Preface

It is indeed a matter of immense pleasure and distinguished honor to bring to your kind attention that UIET, Panjab University Chandigarh has successfully organized the International Conference on Multidisciplinary Aspects of Materials in Engineering (IC-MAME 2021) from 8th – 9th October, 2021 in hybrid mode.

This conference aimed to bring together the experts from the varied disciplines involved in engineering and ancillary aspects of materials engineering thus making ways for youngsters to learn, interact and share their experiences, research methods & results in the multidisciplinary aspect of material science and their contemporary applications.

Prof. Gautam Biswas (J.C Bose Fellow and Professor, IIT Kanpur) and Prof. Rajeev Ahuja (Director, IIT, Ropar) graced the event as Chief Guest during Inaugural Session and valedictory Session of the conference respectively.

The scientific program included keynote lectures, invited talks by academic and industry professionals and 12 different thematic sessions consisting of peer-reviewed full length paper presentations & abstract presentations in parallel technical sessions.

This conference provided an opportunity for young researchers and scientists to discuss scientific topics and research results, to share their knowledge and experiences, to collaborate in innovative designs and proposals.

Editors

Prof. Sunil Agarwal

Professor, Electronics and Communication Engineering, UIET, Panjab University, Chandigarh, India

Dr. Rajesh Kumar

Associate Professor, Mechanical Engineering, UIET, Panjab University, Chandigarh, India

Dr. Gaurav Sapra

Assistant Professor, Electrical and Electronics Engineering, UIET, Panjab University, Chandigarh, India
ABOUT UIET

The University Institute of Engineering and Technology was established in 2002 and is constituent institute of Panjab University, Chandigarh. The institute has maintained high quality in technical education. The well qualified faculty is the backbone of the institute. Well equipped laboratories provide the exposure to the students towards practical aspects of engineering. State-of-art computing facilities and internet connectivity through 1Gbps National Knowledge Network (NKN) provide ample scope for students to learn round the clock. The whole campus is Wi-Fi enabled and students having laptops avail this facility in the institute as well as in the hostels. With the regular revision of syllabi, more industry oriented programme and open Electives have been introduced in the curriculum. UIET is spread over 10.5 acres of land with lush greenery. It has two academic blocks which include labs, office, library, and lecture halls. There are blocks for mechanical labs and workshops. There is a branch of State Bank of India and an ATM of State Bank of India on the campus. Students are from all over the nation, few are day scholars and many live in hostels which provide accommodation, food, washrooms, and sporting facilities. University Institute of Engineering & Technology (UIET) is a institute of Panjab University which has prospered by leaps & bounds over the years achieving great academic heights besides foraying into the top 30 finest engineering colleges of the country. UIET offers Undergraduate (B.E.), Postgraduate (M.E./M.Tech. degree) as well as Doctoral courses.
ABOUT PANJAB UNIVERSITY

Panjab University (PU) established in 1882 at Lahore (Now in Pakistan) was shifted to independent India in 1947. It is one of the four universities established in India before partition by the then Federal Government. In 1956, PU shifted to Chandigarh and in 1966, after re-organization of Punjab and was made as an Inter State Body Corporate under the Act of Parliament. PU is imparting education to over 2.5 lakh students through its 78 teaching and research departments located on the twin campus at Chandigarh and through 195 affiliated/constituent colleges spread over Punjab and Chandigarh besides 4 Regional centers at Mukatsar, Ludhiana, Hoshiarpur and Kauni.

PU has a long tradition of pursuing excellence in teaching and research in Science & Technology, humanities, social sciences, performing arts and sports. By virtue of its history, experience, achievements, and philosophy, PU has a national character and it enjoys an international stature drawing both the faculty and students from all over the country and different parts of the globe. PU faculty includes some of the most distinguished scientists and academicians. Over the years, the reputation of the PU has grown to emerge as an institution at the pinnacle in innovative teaching, research and community outreach. Its alumni include two former Prime Ministers and several past and present cabinet ministers of the country, two Noble Laureates, a large number of Fellows of various Academies, both in Science and Social Science, Theatre Artists, Actors. There is hardly any sphere where the university has not made its mark. The university is ranked amongst the top Universities in India and Internationally by various agencies/bodies.
ABOUT IC-MAME 2021

International conference on multi-disciplinary aspects of Materials in Engineering (IC-MAME 2021) is a flagship event of the University Institute of Engineering and Technology, Panjab University, Chandigarh.

This conference is a multidisciplinary event encompassing themes related to innovative research related to Materials in Engineering.

The objective of the conference is to bring professional engineers, academicians and research scholars of matching interests on a common platform to share new ideas, experiences, and knowledge in various fields of electrical and mechanical engineering.

The scientific program will consist of peer-reviewed paper presentations in parallel technical sessions. In addition, keynote lectures, presentations by academic and industry professionals will be conducted during the conference. Such interactions will facilitate better understanding about technological developments all across the globe amongst the peers. This conference will certainly ignite the minds of the researchers for undertaking more interdisciplinary collaborative research for upgradation of the technology.
Conference Theme

International conference on multi-disciplinary aspects of Materials in Engineering (IC-MAME 2021) is a flagship event of the University Institute of Engineering and Technology, Panjab University, Chandigarh. This conference is a multidisciplinary event encompassing themes related to innovative research related to Materials in Engineering.

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Call for Papers

Original and unpublished research or review papers are invited related to following sub-themes of the conference, but not limited to:

- Composite Materials
- Design, modeling and simulation, Multiscale Materials Modelling
- Industrial, Production, Energy and environmental applications
- Novel materials, manufacturing, joining and characterization
- Smart materials, sensors, instrumentation, AI and IoT
- Thermal and mechatronics
- Biomaterials and Bioengineering.
- Nanomaterials and Nanoengineering
- Functional Materials and Devices
- Advanced Structural Materials

Conference Dates: **October 08-09, 2021**

**Note:** There will be choice for the participants to present papers **online or offline**.

Kindly refer to the conference website [https://www.icmame2021.com](https://www.icmame2021.com) for more details. The information about the conference is also available at [https://easychair.org/cfp/icmame2021](https://easychair.org/cfp/icmame2021)
COMMITTEES

ADVISORY COMMITTEE

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- Dr. Nishima Wangoo, Assistant Professor, Applied Science, UIET

Purchase Committee

- Prof. Sunil Agrawal (Convener), Professor, ECE, UIET
- Prof. Vinay Kanwar, Professor, Applied Science, UIET
- Prof. Manu Sharma, Professor, MECH, UIET
- Dr. Parveen Goyal, Assistant Professor, MECH, UIET
MESSAGE

It is a matter of pride that the University Institute of Engineering and Technology (UIET), Panjab University, Chandigarh is organizing an International Conference on Multidisciplinary Aspects of Materials in Engineering (IC-MAME 2021) on October 08-09, 2021. This International conference is a flagship event of the UIET of Panjab University, Chandigarh. The conference is designed as a multidisciplinary event covering themes related to innovative research on materials in engineering.

This international conference aims to bring together the research interests of professional engineers, academicians and scholars in the field of material science and engineering; in order to facilitate better understanding of technological developments globally.

I hope that there would be a constructive dialogue and contribution by the participants during the conference.

(Raj Kumar)
Professor V.R Sinha  
*Dean University Instructions*  
*Panjab University*

**MESSAGE**

Material science and engineering contribute towards our everyday life. Therefore, it is important that the current and future resources are required and explored for conducting research through wide deliberations by the scientific institutions, as ours is.

It is a matter of great pleasure and pride that the UIET Panjab University, Chandigarh, a prestigious institution, has taken the initiative of organizing two day’s international level conference on *Multidisciplinary Aspects of Materials in Engineering (IC-MAME 2021)*. This is a multidisciplinary event and the key focus would be on themes related to research work in the fields of electrical and mechanical engineering. It is believed that the deliberations made during the conference would reach out to researchers working in this field, in particular.

I congratulate the organizing committee of the UIET for organizing this conference. Such like events are very prestigious and bring huge laurels to the institution to which they belong.

My sincere appreciation and best wishes to the organizing team of the UIET for its successful accomplishment.

Sd/-  
*Dean University Instructions*
Professor Rajesh Gill
Dean Research
Panjab University

It is a matter of great pride for the Panjab University that University Institute of Engineering & Technology is holding the prestigious International Conference on “Multi-disciplinary aspects of Materials in Engineering”, under the dynamic leadership of Prof. J.K. Goswamy, Director, UIET, P.U. The kind of meticulous planning which has gone into organising this event, is evident from the minute details including the choice of currently relevant sub-themes, the noted key speakers and finally, the publication of papers presented in the Conference. I am confident that participation in this Conference will be enormously engaging for all the delegates not only in the theoretical sense but in application as well, given the multi-disciplinary essence of the deliberations and the quality of speakers.

