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About International Society for Energy, Environment and Sustainability (ISEES)

International Society for Energy, Environment and Sustainability

About the Society

The International Society for Energy, Environment, and Sustainability was founded at IIT Kanpur in January 2014 to spread knowledge in Energy, Environment, Sustainability, and Combustion. In this changing environmental scenario, the time has come when more emphasis has to be laid on renewable energy resources. Moreover, in this dynamic scenario of swelling competition and reducing profits, staying environmentally responsible can be highly challenging for any organization. More efficient systems have to be developed to meet the increasing energy demands and their environmental impact. People have to become more aware and concerned about the environmental challenges which the world is facing today to make it a better place for us and our future generations. The society aims to spread knowledge in the areas mentioned above among people and make them more aware of the environmental challenges which the world is facing today. The Society is involved in various activities, like workshops, seminars, conferences, etc., in the domains mentioned above. Society also recognizes young scientists and engineers for their contributions to this field. It comprises experts from leading research institutions working in various domains related to energy

Aims and Objectives

1. To organize Workshops/ Symposia/ Conferences/ Lectures/ Courses for the wide dissemination of knowledge to its members and society at large in the areas related to energy, combustion, sustainability, and environment-related subjects.
2. To publish technical papers, monographs, books, and journals in the areas above.
3. Organizing events and activities for the benefit of the underprivileged in society as per the capability of society members.

Journal of Energy and Environmental Sustainability (JEES)

Journal of Energy and Environmental Sustainability is an official publication of the International Society for Energy, Environment, and Sustainability dedicated to all the conventional and renewable energy areas relevant to environmental sustainability. The journal will publish two issues in a year and offer a platform for high-quality research in the interdisciplinary areas of energy and environmental science and engineering.

ISEES Membership

1. The Society shall have the grades of Student Member, Member, Fellow, and Honorary Fellow. In addition, institutions and organizations will be given Institutional or Corporate membership on payment of dues and satisfying other eligibility criteria as specified by the executive body from time to time.
2. Fellow of the Society will be the highest grade of membership.
3. A graduate in engineering, technology, science, social sciences, humanities, or having equivalent qualification as recognized by ISEES may apply for the Society's membership. In case of unrecognized qualifications, the ISEES executive committee (EC) will recognize the qualifications. The same shall be updated in the membership documentation from time to time. Award of membership shall be at the sole discretion of the EC.
4. A member may withdraw permanently from the membership of the society at any time by giving a notice in writing to the secretary. In such cases, neither partial nor full refund of the membership fee shall be done under any circumstances. There shall not be any exception to this provision.
5. ISEES EC can withdraw the membership of any student member/ member/ fellow in case of the individual's unethical, immoral, and criminal conduct. Any action not in alignment with the society's objectives, interests, and purpose may also lead to suspension of the membership. The permanent withdrawal can only be made after an opportunity to present their views to the EC has been given to the defaulting member. The decision of the ISEES EC in this regard shall be final and irrevocable in all such cases.

Privileges of Membership

1. A member whose subscription is paid up to date shall be entitled:
2. To be notified of all relevant activities of the Society.
3. To vote at all Annual General Body Meetings (AGBM) and special meetings of the Society and voting (online/ ballot) on various issues, including elections and referendums.
4. Reduced registration fees in the events organized under the banner of the Society.
5. Receive a copy of the proceedings of the meetings (to the corporate members only).
6. To be included in a directory of experts along with the domain expertise to be published by the ISEES from time to time.
7. Corporate members will be able to send two delegates at free/ subsidized rates to the events organized by the Society. They will also get a partial fee waiver in the advertisement published in the society newsletters/ literature/ ISEES website.

Awards and Recognition

1. A member whose subscription is paid up to date shall be entitled:
2. To be notified of all relevant activities of the Society.

3. To vote at all Annual General Body Meetings (AGBM) and special meetings of the Society and voting (online/ ballot) on various issues, including elections and referendums.
4. Reduced registration fees in the events organized under the banner of the Society.
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6. To be included in a directory of experts along with the domain expertise to be published by the ISEES from time to time.
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Membership Fees

	Type of membership	Annual Membership Fee	Five-Years Membership Fee NEW	Life Membership Fee (10 Years)
India/ SAARC Countries	Student Members	Rs.1000+18% GST (Rs. 1180)	--	--
	Member/ Fellow	Rs.2000+18% GST (Rs. 2360)	Rs.5000+ 18% GST (Rs. 5900)	Rs.10000+ 18% GST (Rs. 11800)
	Corporate	Rs.10000+18% GST (Rs. 11800)	--	Rs.50000+18% GST (Rs.59000)
	Honorary Fellow	0	0	0
USA, Europe and Developed Countries	Student Members	50 US$	--	--
	Member/ Fellow	100 US$	250 US$	500 US$
	Corporate	500 US$	--	2500 US$
	Honorary Fellow	0	0	0
	The ratio of A and B will depend on relationship between INR and US$ after taking into account the PPP (between India and USA).			

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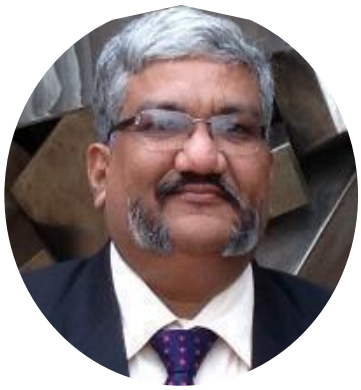

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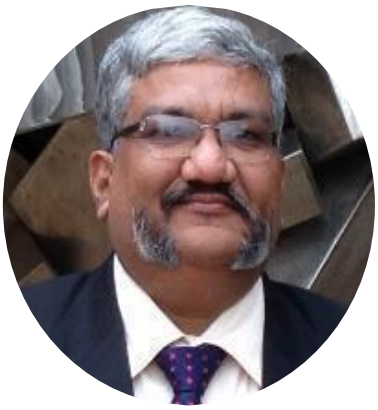

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DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH

A2K+

Access to Knowledge for Technology Development and Dissemination (A2K+) is a scheme targeted towards developing mechanisms to disseminate science, technology and innovation-related information to industries, research and academic institutions, in-house R&D units of industry, Scientific & Industrial Research Organizations (SIROs), consultants, industry associations, techno-entrepreneurs, government departments and others.

The Science and Technology Professional Bodies & Academes of Science and Engineering play an important role in creating cohesiveness amongst the scientific community by organising technical meetings, seminars, conferences and workshops. The financial support is primarily given to encourage the participation of young scientists and research professionals in such events, along with nominal support for pre-operative expenses like announcements, broachers etc.

VII-SEEC ORGANISERS

Prof Ashok Pandey
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Prof Ashok Pandey is currently a Distinguished Scientist at CSIR-Indian Institute for Toxicology Research, Lucknow, India, and Honorary Executive Director at the Centre for Energy and Environmental Sustainability- India. He has been Visiting Professor/ Scientist and UNESCO Professor in many countries, including France, Brazil, the UK, Switzerland, Malaysia, Thailand, etc. Formerly, he was an Eminent Scientist at the Center of Innovative and Applied Bioprocessing, Mohali, and Chief Scientist & Head of the Biotechnology Division at CSIR's National Institute for Interdisciplinary Science and Technology, Trivandrum. Professor Pandey has ~ 1200 publications/communications, including 16 patents, 54 books, 130 book chapters, 465 original and review papers, etc., with an h index of 84 and more than 29,000 citations (Goggle scholar).

Prof Pandey is the recipient of many national and international awards and fellowships, which include the Life-Time Achievement Award from the International Society for Energy, Environment and Sustainability (2017); Fellow of the Royal Society of Biology, UK (2016); Academician of European Academy of Sciences and Arts, Germany (2016); Fellow of International Society for Energy, Environment and Sustainability (2014); Fellow of National Academy of Science, India (2012); Fellow of Association of Microbiologists of India (2010); Fellow of International Organization of Biotechnology and Bioengineering (2008); Fellow of the Biotech Research Society, India (2005); Honorary Doctorate from Universite Blaise Pascal, France (2007); Thomson Scientific India Citation Laureate Award, USA (2008); Lupin Visiting Fellowship, Best Scientific Work Achievement award, Govt of Cuba; UNESCO Professor; Raman Research Fellowship Award, CSIR; GBF, Germany and CNRS, France Fellowship; Young Scientist Award, etc.

Prof Pandey was Chairman of the International Society of Food, Agriculture, and Environment, Finland (Food & Health), during 2003-2004. He is the Founder and President of the Biotech Research Society, India; the International Coordinator of the International Forum on Industrial Bioprocesses, France; Chairman of the International Society for Energy, Environment & Sustainability; and Vice-President of the All India Biotech Association.

Prof Pandey is Editor-in-chief of Bioresource Technology, Honorary Executive Advisors of the Journal of Water Sustainability and the Journal of Energy and Environmental Sustainability, Subject editor of Proceedings of the National Academy of Sciences (India), and editorial board member of several international and Indian journals. He is editor-in-chief of a book series on Current Developments in Biotechnology and Bioengineering, comprising twelve volumes published by Elsevier, and another series on Biomass, Biofuels and Biochemicals, including six volumes.

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Avinash Kumar Agarwal is a Professor Department of Mechanical Engineering, IIT Kanpur. Prof Agarwal is interested in research in IC engines, combustion, conventional fuels, alternative fuels, methanol fuelled engine development, hydrogen, LCA and TCO analyses, fuel sprays, lubricating oil tribology, optical diagnostics, laser ignition, HCCI, particulate and emission control, and large bore engines. Prof. Agarwal has published more than 499 peer-reviewed international journal and conference papers, 63 edited books, 129 book chapters. He has 14550+ Scopus and 21500+ Google Scholar citations. Prof Agarwal is Editor of 'FUEL', Editor-in-Chief of 'Journal of Energy and Environmental Sustainability, and is an editorial board member of IMechE International Journal of Engine Research. He edited "Handbook of Combustion" (5 Volumes; 3168 pages), published by Wiley VCH, Germany, the most updated combustion compilation in the world. For his outstanding contributions, Prof. Agarwal is conferred upon Sir J C Bose National Fellowship (2019) by SERB, Clarivate Analytics India Citation Award-2017 in Engineering and Technology, Prestigious Shanti Swarup Bhatnagar Prize (2016) in Engineering Sciences, Rajib Goyal Prize in Physical Sciences (2015); NASI-Reliance Industries Platinum Jubilee Award (2012); INAE Silver Jubilee Young Engineer Award (2012); Dr C. V. Raman Young Teachers Award (2011); SAE International's Ralph R. Teetor Educational Award (2008); INSA Young Scientist Award (2007); UICT Young Scientist Award (2007); INAE Young Engineer Award (2005); Devendra Shukla Research Fellowship (2009-12), Poonam and Prabhu Goyal Endowed Chair Professorship (2013-16), SBI Endowed Chair Professorship (2018-21) at IIT Kanpur; AICTE Career Award for Young Teachers (2004); DST Young Scientist Award (2002); and DST BOYSCAST Fellowship (2002). He has been conferred the inaugural version of the Distinguished Alumni Award-2021 by MNIT Jaipur and DAA-2022 by IIT Delhi.

Prof Agarwal is a highly cited researcher-2018 and is among the top ten HCR from India, among 4000 HCR researchers globally in 22 fields of enquiry. He is the number one Energy researcher from India in the recently declared Stanford University listing of top 2% researchers globally. He is an elected Fellow of Society of Automotive Engineers International, USA (SAE; 2012), American Society of Mechanical Engineers (ASME; 2013), Indian National Academy of Engineering (INAE; 2015), International Society for Energy, Environment and Sustainability (ISEES; 2016), Royal Society of Chemistry (RSC; 2018), National Academy of Science Allahabad (NASI; 2018), World Society of Sustainable Energy Technologies (WSSET-2020), American Association for Advancement in Science (AAAS; 2020) and Combustion Institute USA (CI; 2022). He is featured in DST Golden Jubillee Coffee Table Book "75 under 50 Scientists Shaping Today's INDIA," released by Vigyan Prasar, Government of India, on National Science Day, February 28th, 2022. At IIT Kanpur, Prof. Agarwal has established a state-of-the-art "Engine Research Laboratory" (www.iitk.ac.in/erl), and he was also the founder-director of IIT Kanpur's Science and Technology Research Park (Technopark@iitk; http://www.technoparkiitk.com). He also founded the International Society for Energy Environment and Sustainability (www.isees.in) in 2014.

Prof Yogesh Chandra Sharma
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Prof Yogesh Chandra Sharma received DSc from Chaudhary Charan Singh University Meerut in 2010. He received his PhD from the Indian Institute of Technology BHU, Varanasi, in 1991 and his BSc and MSc from Rohilkhand University Bareilly. His primary areas of investigation include Biodiesel, Catalysis, Adsorption, Biodiesel production and Aqueous solution. His Biodiesel study combines topics from various disciplines, such as Biofuel, Molar ratio and Diesel fuel. Yogesh Chandra Sharma has included themes like Yield, Chemical engineering, Pulp, and the paper industry in his Catalysis study. His work is dedicated to discovering how Adsorption, Chromatography are connected with Sorption, Metal ions in aqueous solution Copper and other disciplines. The various areas that Yogesh Chandra Sharma examines in his Biodiesel production study include Transesterification and Environmental friendly. Yogesh Chandra Sharma has researched Aqueous solutions in several fields, including Fourier transform infrared spectroscopy, Inorganic chemistry and Nuclear chemistry. Yogesh Chandra Sharma mainly investigates Adsorption, Biodiesel, Aqueous solution, Catalysis and Nuclear chemistry. His biological study spans a wide range of topics, including Inorganic chemistry and Chromatography. The study incorporates disciplines such as Raw material, Transesterification, Methanol, and Biodiesel. His survey on Aqueous solution also encompasses disciplines like Fourier transform infrared spectroscopy that intertwines with fields like Activated carbon and Chromium, which intersects with the area such as Diffusion and Wastewater. His work carried out in the field of Catalysis brings together such families of science as Yield and
Thermogravimetric analysis, Chemical engineering. In Nuclear chemistry, Yogesh Chandra Sharma works on issues like Enthalpy, which is connected to Fly ash and Gibbs-free energy. His primary areas of study are Biodiesel, Biodiesel production, Catalysis, Transesterification and Methanol. The Biodiesel study combines topics such as Heterogeneous catalysis, Chemical engineering, Pulp and paper industry and nuclear chemistry. Yogesh Chandra Sharma has included themes like Vegetable oil and Cetane number in his Chemical engineering study. He interconnects Fourier transform infrared spectroscopy and Activation energy to investigate issues within nuclear chemistry. His Biodiesel production research integrates issues from Raw material and Barium. His Raw material research is multidisciplinary, incorporating perspectives in Biofuel, Bioenergy, Renewable energy, Endothermic process, and Scale. He published more than 210 articles in reputed journals and conferences, and his work has been cited more than 14000 times.

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Rajnesh Tyagi, Professor, Department of Mechanical Engineering at IIT (BHU) Varanasi obtained his bachelor's degree in Mechanical Engineering from the Indian Institute of Technology Roorkee (erstwhile University of Roorkee) in 1992, Master's Degree in Engineering with specialization in Industrial Metallurgy, and PhD (2001) in Materials Tribology from the same Institute. Prof Tyagi did his post-doctoral research at the School of Materials Science and Engineering, Nanjing University of Science and Technology, Nanjing, PR China, where he researched Ni self-lubricating composites' high-temperature wear applications. His areas of interest include Materials Development and Tribology, M.M.C.s (Al, Cu, and Ni Base), Wear Resistant Coatings, Surface Engineering, Solid Lubrication, and High-temperature Wear. Prof Tyagi has published about 70 research papers in various International Journals of repute, presented at several international conferences in India and abroad, and guided several PhD/Masters students. He has delivered invited talks in several workshops/conferences/faculty development programs in India and Abroad. He has visited several countries like, the U.S.A., China, Malaysia, Poland, Lithuania, France, and the Czech Republic. He has developed strong research collaborations with S.K.L.T., Tsinghua University, N.J.U.S.T., Nanjing, and the University of Sabah, Malaysia. Dr Tyagi has broad exposure to teaching at some premier Engineering and Technology institutes in India like Birla Institute of Technology and Science, Pilani, P.E.C., University of Technology. Chandigarh and IIT (BHU) Varanasi. Presently, Prof Tyagi is Dean (Faculty Affairs) IIT (BHU), Member Board of Governors of IIT (BHU), Coordinator, Malviya Center of Innovation Incubation and Entrepreneurship, I.I.T. (B.H.U.) apart from being a member of several committees Institute and Department level committee. He has also served as President of the Faculty Forum of IIT (BHU) in 2015.

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Dr Akhilendra Pratap Singh is working as Assistant Professor at the Department of Mechanical Engineering, Indian Institute of Technology Kanpur. His research areas include advanced low-temperature combustion; optical diagnostics with special reference to engine endoscopy and PIV; combustion diagnostics; engine emissions measurement; particulate characterization and their control; and alternative fuels. He received his master's degree & and PhD in mechanical engineering from the Indian Institute of Technology Kanpur in 2010 and 2016, respectively. Dr Singh has edited 12 books and authored more than 25 book chapters and 65+ research articles in international journals and conferences. He has been awarded "ISEES Best PhD. Thesis Award" (2017), "SERB Indo-US Postdoctoral Fellowship" (2017), "IEI Young Engineer Award" (2017), and "ISEES Young Scientist Award" (2018). He is a member of numerous professional societies, including SAE, ASME, and ISEES.

ISEES FELLOWS

ISEES FELLOWS (2023)

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Automotive Research Association of India
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IIT Bombay, Bombay

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Department of Environmental Science & Technology
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Prof Achintya Mukhopadhyay
Professor
Mechanical Engineering Department
Jadavpur University, Kolkata, India

ISEES FELLOWS (2017)

Dr V K Saraswat
Former Secretary of Defence R&D
Member, NITI Aayog,
DRDO Guest House, Development Enclave,
Sankar Vihar Delhi Cantt., New Delhi-110010

Prof Probir Kumar Bose
Campus Director, NSHM Knowledge Campus, GOI
Arrah, Shivtala, Via Muchipara, Durgapur - 713212

Prof Ramesh Agarwal
William Palm Professor of Engineering
Washington University in St. Louis, USA

Prof Bhola R. Gurjar
Professor in Civil (Environmental) Engineering, and
Head, Centre for Transportation Systems (CTRANS)
Indian Institute of Technology (I.I.T.) - Roorkee

Prof Swarnendu Sen
Professor
Department of Mechanical Engineering
Jadavpur University, Kolkata - 700 032

Dr Thallada Bhaskar
Principal Scientist,
Thermocatalytic Processes Area, Bio-Fuels Division,
CSIR-Indian Institute of Petroleum, Mohkampur,
Dehradun-248005, Uttarakhand, India

Dr Anirudh Gautam
Executive Director
Special Railway Establishment for Strategic
Technology and Holistic Advancement (SHRESHTA)
RDSO, Lucknow

ISEES FELLOWS (2016)

Prof Avinash Kumar Agarwal
Department of Mechanical Engineering
Indian Institute of Technology Kanpur
Kanpur, 208016, UP, India

Dr S. Venkata Mohan
Principal Scientist
Bioengineering and Environmental Sciences Lab, EEFF Department,
CSIR-Indian Institute of Chemical Technology, Hyderabad – 500 007, India

Prof Ernst Wintner
Retired Professor of Applied Laser Technology
Vienna University of Technology (TU Vienna, Photonics Institute),
Vienna, Austria

Dr Satish Kumar
Distinguished Scientist & Chief Controller
R&D (TN) DRDO

Prof Ryo Amano
Professor
Department of Mechanical Engineering
University of Wisconsin-Milwaukee
Milwaukee, WI 53201

ISEES FELLOWS (2015)

Prof L.M. Das
Emeritus Professor
Center for Energy Studies
IIT Delhi, Hauz Khas
New Delhi, 110016

Prof Chang Sik Lee
Chair Professor
School of Mechanical Engineering
Hanyang University Seoul, Korea

Prof O. N. Srivastava
Emeritus Professor
Faculty of Science, Department of Physics
Banaras Hindu University
Varanasi

Dr Gabriel D. Roy
CPnE Consultants,
Fairfax, VA 22030, USA

ISEES FELLOWS (2014)

Prof Ashok Pandey
Distinguished Scientist
CSIR-Indian Institute of Toxicology Research,
Lucknow-226001, India

Prof S. R. Gollahalli
School of Aerospace and Mechanical Engg.
University of Oklahoma
Norman. OK 73019

Dr R. K. Malhotra
Director General
Federation of Indian Petroleum Industry (FIPI)
3rd Floor, PHD House, 4/2,
Siri Institutional Area,
August Kranti Marg,
New Delhi - 110 016

ISEES AWARDS

ISEES Young Scientist Awardees (2022)

Dr Anshul Yadav

Dr Anshul Yadav is a Scientist in Membrane Science and Separation Technology division CSIR-Central Salt and Marine Chemicals Research Institute, Bhavnagar, Gujarat. He has excellent scientific contributions to water treatment specializing in membrane-based (waste)water treatment techniques. He has developed a complete computational toolbox for highly accurate simulations of membrane-based processes. He has authored 82 refereed journal papers and 14 refereed conference papers.

Dr M. Krishnamoorthi

Dr M. Krishnamoorthi is a post-doctoral fellow at the Department of Mechanical Engineering, Indian Institute of Technology Kanpur, Uttar Pradesh. His research interest includes Fuels and Combustion, Low-temperature combustion, and Particulates. He received the National Postdoctoral and Senior Research Fellowship awards from SERB and CSIR, India. He has authored 21 refereed journal papers, 01 refereed conference paper, and 01 book chapter.

Dr Manabendra Saharia

Dr Manabendra Saharia is an Assistant Professor in the Department of Civil Engineering and an associate faculty of the Yardi School of Artificial Intelligence at IIT Delhi. Dr Saharia's HydroSense research lab at IIT Delhi focuses on monitoring and mitigating natural hazards using physics and data-driven techniques. His fields of interest include land surface modelling, AI/ML applications, radar/satellite precipitation, and citizen science. He has authored 17 refereed journal papers, 05 refereed conference papers, and 02 book chapters.

Dr Sakar Mohan

Dr Sakar Mohan is working as an Assistant Professor at the Centre for Nano and Material Sciences, Jain University, Bangalore. He also develops photocatalysis-assisted feedstock-modifications and reactor-design for large-scale biodiesel production. He works on atmospheric water generator toward improving air-filters, condenser, and water purifications through nanocoating and biomimetic concepts. His publications currently include around 96 articles, 2 edited books, 2 patents and 16 book chapters.

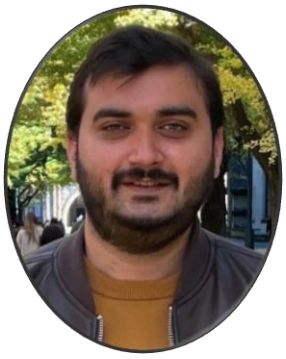
ISEES Best PhD Thesis Awardees (2022)

Rakesh Kona
Thesis Title: Gene Expression Analysis, Process Optimization and CRISPR-Cas9 Genome Engineering using Isolated Photosynthetic Organisms for Nutraceuticals Production
Institute: Academy of Scientific & Innovative Research, New Delhi

Karishma Maheshwari
Thesis Title: Experimental Studies on Treatment of RO Reject & Dye Contaminated Water by Capacitive Deionization through Development of Biomass Derived Activated Carbon Composite Material
Institute: Malaviya National Institute of Technology, Jaipur.

Rohit Kumar
Thesis Title: Measurement of Laminar Burning Velocity of Surrogate Fuels at Elevated Temperatures with Kinetic Analysis
Institute: Indian Institute of Technology Bombay

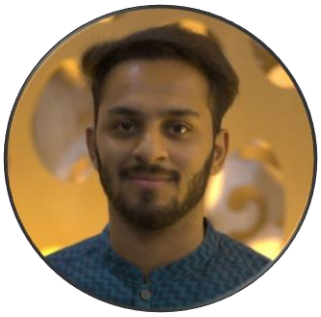
Avnish Kumar
Thesis Title: Catalytic oxidative conversion of lignin to value-added chemicals
Institute: CSIR-Indian Institute of Petroleum, Dehradun



Sarthak Nag
Thesis Title: Mechanistic Insights into Nanobubble Dynamics
Institute: Kyushu University, Japan

ISEES Best Master's Thesis Awardees (2022)

Ayush Tripathi
Thesis Title: DME Fueled Single Cylinder Compression Ignition Engine Prototype Development and Experimental Evaluation
Institute: Indian Institute of Technology Kanpur, India



Jitendra Choudhary
Thesis Title: Modeling of Thermal and Hybrid Advanced Oxidation Reaction Kinetics for Degradation of Organic Pollutants
Institute: Indian Institute of Science Education and Research (IISER) Bhopal.

Aaishi Ashirbad
Thesis Title: Laser Plasma Assisted Combustion of Gasoline Direct- Injected Spray in a Constant Volume Combustion Chamber
Institute: Indian Institute of Technology Kanpur, India

Deepak Kumar
Thesis Title: Life Cycle Assessment and Total Cost of Ownership Studies of Different Fuel and Engine
Institute: Indian Institute of Technology Kanpur, India

LIST OF SPEAKERS OF VII-SEEC

A.B. Gupta	Motilal Nehru National Institute of Technology Jaipur
Abha Kumari	Amity Institute of Biotechnology, Noida
Abhilash	CSIR-National Metallurgical Laboratory, Jamshedpur
Achintya Mukhopadhyay	Jadavpur University
Ajay Kumar Pandey	Chhatrapati Shahu Ji Maharaj University, Kanpur
Akhilesh Tiwari	Indian Institute of Information Technology, Prayagraj
Alok Sinha	Indian Institute of Technology Dhanbad
Ambekar	Indian Institute of Technology Goa
Ambika S	Indian Institute of Technology Hyderabad
Amit Sharma	Indian Institute of Technology Jodhpur
Amitava Datta	Jadavpur University
Anjan Ray	Director of CSIR-Indian Institute of Petroleum Dehradun
Anjana Pandey	Motilal Nehru National Institute of Technology Allahabad, Prayagraj
Aradhana Mishra,	National Botanical Research Institute, Lucknow
Archana Sarkar	National Institute of Hydrology, Roorkee
Archana Tiwari	Amity Institute of Biotechnology, Noida
Arnab Sarkar	Indian Institute of Technology BHU
Ashish N. Sawarkar	Motilal Nehru National Institute of Technology Allahabad, Prayagraj
Ashok Pandey	IITR Lucknow
Ashutosh Pandey	Department of Biotechnology, AKS University, Satna
Atul Dhar	Indian Institute of Technology Mandi
Avinash Kumar Agarwal	Indian Institute of Technology Kanpur
Ayush Pant	FEV
Balkrishna Mehta	Indian Institute of Technology Bhilai
Balendu Shekhar Giri	Indian Institute of Technology, Guwahati
Baskar Gurunathan	St. Joseph's College of Engineering, Chennai
Bhabani K Satapathy	Indian Institute of Technology Delhi
Bhuwan B Mishra	Center of Innovative and Applied Bioprocessing, Mohali
Bijay P. Tripathi	Indian Institute of Technology DELHI MS
Budhi Sagar Tiwari	Institute of Advanced Research, Gandhinagar, India
Chaitanya Kumar Rao	Indian Institute of Technology KGP/ Kanpur
Chetan Patel	Indian Institute of Technology Patna
Christine Mounaïm-Rousselle	Université d'Orléans
Deepak Kumar	Indian Institute of Technology Kanpur
Dev Mani Pandey	Birla Institute of Technology, Mesra, Ranchi

Dhananjay Kumar Srivastava	Indian Institute of Technology KGP
Dhiraj V Patil	Indian Institute of Technology Dharwad
Dilip Sharma	National Institute of Technology Jaipur
Dipesh S Patle	Motilal Nehru National Institute of Technology Allahabad, Prayagraj
Grzegorz Piechota	GPCHEM Laboratory of Biogas Research and Analysis, Poland
Harish C Phuleria	Indian Institute of Technology Bombay
HSN Murthy	
Indu Shekhar Thakur	Amity University, Gurugram
J V Tirkey	Indian Institute of Technology BHU
Jacek Hunicz	Lublin University of Technology, Poland
Jay Shankar Singh	Babasaheb Bhimrao Ambedkar University, Lucknow
Jaydeep Bhattacharya	School of Biotechnology, JNU, New Delhi
Josef Maroušek	Institute of Technology and Business, Czech Republic
K. V. George	CSIR-NEERI
Kamlesh Chaure	AKS University, Satna
Karmakar	Indian Institute of Technology KGP
Kashyap Kumar Dubey	JNU
Keshab Mondal	Vidyasagar University, Midnapur
Kirpa Ram	IESD BHU
Kirti Bhushan Mishra	Indian Institute of Technology Roorkee
Lal Singh	CSIR-National Environmental Engineering Research Institute, Nagpur, India
Manjula Das	National Institute of Technology Arunachal Pradesh
Manoj K. Sharma	Jawaharlal Nehru University, New Delhi
Manoj Kumar Tiwari	Indian Institute of Technology KGP
Michal Petru	Associate ProfessorHead of Department at Technical University of Liberec
Moqtik Bawase	General Manager Automotive Research Association of India ARAI
Munish Chandel	Indian Institute of Technology Bombay
N Stalin	Anna University, Tiruchirapalli
Nagendra Thakur	Sikkim University, Tadong
Nidhi Pareek	Central University of Rajasthan, Kishangarh, Ajmer
Nikhil Sharma	MNIT Jaipur
Niraj Shah	FEV INDIA PVT LTD
Nitin Labhsetwar	Chief Scientist & Head, CSIR NEERI
Om Prakash Singh	Indian Institute of Technology BHU
P A Laxminarayan	Simpsons
Paramvir	National Institute of Technology Agartala

Parmod Kumar	Indian Institute of Technology Mandi
Pooja Sharma	National University of Singapore, Singapore
Prabhanshu Tripathi	CSIR-Indian Institute of Toxicology Research, Lucknow
Pratyoosh Shukla	Banaras Hindu University, Varanasi
Pravesh Chandra Shukla	Indian Institute of Technology Bhilai
Preeti Chaturvedi	CSIR-Indian Institute of Toxicology Research, Lucknow
Priya Chandran	NIT Calicut
Priyangshu M Sarma	Innotech Interventions Pvt Ltd, Guwahati, India
Prof Prakriti Sethi	Methanol Institute
R. Praveen Kumar	Arunai Engineering College, Tiruvannamalai
Raja Banerjee	Indian Institute of Technology Hyderabad
Rajesh Kumar Prasad	UIET Kanpur
Rajesh Mishra	Czech Republic
Ramakrishnan Parthasarathi	CSIR-Indian Institute of Toxicology Research, Lucknow
Ramesh Dharavath H N	Indian Institute of Technology-ISM Dhanbad
Saket Verma	BITS Pilani
Samuel L Rokhum	National Institute of Technology, Silchar
Sandeep Kumar	Indian Institute of Technology Bombay
Sapna Sharma	Shri Ram Swaroop Memorial University, Lucknow
Sarthak Nag	
Satvasheel Ramesh Powar	Indian Institute of Technology Mandi
Satyajit Gupta	Indian Institute of Technology Bhilai
Sayantan Sarkar	Indian Institute of Technology Bombay
Shailendra Sinha	Lucknow
Shailesh K Singh	Indian Institute of Technology Dehradoon
Shantanu Bhattacharya	Indian Institute of Technology Kanpur
Shihabudheen M. Maliyekkal	Indian Institute of Technology Tirupati
Snehasish Panigrahy	Indian Institute of Technology Delhi
Sudarshan Kumar	Indian Institute of Technology Bombay
Sudipta De	Jadavpur University
Sunil Kumar Khare	Indian Institute of Technology Delhi, New Delhi
Suresh Kumar Dubey	Banaras Hindu University, Varanasi
Suresh Pandian Elumalai	Indian Institute of Technology Dhanbad
Swarnendu Sen	Jadavpur University
Swatantra Pratap Singh	Indian Institute of Technology Bombay
Thallada Bhaskar	CSIR-Indian Institute of Petroleum, Dehradun
Tushar Sharma	RGIPT
Uma Maheshwar	Site Chief Consulting Engineer GE Aerospace
V Vivekanand	Malaviya National Institute of Technology, Jaipur

Venugopal	Indian Institute of Technology Bhubneshwar
Vijayanti Mala Ranghoo-Sanmukhiya	The University of Mauritius, Mauritius
Vinod K. Garg	Central University of Punjab, Bathinda
Vinod Sangwan	CCS Haryana Agricultural University, Hisar
Vivek K Gaur	Ulsan National Institute of Science and Technology, Republic of Korea
Yogeshwar Nath Mishra	University of Gothenburg

BIOGRAPHY OF PLENARY SPEAKERS

Dr Ajay Kumar
Former Union Secretary of Defence
Government of India
Email: jstrg-mod@nic.in

Dr Ajay Kumar is a 1985 batch Indian Administrative Service (IAS) officer of the Kerala cadre. He is the former Union Defence Secretary of India. Dr Ajay Kumar has served in various posts in both the Government of India and the Government of Kerala, such as Principal Secretary (Information Technology), managing director of the Kerala State Electronics Development Corporation, Secretary (Industries), managing director of the Kerala State Co-operative Agricultural and Rural Development Bank, general manager in the Kerala State Industrial Development Corporation and as the district magistrate and collector of the Palghat (now Palakkad) district in the Kerala government and as the Defence Production Secretary, additional secretary in the Ministry of Electronics and Information Technology, joint secretary in the Department of Information Technology of the now-erstwhile Ministry of Communications and Information Technology, director in the Department of Biotechnology of the Ministry of Science and Technology and as a deputy secretary in the Department of Home of the Ministry of Home Affairs in the Indian government. He was appointed as the Union Defence Production Secretary by the prime minister-headed Appointments Committee of the Cabinet in November 2017. He served as Defence Production Secretary till 23 August 2019 and was succeeded by Subhash Chandra, an IAS officer of the Karnataka cadre (1986 batch). Dr Ajay Kumar was appointed as Union Defence Secretary on 21 August 2019, and he assumed office on 23 August 2019 when Sanjay Mitra retired.

Dr Ajay Kumar is an alumnus of IIT Kanpur and the University of Minnesota and was awarded two separate fellowships by the University of Minnesota. Dr Ajay Kumar is accredited to scale up defence exports to approximately 13,000 crores for 2021-22 with the introduction of modern warfare capabilities and disruptive technologies and innovations. Dr Ajay Kumar established the iDEX initiative to help create a conducive and cost-effective defence start-up ecosystem that fosters innovation and technology development. Dr Ajay Kumar is in charge of Project 75I, developing next-generation submarines and fighters and laying the groundwork for a future marine aerospace and industrial ecosystem in India. Dr Ajay Kumar has a Bachelor of Technology in electrical engineering from the Indian Institute of Technology Kanpur, a master's degree in development economics from the University of Minnesota, and a PhD in business administration from the Carlson School of Management at the University of Minnesota. In 2019, Dr Ajay Kumar was felicitated as a distinguished alumnus by the Indian Institute of Technology Kanpur for his professional excellence and nation-building efforts.

Dr SSV Ramakumar
Director (R&D),
Indian Oil Corporation Ltd,
Faridabad, Haryana-121007
Email: ramakumarssv@indianoil.in

Dr SSV Ramakumar is a Director (R&D) on the Board of Indian Oil Corporation Ltd., a Fortune 500 company. Dr Ramakumar has more than three decades of uninterrupted experience in the downstream hydrocarbons sector, notably in lubricant technology, refinery process research, and catalyst development. He is instrumental in developing India's home-grown, OEM-approved marine lubricant technology, which catapulted Indian Oil's SERVO lubes Into the select league of five MNCs. He spearheaded the complete indigenization of Indian Oil's flagship INDMAX technology. Currently, he is pioneering various alternative energy programmes, including waste energy, bio, solar and energy storage etc. Dr Ramakumar is steering the Indian Oil Hydrogen endeavours and is on multiple committees working on drawing the strategies for including hydrogen in the energy mix. Dr Ramakumar has over 150 research publications in national/international journals and a sizeable number of granted patents. In his additional assignment as Director of Planning & Business Development, he also spearheaded Indian Oil's Petrochemicals, Natural Gas, Exploration & Production, Alternate Energy & Sustainable Development, International Business and Explosives verticals, besides Corporate Planning. Besides serving on the Board of Indian Oil, Dr Ramakumar also serves on the Boards of Lanzatech, USA, Oil Industry Development; Central Pollution Control, India; Society for Petroleum Laboratories & India Energy Forum and Research Advisory Board (RAB) of ICAT, under Scientific & Research Organisation (SIRO). As Director of Planning & Business Development, he also served on the boards of Green Gas Ltd., Indian Oil Total Pvt. Ltd., IOT Biogas Pvt. Ltd. and Ind Oil Montney Ltd., Canada. Dr Ramakumar presides over several national scientific societies, including the International Council of Internal Combustion Engines, India Chapter; Indian Society of Fuels and Lubricants; National Lubrication Grease Institute, Indian Chapter; and Tribology Society of India. He also spearheads Start-Up initiatives of Indian Oil. Dr Ramakumar, conferred with a National Academy of Engineering Fellowship, has received many awards, including NPMP, FIPI, NRDC, AIIMA Innovation, Bangalore Nano, and WPC Excellence Award for product and process technologies he developed. He holds a doctorate in chemistry from IIT-Roorkee (erstwhile University of Roorkee) and has been conferred with its Distinguished Alumni Award for the year 2021 in Technology & Innovation domains.

