedings	1953,1	030259	2018
11	<u>Synthesis of Aqueous Dispersible Reduced Graphene Oxide by the Reduction of Graphene Oxide in Presence of Carbonic Acid</u> Pravin H Wadekar, Dinesh J Ahirrao, Rahul V Khose, Dattatray A Pethsangave, Neetu Jha, Surajit Some	Chemistry Select IF: 1.46	1942,1	120017	2018
12	<u>Enhanced electrochemical performance of hyperbranched poly (amidographene)</u> Kiran Babasaheb Dhopte, K Mohanapriya, Neetu Jha, Parag R Nemade	Energy Storage Materials IF:5.208			2018
13	<u>Fabrication of one dimensional graphene nanoscrolls for high performance supercapacitor application</u> K Mohanapriya, Neetu Jha	Applied Surface Science IF:3.38	449	461-467	2018



Dr. Ashwin Mohan

Ph.D.

Assistant Professor

FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES:

HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT:

My research work has mainly dealt with probing correlations between structure, magnetism, and thermal transport phenomena in fundamentally interesting and technologically promising classes of materials. Through my research work I have contributed towards understanding of the above-mentioned aspects in transition metal oxides, particularly low-dimensional quantum magnets, where antiferromagnetically coupled spins are arranged in two-dimensional planar or one-dimensional ladder-like and chain-like geometries. I have investigated the synthesis, structure, and physical properties of single crystalline compounds like the one-dimensional spin-chain compounds, Sr_2CuO_3 , SrCuO_2 , $\text{Ba}_2(\text{Mn,Ni})(\text{PO})_4$, the two-dimensional Heisenberg antiferromagnet La_2CuO_4 , the spin-ladder compound $\text{La}_8\text{Cu}_7\text{O}_{19}$, battery materials LiCoO_2 and LiNiO_2 , using solid-state synthesis, optical floating zone method, and

various other microscopic and macroscopic measurement techniques in a wide range of temperature.

In low-dimensional materials that exhibit large anisotropic thermal conductivity mediated by magnetic excitations, my research has shed light on the relevant scattering mechanisms, over a large temperature range from 5 K to 800 K, that are responsible for heat conduction in such materials. These oxide materials, with their unconventionally large and novel thermal transport channel find use in heat dissipation applications in microprocessors. In this regard, the effect of external perturbations like impurity-induced disorder on magnetic excitations and their propagation was also looked at. These results have provided unprecedented information about scattering mechanisms and evidence of strong coupling between spin and lattice degrees of freedom in such materials. I have also investigated magnetic and electrical properties of rare-earth intermetallic shape memory alloys for their use in solid state refrigeration technology. Here, we have found substantially large magnetocaloric effect near

room temperature for compounds doped in a controlled fashion for achieving tunability for specific cooling applications. Recently, I have started work on synthesis of single-crystalline battery materials $\text{Li}(\text{Co,Ni})\text{O}_2$ with an aim to investigate the propagation of Li and O atoms through the bulk of the material and better understand the mechanism of charge transport in these technologically important materials. Future research will be directed towards investigating materials that have potential in generating clean energy from waste heat by means of the thermoelectric and pyroelectric effects.

**PUBLICATIONS (PEER
REVIEWED) SO FAR:** 07

PATENTS : NA

CONFERENCE

PROCEEDINGS/PAPERS: 04

**SEMINARS/LECTURES/
ORATIONS DELIVERED:** 08

**PH.D.S AWARDED AS
SINGLE/ CO-GUIDE:** NA
**MASTERS AWARDED AS
SINGLE/ CO-GUIDE:** NA

H-INDEX : 03

CITATIONS: 51

SUBJECTS TAUGHT:

Under Graduate		
Subject	Class	Sem.
Applied Physics I & II	F. Y. B. Chem. Engg. & B. Tech.	I & II
Colour Physics Laboratory	S. Y. B. Tech.	IV
General Physics Laboratory	MSc, Physics	I

RESEARCH INTERESTS :

Materials Physics, Functional materials, Magnetism and Transport phenomena, Material Synthesis, Single Crystal Growth

RESEARCH STUDENTS

CURRENTLY WORKING :

Ph.D. (Tech.) - RA -
 Ph.D. (Tech.) - Ph.D.(Sc) -
 M.Tech. -
 M.Chem.Eng -

M.Sc - 01

Others (if any) -

RESEARCH PUBLICATIONS:

International- 01
 National-
 Peer-reviewed- 01
 Conference proceeding-
 Books-

PATENTS:

International - 0
 Indian - 0

SPONSORED PROJECTS:

Government- 0
 Private- 0

SPECIAL AWARDS/HONORS:

CSIR-NET, Marie Curie Fellowship

UNDERGRADUATE

STUDENTS' SEMINARS/
 PROJECTS/HOME PAPERS:

DETAILS OF NATIONAL AND INTERNATIONAL COLLABORATIONS

Leibniz Institute for Solid State Research (IFW), Dresden, Germany

Tata Institute of Fundamental Research (TIFR), Mumbai

BARC, Mumbai

PUBLICATIONS

No.	Title and authors	Journal	Vol. No.	Pages	Year
1	<u>The effect of different in-chain impurities on the magnetic properties of the spin chain compound SrCuO₂ probed by NMR</u> Y. Utz, F. Hammerath, R. Kraus, T. Ritschel, J. Geck, L. Hozoi, J. van den Brink, A. Mohan , C. Hess, K. Karmakar, S. Singh, D. Bounoua, R. Saint-Martin, L. Pinsard-Gaudart, A. Revcolevschi, B. Buechner, H.-J. Grafe	<i>Physical Review B</i> ,	96	115135	2017



Dr. Awneesh Singh

Ph.D.