I wish the organisers and my colleagues an extremely successful and fruitful Conference.

Dean Research
Professor J. K. Goswamy
Director UIET
Panjab University

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MESSAGE

It is my pleasure to welcome the delegates to participate in the IC-MAME, 2021 being organized by the University Institute of Engineering & Technology (UIET), Panjab University, Chandigarh on 8-9 October, 2021. The field of materials is mother to all Sciences as it encompasses the synthesis, characterization and application of materials wide and diversification application. The present day economy of any nation is strongly built on know how and judicious usage of materials.

As I have been informed that there is overwhelming response from within and outside India. It is expected that planned 12 sessions over a period of two days shall be very interesting and mind opening. This Conference is expected to be a useful platform to exchange ideas and also forge collaborations in the frontiers of material sciences research. The paper presented in this Conference shall be published in reputed Journals on basis of their merit.

On this occasion, I extend my best wishes to the organizers and delegates for stupendous success of IC-MAME, 2021.

(Prof. J.K. Goswamy)
Director
University Institute of Engineering & Technology,
Panjab University, Chandigarh.
Message

UIET, Panjab University, Chandigarh was established nearly two decades ago, and has emerged as a leading technical institute in the region in teaching and research. Holding an international level conference is a matter of great pride for the students as well as faculty.

Now a day’s material science and engineering has become a very important area across globe as new materials result in products with better functionality. It is an interesting and attractive area of study. Manipulation of materials, their properties and processes are the need of the hour to make the products which are cheaper, stronger and lighter. There are many other reasons for an in-depth and advance research in this emerging field. The study of material science and engineering has the potential to generate a large number of jobs, to provide an excellent skill for jobs and give platform to those students who wish to opt for an international career. Above all, research in this area requires a strong link with the industrial sector.

Faculty of UIET and the organizing committee has taken this initiative in the right direction where a platform is being provided to researchers to share their findings. I convey my best wishes to the faculty, staff, students and the organizing team, in particular, for its big success.

Prof. Renu Vig
Electronics and Communication Engineering, UIET, Panjab University, Chandigarh
Message

Multidisciplinary approach equips a learner with cache of skills which are much needed in the current scenario when technology is fast shaping our society. This aspect in research and training empowers the youngsters with much required virtues of critical thinking, analytic and problemsolving mindset, research design & process and above all the team work. Bringing together the thinkers and doers under the one umbrella are the hallmark of achieving these virtues in the youngsters.

I am indeed happy to learn that the young faculty members at University Institute of Engineering & Technology brain stormed to bring forth these virtues through organizing an International Conference on Multidisciplinary Aspects of Materials in Engineering on 8th and 9th October 2021 at Panjab University, Chandigarh, India.

I rather feel honored to be associated with this event and extend a very hearty welcome to all the participants to this conference.

This Conference aims to bring together the experts from the varied disciplines involved in engineering and ancillary aspects of materials engineering thus making ways for youngsters to learn, interact and share their experiences, research methods & results in the multidisciplinary aspect of material science and their contemporary applications. I wish all very fruitful deliberations during this conference.

Bringing out an abstract book, prelude to conference proceedings to be published in IOP Conference Series: Materials Science and Engineering, will encourage the youngsters and faculty to showcase their dexterity in the field of material sciences and also opening newer vistas for research.

I wish the organizers all the success and commend them for their ever preparedness towards this conference. I am sure their efforts would make this conference academically enriching and hope that all the participants enjoy this conference and go back richer in their knowledge and collaborations for a fruitful tomorrow.

Prof Sanjeev Puri
FISN, FPAS
Biotechnology, UIET, Panjab University, Chandigarh
Professor Sunil Agrawal
Chair
IC-MAME 2021

Chair Message

It is my deep pleasure to announce that UIET, Panjab University, Chandigarh is organising an “International Conference on Multidisciplinary Aspects of Materials in Engineering” on 8th - 9th October 2021 in hybrid mode.

The objective of the conference is to bring professional engineers, academicians and research scholars of matching interests on a common platform to share new ideas, experiences, and knowledge in various fields of electrical and mechanical engineering.

The scientific program will consist of peer-reviewed paper presentations in parallel technical sessions. In addition, keynote lectures, presentations by academic and industry professionals will be conducted during the conference. Such interactions will facilitate better understanding about technological developments all across the globe amongst the peers. This conference will certainly ignite the minds of the researchers for undertaking more interdisciplinary collaborative research for upgradation of the technology.

I welcome all the participants of IC-MAME 2021 and hope that this conference will provide stimulating deliberations to enrich their scientific experience.

I wish all the participants a thriving and vivacious moment at the conference.

Best Wishes,

(Prof. Sunil Agrawal)
Conference Chair
Dr Rajesh Kumar  
*Co-Chair*  
*IC-MAME 2021*

It is a great honor that two days multidisciplinary conference is being organized at UIET, Panjab University on 8th-9th October, 2021. The objective of the conference is to provide opportunity for every individual to explore new windows for innovation and advancements, promoting the contribution of Materials and Engineering for a sustainable future. The conference aims to bridge the researchers working in academia and other professionals through research presentations, keynote addresses and discussions.

This conference is a platform where scholars can share their views and ideas on the related themes and exchange ideas for further progress in research and development for the betterment of society and mankind. I thank the conference committee, all the authors, reviewers, and other contributors for their constant efforts and their belief in the excellence of IC-MAME2021. Lots of appreciations for reviewers as without their cooperation and full support, this conference would not have been possible.

Rajesh Kumar
Dr. Gaurav Sapra  
Co-Chair  
IC-MAME 2021

Message

It is a matter of great pleasure for all of us that an International Level Conference on Multidisciplinary Aspects of Materials in Engineering (IC-MAME 2021) in hybrid mode is being organized at UIET, Panjab University, Chandigarh, India. This event will provide a platform to professional engineers, academicians and research scholars in this field to discuss and share their knowledge, new ideas, experiences, innovations made in different fields of electrical and mechanical engineering. New materials technologies developed through engineering and science shall help in making innovative and advance changes in future which would have great impact on our life. Apparently, the research in materials science and engineering will be the key factor in bringing out these changes.

It is in this context that the UIET, Panjab University, Chandigarh is organizing this two days conference on Materials Sciences and Engineering. A large number of research papers have been received from within the country and abroad for which the faculty of UIET expresses its sincere thanks and gratitude to all of them. The proposed plan is to get published the accepted, registered and presented papers of IC-MAME 2021 in the IOP: Materials Science and Engineering Journal.

We do hope that the deliberations made in this conference would be very beneficial to the scholars working in this field.

Gaurav Sapra
Chief Guest (Inaugural Session)

Prof. Gautam Biswas
J C Bose National Fellow and Professor
Department of Mechanical Engineering
Indian Institute of Technology Kanpur

About Chief Guest

Prof. Gautam Biswas is presently a J C Bose National Fellow and Professor, Department of Mechanical Engineering, Indian Institute of Technology Kanpur. Earlier, he has been the director of Indian Institute of Technology Guwahati and director of the CSIR - Central Mechanical Engineering Research Institute at Durgapur. Prof. Biswas was the occupant of the position of GD and VM Mehta Endowed Chair Professor of Mechanical Engineering at the Indian Institute of Technology Kanpur. He was a Humboldt Fellow in Germany in 1987-88 and JSPS invited fellow in Japan 1994. He is a Fellow of the American Society of Mechanical Engineers (ASME). He has served a full term as the Associate Editor of the Journal of Heat Transfer (Trans ASME). He was a Guest Professor at the University of Erlangen-Nuremberg in 2002. He was the Dean of Academic Affairs at IIT Kanpur for three years since January 2003.

Prof Gautam Biswas is a Fellow of the all three major science academies of India, such as, the Indian National Science Academy (INSA), New Delhi, the Indian Academy of
Sciences (IAS, Bangalore) and the National Academy of Sciences India (NASI, Allahabad). He is a Fellow of the Indian National Academy of Engineering (INAE) and Institution of Engineers (India). He delivered prestigious Prof. CNR Rao Lecture in 2010. He has been awarded the esteemed J.C. Bose National Fellowship by the Department of Science and Technology, New Delhi in 2011.