Tile of the Talk: Future Fuels Under Net Zero Scenario

Underpinned by the global commitments towards environmental protection and seismic shift towards decarbonization, India has laid its plans to achieve Net Zero emissions targets by 2070. The mobility sector will be the mainstay of economic progression, and India is exploring multiple fuel options to achieve the desired objectives. The talk will narrate the changing energy paradigm with advanced transition revolving around the liquid, gaseous and electric mobility options. It would highlight the Indian emissions footprints and energy security challenges while presenting key developments around each probable candidate. The presentation will cover the policy, research and execution landscape of existing and upcoming technologies revolving around ethanol, SAF, methanol, advanced batteries, HCNG and hydrogen, including the challenges associated with each fuel. Indian Oil R&D has been pioneering the national developments in each of these areas, and a brief update will be shared with the audience during the discussions.

BIOGRAPHY OF CHAIRPERSONS & SPEAKERS

Session A1: Advanced Engine Technologies

Chairperson:
Dr P. A. Lakshminarayanan
Advisor
Simpson Engines
Chennai 600002, Tamil Nadu, India
Email: lakshminarayananloganayagi@gmail.com

Dr P. A. Lakshminarayanan is currently an Advisor to Simpson Engines, Chennai. He developed models for heat release and emissions for diesel engines based on the study of fuel-air mixing at the wall in turbulent sprays with multiple injections. He also studied the wear of liners having a general surface texture and tribology of valves, cams, pistons, and rings. He is a fellow of SAE international and INAE. He received the Arch T. Colwell award (1984) from SAE international and AVL awards for conference papers (2005, 2008, and 2010). He has authored 45 peer-reviewed international journals and conference papers with nine patents to his credit.

A1 - Keynote Speaker:

Dr Uma Maheshwar
Site Chief Consulting Engineer
GE Aerospace, Karnataka 560068, India
Email: Umamaheshwar.D@ge.com

Dr Uma Maheshwar is the Chief Consulting Engineer for 700+ member GE Aerospace India Engineering team in Bangalore. The team is involved in the design & development of Next Generation Aircraft Propulsion Systems, supporting the aircraft engine fleet and developing customized digital and engineering software. Uma has ~30 years of experience in setting up & leading large organizations in the Engineering, Research & Development sector. Uma joined GE Aviation in 2001 and has held many leadership positions in Aviation Engineering since then.

Title of the Talk: GE Aerospace – Sustainability Strategy and Technologies

GE Aerospace is a world -leading provider of commercial, military and business and general aviation jet and turboprop engines and components, as well as avionics, electrical power and mechanical systems for aircraft. GE has a global service network to support these offerings. GE and its customers are also working together to unlock new opportunities to grow and deliver more productivity beyond traditional services. GE Aerospace is becoming a digital industrial business with its ability to harness large data streams that provide incredible insights and, in turn, real operational value for customers. Nearly 75 years ago, GE introduced the country's first jet engine, bringing America's aviation industry into the jet age. GE Aviation fully supports global ambitions to achieve a more sustainable future by reducing carbon emissions. As part of the aviation community, GE embraces its role in finding lower -carbon solutions for our customers and believes that a holistic approach is vital to achieving ambitious emission reduction targets. To that end, GE Aviation spent approximately $1.6 billion in 2021 on research and development for aviation technology innovations, including investments made by GE and our customers. This spending includes innovations needed to drive reduced flight emissions. GE's goal is to be carbon neutral in our facilities and operations by 2030. GE also announced an ambition to be a net zero company by 2050—encompassing not just GE's operations but also the Scope three emissions from the use of our sold products. The invited lecture covers the state of art technologies for powering sustainable aviation.

A1 - Invited Speaker 1:

Prof Jacek Hunicz
Professor
Department of Powertrains
Lublin University of Technology
Poland 20-618
Email: j.hunicz@pollub.pl

Prof Jacek Hunicz is an associate professor and head of the Powertrains Laboratory at the Lublin University of Technology, Poland. His track record includes experimental engine research and renewable low-carbon fuels. In the area of combustion research, his studies are centred on the control strategies for low-temperature combustion in HCCI engines, including NVO fuel reforming. With over 23 years of professional expertise in combustion engines and powertrain development, prof Hunicz is a grant holder of several relevant nationwide projects funded by the Ministry of Science and Higher Education and the National Science Centre. He is a member of several international research groups. He is also an innovation consultant for Polish military company HSW Deblin and PAK-PCE Polish Hydrogen Bus company in the powertrain development and testing field. Since 2018, he has been a board member of the Polish Scientific Society for Combustion Engines.

Title of the Talk: Waste polymer pyrolytic oil blends as valuable fuels for modern compression ignition engine

There is abundant worldwide research into combustion engine applications for plastic and rubber pyrolytic oils. However, most studies are methodologically outdated in terms of their assumed technology, either about oil production or engine application or in their analytical approaches. The various studies produce conflicting or ambiguous results, making pyrolytic fuels' role as a feasible future fuel uncertain. This study is an attempt to provide state-of-the-art combustion analysis results for a thoroughly-evaluated pyrolytic fuel in a modern, industry-grade pyrolytic reactor. Testing with a modern, sophisticated single-cylinder research engine offers a detailed analysis of combustion and both regulated and unregulated emissions. Emissions results are supported by FTIR analysis of exhaust gases, including identifying 20 species. The results show that contemporary Tier 4-compliant combustion systems with the split injection can handle high pyrolytic fuel content without needing re-calibration. With diesel/pyrolytic oil blends up to 60% admixture, combustion phasing is delayed only at near-idle loads. The consequential differences in performance and emissions diminish over the load increase. Although exhaust emissions are generally increasing with higher pyrolytic oil admixtures, the specific fuel properties enable the reduction of pollutants emissions at dedicated engine calibration.

Session A2: Combustion and Flames

Chairperson:
Dr Uma Maheshwar
Site Chief Consulting Engineer
GE Aerospace, Karnataka 560068, India
Email: Umamaheshwar.D@ge.com

Dr Uma Maheshwar is the Chief Consulting Engineer for 700+ member GE Aerospace India Engineering team in Bangalore. The team is involved in the design & development of Next Generation Aircraft Propulsion Systems, supporting the aircraft engine fleet and developing customized digital and engineering software. Uma has ~30 years of experience in setting up & leading large organizations in the Engineering, Research & Development sector. Uma joined GE Aviation in 2001 and has held many leadership positions in Aviation Engineering since then.

A2 - Keynote Speaker:
Prof Michal Petru
Associate Professor
Department of Machine Parts and Mechanism
Technical University of Liberec
Liberec 46117, Czechia
Email: michal.petru@tul.cz

Dr Michal Petru is an Associate Professor in design and machine parts in the Faculty of Mechanical Engineering, Technical University of Liberec, Liberec, Czech Republic. At the present time, Prof Petrů is Head of Research and Deputy Director at the Institute for Nanomaterials, Advanced Technology and Innovation, Liberec, Czech Republic. He is the author or coauthor of more than 240 scientific and professional publications for area numerical modelling and optimizing design machine and composite structures. His main interests are related to automotive engineering, composites, environmental science, and R&D in new materials applicable for optimized design machines. He is the author of several patents and utility models.

Title of the Talk: Approach of development of The Light-weight structures for modular platform for autonomous chassis of specialized electric vehicles for freight and equipment transportation

There is no doubt that autonomous vehicles will change the world of logistics. Autonomous vehicles will join the Internet of Things and robotics as being the three most important innovative trends in logistics after 2025. Autonomous vehicles or autonomous logistics have sparked a great deal of research, professional and business interest in recent years, particularly in applications designed to transport people and freight on roads or in closed areas. However, this means that there are significant challenges to the application of autonomous technologies for automated logistics, transport and special operations on general terrain, construction sites, and unpaved areas, etc. Therefore, the aim of this manuscript is to provide a short description about lightweight construction structures for autonomous electric utility vehicles. A competitive lightweight autonomous utility vehicle for transporting conditions has significant innovation potential in the near future.

A2 - Invited Speaker 1:

Dr Paramvir Singh
Assistant Professor
Mechanical Engineering Department
NIT Agartala 799046, Tripura
Email: param016@gmail.com; psingh.me@nita.ac.in

Dr Paramvir Singh is working as an Assistant Professor in Mechanical Engineering Department at NIT Agartala. Prior to joining this position, Dr Singh was a Postdoctoral Researcher at the National University of Ireland Galway and IIT Bombay. At IIT Bombay, he worked on the UKIERI project at the University of Sheffield UK collaboration. During his PhD at NIT Hamirpur, he received the prestigious Bioenergy Award for Cutting Edge Research from Indo-US Science & Technology Forum GOI. As a part of this award, he worked as a B-ACER intern at the University of Maryland, USA. He has been recognized with a couple of renowned awards and fellowships like being selected among 50 young researchers by the Technical University of Munich, Germany; the Shastri Indo-Canadian Institute fellowship for the postdoctoral category; AWSAR award by DST; Young Scientists Award by the International Society for Energy Environment & Sustainability and several best paper and poster awards in national and international conferences/workshops. He published more than 30 peer-reviewed journal papers, 10 conference papers and 5 book chapters.

Title of the Talk: Effects of Aromatics in Fuel on Emissions

An integrated fuel formulation approach is proposed for viable and cleaner formulated fuel blends with optimised fuel contents. Particulate matters and NOx emissions are the major pollutants from diesel combustion that need to be addressed simultaneously. The prolonged exposure to both emissions has detrimental effects. Diesel is a mixture of alkanes (n-alkanes, iso-alkanes and cyclo alkanes) and aromatics (monocyclic and polycyclic). The optimisation of the fuel components based on their emission formation tendencies is a vital approach to reducing these emissions. Aromatics have tendencies of higher particulate matter emission formation during combustion. It is suggested to reduce the aromatic contents in the fuel to lower the particulate matter emissions. However, the removal of all the aromatic content from the fuel reduces fuel propensity. Hence, the fuel has negative impacts on seals and other engine parts. The talk provides comprehensive knowledge on the range of aromatics that need to be removed from the fuel during production processes to lower engine emissions without compromising engine performance and compatibility. The research on aromatics has great significance for future fuel developments.

Session A3: Energy and Exergy

Chairperson:
Prof Achintya Mukhopadhyay
Professor
Mechanical Engineering Department
Jadavpur University
Kolkata 700032, India
Email: achintya.mukho@gmail.com

Dr AchintyaMukhopadhyay is a Professor of Mechanical Engineering at Jadavpur University, Kolkata (Calcutta), India. He also served as a Professor of Mechanical Engineering at the Indian Institute of Technology Madras. Dr Mukhopadhyay also held visiting positions at the Technical University of Munich, where he was an Alexander von Humboldt Fellow and the University of Illinois at Chicago. Dr Mukhopadhyay's teaching and research interests include thermodynamics, heat transfer, combustion, multiphase flows and thermal management of energy systems. Dr Mukhopadhyay has over 325 research publications, including over 125 international journal publications. Prof Mukhopadhyay is a Fellow of the West Bengal Academy of Science and Technology and the International Society for Energy, Environment and Sustainability, a recipient of the INSA Teachers Award from the Indian National Science Academy and a life member of the Indian Society of Heat and Mass Transfer and Indian section of the Combustion Institute.

A3 - Keynote Speaker:

Dr P. A. Lakshminarayanan
Advisor
Simpson Engines
Chennai 600002, Tamil Nadu, India
Email: lakshminarayananloganayagi@gmail.com

Dr P. A. Lakshminarayanan is currently an Advisor to Simpson Engines, Chennai. He developed models for heat release and emissions for diesel engines based on the study of fuel-air mixing at the wall in turbulent sprays with multiple injections. He also studied the wear of liners having a general surface texture and tribology of valves, cams, pistons, and rings. He is a fellow of SAE international and INAE. He received the Arch T. Colwell award (1984) from SAE international and AVL awards for conference papers (2005, 2008, and 2010). He has authored 45 peer-reviewed international journals and conference papers with nine patents to his credit.

Title of the Talk: Energy Storage Methods

A Solar Power Plant produces more energy than is needed during the daytime when the sun is shining and nothing at night. Also, in temperate zones, winters have long nights, and other renewable energy sources like windmills suffer from similar blight. To effectively use energy, storage methods are of paramount importance. Energy storage methods using electrochemical, compressed air, kinetic or potential energy compete with Li-ion battery in cost and value since weight is not a consideration in this application.

The most common electrochemical method is the scalable Redox Flow battery using vanadium ions. Alternative electrochemistry that is more economical and energy-intensive is in the laboratory waiting for commercialisation. Compressed Air Energy Storage is a practical method of storing energy as the pressure of compressed air in salt caverns underground. The heat of compression up to 500 °C and cooling during expansion in turbines running according to the Brayton cycle makes huge installations attractive. Using gravity is a very popular option exercised as pumped hydroelectric storage (PHS), where water is pumped up in elevation during times of low demand and flows back down during times of high demand. Lifting weights just over heights is interesting, and many prototypes or full-scale plants exist. Apart from special electronics, AI and software would be necessary for all the activities.

A3 - Invited Speaker 1:
Dr Ramadhas Arumugam Sakunthalai
Chief Manager
Indian Oil R&D Centre, India
Email: asramadhas@yahoo.com

Dr A.S. Ramadhas has been working at the Indian Oil R&D Centre since 2005 and currently holds the position of Chief Research Manager in the Automotive Research Department, Indian Oil Corporation Ltd R&D Centre, India. He has 20 + years of experience in the field of conventional & alternative fuels, fuel additives and emissions research. He received his PhD in Mechanical Engineering from the National Institute of Technology Calicut in 2008. He was awarded Marie Curie Fellowship from the European Commission for his post-doctoral research at the University of Birmingham, UK, during the year 2013-14. He authored/ co-authored 50+ technical papers in peer-reviewed international journals and conferences and 2 patents. He also edited a book on Alternative Fuels for Transportation published by Taylor & Francis, USA

Title of the Talk: Fuel Economy through Fuels and Lubricants

A3 - Invited Speaker 2:
Mr Ayush Pant
Senior Engineer
HV battery DVP&R
FEV India Pvt. Ltd.
Email: Pant@fev.com

Mr Ayush Pant has done his bachelor's in mechanical engineering from a state university in Rajasthan. He started his career with FEV as a Graduate engineer trainee (GET) in 2016 & now he is a senior engineer in a department of motor, hybrid & fuel cell powertrains in FEV, working on projects related to methanol as a fuel in conventional ICE. As a part of his ongoing professional journey with FEV, he has worked on and led various projects related to advanced mechanical & functional development of ICE systems/sub-systems

Title of the Talk: Investigations of Emission Reduction Potential of Diesel-Methanol Blends in an HD-Diesel Engine

One of the most promising fuel alternatives for Diesel is Methanol. The fuel is regarded advantageous owing to the easy availability of raw materials for its production, its low cost and its high Oxygen content that has the potential to reduce emissions of smoke, CO and PM. This paper expounds on the engine performance and emission evaluation of blending Methanol with Diesel by using two methods that aid in overcoming phase separation. The experiments were performed in two stages. In the first stage, an investigation of phase stabilization of Methanol in Diesel with suitable additive concentration was performed. In the second stage, performance and emission investigations were conducted on the engine with (i) Diesel fuel (baselined data), (ii) Diesel-Methanol blends (using a stirrer), (iii) phase stable Diesel, Methanol, and additive blends. All performance and emission tests were conducted on a Genset engine. Using the Diesel-methanol blend without additives, SFC, CO, smoke & PM improved, while NOx increased. However, with the use of an additive, PM reduction was superior to the Diesel-Methanol blend without additive, but at the cost of deteriorated SFC, NOx, CO and HC. It was concluded that Methanol blending in Diesel without using an additive is promising.

A3 - Invited Speaker 3:

Dr Saket Verma
Assistant Professor
Department of Mechanical Engineering,
Birla Institute of Technology and Science, Pilani
Pilani 333031, Rajasthan, India
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Dr Saket Verma is an Assistant Professor in the department of Mechanical Engineering at Birla Institute of Technology and Science (BITS), Pilani, Pilani Campus, India. Before joining BITS Pilani, he received his PhD from the Indian Institute of Technology Delhi (IIT Delhi), India, in 2019 with a CSIR research fellowship. He holds a master's degree (in Energy Studies) from IIT Delhi, India, in 2014 with an MHRD fellowship. He recently received the DST SIRE award to visit and collaborate with NREL, USA. He has worked extensively on hydrogen energy, especially on developing hydrogen-fueled IC engines and their application for vehicular purposes. His contribution to the industry-academia collaborative research project titled "Demonstration and field trials of hydrogen-fuelled three-wheelers in New Delhi", partnered with IIT Delhi, Mahindra & Mahindra, and Air Products, has been well praised. In addition, he has worked on modelling and optimising hydrogen-based hybrid energy systems, including Fuel cell, Metal hydrides, Photovoltaic cells, electrolyzers and batteries. He has published several high-quality research papers in reputed international journals in the area of alternative fuels, unconventional engines and hydrogen energy

Title of the Talk: Comparative Exergy Analysis for the Utilization of Alternative Fuels in Dual Fuel Engines

Gaseous alternative fuels offer many inherent advantages over conventional fuels. They can provide various performance and emission benefits when utilized in a diesel engine in dual fuel (DF) mode. From India's perspective, three important fuels - biogas, CNG, and hydrogen- have been selected to present a comparison. Furthermore, the conventional approach for performance evaluation of internal combustion (IC) engines is based on energy analysis, i.e. the law of conservation as envisaged by the first law of thermodynamics, which does not account for the quality of energy. Therefore, the exergy analysis approach based on the second law of thermodynamics is being used to account for the quality of energy. Using exergy analysis, irreversibilities in various processes are evaluated, which indicates the losses and can be used to improve these processes. It is shown that maximum diesel substitution is considerably affected by the type of main fuel and engine load. However, they are relatively less affected by injection timing (IT) advances. It is also shown that IT that gives the highest performance or lowest emission varies with both the type of main gaseous fuels and engine loads. On the emissions side, hydrocarbon (HC), carbon monoxide (CO) and smoke emissions are found to be reduced with advanced ITs; however, oxides of nitrogen (NOx) emissions are increased.

Session A4: Alternative Transportation Fuels and Materials

Chairperson:
Dr HSN Murthy
Professor and Head
Department of Aerospace Engineering
Indian Institute of Technology, Madras
Chennai 600036, Tamil Nadu
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Prof Murthy Haradanahalli S N is currently the head of the Aerospace Engineering Department at IIT Madras (since December 2019). He joined IIT Madras as faculty in 2004 after his BTech in Aerospace Engineering at IIT Madras (1998), Master (2000), and PhD (2004) in Aeronautics and Astronautics at Purdue University. He has been actively engaged in various projects of national importance. Under his leadership as Head of Aerospace Engineering, the department has grown to a faculty size of about 37. Further, he has encouraged faculty to take up projects that greatly impact making Atmanirbhar Bharath. Consequently, the department is now involved in various projects amounting to 65 crores, a large part of it towards our defence sector. His academic interests are in the field of Aerospace Structures, in general, lightweight structures, including composites.

A4 - Keynote Speaker:

Prof Achintya Mukhopadhyay
Professor
Mechanical Engineering Department
Jadavpur University 700032, Kolkata, India
Email: achintya.mukho@gmail.com

Dr Achintya Mukhopadhyay is a Professor of Mechanical Engineering at Jadavpur University, Kolkata (Calcutta), India. He also served as a Professor of Mechanical Engineering at the Indian Institute of Technology Madras. Dr Mukhopadhyay also held visiting positions at the Technical University of Munich, where he was an Alexander von Humboldt Fellow and the University of Illinois at Chicago. Dr Mukhopadhyay's teaching and research interests include thermodynamics, heat transfer, combustion, multiphase flows and thermal management of energy systems. Dr Mukhopadhyay has over 325 research publications, including over 125 international journal publications. Prof Mukhopadhyay is a Fellow of the West Bengal Academy of Science and Technology and the International Society for Energy, Environment and Sustainability, a recipient of the INSA Teachers Award from the Indian National Science Academy and a life member of the Indian Society of Heat and Mass Transfer and Indian section of the Combustion Institute.

Title of the Talk: Active and Passive Techniques for Mitigation of Thermal Runaway in Lithium-Ion Batteries

With increasing concerns about global warming caused by the combustion of fossil fuels, electric and hybrid vehicles are becoming increasingly popular. However, the safety of batteries is a major cause of concern. One of the major causes of accidents is a thermal runaway, caused by various factors like mechanical damage, electrical short circuit or overcharging or overheating of cells. Excessive heat generation due to the uncontrolled occurrence of electrochemical reactions leads to a sharp increase in the temperature of the battery and can even cause a fire hazard. To prevent thermal runaway, adequate battery cooling must be ensured to prevent overheating. In this presentation, some of the recent novel active and passive techniques for the prevention of thermal runaways, like using water mist for air precooling and using phase change materials and their impacts on delaying or preventing thermal runaways, will be discussed.

A4 - Invited Speaker 1:

Prof Dilip Sharma
Professor (HAG)
Department of Mechanical Engineering
Malaviya National Institute of Technology Jaipur
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Email: dsharma.mech@mnit.ac.in

Prof Dilip Sharma is a Mechanical Engineering Graduate (1988) from MNIT Jaipur. After working with CIMMCO Ltd, Bharatpur, for a short while, he joined Roorkee University for Post-Graduation in Thermal Engineering and was awarded with University Medal. Dr Sharma joined MNIT Jaipur in 1992 and is presently working as Professor (HAG) in Mechanical Engineering Department at MNIT Jaipur. He has supervised 14 PhD scholars in the field of Alternate Sources of energy. He published more than 150 research papers, 15 books, and 07 book chapters and filed 07 patents (4 Awarded). Dr Sharma has completed 07 major R&D projects and 41 consultancy projects. Dr Sharma has taken various assignments at MNIT, Jaipur, such as Dean (SW), Head (Mech. Eng. Dept.), Coordinator Institute Security, Coordinator Transportation, Coordinator Central Workshop, Vice President Games and Sports, In-charge of Institute Guest house, etc.

Title of the Talk: Feasibility of HHO Fuelled CI Engines

In the current study, feasibility of HHO fuelling in C.I. engine has been investigated under dual fuel mode. HHO gas generator was used to supply three different flow rates of HHO (0.25, 0.5, and 0.75 lpm) along with diesel for the experimental work on a modified constant speed C.I. engine. Significant improvement of 6.5% in brake thermal efficiency was obtained with 0.75 lpm HHO flow rate at 80% load. However, a slight increment in heat transfer losses and energy in exhaust gas were observed by 6.29% and 8.55%, respectively, at the optimized condition. The work availability, exhaust gas, and heat transfer exergy were increased by 6.54%, 5.69%, and 6.36% (0.75 lpm and 80% load), respectively due to the higher diffusivity of hydrogen and faster oxidation of fuel species within the cylinder. A significant reduction in emission parameters was obtained in carbon monoxide, unburnt hydrocarbon, and smoke emission as 53%, 62%, and 49%, respectively. High pressure and temperature within the cylinder improve the rate of oxidation of fuel species, which results in decreased HC, CO, and smoke emission. Furthermore, high temperature increases the NOx emission by 35%. Overall, it can be concluded the HHO can be used as a prominent alternative fuel with increased exergy and lower emissions.

A4 - Invited Speaker 2:
Dr Prakrati Sethi
Chief India Representative for Methanol Institute
Methanol Institute, Delhi, India
Email: isthakur@hotmail.com, isthakur@ggn.amity.edu

Dr Prakriti Sethi is the Chief India Representative for Methanol Institute (MI) - a globally integrated trade association representing the world's leading methanol producers, distributors, and technology companies. Bringing aboard a plethora of fresh and innovative ideas and hands-on experience in public policy, Prakriti is spearheading operations in India to bolster Methanol Institute's government relations efforts and network in key markets around the world. She has contributed to the preparation of the UNESCO Small Island Developing States (SIDS) Plan 2016–2021 and supported the UNESCO Secretariat as part of the UNFCCC's COP22 delegation.

Title of the Talk: Methanol; The future-proof fuel

Methanol is a flexible, cost-effective alternative transportation fuel due to its efficient combustion, simplicity of distribution, and global availability. It is utilized in gasoline blends all over the world in low (3-5%), mid (15-30%), and high (50-100%) volume percentages, as well as a diesel alternative in heavy-duty vehicles (HDVs). Methanol's high-octane level can enhance the performance of vehicles, and its clean-burning properties allow it to offer immediate emission reductions when combusted in Internal Combustion Engines (ICEs). Methanol will help to lower GHG emissions and improve air quality in the country, thereby enhancing the overall health and well-being of the citizens. In the maritime industry, the combustion of methanol on ocean-going vessels complies with the International Maritime Organization (IMO) 2020 regulations by providing a significant reduction in the emission of sulphur oxides (SOx), nitrogen oxides (NOx), and particulate matter. Methanol produced from renewable feedstocks reduces CO2 by up to 95% and NOx by up to 80% and eliminates SOx and PM emissions, thereby providing a pathway to the shipping industry to lower GHG emissions. Methanol requires relatively few modifications to existing bunkering infrastructure as it is liquid at ambient temperature and pressure like conventional bunker fuels. Methanol is strategic to India's efforts to be more self-sustaining and contributes to the spirit of Atmanirbhar Bharat with the development of a new domestic industry that will create more economic opportunities within the country. It will support the government in achieving a future energy landscape that is self-sufficient and sustainable for India.

A4 - Invited Speaker 3:

Prof Shailendra Sinha
Professor
Department of Mechanical Engineering
Institute of Engineering & Technology, Lucknow
Email: shailendra.sinha@ietlucknow.ac.in

Dr Shailendra Sinha is presently working as Professor, Mechanical Engineering and holding Dean's (P.G. & R) portfolio at IET Lucknow. He completed his BTech in Mechanical Engineering in 1989 from KNIT Sultanpur, M.E. in 1992 from the University of Roorkee, presently known as IIT Roorkee, and PhD in 2008 from IIT Kanpur. He served the industry from 1993-1996 in various positions and then joined IET Lucknow as Lecturer in Mechanical Engineering in 1996 and became Professor in 2012 at IET Lucknow. His Area of interest is I.C. Engine, Fuels, Energy, vehicle emissions, combined power cycles etc. He guided several MTech and PhD students at IET Lucknow and Dr APJAKTU, Lucknow. He published many papers in International and National Journals, conferences etc. He has worked in many administrative capacities like additional COE, Prof I/c Training & Placement, Head of the department etc., at IET Lucknow, UP state engineering Entrance examination, various committees of Govt of UP and Associate Dean at AKTU Lucknow.

Effect of Nano particles as additives in biodiesel in CI engine

Energy plays a very important role in our lives. Transportation by cars and trucks radically changed the face of our country over the previous years. The sharp increase in petroleum prices, experiences with tighter supply, and international instability have renewed concern about our dependence on petroleum imports. Despite recent discoveries and accelerated extraction, India imports more than 80% of crude oil to meet its energy requirement. Emerging markets face two significant challenges, exhaustion of fossil fuels resources and environmental degradation. The push to develop alternative fuels, although driven by energy security concerns, has been aided by concerns over the environment. The alternative fuels that are being actively explored: are methanol; ethanol; compressed and liquefied natural gas; Electric and hybrid vehicles; biodiesel; and hydrogen fuel cells. Factors such as cost, fuel distribution, emissions and energy storage are just some of the considerations in phasing alternative fuel. Biodiesel is a fuel made by chemically reacting alcohol with vegetable oils or fats. It is most often used in blends with petroleum diesel and is compatible with and can be used in unmodified diesel engines with the existing fueling infrastructure. Emissions such as hydrocarbons (H.C.), carbon monoxide (C.O.), and particulate matter (PM) are significantly reduced with biodiesel, but some adverse effects such as relatively low cloud and pour points and generally high NOx emissions are reported with biodiesel as a fuel. The addition of nano particles to a diesel-biodiesel blend has emerged as a new promising fuel for achieving the utmost improvement in the performance and reduction of exhaust emission.

A4 - Invited Speaker 4:
Dr Srinibas Karmakar
Associate Professor
Department of Aerospace Engineering
Indian Institute of Technology Kharagpur
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Dr Srinibas Karmakar is working as an Associate Professor in the Dept. of Aerospace Engineering at IIT Kharagpur. He obtained B.E. in mechanical engineering from Jadavpur University in 2003 and subsequently completed an MTech degree in aerospace engineering with a specialization in propulsion from the Indian Institute of Technology Kanpur in 2005. After obtaining his master's degree, he worked for two years as an Assistant System Engineer at Tata Consultancy Services (TCS). He obtained PhD in mechanical engineering from Louisiana State University in 2012 with a specialization in combustion. Dr Karmakar was one of the recipients of the LSU graduate school enhancement and supplementary awards during his PhD study. Dr Karmakar's broad research area is Aircraft and Rocket Propulsion. His research group at IIT KGP is actively involved in the investigation of droplet and spray combustion involving various alternative aviation fuels, combustion of solid fuels and propellants, and development of green propellants. Research scholars from his group publish their work in reputed combustion and propulsion journals

Title of the Talk: Combustion Characteristics of Alternative Aviation Fuels

There is an increasing demand for conventional fossil fuels as well as alternative fuels due to rapid growth in the aviation sector. Alternative aviation fuels derived from non-conventional sources have the potential to make an important contribution to mitigating the uneven distribution of fossil fuel sources, depletion of fossil fuels, and environmental concerns of aviation-based greenhouse gas emissions. However, all alternative fuels cannot be directly used in aviation gas turbine engines. Since the physical properties and the composition of alternative jet fuels differ from conventional jet fuel, it requires a thorough understanding of the combustion characteristics of these fuels to assess their performance. It is necessary to conduct fundamental combustion experiments before carrying out any expensive engine-level tests or flight tests with any alternative fuel considered to have the potential to substitute conventional jet fuel. The present talk focuses on the spray and combustion characteristics of potential alternative aviation fuels relative to commercial jet fuel (Jet A-1). Some of the pertinent characteristics observed during the combustion of single droplets comprising multi-component fuels (blends of Jet A-1 and alternative aviation fuels) will also be discussed.

Session A5: Sprays and Atomization

Chairperson:
Dr Srinibas Karmakar
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Dr Srinibas Karmakar is working as an Associate Professor in the Dept. of Aerospace Engineering at IIT Kharagpur. He obtained B.E. in mechanical engineering from Jadavpur University in 2003 and subsequently completed his MTech. Degree in aerospace engineering with a specialization in propulsion from the Indian Institute of Technology Kanpur in 2005. After obtaining his master's degree, he worked for two years as an Assistant System Engineer at Tata Consultancy Services (TCS). He obtained PhD in mechanical engineering from Louisiana State University in 2012 with a specialization in combustion. Dr Karmakar was one of the recipients of the LSU graduate school enhancement and supplementary awards during his PhD study. Dr Karmakar's broad research area is Aircraft and Rocket Propulsion. His research group at IIT Kgp is actively involved in the investigation of droplet and spray combustion involving various alternative aviation fuels, combustion of solid fuels and propellants, and development of green propellants. Research scholars from his group publish their work in reputed combustion and propulsion journals

A5 - Invited Speaker 1:

Dr Yogeshwar Nath Mishra
Department of Physics
University of Gothenburg
SE 41296, Sweden
Email: Yogeshwar.mishra@physics.gu.se

Dr Yogeshwar Nath Mishra is an Indian Swedish born in a rural village of Azamgarh district in Uttar Pradesh, India. Yogeshwar works on laser diagnostics of sprays and combustion. He is a Research Scientist at the University of Gothenburg in Sweden and a Visiting Scientist at NASA-Jet Propulsion Laboratory (JPL), Caltech, USA. He worked full-time as a researcher at NASA-JPL and Caltech from 2019 to 2021. Before this, he worked at the Institute of Engineering Thermodynamics, FAU Erlangen Nuremberg in Germany, and as a Visiting Faculty at the Indian Institute of Technology, Indore. He did his PhD in Engineering from the Division of Combustion Physics, Lund University in Sweden, in early 2018. The same year, he received Sweden's most prestigious postdoc fellowship from the Swedish Research Council. For his outstanding PhD work, he received Petra Award for Young Researchers from the ILASS Europe in 2013 and Aforsk Foundation Scholarship 2015 in Sweden, and he was the invited speaker at the Gordon Research Seminar in Laser-based Combustion Diagnostics 2017, USA. Yogeshwar did his integrated masters in Photonics from the Centre of Excellence in Lasers & Optoelectronic Sciences, CUSAT 2012. He did his bachelor's internship at the University of Texas at Arlington in the USA and his master's thesis work at the University of Gothenburg, Sweden. During his master's, he received the Indian Academy of Sciences Summer Research Fellowship and VSRP from Raman Research Institute and SPIE Author travel grant 2011 for presenting his research articles at the Photonics West 2011 conference in San Francisco, USA. Yogeshwar enjoys playing cricket and table tennis. He likes yoga, music, and travelling around the world.

Title of the Talk: SLIPI-based Techniques for 2D and 3D Imaging of Sprays and Combustion Species

In engine sprays, the laser beam interacts with many droplets leading to multiple light scattering and other imaging challenges. Multiple light scattering effects produce image blur and often hide or obscure the "true" information of the sprays. SLIPI (Structured Laser Illumination Planar Imaging) – based imaging techniques have been used to suppress the multiple light scattering effects in sprays, resulting in spray images with enhanced image contrast. First, I will introduce SLIPI-based techniques for averaged and single-shot imaging. Further, I will present the application of SLIPI for 2D-3D droplet sizing in biofuel sprays, 2D imaging of droplet concentration, and spray temperature. Finally, I will demonstrate the application of SLIPI in combustion diagnostics.

A5 - Invited Speaker 2:

Dr Chaitanya Kumar Rao
Assistant Professor
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Indian Institute of Technology Kanpur
Kanpur 208016, Uttar Pradesh, India
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Dr Chaitanya Kumar Rao is currently an Assistant Professor in the Department of Aerospace Engineering at the Indian Institute of Technology Kanpur. He received his PhD in Aerospace Engineering from IIT Kharagpur. Prior to joining IIT Kanpur, he was a Carl Tryggers postdoctoral fellow in the Department of Physics at the University of Gothenburg and a postdoctoral researcher at the Department of Mechanical Engineering at the Indian Institute of Science, Bangalore. His core research projects focus on understanding liquid atomization phenomena, principally the physics associated with bubble dynamics and droplet breakup. The experimental systems employed by his group range from the combustion of fuel droplets and evaporation of levitated droplets to nanosecond and femtosecond laser-induced bubble generation and liquid fragmentation.

Title of the Talk: Application of Liquid Fuel Atomization for Medical Diagnostics

Liquid fuel atomization is ubiquitous in several applications ranging from medical diagnostics to enhancing and optimizing liquid jet propulsion. In this talk, I will discuss our research on the combustion, evaporation, and atomization of single fuel droplets using distinct experimental techniques and talk through the universality of breakup mechanisms. First, I will briefly talk about the role of biofuels on the breakup characteristics of burning Jet fuel/Diesel blended droplets, and in particular, I will discuss the nucleation, bubble growth, and ligament-mediated atomization associated with the fuel blends. Subsequently, I will talk about the evaporation and atomization mechanisms in multi-component droplets (such as emulsions and polymeric solutions) under acoustic levitation using a tunable continuous laser. Finally, I will talk about how we can accurately control and manipulate the interaction of a pulse laser with a single and arrangement of droplets and potentially explore new breakup pathways in blended droplets. I will elaborate on how the fluid dynamic response (such as drop–drop and shock– drop interactions) of an array of droplets can be regulated and optimally shaped by laser pulse energy and its interplay with the optical density of the liquid target.

A5 - Invited Speaker 3:
Dr Venugopal Arumuru
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Bhubneshwar- 752050, Odisha
Email: venugopal@iitbbs.ac.in

Dr Venugopal Arumuru is presently working as Assistant Professor at the Indian Institute of Technology (IIT) in Bhubaneswar, India. After obtaining his PhD from IIT Bombay in 2014, he joined NUS Singapore as a research associate. He was with GE Measurement and Control India as a Lead Engineer for two years before joining IIT Bhubaneswar in 2016. He has been awarded Young Engineer awards, including INAE Young Engineer Award, the excellence in PhD thesis award, and the teaching excellence Award. His research group, "Applied Fluids Group", is engaged in applied and fundamental research in fluid-structure interaction, Structural Health Monitoring, unsteady aero-hydrodynamics, turbulence and flow control, electronics cooling, and fluid flow metrology. He has authored more than 40 papers in reputed international journals, more than 30 international conference publications, and 8 patents.

Title of the Talk: Pulsed Jets for Flow Control and Mixing

In this talk, I will present two novel configurations of a synthetic jet actuator for flow control and mixing. A coaxial synthetic jet actuator in which two piezo-driven single cavity synthetic jet (SJ) actuators are configured coaxially with a 0° orientation angle. The single cavity SJ actuators have their own oscillating mechanisms that can be controlled independently. The configuration facilitates the independent control of the operating parameters (amplitude, frequency, and phase difference) for both diaphragms. In the second part of the talk, I will discuss phase delay-based steering and the focusing of a jet using a synthetic jet array. I will present some experimental and numerical results highlighting these two devices' capabilities and distinct features.

A5 - Invited Speaker 4:

Dr Rajesh Kumar Prasad
Associate Professor & Coordinator
Mechanical Engineering
University Institute of Engineering & Technology
CSJM University Kanpur
Email: rajesh@csjmu.ac.in

Dr Rajesh Kumar Prasad is currently working as an Associate Professor of Mechanical Engineering at UIET, CSJM University Kanpur. Dr Prasad has done a Doctor of Philosophy from the Mechanical Engineering Department (Engine Research Laboratory) of IIT Kanpur in 2019. His areas of expertise/interest include the design and development of Laser fired Engines fuelled with Gaseous fuels (CNG, hydrogen, Hythane) and their evaluation of combustion, performance and emissions. Another area of interest is Laser diagnostic techniques: Schlieren/ Shadowgraphys. He has published 9 peer-reviewed journal papers, 3 book chapters and 2 international conference papers.