UGC Assistant Professor

FELLOWSHIPS/
MEMBERSHIPS OF
PROFESSIONAL BODIES:
HIGHLIGHTS OF RESEARCH
WORK DONE AND ITS
IMPACT:
PUBLICATIONS (PEER

REVIEWED) SO FAR: 23
PATENTS : 00
CONFERENCE
PROCEEDINGS/PAPERS: 01
SEMINARS/LECTURES/
ORATIONS DELIVERED: NA

Ph.D.S AWARDED AS
SINGLE/ CO-GUIDE: 00
MASTERS AWARDED AS
SINGLE/ CO-GUIDE: 00
H-INDEX : 06
CITATIONS: 90

SUBJECTS TAUGHT DURING 2016-17 or 2017-18:

Under Graduate		
Subject	Class	Sem.
General Physics Lab	F. Y. B. Chem. Tech	II
Post Graduate		
Subject	Class	Sem.
Polymer Physics I	M. Sc. Physics	II
Statistical Mechanics	M. Sc. Physics	III
Computational Physics	M. Sc. Physics	III

RESEARCH INTERESTS :

(1) Theory and computer simulations of multicomponent simple-fluids/polymer-blends/block-copolymers; (2) Pattern formation in nonequilibrium systems; (3) Computational design of smart materials; (4) Computational analysis of the following polymerization processes: (I) Atom Transfer Radical Polymerization (ATRP); (II) Free Radical Polymerization (FRP); (III) Photo-Controlled

Radical Polymerization (Photo-CRP).

RESEARCH STUDENTS CURRENTLY WORKING :

P.D.F (Tech.) -
RA -
Ph.D. (Tech.) -
Ph.D.(Sc) -
M.Tech. -
M.Chem.Eng -
M.Sc - 01
Others (if any) -
RESEARCH PUBLICATIONS:
International-

National-
Peer-reviewed-
Conference proceeding-
Books-

PATENTS:

International - 0
Indian - 0

SPONSORED PROJECTS:

Government- 0
Private- 0

PROFESSIONAL
ACTIVITIES (MEMBERSHIP
OF IMPORTANT
COMMITTEES):

GENERAL PUBLICATIONS:

SCI Journal Articles

1. *Kinetics of phase separation in ternary fluid mixtures: A dissipative particle dynamics simulation study*; Amrita Singh, Anirban Chakraborti, and Awaneesh Singh; **Soft Matter**, Vol. 14, 4317-4326 (2018). IF: 3.889
2. *Designing polymer gels and composites that undergo bio-inspired phototactic reconfiguration and motion*; Olga Kuksenok, Awaneesh Singh, and Anna C. Balazs; **Bioinspir. Biomim.** Vol. 13, 035004 (2018). IF: 2.939
3. *Effect of bond-disorder on the phase-separation kinetics of binary mixtures: A Monte Carlo simulation study*; Awaneesh Singh, Amrita Singh, and Anirban Chakraborti; **Journal of Chemical Physics**, Vol. 147, (12) 124902 (2017). IF: 2.965
4. *Combining ATRP and FRP gels: soft gluing of polymeric materials for the fabrication of stackable gels*; Antoine Beziau, Rafael N. L. de Menezes, Santidan Biswas, Awaneesh Singh, J. Cuthbert, Anna C. Balazs, Tomasz Kowalewski, Krzysztof Matyjaszewski; **Polymers (mdpi)**, Vol. 9, 186 (2017). (Featured article 2017) IF: 3.364
5. *Photo-regeneration of Severed Gel with Iniferter-mediated Photo-growth*; Awaneesh Singh, Olga Kuksenok, Jeremiah A. Johnson and Anna C. Balazs. **Soft Matter**, Vol. 13, 1978-1987 (2017). IF: 3.889
6. *Living Additive Manufacturing: Transformation of Parent Gels into Diversely Functionalized Daughter Gels Made Possible by Visible Light Photo-redox Catalysis*; Mao Chen, Yuwei Gu, Awaneesh Singh, Mingjiang Zhong, Alex Jordan, Santidan Biswas, LaShanda Korley, Anna C. Balazs, and Jeremiah A. Johnson. **ACS Central Science**, Vol. 3, 124-134 (2017). (Web highlight of the issue) IF: 7.939