Prof. Biswas completed his Baccalaureate in Mechanical Engineering from Calcutta University (IIEST, Shibpur) in 1979. In the year 2013, he was bestowed with the Distinguish Alumni Award of BESU (currently IIEST, Shibpur) by the Hon’ble President of India. He completed his MTech and PhD from the Indian Institute of Technology Kharagpur in 1981 and 1985 respectively.
Chief Guest (Valedictory Session)

Prof. Rajeev Ahuja
Director
Indian Institute of Technology Ropar

About Chief Guest

Prof. Rajeev Ahuja has joined Indian Institute of Technology (IIT) Ropar director from April 1st, 2021. Before joining as director at IIT Ropar, Rajeev Ahuja was professor of computational Materials science at Uppsala University, Sweden. He is one of the most highly cited researchers in Sweden. He has done his Ph.D. from I.I.T. Roorkee in India in 1992. Same year he has joined Uppsala University, Sweden as postdoctoral fellow. He became Assistant Professor in 1996, Associate Professor in 2002 and become Professor in 2007 at Uppsala University, Sweden. His main area of interest is computational materials science with focus on energy such Batteries, Hydrogen Storage & production, sensors as well high pressure physics. He has published 977 scientific papers in peer reviewed journals H-Index of 86 (Google Scholar), i-10 index (Google Scholar) 585 & no. of citations more than 34100, of which more than100 are in high profile journals (like Science, Nature, Nature Materials, PNAS etc.).

He was recently elected FRSC (fellow of Royal Society Chemistry), London, UK, APS-Fellow by American Physical Society (APS), USA and Appointed in the advisory Board of Journal of Materials Chemistry A (IF=10.8) & Materials Advances from Royal Society of Chemistry (England). He is Associate editor of Nano Energy (IF=16.6). He was
also awarded Beller Lectureship for the APS March Meeting, 13-17 March 2017, in New Orleans, Louisiana. He been awarded the Wallmark prize for 2011 from KVA (Royal Swedish Academy of Sciences), and has previously received the Eder Lilly & Sven Thureus prize and the Benzelius prize from KVS. Ahuja is an elected member of the Swedish Royal Society of Sciences (KVS), of the board of the European High Pressure Research Group as well as of the executive board of the International Association for the Advancement of High Pressure Science and Technology.
Keynote Speaker

Prof. S. Anantha Ramakrishna
Director, CSIR-CSIO
Email: director@csio.res.in

About Speaker

Prof. S. Anantha Ramakrishna received the M.Sc. (integrated 5 years) degree in Physics from IIT Kanpur, in 1995 and the Ph.D. degree from the Raman Research Institute, Bengaluru, in 2001. He worked on theoretical aspects of light propagation in random media including temporal signatures of Anderson localization during his PhD and was supervised by the Late Prof. N. Kumar. After working as a Post-Doctoral Researcher with Sir John Pendry at Imperial College London, he joined IIT Kanpur as an Assistant Professor in 2003 and became a Professor in 2012. He joined CSIR-CSIO as Director on 27 July 2020 on lien from IIT Kanpur.
Keynote Speaker

Prof. Mohsen Rahmani
Professor
School of Science & Technology
Nottingham Trent University (NTU), UK
Email: mohsen.rahmani@ntu.ac.uk

About Speaker

Prof. Rahmani obtained his PhD from the National University of Singapore in 2013, followed by postdoc fellowship at Imperial College London, and the Australian Research Council Early Career Fellowship at the Australian National University (ANU). In 2020, he moved to the Nottingham Trent University as a Royal Society Wolfson Fellow, and has recently been awarded the UK Research and Innovation Fellowship. Prof. Rahmani has been invited to present his research findings at >30 international conferences, and he has published more than 60 peer-reviewed journal papers, with over 3k citations (H-index=34). He is the recipient of several prestigious awards and prizes, including the Eureka Prize for Outstanding Early Career Academics (Australian Oscar of Science), Early Career Medal from the International Union of Pure and Applied Physics, and the Australian Optical Society Geoff Opat Award. He is an editorial board member of Opto-Electronic Advances. Currently, he serves as the chair of the IEEE Nanotechnology Chapter in the UK and Ireland Session.

Abstract of Talk

Light-matter interactions can be highly controlled via nanostructured thin films on the surface of objects. Indeed, a single-layer of designed and engineered subwavelength nanostructures, so-called metasurfaces, can resonantly couple to the incident light and manipulate the light’s behaviour on demand. Metasurfaces can reproduce the functions of bulk optics, and on occasions, can offer new functionalities that are not possible with conventional diffractive optics. In this presentation, Prof. Mohsen Rahmani from Nottingham Trent University will review his journey in employing metallic to dielectric and semiconductor metasurfaces to control the light intensity, frequency and propagation direction. In addition, Rahmani will discuss how metasurfaces can lead to several exciting applications, including night vision, flat optics and ultra-sensitive biochemical sensing.
IC-MAME 2021: Session-Wise Schedule

Session I: Composite Materials

1. **Paper ID: 001_Nanocomposites.Sensing**
   
   **Title of Paper:** Microwave Assisted Synthesis of Molybdenum Disulphide/Tungsten Trioxide/Reduced Graphene Oxide (MoS2/WO3/RGO) Nanocomposites for Organic Vapor Sensing
   
   **Authors:** Jyoti Gupta, Prachi Singhal, Sunita Rattan
   
   **First Author Affiliations:** Amity Institute of Applied Sciences, Amity University Uttar Pradesh, Noida, UP, India

2. **Paper ID: 002_E.Glass.Composites**
   
   **Title of Paper:** Fabrication and characterization of e-glass composites cylindrical tubes using three different methods
   
   **Authors:** Krishnan Ganesh Kumar, Lau Zheng Loong, Megat Ahmad Megat Mohamad Hamdan and Yaakob Mohd Yuhazri.
   
   **First Author Affiliations:** Faculty of Engineering & Technology (FET), Multimedia University, Jalan Ayer Keroh Lama, 75450, Melaka, Malaysia

3. **Paper ID: 003_Failure.Behavior.Epoxy**
   
   **Title of Paper:** Effect of ply orientation, staking sequence and notch geometry on the failure behavior of glass fiber-reinforced epoxy composite laminates: A numerical investigation
   
   **Authors:** Krishna Prasad G.R and Faizan Mohammad Rashid
   
   **First Author Affiliations:** Department of Mechanical Engineering, Birla Institute of Technology and Science (BITS-Pilani) Pilani Campus, Jhunjhunu, Rajasthan 333031, India

4. **Paper ID: 004_Metal.Oxides.Nanocomposites**
   
   **Title of paper:** A review on transition metal oxides based nanocomposites, their synthesis techniques, different morphologies and potential applications
   
   **Authors:** Sapna Yadav, Nutan Rani and Kalawati Saini.
   
   **First Author Affiliations:** Department of Chemistry, Miranda House, University of Delhi, Patel Chest Marg, New Delhi-110007, India

5. **Paper ID: 005_Polymer.Composite.Carbon.Fiber**
   
   **Title of paper:** Flexural and shear strength properties of unidirectional carbon fiber reinforced polymer composite interleaved with recycled carbon fiber and short virgin aramid fiber non-woven mats
   
   **Authors:** Cephas Yaw Attahu, Jian Yang, Kok-Hoong Wong and Chungket Thein.
   
   **First Author Affiliations:** Faculty of Science and Engineering, University of Nottingham Ningbo China, Ningbo 315100, China
6. **Paper ID: 006 Tool.Flank.Wear**
   **Title of paper:** The effect on the tool flank wear width VBmax during turning of Hybrid Mg/(8wt% SiC(p) +2wt% Al2O3(p) +1wt% Gr(p)) MMC using PVD coated cermet tool
   **Authors:** Jaspreet Hira, Alakesh Manna, Deepak Bhutani, Anup Malik, Binit Kumar Jha and Rohit Sharma.
   **First Author Affiliations:** Assistant Professor, Department of Mechanical Engineering, Amity University Noida, India

7. **Paper ID: 007 Red.Mud.Composite**
   **Title of paper:** Performance optimization of operating parameters: Al 6061-Red Mud composite under sliding wear
   **Authors:** Narender Panwar, Saroj Bala and Amit Chauhan
   **First Author Affiliations** Skill faculty of engineering and technology, Shri Vishwakarma Skill University, Dudhola, Palwal, Haryana-121102 (India)

8. **Paper ID: 008 Tribological.Behavior.Polymer.Composite**
   **Title of paper:** A fuzzy logic approach for investigating the tribological behavior of polymer composite
   **Authors:** Gogineni Venkata Jagadeesh, T Teja Rakesh Kumar, T Sai Aneesh, N Dheeraj Srinivas, V Harish and A Ravi Kumar.
   **First Author Affiliations** Department of Mechanical Engineering, Seshadri Rao Gudlavalleru Engineering College, Gudlavalleru, Andhra Pradesh, India-521356

**Session II: Design, modeling and simulation, Multiscale Materials Modelling**

1. **Paper ID: 009 PVA.Hydrogel**
   **Title of paper:** Print fidelity evaluation of PVA hydrogel using computational fluid dynamics for extrusion dependent 3D printing
   **Authors:** Ratnesh Raj, Siriki Vamsi Venkata Krishna, Akshat Desai, Chintapalli Sachin and Amit Rai Dixit.
   **First Author Affiliations:** Department of Mechanical Engineering, Indian Institute of Technology (ISM), Dhanbad, Jharkhand 826004, India.