Title of the Talk: Development of Laser Ignited Hydrogen Fuelled Supercharged Engine

In this study, a prototype laser-ignited single-cylinder supercharged engine (capacity 948cc) was developed and fuelled with H2. The supercharged engine was operated at 1500 rpm. This experimental study aims to assess the challenges and benefits of using H2 as fuel and solid-state laser as the source of ignition in a prototype IC engine. Experiments in this study were conducted in two phases. In the first phase of experiments, a constant volume combustion chamber (CVCC) was used for the study of fundamental aspects of LI and flame kernel growth of the H2 –air mixture. In the second phase of experiments, engine experiments were performed to compare LI vs. SI systems for H2 for their combustion, performance and emissions characteristics. It was observed that the H2 engine operated efficiently beyond λ= 2.0 in supercharged conditions. Using LI, the peak cylinder pressure and NOx emissions (> 300 ppm) were reduced with supercharging. Brake thermal efficiency (BTE) increased with increasing brake mean effective pressure (BMEP) and was higher for LI compared to SI at 3.987 bar BMEP. Lower exhaust gas temperature (EGT) and brake-specific fuel consumption (BSFC) were observed for LI with supercharging (LI_SC) compared to SI with naturally aspirated (SI_NA) at stoichiometric conditions.

Session A6: Modelling and Simulation

Chairperson:
Prof Dilip Sharma
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Prof Dilip Sharma is a Mechanical Engineering Graduate (1988) from MNIT Jaipur. After working with CIMMCO Ltd, Bharatpur, for a short while, he joined Roorkee University for Post-Graduation in Thermal Engineering and was awarded with University Medal. Dr Sharma joined MNIT Jaipur in 1992 and is presently working as Professor (HAG) in Mechanical Engineering Department at MNIT Jaipur. He has supervised 14 PhD scholars in the field of Alternate Sources of energy. He published more than 150 research papers, 15 books, and 07 book chapters and filed 07 patents (4 Awarded). Dr Sharma has completed 07 major R&D projects and 41 consultancy projects. Dr Sharma has taken various assignments at MNIT, Jaipur, such as Dean (SW), Head (Mech. Eng. Dept.), Coordinator Institute Security, Coordinator Transportation, Coordinator Central Workshop, Vice President Games and Sports, In-charge of Institute Guest house, etc.

A6 - Keynote Speaker:

Prof Raja Banerjee
Professor
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IIT Hyderabad
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Prof Raja Banerjee is a faculty in the Department of Mechanical and Aerospace Engineering of IIT Hyderabad. He obtained his Bachelor's degree in Mechanical Engineering from the University of Rewa (1995), Master's degree in Cryogenic Engineering from IIT Kharagpur (1998) and PhD in Mechanical Engineering from the University of Missouri Rolla (2001). Following his PhD, he worked as a Senior Research Engineer in Mark IV Automotive Inc., USA, for several years before returning to India and joining IIT Hyderabad.

Title of the Talk: Combustion of Ammonia as a Carbon-Neutral Fuel

Decarbonization of the automotive, energy and other heavy engineering sectors is needed to meet the country's obligation to reduce CO2 emissions. Though several pathways are being explored to achieve the above objective, the combustion of hydrogen as a carbon-neutral fuel is being actively explored. Though hydrogen has excellent combustion characteristics, it also has its own set of challenges like low gravimetric energy density, storage, transportation and safety-related issues. Some of these challenges are offset by the direct combustion of ammonia. We have recently started working in ammonia-related combustion at IIT Hyderabad. A brief review of the opportunities and challenges with ammonia as a carbon-neutral fuel will be presented. Subsequently, a more detailed description of the research activities being performed in our group will be presented. Our work centres around the application of ammonia as an alternative for CI engines. The primary focus of our work is to develop a turbulent combustion CFD model that will be used to simulate in-cylinder CI engine combustion operating under dual fuel mode. As the first step in that direction, a skeletal 122 species and 616 reaction combustion kinetics model has been developed to simulate the combustion of the C12H26/CH4/NH3/H2 blend. This combustion model aims to investigate the effect of partially replacing natural gas with ammonia in CNG-diesel dual-fuel CI engines. This kinetics model was validated against ignition delay and laminar flame speed data reported in the open literature. Lastly, the effect of hydrogen in small quantities in the initial mixture blend on these parameters was also investigated. Complimentary engine bench tests are being planned in the near future to validate the CFD combustion.

A6 - Invited Speaker 1:

Prof Chetankumar Patel
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Dr Chetankumar Patel is currently working as an Assistant Professor in Mechanical Engineering Department at IIT Patna. He did his PhD from IIT Kanpur in 2016. He obtained his bachelor's and master's degree in Mechanical engineering from L.D. College of Engineering, Ahmedabad, in 2003 and 2007, respectively. He worked as a senior project engineer in the Engine Research Laboratory, IIT Kanpur, on the topic "Investigation of combustion and soot process in a compression ignition engine fuelled with biodiesel (2016-2018) (DST funded Indo-Korean project). He worked as a Post-doctoral Research Fellow in PRISME Laboratory at the University of Orleans, France, on the topic "Soot investigation by Diffused back illumination (DBI) technique on New one-shot engine (NOSE) for Engine Combustion Network (ECN) Spray A condition" (2018-2019). His primary research areas include microscopic and macroscopic spray investigations, in-cylinder spray and combustion visualization, in-cylinder combustion investigations, emissions, noise and vibrations investigations and Alternative fuels. He has 17 peer-reviewed publications (9 as a first author) in high-impact SCI journals and six peer-reviewed international conference publications (4 indexed in Scopus). He has six years of teaching experience in the Mechanical engineering Department.

Title of the Talk: Effect of exhaust gas recirculation composition on soot in ECN spray A conditions

Due to its strong impact on health, particulate matter is increasingly regulated by government vehicle emission standards. As one of the sources of particulate matter is the soot produced by internal combustion engines, improving advanced combustion modes to reduce it remains a challenge. There is still some lack of understanding about the formation and oxidation processes of soot, especially in "realistic" conditions, such as, for example, at high temperature and pressure conditions with or without the presence of exhaust gases. This study aims to investigate soot formation in the case of n-Dodecane spray flames at conventional Diesel engine conditions generated in the New One-Shot Engine by using diffused back-illumination extinction with different CO2 and water vapour contents. It was found that CO2 addition reduces the soot mass fraction if its volumetric concentration in ambient mixtures is at least 4.5%, while 19 1% of water is sufficient to reduce the soot mass fraction significantly. The impact of the ambient mixture obtained in ECN spray A pre-burn vessel was also investigated to assess the accuracy against soot measurements available in the literature.

A6 - Invited Speaker 2:

Dr Rajesh Mishra
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Dr Rajesh Mishra works at the Czech University of Life Sciences in Prague, Czech Republic. His research areas are nanomaterials and nano-textiles, textile structural composites, green composites, nanocomposites, biomechanical engineering of fibrous structures, thermo-mechanical characterization of materials etc. He has about 200 publications in international journals and about 300 presentations at international conferences. His teaching and research activities include subjects based on nanotechnology, biomaterials, structural mechanics of fibrous structures in general and 3D woven structures in particular, textile quality characterization, engineering of textile structures, biomechanics of apparel textiles etc. He is responsible for international students' education and research at the engineering faculty. To date, he has successfully guided 7 PhD candidates leading to the award of the title. The graduates are highly placed in academia and industry around the world. At present, a few more are continuing research in leading areas of technology. He has educational and research cooperation around the globe

Title of the Talk: Numerical Modeling and Experimental Analysis of Light-weight Composite Structures for Automotive Applications

The paper explains numerical/computational models using Finite Element Analysis with the input of fibre and matrix properties to predict the composite component's mechanical performance. Natural/blended fibre-based composite components are developed to be used in the interior/exterior of automobiles. Models are validated with experimental results and determination of model accuracy and error of prediction. Reduction in the weight of the transport vehicle components is achieved by replacing the conventional heavier components with polymer-based composites whilst maintaining other useful properties. Resistance to impact-induced delamination damage is critical to the safety of composite structures, and the extent of delamination depends on the delamination toughness. A 3D hybrid technique was used for polymer matrix composites to resist in-situ delamination cracks. This hybrid fibre composite exhibits a superior performance-to-weight ratio necessary for automotive components.

A6 - Invited Speaker 3:

Prof Anirudha Ambekar
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Dr Anirudha Ambekar received his doctoral and Master's degree from IIT Bombay in 2015 and 2007, respectively. His doctoral research was on the topic of combustion characteristics of liquid monopropellants. He was a Post-doctoral Research Fellow at Seoul National University from 2015 to 2018, where he worked on various solid composite energetic materials. He has been working as an Assistant Professor in the School of Mechanical Sciences at IIT Goa since May 2018. He typically works on application-oriented projects involving experimental combustion diagnostics. His research interests include experimental combustion, propellant characterization, chemical kinetics and aging of energetic materials, pollution reduction and optimization of energy conversion systems, alternative fuels, and sustainable combustion.

Title of the Talk: Alternative Fuels for Aviation

Across the globe, the aviation industry is a rapidly growing industry that is also a significant source of greenhouse gas (GHG) emissions connected with global climate change. Domestically, our aviation fuel consumption over the fiscal year 21-22 was about 5 million metric tonnes, which is expected to increase by 5.5% in the next year, with further growth in the future. The growth in the Indian aviation sector will be accelerated further by government initiatives such as the Ude Desh Ka Aam Nagrik (UDAN) and Nextgen Airports for Bharat Nirman (NABH).

The increase in the consumption of conventional aviation turbine fuel (ATF) and corresponding CO2 emissions will have to be avoided or offset by a carbon sink. The CO2 emissions may be completely avoided through electrification or using hydrogen as an aircraft fuel. Another alternative is the aviation-grade biofuels termed sustainable aviation fuel (SAF), which offer significant operational ease and technological maturity. SAFs possess thermochemical properties similar to ATF and are derived from renewable feedstock. They often have energy density comparable to ATF while being sulphur free. SAFs have the potential to play a key role in decarbonizing air travel in the near future. A brief review of the state of the art is presented.

Session A7: Engine Emissions and Control

Chairperson:
Prof Amitava Datta
Professor
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Prof Amitava Datta is a professor in the Department of Power Engineering at Jadavpur University. He completed his graduate education in Mechanical Engineering from Jadavpur University and his PhD from IIT Kharagpur. Dr Datta is a recipient of the Alexander von Humboldt Fellowship In Germany in the year 2000 and worked at Lehrstuehl fuer Technische Thermodynamik at the University of Erlangen Nuernberg. His research interests include combustion, atomization, energy, thermodynamic modelling and the application of CFD in reacting flows, microfluidics and biological flows. Dr Datta is an active researcher and has completed guidance of 17 PhD theses and several Masters theses. He has published more than a hundred peer-reviewed research papers in various International Journals and edited volumes and also presented and published several papers at National and International conferences. He has authored one text book on combustion. Dr Datta has undertaken several sponsored research projects and has received awards and recognitions from different national and international bodies. He is a Fellow of the Indian National Academy of Engineering, West Bengal Academy of Science and Technology and International Society of Energy, Environment and Sustainability. He also receives the Shikhsharatna (Outstanding Teacher) award from the Government of West Bengal. He has held various administrative positions at his University and is presently the Director of the Internal Quality Assurance Cell.

A7 - Keynote Speaker:
Dr HSN Murthy
Professor and Head
Department of Aerospace Engineering
Indian Institute of Technology, Madras
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Prof Murthy Haradanahalli S N is currently the head of the Aerospace Engineering Department at IIT Madras (since December 2019). He joined IIT Madras as faculty in 2004 after his BTech in Aerospace Engineering at IIT Madras (1998), Master (2000), and PhD (2004) in Aeronautics and Astronautics at Purdue University. He has been actively engaged in various projects of national importance. Under his leadership as Head of Aerospace Engineering, the department has grown to a faculty size of about 37. Further, he has encouraged faculty to take up projects that greatly impact making Atmanirbhar Bharath. Consequently, the department is now involved in various projects amounting to 65 crores, a large part of it towards our defence sector. His academic interests are in the field of Aerospace Structures, in general, lightweight structures, including composites.

Title of the talk: Insitu-hydrogen generation from aluminium water combustion

Aluminum-water combustion can be employed to generate hydrogen that can be used for power generation while simultaneously synthesizing alumina, whose industrial applications include use as abrasives, development of engineered ceramics etc. The exhaust gases from aluminium-water combustion employed in this study comprise 70% (by mole basis) of hydrogen. When burnt with excess air at an Air to Fuel ratio of about 16:1, this hydrogen gas produced a large mass flow rate of gases at temperatures around 1873 K. These gases could be further used to run a turbine for generating power. The possible power generation for this method is estimated to be 6.37 MW per kg of aluminium. The purity and the fraction of alumina in the residue of aluminium-water combustion were mainly influenced by the oxidizer-to-fuel (O/F) ratio. The stoichiometric O/F ratio of 1 resulted in 94% pure alumina at all pressures, which was confirmed by X-Ray diffraction (XRD) analysis

A7 - Invited Speaker 1:

Prof Kirti Bhushan Mishra
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Dr Mishra has more than a decade of research experience in the area of combustion, fuels, and fire safety at world-renowned research labs in Germany. He has extensive hands-on experience in measurements and modelling various real-life combustion-related problems. Apart from 21 international patents, 29 journal papers, and 48 conference papers to his credit, he also carries substantial experience in managing national and international projects. He is the founder of the TRAG (Technological Risk Research and Analysis Group) lab at IIT Roorkee, where small-scale combustion tests on various alternative fuels can be performed for initial screening. His areas of interest are alternative fuels, combustion, emission control, fire, explosion, and CFD modelling.

Title of the Talk: Implication in measurement techniques for vehicular emission

This presentation highlights the implications of different methods used to measure vehicular emissions. Among many NDIR (Non-Dispersive Infrared), FID (Flame Ionization Detector) and CLD (Chemilumiscence Detectors) are the most commonly used sensors for the measurement of CO2, CO, unburned hydrocarbons and NOx from Internal combustion engines. However, these techniques have several limitations regarding the number of compounds they can handle at a time under different environments and compactness. With the help of FTIR (Fourier Transform Infrared) based analyzers, simultaneous measurements of multiple compounds present in a hot and wet environment, such as one in engine exhausts, are possible. To verify this, a measurement campaign was undertaken for various vehicles present on-road such as a 110 cc motorbike, a 1500 cc car, a 2700 cc tractor and a 2956 cc engine of a truck. The vehicles are so selected that emission measurements for various engines running on-road can be obtained for proper distinction. The selected engines were tested under idle, accelerated and different load conditions. It has been observed that apart from the common emissions, the concentration of benzene, m-xylene, hydrogen cyanide, xylene, acetaldehyde, toluene, styrene and ethylbenzene and ethanol. The proportionate rise in all components was found for different loads and speeds for all the engines except the car. A detailed comparative analysis of the results with respect to existing vehicular emission norms is currently underway. In order to reduce the emission of non-obvious and harmful emissions, a strategic plan for selecting the proper combustion mode is required to be developed jointly by the industry and academia.

Session A8: Coal & Biomass Gasification

Chairperson:
Prof Raja Banerjee
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Prof Raja Banerjee is a faculty in the Department of Mechanical and Aerospace Engineering of IIT Hyderabad. He obtained his Bachelor's degree in Mechanical Engineering from the University of Rewa (1995), Master's degree in Cryogenic Engineering from IIT Kharagpur (1998) and PhD in Mechanical Engineering from the University of Missouri Rolla (2001). Following his PhD, he worked as a Senior Research Engineer in Mark IV Automotive Inc., USA, for several years before returning to India and joining IIT Hyderabad.

A8 - Invited Speaker 1:

Prof Jeewan V Tirkey
Associate Professor
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Dr Jeewan V Tirkey is presently working as Associate Professor, in the Department of Mechanical Engineering, Indian Institute of Technology (BHU) Varanasi. He graduated in Mechanical Engineering from Govt. Engineering College (GGU) Bilaspur in 1998. He did his Ph.D. at Indian Institute of Technology (BHU) Varanasi (Formerly IT-BHU) in 2008 in the research area of Internal-combustion Engine. Dr Tirkey has published more than 50 peer reviewed International & National journal papers and 19 conference papers. Dr Tirkey has guided more than 30 UG projects and 35 Master's theses. In his supervision, 3 Ph.D. scholar has completed their thesis and 3 are working now. He has conducted several national and international conferences and short-term courses for teachers and students at National Level. He was the Member of Energy Management Sectional Committee, MED-39, Bureau of Indian Standard (New Delhi), and Member of Executive Council, Rajiv Gandhi Proudyogiki Vishwavidyalaya RGPV, Bhopal (MP). He has worked as a Team Averera of IIT (BHU), participating in Eco-Shell Marathon Asia, in Singapore, from 19 March 2017, and Achieved-energy efficiency of prototype battery Electric vehicle: 131.8 km/kWh. He has also worked as a consultant to many industries for industrial problems and has very extensive administrative experience.

Title of the Talk: Gasification of waste biomass and application to IC engine

A developing country like India needs energy demand to keep its pace of growth to become a developed nation. Moreover, the population with pollution is an abysmal difficulty for the energy and environmental sustainability of the current society. India has different types of waste produced from agricultural, industrial, and anthropogenic activities. Thus, to meet the constraints of energy and the environment, a comprehensive technology must be developed. These constraints of energy and environment can only be countered by utilizing waste biomass to fulfil the energy crises and economy and to provide a healthy environment. Cutting-edge, innovative and economic gasification techniques with high efficiencies are a prerequisite for developing this technology. Gasification of biomass can able to generate electricity without exploiting natural resources and can solve the problem of rural electrification through the decentralised mode of power generation. There is a lack of work in producing high-quality producer gas through waste biomass and its implementation in the gasifier, advanced reactor system which can reduce tar content to a minimal level and mixing system to integrate ICE to generate electric power. This talk will completely base on the gasification of waste biomass by integrating with IC engines for decentralized power generation.

A8 - Invited Speaker 2:

Dr Tushar Sharma
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Rajiv Gandhi Institute of Petroleum Technology
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Dr Tushar Sharma is an Associate Professor (Petroleum Engineering) at Rajiv Gandhi Institute of Petroleum Technology (RGIPT), Jais (an institute of national importance). He received his PhD in EOR (Petroleum Engineering) from the Indian Institute of Technology (IIT) Madras. He has also earned his parallel research experience in Thermal-OR from the University of Alberta, Canada. Presently, Dr Sharma has 7 years of teaching and research experience, and so far, he has completed two funded sponsored research projects from the Department of Science and Technology (DST) India and RGIPT. His research interests are in the areas of rock/fluid interaction, CO2 utilization, development of cement slurry, wettability alteration, and EOR. He has published over 60 technical articles in peer-reviewed International journals and the same number of manuscripts in International conferences of repute. He has reviewed several research papers and guided several undergraduate and postgraduate dissertations. Dr Sharma is also a member of the Society of Petroleum Engineers (SPE).

Title of the Talk: Utilisation of carbon dioxide for oilfield applications

CO_2 utilization for oilfield applications is affected by viscous fingering, which leads to premature breakthroughs without showing any appreciable impact on oil recovery and storage. Therefore, CO2 is often injected with a highly viscous fluid such as a nanofluid to control these issues. Nanofluid not only increases the specific area of CO2 [via interfacial tension (IFT) reduction] but also increases CO2 absorption capacity through the formation of foam. Thus, in this study, polymer-based single-step silica nanofluids of varying concentrations were utilized in CO2 absorption, IFT reduction of crude oil, and fossil fuel displacement. CO2 absorption experiments showed that pressure and NP concentration positively influenced absorption while increasing temperature negatively impacted CO2 absorption. In addition, the formation of a Pickering foam made CO2 retain inside for over ten days (an increase of 67%), higher than six days of simple nanofluid. Pickering CO2 foam of nanofluids was also envisaged for IFT reduction of crude oil to identify the role of these nanofluids in crude mobilization from the porous reservoir. The CO2 absorption capacity of nanofluid exhibited an inverse relationship with the IFT value of crude oil. Finally, displacement experiments were conducted, which also support the inclusion of silica nanofluid for reduced water cut and higher fossil fuel recovery from porous media.

A8 - Invited Speaker 3:

Prof Satyajit Gupta
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Dr Satyajit Gupta is an Assistant Professor in the Department of Chemistry at IIT Bhilai. Dr Gupta received PhD from IISc, Bangalore and did his post-doctoral research at the University of Nevada-Reno (USA) and Weizmann Institute of Science (Israel). He also has working experience with several groups abroad (Japan, Germany, Spain, UK and China) in collaborative proposals and projects. Dr Satyajit Gupta's research is in the areas of visible light harvesting materials, functionalized composite materials for solar-cell passivation, oxide-based semiconductors for solar-light driven multifunctional applications, hierarchical inorganic structure development, conducting carbon-based catalyst composites for environmental remediation and halide perovskites for light to electricity conversion. Dr Gupta likes to disseminate his knowledge and experience through teaching, research and mentoring the students. He has published more than 46 articles in peer-reviewed International Journals, published two book chapters, and one granted Indian patent and filed one Indian and one US patent

Title of the Talk: 2G Bioethanol Production from Organic Waste: An Overview of the Pre-Treatment Process and Case Studies

Bioethanol has become a potential alternative to fossil fuels. This reduces greenhouse gas emissions compared to petroleum fuels. Bioethanol can be extracted using edible resources like sugarcane, rice, corn grains, etc. However, the production of bio-ethanol may create issues in food security. On the other hand, non-edible sources such as rice paddy straw containing lignocellulose have attracted attention toward the production of second-generation (2G) ethanol as a bioenergy source for internal combustion (IC) engines. Cellulose and hemicellulose can be effectively used as a source of reducing sugar for the production of ethanol. But, the presence of lignin fibres and silica content in the rice paddy is a major issue in the quantitative production of ethanol. In this talk, I will discuss various acid pre-treatment methodologies and how those methods can help in breaking the lignin fibres. Morphological and FTIR studies indicated complete damage of the silica and lignin layer, resulting in enhanced extraction of sugar into solution when hydrochloric acid was used for pretreatment.

Session B1: Air Pollution Monitoring

Chairperson:
Dr Kirpa Ram
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Dr Kirpa Ram is working as an Assistant Professor at the Institute of Environment and Sustainable Development, Banaras Hindu University, Varanasi-221005, India. He completed his post-doctoral studies at the University of Tokyo, Japan. Before joining Banaras Hindu University, he served as a Scientist at National Environmental Engineering Research Institute (NEERI) and INSPIRE Faculty: IIT Bhubaneswar. Kirpa specializes in atmospheric and aerosol Chemistry. His research interests include Carbonaceous Aerosols with emphasis on Black Carbon, Secondary Aerosols, Optical and Microphysical properties of Aerosols, Aerosol-Cloud Interaction and Climate, Trace Gases and Ozone Measurements, Stratosphere-Troposphere Exchange, Volatile Organic Compounds, Poly-Aromatic Hydrocarbons and Platinum Group Elements, Carbon Dioxide Capture and Sequestration Dr Kirpa ram has authored and co-authored 70+ peer-reviewed scientific papers and presented works at many National and International conferences. These papers have been widely cited, and the author has a total citation of >3000 with an h-index of 30 and an i-10 index of 49. Dr Kirpa Ram's contributions have acclaimed recognition from honourable subject experts worldwide, and his academic career is decorated with several reputed awards and funding. Some of the scientific recognition includes Inspire Faculty award from DST, the President's International Fellowship Initiative (PIFI) award for visiting scientists, the Chinese Academy of Sciences, China, CONNECT Fellowship of Alexander van-Humboldt (AvH) Foundation, Berlin, Germany, Early Career Research Award (ECRA)-2016, Science and Engineering Research Board (SERB), Govt. of India

B1 - Keynote Speaker:
Dr Sayantan Sarkar
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Dr Sayantan Sarkar is an Assistant Professor in the School of Civil and Environmental Engineering, IIT Mandi, specializing in the effects of aerosols on air quality, climate and human health. He has a PhD degree from Jawaharlal Nehru University. He has held postdoctoral research positions at Wadsworth Center, New York State Department of Health, USA, and at the National University of Singapore. Prior to joining IIT Mandi, he worked as an Assistant Professor in the Department of Earth Sciences, IISER-Kolkata. His major research interests include: i) chromophoric composition and climatic effects of aerosol brown carbon in the Indo-Gangetic Plains, the Himalayas, the Arctic, and in indoor biofuel emissions; ii) exposure to size-segregated aerosols in various microenvironments, corresponding respiratory deposition, and potential health effects; and iii) air quality and population health effects from thermal power plants on transboundary scales. He also has interests in source apportionment studies, especially for atmospheric halocarbons and other VOCs, and the reconstruction of pollutant deposition profiles from lake sediments. Dr Sarkar's research is funded by SERB (DST), the Ministry of Earth Sciences, the National Centre for Polar and Ocean Research, and the Swedish Research Council, among others.

Title of the Talk: Field-based Measurements of Brown Carbon for Aerosol

The eastern Indo-Gangetic Plain (IGP) is a receptor location experiencing a mix of fresh and aged aerosol originating from local and regional sources. This talk focuses on field-based measurements of brown carbon (BrC), a significant yet understudied component of aerosol climate forcing, and its constituent humic-like substances (HULIS) from this region, along with their sources, atmospheric processing and radiative impacts. Daytime and nighttime fine-mode aerosol samples collected during 2018-2019 are characterized using a host of spectroscopic techniques: UV-Vis for quantification of absorption coefficients, excitation-emission matrix (EEM) fluorescence coupled with PARAFAC for chromophoric composition, FT-IR for functional group identification, and 1H NMR for source attribution. These are supplemented with concentration-weighted trajectories for assessment of source regions, followed by an estimation of relative radiative forcing. The findings point towards a significant role of regional-scale biomass burning in constraining BrC and HULIS levels and their climate effects in this region.

B1 - Invited Speaker 1:

Dr Arnab Sarkar
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Dr Arnab Sarkar received two Gold Medals in his Master of Mechanical Engineering at Jadavpur University in 2003 for being topper in the department as well as in the faculty of engineering and technology. He was also a DAAD Doctoral Fellow at Ruhr-University Bochum Germany from 2007-09. He along with his colleagues also established Centre for Energy and Resources Development which is a Centre of Excellence under FAST scheme of MHRD. Dr Sarkar's research interests lie on the broad area of fluid mechanics and thermodynamics. At present, he is working on the application of fluid mechanics related to renewable energy harvesting and biomicrofluidics which results publications in highly cited journals such as Biosensors and Bioelectronics, Analyst, Biomicrofluidics, Microchemical Journal, Energy, Renewable Energy, Hydrogen Energy, Journal of Energy Storage, Fuel etc. He has published 29 articles in SCI/SCIE journals and investigated many projects so far as PI with a total budget of approximately 3 crores from various funding agencies such as BRNS, BIS, IDAPT, MHRD, DST, SERB, CST UP etc. He has also published 27 articles in various conference proceedings.

Title of the Talk: Estimation of Wind Energy Potential through Weibull Statistics Integrated with Meso-Micro Scale Coupling Approach

Due to the rapid depletion of fossil fuels and increasing demand for wind energy across the globe, especially in developing countries due to their growing economy, wind farms are being increasingly installed. Though the appropriate assessment of wind energy resources is the need of the hour, it still remains a challenging problem. For estimating wind energy resources wind, a suitable probability distribution should model speed data. During the last decade Weibull model has been proven as the most suitable probability distribution for parent wind speed data modelling, whereas for modelling extreme wind speeds, extreme value limit distributions such as Type I (Gumbel), Type II (Fre'chet) and Type III (Reverse Weibull) distributions have been found as appropriate. Apart from wind speed data modelling, mesoscale meteorological models (MMM) using Numerical Weather Prediction (NWP) tools (with atmospheric data) are used to simulate realistic wind forecasts over several days with a spatial resolution ranging from a continent level to a few hundred-meter scales. The standard approach has been developed to adopt a meso-micro-scale coupled modelling by combining two predictive tools, Weather Research & Forecasting (WRF) and RANS-based microscale modelling, to improve the spatial resolution of the prediction, particularly for complex terrains and specific areas of interest.

B1 - Invited Speaker 2:

Dr Suresh Pandian Elumalai
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Dr Suresh Pandian Elumalai holds a B.Tech degree in Chemical engineering from Arunai Engineering College, University of Madras, Chennai, Tamil Nadu in 2002, M. Tech. Degree in Environmental Engineering from Pondicherry University, Puducherry, India, in 2005 and a PhD from the Indian Institute of Technology, Guwahati, India, in 2011. Since then, serving as an Associate Professor (starting from April 2021) and Assistant Professor (June 2011 to April 2021) in Environmental Science and Engineering at the Department of Environmental Science and Engineering, Indian Institute of Technology (Indian School of Mines, Dhanbad, Jharkhand, India. His major area of research are vehicular emission and dispersion modelling, rainwater analysis for air pollutants reaction, PM exposure dose, urban heat island effects and emission inventory

Title of the Talk: Energy consumption of academic buildings and strategies to reduce the cooling demand

This research work analyzed the impacts of various retrofit scenarios of academic office buildings in reducing cooling demand and CO_2 emissions. We have studied the cooling load demand of two (exam and finance) sections of an admin block of IIT(ISM) Dhanbad. Electricity consumption for space cooling is an essential driver of commercial buildings especially in hot climatic zones making it of prime importance. Design builder as a simulation software helps understand the influence of using different design strategies to reduce the cooling demand. The energy consumed by finance section buildings is considerably more than the exam section because of heat released from a higher number of equipment's usage, higher occupancy rate and major contribution of heat gains from external walls. The cooling demand for the exam section is higher than for the finance section due to a high rate of heat gain from the roof. Applying a polyurethane membrane and bitumen sheet on the roof proves to be the best solution in the exam section. This application reduces the cooling demand by 40.44 % and CO_2 by 31.86 %. The addition of local shading devices over windows resulted in reducing heat gain from solar radiation from 6.35% to 25 %. The other options, such as the implementation of low-emissivity argon-filled glass and the use of reflective coating on external walls, showed minimal reductions in decreasing the cooling demand

Session B2: Air Pollution Control

Chairperson
Prof Akhilendra Bhushan Gupta
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Prof Gupta is working on various aspects of water and air pollution and their impact on human health- evolved pathophysiologies for fluoride, nitrate, and aluminium toxicities and linkages between air pollution and human respiratory health; and developed low-cost technologies for removal of fluorides and nitrates from drinking water/wastewater. His current research areas include advanced bioprocesses for waste treatment, the characterization of PM fractions in air, and the developing of field kits for biological analysis.

B2 - Keynote Speaker:

Dr Anjan Ray
Director
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Anjan Ray received his Doctorate in Chemistry from the University of Pennsylvania under the guidance of Nobel Laureate Prof Alan MacDiarmid. He worked after that for over 25 years in the Chemicals and Energy Industries across functions ranging from Quality Control, Technical Service, R&D and Marketing to General Management, Mergers & Acquisitions and Corporate Strategy. Subsequently, he took up his current position as Director CSIR-Institute of Petroleum (CSIR-IIP), Dehradun, in November 2016. He has also held, at various times, additional charge within CSIR of its Research Planning & Business Development Directorate, of its Human Resources Development Group, and CSIR-Central Building Research Institute, Roorkee. Dr Ray's professional interests have spanned fields as diverse as surfactants, lubricants, oleochemicals, cosmetics, pharmaceuticals, oil and gas, energy efficiency, biofuels, biotechnology, sustainable supply chains and renewable energy policy. His doctoral students are engaged in multidisciplinary research across thesis topics in catalysis, tribology, polymers, reaction engineering in gas-liquid systems and environmental biotechnology. He dreams of a future in India where all fossil fuel and organic chemicals imports would be displaced by products derived from domestic carbon atoms and sustainable energy sources, and decentralized pursuit of the nation's climate goals would be practised widely under enabling policies.

Title of the Talk: Decentralised Approaches to Greenhouse Gases and Pollutant Emissions Mitigation

Atmospheric anthropological impact related to transportation, buildings and industrial activity can broadly be classified into pollutants that affect air quality and public health in the short term - such as NOx, SOx and particulate matter - and those that affect climate trends through the greenhouse effect exacerbation, notably methane and carbon dioxide. While conventional thinking has placed the onus of mitigation on industry and government, critical analysis suggests that users have an equally important role to play. Using case studies, decentralised mitigation technologies down to the level of an individual household kitchen, passenger vehicle user, or rural community will be shown to have a significant positive impact on both local air quality and in meeting the nation's Net Zero ambitions if widespread adoption can be achieved.

B2 - Invited Speaker 1:

Prof Swarnendu Sen
Professor
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Dr Swarnendu Sen is a Professor of Mechanical Engineering at Jadavpur University. He did his graduation, master's and doctoral degrees from Jadavpur University. He did his post-doctoral research at the University of Illinois at Chicago, Virginia Tech, and the Technical University of Munich. He is a DAAD fellow and fellow of the International Society for Energy Environment and Sustainability (ISEES) and West Bengal Academy of Science and Technology (WAST). His area of interest is mainly heat transfer and reacting & multiphase flow. He has authored more than 200 research papers in different journals and conferences.

Title of the Talk: Strategy for Air Quality Management

Air quality management is a four-stage process involving problem identification, policy formulation, implementation, and control strategies. The challenges lie in some cases at the problem identification level and in some cases with the policy formulation. The absence of technical measures plays a lead role in problem identification. Sometimes, lack of technology puts a barrier to formulating the policy. Strategy formulation, as well as policy implementation, are not governed by technology mainly. At present, combating greenhouse gases is a big issue. Carbon sequestration is a need, but facing challenges for implementation. Some unknown pollutants are also there. These will be gradually discovered and will pose a challenge towards control.

B2 - Invited Speaker 2:

Dr Harish C Phuleria
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Dr Harish C Phuleria is an associate professor with 14 years of experience in environmental monitoring, exposure assessment and environmental health. His primary area of research is directed at quantifying and characterizing the short- and long-term exposures to different environmental stressors such as air pollution and road traffic noise. Dr Phuleria's research group focuses and aspires to lead the research on understanding the emissions from vehicular and biomass emissions sources, monitoring and modelling the long-term air pollution exposures in various urban/ rural microenvironments, quantifying toxic chemicals in human tissues and examining the association of air pollution exposures with health effects in children and adults. Dr Phuleria has a bachelor's and master's degree in Chemistry from the University of Delhi and IIT Delhi, respectively. Subsequently, he completed a master's in Environmental Science and Engineering from IIT Bombay before earning his PhD degree in Environmental Engineering from the University of Southern California, Los Angeles. After spending about 6 years in Switzerland in various positions, in 2013, he joined IIT Bombay and continued to teach and conduct research there.

Title of the Talk: Developing vehicular fleet emission factors and prediction of super-emitters through real-world studies

Vehicular emissions are one of the major sources that deteriorate urban air quality, which leads to adverse health effects, impaired visibility, and climate-related problems. In low- and middle-income countries such as India, 30-50% of urban emissions come from vehicular sources. Environmental and climate studies that project the future vehicular emissions in India are mostly adapting the lab-based vehicular emissions factors (EFs). However, laboratory studies suffer from several limitations, including testing of very few vehicles, testing of newer vehicles without actual payloads, and omitting poorly maintained and overloaded "super-emitter" vehicles. Roadside and roadway tunnel measurements are the best alternatives to capture the emissions from vehicles in real-world driving conditions in a short period with limited resources. In this talk, our recent work in characterizing vehicular traffic fleet emissions in Mumbai and around will be shared along with an approach for predicting super-emitting vehicles. Our recent findings will also be shared, where we apportioned LDVs and HDVs EFs from the on-road vehicular fleet.

B2 - Invited Speaker 3:

Dr Snehasish Panigrahy
Assistant Professor
Department of Energy Science and Engineering
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Dr Snehasish Panigrahy received his PhD in July 2018 from the Department of Mechanical Engineering, Indian Institute of Technology Guwahati. Earlier, he completed his Master of Technology degree from the same institute in June 2014. During his PhD, he directed a lot of efforts towards the utilization of porous medium technology for cheaper and (environmentally) clean cooking applications. After obtaining the doctoral degree, he spent nearly three years at Combustion Chemistry Centre, National University of Ireland Galway, Ireland, working with Prof Henry J. Curran as a postdoctoral fellow developing detailed chemical kinetic modelling to study the pyrolysis, ignition and oxidation of small to heavier hydrocarbons and renewable fuels. In this role, he acquired the necessary skills to successfully handle the responsibilities for designing experiments for pyrolysis and ignition delay times of different fuels using single pulse shock tubes, high-pressure shock tubes and rapid compression machines. Snehasish then joined Collins Aerospace, Ireland as a Senior Research Scientist. His research contributions at Collins Aerospace had been to design and conceptualize various projects like H2-powered aircraft systems, the thermal runaway of Li-ion batteries, etc. Since April 2022, he has been part of the Indian Institute of Technology Delhi as an Assistant Professor.

Title of the Talk: Understanding Auto-ignition of Light Hydrocarbons and Their Interactions with Nitrogen Oxides

It is important to understand the elementary reactions responsible for igniting and oxidation of light hydrocarbons, including hydrogen, syngas, methane, ethane, propane, etc., because of their prominent influence on controlling the kinetics of heavier fuels. It is also crucial to examine the interaction chemistry of these small hydrocarbons with NOx species at conditions relevant to gas turbines, industrial burners and SI engines that play a vital role in the development of more effective combustors. Several laboratory-scale fundamental reactors, such as shock tubes, rapid compression machines, flat flame burners, and flow reactors, are used to investigate the sensitization effect of NOx species (NO, NO2 and N2O) on light as well as larger hydrocarbons. The ignition delay time, flame speed and speciation profile data measured using these facilities are usually utilized to validate a detailed chemical kinetic mechanism. The competition between the reactions $\dot{R}+NO2 \leftrightarrow R\dot{O}+NO$ and $\dot{R} +NO2 (+M) \leftrightarrow RNO2 (+M)$ governs the inhibiting and prompting effects of nitrogen oxides addition on hydrocarbon auto-ignition.

Session B3: Desalination and Wastewater Treatment

Chairperson:
Prof Alok Sinha
Professor
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Indian Institute of Technology (ISM) Dhanbad
Jharkhand, India 826004
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Prof Sinha is working as a professor in the Department of Environmental Science and Engineering and Dean (Infra) at IIT(ISM) Dhanbad. He has finished his PhD at IIT Kanpur and M.Tech and B.Tech from Z.H.C.E.T., A.M.U., Aligarh. His research interests are water and wastewater treatment, in-situ groundwater remediation, nano-technology for water remediation, and advanced oxidation processes (AOPs).

B3 - Keynote Speaker:
Prof Akhilendra Bhushan Gupta
Department of Civil Engineering,
Malaviya National Institute of Technology
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Prof Gupta is working on various aspects of water and air pollution and their impact on human health- evolved pathophysiologies for fluoride, nitrate, and aluminium toxicities and linkages between air pollution and human respiratory health; and developed low-cost technologies for removal of fluorides and nitrates from drinking water/wastewater. His current research areas include advanced bioprocesses for waste treatment, the characterization of PM fractions in air, and the development of field kits for biological analysis.

Title of the Talk: Energy consumption and cost optimization in community RO plants (CROPs) for rural drinking water supplies

In response to a recent mandate of the Government of India, in its National Rural Drinking Water Program (NRDWP) guidelines, that it is the responsibility of the state governments to supply a minimum of 8 litres per person (per capita) per day (LPCD) potable water for drinking and cooking (NRDWP guidelines updated 2013), which meets BIS 10500 standards. In this context, the government of Rajasthan has installed about 3500 Community RO Plants (CROPs) in different villages during the last 6 years. Apart from the government, many private institutions and corporations have also installed CROP to provide clean drinking water to society under their Corporate Social Responsibility (CSR) theme. The sustainability of these CROPs is a major concern due to high operational and maintenance costs along with low usage. This presentation covers a study of several CROPs installed by BOSCH limited nearby Jaipur, Rajasthan area, to assess the factors involved in ensuring the sustainability of these CROPs through a scientific analysis in order to initiate some techno-managerial interventions to make them self-sustainable. The use of antiscalants to enhance the membrane life, reject- management, membrane cleaning methods, solar integration etc., have been discussed to bring down the CAPEX and OPEX of these CROPs, and some measures for promoting a circular economy approach have been suggested through recycling of the used Cartridge filters for value-added products. CROPs play a vital role in producing clean drinking water at a subsidised cost to the community. However, their long time sustainability can only be ensured through the development of an appropriate business model.

B3 - Invited Speaker 1:

Prof Munish Chandel
Professor
Environmental Science and Engineering Department
Indian Institute of Technology Bombay
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Munish K. Chandel is a Professor at the Environmental Science and Engineering Department, Indian Institute of Technology Bombay. His research interest includes climate and transport, greenhouse gas mitigation, sustainable development, water-energy nexus, solid waste management and waste to energy. Prof Chandel received B. Tech. Degree in Civil Engineering from NIT Hamirpur and PhD in Environmental Engineering from IIT Delhi. Before joining, IIT Bombay, he was Assistant Professor at Civil Engineering Department at IIT Roorkee. Before that, he was Research Scientist at Duke University, NC, USA. and a Postdoc at Ecole des Mines de Nantes, France and Dalhousie University, Halifax, Canada. Prof Chandel has more than 16 years of research and teaching experience. He has published more than 80 research publications in different journals and conferences and has been the associate editor of two journals.

Title of the Talk: Sustainable urban water system: water-energy-greenhouse gas nexus

India's rapidly growing urban population would increase water demand and further stress water resources. Reusing municipal wastewater could ease the water demand and reduce wastewater discharge to the water bodies. Wastewater reuse has several environmental benefits; however, it requires extra resources and energy and could be capital-intensive. The present work presents the different possibilities of wastewater reuse and their impacts on water saving, energy usage and greenhouse gas emissions. The presentation would highlight the trade-off of water, energy and greenhouse gas emissions for different wastewater reuse scenarios.

B3 - Invited Speaker 2:
Dr Archana Sarkar
Senior Scientist
National Institute of Hydrology, Roorkee
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Dr Archana Sarkar is a senior scientist with the National Institute of Hydrology, Roorkee, a premier R&D institute under the Ministry of Jal Shakti, Dept of Water Resources, RD & GR, Govt of India. She obtained her doctoral degree as well as M.Tech. (CAD in Civil Engineering) from IIT Roorkee in the years 2013 and 1999, respectively. She did B.E. in Civil Engineering from MNIT Jaipur in 1989 and passed with honours with 3rd rank in the University. She has also worked at the Water Resources department of Imperial College, London, as a commonwealth Professional Fellow in 2006. She has 26 years of experience in the field of Hydrology and Water Resources. She has authored more than 100 publications, including peer-reviewed articles, book chapters, and conference contributions and delivered more than 150 presentations in International/National workshops, training courses etc., including invited talks. She has co-supervised around 15 students (PhD, M.Tech and M.Sc level) from various IITs, NITs and other universities.

Title of the Talk: Water Security in a Changing Climate: Challenges and Way Forward with Special Emphasis on Indian Water Resources

The climate change crisis is intricately linked to water. Climate change directly impacts water security through increases in variability in the water cycle, inducing extreme weather events, reducing the predictability of water availability, affecting water quality, exacerbating water scarcity, and threatening sustainable development worldwide. These changes disproportionately affect poor and vulnerable communities and are compounded by a number of contributing factors, including population increase, unmanaged migration, land use change, reduced soil health, accelerated groundwater extraction, widespread ecological degradation and biodiversity loss. At the same time, increased demand for water for energy, agriculture, industry and human consumption is gradually becoming a more difficult trade-off for this limited and precious resource, especially in areas of the world already facing water stress, including India. And some climate change mitigation measures, such as the expanded use of biofuels, can further affect water security. India faces a severe and persistent water crisis, with total water demand expected to rise by over 70% by 2025, creating a huge demand-supply gap in the coming years and posing a potentially significant constraint on economic growth. The way forward to improving water security in a changing climate is through policy intervention for sustainable water management adopting affordable water solutions and appropriate adaptation options like improved carbon storages, protecting natural buffers, rainwater harvesting, adopting climate-smart agriculture, recycling and reuse of wastewater, harnessing of groundwater etc. This paper presents a brief review of the challenges posed by water security in a changing climate and the possible solutions with examples from Indian River basins.

B3 - Invited Speaker 3:
Prof Bhabani K Satapathy
Professor
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Prof Bhabani K. Satapathy did his PhD from IIT Delhi in the area of polymer composites and specifically on the tribological aspects of composites for automotive braking applications. He subsequently pursued his research career as a Postdoctoral fellow at Leibniz Institute of Polymer Research Dresden (IPF Dresden) and in the Mechanics of Functional Materials (MfM) group of the Institute of Material Science and Technology at Friedrich Schiller University Jena, Germany. He also has an M Tech degree in Polymer Science and Engineering from IIT Delhi. His main research interests are on phase behaviour, tribology, and fracture mechanics of polymer-based blends, composites, block copolymers, and 3D printed and electrospun soft materials. He has more than 101 publications in international journals and about 53 contributions to seminars/conferences and workshops.

Title of the Talk: Sustainable electrospun mats as microplastics free controlled release fertilizer systems

Meeting agricultural requirements without significantly affecting the soil-water ecosystem in terms of delivering agrochemicals (urea, NPK) for the growth of plants has become a thematic challenge, particularly given the increasing population, loss of biodiversity, and contamination of soil-water interfacial ecosystems due to overuse of synthetic agrochemicals. In this regard, the development of microplastics free polymer-based electrospun micro/nanofibrous assemblies will act as sustainable controlled release fertilizer systems (CRFs) by optimally promoting agro-output and "precision farming" without significantly aggravating water/soil pollution. Thus, our research aims to design mechano-functionally engineered urea/NPK-loaded optimized Polyvinyl alcohol (PVA)/Sodium alginate (SA)-based electrospun nanofibrous constructs as potential controlled nutrient release substrates with improved and sustainable physicomechanical performance for agricultural and horticultural practices. The variation in microstructural, morphological, thermal, viscoelastic and mechanical attributes of NPK-loaded PVA/SA blended electrospun mats have been evaluated to establish their structural stability systematically. The rate of biodegradability, swelling properties, water retention capacity and nutrient release kinetics in both soil and water media were also investigated to ascertain their emerging potential as CRFs for sustainable agriculture. To further validate the effectiveness of mats on plant growth, a pot experiment of capsicum (Capsicum frutescens) was conducted, and the results revealed that the germination rate, plant height, root length, dry and fresh weight of root, and stem length treated with the electrospun mats were higher than those of treated with the primitive urea/NPK.

Session B4: Emerging Environmental Contaminants

Chairperson:
Prof Swarnendu Sen
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Dr Swarnendu Sen is a Professor of Mechanical Engineering at Jadavpur University. He did his graduation, master's and doctoral degrees from Jadavpur University. He did his post-doctoral research at the University of Illinois at Chicago, Virginia Tech, and the Technical University of Munich. He is a DAAD fellow and fellow of the International Society for Energy Environment and Sustainability (ISEES) and West Bengal Academy of Science and Technology (WAST). His area of interest is mainly heat transfer and reacting & multiphase flow. He has authored more than 200 research papers in different journals and conferences.

B4 - Invited Speaker 1:

Dr Ambika S
Assistant Professor
Department of Civil Engineering
IIT Hyderabad
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Dr S. Ambika is an assistant professor in the Civil Engineering Department at IIT Hyderabad. Early, Dr S. Ambika worked as an assistant professor at NIT Warangal. Dr S. Ambika worked as a postdoctoral fellow at IIT Madras. Dr S. Ambika has completed her PhD in civil engineering at IIT Madras. Her research interest includes water treatment using nanomaterials, groundwater sampling and assessment, waste-to-wealth aspects, life cycle analysis and sustainable development. Dr S. Ambika has authored over 20 articles in reputed journals and conference proceedings. Dr S. Ambika received a Technical excellence award at IIT Madras in 2018 and a WARI fellowship at Univ. of Nebraska-Lincoln, USA.

Title of the Talk: Photocatalytic Membrane for the Treatment of Emerging Contaminants in Agricultural Run-off

Agricultural run-off is known for holding and spreading emerging contaminants sourced from pesticides, herbicides, etc. These persistent pollutants reach the water sources quickly if not removed, putting the environment and human health at risk. In addition, N and P compounds are present in the agricultural run-off due to the usage of fertilisers in agricultural activity. While these pollutants end up in the water bodies, they cause algal blooms and damage the ecosystem. Hence, treatment systems should be developed in such a way that the emerging contaminants from this run-off can be removed in the presence of N and P compounds. Few studies are addressing real-time water and wastewater treatment when it comes to agricultural drainage. However, given the associated negative impact on the biotic environment, it requires attention. This study tested the photocatalytic membrane for the treatment of emerging contaminants in agricultural runoff. The photocatalyst Bi2O3-ZrO2 was synthesised and characterised for its chemical stability and photochemical activity. The suspended Bi2O3-ZrO2 particles were tested for the removal of 2,4-dichlorophenoxyacetic acid (2,4-D), which is taken as the representative emerging contaminant. The photocatalysis study was conducted in the presence and absence of P, and each N-based contaminant to (i) denote the agricultural run-off water, (ii) understand the overall treatment efficiency, (iii) know the influence of each ion during photocatalysis, (iv) measures the change in kinetics when the research moves from single emerging contaminants to the mixed pollutants' removal representing the actual composition, and (v) study the transformation of fertiliser-based pollutants during the photocata Further studies were carried out using a photocatalytic membrane in which the polymer membrane was incorporated with the studied photocatalyst. Here, the tests were designed to assess the membrane filtration and photocatalysis of Bi2O3-ZrO2 and their integration in the treatment efficiency of agricultural runoff.

B4 - Invited Speaker 2:

Dr Ramesh Dharavath H N
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Dr Dharavath Ramesh (Senior Member, IEEE and ACM) is an Associate Professor in the Computer Science & Engineering Department at the Indian Institute of Technology Dhanbad, Jharkhand, India. He obtained PhD from the Indian Institute of Technology (Indian School of Mines), Dhanbad, in 2015. His Master's degree in Computer Science and Engineering with a specialization in Software Engineering is from Jawaharlal Nehru Technological University, Hyderabad, India, in 2009. His Bachelor of Engineering degree in Computer Science and Engineering is from KITS, Warangal, India, in 2004. He works and publishes widely in the areas of Blockchain & Distributed Computing, Distributed Databases, Cloud Databases, Modelling Big Data, Processing Big Data, Virtualization and Scheduling in Cloud Environment, Brain-Computer Interaction, Community Detection in Social Networks, ML paradigms in Agriculture. He has published over a hundred technical papers in refereed journals, i.e., IEEE - TSC, TASE, TIM, TII etc., and conference proceedings - IEEE PerCom, IEEE HPCC etc. He has served in various capacities for journals and conferences. He has served on the program committees of various conferences, including BDA, ICDCIT, ADCONS, RAIT, and ICDE. He is a senior member of the IEEE and ACM.

Title of the Talk: Optimal Allocation of Surface Water and Groundwater Resources for Crop Production

Extensive variability in current climatic conditions necessitates the need for optimal planning of water resources to manage socio-economic and environmental requirements efficiently. The optimal allocation of surface water and groundwater is essential to maximize crop net return due to uncertainty in seasonal rainfall, groundwater, and surface water availability in each region. This talk demonstrates a multi-objective model to maximize the crop net return and efficient management of water resources. The multi-objective model comprised three objective functions maximizing the crop net return, minimizing the water deficit, and maximizing the aquifer recharge. Its practicability can be analysed through the case study of a Pennar-Palar-Cauvery link canal command in India. The meta-heuristic approaches such as particle swarm optimization (PSO), genetic algorithm (GA), and marine predator's algorithm (MPA) can be employed to solve the presented model. Also, their performance evaluated using hypervolume and coverage metrics indicates the superiority of MPA in obtaining well-distributed Pareto-optimal solutions. Thus, decision-makers can choose the best solution based on current resource availability and preferences.

B4 - Invited Speaker 3:

Dr Bijay P. Tripathi
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Dr Tripathi is an Associate professor in the Materials Science & Engineering Department at IIT Delhi. He received his PhD from CSIR-CSMCRI, Bhavnagar and Helmholtz-Zentrum Geesthacht, Germany, in 2011. Soon after, he was awarded the prestigious Alexander von Humboldt postdoctoral fellowship for the period of 2011-2013 at the Leibniz Institute of Polymer Research Dresden, Germany, where he subsequently undertook a Group Leader position before starting his independent career as an Assistant Professor at the Department of Materials Science & Engineering, IIT Delhi in 2017. During his research career, he has been awarded prestigious fellowships such as DAAD and Humboldt fellowship (Germany), JSPS (Japan), Marie-Curie Fellowship (European Commission), CSIR, DST-INSPIRE, and UGC-FRP (India). After joining IIT Delhi, he was again awarded the Alexander von Humboldt Group Linkage Award with a grant of 55 thousand euros. At IIT Delhi, he received Kusuma Trust Young Faculty Fellowship, and in 2022 he was awarded Mrs Veena Arora Early Career Research Award-2021.

Title of the Talk: Nanostructured responsive microgel membranes for separation and purification applications

The microgel-based nanostructured materials have received significant attention in various applications due to their structural flexibility, unusual molecular architecture, colloid-like behaviour, thermo-responsiveness, and tunable functionality. This presentation focuses on our recent works based on synthesising, characterization, and modifying different types of responsive microgels and their assemblies into the compactly packed layer as a membrane. The microgels were synthesized using N-isopropyl acrylamide along with various active monomers. The presence of active monomers allowed for further functionalization to impart additional properties such as antifouling and antibacterial properties. Finally, a thin layer of cross-linked composite microgels was constructed via suction filtration on a polyethylene terephthalate track-etched membrane. The composite microgel membranes' chemical functionality, surface morphology, hydrophilicity, water permeation, and rejection properties were thoroughly investigated. Surface and morphological analyses validate the packed microgel layer formation. The constructed layer was temperature switchable, resulting in a significant increase in water flux from room temperature to 40 °C. The thin and closely packed microgel particles resulted in a sub-2 nanometer surface pore size and strong rejection (>99%) of small molecules. The easy preparation strategy offers diverse modification possibilities, and the advantageous properties make the responsive membrane more applicable for environmentally-friendly separation technology.

Session B5: Solid Waste: Challenges and Mitigation

Chairperson:
Prof Munish Chandel
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Munish K. Chandel is a Professor at the Environmental Science and Engineering Department, Indian Institute of Technology Bombay. His research interest includes climate and transport, greenhouse gas mitigation, sustainable development, water-energy nexus, solid waste management and waste to energy. Prof Chandel received B. Tech. Degree in Civil Engineering from NIT Hamirpur and PhD in Environmental Engineering from IIT Delhi. Before joining, IIT Bombay, he was Assistant Professor at Civil Engineering Department at IIT Roorkee. Before that, he was Research Scientist at Duke University, NC, USA. and a Postdoc at Ecole des Mines de Nantes, France and Dalhousie University, Halifax, Canada. Prof Chandel has more than 16 years of research and teaching experience. He has published more than 80 research publications in different journals and conferences and has been the associate editor of two journals.

B5 - Keynote Speaker:

Prof Alok Sinha
Professor
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Prof Sinha is working as a professor in the Department of Environmental Science and Engineering and Dean (Infra) at IIT(ISM) Dhanbad. He has finished his PhD at IIT Kanpur and M.Tech and B.Tech from Z.H.C.E.T., A.M.U., Aligarh. His research interests are water and wastewater treatment, in-situ groundwater remediation, nano-technology for water remediation, and advanced oxidation processes (AOPs).

Title of the Talk: Economic evaluation of anaerobic hybrid membrane bioreactor (AnHMBR) treating leachate at mesophilic temperature

The performance of a laboratory-scale mesophilic anaerobic hybrid membrane bioreactor (AnHMBR) was evaluated for treating leachate at two days HRT. Raw leachate had a COD value of 27,850 ± 1,103 mg/L, and an organic load of kgCOD/m3d was applied to AnHMBR. Chemical oxygen demand (COD) removal efficiency of 88% was obtained with a methane yield rate of 0.32 L CH4/gCODremoval at 2 d HRT. The results of the lab-scale reactor were utilized for up-scaling and cost analysis. Economic analysis of the full-scale AnHMBR revealed that tank and heating costs accounted for the most significant segment of total life cycle costs. The heating cost can be compensated by gas recovery and heating of influent by permeate. Sensitivity analysis revealed that interest rates, influent flow, and membrane flux were the most crucial parameters which affected the total cost of An-HMBR

B5 - Invited Speaker 1:

Dr Manoj Kumar Tiwari
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Dr Manaj Kumar Tiwari (PhD, Fulbright Fellow) is faculty of water and wastewater engineering at the School of Water Resources at IIT Kharagpur. Dr Tiwari holds expertise in smart water supply systems, water quality management, wastewater treatment and recycling and contaminant fate and transport. Dr Tiwari has over ten years of teaching and research experience and is leading several projects with a cumulative worth of ₹ 120 million. His current research involves integrated urban water management, water loss and energy inter-relations, emerging contaminants removal, and real-time water quality sensing. Dr Tiwari has also developed 3 NPTEL online certification courses, all recognized as FDP courses b AICTE. He has also been actively engaged in international collaborations and associated with several projects of National importance in India, including SPARC, Future of Cities, Water Technology Initiative, and Unnat Bharat Abhiyan, where he is coordinating Water Resources SEG.

Title of the Talk: Waste to Wealth: Circular Economy in Solid Waste Management

The conventional linear economy approach relies on the produce-consume-dispose model, which has been damaging the environment due to unrestrained resource extraction, excessive carbon emission, massive waste generation, and mounting environmental pollution. To combat this, an alternative circular economy approach is being advocated, where through recycling and reuse, waste can be fed back into the system as usable materials/resources, thereby minimizing waste, conserving natural resources, and at times providing efficiency gains. Adopting the concept of circularity requires the recovery of resources or value-added products from waste materials. This talk focuses on some common and alternate/advanced approaches for resource and value-added products recovery from various types of solid waste. The discussion will encompass managing and treating municipal solid waste, cattle dung, water/wastewater treatment sludge, and some specific industrial residues to recover valuable resources.

B5 - Invited Speaker 2:

Prof Priya Chandran
Department of Computer Science and Engineering,
National Institute of Technology, Calicut
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Prof Priya Chandran is a Professor in Computer Science and Engineering at the National Institute of Technology Calicut. With a Bachelors' in Technology from MANIT Bhopal, M. Tech from University of Roorkee, and Ph. D from Indian Institute of Science Bangalore, Priya is passionate about teaching Algorithms and Complexity, and Data Structures. Her primary area of Research is Computer Architecture, virtualization and security in the context of virtualization are the current area of focus. Interested in women empowerment, and the role of social media for positive awareness and impact on social issue, she has played a lead role in the social media based publicity for impactful, innovative initiatives from her Institute.

Title of the Talk: Some exemplary initiatives at NIT Calicut on Solid Waste Management

The post COVID year has witnessed a spurt in environment awareness, and expensive support for sustainable technologies, and decades of distributed dedicated efforts have found a common universal goal. The Centre of sustainable technologies, set up in 2021, is on a mission to provide quality of life through potential emerging technologies for environmental sustainability, waste management, renewable energy systems, water harvest, pesticide free organic farming as a model ecosystem and designs. The projects include a fully commissioned 20 kg P2P (plastic to power) plant based on patented work, and prototype for a 75 kg version. Other initiatives includes treatments for industry waste in neighbouring districts, and-in campus green vegetable farming, nourished with organic waste from the campus. A community initiative with active participation from the student community and NSS, the team has converted tons of solid waste into tons of fresh healthy vegetables over the part 10 years, setting a motivating example for the community and triggering similar initiatives in the state

Session B6: Renewable Energy Technologies

Chairperson:
Dr Satvasheel Ramesh Powar
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Dr Satvasheel Powar is an associate professor at the Indian Institute of Technology Mandi's mechanical and materials engineering school. His research interests include solar energy and sustainable development. He previously worked at Greatcell Solar SA in Switzerland, G24i Power in the United Kingdom, Nanyang Technological University in Singapore, and Dalarna University in Sweden. He secured his Master's degree at Dalarna University, Sweden and his PhD from Monash University, Australia. He has published 30 research papers with an average impact factor of more than 10, edited four books, and received 8 patents. He was awarded a scholarship from the United States Studies Centre in Australia to attend Stanford University's ignite programme. He received a Bhaskara Advanced Solar Energy Fellowship to visit Lawrence Berkeley National Laboratory in the United States

B6 - Keynote Speaker:

Prof Sudipta De
Professor
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Prof Sudipta De, Mechanical Engineering Department of Jadavpur University, received his PhD from IIT-Kharagpur. He was a guest researcher at Lund University, Sweden. He was nominated senior scientist by the Indian National Science Academy (INSA), New Delhi, to the Technical University of Munich, Germany, under the international bilateral exchange program of the Academy in clean energy. He was the selected faculty under the "India4EU" program and worked at the Royal Institute of Technology (KTH), Stockholm, in sustainable energy. He has received research funding from different institutes, including the University Grant Commission, the Department of Science and Technology of India; EU, Swedish Research Council, DFG-Germany; SIU and DIKU-Norway. He is an elected fellow of the West Bengal Academy of Science and Technology. He is on the editorial board of the International Springer Nature journal 'Clean Technologies and Environmental Policy (Impact Factor: 4.7). He is an INSA Teacher awardee. He was the leader of the Indian Delegation in the 13th Plenary Meeting of ISO/TC 238: Solid Biofuels. The higher education Department of the Government of West Bengal also awards him 'Shiksharatna'. His research interest is interdisciplinary sustainable energy, including the Indian energy transition.

Title of the Talk: Is optimised distributed hybrid renewable systems a future sustainable energy solution for India?

Due to limited resources and carbon emissions, fossil fuel-based plants/systems are not sustainable. The global energy transition is to shift towards renewable power. However, due to several limitations, the such transition may not happen immediately. According to available resources and other constraints, innovations are required for this paradigm shift. Each country has their own way of planning towards this goal. Indian power is highly carbon-intensive and dominated mainly by large coal-based power plants. Several problems are arising due to it. To meet the increasing energy demand with a largely poor population, India needs multi-dimensional planning and innovations for an energy transition towards better sustainability. This presentation explores several optimized distributed hybrid renewable energy systems as one of the possible options for the future energy sustainability of the country.

B6 - Invited Speaker 1:

Dr Balkrishna Mehta
Assistant Professor
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Dr Balkrishna Mehta has been working as an Assistant Professor in the Department of Mechanical Engineering Indian Institute of Technology Bhilai (IIT Bhilai) since February 2019. He received his PhD in 2014 and M. Tech. in 2006 from the Indian Institute of Technology Kanpur (IIT Kanpur). He served as Manager at Tata Motor's Technical Center after his M.Tech. After his PhD, he also worked as a Post-Doctoral Fellow at ISAE-ENSMA Poitiers, France. Before joining IIT Bhilai, he served as Assistant Professor in the Department of Mechanical Engineering at IIT Guwahati since July 2015. The research works of Dr Mehta mainly lie in the specialization of Fluids and Thermal Sciences and, particularly, investigation of thermo-hydrodynamics of evaporating thin liquid films, transport in porous media and thermal performance for energy systems. He has published approximately 25 technical articles in peer-reviewed international/national journals and conferences.

Title of the Talk: Cooling of Solar PV panels for Enhanced Efficiency

The higher operating temperature of the photovoltaic (PV) module above the standard operating temperature, usually 25°C, adversely affects the panels' efficiency. Therefore, it demands a careful analysis of the thermal characteristics of the photovoltaic module under the actual environmental parameters. Performing the numerical experiment, this work attempts to investigate the temperature variation on a photovoltaic module under experimental conditions by including radiative heat transfer and forced convection. Here, in the first step, steady-state simulation with solar insolation at a particular location (Jaipur, Rajasthan), day (21 June) and time (13:00 hours) has been calculated by the solar load model of ANSYS Fluent. Further, this data will be provided as a boundary condition to the full three-dimensional fluid flow and heat transfer models were in, radiative heat exchange is also included between the surfaces of the photovoltaic module and surroundings, and a comparison is made with the simulation results without radiation model. It has been observed that simulation with a radiation model provides an accurate temperature value.

B6 - Invited Speaker 2:

Dr Om Prakash Singh
Associate Professor
Department of Mechanical Engineering
IIT (BHU) Varanasi
Email:

Dr Om Prakash Singh is an associate professor at IIT (BHU), Varanasi working in the department of Mechanical Engineering. He did his master's and PhD from the Indian Institute of Science, Bangalore and joined the industry after his PhD. Before joining academics, he worked in industry (6 years) in the R&D department of the automobile sector after his PhD. He worked at IIT Mandi (for 4.5 years) before joining IIT (BHU). His research interests are renewable energy, solar energy, green buildings, heat and mass transfer phenomenon, design and innovation etc. He has 16 patents granted, and 10 more are under review.

Title of the Talk: Solar Energy: Opportunity for Design Innovations

Talk on the above topic will focus on harnessing solar energy using various technologies such as photovoltaic integrated with phase change materials, solar air heaters integrated with buildings etc., with a focus on heat transfer analysis and related theories. Methodologies for developing numerical models will also be discussed. A discussion on the performance evaluation parameter will also be done, which is the most misused parameter in the heat transfer analysis

B6 - Invited Speaker 3:

Dr Shihabudheen M. Maliyekkal
Department of Civil and Environmental Engineering
IIT Tirupati
Chindepalle 517619, Andhra Pradesh
Email: shihab@iittp.ac.in

Dr Shihabudheen M. Maliyekkal is an Assistant Professor in the Civil and Environmental Engineering Department at the Indian Institute of Technology Tirupati. He earned his master's and PhD from the Indian Institute of Technology Madras in Environmental Engineering. His research addresses the challenging task of providing safe water for all. Dr Maliyekkal has authored over 80 articles in reputed journals and conference proceedings, and he is an inventor/co-inventor in 18 patents or patent applications. Six of his patents/technologies have been licenced or sold. He is a recipient of the patent and invention award and J.C Bose patent award, among others.

Title of the Talk: Nanotechnology-enabled point-of-use sustainable water treatment systems

Adequate access to clean water is fundamental to a healthy life, driving economic growth, and realizing human rights. Water is a gift from nature that must be safeguarded, defended, and treated as such. However, this limited and vital resource has yet to receive the attention it deserves. Over the years, negligence and mismanagement, pollution, and lack of conservation have caused significant quantitative and qualitative changes in water reserves. The vast presence of regulated and non-regulated pollutants in water bodies poses significant challenges to achieving water quality objectives. It is worth noting that reducing many chemical compounds at the source is highly challenging due to increasing industrial and societal dependence on them or their complex release mechanisms. Therefore, developing advanced and sustainable treatment technologies to remove contaminants to acceptable levels before discharging them into natural streams is vital to protect water bodies from pollution. Also, drinking water must be treated before consumption to ensure its safety and protect public health. The poor success in establishing new large-scale public water supply treatment systems and the poor ability of centralized public water treatment plants to prevent waterborne diseases warrant an alternate solution to the problem. Recent studies show that Point of use (PoU) household treatment systems may be a better option and a sustainable way to provide safe drinking water in low-income communities where only limited households have sustained access to piped water. However, developing a reliable and affordable PoU treatment system is a must to achieve its sustained large-scale use. Besides, the treatment system should have a reduced carbon footprint, minimal environmental impact, and greater access to unprivileged communities. The focus of the talk is to summarize our recent efforts in developing affordable and eco-friendly nanotechnology-enabled point-of-use water purification systems. The speaker will discuss concepts, development, and the working mechanism of the treatment units.

Session B7: Cleaner Technologies for Pollution Mitigation

Chairperson:
Dr Shihabudheen M. Maliyekkal
Department of Civil and Environmental Engineering
IIT Tirupati
Chindepalle 517619, Andhra Pradesh
Email: shihab@iittp.ac.in

Dr Shihabudheen M. Maliyekkal is an Assistant Professor in the Civil and Environmental Engineering Department at the Indian Institute of Technology Tirupati. He earned his master's and PhD from the Indian Institute of Technology Madras in Environmental Engineering. His research addresses the challenging task of providing safe water for all. Dr Maliyekkal has authored over 80 articles in reputed journals and conference proceedings, and he is an inventor/co-inventor in 18 patents or patent applications. Six of his patents/technologies have been licenced or sold. He is a recipient of the patent and invention award and J.C Bose patent award, among others.

B7 - Keynote Speaker:
Prof Shantanu Bhattacharya
Department of Mechanical Engineering
Indian Institute of Technology Kanpur
Kanpur, 208016, Uttar Pradesh, India
Email: bhattacs@iitk.ac.in

Prof Shantanu Bhattacharya is the GVMM chair and Professor of Mechanical Engineering at the Indian Institute of Technology Kanpur. He served as Head of the Interdisciplinary Design program in 2017~2020 at IIT Kanpur. Prior to this, he completed his MS in Mechanical Engineering from Texas Tech University, Lubbock, Texas, and a PhD in Bioengineering from the University of Missouri, Columbia, USA. He also completed postdoctoral training at the Birck Nanotechnology Center at Purdue University. His main research interests are designing and developing micro- and nano-sensors and actuation platforms, nano-energetic materials, micro- and nano-fabrication technologies, water remediation using visible light photocatalysis process, and product design and development. He has many awards and accolades to his credit, including the Institution of Engineers Young Engineer Award, the Institute for Smart Structures and Systems Young Scientist Award, the National Academy of Sciences, and the Dr R.S. Khandpur Award of IETE and Er. M.P. Baya National Award of the IEI, respectively. He is a Senior member of IEEE and a fellow of the Royal Society of Chemistry (UK). He has bagged the prestigious Abdul Kalam Technological Innovation National fellowship from the Indian National Academy of Engineering. He has guided many PhD and master's students and has many international journal publications, patents, books, and conference proceedings.

Title of the Talk: A novel AOP based effluent treatment methodology: perspectives of working in an industrial setup

Synthetic dye has gained prominence in all essential things in the modern world. This emergence of usage is blinded towards the proper treatment of the wastewater associated with different processes of the industries as well as the ineffective nature of the Common Effluent Treatment Processes (CETP) towards colour removal and results in the creation of toxic sludge. Colour removal is especially challenging due to the high variation of influent pH that may tremendously affect the secondary processes. To circumvent this issue and ensure high colour removal efficiency, we have deployed a modified AOP treatment methodology developed on a pilot scale (10 KLD) based in Jaipur, comprising controlled serial steps of Coagulation & Flocculation, Acid changed soil-based absorption, Advanced Oxidation Processes (AOP), carbon absorption etc. thus providing treated effluent at levels proposed through the Inland Water Discharge Standards. The proposed methodology is proven through characterization of the detailed study of the behaviour of the photocatalyst, analysis and characterization of various industrial textile dyes along with an anthraquinone-based Reactive Blue 4 (RB4) dye molecule through Ultraviolet-Visible (UV-vis) spectrophotometry, High-Performance Liquid Chromatography (HPLC) etc.

B7 - Invited Speaker 1:

Dr Parmod Kumar
Assistant Professor
School of Mechanical and Materials Engineering
IIT Mandi, Mandi-175005, Himachal Pradesh
Email: parmod@iitmandi.ac.in

Dr Parmod Kumar is an Assistant Professor in the School of Mechanical and Materials Engineering at the Indian Institute of Technology Mandi. His area of expertise is Interfacial Flows, Heat Transfer and Design of Energy Systems. He has published more than 20 articles in reputed journals like Langmuir, Physics of Fluids, International Journal of Hydrogen Energy, etc. He is also actively involved in sponsored projects and drawn government and industrial funding.

Title of the Talk: Performance enhancement of methanol-reforming reactor utilizing engine exhaust heat for hydrogen generation

Internal combustion engines are mostly used across the globe to generate mechanical power in the transport sector. Efficiency improvement, emission reduction, and utilization of alternative fuels are the main aspects of current IC engine research. Hydrogen-enhanced combustion proved to be one of the efficient ways to achieve such goals. However, hydrogen storage is the most critical issue for the transportation sector. Therefore, onboard fuel reforming is a promising option for solving this issue. A catalytic conversion process transforms a suitable liquid fuel (methanol) into an H2-rich gas. For sustaining the reforming reaction, the required heat energy is taken from engine exhaust waste heat by the process of thermochemical recuperation. The present work elucidates the performance of a reactor that uses exhaust gas heat energy to sustain the reforming reaction. A packed bed-type reactor was chosen for the current study, and an attempt has been made to improve its design for onboard hydrogen generation. To enhance the heat transfer, a finned surface (straight & wavy) was introduced in the reactor, which significantly increased methanol conversion. It was found that the wavy fin improved the methanol conversion up to 96.8% at an exhaust inlet temperature of 673 K.

B7 - Invited Speaker 2:

Dr Sandeep Kumar
Assistant Professor
Department of Energy Science & Engineering
IIT Bombay, Mumbai 400076, India
Email: sandeep.kumar@iitb.ac.in

Dr Sandeep Kumar is a faculty in the Department of Energy Science and Engineering at IIT Bombay. He did his BTech from NIT Silchar (Assam) in Mechanical Engineering in 2003. He joined Infosys Pvt. Ltd. after his BTech and worked as a Software Engineer and Analyst. He left Infosys in 2007 to pursue his dream career in research and joined IISc Bangalore for a Master's program in the Centre for Sustainable Technology. He later continued with his PhD in IISc Bangalore. After finishing his PhD, he joined IIT Bombay as a Faculty in 2017. He has expertise in the thermo-chemical conversion of biomass and using alternate fuels in IC engines. His work involves both experimental works as well as CFD-based models. His research areas are Biomass Gasification, Hydrogen production from biomass, Use of alternate fuels in IC Engines and High-value Carbon Products from waste biomass and plastics

Title of the Talk: Biomass Gasification - Sustainable technology for waste to energy

Biomass is a potential source of renewable energy. Agro residue and organic industrial and civic waste provide a vast potential to harvest energy from waste. Biomass gasification is a quite mature technology finding its use in various sectors. Downdraft gasification system is widely used to produce gas and an IC engine to generate electricity. Oxy-steam gasification yields syngas of high energy density (8-10 MJ/Nm^3). High H_2 fraction, up to 55% by volume, in syngas and its combustion characteristics motivate the development of a more efficient gasifier-engine system. Engine studies have given promising results with reduced emissions. The system developed has the capability to generate Syngas with varying H_2/CO ratios. Oxy-steam gasification proved to be a highly efficient system with over 80% efficiency achieved at a lower steam-to-biomass ratio of 0.75. The high energy density in the range of 8-9 MJ/Nm^3 has been completed, making it a better fuel than producer gas obtained from air gasification. The biomass gasification process provides an opportunity for waste to energy and valuable chemical production and waste management in a decentralized manner.

Session B8: Environmental Challenges Mitigation

Chairperson:
Prof Sudipta De
Professor
Mechanical Engineering Department
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Prof Sudipta De, Mechanical Engineering Department of Jadavpur University, received his PhD from IIT-Kharagpur. He was a guest researcher at Lund University, Sweden. He was nominated senior scientist by the Indian National Science Academy (INSA), New Delhi, to the Technical University of Munich, Germany, under the international bilateral exchange program of the Academy in the field of clean energy. He was the selected faculty under the "India4EU" program and worked at the Royal Institute of Technology (KTH), Stockholm, in the field of sustainable energy. He has received his research funding from different institutes, including the University Grant Commission, the Department of Science and Technology of India; EU, Swedish Research Council, DFG-Germany; SIU and DIKU-Norway etc. He is an elected fellow of the West Bengal Academy of Science and Technology. He is on the editorial board of the International Springer Nature journal 'Clean Technologies and Environmental Policy' (Impact Factor: 4.7). He is an INSA Teacher awardee. He was the leader of the Indian Delegation in the 13th Plenary Meeting of ISO/TC 238: Solid Biofuels. The higher education Department of the Government of West Bengal also awards him 'Shiksharatna'. His research interest is interdisciplinary sustainable energy, including the Indian energy transition.