2. **Paper ID: 010 Nano.Photo.Diode.Arrays**
   **Title of paper:** Modelling, Simulation and Analysis of Nano Photo Diode Arrays using CNT and Graphene Nano Materials for Sub-retinal implant
   **Authors:** M Vijai Meyyappan and R Joseph Daniel
   **First Author Affiliations:** Assistant Professor, M.I.E.T. Engineering College, Dept. of Electronics and Communication Engg., Gundur, Trichy, 620 007
3. **Paper ID: 011_Nanofluid.Darcy.Brinkman**  
**Title of paper:** Thermal Convection in a Casson Nanofluid Layer Saturating Porous Medium: Darcy-Brinkman Model  
**Authors:** Mamta Devi, Jyoti Sharma and Urvashi Gupta.  
**First Author Affiliations:** Energy Research Centre, Panjab University, Chandigarh-160014, India.

4. **Paper ID: 012_Triboelectric.Nanogenerator.Simulation**  
**Title of paper:** Simulation and Modelling of Triboelectric Nanogenerator for Self-powered Electronic Devices  
**Authors:** Jashan Kumar Mainra, Akshpreet Kaur, Gaurav Sapra and Parul Gaur  
**First Author Affiliations:** UIET, Panjab University, Chandigarh, India.

5. **Paper ID: 013_FDSOI.MOSFETS**  
**Title of paper:** Investigation of Self-heating Effects in Ultrathin FDSOI MOSFETS  
**Authors:** Vinod Kumar and Ashwani K. Rana  
**First Author Affiliations:** NIT Hamirpur, Hamirpur, India.

6. **Paper ID: 014_Single.Photon.Source**  
**Title of paper:** Eight Wave Mixing Process is suitable to make Single-Photon Source for Quantum Cryptography  
**Authors:** Priyanka and Savita Gill  
**First Author Affiliations:** Department of Applied Science, University Institute of Engineering and Technology, Kurukshetra, 136119, India.

**Session III: Industrial, Production, Energy and environmental applications**

1. **Paper ID: 015_Electric.Vehicles**  
**Title of paper:** Revolution in electric vehicles  
**Authors:** Amandeep Sagwal, Mangladeep Bhullar, Paras Agrawal and Randeep  
**First Author Affiliations:** Physics Department, DAV College, Sector 10, Chandigarh 160011, India.

2. **Paper ID: 016_Halide.Perovskite.Solar.Cell**  
**Title of paper:** Numerical Assessment of Highly Efficient Tin-Halide Perovskite Solar Cell  
**Authors:** Ajay Kumar, Uddeshya Gupta, Neha Gupta and Amit Kumar Goyal  
**First Author Affiliations:** Electronics and Communication Department, Jaypee Institute of Information Technology, Noida, India.

3. **Paper ID: 017_Bulk.Heterojunction.Solar.Cell**  
**Title of paper:** Active layer thickness optimization for Maximum efficiency in bulk heterojunction solar cell
Authors: Susan G Daniel, B Devu and C O Sreekala.
First Author Affiliations: Department of Physics, Amrita School of Arts and Sciences, Amritapuri, Amrita Vishwa Vidyapeetham, Kollam, India

4. Paper ID: 018_MXene.Heterostructures.Electrode
Title of paper: MXene based Heterostructures for electrode materials of Batteries: A Review
Authors: Md Abid Hasan Shanto, Muzaddidul Islam Chowdhury, Arijit Biswas Antu, Md Naimur Rahman Niloy, Nazmul Alam, Md Atiq Ullah and Md. Sakib Anowar.
First Author Affiliations: Ahsanullah University of Science and Technology Dhaka, Bangladesh.

5. Paper ID: 019_Simulation.Concentric.Tube.Heat.Exchanger
Title of paper: Exergy modeling and simulation of a horizontal concentric tube heat exchanger
Authors: Ankit Upadhyay, Sankalp Gour, Ankul Kumar, Deepak Kumar and Aseem Chandra Tiwari.
First Author Affiliations: Department of Mechanical Engineering, UIT-Rajiv Gandhi Proudyogiki Vishwavidyalaya Bhopal, Madhya Pradesh, India-462033

6. Paper ID: 020_DFT.Investigations
Title of paper: DFT Investigations of BeSnN2 Chalcopyrite Compound for Optoelectronic Applications
Authors: Sanjay Lathwal, Aditi Gaur, Karina Khan, Sunil Kumar Goyal, Amit Soni and Jagrati Sahariya
First Author Affiliations: Birla Institute of Technology & Science, Pilani-333031, Rajasthan, India

7. Paper ID: 021_CFD.Analysis.Nanofluid
Title of paper: Numerical and CFD analysis of a heat transfer enhancement in turbulent flow through a circular pipe using nanofluid
Authors: S Gupta, J Singh and B K Gill
First Author Affiliations: Dr. S. S. B. U. I. C. E. T, Panjab University, Chandigarh, Punjab, India

8. Paper ID: 022_Bilayer.Organic.Solar.Cell
Title of paper: Effect of Alkyl Substitution to the Active Layer Material for Improved Efficiency in Bilayer Organic Solar Cell
Authors: S Rugma, B Devu and C O Sreekala
First Author Affiliations: Department of Physics, School of arts and sciences, Amritapuri, Amrita Vishwa Vidyapeetham, Kollam, Kerala.
Session IV: Novel materials, manufacturing, joining and characterization

1. **Paper ID: 023_Raman.Photoluminescence**
   **Title of paper:** Raman Photoluminescence - An Efficient way to distinguish Natural Diamonds and Lab Grown Diamonds
   **Authors:** Akesh Kumar G, Prabavathy N and Laxmidhar Biswal
   **First Author Affiliations:** Centre for Innovation and Technology Excellence, Titan Company limited (Jewellery Division, Brand TANISHQ), Hosur, INDIA

2. **Paper ID: 024_End.Milling.Al4032SiC.MMC71**
   **Title of paper:** A study on bi-objective optimization for end milling of Aluminium based composite
   **Authors:** Pardeep Saini, Deepak Kumar, Anuj Maurya and Pradeep Singh.
   **First Author Affiliations:** Department of Mechanical Engineering, Sant Longowal Institute of Engineering & Technology, Longowal, 148106, India

3. **Paper ID: 025_Graphene.Quantum.Dots**
   **Title of paper:** Up-conversion and Tunable Up-conversion Emission from Nitrogen Functionalized Graphene Quantum Dots
   **Authors:** Abu Bakar Siddique, K L V Prasad, Sneha M Joseph, Dannina Kishore, Bhaskar Das, Suhail Mubarak, Kingshuk Mukhuti and Mallar Ray
   **First Author Affiliations:** Aditya College of Engineering and Technology, Surampalem -533437. Andhra Pradesh, India

4. **Paper ID: 026_Electrochemical.Micromachining**
   **Title of paper:** Electrochemical Micromachining of Linear Micropattern on Stainless Steel Surface
   **Authors:** Sandip Kunar, V. Pragna, A.K. Singh and M.S. Reddy
   **First Author Affiliations:** Department of Mechanical Engineering, Aditya Engineering College, Surampalem, India

5. **Paper ID: 027_Focusing.Radially.Polarized.Light**
   **Title of paper:** Focusing of Radially polarized Light Using Gaussian laser beam Near its focal length
   **Authors:** Getu Endale, Devendra Mohan and Sandeep Yadav.
   **First Author Affiliations:** Department of Physics, Wolkite University, Wolkite, Ethiopia

6. **Paper ID: 028_Silicon.Armchair.Graphene.Nanoribbon**
   **Title of paper:** Integrating silicon in armchair graphene nanoribbon for solar cell applications
   **Authors:** Preetika Sharma and Gaurav Sapra.
   **First Author Affiliations:** Assistant Professor, UIET, Panjab University, Sector 25, Chandigarh, India-160014.
7. **Paper ID: 029_Mo.Nanoparticles.Leadfree.Solder.Joint**  
**Title of paper:** Impact of 3% Molybdenum(Mo) nanoparticles on the interfacial and shear properties of lead-free Sn58Bi/Cu solder joint.  
**Authors:** Amares Singh, Rajkumar Durairaj, K Ganesh Kumar and Seng How Kuan  
**First Author Affiliations:** Faculty of Engineering Technology and Built Environment, UCSI Heights, 1, Jalan Puncak Menara Gading, Taman Connaught, 56000 Cheras, Wilayah Persekutuan Kuala Lumpur, Malaysia.