Title of the Talk: Is optimised distributed hybrid renewable systems a future sustainable energy solution for India?

Due to limited resources and carbon emissions, fossil fuel-based plants/systems are not sustainable. The global energy transition is to shift towards renewable power. However, due to several limitations, such a transition may not happen immediately. According to available resources and other constraints, new innovations are required for this paradigm shift. Each country has their own way of planning towards this goal. Indian power is highly carbon-intensive and dominated mainly by large coal-based power plants. Several problems are arising due to it. To meet the increasing energy demand with a largely poor population, India needs multi-dimensional planning and innovations for an energy transition towards better sustainability. This presentation explores several optimized distributed hybrid renewable energy systems as one of the possible options for the future energy sustainability of the country.

B8 - Invited Speaker 1:

Dr Dhiraj V Patil
Associate Professor
Depart of Mechanical, Materials, and Aerospace Engineering
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Email: dhiraj@iitdh.ac.in

Dr Dhiraj Patil is currently Associate Dean (Academic Programmes) and Associate Professor at the Department of Mechanical, Materials, and Aerospace Engineering, IIT Dharwad. He has been with IIT Dharwad since December 2017 and was acting as Faculty Associate and then Head of the Department from October 2019 to September 2022. He has guided/co-guided a total of 3 PhDs, 2 MS scholars, and several MTech and BTech projects. He is currently guiding 2 PhD and 1 MS scholar. Prof Dhiraj received his PhD from the Indian Institute of Science Bangalore. His research interests are computational fluid dynamics, high-performance computing, high-speed flow simulations and turbulence. He worked as a postdoctoral research associate at the Engineering Mechanics Unit, JNCASR, Bangalore; CUNY Energy Institute of the City College of New York; and University of Edinburgh, UK. He has published in leading international journals such as Physical Review E, Physics of Fluids, Journal of Computational Physics, Journal of Fluid Mechanics, and Internal Journal of Heat and Mass Transfer. He has received research funding from DST, ISRO, and BITS BioCyTiH Foundation. He has been working as faculty-in-charge of a high-performance computing facility. He is also a faculty-in-charge of the Global Center of Excellence in Affordable and Clean Energy (GCoE-ACE), IIT Dharwad.

Title of the Talk: On the United Nations Sustainable Development Goal 7; Affordable and Clean Energy

The Sustainable Development Goal - 7 (SDG-7) is on Affordable and Clean Energy (ACE), is one of the 17 goals defined by the United Nations, to be achieved by 2030. The impact of any development in this domain has the potential to create a multiplier effect as energy is a key input in the income and economic progress, ensuring essential healthcare, education, transportation, communication facilities in remote regions, minimizing damage to the environment, and others. The Affordable and Clean Energy (ACE) is a backbone of development. We will review targets of the SDG-7, India's current data on SDG-7, and the corresponding global data. This talk also reviews the percentages of the Indian population having access to (i) grid-connected electricity, (ii) the access to clean cooking, and, (iii) renewable energy. One of the targets of the SDG-7 is to double the global rate of improvement in energy efficiency. The rate of the global primary energy intensity improvement is the indicator used to track progress on global energy efficiency. The indicator corresponds to the percentage decrease in the ratio of global total energy supply per unit of gross domestic product (GDP). We will review the opportunities and challenges to achieve this SDG-7 target.

Session B9: Pollution and Climate Change: Challenges and Priorities

Chairperson:
Dr Harish C Phuleria
Associate Professor
Environmental Science and Engineering Department
Interdisciplinary Programme in Climate Studies
IIT Bombay, Powai– 400 076, India
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Dr Harish C Phuleria is an associate professor with 14 years of experience in environmental monitoring, exposure assessment and environmental health. His primary area of research is directed at quantifying and characterizing the short- and long-term exposures to different environmental stressors such as air pollution and road traffic noise. Dr Phuleria's research group focuses and aspires to lead the research on understanding the emissions from vehicular and biomass emissions sources, monitoring and modelling the long-term air pollution exposures in various urban/ rural microenvironments, quantifying toxic chemicals in human tissues and examining the association of air pollution exposures with health effects in children and adults. Dr Phuleria has a bachelor's and master's degree in Chemistry from the University of Delhi and IIT Delhi, respectively. Subsequently, he completed a master's in Environmental Science and Engineering from IIT Bombay before earning his PhD degree in Environmental Engineering from the University of Southern California, Los Angeles. After spending about 6 years in Switzerland in various positions, in 2013, he joined IIT Bombay and continued to teach and conduct research there.

B9 - Invited Speaker 1:
Mr Niraj Sah
Product Manager for Hydrogen Commercial Engines
FEV India Pvt Ltd
Email: shah_n@fev.com

Mr Niraj Sah has done his master's in automotive engineering. He started his career in motorsports before joining FEV India in 2016 as a Powertrain Calibration engineer. He is currently working as a product manager for Hydrogen based powertrains.

Title of the Talk: Current trends in Hydrogen Internal Combustion Engine

One of the main concerns of our time is global warming, and the transportation sector is one of the biggest contributors. We need to explore all the possible options for lowering our CO2 emissions in order to meet the global goal of restricting the temperature increase to +1.5°C. To accomplish this goal, together with electrification, the world needs to move away from fossil fuels to more green fuels. Exploring Hydrogen as one of the green fuels is necessary to decarbonize the world. Considering that Fuel-Cell will require more time to realize their full potential, the Internal combustion engine fuelled by hydrogen has enormous potential. In this session, I will provide insights into the prospects of Hydrogen Internal Combustion Engine in various transportation sectors together with specific layouts possible, potential challenges and possible solutions for the same

B9 - Invited Speaker 2:
Dr Kirpa Ram
Assistant Professor
Institute of Environment and Sustainable Development
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Varanasi 221005, India
Email: kirpa81@gmail.com, ram.iesd@bhu.ac.in

Dr Kirpa Ram is working as an Assistant Professor at the Institute of Environment and Sustainable Development, Banaras Hindu University, Varanasi-221005, India. He completed his post-doctoral studies at the University of Tokyo, Japan. Before joining Banaras Hindu University, he served as a Scientist at National Environmental Engineering Research Institute (NEERI) and INSPIRE Faculty: IIT Bhubaneswar. Kirpa specializes in atmospheric and aerosol Chemistry. His research interests include Carbonaceous Aerosols with emphasis on Black Carbon, Secondary Aerosols, Optical and Microphysical properties of Aerosols, Aerosol-Cloud Interaction and Climate, Trace Gases and Ozone Measurements, Stratosphere-Troposphere Exchange, Volatile Organic Compounds, Poly-Aromatic Hydrocarbons and Platinum Group Elements, Carbon Dioxide Capture and Sequestration Dr Kirpa ram has authored and co-authored 70+ peer-reviewed scientific papers and presented works at many National and International conferences. These papers have been widely cited, and the author has a total citation of >3000 with an h-index of 30 and an i-10 index of 49. Some of the scientific recognition includes Inspire Faculty award from DST, the President's International Fellowship Initiative (PIFI) award for visiting scientists, Science and Engineering Research Board (SERB), Govt. of India

Title of the Talk: Chemistry as a sustainable solution to curb environmental pollution: Challenges and way forward

Anthropogenic activities have substantially affected our environment and major environmental issues of the 20th and 21st centuries include deterioration of air and soil quality, poor water quality, vast pesticide usage and the emergence of microplastics, and reduction in nutritional values of the foods. In addition, the emission of greenhouse gases and aerosols and ozone layer depletion have played a significant role in causing warming and climate change globally. Most of the current environmental problems do not have a unique solution. We need an inter-and multi-disciplinary team of chemists, engineers, agriculture scientists, geologists and environmentalists to tackle pollution. In this talk, I shall be speaking on how chemistry can be used as a sustainable solution to curb environmental pollution, focusing on India's environmental challenges.

Session B10: Energy and Environment

Chairperson:
Dr Swatantra P. Singh
Assistant Professor
Department of Environmental Science & Engineering
Indian Institute of Technology Bombay
Powai 400076, India
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Dr Swatantra is an Assistant Professor at IIT Bombay in Environmental Science and Engineering Department; before that, he was a Post-Doctoral Scholar at the Zuckerberg Institute of Water Research at Ben-Gurion University, Israel. He is an environmental engineer with training in pollution control using state-of-the-art technologies. He received his PhD and MTech in environmental engineering from the Indian Institute of Technology Kanpur, India. His current research interests are desalination & wastewater treatment by membranes and nanomaterials for environmental remediation. He was the recipient of the INAE Young Engineering Award 2020 and the ISEES Young Scientist Award 2020.

B10 - Invited Speaker 1:
Dr Nikhil Sharma
Assistant Professor
Department of Mechanical Engineering
Malaviya National Institute of Technology
Rajasthan 302017, India
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Dr Nikhil Sharma has been an Assistant Professor at the Department of Mechanical Engineering, Malaviya National Institute of Technology Jaipur, India, since 2020. He received his PhD from the Department of Mechanical Engineering, Indian Institute of Technology Kanpur. After his PhD, he was awarded Senior Research Associateship by the Council of Scientific and Industrial Research (India) to pursue research at IIT Kanpur. He was awarded the Research fellowship of the Swedish Energy Agency for pursuing postdoctoral research at Chalmers university of technology, Sweden, for two years. He receives the best PhD thesis award (2017) and the young scientist award (2018) from the International Society for Energy, Environment and Sustainability, India. His areas of interest include two broader aspects; Combustion Generated Particulates and Gaseous Emission: Particulate characterization and its control using after-treatment devices, soot morphology, emission measurement and their control. Laser Diagnostic Techniques: Phase Doppler Interferometry for spray characterization, particle image velocimetry for flow visualization, schlieren, shadowgraphy, Mie scattering, optical engine measurement, spray chamber development.

Title of the Talk: Characterization from Diesel and Renewable Fuel Engine Exhaust

Combustion of fossil fuels produces emissions and is one of the major environmental problems leading to climate change. Diesel engines are highly efficient but produce particulate emissions. These particulate emissions are considered dangerous to human health because inhaling particulates may cause respiratory and heart disease. Substituting fossil diesel fuel with renewable diesel fuel and using diesel particulate filters is one possibility to meet stringent legislative requirements. With this motivation, an experimental investigation aimed to evaluate the particle size distribution (PSD), optical properties of particulate matter (PM) emitted, and the outcome of using an after-treatment system comprising a diesel particle filter (DPF). This investigation aimed to compare particulate emissions upstream and downstream of the DPF with and without ultraviolet (UV) light (405 nm and 781 nm wavelength) turned on/off.

Session C1: Anaerobic Digestion

C1 - Invited Speaker 1:
Dr Josef Maroušek
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Dr Josef Maroušek is passionate about research and development in industrial (bio)technology with environmental and (bio) economic aspects in mind. Recently, he has been involved in (bio)waste valuation via (bio)refining into feed, cosmetics, fertilizers, packaging materials, soil improvers, (bio)fuels etc. He is a senior researcher at the Institute of Technology and Business in České Budějovice (Faculty of Technology), Tomas Bata University in Zlín (Faculty of Management and Economics), the University of South Bohemia in České Budějovice (Faculty of Agriculture and Technology), Technical University of Košice (Faculty of Mining, Ecology, Process Control and Geotechnologies) and University of Žilina (Faculty of Operation and Economics of Transport and Communications). He is a member of multiple advisory bodies, valuation committees and editorial boards. He serves as a consultant, expert witness, investment advisor, reviewer, or supervisor of PhD students. He has published dozens of papers, patents, and books (Hi = 41).

Title of the Talk: Valorisation of biogas fermentation residues

There are hundreds of thousands of commercial biogas plants around the world, each producing approximately 30 tons of fermentation residues (digestate) per day. The resulting digestate is mostly ploughed into arable land. However, it has been shown repeatedly and independently demonstrated that the agronomic value of digestate is so low (more than 90% is water, and what's worse, the nutrients are in organic form while the plants take up mainly mineral forms) that it often cannot cover the cost of application. Thus, ways of environmentally and financially viable digestate valorization are urgently sought worldwide. Technologies to increase the biodegradability of digestate and return it back to the biogas plant or to (bio)refine it for cosmetics, animal feed, packaging materials, pyrolyze it into char and biochar, and others are being techno–economically assessed. The most promising technologies are highlighted, with energy and fertilizer prices among the decisive factors for competitiveness.

C1 - Invited Speaker 2:

Dr V Vivekanand
Centre for Energy and Environment
Malaviya National Institute of Technology Jaipur
Jaipur 302 017, India
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Dr V Vivekanand is working as Assistant Professor and has been Head (2020-2022) at the Centre for Energy and Environment, Malaviya National Institute of Technology (MNIT) Jaipur, India. He has completed PhD from IIT Roorkee, India. He has been awarded the highly prestigious 'Ramalingaswami Re-Entry Fellow' (DBT Govt of India), 'National Doctoral Fellowship' from AICTE, New Delhi, India. He worked as a postdoctoral research scientist for seven years in Sweden and Norway. At the University of Gothenburg, Sweden and awarded a seed grant from 'The Royal Society of Arts and Sciences Sweden. He worked on 'Biomass to Bioenergy' projects at the Norwegian University of Life Science at Norway's National Facility of Biogas. He has a keen research interest and expertise in biomass pretreatment, bioprocessing, and its conversion for bioenergy applications. Presently, he has >81 international research articles (with citations >3078, h-index 30) published in SCI journals of high repute, conferences (>30) and authored book chapters (>7).

Title of the Talk: Solid-state anaerobic digestion of agricultural stubble and its simultaneous treatment for improved methanogenesis

Our global economic system is dependent on the use of fossil energy sources for the production of fuels and chemicals. However, fossil fuels are limited resources, and their depletion is inevitable. Escalating world population and living standards will lead to higher global energy consumption and demand. It is predicted to increase dramatically over the next half-century, at least from 17.7 TW to 28 TW by 2050. To solve this challenge, renewable energy sources (biomass, wind, solar, etc.) may meet the energy demand in a secure, sustainable and eco-friendly way. Agro-industrial residual resources and non-food plant biomass represent sustainable, renewable, alternative feedstock(s) for producing energy and chemicals in the emerging Bioeconomy. In this regard, efficient technologies for biomass conversion and sustainable biomass production systems will be critical technologies. Lignocellulosic biomass has inherent recalcitrance due to its chemical composition; despite recent improvements in enzyme technology, it's processing usually requires physic-o-chemical pretreatment for optimal biochemical conversion. Thermal hydrolysis/steam explosion is one of the most efficient and environment-friendly pretreatment methods for lignocellulosic biomass. It works well on marine as well as terrestrial biomass. Intense research is on the way to understanding the underlying mechanisms of lignocellulose breakdown by pretreatment that will allow us to extract more sugar/energy. The fundamental insight of biomass (viz., lignocellulose, seaweed and agricultural residues), its saccharification efficiency, biomethane potential and microbial consortia composition are under investigation to realize the potential of biomass for energy applications in future bio-economy.

C1 - Invited Speaker 3:
Dr Grzegorz Piechota
GPCHEM Laboratory of Biogas Research and Analysis
Cytowany przez 620, Poland
Email: gp.chem@g.p.chem

Dr Grzegorz Piechota completed his PhD in 2016 in Chemistry from Nicolaus Copernicus University in Toruń, Poland and his D.Sc in 2022 at Cracow University of Technology. Since 2014 is employed in his Laboratory - GPCHEM Laboratory of Biogas Research and Analysis. Since 2009, he has been a member of the Polish Association of Chemical Engineers and Technicians. Moreover, since 2021, he has been Vice-President of the Polish Association - Green Gas for Climate (as a Member of the European Biogas Association - EBA). Scientific interests are focused on processes of biogas upgrading to biomethane and biohydrogen in sustainable renewable energy development. In the subject area, in 2014-2021, Dr Grzegorz Piechota was an expert/performer/manager of 7 national grants and an expert (International Advisory Board) in two European Projects (INTERREG IVc – Waste to Energy and CERREC). He was awarded the Scholarship of the Polish Minister of Science and Higher Education and the Polish Prestige Awards. Currently, he acts as Associated Editor for Sustainable Chemical Engineering (Universal Wiser Publisher, Singapore) and serves as Guest Editor for Bioresource Technology (Elsevier, IF: 11.889) SI: "Bioresource management of biowaste for a sustainable environment (BMBSE-2022)" Biomass and Bioenergy (Elsevier, IF: 5.77) SI" "Recent advances in Biomethane production – accelerating autonomous energy provision" and SI: Molecules (MDPI, IF: 4.927) - "Fate of Organosilicon Compounds in the Environment". In his academic career reviewed more than 150 manuscripts for many high-impact journals published by Elsevier and Springer Publishers.

Title of the Talk: Natural adsorbents in the process of biogas upgrading to biomethane quality

The adsorptive packed column system (APCS) was applied to improve the biogas quality to biomethane purity. Inside the APCS, four adsorbent-packed columns were arranged based on four adsorbents incl.: including biochar, chemically modified biochar, zeolite and active carbon. Moreover, The APCS was enriched in a specially constructed "dispersal star" that provided a turbulent flow of purified biogas. The removal performance of ACPS was tested using gas chromatography techniques coupled with different types of detectors (MS, ECD, FID, TCD). The removal efficiency of total non-silica impurities was obtained at the level of 68.62% to 99.89%, depending on the adsorbent, whereas trimethylsilonol and volatile methyl siloxanes were removed entirely. The work describes the concentrations of silica and non-silica impurities with CHP manufacturers' limits and biomethane quality in context to its injection into the national gas grid system.

C1 - Invited Speaker 4:
Dr Abha Kumari
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Amity Institute of Biotechnology
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Title of the Talk: Strategic Potential of Flower waste as a feedstock for Biogas Production

The flower is a hidden wealth or treasure trove. With a 68% yearly contribution to flower production, the Netherlands is the world's greatest producer of flowers, such as tulips and chrysanthemums. The global flower market has an annual turnover of 30 billion euros and a 9% annual growth rate in trade volume. There is now 2785000 MT of flowers produced in India. Worldwide, there is a large amount of floral waste that needs to be disposed of scientifically, together with the creation of high- and low-value items. According to the present scenario yearly quantity of solid waste created by the world's floral waste is 2.01 billion tonnes or 0.74 kg per person per day. Valentine's Day generates 9,000 metric tonnes CO_2 emissions from the field when 100 million roses are sent out. The amazing amount of floral waste created daily in India at hotels, temples, wedding gardens, houses of worship, and other civilised and religious ceremonies totals 20 million tonnes. Only in India are the rivers polluted with around 80,000,000 tonnes of discarded flowers annually, but the effects are also seen in other nations. According to the estimates, flower waste makes up 0.14 to 2% of municipal solid garbage produced in major cities like Mumbai, Bangalore, Chennai, Hyderabad, and Pune. Flower wastes are a storehouse of several valuable components such as carotenoid, flavonoid, pectin, hemicellulose, cellulose, lignin, water etc.

The flower waste generated from any religious place consist mainly of marigold, about 90%, and the remaining 10% contains rose, jasmine, chrysanthemum, hyacinth, hibiscus, etc. This floral waste can be properly managed and utilized in various value-added forms. Marigold flower has 90% water and 10% solid. 9.9% out of 10% of solids are polysaccharides in the form of pectin, hemicellulose, cellulose, and lignin. Therefore, flower waste can be a potential and powerful feedstock base for the production of biogas by flower waste enterprises. Biogas production from floral waste has been studied on a laboratory scale, and raw biogas from floral waste contains over 57% methane. Generating a large amount of flower waste from several religious sites gives ample opportunities for the progress of biogas technologies. The potential volume of biogas production from a flower on a large scale can provide employment, benefit society, support the economy of the country, and reduce the dependency on natural fossil fuels. The lecture will cover the evaluation of flower waste generated across India, identification of the flower waste management trends in India based on data on flower waste generation, flower waste management and application and calculation of the strategic potential of flower waste as a feedstock for biogas production.

Session C2: Biodegradation of Toxic Chemicals

Chairperson:
Prof Abha Kumari
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Dr Abha Kumari is working as an Associate Professor at the Amity Institute of Biotechnology, Amity University. She holds a PhD and M.S. in Biochemical Engineering from the Indian Institute of Science (IISc) Bangalore. She holds a Post-Doctoral Fellowship from CSIR's National Chemical Laboratory (NCL), Pune and another Post-Doctoral Fellowship from Lakehead University, Canada. She was also a Visiting Researcher at the Tohoku Institute of Technology, Sendai. She received a Pool Officer fellowship from CSIR in 2009, DBT-PDF Fellowship, Dept. of Biotechnology, Govt. of India, 2005 and Fellowship Awarded for M. S. and PhD by IISc Bangalore. She has also received numerous grants as project funding for various projects from CSIR and the DBT government of India. She has published several papers in a reputed international journal. She guided three students to their PhD degree. Her research areas are the development of the biological process for producing a value-added product from flower wastes, biogas production, municipal solid waste management, bioremediation of industrial effluent, wastewater treatment, and metals recovery from ores.

C2 - Invited Speaker 1:

Dr Vivek K Gaur
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Ulsan National Institute of Science and Technology
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Dr Vivek Kumar Gaur is currently employed as a Post-Doctoral Fellow in the School of Biochemical Engineering at Ulsan National Institute of Science And Technology (UNIST), Ulsan, South Korea. He has done PhD in Biotechnology from the CSIR-Indian Institute of Toxicology and Research (CSIR-IITR) in 2021. His major areas of research are Environmental Biotechnology, Metabolic and Bioprocess engineering. He has authored over 80 publications, including research and review papers, book chapters and conference communications. He was awarded the Young Researcher Award in 2021 for his work on microbial biosurfactants. He is a member of The Biotech Research Society of India (BRSI), the Association of Microbiologists of India (AMI), and the Korean Society for Biotechnology and Bioengineering (KSBB)

Title of the Talk: Engineering Escherichia coli for the production of polyhydroxypropionate homopolymer

Polyhydroxyalkanoates (PHAs) have emerged as a good alternative to petroleum-derived non-biodegradable plastics. Although polyhydroxy butyrate (PHB) has been extensively studied, the production of polyhydroxypropionate (PHP) has been attractive due to its unique physicochemical properties such as high degradability, high flexibility, high elongation at break, and low melting temperature. However, the polymer has not yet been commercialized due to a lack of economical production methods. The present study aims to develop an efficient strain and process for the production of P3HP homopolymer by metabolic engineering of Escherichia coli and fermentation optimization. Different E. coli strains were evaluated, among which the K12 (MG1655) strain, showing the highest production of 2.1 g/L, was selected. The P3HP titer was increased to 6.5 g/L on the flask scale by balancing the production pathway and partial optimisation of process parameters. In addition, by overexpressing a phasin that is believed to stabilize the polymer inside the cell and upregulating the expression of cell division protein FtsZ, the titer was enhanced to 9.5 g/L on the flask scale and 70 g/L in a fed-batch bioreactor fermentation in 48 h, the highest titer reported so far. Further studies to improve the economics of P3HP production are underway.

C2 - Invited Speaker 2:
Dr Nidhi Pareek
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Dr Nidhi Pareek is working as Associate Professor cum INSPIRE Faculty (DST) cum BioCare Scientist (DBT) at the Department of the Sports Bioscience-Central University of Rajasthan, Ajmer, India. She has been a proud receiver of the highly prestigious National Doctoral Fellowship from the All India Council for Technical Education (AICTE), New Delhi, during her PhD at IIT Roorkee, India. She was awarded a fellowship from Kempe Foundation-Sweden for working as a postdoctoral research scientist for 2 years in Sweden. Subsequently, she worked on enzymatic degradation of biomass for high-value biochemical production with a premier institute in Sweden. She has keen research interest and expertise in microbial catalysis, marine microbiology and prospecting, and bioprocessing of biomass. She has 60 peer-reviewed international research articles published in journals of high repute, conferences (25) and authored book chapters (24) (Citations >2125, h-index 25). She is working on projects funded by Indo-EU, Indo-Russia, DST (WTI) and SERB (POWER, ECR) for the production of upcycling from marine and terrestrial residual resources into bioactive compounds. She is a proud receiver of the Chancellor's Award for Best Faculty at the Central University of Rajasthan (2019) and the Young Scientist Award from the Association of Microbiologists of India (2017).

Title of the Talk: Combinatorial process development for rationalized recycling of nutrients for environment clean-up and waste-management

The expedited advent of industrialization and urbanization for economic growth has adversely affected the quality of the environment. Phytoremediation is a potential biological treatment that is cost-effective and eco-friendly over the current physicochemical techniques that bear economic and environmental limitations. The nutrient recycling potential of microalgal strains in terms of biomass productivity and specific growth rate was investigated using different wastewater (dairy, primarily treated sewage, and textile, respectively) as a nutrient source. Notable nutrient removal from the wastewater using the microalgal species in terms of biological oxygen demand (BOD), chemical oxygen demand (COD), chloride, nitrate and phosphate concentration has been observed. Compositional analysis of dried algal biomass has revealed that the carbon content has increased in the biomass cultivated in the 3:1 ratio of wastewater with respect to control. Co-digestion of dried biomass with cow dung yielded 580-1098 ml g-1 VS biogas with 48-65% of methane content. Integration of remediation of wastewater and bioenergy production gives hope for a sustainable future, and the scaling-up of the process can eradicate the wastewater and energy crisis.

C2 - Invited Speaker 3:
Dr Jaydeep Bhattacharya
Assistant Professor
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Dr Jaydeep Bhattacharya is working as an assistant professor in the department of Biotechnology at Jawaharlal Nehru University, New Delhi. He completed his PhD in Biotechnology from the University of Calcutta in 2007 and his MTech from Jadavpur University in 2003. He worked as a Scientist and Postdoctoral fellow at Forschungzentrum Juelich, Germany, from 2010 to 2014. Dr Jaydeep Bhattacharya received many projects from ICMR, DBT, DST and SERB. He received a DAAD fellowship from the Federal Republic of Germany. He supervised 10 PhD, 15 Master and 3 postdoctoral fellow students. He published more than 40 peer-reviewed journal articles and 10 book chapters and filed 10 patents.

Title of the Talk: Anisotropic nano structures for detection and degradation of toxic chemical and biotic contaminants

Sustainability is the key player in the development of modern technologies by ensuring efficient resource utilization. The use of greener fabrication processes for the development of products helps to achieve technological translation. Herein, a hetero junction plasmonic binary bi-functional hybrid (semiconductor–metal) system comprising zinc oxide nano leaves uniformly decorated with gold nano islands and (Au/ZnO, RGO/ZnO) and ternary (RGO/Au/ZnO) nanocomposites (NC) have been was synthesized using a one-step, room temperature biosynthetic reduction and one pot hydro thermal process. Detailed characterization of the as-synthesized hybrid system defines the crystalline nature, engineered band gap, appropriate chemical elemental state and interfacial charge distribution features. Marked with the presence of symmetric and non-totally symmetric Raman vibrations, the role of electromagnetic and chemical enhancement was equally attributed to improved signal strengths. Dendritic metal nanostructures increased the enhancement with increased hotspots and spatial confinement. The hybrid structures demonstrated sunlight-mediated photo-degradation and anti-bacterial activity. Decoration with Au nanoparticles (ca. 11 ± 3 and 48 ± 5 nm) and RGO of ZnO (3D/1D) (aspect ratio 15.18) provides ternary NCs with an edge over mono/bi component catalysts. The ternary NC have improved dye degradation capacity with 100% efficiency (5 µM MB solution). . The self-cleaning feature of the nano hybrid was tested against a model bacterial contaminant S. aureus, which was killed with 100% efficiency using ~60 µgml under natural sunlight. Further, the regeneration ability (ca. 90% for ten µM solutions) of these NCs, shows a broader potential and could reduce the continuous requirement of such material, limiting the environmental toxicity.

Session C3: Environmental Bioengineering

Chairperson:
Dr V Vivekanand
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Dr V Vivekanand is working as Assistant Professor and has been Head (2020-2022) at the Centre for Energy and Environment, Malaviya National Institute of Technology (MNIT) Jaipur, India. He has completed PhD from IIT Roorkee, India. He has been awarded the highly prestigious 'Ramalingaswami Re-Entry Fellow' (DBT Govt of India), 'National Doctoral Fellowship' from AICTE, New Delhi, India. He worked as a postdoctoral research scientist in Sweden and Norway for seven years. At the University of Gothenburg, Sweden and awarded a seed grant from 'The Royal Society of Arts and Sciences Sweden. He worked on 'Biomass to Bioenergy' projects at the Norwegian University of Life Science at Norway's National Facility of Biogas. He has a keen research interest and expertise in biomass pretreatment, bioprocessing, and its conversion for bioenergy applications. Presently, he has >81 international research articles (with citations >3078, h-index 30) published in SCI journals of high repute, conferences (>30) and authored book chapters (>7).

C3 - Keynote Speaker:
Dr Indu Shekhar Thakur
Professor & Director,
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Prof Indu Shekhar Thakur, FNASc, FNAAS, FIBA, FBRS, FNAES, FISEES, graduated and served at Jawaharlal Nehru University, New Delhi. He is working on research areas of bioremediation, bio-valorization, and detoxification of natural and organic compounds, developed bacterial consortium by genetic breeding, characterized genes and proteins, proteomics, genomics analysis for Green House Gases sequestration for biomass, enzymes, biodiesel, bio-flocculant, bioplastic, biomaterials. Biocomposite materials synthesized by enzymes adsorbed on calcite of CO_2-sequestrating bacteria for chromate, arsenite, and heavy metals removal. Degradation of pentachlorophenol in the tannery and recovery of nitrogen and phosphorus in wastewater performed. He published more than 270 research papers in peer-reviewed journals, chapters in books, two textbooks, four patents, and technologies. He is a member of several journal editorial boards and review committees. He completed 22 research projects as a PI, 30 PhD, 2 M.Phil, and 14 Post Graduate theses/dissertations under his supervision, included in the world ranking of the top 2% of scientists (rank 503).

Title of the Talk: Biological looping mechanisms for decarbonization of carbon dioxide for the production of biofuel and biomaterials by microorganisms

Enormous emissions of Green House Gases (GHGs), carbon dioxide, methane and nitrous oxide have become a major source of global warming and present socio-political issues. The atmospheric CO2 level over the last 300 years has rapidly changed to over 100 ppm from the pre-1750 level at ~ 280 ppm to the current level exceeding 417 ppm, much above the accepted limit of 350 ppm. Compared to traditional chemical absorption, cryogenic separation, electrochemical separation, pressure swing adsorption technique, gas separation, membrane technology and other chemical looping mechanisms for the sequestration of GHGs, biological looping mechanisms have significant potential for the production of biofuel and biomaterials. To meet the CO_2 emission reduction targets, carbon dioxide capture and utilization (CCU) comes as an evolving technology. At the industrial scale, the utilization of CO_2 as raw material is insignificant compared to its abundance. Mechanisms in nature have evolved for carbon concentration, fixation and utilization. This presentation is related to an overview of the biocatalytic transformation of CO_2 into biofuels and biomaterials by chemical and biological methods by bacteria, enriched in the presence of sodium bicarbonate, characterized by proteomics and genomic approaches, for the production of biofuel and biomaterials.

C3 - Invited Speaker 1:

Dr Keshab Mondal
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Dr Keshab Chandra Mondal is a Professor at the Department of Microbiology, Vidyasagar University, West Bengal, India. He was awarded Chancellor's Gold medal for scoring the first rank in the M.Sc. examination. For the last 25 years, he has served in various capacities at the Faculty of Raja N L Khan Women's College and Microbiology Department, Vidyasagar University. His research efforts have focused on understanding traditional fermented foods' microbial diversity and their impacts on gut flora as well as anti-diabetic, antiobesity and antitoxic potentialities. Exploration of effective probiotic organisms and microbial enzymes is also his field of research. Prof Mondal has published more than 162 scientific papers, 8 reviews, 20 book chapters and one textbook (Microbial Fermentation and Enzyme Technology) from CRC press. Prof Mondal has guided more than 100 dissertation projects, 4 M.Phil students and produced 19 Ph. D. students. He is the recipient of the Indo-Hungarian fellowship in 2014 and the Tempus Public Foundation (TPF) fellowship in Hungary for 2015-16. He has been conferred Fellow of the Biotech Research Society, India (2020) and Fellow of the Physiological Society of India (2021). He has widely travelled in Europe and many other countries, delivered lead talks at many conferences, and organized several conferences and workshops.

Title of the Talk: Fungal laccase-mediated detoxification of laboratory dyes

The extensive use of synthetic dyes in laboratories has released effluents containing various noxious, persistent, and slowly biodegradable products, severely deteriorating the environment. Among the used toxic laboratory dyes, eosin was found to be the most toxic, followed by phenol red, methylene blue, crystal violet, and rhodamine since such dyes impeded the growth parameters of plant growth-promoting microorganisms (PGPMs) and chickpea (Cicer arietinum). To biodegrade such pervicacious dyes, the current study aimed to utilize laccase (1509.89 U/gds) from the solid-state fermentation of inexpensive agricultural remnants using an isolated fungal strain MSK3. The produced laccase was significantly decolourized and detoxified the harmful effects of rhodamine, followed by crystal violet, methylene blue, phenol red, and eosin. A pilot scale is running where an immobilized laccase is utilized to detoxify a large volume of such laboratory dyes.

C3 - Invited Speaker 2:

Dr Akhilesh Tiwari
Department of Applied Sciences, Indian Institute of Information Technology Allahabad, Deoghat, Jhalwa, Prayagraj-211015, UP, India
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Dr Akhilesh Tiwari gained his MSc (Physics) and achieved two PhD degrees, one in Physical Sciences and another one in Process Engineering from France. He did his postdoctoral fellowship at UBP, France. He is working as Associate Professor (Physics) at the Department of Applied Sciences, IIIT Allahabad, Prayagraj. He has more than 23 years of experience and has published and presented more than 180 scientific papers in his credit at different National/International platforms. Has supervised several PhD and MTech students. In his research studies, he worked on the modelling and simulation of photonic crystals, quantum optics & informatics, and space studies for a life support system. He is a very active member of several International/national scientific bodies such as the Senior member of IEEE, Life member IAPT, BRSI, Photonics Society of India (PSI), and the members of Optica and AIAAA etc.

Title of the Talk: Condensation of atmospheric water vapour its feasibility as active potable source and physicochemical analysis

The condensation of atmospheric water vapour is a natural phenomenon. It is one of the important links of the water cycle on earth. It helps us in providing fresh water for human society. However, the availability of fresh water on earth is decreasing day by day. The challenges are increasing for the survival of human society. Scientists are trying to develop novel approaches for the non-conventional sources of water collection from the atmosphere, which are active and passive. In this experimental study, a novel technique has been developed to create an active surface for water vapour condensation. A detailed analysis will be presented, and the physicochemical parameters of water condensate will be analyzed. A mathematical model has been proposed, and a correlation has been validated experimentally. This energy-efficient technique will help us to develop more vital techniques, which may be viable in fulfilling the needs of the society

C3 - Invited Speaker 3:
Dr Preeti Chaturvedi
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Dr Preeti Chaturvedi Bhargava is currently working as a Senior Scientist in Environmental Toxicology Group at CSIR-Indian Institute of Toxicology Research, Lucknow. Currently, her team involves in working on the synthesis of native and engineered (surface modifications) biochar using different catalysts for enhancing adsorption capacity for remediation and adsorption of pollutants from wastewater samples. In addition, she is also involved in developing green technologies for effluent treatment for a sustainable environment & health. The major areas of her research work include Bioremediation, Toxicity assessment, Metagenomics, Microbial biotechnology, and Proteomics. She has published more than 60 research/review papers in Springer, Elsevier, and Frontiers peer-reviewed SCI journals. She has also contributed to peer-reviewed books in Wiley & CRC press, book chapters and magazine articles. She works on mega projects funded by the National Mission for Clean Ganga, Department of Water Resources, River Development & Ganga Rejuvenation, Ministry of Jal Shakti, Government of India. Her group has been involved in studying and rejuvenating various rivers of Himalayan origin, like the Ganga and Yamuna. She is a life member of many renowned international and national scientific societies.

Title of the Talk: Effective elimination of toxic azo dyes using biochar-microbial composite hybrid technology

Azo dyes, a major constituent of textile, paper & pulp, cosmetic and pharmaceutical units, are released in large quantities from effluents of these industries. Its low cost and desirable properties favour its massive application in these sectors in spite of its toxic and mutagenic effects. The recalcitrant nature of azo dyes hinders their effective eradication through conventional biological/physical/chemical treatment methods. The talk involves cognizance of an integrative approach for successfully removing azo dyes from effluent. The approach entails the action of a biochar-microbe composite in a fabricated continuous packed bed reactor (CPBR) for the treatment of effluent containing a mixture of azo dyes. Individual studies using free and immobilized bacterial cells yielded removal efficiency of 52.360±0.209% and 78.241±0.211%, respectively. The performance of the decolourization process was assessed through response surface methodology (RSM) and artificial neural network (ANN) models. Predictions made by models suited well with the test runs, thus indicating sustainable management of the issue.

Session C4: Sustainable Processing of Biomass

Chairperson:
Dr Akhilesh Tiwari
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Akhilesh Tiwari gained his MSc (Physics) and achieved two PhD degrees, one in Physical Sciences and another one in Process Engineering from France. He did his postdoctoral fellowship at UBP, France. He is working as Associate Professor (Physics) at the Department of Applied Sciences, IIIT Allahabad, Prayagraj. He has more than 23 years of experience and has published and presented more than 180 scientific papers in his credit at different National/International platforms. Has supervised several PhD and MTech theses. In his research studies, he worked on the modelling and simulation of photonic crystals, quantum optics & informatics, and space studies for life support systems. He is a very active member of several International/national scientific bodies such as the Senior member of IEEE, Life member IAPT, BRSI, Photonics Society of India (PSI), and the members of Optica and AIAAA etc.

C4 - Invited Speaker 1:

Dr Thallada Bhaskar
Principal Scientist,
Thermocatalytic Processes Area, Bio-Fuels Division,
CSIR-Indian Institute of Petroleum, Mohkampur,
Dehradun 248005, Uttarakhand, India
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Dr Thallada Bhaskar is heading the Material Resource Efficiency Division (MRED) at CSIR-Indian Institute of Petroleum, Dehradun, India, which covers Thermo-catalytic & Biochemical conversion of Biomass along with the Sustainability impact assessment area. He received PhD for his work at CSIR-Indian Institute of Chemical Technology (IICT), Hyderabad. His areas of interest are thermo-catalytic conversion of lignocellulosic biomass, lignin valorisation, biochar, nano-catalysts/nano-metal incorporated biochar for environmental applications, and other applications, novel catalytic materials, adsorbents/specialty carbons from renewable materials. He carried out Postdoctoral Research at Okayama University, Okayama, Japan, after which he worked as Assistant Professor for ~5 years. He has 200 publications in SCI journals of international repute with an h-index of 59 and more than 10850 citations. He has contributed 40 book chapters and 14 patents to his credit in his field of expertise, in addition to 300 national and international symposia presentations. In addition, he is the project leader/ coordinator for several projects for biomass and waste valorisation. He received the Distinguished Researcher award from AIST (2013), Japan and Most Progressive Researcher from FSRJ, Japan (2008). He is also the FRSC, FBRS, FISEES, FIBA, and FTAS. Scientist of the Year Award (2016) from the National Environmental Science Academy (NESA) and Raman Research Fellow (RRF) from CSIR.

Title of the Talk: Biochar for diverse applications: Role of feedstock and process

The recent COP26 meeting and the IPCC reports have stressed the importance of using renewable feedstocks in all sectors. Feedstocks such as lignocellulosic biomass are widely available across the country and can be used as a domestic source of renewable organic carbon. These biomasses can be processed through different thermochemical conversion processes, and among them, pyrolysis or hydrothermal conversion are mainly used due to the associated processing advantages. The major products from the above processes are bio-oil and bio-char. Bio-oil can be used for different energy/ fuel/ chemical applications. Biochar, on the other hand, has varied and high-value applications. The other uses of bio-char are used as catalytic supports/ catalysts for different conversions. Biochar can also be used in wastewater treatment or other applications requiring adsorbents. Some of the high-end applications of biochar include their use in electrode and supercapacitor applications. The talk includes the different applications of biochar produced from various lignocellulosic biomass available across the country.

C4 - Invited Speaker 2:

Dr Bhuwan B Mishra
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Dr Bhuwan Mishra is working as Scientist-D at the Center of Innovative and Applied Bioprocessing (CIAB), SAS Nagar, Mohali, India. He received his PhD degree in chemistry from Banaras Hindu University, Varanasi, India. He has expertise in the area of natural products, synthesis of heterocyclic and carbohydrate derivatives and biomass processing. He works on developing new food-grade flavour & fragrance ingredients, nutraceuticals & functional foods, task-specific ionic liquids/surface active ionic liquids, biodegradable packaging materials and platform chemicals from lignocelluloses using synthetic/semi-synthetic techniques. He has several awards, patents, and research papers published in various SCI journals to his credit. He received the 'Young Scientist Award' from 'The Council of Science and Technology (CST)', Uttar Pradesh (UP), Young Scientist Award under the Fast Track Scheme by the Department of Science and Technology (DST), New Delhi. Best paper award at 7th International Forum on Industrial Bioprocesses held at Jiangnan University, Wuxi, China. He is the recipient of a University Clermont – Auvergne (UCA) fellowship for working as a 'Visiting Professor' at Polytech Clermont-Ferrand, France. He is a member of many prestigious scientific societies, such as the Association of Carbohydrate Chemists & Technologists, India (ACCTI); Biotech Research Society, India (BRSI) and the International Society for Energy, Environment and Sustainability (ISEES), India

Title of the Talk: Valorisation of Spent Aromatic Waste to Platform Chemicals

Globally, about 400 plant species are cultivated for the commercial production of essential oils. Among these, lemongrass (*Cymbopogon flexuosus)*, citronella grass (*C. winterianus*) and palmarosa (*C. martini)* are most popular in Asia, Africa and America.[1] Extraction of essential oil from these crops results in the generation of spent aromatic waste. Lemongrass alone accounts for ~30,000,000 ton/year of aromatic waste generated worldwide.[2] India generates ~6.0 million ton/year spent waste by processing citronella and menthe oil. This most abundant and underutilized biomass does not have high-value applications. Hence, the majority is burned or disposed of to vacate the fields.[3] Open burning of spent aromatic biomass causes the deterioration of surrounding air quality due to releasing a substantial amount of pollutants into the atmosphere. The talk will cover the vital research activity of our group 4-6 on the chemical valorisation of spent aromatic waste to platform chemicals, e.g., CMF, 5-HMF, levulinic acid, lactic acid, ethyl-glycosides, etc.

C4 - Invited Speaker 3:

Dr Ashish N. Sawarkar
Department of Chemical Engineering,
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Dr Ashish N. Sawarkar has done his B.Tech. and MTech. from LIT, Nagpur. Further, he did his PhD (Chemical Engineering) from ICT, Mumbai. He is a recipient of International Travel Support from DST, Government of India, for presenting a research paper at the 61st Canadian Chemical Engineering Conference held during 23-26 October 2011 in Ontario, Canada. He was awarded a Certificate of Achievement and Medallion during the 51st National Annual Convention of the Indian Society for Technical Education (ISTE) held on August 27, 2022, for having guided the Best MTech. The thesis in Chemical Engineering (I Prize) titled "Studies on Co-gasification of Petcoke and Biomass" was submitted by Mr Zavin R. Gajera. He was also awarded a Certificate of Achievement and Medallion for guiding the Best MTech. Thesis in Chemical Engineering (II Prize) titled "Kinetic and Thermodynamic Analysis of Pyrolysis of Pigeon Pea (Cajanus cajan) Stalk" submitted by Mr Nikhil Kirti. He received the best paper presentation award at the International Conference (ACMS-2022) organized by IIChE, Kolkata. He has guided 3 PhD and 11 M. Tech. Students and currently guiding 2 PhD students. His research interests are biomass utilization, pyrolysis & gasification, and heavy oil upgrading. Presently, he is serving as an Asst. Prof (Grade-I), Department of Chemical Engineering, MNNIT Allahabad, Prayagraj

Title of the Talk: Advances in the valorization of agro residues through pyrolysis: A case study of finger millet straw

India is one of the world's largest agricultural-based economies; the livelihood of about 80% of its population depends on agriculture. National Policy on Biofuels–2018, Government of India, has further emphasized agro residues' role in the overall renewable energy sources mix. As regards the energy recovery from agro-residues, biochemical and thermochemical conversion processes are the two main routes at the forefront in realizing agro residue's bio-energy potential. Pyrolysis, a thermochemical conversion process in the presence of an inert atmosphere, is gaining increasing attention to convert agro-residues into pyro-gas, bio-oil, and bio-char, which could be employed for different applications. Finger millet (Eleusine coracana), ranked as the seventh most-grown cereal in the world, is a very important food crop grown in India. Finger millet accounts for 2.3 million ha in India, representing more than 50% of the world's total area, with an annual production of 2.1 million tonnes (MT). With each ton of crop produced, 1.3 tons of finger millet straw (FMS) is generated. The present talk will highlight some of the recent advances and will be centred on thermal degradation behaviour, kinetics, and thermodynamics parameters of pyrolysis of FMS, together with the characterization of FMS and its derived biochar

Session C5: Solid Waste Management

Chairperson:
Dr Ashish N. Sawarkar
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Dr Ashish N. Sawarkar has done his B.Tech. and MTech. from LIT, Nagpur. Further, he did his PhD (Chemical Engineering) from ICT, Mumbai. One of his published papers has been featured in the list of the Top 20 most accessed articles published in Industrial and Engineering Chemistry Research (ACS publication). Another published paper in The Canadian Journal of Chemical Engineering (Wiley publication) has been featured in the Virtual Issue of the Canadian Journal of Chemical Engineering on "Exploring the Diversity of The Canadian Journal of Chemical Engineering". Recently, one of his research group's papers titled "Kinetics of co-gasification of rice husk biomass and high sulphur petroleum coke with oxygen as gasifying medium via TGA" has featured in the list of most cited articles in Bioresource Technology Reports (Elsevier publication). He is a recipient of International Travel Support from DST, Government of India, for presenting a research paper at the 61st Canadian Chemical Engineering Conference held during 23-26 October 2011 in Ontario, Canada. He received the best paper presentation award at the International Conference (ACMS-2022) organized by IIChE, Kolkata. He has guided 3 PhD and 11 M. Tech. Students and currently guiding 2 PhD students. His research interests are biomass utilization, pyrolysis & gasification, and heavy oil upgrading. Presently, he is serving as an Asst. Prof (Grade-I), Department of Chemical Engineering, MNNIT Allahabad, Prayagraj

C5 - Keynote Speaker:
Dr Sunil Kumar Khare
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Prof Sunil Khare, an Institute Chair Professor of Biochemistry (HAG), currently holds Dean (R&D) position at IIT Delhi. An alumnus of IIT Delhi, he received his doctoral degree in Biochemistry (1990). He did his Postdoctoral research at the National Food Research Institute, Tsukuba, Japan. Prof Khare has more than 30 years of teaching and research experience with 200+ publications (h-index of 47), three product/ process patents, six microbial strains, and fifty National GenBank submissions. He has authored 22 book chapters and books and guided >15 PhD students. His noteworthy contributions have been in extremophiles, enzyme technology & nanobiocatalysis, nanotoxicity, food toxicology and bioremediation. Prof Khare holds a good reputation in the international research community. He has been invited as a visiting Professor to the University of Blaise Pascal, Clermont Ferrand, France (2018 and 2014). He was a Visiting Fellow (DBT) at Northern Regional Research Laboratory, USDA, Peoria, IL, USA (2006). He has also been a member of several professional societies like the American Chemical Society (ACS) and has served as Chairman/ member in DST, DBT, CSIR task force and committees and scientific advisory boards of various universities and institutions. Apart from being an academician, he has been actively involved in several administrative responsibilities at IIT Delhi. This is reflected by being Chairman GATE- JAM, IIT Delhi (2016-17).

Assessment and evaluation of microplastic particles from Gorai beach of Arabian sea, Maharashtra, India

There is a growing concern worldwide about microplastics (MPs) and their effect on the environment. The assessment and evaluation of MPs were done from the Gorai beach (19.2420° N latitude and 72.7808° E longitude), an Arabian coast in Mumbai, India. This is the first study on the evaluation of MPs from this beach. The sample was collected during low tide, and a stretch of 600m was selected for microplastic sampling. A total of ~2kg wet sand samples containing MPs were collected. The samples were dried in an oven at 65°C to reduce the moisture content. After drying, the samples were sieved with a mesh size of 4 mm to 0.08 mm. The visible MPs were then picked and segregated according to their morphotypes and sizes. A total of 527+25 particles/300g dominated by polypropylene (PP) > high-density polyethylene (HDPE) > polyvinyl alcohol (PVA) > low-density polyethylene (LDPE) > polyvinyl acetate (PVAc). Size 3-5 mm constituted 41.56% of particles, mostly of yellow film. Size <1mm, constituting 22.20%, belongs to pellet and HDPE polymers. This study showed that Gorai beach in the Arabian Sea is heavily contaminated with MP. There is an urgent need to remediate these MPs to protect the marine and surrounding environment. This overview shall discuss the various technological options to replenish these metals from the global cum Indian perspective and the advent of indigenous technologies to exploit such resources.

C5 - Invited Speaker 1:
Dr Abhilash
Principal Scientist
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Dr Abhilash, Principal Scientist & Group Leader, Secondaries and Resource Recycling Group; Metal Extraction and Recycling Division, CSIR-NML, Jamshedpur, and Associate Professor (ACSIR, India) is working towards the development of sustainable technologies for critical metal extraction from primary and secondary resources by interdisciplinary processes, via various industry & government-funded projects (over INR 15 crores) as Principal Investigator. Dr Abhilash has published 97 papers in SCI Journals and Nat./Int. Conference Proceedings and 4 granted and 13 filed patents to his credit; edited 7 books, contributed 14 chapters; and guided more than 60 students for Master's Thesis and at present engaged with 2 PhD. Students. He has been awarded by many forums/societies (DAE, BRSI, Ministry of Steel and Mines, Govt of India, etc.) for his contributions to hydrometallurgy, environmental biotechnology/microbiology, and nuclear metals. He is an editorial board member in many reputed journals of T&F, Springer, etc. He represents India in International Biohydrometallurgy Council and is an awarded Member of the National Academy of Sciences, India.

Title of the Talk: Circular economy in solid waste management

Solid waste generation from the metallurgical and chemical sectors are resources for metals of high economic importance. These metals, the governing factor for economics and national security, often fall in the high-risk zone of critical metals. India lacks many of those critical metals due to a lack of primary resources; hence, secondary resources play a pivotal role in augmenting their supply. Various wastes from the iron & steel sector, aluminium sector, copper, WEEEs, etc., contain some very critical metals like rare earth, Se, Te, Co, Ni, Li, etc., which are worthy of exploitation for recovery. Most of these metals present in the metal wheel of a resource often occupy the last priority due to less concentration, but these concentrations are high magnified in their respective wastes. A circular economy in remediating those wastes vis-à-vis extraction of these critical metals shall be very advantageous for economies like India to be self-reliant in many of these nets imported metals.

C5 - Invited Speaker 2:
Dr Vinod K. Garg
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Prof V.K. Garg is working as a Professor and Former Dean of the School of Environmental and Earth Sciences Central University of Punjab, Bathinda. He completed his Ph D in 1992 from CCS Haryana Agricultural University, Hisar. He has 30 years of Teaching and Research experience. He is actively involved in research in the field of solid waste management, bioremediation, heavy metal pollution and radioecology. He has guided 20 students in doctoral research. He has published more than 230 research papers in national and international journals. He has handled several research projects funding by BRNS, MOEFC, DST, UGC etc. His H-Index is 58 on Scopus and 68 on Google Scholar. He has more than 16500 citations.

Title of the Talk: Vermicomposting technology for non-toxic, biodegradable wastes

Non-toxic, biodegradable wastes are generated from domestic, commercial, agricultural and industrial activities. Several methods are used for their management but still huge quantities of remain unattended, which is a cause for concern. Therefore, scientific and sustainable interventions are needed to manage such waste. Vermicomposting is one such technique that is economically viable and has manifold advantages over other waste disposal techniques. Researchers have investigated the effectiveness of vermi-technology in treating different wastes. Although organic wastes are heterogeneous, their biodegradable nature offers an opportunity for their use as raw material for vermicomposting. The combined action of the earthworm and microbes mineralized organic waste and transformed it into manure that has the potential to solve several soil fertility and pollution-related issues. Vermicomposting can also potentially be used as a bioremediation technique. On the one hand, the use of vermicomposting for waste treatment and bioremediation ensures agricultural and environmental sustainability; on the other hand, manure is provided. Earthworms, a product of vermicomposting, can be used as feed in the aquaculture and poultry industry.

C5 - Invited Speaker 3:
Dr Manoj K. Sharma
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For more than 20 years, he has been working with plant genetic engineering and functional genomic studies in plants. Currently, he is employed as Assistant Professor at the School of Biotechnology, JNU, New Delhi, where he teaches Plant Biotechnology, Environmental Biotechnology and Research Methodologies to M.Sc and PhD students. He earned a doctoral degree from Delhi University in the field of plant molecular biology. During my postdoctoral studies at the University of California and Joint Bioenergy Institute Emeryville, CA, USA, he worked extensively in the field of plant genomics. He contributed actively towards whole genome sequencing programs for Brachypodium distachyon, Steria italic and Panicum virgatum. My research at JNU focuses on tool development for functional Genomic studies in sorghum. He is interested in understanding the carbohydrate portioning in sorghum for its improvement as biofuel feedstock and using various high-throughput approaches like transcriptomics and genetic engineering / CRISPR-based editing for designing improved biotech sorghum. In addition, we are interested in molecular farming in plants and are currently working to produce antigenic determinants from Bacillus anthracis in fodder plants for vaccinating domestic animals.

Title of the Talk: Multipurpose sorghum feedstock for biofuel production: a sustainable solution

Plant-based biofuels are a sustainable solution to meet the increasing world population's food/feed/fuel demands. Sorghum is a versatile crop that could serve as a potential bioenergy crop. Though Sorghum has remarkable potential to thrive on marginal land with minimum agricultural inputs, there exists huge diversity w.r.t. fermentable sugars and biomass accumulation. However, very little is known about the genetic regulators that regulate its growth and development. With the aim of genetic dissection of sorghum to understand the regulation of carbohydrate metabolism and its behaviour during drought conditions, we surveyed stem internodes from diverse sorghum cultivars during development as well as in response to progressive water-limiting conditions. Results showed systematic changes that occur in pathways affecting stem sugar accumulation and adaptation to the drought stress response. It specifically highlighted the significant role of carbohydrate transport and sugar metabolism, cellular signalling components, phytohormones and transcription factors like ERF, MYB, or NAC.

Session C6: Bioremediation

Chairperson:
Dr Asha Chaube
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Dr Asha Chaubey is presently working as Senior Principal Scientist and Head of the Fermentation and Microbial Biotechnology Division. She has been working in fermentation technology for the exploration and exploitation of microorganisms for producing bioactive and novel enzymes for more than 18 years. These include isolating and characterising microorganisms from unexplored niches of the North-Western Himalayas, Shivalik foothills and endophytes. Their significant contributions include the biotransformation of industrially important molecules, the immobilization of enzymes for enantioselectivity improvement, the production of industrially important biopharmaceuticals and publishing her work in the best journals of the field. She obtained a PhD degree from LLRM Medical college, Meerut, in collaboration with the National Physical Laboratory in the field of biosensors for diagnostics. During her doctoral research, she has significantly contributed towards the development of biosensors for health care and generated good-quality publications and patents. Presently, she has been actively involved in developing fermentation processes for biopharmaceuticals, nutraceuticals, therapeutic enzymes and enzymes/products for agriculture applications.

C6 - Invited Speaker 1:

Dr Pratyoosh Shukla
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Prof Pratyoosh Shukla is presently working as a Professor and coordinator at the School of Biotechnology, Banaras Hindu University, Varanasi, India. He was awarded Indo-USA Research Professor at the University of Cincinnati, USA. He also works as Visiting Guest Professor at the South China University of Technology, Guangzhou, China. His research areas include enzyme technology and protein bioinformatics and their applications in biofuel and other interdisciplinary areas. He has published more than 212 publications in reputed SCI journals, 9 books and 34 book chapters. He has carried out more than 14 R&D projects funded by national and international agencies as PI/Co-PI, including the prestigious Erasmus grant by European Union (EU). He has more than 6710 citations with an H-index of 47 and an i10 index of 137. He was recently also featured among a list of Indian Researchers who were Top 2% in 2019 and 2020 2021–Stanford Study). He is a Fellow of the National Academy of Agricultural Sciences (FNAAS), a Fellow of the Biotech Research Society of India (FBRS) and a Fellow of the Academy of Microbiological Sciences (FAMSc).

Title of the Talk: Integrated approaches for microbial bioremediation: Future scope and applications

The use of bio-computational tools in microbial bioremediation is always advantageous, and it has tremendous potential for gaining effectual bioremediation. It is now well known that the efficient bioremediation of environmental pollutants is highly significant, but it has many challenges and limitations. In the present work, we have explored the tools of systems biology as these tools are helpful in identifying novel genes and also their possible role in metabolic pathways. Our current studies also describe the use of synonyms (synthetic microbial consortium) and the advanced idea of microbe co-cultivation. Our present studies successfully indicated the role of indigenous bacterial isolate, i.e. *Bacillus cereus* BPS-9, in Lead bioaccumulation and its metabolic potential. Further, the role of genes encoding heavy metal-resistant proteins and transporters for the efflux of heavy metals is also described using the SEED viewer in the present study. In addition, our studies also presented the integrated use of wet-lab-dry-lab techniques for elucidating the comparative heavy metal bioaccumulation potential of *Ochrobactrum intermedium* BPS-20 and *Ochrobactrum ciceri* BPS-26. These integrated approaches, combined with metabolic engineering, may be helpful for attaining the effectual bioaccumulation of heavy metals.

C6 - Invited Speaker 2:

Dr Balendu Shekhar Giri
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Dr Balendu Shekher Giri currently works at the Indian Institute of Technology Guwahati, Assam, India as a Postdoctoral Researcher. Dr Balendu does research in Environmental Science, Soil Science, Wastewater Treatment and Waste Management. Their current project is 'Application of Biochar; Bioremediation of synthetic organic compounds including Antibiotics, Pharmaceutical Waste, Agrochemicals waste and textile industries waste and others like Thallada Bhaskar bioenergy and biofuel." He has worked as a researcher at Sejong University South Korea and the University of Hawaii in Manoa, USA. Balendu has published 97 publications, including review and research papers having more than 4500 google scholar citations.

Title of the Talk: Biochar-based catalysts for the abatement of toxic pollutants from water via advanced oxidation processes (AOPs)

Proper waste disposal is a key towards sustainable development. The application of efficient, economic, and novel catalysts delineates wastewater treatment. Biochar is derived from the thermochemical conversion of biomass or any carbonaceous materials and is considered one of the most eco-friendly substitutes for activated carbon. Owing to its large surface area, porosity, crystallinity and active functional groups, the biochar-based catalysts have been extensively applied to abate toxic pollutants from wastewater streams. While most of the reviews focus on the adsorptive properties of the biochar, this review critically analyses the recent development of biochar-based catalysts in the field of advanced oxidation processes (Fenton-like systems, photocatalytic and sonocatalytic systems). The presence of persistent free radicals and oxygen-containing functional groups renders biochar to act as a catalyst. The mechanisms accompanying the catalytic performance of biochar-based catalysts have also been reviewed. However, the research in this area is entirely at an initial phase, and many advancement schemes are essential before scale-up and commercialization. Future research should be devoted to a more efficient and rigorous understanding of the structural properties of biochar to engineer the catalytic degradation of targeted pollutants in wastewater treatment.

C6 - Invited Speaker 3:

Prof Kashyap Kumar Dubey
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Prof Dubey is currently working as Associate Professor at the School of Biotechnology, JNU New Delhi. Prof Dubey received his PhD degree in 2008 in the area of Industrial Biotechnology. Dr Dubey's researches are biochemical engineering and wastewater treatment which includes process development of value-added pharmaceutical products (3-demethylated colchicine, betulin, CoQ10, pullulan, and lipstatin), through optimization of enzyme reactions and toxicological studies of micro-pollutants. He is running a research project sanctioned by DST-BRICS, and completed projects funded by DBT (Horizon2020) on Clean Water for Health, BIRAC-DBT and DBT on microbial process development. He has completed Four major research projects and published 60 articles in International Journals. He is a Member of Various Scientific societies like IFIBbiop, BRSI, NASc, ISCA, SBC, DST-INSPIRE, MSI, ISCB, and AMI.

Title of the Talk: Treat-after-too: Strategies for degradation of native as well as transformed cancer drugs present in biological fluid of cancer patient

India lacks a hospital wastewater treatment process to remove antineoplastic agents from wastewater in hospitals (mainly in the metro city). European Union countries like Portugal and Belgium share the same situation in which antineoplastic agents are not explicitly removed, reaching conventional wastewater treatment plants that are not able to destroy these persistent components, reaching the aquatic environment. In addition, the increasing rate of cancer patients all over the world has become a global fact during the last two decades. Keeping in view the necessity of specific treatment methods for the removal of antineoplastic agents (Cyclophosphamide, 5-flurouracil, Etoposide) developed with the integration of biological and membrane technology.

C6 - Invited Speaker 4:

Dr Priyangshu M Sarma
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Dr Priyangshu Manab Sarma has a Ph D in microbial biotechnology with 22 years of experience translating and commercializing laboratory-based research and innovations. Starting his research career at CSIR-National Chemical Laboratory, Pune, he was associated with TERI (formerly Tata Energy Research Institute), New Delhi, for 15 years. For two and a half years, Dr Sarma was associated with Oil and Natural Gas Corporation Ltd (ONGC) as a Domain Expert for Biotechnology at ONGC Energy Center. Later he quit the corporate R&D position to start his own Startup. He is the founder of two tech-based startup companies, with the R&D facility at Guwahati Biotech Park at IIT Guwahati Campus and its operational office in New Delhi. With an h-index of 29 and over 2700 citations, Dr Sarma has 55 peer-reviewed international publications, two books and three patents. His work area focuses on environmental biotech solutions for hazardous waste management, alternative bio-energy technologies and specialty agricultural products.

Title of the Talk: Integrated Bio-electrochemical system for treatment of produced water: Concept to Commercialization

Exploration and extraction operations of conventional fossil-based energy resources like petroleum and natural gas, as well as the newer non-conventional resources like coal bed methane, shale gas and gas hydrates, generate a significant amount of wastewater. This huge volume of water brought along with the fossil resource from the subsurface is also known as produced water (PW). Reports indicate that in some of the oil fields, over 90 barrels of PW are generated for every barrel of oil. The management of PW thus incurs significant resources to the energy companies. In addition to the staggering volumes generated per day, the PW contains few unique constituents. Thus the conventional treatment processes fail not only in handling the volumes but also in meeting the regulatory standards of the effluents due to their unique composition. Innotech's technology integrates an electrochemical process with the controlled microbial conversion of sulphate to sulphides. This generates polysulfides and sulphur at the anode. Removal of sulphates from PW would prevent the proliferation of SRBs in storage tanks. It also helps in the reduction of microbial-induced corrosion. Thus the oil operators can opt to reuse the PW for its operations without the addition of biocides, with the additional recovery of polysulfide and sulphur as a recoverable product. In case the operator opts for disposal, the process uses a bio-electrochemical system where the bio-anode removes all the organics and the toxic hydrocarbons, and the salinity is removed in the form of caustic soda at the cathode. Apart from generating water that is fit to meet the regulatory standards, there will be the generation of caustic soda as a second value-added product from the process.

Session C7: Microbial Processes

Chairperson:
Dr Suresh Kumar Dubey
Professor
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Dr Suresh K. Dubey is a Professor in the Molecular Ecology Laboratory, Department of Botany, Institute of Science, Banaras Hindu University, India. His group is working on the structure and function of the microbial community involved in controlling methane emission, screening, and utilising microbes for their potential role in bioremediation and the prevalence of AMR gene-containing bacteria in rivers and wastewater. He has supervised 10 Ph. D., edited two books (Elsevier & Springer) and published over 70 research papers in peer-reviewed journals. He has completed projects funded by DST-SERB, DAE-BRNS, and ICMR and currently running the DBT-UKRI and DST-SERB projects. He has won multiple awards for his work, including the Biotech Research Society of India Young Scientist. Medal 2004, DST-BOYSCAST Govt. of India fellowship 2006, INSA visiting fellowship 2012 and 2017, and JSPS Invitation fellowship 2012, among others.

C7 - Keynote Speaker:

Dr Ramakrishnan Parthasarathi
Principal Scientist
Computational Toxicology Facility
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Dr Parthasarathi Ramakrishnan serves as Principal Scientist of CSIR-Indian Institute of Toxicology Research, Lucknow, at Computational Toxicology Facility, and leading Centre for Innovation and Translational Research (CITAR), BIRAC-BIONEST-IITR and Environmental Monitoring and Intervention Hub (DSIR-CRTDH-IITR). Dr Partha earned his PhD from CLRI, University of Madras, and he served as a scientist with highly reputed institutions like the Lawrence Berkeley National Labs, Los Alamos National Laboratory, and Sandia National Laboratories, USA. He has more than 22 years of research experience in applied biochemistry to unravel important issues in human health and the environment. He has authored more than 120 research articles in journals of high repute with 7600 citations, H-Index: 46 and six patents from his research contributions. His lab is currently involved in developing AI & Machine Learning based computational models and databases and developing innovative predictive approaches relevant to translational research. Dr Parthasarathi has received several awards & recognitions at National and International stages, including being elected Fellow of the International Society for Energy, Environment and Sustainability (ISEES), Fellow of the Royal Society of Chemistry (FRSC), Fellow of the Indian Chemical Society, Prof S B Chincholkar Memorial Award of the Biotech Research Society, India, Cray's HPC Dr A.P.J Abdul Kalam Award – 2019, and a prestigious Directors Fellowship.

Title of the Talk: Deriving Adverse Outcome Pathway Framework for Environmental Persistent Chemicals through Computational Approaches

Computational approaches continue to increase in capability and applicability in predictive toxicology and play a vital role in understanding at the molecular level exposure of chemical-induced impact on environmental health. *In silico* tools with advanced methodology are utilized in various stages for predicting properties that correlate with activity, structure-activity relationship models for chemical formulations, database construction, and retrieving information to develop consensus for chemical risk assessment. This talk covers different aspects of computational approaches that focus on applied AOP development for understanding mechanisms, predicting toxicity, and prioritizing risk management chemicals to minimize harmful effects. The state-of-the-art computational approaches used in predictive toxicology will be highlighted in this talk. Special attention will be focused on the utility of quantitative structure-activity relationship models for persistent environmental chemicals.

C7 - Invited Speaker 1:

Dr Nagendra Thakur
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Dr Nagendra Thakur has been an Assistant Professor in the Department of Microbiology at Sikkim University since 2008. Before joining Sikkim University, Dr Thakur was a Post-Doctoral fellow at the Louisiana State University Health Science Center for three years. His area of research was "Glycoproteins of Epstein-Barr Virus". Dr Thakur did his PhD from Klinikum Grosshadern, Ludwig-Maxilians University, Munich, Germany, in Herpesviruses. Dr Thakur also worked as a Research Assistant in several laboratories in countries like South Korea, Hong Kong and Denmark in polymer production, antibacterial peptides and antibiotic resistance mechanism. His research areas are "Characterization of thermophiles and Psychrophiles obtained from hot springs and glaciers of Sikkim. He published 40 research papers, 3 book chapters and one book. There are two patents to his credit. He also gave several keynote lectures in seminars and works. He is teaching Virology and Immunology to Postgraduate students at Sikkim University

Title of the Talk: Comparative study of microbial diversity and antibiotic resistance profile at various temperature gradients in the vicinity of high-altitude Himalayas

Distinct microbial communities occupy the various niches among various spheres throughout the Earth. Based on the adaptations to different gradients of physical or chemical parameters such as temperature, pH, pressure, NaCl etc., different microbial populations thrive significantly or become extinct and vice versa. Temperature plays a crucial role in maintaining microbial diversity. However, very few studies have been done on the role of temperature gradient in sustaining microbial diversity. The results have shown the predominance of phyla Proteobacteria, Firmicutes, Bacteroidetes and Chloroflexi. We found a significant concave down the curve in the number of microbial taxa as the temperature increased from warm to hot. A mesophilic environment (37 °C) was shown to possess a large number and accumulation of microbial taxa. However, there is a significant increase in the accumulation of specific taxa within a specific ideal temperature. For example, phylum Proteobacteria have a significant linear reduction from a psychrophilic to a thermophilic environment. In contrast, phylum Firmicutes showed a significant linear increase from a psychrophilic to a thermophilic environment. The physicochemical parameters were evaluated, and their correlation was checked with respect to bacterial diversity. It was shown that almost all the parameters, such as pH, Na, P, Mg, Ca, etc., hardly correlate with various bacterial phyla.

C7 - Invited Speaker 2:

Dr Archana Tiwari
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Dr Archana Tiwari is a Professor at Amity Institute of Biotechnology, Amity University, Noida, India. She is a PhD from the University of Allahabad, a gold medalist and a distinction holder in Botany. Her key research interests include Phycoprospecting Diatoms for wastewater remediation and high-value products. She has been working in Algal Biotechnology for nineteen years. The research work has been published in many International Journals with high-impact factors. She has also authored ten books and several chapters in Springer, Wiley Blackwell, and Elsevier on Algae and its applications. She has delivered talks as an Invited speaker, Keynote speaker and Session Chair at many conferences. She was awarded the 'Researcher of the Year Award' in 2016 by Noida International University and the 'Distinguished Scientist Award' in 2016 by Society for Recent Development in Agriculture. She established the Diatom Culture Collection of India in 2018 with research funding from the Department of Biotechnology, Government of India.

Title of the Talk: Impact of carbon sources on enhancing lipid productivity in marine diatoms

Diatoms are unique microalgae with diversified capabilities, and they are excellent reservoirs of lipids, sterols, hydrocarbons, phenolic compounds, terpenes, enzymes, polysaccharides, alkaloids, and pigments with high bioactivity. The lipids from marine diatoms find their applications as biofuels and as valuable sources of nutraceuticals in the industry. Low lipid productivity is a major challenge associated with diatoms. To address this research gap, we have evaluated the impact of diverse carbon sources on lipid productivity and metabolite production on two marine diatoms- *Chaetoceros gracilis* and *Thalassiosira weissflogii*. The total lipid content of *C. gracilis* was maximum in glycerol 73.4 ± 0.6% followed by 61.2 ± 0.1% in control, 34.4 ± 0.3% in sucrose, and minimum in glucose (13.0 ± 0.1%). In contrast, the total lipid concentration in *T. weissflogii* was maximum in glucose 39.7 ± 0.2% followed by 34.0 ± 0.6% in sucrose. In the experimental findings, the lipid content of *C. gracilis* was significantly higher than *T. weissflogii* in varied carbon sources. Through the alterations in the culture conditions and the cultivation system, the productivity in diatoms can be manipulated to trigger optimum lipid production to foster their accelerated application of commercial platforms.

Session C8: Biofuels and Biorefineries

Chairperson:
Dr Grzegorz Piechota
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Dr Grzegorz Piechota completed his PhD in 2016 in Chemistry from Nicolaus Copernicus University in Toruń, Poland and his D.Sc in 2022 at Cracow University of Technology. Since 2014 is employed in his Laboratory - GPCHEM Laboratory of Biogas Research and Analysis. Since 2009, he has been a member of the Polish Association of Chemical Engineers and Technicians. Moreover, since 2021, Vice-President of the Polish Association - Green Gas for Climate (as a Member of the European Biogas Association - EBA). Scientific interests are focused on processes of biogas upgrading to biomethane and biohydrogen in sustainable renewable energy development. In the subject area, in 2014-2021, Dr Grzegorz Piechota was an expert/performer/manager of 7 national grants and was an expert (International Advisory Board) in two European Projects (INTERREG IVc – Waste to Energy and CERREC). He was awarded the Scholarship of the Polish Minister of Science and Higher Education and the Polish Prestige Awards. Currently, he acts as Associated Editor for Sustainable Chemical Engineering (Universal Wiser Publisher, Singapore) and serves as Guest Editor for Bioresource Technology (Elsevier, IF: 11.889) SI: "Bioresource management of biowaste for a sustainable environment (BMBSE-2022)" Biomass and Bioenergy (Elsevier, IF: 5.77) SI" "Recent advances in Biomethane production – accelerating autonomous energy provision" and SI: Molecules (MDPI, IF: 4.927) - "Fate of Organosilicon Compounds in the Environment". In his academic career reviewed more than 150 manuscripts for many high-impact journals published by Elsevier and Springer Publishers.

C8 - Invited Speaker 1:

Dr Samuel L Rokhum
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Dr Samuel L Rokhum completed his PhD in Chemistry at North Easter Hill University, Shillong, India. He further did his postdoctoral study at the Centre of Biomedical Research, Lucknow, under Prof Ganesh Pandey, followed by postdoctoral at the Department of Chemistry, Cambridge University, UK, under Prof Andrew EH Wheatley during 2019-2021. He has been an Assistant Professor at the Department of Chemistry, NIT Silchar, since 2013. So far, five (5) students have obtained a PhD degree under his supervision, and he is currently supervising nine (9) PhD students. He has published 60 research papers in highly reputed journals and several book chapters. He has authored and edited one book, each published by Wiley. He was granted a German patent recently. He currently serves as Academic Editor of the Journal of Chemistry (Hindawi) and Associate Editor of Frontiers in Chemistry (Frontiers). His area of research includes renewable energy, synthetic chemistry, and biomass valorization.

Title of the Talk: Sustainable production of biodiesel using functional material as a heterogeneous catalyst

Diminishing supply coupled with rising demand and environmental pollution related to exhaustible petroleum fuels has led to the quest for alternative sustainable sources of energy. The consumption of petroleum (or fossil) fuels causes severe environmental pollution by increasing the CO_2 concentration in the atmosphere, hence global warming. Therefore, the need of the present hour is meeting rising energy demands and concurrently alleviating current CO_2 emissions to control the alarming rate of global warming sustainably and amicably using renewable resources. In this context, biodiesel is attracting increasing attention worldwide as an alternative to fossil fuels. Biodiesel, also called fatty acid methyl esters (FAME), a transesterification product of vegetable oil such as Jatropha and soybean oil with methanol, has the advantages of being renewable, sustainable, non-toxic, safe to handle, biodegradable and carbon neutral along with giving low emission for the whole life cycle. In addition, conventional diesel engines can be operated without modification on biodiesel.

C8 - Invited Speaker 2:

Dr Baskar Gurunathan
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Dr Baskar Gurunathan is a Professor in the Department of Biotechnology, St. Joseph's College of Engineering, Chennai, India. Dr Baskar has 21 years of teaching and research experience, published more than 170 research and review articles in National and International Journals, 35 book chapters and edited 6 books in different fields of Biotechnology. Delivered several invited lectures and chaired technical sessions at national and international conferences. He is an active fellow and life member of various national and international professional bodies. Visited the Swiss Federal Institute of Technology (EFPL), Switzerland, as visiting researcher in November and December 2018. His research works are focused on therapeutic proteins, nanomedicine, food processing, biofuels, bioenergy, waste to wealth, and techno-economic analysis. Dr Baskar is the recipient of the Outstanding Researcher on Renewable Energy Award from the Indian Society for Technical Education, New Delhi, in 2016, the Young Scientist Award 2015 from the International Bioprocessing Association, France, in 2017, 'Prof S B Chincholkar Memorial Award 2019' from Biotech Research Society, India for the outstanding work in Biofuels and Food Biotechnology in 2019 and ISTE-Periyar Best Engineering College Teacher award 2020 from Indian Society for Technical Education.