8. **Paper ID: 030_Lower.Limb.Prosthetics**  
**Title of paper:** FEA simulations of Lower Limb Prosthetics  
**Authors:** Jashan Jyot Singh, Jaswinder Singh Mehta, Rajesh Kumar and Gaurav Sapra  
**First Author Affiliations:** UIET, Panjab University, Sector 25, Chandigarh, India-160014.

**Session V: Functional Materials and Devices**

1. **Paper ID: 031_Wearable.Human.Motion.Monitoring**  
**Title of paper:** Wearable Human Motion Monitoring using Vertical Contact Separation mode Triboelectric Nanogenerator  
**Authors:** Akshpreet Kaur, Ankur Gupta, Cuifeng Ying, Mohsen Rahmani and Gaurav Sapra  
**First Author Affiliations:** UIET, Panjab University, Chandigarh, India

2. **Paper ID: 032_Antenna.DCSRR**  
**Title of paper:** Dual band compact antenna design using DCSRR  
**Authors:** Ambika Chandru, M. Mohamed Humaid, Kowshic S., S. Mohamed Afrath and Abdul Rahman.  
**First Author Affiliations:** Electronics And Communication Engineering, BSA Crescent Institute Of Science And Technology, Chennai, Tamil Nadu, India

3. **Paper ID: 033_Plastic.Polymers**  
**Title of paper:** Characterization of Plastics And Polymers: A Comprehensive Study  
**Authors:** Tarik Hassan, Ambikesh Kumar Srivastwa, Subhais Sarkar and Gautam Majumdar  
**First Author Affiliations:** Department of Mechanical Engineering, Jadavpur University, Kolkata- 700032, India

4. **Paper ID: 034_Proton.Irradiation.Effects**  
**Title of paper:** Study of the proton irradiation effects in n-Fz DSSD detectors for the Si tracker at R3B experiment  
**Authors:** Puspita Chatterjee, Nitu Saini, Ajay Srivastava, Shilpa Patyal, Balwinder Kaur, Thresia Michael and Sonia Raheja  
**First Author Affiliations:** Department of Physics, University Institute of Sciences, Chandigarh University, 140413, Punjab, India.
5. **Paper ID: 035_Miniaturized.DGS.Antenna**

**Title of paper:** Metamaterial-Based Miniaturized DGS Antenna for wireless Applications  
**Authors:** Jaget Singh and Fateh Lohar  
**First Author Affiliations** University Institute of Engineering and Technology, Panjab University, Chandigarh 160014, India

**Session VII: Thermal and mechatronics**

1. **Paper ID: 036_Change.Gear**

**Title of paper:** Analysis of Effects of Change of Gear Parameter Module on Transmission Error in Spur Gear using Interference Volume Method  
**Authors:** Vijay Karma, Govind Maheshwari and Sunil Somani.  
**First Author Affiliations** Mechanical Engineering Department, Institute of Engineering & Technology, Devi Ahilya University, Indore, Madhya Pradesh, 452001, India

2. **Paper ID: 037_Fem.Sandwich.Spherical.Shells**

**Title of paper:** Finite element modelling for bending and vibration analysis of composite and sandwich spherical shells.  
**Authors:** Vikram Parmar, Najeeb Ur Rahman, Nausad Alam, Varun Sharma and Aftab Alam  
**First Author Affiliations** Department of Mechanical Engineering, ZHCET, AMU, Aligarh, UP-202002, India

3. **Paper ID: 038_Weld.Bead.Shape**

**Title of paper:** Experimental investigation and optimization of weld bead shape factor and form factor using recycled steel slag as a flux in submerged arc welding process  
**Authors:** Sumit Saini, Kulwant Singh and Jatinder Garg.  
**First Author Affiliations** Department of Mechanical Engineering, SLIET Longowal, Punjab, India-148106

4. **Paper ID: 039_Fiber.Metal.Laminates**

**Title of paper:** Numerical studies on mode I delamination and its effect on the vibrational characteristics in fiber metal laminates  
**Authors:** Naresh Kali and Srikanth Korla.  
**First Author Affiliations** National institute of Technology Warangal, Warangal, India

5. **Paper ID: 040_Washing.Machine**

**Title of paper:** Investigation of jump resonance of a horizontal axis washing machine for nonlinear vibration using the harmonic balance method  
**Authors:** Mohit Dhanda and Arpan Gupta  
**First Author Affiliations** School of Engineering, Indian Institute of Technology, Mandi, Himachal Pradesh, India
6. **Paper ID: 041_Mechanical.PDMS**  
**Title of paper:** Static and dynamic mechanical characterization of polydimethylsiloxane (PDMS) under uniaxial tensile loading  
**Authors:** David Kumar and Sarthak S. Singh  
**First Author Affiliations:** Department of Aeronautical Engineering and Center for NDT, Chaoyang University of Technology, Taichung 413310, Taiwan

7. **Paper ID: 042_Particle.Swarm.Optimization**  
**Title of paper:** Optimization of reinforced concrete cantilever retaining wall using particle swarm optimization  
**Authors:** Shubham Srivastava, Saurabh Pandey, Rajesh Kumar  
**First Author Affiliations:** Department of Civil Engineering, IIT BHU Varanasi, India

**Session VIII: Biomaterials and Bioengineering.**

1. **Paper ID: 043_Anticancer.Agent**  
**Title of paper:** Biogenic Metal and Metal Oxides Nanoparticles as Anticancer Agent: A Review  
**Authors:** Nutan Rani and Kalawati Saini  
**First Author Affiliations:** Department of Chemistry, Miranda House, University of Delhi, Patel Chest Marg, New Delhi-110007

2. **Paper ID: 044_Yttrium.Oxide**  
**Title of paper:** Probe into DNA interaction, cell toxicity and antifungal activities of phyto-synthesized yttrium oxide (Y2O3) nanoparticles  
**Authors:** Rugmani Meenambal, Hema S K, Vedika Tomar and Anita Puyam  
**First Author Affiliations:** Department of Clinical Psychopharmacology and Neurotoxicology, National Institute of Mental Health and Neuro Sciences, Bangalore, India

3. **Paper ID: 045_Maize.Seed**  
**Title of paper:** Comparative Study of Chemo- Bio Synthesized MgO Nanoparticle on Maize Seed Germination  
**Authors:** Karanpreet Kaur, Naradala Jayarambabu and Kalagadda Venkateswara Rao  
**First Author Affiliations:** Department of Nanotechnology, Sri Guru Granth Sahib World University, Fatehgarh Sahib, Punjab, India

4. **Paper ID: 046_Milk.Adulteration**  
**Title of paper:** A Study on Milk Adulteration and methods of detection of various Chemical Adulterants qualitatively  
**Authors:** Riya Chugh and Gurmeet Kaur  
**First Author Affiliations:** Chemistry Department (UIS), Chandigarh University, Gharuan, Mohali – 140413, India
5. **Paper ID: 047_Boron.Neutron**  
**Title of paper:** A Mini Review on Application of Boron Neutron Capture therapy in Cancer Treatment  
**Authors:** Shruti Namdev and Gurmeet Kaur  
**First Author Affiliations:** Chemistry Department (UIS), Chandigarh University, Gharuan, Mohali – 140413, India

6. **Paper ID: 048_Rod.Shaped.Zno**  
**Title of paper:** Green Synthesis of Rod Shaped ZnO using Extract of Origanum majorana Leaf and Investigation for Antibacterial Applications  
**Authors:** Mona Saini, Asifa Mushtaq, Sapna Yadav, Seema Rawat, Kalpna Gupta and Kalawati Saini  
**First Author Affiliations:** Department of Chemistry, Miranda House, University of Delhi, Patel Chest Marg, New Delhi-110007, India

**Session IX: Nanomaterials and Nanoengineering**

1. **Paper ID: 049_Antifreezing.Agent**  
**Title of paper:** Role of nanofluids as an antifreeze agent  
**Authors:** Shivam Soni, Jodh Singh and Baljinder Kaur Gill.  
**First Author Affiliations:** Dr S.S.B.UICET, Punjab University Chandigarh-160014.