Title of the Talk: Production of biodiesel from food waste using a citrus fruit peel biochar catalyst: Process optimization, economic and environmental impact analysis

The concept of sustainably reusing food waste to produce value-added byproducts, such as biodiesel, was studied. Food waste is an organic-rich source of lipids. An optimization study of oil extraction from food waste using a solvent for biodiesel production was studied. A biochar catalyst was derived from citron (*Citrus medica*) peel containing rich carbon sources. The process conditions for biodiesel production using biochar catalyst were optimized by response surface methodology with a central composite design. A biodiesel yield of 96.3% was obtained under the optimized reaction conditions of a 1:10 oil-to-methanol molar ratio, 4 w% catalyst loading, reaction temperature of 55 °C, and a reaction time of 52 min. The biochar catalyst maintained a significant biodiesel yield for four cycles. This techno-economic analysis found that the annual plant revenue was $24,140,000 for a project lifetime of 20 years, the payback time was 3.16 years, the internal rate of return after tax was 39.92%, and the net present value at 10.0% interest was $55,017,000. A minimum biodiesel selling price of 0.46 $/kg was used, and the environmental sustainability of the produced biodiesel was assessed by a life cycle assessment. The impact of global warming potential on the FW-based biodiesel scenario was −3.967 kg CO2 equivalent.

C8 - Invited Speaker 3:

Dr Asha Chaube
Senior Principal Scientist & Head
Fermentation and Microbial Biotechnology Division
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Dr Asha Chaubey is presently working as Senior Principal Scientist and Head of the Fermentation and Microbial Biotechnology Division. She has been working in fermentation technology for the exploration and exploitation of microorganisms for producing bioactive and novel enzymes for more than 18 years. These include isolating and characterising microorganisms from unexplored niches of the North-Western Himalayas, Shivalik foothills and endophytes. Their significant contributions include the biotransformation of industrially important molecules, the immobilization of enzymes for enantioselectivity improvement, the production of industrially important biopharmaceuticals and publishing her work in the best journals of the field. She obtained a PhD degree from LLRM Medical college, Meerut, in collaboration with the National Physical Laboratory in the field of biosensors for diagnostics. During her doctoral research, she has significantly contributed towards the development of biosensors for health care and generated good-quality publications and patents. Presently, she has been actively involved in developing fermentation processes for biopharmaceuticals, nutraceuticals, therapeutic enzymes and enzymes/products for agriculture applications.

Title of the Talk: Rare *Streptomyces* spp. from NW Himalayas and their therapeutic applications

NW Himalayas are bestowed with vast microbial diversity of microbes with unique properties. The extreme environmental niches in the Himalayas have several microbes, including rare actinobacteria and rare species of *Streptomyces* genus. My research group has been involved in bioprospecting these unexplored niches for the production of bioactive enzymes. The proposed presentation will focus on some of the recent research outcomes of the group on rare *Streptomyces* species and their therapeutic potential, including antimicrobial, anticancer and antiviral activities. Some of these rare *Streptomyces* isolates are psychrophiles, mesophiles, and extremophiles, therefore possessing unique properties for producing bioactive enzymes. Therefore, some aspects of the fermentation process development for these isolates will also be discussed during the presentation.

C8 - Invited Speaker 4:

Dr Dipesh S Patle
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Dr Dipesh S Patle has received Bachelor's, Master's, and Doctoral degrees from Amaravati University (India), Birla Institute of Technology and Science (BITS) Pilani (India), and Universiti Sains Malaysia (USM) (Malaysia), respectively. He completed his post-doctorate at Politecnico di Milano (PILIMI), Italy. He has worked at BITS Pilani (India), Indian Institute of Technology (IIT) Kharagpur (India) and Vellore Institute of Technology (VIT) (India) in various capacities. Currently, he is associated with Motilal Nehru National Institute of Technology Allahabad (India). His research interests include Biodiesel Synthesis, Process Intensification, Simulation, Plantwide Control and Operator Training Simulator development. He has many international publications to his credit and has visited several countries for various purposes, including conference presentations. Dr Dipesh has received several awards from various organizations - Sanggar Sanjung Award 2014 (Journal Publication 2014) from USM Malaysia, Graduation on Time (GOT) award from USM Malaysia, Erasmus Mundus Post-Doctoral Fellowship from Erasmus Mundus (It's Time for CollaboratioN TowArds Close CooperaTion (INTACT) in 2016, etc. He has guest-edited many special issues for various journals.

Title of the Talk: Simultaneous optimization of economic, environmental, and safety criteria for algal biodiesel process retrofitted using dividing wall column and multistage vapour recompression for sustainable development

The present study deals with the multiobjective optimization (MOO) of retrofitted in situ algal biodiesel process. Transesterification of the algal lipids is intensified using ultrasonication and catalyzed using the ionic liquid catalyst. The process includes retrofitting two conventional distillation columns into a dividing wall column (DWC), which is further intensified using multistage vapour recompression (DWC-MVR) to reduce energy consumption and carbon emission from the process. Excel-based hybridized multiobjective differential evolutionary dynamic local search (HMODE-DLS) algorithm is used for the constrained MOO, whereas Aspen Plus is used for the process simulation. Break-even cost (BEC), eco indicator (EI99) and individual risk (IR) are considered as objectives to evaluate economics, environmental impact, and safety of the process, respectively. Initially, bi-objective case studies were analyzed, and finally, all three objectives were studied in one case. Multiobjective optimization of BEC, EI99, and IR showed a significant decrease in BEC (~20%), EI99 (~48%), and IR (~10%). The Pareto optimal fronts clearly depicted that BEC is reduced at the cost of IR and EI99. The rationale behind the obtained trade-offs between objectives is clearly contemplated in this study.

Session C9: Human Health & Environmental Sustainability

Chairperson:
Dr Kamlesh Choure
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Dr Kamlesh Choure serves as Professor and Head of the Department of Biotechnology, AKS University, Satna. He is also acting as Director of the Center for Research Innovation, Incubation and Skill Development (CRIISD), AKS University, Satna (M.P.). He has more than 18 years of teaching and research experience. His area of research includes molecular taxonomy and phylogenetic analysis of bacterial diversity and their application for environmental and agriculture sustainability. He has published several research articles in national and international journals of repute. He is acting as Principal Investigator of major research projects funded by government funding agencies, guided doctoral programmes, and several post-graduate dissertations. He has awarded as Best Faculty Award 2018 by MP Private University Regulatory Commission, Govt. of Madhya Pradesh, Bhopal, M.P (India) on 21 Oct. 2018. Outstanding Achievement Award of the Society for Bioinformatics and Biological Sciences for the year 2018, in recognition of the field of Biotechnology and Microbiology. Biotechnology Excellence Award-2020 by the Society of Life Sciences, Satna (MP) India, for teaching-learning, research & innovation in the biotechnology field for rural development.

Title of the Talk: Role of microbial consortia for making quality compost to reduce the load of spent mushroom substrate

Composting is a physicochemical and microbiological controlled aerobic and biotic breakdown process. As compost is made up of agricultural feedstock, it contains a wide range of nutrients and supports a diverse microbial community. The significance of microbial population in composting is widely understood. During composting, however, the variety of the bacterial community may vary depending on the composting material and nutrients present. As a result, it's critical to research the several kinds of microorganisms that arise during the composting of various agricultural byproducts. The evolution of microbial communities during composting and their biochemical activity can help shorten the time it takes to make compost, resulting in a higher yield in mushroom cultivation, specifically Agaricus bisporus. Several attempts were reported in the previous studies that do not draw any conclusive idea that promotes commercial mushroom production based on compost-associated microbes and shows the role of microbial consortia in reducing the spent mushroom substrate. This metagenomic research intends to find, decipher, and screen possible microbial species that can shorten the duration of compost formation, reduce the spent mushroom substrate from agro-waste materials, and examine how mycelium grows and the fruiting body of mushrooms might be improved.

C9 - Invited Speaker 1:
Dr Jay Shankar Singh
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Dr Jay Shankar Singh is presently working as a faculty member in the Department of Environmental Microbiology at Babasaheb Bhimrao Ambedkar University in Lucknow, India. Dr Singh has contributed significantly to ecology and natural resource management restoration. He has published his research outputs in international journals with high impact factors on Scopus and other scientific databases. He is also actively serving as a member of various scientific committees, holding editorial responsibilities for journals, such as Microbiology Research, PLoS ONE, etc. He has published several books from Springer and Elsevier, among others. Dr Singh achieved commendable research outputs in the area of Natural Resource Management, Restoration Ecology and Mitigation of Green House Gas CH4. His research group has developed Pyrite, Press mud, FYM and salt-tolerant microbial inoculants to reduce methane emissions and rehabilitate wastelands. His current Google Research Scholar Citations as of 18/10/2022 was 5926 (h-index: 38 and i-10-index: 73). Dr Singh has been included continuously for the last 3 years in the list of top 2% world scientist ranking reported by Stanford University published by Elsevier.

Title of the Talk: Microbial Services in Energy and Environmental Sustainability

Escalating global hunger as a consequence of the ongoing increase in population will be a severe concern for energy and the environment in the near future, as well as earlier problems knocking on the door. The global climate changes due to an increase in greenhouse gases such as methane (CH_4) and the generation of bio-energy/bio-fuels as an alternative to fossil fuels are major concerns of the 21st century. Entire dependence on fuels and energy from limited fossil fuels deposits creates continuous pressure on soil health, environment and biodiversity deterioration. Therefore, there has been a recent resurgence of interest in alternative and eco-friendly energy sources for fuel and other purposes. Various researchers have proven micro-algae and cyanobacteria to be potential bio-agent for the growing necessity of sustainable energy with a holistic vision of environmental protection. Cyanobacteria are equipped to use sunlight to manufacture their food and a huge amount of biomass through photosynthesis. Microbial agents are not in optimum use in most developing countries due to technical, social and institutional constraints. Another greatest challenge in the 21st century is to meet the growing energy demand world over and reduce the dependency on deposited limited fuels. The future risks of global warming, depletion of oil reserves and environmental concerns promote the production and usage of alternative fuels and bio-energy. Therefore, detailed investigations on microbes such as microalgae, cyanobacteria, etc. and their contribution to bio-fuel/bio-energy generation are required.

C9 - Invited Speaker 2:

Dr Suresh Kumar Dubey
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Dr Suresh K. Dubey is a Professor in the Molecular Ecology Laboratory, Department of Botany, Institute of Science, Banaras Hindu University, India. His group is working on the structure and function of the microbial community involved in controlling methane emission, screening, and utilising microbes for their potential role in bioremediation and the prevalence of AMR gene-containing bacteria in rivers and wastewater. He has supervised 10 Ph. D., edited two books (Elsevier & Springer) and published over 70 research papers in peer-reviewed journals. He has completed projects funded by DST-SERB, DAE-BRNS, ICMR and currently running the DBT-UKRI and DST-SERB projects. He has won multiple awards for his work, including the Biotech Research Society of India Young Scientist. Medal 2004, DST-BOYSCAST Govt. of India fellowship 2006, INSA visiting fellowship 2012 and 2017, and JSPS Invitation fellowship 2012, among others.

Title of the Talk: Cellulose degradation using bacteria isolated from agroecosystem

Cellulases are used in the food, textile, paper and pulp industry and for improving the digestibility of animal feed, and constitute a significant share of the world enzyme market. Cellulases act upon the biopolymers and eventually convert these into glucose. The aim of this work was to study cellulose degradation and whole genome sequence of Paenibacillus lautus BHU3 isolate. The 16S rRNA gene sequence analysis revealed genetic relatedness (99%) of Iso 7 with Paenibacillus lautus, Iso 8 with Paenibacillus lactis, and Iso 9 with Bacillus amyloliquefaciens. Clear zone formation followed by CMCase and FPase assays exhibited cellulolytic potential in the order: of P. lautus > P. lactis > B. amyloliquefaciens. The most potent isolate, Paenibacillus lautus strain BHU3, was subjected to whole genome analysis with reference to the genomic basis of cellulose degradation. Results showed that P. lautus strain BHU3 contains 6234 protein-coding genes, of which 316 were associated with carbohydrate metabolism. Further, genomic CAZymes analysis indicated that the P. lautus strain BHU3 comprising a range of glycoside hydrolase (GH) family genes (143), may play a vital role(s) in enhancing the cellulolytic attributes and could be a useful tool for lignocellulosic biomass degradation and waste management.

C9 - Invited Speaker 3:
Dr Prabhanshu Tripathi
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Dr Prabhanshu Tripathi is working as a Senior Scientist in the Food, Drug and Chemical Toxicology Division of CSIR-IITR, Lucknow. Dr Tripathi has done his PhD from CSIR-IGIB, New Delhi, in the field of Allergy and Immunology. He was also working as visiting faculty in Johns Hopkins University, USA. He has more than ten years of postdoctoral experience from India and abroad in Molecular Biology and Immunology. He was a postdoctoral fellow at the University of Chicago, USA (2011-2012), where he worked on 'Gut microbiome and allergic susceptibility to food antigens', and at the University of Gothenburg, Sweden (2013-2015), where he worked on 'activation of type 2 NKT cells by microbial antigens. He moved back to India in 2016 as a prestigious Ramalingaswami Fellow. He joined DBT-Translational Health Science & Technology Institute in Delhi-NCR, where he started working on the gut microbiome and type 2 diabetes. He is a member of different scientific societies and Joint Secretary of 'The Indian Society of Translational research. Joint Secretary of the Indian Society of Translational research. He is also a member of the editorial board of various international journals of Immunology. Dr Tripathi is the Associate Editor of Frontiers in Physiology. Dr Tripathi has research interests in exploring the role of the microbiome in human health and CSIR-IITR. He is working on 'Toxicant mediated modulation of the microbiome and their health consequences

Title of the Talk: Artificial sweetener-induced modulation of gut microbiota compromises intestinal barrier functions

Consumption of artificial sweeteners in food and beverages has become integral to daily lifestyle. It is a general perception that artificial sweeteners (AS) are healthy substitutes for sugars, imparting a sweet taste without calories or glycemic effects. In the present scenario with upcoming studies, it is considered to be a health concern with their implications in metabolic diseases as their downstream products may have side effects. Few reports suggest that chronic consumption of artificial sweeteners can contribute to metabolic dysregulation. Still, the available literature on long-term health risks linked with artificial sweetener consumption is limited. In the study presented here, we assess change in gut microbiota in artificially sweetener-treated C57/BL6 mice and different markers as signals for intestinal integrity and cellular damage using Caco-2 monolayers as an *in-vitro* model of absorption and metabolism. Our study reveals that the consumption of artificial sweeteners leads to hyperglycemic conditions that influence intestinal barrier biomarkers and show dysfunction in the tight junction assembly of protein which increases membrane permeability and expression of glucose transporters. Our study explains the possible consequences of the consumption of artificial sweeteners on gut microbiota and intestinal epithelial cells in terms of regular intake of the artificial sweeteners

C9 - Invited Speaker 4:

Dr Budhi Sagar Tiwari
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Dr Budhi Sagar Tiwari took a PhD (Botany) in 1993 from Banaras Hindu University on understanding desiccation tolerance in a sub-aerial cyanobacterium Scytonema gentler. Dr Tiwari joined Bose Institute Calcutta as a DBT PDF scheme to work on dissecting components of photosynthetic apparatus during heat stress in rice. After spending a brief time at Vivekanand Institute of Biotechnology, 24 Pgs (S) WB in the capacity of scientist, he moved to The Hebrew University of Jerusalem, Israel, as a post-doctoral fellow in Prof Alex Levine's group to work on programmed cell death (PCD) in plants. He extended this PCD work to different leading institutions like Rutgers University, NJ, before landing at Jawaharlal Nehru University India as a Ramalingaswami fellow (DBT, India) in 2008. After the Ramalingaswami fellowship, Dr Tiwari joined the Institute of Advanced Research Gandhinagar as Associate Professor that recently got upgraded to Professor. Dr Tiwari has extensively worked on abiotic stress-induced PCD in plants. Currently, he is interested in deciphering the role of chloroplast in abiotic stress-induced PCD. During his academic journey, Dr Tiwari published several research articles in leading journals like Plant Physiology, Nature Cell Biology, and Apoptosis that are widely recognized within the plant scientific community across the globe

Title of the Talk: Requirement of active chloroplast for the salinity-induced and photo-modulated programmed cell death in rice

In animals, mitochondria are the key executioner of programmed cell death (PCD) that is mediated by reactive oxygen species (ROS) generated mostly in mitochon Dria. To pinpoint chloroplasts, the whole study was carried out in 12 days old light-treated green and dark incubated etiolated seedlings (where chloroplasts are not completely developed). We found by Evans-blue staining that salt (150 mM NaCl)-treated protoplasts obtained from green seedlings had a higher rate of cell death than protoplasts obtained from etiolated seedlings. This indicated that cell death induced by NaCI is accentuated by light. Imposition of salt stress to green protoplasts generated H202 and known hallmarks of PCD such as membrane blebbing, nuclear loading, DNA ladder and nicks. Conversely, salt-treated etiolated protoplasts kept in the dark had only a few. TUNEL-positive nuclei. Substantial numbers of TUNEL-positive nuclei were observed in protoplasts isolated from green leaves that came out with substantial decline when evaluated in etiolated protoplasts. The addition of Caspase 3 inhibitor (DAVD-CHO) rescued (-50%) green protoplasts from salt-stress-induced cell death, suggesting the involvement of apoptosis-like PCD (AL-PCD). This resulted in severe granite de-stacking in chloroplasts while the structural integrity of mitochondria was maintained. These studies demonstrate that chloroplasts mainly execute the photo-modulation of salinity-induced PCD in photosynthetic tissues.

Session C10: Sustainable Food & Agri Biotechnology

Chairperson:
Dr R. Praveen Kumar
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Dr Praveen Kumar Ramanujam, an Undergraduate in Chemical Engineering and postgraduate in Industrial Biotechnology, both degrees from Annamalai University, is working as Head of the Department of Biotechnology, Arunai Engineering College, Tiruvannamalai, Tamilnadu, India. His area of research includes renewable energy from biomass and municipal waste. He served as a Scientific Advisory Committee member in several National and International events. He has visited various countries, including the USA, Australia, China, Switzerland, Italy, Hongkong & Bangladesh, to attend various conferences. He has chaired sessions and delivered invited talks at various National and International conferences, which include. He had done provisional registration for 4 patents. He has published more than 65 papers in peer-reviewed journals, Book Chapters – 17 and edited seven books. He was invited as a resource person for 10 National and International forums (Overseas – 1, National – 9). He is a life member of various professional societies, including the Biotech Research Society of India (BRSI), India (EWBIndia). He was awarded "The ISTE-Syed Sajid Ali National Award for Outstanding Research work in the field of Renewable Energy" for the year 2017, an award instituted by the Indian Society for Technical Education and "The outstanding Young Investigator Award" for excellence in research and teaching in a rural setting, awarded by Raise Rural.

C10 - Invited Speaker 1:

Dr Aradhana Mishra
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Dr Aradhana Mishra holds a PhD in Biosciences in 2007 from Rani Durgavati University, Jabalpur, India. Dr Mishra joined CSIR-National Botanical Research Institute, Lucknow, India, as a senior scientist in January 2013 at the Division of Microbial Technology. Her research work focused on the bio-inspired nano-materials synthesis and plant-microbe interaction during abiotic and biotic stresses. She was awarded for Women Scientist fellowship award by DST, Govt. of India in 2007 and 2011. She has completed several major research projects. So far, Dr Mishra has 61 publications in peer-reviewed SCI journals, 13 book chapters, four patents have been granted, and two patents have been filled. She has been awarded several times for best research paper by CSIR. She is also an editor in reputed journals PLoS One and a former editor of other journals, American Journal of Clinical Microbiology and Antimicrobials and Genetics and Molecular Biology Research. In November 2019, she was honoured with the prestigious Women Scientist Award 2018 by The Biotech Research Society, India. She has also developed three products: bioagent for controlling Fusarium wilt and charcoal rot disease, Herbal Nanoemulsion for skin care and against dermal pathogens and microfluidic nanoemulsion for the management of charcoal rot and anthracnose disease in soybean.

Title of the Talk: Biotransformation of the phytopathogen *Fusarium* sp. regarding substrate utilization pattern by the intervention of biocontrol PBE-8 during wilt disease in tomato

Fusarium oxysporum f.sp. lycopersici (FOL), which causes fusarium wilt disease, is responsible for severe yearly loss in tomato crop production. The biocontrol efficiency of Bacillus subtilis PBE-8 against FOL was assessed through physiological and metabolic methods. Additionally, the antifungal efficacy of PBE-8 cell-free filtrate (CFF) by mycelial growth suppression, metabolite profiling, and substrate utilization patterns are elaborated. Varying concentrations of CFF cause a reduction in mycelial cytoplasmic bulbous protrusions, biomass (50%), and spore count (94%-55%). The metabolic alteration in FOL by CFF was validated through GC-MS. During co-culturing conditions, CFF reduces the concentration of aliphatic amino acids along with fatty acids, which are crucial for pathogenicity and resistance against the systemic acquired resistance of the host. Phenotype microarray assay reveals the phenotypic loss of 507 (56.58%) substrates in CFF-treated FOL out of 896 substrates. Twenty-seven of the 507 substrates exhibited significant phenotypic loss, which is responsible for crucial metabolic pathways in FOL. The findings imply that PBE-8 antifungal metabolites obstruct the metabolic pathways of fusarium.

C10 - Invited Speaker 2:

Dr Dev Mani Pandey
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Dr Dev Mani Pandey is working as Associate Professor at the Department of Bioengineering and Biotechnology, Birla Institute of Technology, Mesra, Ranchi, Jharkhand, India. He has completed his Ph. D. (Plant Physiology) from CCS Haryana Agricultural University, Hisar, India and worked as Post-Doctoral Fellow in South Korea. He was a Consultant to PBGB, International Rice Research Institute, Los Banos, Philippines. He received the Young Scientist Award at the Indian Genetics Congress in 2015. Dr Pandey has successfully presented his research findings and chaired the conference sessions at National-International Symposiums in India and abroad and organised the International Symposium. He is Associate Editor and Guest Editor in some reputed journals and has also published research papers in peer-reviewed journals. He has been the PI of the Sponsored project and Guide of master and PhD Scholars. His research areas and scientific expertise include plant biotechnology, functional genomics, stress physiology and bioinformatics.

Title of the Talk: Impact of soil acidity stress in rice: A computational and molecular approach

Crop plants are universally affected by their surrounding environments. Among many environmental factors, including abiotic stresses, soil acidity stress is another important and detrimental factor limiting crop plants' growth and productivity. A lesser research report is available on soil acidity stress (low pH) responsive genes in rice. An effort was made to identify the soil acidity-responsive differentially expressed genes in rice using publically available microarray datasets of *A. thaliana* consisting of 22,810 genes studied under varied pH conditions at different time durations. A total of 983 DEGs were found to be pH-responsive genes responding to acidity stress (at pH 4.5 and 6.0) at different time durations (after 1 hour and 8 hours). Various computational tools were used for network analysis and finding their role in biological processes. Based on the highest intra-modular connectivity in the modules of interest, some candidate (hub) genes were identified in *A. thaliana* and used to identify homolog genes in rice. Rice homolog genes were used to see their Real Time-PCR-based expression response in rice leaves under acidic stress. Microstructural changes in rice leaves under soil acidity stress using swept-source optical coherence tomography (SS-OCT) were also studied. Further, detailed transcriptional changes in rice leaves under soil acidity stress were also examined by RNA sequencing technique. Obtained above-mentioned detailed findings will be presented.

C10 - Invited Speaker 3:

Dr Vinod Sangwan
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Dr Vinod Kumar is working as Assistant Scientist (Biochemistry) with an additional charge of Assistant Director and In-charge, IPR Cell & BPD Unit at CCS Haryana Agricultural University, Hisar. He obtained his PhD degree in Biochemistry from G.B. Pant University of Agriculture and Technology, Pantnagar. He has done extensive research on phytases, including their study from different sources, purification, characterization, heterologous expression and in silico study of all four phytases. His current research focuses on phytases' applications for enhanced micronutrient bioavailability from biofortified crops and Biochemical & molecular assessment of biofortified crop varieties for quality traits and performance under varying nutrient and soil types. He has published 86 research, review, and popular articles with 3900 citations, an i10-index of 54, and an h-index of 30 and delivered various invited talks. He has completed two projects from DBT & DST, Govt. of India and filed 02 patent applications for innovations. He is a life member of six scientific societies and received various recognitions and awards. He is an editorial board member & reviewer for various reputed journals.

Title of the Talk: Potential of biofortified crop varieties towards enhanced

Biofortification describes the use of breeding, agronomy, and transgenic approaches to increase the levels of specific micronutrients in crops as they grow. Biofortified crops generated by either approach are improving the lives of millions of people around the world by improving the nutritional quality of the food supply. They may help to reduce micronutrient deficiencies, particularly in developing countries. Biotechnology has contributed tremendously towards the development of improved crop varieties. Public sector institutions in India have developed several biofortified crop varieties. A study on biofortified wheat varieties for their nutritional quality, including micronutrient bioavailability, revealed that better micronutrient dialyzability, bioaccessibility and bioavailability was obtained in biofortified wheat over non-biofortified wheat, which was further improved by supplementing with phytases. The data from the biochemical attributes, including the higher activity of SOD, lower decrease in catalase activity, Maximum MDA content at highest Fe deficiency, the low release of phytosiderophores, and higher uptake of Fe under Fe deficient conditions in genotype HHB-299 as compared to genotype HHB-67(I), revealed the better tolerance of biofortified hybrid HHB-299 to the Fe deficiency stress. The study might have implications in developing, evaluating and promoting biofortified or Fe deficiency tolerant crops for cultivation in soils with prevailing Fe deficiency. This aspect might open several new avenues for study on biofortified crops for their evaluation and cultivation under different environmental conditions, considering global challenges for sustainable agriculture.

C10 - Invited Speaker 4:
Dr Sapna Sharma
Institute of Biosciences and Technology
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Dr Sapna Sharma is presently working as Assistant Professor at Shri RamSwaroop Memorial University, Lucknow, UP, India. I have completed my PhD (2007-2012) from CSIR-Indian Institute of Toxicology Research, Lucknow, India. Post-doc fellow at the University of Chicago, IL, USA Studying the molecular mechanisms regulating SLC26A6, an anion exchanger which plays an essential role in intestinal oxalate secretion in the presentation of hyperoxaluria. Post-Doc fellow (University of Gothenbörg, Gothenbörg, Sweden). Vaccine development against Myasthenia Gravis, a neurological disorder. UGC Research fellow (2015-2020), School of Biotechnology, Jawaharlal Nehru University, New Delhi, India.Metabolic diseases and Gut axis: Role of Intestinal permeability during the early onset of disease. More than 22 publications in international journals in the field of Intestinal membrane integrity (Membrane Biology) in metabolic disorders, drug-induced hepatotoxicity, oxidative stress and the role of flavonoids in human health. Received UGC-Research Grant for Women in 2015 (5 years). Gold Medal for M. Phil (Topper, Batch 2005) from Ch. Charan Singh University Campus, Meerut. Best Paper Award in 4th International Conference on Translational Research-2018 held on 11th-13th Oct 2018 in Goa, India.

Title of the Talk: Phytochemicals modulate membrane integrity in metabolic disorders

Diabetes mellitus is a chronic disease requiring lifelong medical attention. Recent studies are investigating the underlying mechanisms involved in disease development in diabetes point to the role of the dysregulation of the intestinal barrier. Hyperglycemia-mediated tight junction deformity contributes to leaky gut in various metabolic disorders. Our study aimed to investigate the role of oxidative stress on intestinal epithelial tight junction (TJ) barrier functions in hyperglycemia. Many flavonoids are known to influence the cellular redox state. Exploring these flavonoids may help to understand the role of the TJ barrier in hyperglycemia-mediated oxidative stress, which in turn might unfold the association of oxidative stress and dysfunction of barrier-forming TJs. We found that high glucose treatment resulted in reduced cell viability, increased reactive oxygen species production, measurable mitochondrial dysfunction, and decreased transepithelial electrical resistance, with increased membrane permeability in human epithelial Caco-2 cells. A concomitant decrease in reactive oxygen species production, pro-inflammatory cytokines, and Glut-associated genes and proteins was identified with flavonoid treatment. Our findings indicate that flavonoids confer protection against hyperglycaemia-mediated oxidative stress and enhance intestinal barrier functions by modulating underlying intracellular molecular mechanisms

C10 - Invited Speaker 5:

Dr Kamlesh Choure
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Dr Kamlesh Choure serves as Professor and Head of the Department of Biotechnology, AKS University, Satna. He is also acting as Director of the Center for Research Innovation, Incubation and Skill Development (CRIISD), AKS University, Satna (M.P.). He has more than 18 years of teaching and research experience. His area of research includes molecular taxonomy and phylogenetic analysis of bacterial diversity and their application for environmental and agriculture sustainability. He has published several research articles in national and international journals of repute. He is acting as Principal Investigator of major research projects funded by government funding agencies, guided doctoral programmes, and several post-graduate dissertations. He has awarded as Best Faculty Award 2018 by MP Private University Regulatory Commission, Govt. of Madhya Pradesh, Bhopal, M.P (India) on 21 Oct. 2018. Outstanding Achievement Award of the Society for Bioinformatics and Biological Sciences for the year 2018, in recognition of the field of Biotechnology and Microbiology. Biotechnology Excellence Award-2020 by the Society of Life Sciences, Satna (MP) India, for teaching-learning, research & innovation in the biotechnology field for rural development.

Title of the Talk: Role of microbial consortia for making quality compost to reduce the load of spent mushroom substrate

Composting is a physicochemical and microbiological controlled aerobic and biotic breakdown process. As compost is made up of agricultural feedstock, it contains a wide range of nutrients and supports a diverse microbial community. The significance of microbial population in composting is widely understood. During composting, however, the variety of the bacterial community may vary depending on the composting material and nutrients present. As a result, it's critical to research the several kinds of microorganisms that arise during the composting of various agricultural byproducts. The evolution of microbial communities during composting and their biochemical activity can help shorten the time it takes to make compost, resulting in a higher yield in mushroom cultivation, specifically Agaricus bisporus. Several attempts were reported in the previous studies that do not draw any conclusive idea that promotes commercial mushroom production based on compost-associated microbes and shows the role of microbial consortia in reducing the spent mushroom substrate. This metagenomic research intends to find, decipher, and screen possible microbial species that can shorten the duration of compost formation, reduce the spent mushroom substrate from agro-waste materials, and examine how mycelium grows and the fruiting body of mushrooms might be improved.

Session C11: Biofuels and Biorefineries

Chairperson:
Dr Indu Shekhar Thakur
Professor & Director,
Amity School of Earth & Environment Science
Amity University
Haryana- 122413, India
Email: isthakur@hotmail.com

Prof Indu Shekhar Thakur, FNASc, FNAAS, FIBA, FBRS, FNAES, FISEES, graduated and served at Jawaharlal Nehru University, New Delhi. He is working on research areas of bioremediation, bio-valorization, and detoxification of natural and organic compounds, developed bacterial consortium by genetic breeding, characterized genes and proteins, proteomics, genomics analysis for Green House Gases sequestration for biomass, enzymes, biodiesel, bio-flocculant, bioplastic, biomaterials. Biocomposite materials synthesized by enzymes adsorbed on calcite of CO_2-sequestrating bacteria for chromate, arsenite, and heavy metals removal. Degradation of pentachlorophenol in the tannery and recovery of nitrogen and phosphorus in wastewater performed. He published more than 270 research papers in peer-reviewed journals, chapters in books, two textbooks, four patents, and technologies. He is a member of several journal editorial boards and review committees. He completed 22 research projects as a PI, 30 PhD, 2 M.Phil, and 14 Post Graduate theses/dissertations under his supervision, included in the world ranking of the top 2% of scientists (rank 503).

C11 - Invited Speaker 1:

Dr Ajay Kumar Pandey
Assistant Professor,
Department of Life Sciences and Biotechnology,
Chhatrapati Shahu Ji Maharaj University, Kanpur
Kanpur-208024, Uttar Pradesh, India
Email: ajaynitbiotech@gmail.com, ajaykp4@csjmu.ac.in

Dr Ajay Kumar Pandey is currently working as an Assistant Professor in the Department of Life Science and Biotechnology, Chhatrapati Shahu Ji Maharaj University (CSJMU), Kanpur. Previously, he worked as an Assistant Professor at the National Institute of Technology, Raipur. He holds M. Tech. and Ph. D. in Biotechnology. He has qualified for NET and GATE. He did a post-doctorate from International Centre for Genetic Engineering and Biotechnology (ICGEB), New Delhi. He has published 15 research articles in reputed journals such as Biotechnology for Biofuels, Bioresource Technology, Chemical Engineering Journal, Renewable Energy, Process Biochemistry, mBio, PNAS etc. He has published books and book chapters with renounced publishers such as Elsevier and Springer. He has filed one patent. His research work is focused on Industrial Biotechnology, Biofuels, Biochemical Engineering, Metabolic Engineering, and Fermentation Technology. He is currently running two projects. He has supervised three B. Tech. Thesis and currently supervising one PhD and six master's students. He has delivered talks at various international conferences in Hongkong and India. He is passionate about developing technologies for biofuels and other valuable industrial important products.

Title of the Talk: Integrated Biorefinery process design for co-production of bioethanol and biogas using molasses and lignocellulosic biomass

Molasses fermentation requires enormous amounts of water as the diluent, and lignocellulosic hydrolysate (LH) fermentation suffers from the presence of an inhibitor in it. Hence, hybrid technology, using LH as molasses diluent, opens a resolution window for both their respective issues and integrates fermentable sugars from both sources. In this study, we applied acid-pre-treated sugarcane bagasse hydrolysate (APSBH) as a diluent for molasses to develop hybrid bioethanol production technology using our robust yeast isolate. In batch fermentation, under optimized conditions, 102.56 ± 8.39 g/l (12.9% v/v) ethanol was achieved with a volumetric productivity of 5.69 g/l/h. In high solid loading simultaneous saccharification and fermentation (HSL-SSF), a maximum of 111.72 ± 7.65 g/l (14.1 % v/v) ethanol was produced with the productivity of 1.55 g/l/h 40^{o}C under optimized conditions using 7.5 FPU/g APSBH cellulase loading and 9 h pre-saccharification. During ethanol production majorly, hexoses are fermented to ethanol. However, the pentoses remain unutilized. The developed Biorefinery process design integrating molasses and bagasse together could be a potential strategy for co-producing bioethanol and biogas.

C11 - Invited Speaker 2:

Dr R. Praveen Kumar
Department of Biotechnology
Arunai Engineering College
Tiruvannamalai 606603, Tamil Nadu, India
Email: praveenramanujam@gmail.com

Dr Praveen Kumar Ramanujam, an Undergraduate in Chemical Engineering and postgraduate in Industrial Biotechnology, both degrees from Annamalai University, is working as Head of the Department of Biotechnology, Arunai Engineering College, Tiruvannamalai, Tamilnadu, India. His area of research includes renewable energy from biomass and municipal waste. He served as a Scientific Advisory Committee member in several National and International events. He has visited various countries, including the USA, Australia, China, Switzerland, Italy, Hongkong & Bangladesh, to attend various conferences. He has chaired sessions and delivered invited talks at various National and International conferences, which include. He had done provisional registration for 4 patents. He has published more than 65 papers in peer-reviewed journals, Book Chapters – 17 and edited seven books. He was invited as a resource person for 10 National and International forums (Overseas – 1, National – 9). He is a life member of various professional societies, including the Biotech Research Society of India (BRSI), India (EWBIndia). He was awarded "The ISTE-Syed Sajid Ali National Award for Outstanding Research work in the field of Renewable Energy" for the year 2017, an award instituted by the Indian Society for Technical Education and "The outstanding Young Investigator Award" for excellence in research and teaching in a rural setting, awarded by Raise Rural.

Title of the Talk: Current trends and progress of Heterogenous nanocatalysts for the production of biodiesel from microalgae

Petroleum fuel, a promising energy source becomes less favourable due to massive depletion over the past century. The search for new and renewable energy sources is becoming a trend now. Biofuels are a promising alternative to petroleum fuel due to their physical and chemical nature. Most biofuels are tested, and their usage is in practice; biodiesel is an essential class among them. Biodiesel can be produced from different types of feedstocks. However, with reference to the current technologies, the cost of biodiesel is a major concern for its wide commercialization. Major concerns are the cost of feedstocks, transportation of feedstocks, reaction parameters, cost of catalysts, etc. Microalgae oil was proved as a promising feedstock for the production of biodiesel. Catalysts play a major role in the transesterification of fatty acid to methyl esters. Homogenous and heterogenous catalysts have been widely studied in the past. Heterogenous nanocatalysts were an interest among researchers due to their better productivity compared to homogenous catalysts. This review discusses various types of nanocatalysts, and the physiochemical properties of biodiesel were compared.

C11 - Invited Speaker 3:

Dr N Stalin
Department of Petrochemical Technology
Anna University, Tiruchirappalli
Mandaiyur 620024, Tamil Nadu
Email: mnstalin@gmail.com

Dr N. Stalin graduated with an engineering degree from Bharathidasan University. He proceeded to obtain his M.Tech (Energy Engineering) and PhD (Energy Engineering) in the department of CEESAT, National Institute of Technology (NIT), Tiruchirappalli. He started his career as a Research Associate at NIT, Trichy and developed 15 energy-efficient models, working successfully in industries & households. He has an academic career spanning over 17 years in which he has successfully completed 10 PhD scholars and 25 MTech. Dissertations and 42 undergraduate projects and presently guiding 5 PhDs research scholars. He has published more than 67 papers in national and international journals and 123 papers in conferences. He has conducted over 15 workshops/ training programmes/ short-term courses for practising engineers and faculty of engineering institutions sponsored by AICTE, ISTE, and TEQIP II. He received the young faculty research scheme award in 2015 under TEQIP. He received the Best Report preparation and presentation award from PSG Tech Coimbatore in 2017. He received the Best paper award at the International Conference conducted by NUS Singapore in August 2019. He has completed various funding research projects with a cost worth 55 lakhs from various funding agencies MNRE, DST, TEDA and DRDO projects.