2. **Paper ID: 050_Graphene.Reducing.Agent**  
**Title of paper:** Synthesis and characterization of Graphene Oxide and its reduction with different reducing agents  
**Authors:** Karan Bansal, Jagdeep Singh and A S Dhaliwal.  
**First Author Affiliations:** Department of Physics, Sant Longowal Institute of Engineering and Technology, Longowal-148106, Punjab, India

3. **Paper ID: 051_Nio-Graphene**  
**Title of paper:** Electro-Magnetic switching in NiO-Graphene film  
**Authors:** Suchandra Goswami, Dr. Manashi Chakraborty and Dr. Debajyoti De  
**First Author Affiliations:** Material Science Research Lab, The Neotia University, Sarisa, D.H. Road, 24 Pgs (South) West Bengal 743368, India

4. **Paper ID: 052_Lubricating.Engine.Oil**  
**Title of paper:** Experimental study of Carbon Nanotubes to enhance Tribological Characteristics of Lubricating Engine Oil SAE10W40  
**Authors:** Nitesh Kumar and Parveen Goyal.  
**First Author Affiliations:** UIET, Panjab University, Chandigarh-160014, INDIA
Session X: Smart materials, sensors, instrumentation, AI and IoT

1. **Paper ID: 055_Electrochemical.Sensing**
   
   **Title of paper**  Electrochemical sensing of malathion using doped MOFs
   
   **Authors**  Shibyendu Nikhar and Pawan Kumar
   
   **First Author Affiliations**  Materials Application Research Lab. 13 Department of Nano Sciences and Materials, Central University of Jammu, 15 Jammu - 181143 (India)

2. **Paper ID: 056_Piezoelectric.Sensor**
   
   **Title of paper**  Piezoelectric sensor voltage variation with different adhesives at elevated temperature
   
   **Authors**  Sukesh Sharma
   
   **First Author Affiliations**  UIET, Panjab University, Chandigarh, India

3. **Paper ID: 057_Ifttt.Implementation**
   
   **Title of paper**  IoT based Resuscitation and Hypoxemia Diagnosis System using Embedded Microcontroller Architecture and IFTTT Implementation
   
   **Authors**  Nikita Mohanty, Auhona Ghosh and Sumit Kumar Jindal
   
   **First Author Affiliations**  School of Electronics Engineering, Vellore Institute of Technology, Vellore, Tamil Nadu, India

4. **Paper ID: 058_Iot.Control.System**
   
   **Title of paper**  Design of low cost IoT enabled embedded control system for covid free smart home
   
   **Authors**  Khushi Singh and Sumit Kumar Jindal
   
   **First Author Affiliations**  School of Electronics Engineering, Vellore Institute of Technology, Vellore, Tamil Nadu, India
5. **Paper ID: 059_Ammonia.Sensing**  
**Title of paper** MoS$_2$/CeO$_2$ Based Composite for Ammonia Sensing  
**Authors** Nitesh Dogra, Kajal Dadwal, Arun Kumar and Sandeep Sharma  
**First Author Affiliations** Department of Physics, Guru Nanak Dev University, Amritsar, Punjab-143005, India

6. **Paper ID: 060_Semiconductor.Wafer**  
**Title of paper** Semiconductor wafer defect classification using convolution neural network: a binary case  
**Authors** Krishan Kumar Chauhan, Garima Joshi, Manjeet Kaur and Renu Vig.  
**First Author Affiliations** UIET, Panjab University, Chandigarh, India

7. **Paper ID: 061_Xylene.Sensing**  
**Title of paper** Xylene sensing using Dy-doped NiO nanoparticles  
**Authors** Shailja, Kanwarjit Singh and Sandeep Sharma  
**First Author Affiliations** Department of Physics, Guru Nanak Dev University, Amritsar 143005, India

8. **Paper ID: 062_Thin.Film.Sensor**  
**Title of paper** Green synthesis of vanadium oxide nanoparticles for thin film based sensor application  
**Authors** T.R. Kishan Chand, H.M. Kalpana and H.S. Lalithamba  
**First Author Affiliations** Department of Electronics and Instrumentation, Siddaganga Institute of Technology, Tumakuru 572103, Karnataka, India.

### Session XI: Advanced Structural Materials

1. **Paper ID: 063_Orthopaedics.Implants**  
**Title of paper** Electrochemical corrosion behaviour analysis of Mg-alloys used for orthopaedics and vascular implants  
**Authors** Rohit Kumar, Puneet Katyal, Munish Gupta and Vijender Singh  
**First Author Affiliations** Department of Mechanical Engineering Guru Jambheswar University of Science and Technology, Hisar Haryana, INDIA – 125001

2. **Paper ID: 064_Vacuum.Annealing**  
**Title of paper** Evolution of magnetic and structural properties of MgO thin film with vacuum annealing  
**Authors** Harsh Vardhan, Gagan Sharma, Kavita Sharma, R. J. Choudhary, D. M. Phase, V. Raghavendra Reddy and Ajay Gupta  
**First Author Affiliations** Amity Center for Spintronic Materials, Amity University UP, Sector-125, Noida-201313, India.
3. **Paper ID: 065_Ni.Cr.Alloy**
   **Title of paper** Study on Defect Reduction in Casting of Ni-Cr alloy (UNS N06003)
   **Authors** Kaustubh Samvatsar and Harsh Dave
   **First Author Affiliations** Faculty of Technology and Engineering, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat 390001, India

4. **Paper ID: 066_GaN.Hetrostructure**
   **Title of paper** Study of electronic structure and transport coefficients of GaN-MoS$_2$ heterostructure.
   **Authors** Gurpal Singh Khosa, Ranjan Kumar and Shuchi Gupta
   **First Author Affiliations** Department of Physics, Panjab University, Chandigarh 160014, India

5. **Paper ID: 067_Electrical.Discharge**
   **Title of paper** Wear and Corrosion Behaviour of Wire Electrical Discharge Machined Ti-6Al-4V alloy
   **Authors** Sanyukt Kumar Manderna, Puneet Katyal, Munish Gupta and Vijender Singh
   **First Author Affiliations** Department of Mechanical Engineering, Guru Jambheswar University of Science and Technology, Hisar, Haryana, INDIA – 125001
INVITED SPEAKER

Dr Navin Kumar
Associate Professor
Department of Mechanical Engineering
IIT Ropar, Punjab, India
Email: nkumar@iitrpr.ac.in

About Speaker

Dr. Navin Kumar is an Associate Professor in the Department of Mechanical Engineering at IIT Ropar. Prior to joining IIT Ropar, he was working as a Research Scientist at Stevens Institute of Technology, New Jersey, USA. He has completed masters in Mechanical Engineering from IIT Kharagpur and Ph.D. (Mechanical Engineering) from IIT Delhi. Dr. Navin Kumar's research interests are related to both theoretical and experimental aspects of mechanics and dynamics of nano, biological and bio materials and structures, Bone Properties Characterization, Biomedical Engineering, Biomechanics, Biomedical Instrumentation, smart structures and materials, fault diagnosis and condition monitoring. In particular he is interested in the areas, Biomaterial Characterization. Experimental and simulation of nano and bio materials and structures, active vibration control and fault diagnosis.
INVITED SPEAKER

Dr. Lalit M Bhardwaj

Chief Executive President, RML Consultancy & Fabrication, Global Director General, Rejoice Health Foundation.
Former
Vice President, Amity Science, Technology & Innovation Foundation, Deputy Director General, Amity Directorate of Science & Innovation
Prof. & Director Nanoscience & Nanotechnology, Amity Dean, Research, Lovely Professional University, Jalandhar
Addl. Director, CSIO/CSIR, Chandigarh

About Speaker

Former Vice President, Amity Science, Technology & Innovation Foundation (ASTIF), Deputy Director General, Amity Directorate of Science & Innovation (ADSI), Professor of Nanotechnology, Noida and former, Additional Director and Head, Biomolecular Electronics and Nanotechnology, Central Scientific Instruments Organisation (CSIR), Chandigarh, India, has excellent academic record and worked in leading national and international institutions of repute and has acquired leadership qualities for multi-disciplinary research.
INVITED SPEAKER

Dr Parveen Kumar
Head R&D
Exigo Recycling Pvt. Ltd.
Noida, UP - 201309
Email: parveenkaushik7@gmail.com

About Speaker

Dr Parveen Kumar did his Ph.D. from Punjab University and CSIR-CSIO in year 2014. He worked on various analytical instruments to complete his Ph.D. in the field of biosensing. Another area of interest is urban mining to recover valuable high end products such as, nanoparticles. He achieved INSPIRE Faculty award from Department of science and technology, New Delhi, Dr. D. S. Kothari Post doc fellowship from UGC, New Delhi and MHRD Post doc fellowship. He has contributed in various CSIR, ICMR, DBT and DST funded projects as PI, Co-PI and team member. He is keen to work in collaboration with industries and provided consultancies and accomplished industry sponsored project in strict deadlines. He is currently supervising 4 Ph.D. students and guided many Graduates and post graduate students for their thesis/ dissertation. He has around 35 international publications in various reputed journals and published 2 book chapters, one patent and transferred 3 technologies. He has delivered multiple invited talks at prestigious forums.

Abstract

Traditionally mining is supplying all materials, especially metals for various industrial and domestic applications. These generate high carbon footprints even reducing forest area, disturbing all ecological aspects, and finally responsible for the ill health of mother earth. One initiative to reduce the mining of natural mines is to bring the mined material back into work. All the metal/nonmetal waste accumulated in urban areas can prove to be a better resource in the material supply chain. The government has introduced Extended Producer Responsibility to bring back the material produced by Original equipment manufacturers. These are recycled by professionals to use with pristine/virgin material to bring value back to recycled materials. Electronic waste management is one of such industries which is recycling/ recovering and refurbish to reuse the material back. The electronic devices after their end of life are collected and dismantled by the recycler to segregate metallic and nonmetallic components. Ferrous metals can be directly sent to metal
refineries whereas nonmetals like plastic, glass, etc. are recycled by other industries. Some materials like Lithium-Ion batteries require special attention to recycle as the electric vehicle era is about to begin. These batteries can supply fine battery-grade material for upcycling as novel electrode materials. Exigo has scaled up technologies for graphite recovery, which is a precursor to making graphene oxide, reduced graphene oxide, quantum dots, etc.
INVITED SPEAKER

Dr. Vijayender Bhalla
Principal Scientist
CSIR - Institute of Microbial Technology
Ministry of Science & Technology, Govt. of India
E-mail: vkbhalla@imtech.res.in

About Speaker

His research focuses on detection technologies using nanomaterials for a range of analytes i.e. blood biomarkers, pathogens, pesticides and small molecules. The currently undergoing projects include Point of care detection of cardiac biomarker peptides using natural and synthetic receptors (aptamers) on nanostructured electrochemical based biochips. We also work on Purification and characterization of surface biomarkers to enable selective detection of water borne pathogens. We develop new kinds of optical and electrochemical immunoassays for pathogen detection in food and water samples. We synthesize different kinds of nanoparticles, nanoclusters, carriers, haptens, bioconjugates and work on biointerface development to enable low-cost diagnostics.

Abstract

Nanomaterials have opened new avenues for researchers working in the area of biosensors. By taking examples from my own research, I will explain how the different nanomaterials such as Carbon nanotubes, Graphene, Molybdenum disulfide can be used to realize high sensitivity of detection. The high surface area and presence of functional groups on nanomaterials allow facile immobilization of bioreceptors onto the sensing layer. The nanomaterials are easy to synthesize in lab and they have an indispensable role to play in sensing. Not only electrochemical and FET based sensors but also fluorescence and optical sensing have been demonstrated by employing nanomaterials.
INVITED SPEAKER

Dr Vinay Sharma
Ramanujan Faculty
Department of Materials Engineering
IIT Jammu, Jammu, India
Email: vinay.sharma@iitjammu.ac.in

About Speaker

Dr. Vinay Sharma currently works at the Indian Institute of Technology Jammu (IIT Jammu), India. He was previously associated with University of California, Riverside as a postdoctoral researcher and Indian Institute of Technology Indore as a research scholar. He obtained Ph.D. in the area of nanomaterial-based biosensor and bioimaging probes from IIT Indore. He was awarded with the prestigious Ramanujan fellowship by DST-SERB, Govt. of India in the year 2020. He has also received ESONN-CEFIPRA Fellowship award in the year 2016 by CEFIPRA, Govt of India. Dr. Sharma’s research interests are in Nanopores, Single molecule techniques and nanomaterials for healthcare. He has extensive experience in fluorescent quantum dots, bioimaging and nano-bio-hybrids for bio-medical applications. He has published more than 30 research articles, review articles and book chapters in high impact journals of international repute. Dr. Sharma is also associated with various international journals as editor and reviewer. He works with a vision of making healthcare accessible and affordable with the intervention of nanotechnology.

Abstract

The unprecedented chemical and physical properties of nanomaterials have the potential to revolutionize the field of biology and medicine. Nanomaterials have found applications in the disease biosensing, bioimaging and even therapeutics. The nanomaterial-based biosensors have the promise to provide portable alternatives to lab diagnostics. The high sensitivity, selectivity, high throughput and the potential to bring Lab-on-a-Chip have brought significant attention to the field of nanosensors. Similarly, the photodynamic and photothermal nanoparticles have shown immense potential in therapeutics. The field of DNA sequencing, protein folding and biomolecule interaction is hugely benefitted by the advent of nanopore technology which can make modern diagnostics fast, accurate and inexpensive. The present talk discusses various application of nanoparticles in sensors, bioimaging probes, therapeutics and envision the potential of nanopore technology to lead nanodiagnostics.
INVITED SPEAKER

Dr Sumit Jindal
Assistant Professor (Sr.)
School of Electronics Engineering
Vellore Institute of Technology, Vellore, Tamil Nadu, India
Email: sumitjindal08@gmail.com

About Speaker

Dr. Sumit Kumar Jindal received his Bachelor’s degree in Electronic and Instrumentation Engineering from B.P.U.T, Orissa, India and Ph.D. from Indian Institute of Technology(ISM), Dhanbad, India in 2009 and 2017 respectively. He was University topper during his undergraduate studies. He specializes in the area of MEMS Sensors. In particular, his research interest is MEMS Sensor Technology, Electronics and Instrumentation & Embedded Systems. He has a total of twelve years of experience in Teaching and Research. Currently, he is an Assistant Professor (Sr.) with School of Electronics Engineering (SENSE) in Embedded Technology Division, Vellore Institute of Technology, Vellore. He is an active reviewer for renowned journals in his field of interest such as IEEE Transactions on Instrumentation and Measurement, IEEE Sensors Journal, Mechatronics (Elsevier), Microsystem Technologies (Springer) and Journal of Micro/Nanopatterning, Materials and Metrology (SPIE). He has published three patents with Intellectual Property, Govt. of India. He is faculty co-coordinator for IEEE Robotics and Automation Society Chapter at VIT. This chapter organizes a lot of technical workshops and hands on training sessions throughout the year. He is also an active member of Placement and Training cell at VIT.

Abstract

Modelling and simulation are changing the way modern materials science work. Over the years it has become one of the most vital tools for discovering new materials and material phenomena. It is increasingly being used for obtaining information about the processes that determine the behaviour of materials. It is also being used for quantitative forecasting which can then be utilized for design in association with synthesis and experimental set-up. Modelling and simulation acts as the essential bridge between science and engineering. It ranges from a basic understanding of the behaviour of materials to the cognizant plan to design new material technologies using newer properties as well as
procedures. This work provides a wide outline of the huge impact of simulation and modelling on materials science over the past years and provides centred viewpoints on the way forward. This field continues to make rapid advancements and evolves to address the difficulties of materials for the upcoming decades. This work gives valuable insights into the advancements made in disciplines which ranges from phase field methods to model behaviour at the mesoscale; to molecular dynamics method in order to derive the basic dynamic processes at the atomic level that control the reaction of material, to the challenges of interdisciplinary research that targets complicated material problems that require multi-scale approaches. The shift from understanding the basic behaviour of the material to developing quantitative approaches in order to explain and foresee experimental observations require advancements in these methods and practice of simulation in terms of reproducibility and integrity. It also includes interaction with different computational ecosystems which allow to develop new theories, unique applications along with an integrated computing and software facility using efficient computational methods and highly powerful computational hardware resources.
INVITED SPEAKER

Mr. Ayan Karmakar
Scientist
Semi-Conductor Laboratory (SCL), Chandigarh
Indian Space Research Organization (ISRO), India
Email: ayan_ns@scl.gov.in

About Speaker

Ayan Karmakar received the B.Tech degree (ECE) from WBUT, Kolkata in 2005. Later he did his masters from NIT, Durgapur. He joined Indian Space Research Organization (ISRO) as a ‘Scientist’ and subsequently posted to Semi-Conductor Laboratory (SCL), Chandigarh. His research interests include design and development of L, S, C, X and K-band passive microwave integrated circuits and antennas using silicon based MIC and RF-MEMS technology. His field of expertise are expanded in fabrication technology of various MEMS based sensors and evolving the test strategies for the same. Currently, he engages himself in high frequency device modelling and development of electronic interfaces for various MEMS based sensors.

He has more than 40 publications in reputed journals and conferences at various national and international levels. Recently, he has authored one technical book named ‘Si-RF Technology’ from Springer Publication, Singapore. He received multiples prizes/awards from Department of Space, Govt. of India for his active involvement and technical contributions in Rajbhasha (Hindi). He has shown keen interest to build a strong communication link between academics and industry. In this context, he has delivered numerous lectures in the invited talk series of various institutes of national importance and Webinars. He serves as a reviewer in reputed referred journals, like-IEEE Access, RF-MiCAE, Springer, EJAET, etc. He is a Fellow member of IETE, India and life member of Indian Science Congress Association, ISSE and Bangiya Bigyan Parishad.

Abstract

Micro-electro Mechanical System (MEMS) is an agglomeration of sub-micron mechanical moving parts and electronic components on a single module. MEMS devices operated at Radio Frequency (RF) are emerging as a propitious technology. In near future
5G, 6G wireless network (WSN), IoT, and even in the potential millimeter and sub-millimeter wave applications, this technology will play a pivotal role. Lots of passive communication building blocks of the system can be realized utilizing this upcoming technology. Starting from the basic building blocks to system level approach can be adopted with MEMS. In terms of antenna engineering or any other signal processing blocks like filter, oscillator, switching matrix or phased array antenna system, this technology can be implemented in multifaceted applications. Bottom to top approach is adopted in this field. Using the standard CMOS foundry and few additional post-CMOS fabrication techniques the unique MEMS devices are realized. Device modeling plays an important role. Vertical integration approach can also be materialized with MEMS, which is inevitable for higher frequency applications. MEMS using the silicon substrate or silicon micromachining can even be used to develop Terahertz (THz) devices. In this talk, the speaker will cover the basic understanding of this technology in context with RF/microwave engineering and then its applied fields.
INVITED SPEAKER

Dr. Harlal Singh Mali  
Associate Professor,  
Department of Mechanical Engineering  
Malaviya National Institute of Technology,  
Jaipur, India  
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About Speaker

Alumni of PEC and PU Chandigarh, Dr Harlal Singh Mali has experience of 15 years in academics and 10 years in the aviation industry. He holds two patents and has applied for another seven. He held multiple research grants from Indian and international funding agencies, including BIG of BIRAC (DBT), ECR, EMR of DST (SERB), DRDO (ARMREB), NSF (USA) and various industries. Has supervised 08 PhD and 32 M. Tech. theses and has more than 100 peer-reviewed publications. He is also the founder-director of startup; Jaipur Club Foot Pvt. Ltd., which is an outcome of NISP 2019 to solve a complex socio-medico-technological problem called Club Foot treatment. He did set up an Advanced Manufacturing & Mechatronics Lab and founded CAM Society. MNIT CAM Society is a student-driven club dedicated to teaching and learning manufacturing technologies.

Abstract

State-of-the-art and high-performance textile composites are used worldwide due to their enhanced applicability in defense, automotive, aviation, sports, and marine sectors where high performance of a material is required. Textile composites have an architecture in the form of unidirectional, woven, braided, knitted, and stitched fabrics. High-performance textile reinforcements such as Aramid, Dyneema, Spectra, Zylon, Vectran, Boron, Carbon, and Glass are impregnated with a polymer matrix to fabricate the advanced polymer textile composites with high-end specifications. Glass, Carbon, and Kevlar fiber reinforcements are popular due to their high strength to weight ratio, modulus of rigidity, heat and chemical resistance, toughness, dimensional stability, creep resistance, and moisture insensitive properties.

Hybrid textile fabrics are developed by weaving more than one type of synthetic fiber to obtain the optimum properties of individual fiber material. Hybridization at interply and intraply levels can obtain different engineering properties on a specific characterization
and be further optimized. The polymer textile composites can be processed using hand layup, spray layup, filament winding, autoclave, resin transfer molding, vacuum-assisted resin infusion, thermoforming, and compression molding techniques. Alike all other engineering materials, developed composites are further used for several experimental characterizations: tension, compression, flexural, fracture toughness, dynamic mechanical analyzer, high and low-velocity impact test, hardness, creep, machinability, fatigue, and wear.

Numerical characterization of textile composites has the advantage over the costly experimental setup. The numerical model can be able to predict the various engineering properties. Numerical simulation of textile composites entirely depends on the geometrical model of textile composites, which is a challenging task due to the complicated architecture of textile reinforcements. Few geometrical modeling tools such as Texgen, Wisetex, and TechText CAD can model the textile reinforcements.

Once modelled, the textile composites are numerically characterized using finite element simulation tools such as ABAQUS®, ANSYS®, HyperWorks®, and Nastran® to predict the many engineering properties. The finite element simulation tool, ABAQUS® is very popular among researchers due to the accuracy of results. Numerically simulated results can further be used for experimental validation, hence making the developed material usable for the intended application.
INVITED SPEAKER

Dr Balwinder Singh
Joint Director & Head, ACSD
Centre for Development of Advanced Computing (C-DAC)
Mohali, Punjab, India
E-mail: balwinder@cdac.in

About Speaker

Dr. Balwinder Singh has completed his PhD in 2014 from GNDU Amritsar & also has obtained his Bachelor of Technology degree from National Institute of Technology, Jalandhar and Master of Technology degree from University Centre for Inst. & Microelectronics (UCIM), Panjab University, Chandigarh in 2002 and 2004 respectively. He is currently serving as Joint Director and Head (ACSD) in Center for Development of Advanced Computing (CDAC), Mohali. He has successfully executed many Govt funded projects. He has 15+ years of teaching experience to both undergraduate and postgraduate students. Singh has published three books and about 120+ papers in the International & National Journal and Conferences.

He was also awarded with Best Teacher Award by ISTE, New Delhi in 2015 and COSMIC – Young Scientist Award for Contribution in the field of “Engineering and Technology 2015 at AETM 2015 – Bangkok, Thailand. His current interest includes IoT based smart Agri-systems, AI based agriculture and health systems, Low Power Techniques and VLSI Design & Testing.

Abstract

Human beings have always been fascinated by nature and especially by advanced technology and their evolutionary process. This has resulted into Inspirations drawn from natural or technological systems, and innovations in agriculture, for problem solving and has seen an emergence of a new paradigm for revolutionary technology using Internet of Things (IoT) known as Smart Agriculture with Precision farming as its subset. Just as any of the smart technology are poised to change the way we get around similarly smart technology in the field of agriculture is set to revolutionize the way we cultivate the food we eat.

The main challenge towards the food and agricultural industry ponder is that, how
to double food production by 2050 with less land available with the increase of population in the country every year. Moreover, according to the United Nations, the planet's global population is expected to reach 9.6 billion by 2050. There is an extensive demand of food products, along with require growth in the production itself, which requires the smart technologies for precision farming and further reach the food products in the market. However, in the food supply chain, it is believed that IoT will help to revolutionize the technology towards food desirability for suppliers and supermarkets alike.

The broadly used approaches are artificial neural network, Precision farming, Remote Sensing, Robotics. IoT enabled Agri products etc. counts to be few technological developments in the field of agriculture. It also allows for much more reliable production and, which in turn enables greater management of demand.
INVITED SPEAKER

Dr Akash Deep
Principal Scientist
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CSIR-CSIO
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About Speaker

Dr. Akash Deep received his Ph.D (Chemistry) degree in 2004 from the Indian Institute of Technology, Roorkee, India after which he worked as a postdoctoral research fellow till 2008. He joined CSIR-CSIO, Chandigarh in 2008, where he is presently working as a Principal Scientist. Dr. Akash Deep has worked in the fields of analytical and material chemistry, biochemistry, and nanosensors for environmental and health applications. He has expertise in the synthesis and applications of advanced materials, such as 2-dimensional layered materials, fluorescent nanoparticles, metal-organic frameworks, graphene composites, and conducting polymers. Dr. Akash Deep has also worked as a Visiting Professor at the Hanyang University, Seoul, South Korea and CSIR-Raman Research Fellow at RWTH Aachen University, Germany. He has published more than 180 research articles in reputed international journals. He has also transferred technologies to the industries and provided consultancy in the areas of nanomaterial synthesis, biosensors and waste treatment.

Abstract

The increasing demand for clean and green energy necessitates the development of efficient energy storage devices such as batteries, fuel cells, and supercapacitors. Batteries deliver high energy density values but are not necessarily efficient in terms of their cycle life and power density. Supercapacitors are the emerging energy storage devices which can exhibit high values of power density. Nonetheless, a moderate energy density limits the applications of supercapacitors in many fields. Therefore, the researchers are exploring the applications of new materials and composites to design superactions with combined features of high energy and power densities along with sufficient cycle life. Graphene and metal-organic frameworks (MOFs) are the class of advanced functional materials that are characterized with many attractive features such as high surface to volume ratio, accessible porosity, electrocatalytic activity, etc. The individual properties of graphene and MOFs can
be further augmented by forming their composites. As our research studies have revealed, graphene, MOFs, and their derived structures/composites pool the benefits of high electrical conductivity, high specific surface area, and hierarchical pore size distribution. These features are useful in enhancing the specific capacitance of the supercapacitors. The graphene and MOF based supercapacitor electrodes can be operated in different electrolytes (e.g., redox additive and polymer gel electrolytes) to attain wide potential windows, high specific capacitance, and several other desirable supercapacitor performance parameters.