Title of the Talk: Enhancement of bioreactor activities by operating parameter optimization methods in biofuel production

The aim of operating parameter optimization in bio-reactor is to adjust the actual state of a process with regard to a certain property through selective variation of influencing factors in such a way as to achieve a defined target state (the optimum). In general terms, the operation of a biogas plant can be optimized in three areas: technical, economic and environmental. These areas cannot be optimized independently; on the contrary, and they mutually influence each other. Furthermore, when it comes to solving an optimization problem, it should not be assumed that there will be a single solution, but rather it should be expected that there will be a host of different solutions. The various possible solutions can then be compared with each other on the basis of evaluation criteria. Optimizing technical procedures in a biogas plant is aimed at raising the availability of the technology, in other words, minimizing downtimes and ensuring smooth management of the process. This objective also has indirect consequences for the economics of the plant, of course, because the plant can only meet its performance target if it has a high capacity utilization rate. On the other hand, a high level of technological input means high cost, so a cost-benefit analysis should be performed in the context of economic optimization.

C11 - Invited Speaker 4:

Dr Anjana Pandey
Department of Biotechnology,
Motilal Nehru National Institute of Technology
Allahabad, Prayagrag-211004, U.P., India
E-mail: anjanap@mnnit.ac.in

Dr Anjana Pandey is currently a Professor at the Department of Biotechnology and Chairperson of the Library and learning resource committee at Motilal Nehru National Institute of Technology Allahabad (MNNITA). She persuaded her PhD (1998) in Biochemistry from the renowned Banaras Hindu University (BHU), India, and her post-doctorate from Bose Institute, Kolkata, in the thrust area of Molecular Microbiology (2001). In the past two decades of her journey, her research expertise is not just limited to her core area but extends to Environment and Health Biotechnology, Nanotechnology, and Biofuel, claiming 14 honours, 6 patents and more than 100 publications, including 7 books in well-known publications. She has supervised 13 PhD, 11 MTech and 16 BTech students. Dr Pandey has been included in Standford University's top 2% scientist list for 2022.

Title of the Talk: Algal feedstock as potential biowaste for mitigation of organic carbon and generation of bioenergy and useful products: A solution for circular bio-economy

The circular bio-economy constitutes a vital principle of the circular economy that will drastically revolutionize our approach towards the management and clearance of biowaste into bio-based value-added products and bio-energy. A sustainable circular bio-economy is expected to contribute towards addressing contemporary challenges like global warming, fossil resource paucity, ecosystem degradation, food shortages and poor municipal biowaste management. The circular bio-economy is envisioned to deliver multiple bio-based products from bioresources feedstock such as algae. Microorganisms have been considered potential feedstock for producing biofuels and other value-added products. We have used Anabaena iyengiri biomass as a natural biowaste for the extraction of pigments, EPS, lipids, biodiesel and bio-hydrogen. This algal culture was grown (doubling time 21.6 ± 1.3 h) in cheese whey wastewater with minimal supplements and optimized concentrations of organic loads. The biomass yield of Anabaena was obtained at 3.12gL-1 by cultivation in a cylindrical airlift photobioreactor. The extracted concentration of chlorophyll a, carotenoids, lipids and EPS are 3885 ± 286 μg/L, 2045 ± 184 μg/L, 8.6 % by weight, 14g/L. We produced 13.4 ± 1.2 moles H2/g of dry waste of algal mass.

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Technical Schedule of VII-SEEC

Technical Schedule at a Glance

16th December 2022					
Day-1	**12:00-01:00 PM**	*Lunch*			
	Venue	**Conference Room-1 (ABLT1)**	**Conference Room-2 (ABLT2)**	**Conference Room-3 (ABLT3)**	**Conference Room-4 (ABLT4)**
	01:00-02:50 PM	Session A-1: Advanced Engine Technologies	Session B-1: Air Pollution Monitoring	Session C-1: Anaerobic Digestion	ISEES Awardees Presentation
	02:50-03:10 PM	*Tea Break*			
	03:10-05:00 PM	Session A-2: Combustion and Flames	Session B-2: Air Pollution Control	Session C-2: Biodegradation of Toxic Chemicals	
	05:00-05:30 PM	*Tea Break*			
	05:30-07:30 PM	Inaugural, Award and Book Release Function; Plenary Talk by **Dr. Ajay Kumar**, Former Union Defense Secretary, MoD GoI			
	07:30 PM Onwards	Conference Banquet Dinner			
17th December 2022					
Day-2	**09:00-09:45 AM**	**Plenary Talk** by **Dr. SSV Ramakumar**, Director (R&D), Indian Oil			
	09:45-10:15 AM	*Tea Break*			
	10:15 AM-12:15 PM	Session A-3: Energy and Exergy	Session B-3: Desalination and Wastewater Treatment	Session C-3: Environmental Bioengineering	Session B-9: Pollution and Climate Change: Challenges and Priorities.
	12:15-01:30 PM	*Lunch and Poster Session*			
	01:30-03:30 PM	Session A-4: Alternative Transportation Fuels and Materials	Session B-4: Emerging Environmental Contaminants	Session C-4: Sustainable Processing of Biomass	Session C-9: Human Health & Environmental Sustainability
	03.30-04.00 PM	*Tea Break*			
	04:00-06:00 PM	Session A-5: Sprays and Atomization	Session B-5: Solid Waste: Challenges and Mitigation	Session C-5: Solid Waste Management	Session C-10: Sustainable Food & Agri Biotechnology
	06:00-07:00 PM	General Body Meeting of ISEES *(For ISEES Members only)*			
	07:30 PM Onwards	Onwards Fellows Dinner *(By invitation only)*			
18th December 2022					
Day-3	**09:00-11:00 AM**	Session A-6: Modelling and simulations	Session B-6: Renewable Energy Technologies	Session C-6: Bioremediation	Session C-11: Biofuels and Biorefineries-II
	11:00-11:30 AM	*Tea*			
	11:30 AM-01:00 PM	Session A-7: Engine Emissions and Control	Session B-7: Cleaner Technologies for Pollution Mitigation	Session C-7: Microbial Processes	Session B-10: Energy and Environment
	01:00-02:00 PM	*Lunch*			
	02.00-04:00 PM	Session A-8: Coal & Biomass Gasification	Session B-8: Environmental Challenges Mitigation	Session C-8: Biofuels and Biorefineries-I	
	04:00-04:30 PM	Valedictory & Best Paper Presentation Awards			
	04:30 PM onwards	*High Tea and Closure of the Conference*			

Technical Schedule for Contributed Papers

ISEES Awardees Presentation (Session Chair: Dr. Nikhil Sharma, MNIT Jaipur) (Venue: ABLT4, Time: 01:00-02:50 PM, Date: 16th December 2022)		
01:00-01:10 PM	**Best Master Thesis:** Ayush Tripathi, IIT Kanpur	Dimethyl Ether Fuelled Single Cylinder Compression Ignition Engine Prototype Development and Experimental Evaluation
01:10-01:20 PM	**Best Master Thesis:** Aaishi Ashirbad, IIT Kanpur	Laser Plasma Assisted Combustion of Gasoline Direct Injected Spray in a Constant Volume Combustion Chamber
01:20-01:30 PM	**Best Master Thesis:** Deepak Kumar, IIT Kanpur	Comparative Total Cost of Ownership Analysis of Two and Four Wheelers Battery Electric Vehicles and Internal Combustion Engine Powertrain Vehicles
01:30-01:40 PM	**Best PhD Thesis:** Dr. Karishma Maheshwari, MNIT Jaipur	Experimental Studies on Treatment of Ro Reject & Dye Contaminated Water by Capacitive Deionization Through Development of Biomass Derived Activated Carbon Composite Material
01:40-01:50 PM	**Best PhD Thesis:** Dr. Rohit Kumar, IIT Bombay	Measurement of Laminar Burning Velocity of Surrogate Fuels at Elevated temperatures with Kinetic Analysis
01:50-02:00 PM	**Best PhD Thesis:** Dr. Avnish Kumar, CSIR-IIP, Dehradun	Catalytic Oxidative Conversion of Lignin to Value-Added Chemicals
02:00-02:10 PM	**Best PhD Thesis:** Dr. Sarthak Nag, The University of Tokyo	Mechanistic insights into nanobubble dynamics through in-situ liquid-phase electron microscopy
02:10-02:20 PM	**YSA:** Dr. Anshul Yadav, CSMCRI, Bhavnagar	Membrane distillation process for high saline and wastewater treatment
02:20-02:30 PM	**YSA:** Dr. M. Krishnamoorthi, IIT Kanpur	Gasoline Compression Ignition (GCI) engine performance with G70 over the full operating range
02:30-02:40 PM	**YSA:** Dr. Manabendra Saharia	Physics- and Data-Driven Modeling for Sustainable Water Management
02:40-02:50 PM	**Best Master:** Jitendra Choudhary, IISER Bhopal*	Modelling of Thermal and Hybrid Advanced Oxidation Reaction Kinetics for Degradation of Organic Pollutants
02:50-03:00 PM	**Best PhD:** Dr. Rajesh Kona, ACSIR – New Delhi*	Gene Expression Analysis, Process Optimization and CRISPR-Cas9 Genome Engineering using Isolated Photosynthetic Organisms for Nutraceuticals Production12ploi0p
* Video presentation made available by Awardees.		
Session A-1: Advanced Engine Technologies (Session Chair: Prof. P A Laxminarayan, Sympsons) (Venue: ABLT1, Time: 01:00-02:50 PM, Date: 16th December 2022)		
01:00-01:30 PM	**Keynote:** Dr. D. Uma Maheshwar GE Aerospace	GE Aerospace – Sustainability Strategy and Technologies
01:30-01:50 PM	**Invited:** Prof Jacek Hunicz, Lublin University of Technology, Poland	Waste Polymer Pyrolytic Oil Blends as Valuable Fuels for Modern Compression Ignition Engine
01:50-02:00 PM	Vikram Kumar, Avinash Kumar Agarwal	SEEC2022_058: Effect of Injection Timing on The Performance and Emissions from Dual-Fuel Engine
02:00-02:10 PM	Ankur Tripathi, Bhargav Saikia, RR Sahoo, AP Singh	SEEC2022_080: Reactivity Controlled Compression Ignition Engine: - As Solution for Emissions Reduction Leading to Alternative Fuel
02:10-02:20 PM	Bhargav Saikia, Ankur Tripathi, AP Singh	SEEC2022_083: Gasoline Compression Ignition for Simultaneous Reduction of Oxides of N2 And PM
02:20-02:30 PM	Shanti Mehra, Avinash Kumar Agarwal, Hardikk Valera, Vikram Kumar	SEEC2022_081: Applicability of Dimethyl Ether (DME) As A Replacement for Conventional Diesel Fuel in a Tractor Engine
02:30-02:40 PM	Tomesh Kumar Sahu, Pravesh Chandra Shukla	SEEC2022_124: Gaseous and Particulate Emissions Investigation of Higher Alcohol Blends in A Modified CI Engine
02:40-02:50 PM	Saurabh Yadav, Binita Pathak	SEEC2022_188: Characterization of A Dental Spray Using High-Speed Shadow Imaging to Examine the Spray Morphology
Session B-1: Air Pollution Monitoring (Session Chair: Dr. Kirpa Ram, IESD BHU) (Venue: ABLT2, Time: 01:00-02:50 PM, Date: 16th December 2022)		
01:00-01:30 PM	**Keynote:** Dr.Sayantan Sarkar,IIT Mandi	Sources And Climate Forcing of Aerosol Brown Carbon in The Eastern Indo-Gangetic Plain
01:30-01:50 PM	**Invited:** Dr. Arnab Sarkar, IIT (BHU) Varanasi	Estimation of Wind Energy Potential Through Weibull Statistics Integrated with Meso-Micro Scale Coupling Approach
01:50-02:10 PM	**Invited:** Dr. Suresh Pandian Elumalai, IIT (ISM) Dhanbad	Energy Consumption of Academic Buildings and Strategies to Reduce the Cooling Demand

02:10-02:20 PM	Ashish Kumar, Najmul Haque Barbhuiya, Swatantra Pratap Singh	SEEC2022_076: Magnéli Phase Doped Laser-Induced Graphene Surfaces with Enhanced Electrochemical Activity for Environmental Remediation
02:20-02:30 PM	Anjali Kumari, Alok Sinha, D.B.Singh	SEEC2022_140: Reduction of Cr (Vi) By Using Modified Nano High Carbon Iron Filling in Aqueous Solution: Role Of Ph And Process Mechanism
02:30-02:40 PM	Pranav Agarwal, Gaurav Sarode, Piyush Kokate, Anirban Middey, Roshan Wathore	SEEC2022_144: Design of Cost Effective Aq Data Acquisition Module for Urban Environment
02:40-02:50 PM	Anushri Vaidya, Hemant Bherwani, Rajesh Biniwale	SEEC2022_115: Connecting Midpoint Impacts to Endpoint Impacts: A Case Study of Building Infrastructure from LCA Approach
Session C-1: Anaerobic Digestion (Dr Anna Marouskova) (Venue: ABLT3, Time: 01:00-02:50 PM, Date: 16th December 2022)		
01:00-01:20 PM	**Invited:** Dr. Josef Maroušek, Institute of Technology and Business, Czech Republic	Valorization of Biogas Fermentation Residues
01:20-01:40 PM	**Invited:** Dr. V Vivekanand, Malaviya National Institute of Technology, Jaipur	Solid-State Anaerobic Digestion of Agricultural Stubble and Its Simultaneous Treatment for Improved Methanogenesis
01:40-02:00 PM	**Invited:** Dr. Grzegorz Piechota*, Gpchem Laboratory of Biogas Research and Analysis, Poland	Natural Adsorbents in The Process of Biogas Upgrading to Biomethane Quality
02:00-02:20 PM	**Invited:** Dr. Abha Kumari, Amity Institute of Biotechnology, Noida	Strategic Potential of Flower Waste as A Feedstock for Biogas Production
02:20-02:30 PM	Pushpita Das, Prof. Vs Moholkar, Dr. Lepakshi Barbora	SEEC2022_123: Biodesulfurization of Recalcitrant Organo-Sulfur Compounds in Model Oil by Rhodococcus Rhodochrous (MTCC 3552)
02:30-02:40 PM	J Santhosh, Dr. S Venkata Mohan	SEEC2022_126: Biohythane (Bio-H-CNG) Production from Food Waste in Continuous Mode Operation
Session A-2: Combustion and Flames (Session Chair: Dr. D. Uma Maheshwar, GE Aerospace) (Venue: ABLT1, Time: 03:10-05:00 PM, Date: 16th December 2022)		
03:10-03:40 PM	**Keynote**: Prof. Michal Petru, Technical University of Liberec	Approach of Development of The Lightweight Structures for Modular Platform for Autonomous Chassis of Specialized Electric Vehicles for Freight and Equipment Transportation
03:40-04:00 PM	**Invited:** Dr. Paramvir Singh, NIT Agartala	Effects of Aromatics in Fuel on Emissions
04:00-04:10 PM	Pragya Berwal, Sudarshan Kumar	SEEC2022_093: Effect of Ammonia Cracking on The Laminar Burning Velocity of Methane-Air Mixtures At Elevated Temperatures
04:10-04:20 PM	Vijay Shinde, Amardeep Fulzele, Sudarshan Kumar	SEEC2022_094: Measurements of Laminar Burning Velocity of Ethane-Air Mixtures at Elevated Temperatures
04:20-04:30 PM	Amardeep Fulzele, Subhankar Mohapatra, Sudarshan Kumar	SEEC2022_119: Measurements of Laminar Burning Velocity of N-Dodecane/Air Mixture at Elevated Temperature
04:30-04:40 PM	Santosh Deb Barma, Rakesh Saini, Danda Srinivas Rao, R Sathish	SEEC2022_120: Thermogravimetric Analysis of Petroleum Pitch in An Inert Atmosphere
04:40-04:50 PM	Mohammad Kalamuddin Ansari, Dr. Sudarshan Kumar, Saran Solagar, Mudit Sood	SEEC2022_097: Effect of Hydrogen Addition on Emissions in Flameless Combustion with Liquid Fuel
04:50-05:00 PM	Kumar Saurabh, Rudrodip Majumdar	SEEC2022_072: Projection of Two-Wheeler Vehicle Fleet In India Using Road Density Per Capita for Accurate Emission Estimation
Session B-2: Air Pollution Control (Session Chair: Prof. A.B. Gupta, MNIT Jaipur) (Venue: ABLT2, Time: 03:10-05:00 PM, Date: 16th December 2022)		
03:10-03:40 PM	**Keynote:** Dr. Anjan Ray, CSIR-Indian Institute of Petroleum Dehradun	Decentralized Approaches to Greenhouse Gases and Pollutant Emissions Mitigation
03:40-04:00 PM	**Invited:** Prof. Swarnendu Sen, Jadavpur University	Mitigation of Air Pollution-Challenges and Strategies
04:00-04:20 PM	**Invited:** Dr. Harish C Phuleria, IIT Bombay	Developing Vehicular Fleet Emission Factors and Prediction of Super-Emitters Through Real-World Studies
04:20-04:40 PM	**Invited:** Dr. Snehasish Panigrahy, IIT Delhi	Understanding Auto-Ignition of Light Hydrocarbons and Their Interactions with Nitrogen Oxides

04:40-04:50 PM	Ankur Kaundal, Dr. Atul Dhar, Satvasheel Powar	SEEC2022_079: Numerical Investigation of Wood Combustion to Predict the Temperature Profile and Concentration of Emitting Species for Varying Air Supplies
04:50-05:00 PM	Adrija De, Viksit Singh Padam,Sukhda Goyal, Dr. Akhilendra Pratap Singh	SEEC2022_084: A Novel Photobioreactor for Carbon Dioxide Sequestration
Session C-2: Biodegradation of Toxic Chemicals (Session Chair: Dr. Abha Kumari, Amity Institute of Biotechnology, Noida) (Venue: ABLT3, Time: 03:10-05:00 PM, Date: 16th December 2022)		
03:10-03:25 PM	**Invited:** Dr. Vivek K Gaur, Ulsan National Institute of Science and Technology, Republic of Korea	Engineering Escherichia Coli for Production of Polyhydroxy propionate Homopolymer
03:25-03:45 PM	**Invited:** Dr. Nidhi Pareek, Central University of Rajasthan, Kishangarh, Ajmer	Combinatorial Process Development for Rationalized Recycling of Nutrients for Environment Clean-Up and Waste-Management
03:45-04:05 PM	**Invited:** Dr. Jaydeep Bhattacharya, School of Biotechnology, JNU, New Delhi	Anisotropic nano structures for detection and degradation of toxic chemical and biotic contaminants
04:05-04:15 PM	Dharmendra Singh Ken, Alok Sinha	SEEC2022_125: Electrochemical Advanced Oxidation of Cod and Ammonical Nitrogen from Laboratory-Prepared Coke-Oven Wastewater
04:15-04:25 PM	Azhagu Saravana Babu Packirisamy, Vajiha Aafrin Basheer, Sai Nandhini Ravi, Sugumari Vallinayagam, Sukumar Muthusamy	SEEC2022_131: Potential Therapeutic Application of Polyphenols from Juice Industry Waste: A Novel Approach On Waste To Wealth
04:25-04:35 PM	Sushmita Tiwari, Ramakrishnan Parthasarathi	SEEC2022_077: Biopolymer Based Composite Membrane: Demethoxylated Lignin Based Porous Film for Heavy Metal Ion Filtration
Session A-3: Energy and Exergy (Session Chair: Prof Achintya Mukhopadhyay, Jadavpur University) (Venue: ABLT1, Time: 10:15 AM-12:15 PM, Date: 17th December 2022)		
10:15-10:45 AM	**Keynote:** Prof. P A Laxminarayan, Sympsons	Energy Storage Methods
10:45-11:05 AM	**Invited:** Dr. Ramadhas Arumugam Sakunthalai, Indian Oil R&D Centre	Fuel Economy through Fuels and Lubricants
11:05-11:25 AM	**Invited:** Mr. Ayush Pant, FEV	Investigations of Emission Reduction Potential of Diesel-Methanol Blends in A HD-Diesel Engine
11:25-11:45 AM	**Invited:** Dr Saket Verma, BITS Pilani	Comparative Exergy Analysis for the Utilization of Alternative Fuels in Dual Fuel Engines
11:45-11:55 AM	Bipin G. Vyas	SEEC2022_167: Energy, Exergy Analysis, And Optimizations of Paddle Wheel Operated Portable Model for Enhanced Brine Evaporation
11:55 AM-12:05 PM	Srijit Biswas, Avinash Kumar Agarwal	SEEC2022_055: Parametric Optimization of the CNG/Ethanol-Induced RCCI Profiles in Biodiesel Combustion Through a Robust Design Space Foray
12:05-12:15 PM	Ankur Kalwar, Avinash Kumar Agarwal	SEEC2022_062: Emissions Assessment from M15 Fuelled BSVI SI Engine
Session B-3: Desalination and Wastewater Treatment (Session Chair: Prof. Alok Sinha, IIT (ISM) Dhanbad) (Venue: ABLT2, Time: 10:15 AM-12:15 PM, Date: 17th December 2022)		
10:15-10:45 AM	**Keynote:** Prof. A.B. Gupta, MNIT Jaipur	Energy Consumption and Cost Optimization in Community Ro Plants (CROPs) for Rural Drinking Water Supplies
10:45-11:05 AM	**Invited:** Prof. Munish Chandel, IIT Bombay	Sustainable Urban Water System: Water-Energy-Greenhouse Gas Nexus
11:05-11:25 AM	**Invited:** Dr. Archana Sarkar, National Institute of Hydrology, Roorkee	Water Security in A Changing Climate: Challenges and Way forward with Special Emphasis to Indian Water Resources
11:25-11:45 AM	**Invited:** Prof. Bhabani K Satapathy, IIT Delhi	Sustainable electrospun mats as microplastic-free control release fertilizer systems
11:45-11:55 AM	Kirti Rajvanshi, Muktesh Bhatt, Munish Kumar Upadhyay, Johan Goemets, Paul Campling, Abhas Singh	SEEC2022_185: Impact of Treated Wastewater Agricultural Reuse on Groundwater Quality: A Case Study in Kanpur, India
11:55 AM-12:05 PM	Utkarsh Misra, Nandini Dixit, Swatantra Pratap Singh	SEEC2022_078: Optimized Laser-Induced Graphene Based Surfaces for Desalination and Wastewater Treatment
12:05-12:15 PM	Komal Saini, Amrita Kumari, Abhisek Sahoo,	SEEC2022_085: Hierarchical Lignin Carbon Using Eggshell as Activating Agent for Wastewater Treatment

	Kamal Kishore Pant, Thallada Bhaskar	
Session C-3: Environmental Bioengineering (Session Chair: V Vivekanand, Malaviya National Institute of Technology, Jaipur) (Venue: ABLT3, Time: 10:15 AM-12:15 PM, Date: 17th December 2022)		
10:15-10:45 AM	**Keynote:** Dr. Indu Shekhar Thakur, Amity University, Gurugram	Biological Looping Mechanisms for Decarbonization of Carbon Dioxide for Production of Biofuel and Biomaterials by Microorganism
10:45-11:05 AM	**Invited:** Dr. Keshab Mondal, Vidyasagar University, Midnapur	Fungal Laccase-Mediated Detoxification of Laboratory Dyes
11:05-11:25 AM	**Invited:** Dr. Akhilesh Tiwari, Indian Institute of Information Technology, Prayagraj	Condensation of Atmospheric Water Vapour Its Feasibility as Active Potable Source and Physicochemical Analysis
11:25-11:45 AM	**Invited:** Dr. Preeti Chaturvedi, CSIR-Indian Institute of Toxicology Research, Lucknow	Effective Elimination of Toxic Azo Dyes Using Biochar-Microbial Composite Hybrid Technology
11:45-11:55 AM	Thara M V, Indumati M Nambi	SEEC2022_074: Patterns of Antimicrobial Resistance in The Major Waterways of Chennai
11:55 AM-12:05 PM	Arpita Das, Dr. Samuel Lalthazuala Rokhum	SEEC2022_106: Microwave Assisted Synthesis of Glycerol Carbonate from Glycerol with Dimethyl Carbonate Transesterification Using Terminalia Arjuna Bark Calcined Ash as Catalyst
Session A-4: Alternative Transportation Fuels and Materials (Session Chair: Prof. HSN Murthy, IIT Madras) (Venue: ABLT1, Time: 01:30-03:30 PM, Date: 17th December 2022)		
01:30-02:00 PM	**Keynote:** Prof Achintya Mukhopadhyay, Jadavpur University	Active and Passive Techniques for Mitigation of Thermal Runaway in Lithium-Ion Batteries
02:00-02:20 PM	**Invited:** Prof Dilip Sharma, NIT Jaipur	Feasibility of HHO Fueled CI Engines
02:20-02:40 PM	**Invited:** Ms. Prakrati Sethi, Methanol Institute	Methanol; The Future-Proof Fuel
02:40-03:00 PM	**Invited:** Prof Shailendra Sinha, Lucknow	Effect of Nano particles as additives in biodiesel in CI engine
03:00-03:20 PM	**Invited:** Prof Srinibas Karmakar, IIT KGP	Combustion Characteristics of Alternative Aviation Fuels
03:20-03:30 PM	Ashish Nayyar, Chandan Kumar	SEEC2022_075: Experimental Analysis of Blended Fuel with EGR on Agriculture Based Diesel Engine
Session B-4: Emerging Environmental Contaminants (Session Chair: Prof. Swarnendu Sen, Jadavpur University) (Venue: ABLT2, Time: 01:30-03:30 PM, Date: 17th December 2022)		
01:30-01:50 PM	**Invited:** Dr. Ramesh Dharavath H N, IIT (ISM) Dhanbad	Optimal Allocation of Surface Water and Groundwater Resources for Crop Production
01:50-02:10 PM	**Invited:** Dr. Ambika S, IIT Hyderabad	Photocatalytic Membrane for The Treatment of Emerging Contaminants in Agricultural Run-Off
02:10-02:30 PM	**Invited:** Dr. Bijay P. Tripathi, IIT Delhi	Nanostructured Responsive Microgel Membranes for Separation and Purification Applications
02:30-02:40 PM	Nishant Kumar, Shravan Kumar Singh, Nikhil Chander	SEEC2022_127: Performance Comparison of Vertical Bifacial Solar PV Module in East-West and North-South Facing Configuration in Summer Season at An East-Central Indian Location
02:40-02:50 PM	Najmul Haque Barbhuiya, Utkarsh Misra, Bhavana Kanwar, Swatantra P. Singh	SEEC2022_071: Advanced Oxidation Process in Combination with Electroconductive Membranes for Removing Emerging Contaminant
02:50-03:00 PM	Priyansha Gupta,Mahua Saha, Suneel Vasimalla, Chayanika Rathore	SEEC2022_090: Vertical Distribution and Characterization of Microplastics in The Sediment Core Samples from The Eastern Arabian Sea
03:00-03:10 PM	Aniket Desai, Mandar Nanajkar	SEEC2022_092: Risk Assessment of Plastic Additive (Dehp) On Pearl Spot (Etroplus Suratensis)
03:10-03:20 PM	Subhashini, Dr. Tarak Mondal	SEEC2022_176: Catalytic Pyrolysis Of Plastic Waste Over Synthesized Hzsm-5 To Obtain Fuel Grade Hydrocarbons
Session C-4: Sustainable Processing of Biomass (Session Chair: Akhilesh Tiwari, Indian Institute Of Information Technology, Prayagraj) (Venue: ABLT3, Time: 01:30-03:30 PM, Date: 17th December 2022)		
01:30-01:50 PM	**Invited:** Dr. Thallada Bhaskar, CSIR-Indian Institute of Petroleum, Dehradun	Role of Feedstock and Process

01:50-02:10 PM	**Invited:** Dr. Bhuwan B Mishra,CIAB Mohali	Valorisation of Spent Aromatic Waste to Platform Chemicals
02:10-02:30 PM	**Invited:** Dr. Ashish N. Sawarkar*, MNIT Allahabad, Prayagraj	A Case Study of Finger Millet Straw
02:30-02:50 PM	**Invited:** Dr. Ashutosh Pandey, AKS University, Satna	Carbon dioxide fixation and lipid production using Scenedesmus sp. ASK22: a sustainable approach for carbon sequestration and biofuel production
02:50-03:00 PM	Mahendra Tiwari, Vinu R.	SEEC2022_073: Resource and Energy Recovery Through Microwave Assisted Co-Pyrolysis of Rice Straw Pellets and Multi-Layered Packaging Waste
03:00-03:10 PM	Madhava Anil Kumar, Tarini Prasad Sahoo, Shreya Sadukha, Ramalingam Dineshkumar, Gurunathan Baskar	SEEC2022_110: Pre-Treated Biomass of Chlorella Variabilis for The Adsorptive Removal of Water Colorant: Phase Transfer And Thermodynamic Modelling
03:10-03:20 PM	Ranaprathap Katakojwa, Dr. S Venkata Mohan	SEEC2022_118: Biorefining of Surplus Agri-Waste Biomass Through Hydro-Catalyzed Valorisation for Energy-Dense Chemicals And Fuels
Session A-5: Sprays and Atomization (Session Chair: Prof Srinibas Karmakar, IIT Kharagpur) (Venue: ABLT1, Time: 04:00-06:00 PM, Date: 17th December 2022)		
04:00-04:20 PM	**Invited:** Dr. Yogeshwar Nath Mishra, Department of Physics, University of Gothenburg	SLIPI-Based Techniques for 2D and 3D Imaging of Sprays and Combustion Species
04:20-04:40 PM	**Invited:** Dr. Chaitanya Kumar Rao, IIT Kanpur	Application of Liquid Fuel Atomization for Medical Diagnostics
04:40-05:00 PM	**Invited:** Dr. Venugopal, IIT Bhubaneswar	Pulsed Jets for Flow Control and Mixing
05:00-05:20 PM	**Invited:** Dr. Rajesh Kumar Prasad, UIET Kanpur	Development of Laser Ignited Hydrogen Fueled Supercharged Engine
05:20-05:30 PM	Utkarsha Sonawane, Avinash Kumar Agarwal	SEEC2022_053: Experimental Study on Spray Characteristics of Diesel and Diethyl Ether Blends Under Split Injection Strategy
05:30-05:40 PM	Ashutosh Jena, Avinash Kumar Agarwal	SEEC2022_066: Investigation of Spray Wall Impingement of Gasoline and Methanol Using Port Fuel Injector Under Crossflow Condition
05:40-05:50 PM	Swarnendu Sen, Sabyasachi Mondal, Sourav Sarkar, Achintya Mukhopadhyay	SEEC2022_133: Investigation on Downstream Mixing Behavior Due to Fuel Injection from Bluff Body Embedded Fuel Port
05:50-06:00 PM	Rahul Kumar Singh, Avinash Kumar Agarwal	SEEC2022_063: Impact of Methanol Addition into Gasoline on BS-VI Port Fueled Si Engine's Combustion and Performance Characteristics
Session B-5: Solid Waste: Challenges and Mitigation (Session Chair: Prof. Munish Chandel, IIT Bombay) (Venue: ABLT2, Time: 04:00-06:00 PM, Date: 17th December 2022)		
04:00-04:30 PM	**Keynote:** Prof. Alok Sinha, IIT (ISM) Dhanbad	Economic Evaluation of Anaerobic Hybrid Membrane Bioreactor (AnHMBR) Treating Leachate at Mesophilic Temperature
04:30-04:50 PM	**Invited:** Prof. Priya Chandran, NIT Calicut	Some exemplary initiatives at NIT Calicut on Solid Waste Management
04:50-05:10 PM	**Invited:** Dr. Manoj Kumar Tiwari, IIT Kharagpur	Waste To Wealth: Circular Economy in Solid Waste Management
05:10-05:20 PM	Shivani Singh, Dr. Preeti Chaturvedi Bhargava	SEEC2022_111: Effect of Seasonal Variations on Dissemination of Args in Community Landfill Sites
05:20-05:30 PM	Diwakar Kumar Singh, Anurag Garg	SEEC2022_134: Mitigation of Ecological Risk Due to Presence of Heavy Metals in Sewage Sludge Through Thermal Hydrolysis
05:30-05:40 PM	Hemant Thakur, Atul Dhar, Satvasheel Powar	SEEC2022_61: Anaerobic Co-Digestion of Food Waste and Primary Sewage Sludge Towards Bio-Methane Production: A Comparative Analysis
05:40-05:50 PM	Roshan Vilasrao Mankhair, Munish Kumar Chandel	SEEC2022_161: Estimating Resource Recovery Potential of Legacy Waste Excavated from An Indian Dumpsite
05:50-06:00 PM	Rohit, Munish K. Chandel	SEEC2022_163: Modeling and Evaluating a Small-Scale Solar Pyrolysis System for Treating Municipal Solid Waste Using A Lumped Approach
Session C-5: Solid Waste Management (Session Chair: Dr. Ashish N. Sawarkar, Motilal Nehru National Institute of Technology Allahabad, Prayagraj) (Venue: ABLT3, Time: 04:00-06:00 PM, Date: 17th December 2022)		
04:00-04:30 PM	**Keynote:** Dr. Sunil Kumar Khare, Indian Institute of Technology Delhi, New Delhi	Assessment And Evaluation of Microplastic Particles from Gorai Beach of Arabian Sea
04:30-04:50 PM	**Invited:** Dr. Abhilash, CSIR-National	Circular Economy in Solid Waste Management

	Metallurgical Laboratory, Jamshedpur	
04:50-05:10 PM	**Invited:** Dr. Vinod K. Garg, Central University of Punjab, Bathinda	Vermicomposting Technology for Non-Toxic Biodegradable Wastes
05:10-05:30 PM	**Invited:** Dr. Manoj K. Sharma, Jawaharlal Nehru University, New Delhi	Multipurpose Sorghum Feedstock for Biofuel Production: A Sustainable Solution
05:30-05:40 PM	Phurailatpam Sujata Devi, Meena Khwairakpam	SEEC2022_101: The Abundance and Diversity of Invertebrates in Vegetable Waste During the Pile Composting
05:40-05:50 PM	Nishant Ranjan, Sandeep Kumar	SEEC2022_132: Plastic and Agro Wastes Co-Gasification Using Aspen Plus: A Restricted Equilibrium Model
Session A-6: Modelling and Simulations (Session Chair: Prof Dilip Sharma, NIT Jaipur) (Venue: ABLT1, Time: 09:00-11:00 AM, Date: 18th December 2022)		
09:00-09:30 AM	**Keynote**: Prof Raja Banerjee, IIT Hyderabad	Combustion of Ammonia as A Carbon-Neutral Fuel
09:30-09:50 AM	**Invited:** Dr. Chetan Kumar Patel, IIT Patna	Effect of exhaust gas recirculation composition on soot in ECN spray A conditions
09:50-10:10 AM	**Invited:** Dr. Rajesh Mishra, Czech Republic	Numerical Modeling and Experimental Analysis of Light-Weight Composite Structures for Automotive Applications
10:10-10:30 AM	**Invited:** Dr. Anirudha Ambekar, IIT Goa	Alternative Fuels for Aviation
10:30-10:40 AM	Chandan Kumar, Mukesh Kumar, Umesh Kumar Das, K. B. Rana, Ashish Nayyar	SEEC2022_068: Experimental and Numerical Study of Diesel-Diethyl Ether-2-Methoxy Ethyl Ether Blends in Ci Engines
10:40-10:50 AM	Rajeeb Kumar Upadhyay, Pushpendra K Vishwakarma, Kirti Bhushan Mishra	SEEC2022_102: Numerical Investigation on Thermal Response of a Separator
10:50-11:00 AM	Priyaranjan Jena, Jeewan Vachan Tirkey, Reetu Raj, Deepak Kumar Singh	SEEC2022_147: Mathematical Simulation of Si Engine Performance Using Sewage Sludge Derived Producer Gas with Methane Blend
Session B-6: Renewable Energy Technologies (Session Chair: Dr. Satvasheel Ramesh Powar) (Venue: ABLT2, Time: 09:00-11:00 AM, Date: 18th December 2022)		
09:00-09:30 AM	**Keynote:** Prof. Sudipta De, Jadavpur University	'Is Optimized Distributed Hybrid Renewable Systems a Future Sustainable Energy Solution for India?'
09:30-09:50 AM	**Invited:** Dr. Shihabudheen M. Maliyekkal, IIT Tirupati	Nanotechnology-Enabled Point-of-Use Sustainable Water Treatment Systems
09:50-10:10 AM	**Invited:** Dr. Om Prakash Singh, IIT (BHU) Varanasi	Solar Energy: Opportunity for Design Innovations
10:10-10:30 AM	**Invited:** Dr. Balkrisna Mehta, IIT Bhilai	Cooling of Solar PV Panels for Enhanced Efficiency
10:30-10:40 AM	Rupam Nandan, Rashmi Ranjan, Swatantra Pratap Singh	SEEC2022_159: Lig Based Polyamide Reverse Osmosis Membrane for Water Purification and Desalination
10:40-10:50 AM	Kapil Pareek, Jayesh Sharma	SEEC2022_069: Non-Contact Testing Using Infrared Thermography in Renewable Energy Sector
10:50-11:00 AM	Anubhav Kumar, Bijay P. Tripathi	SEEC2022_087: A Neutral PH Aqueous Organic Redox-Flow Battery for Renewable Energy Storage and Management
Session C-6: Bioremediation (Session Chair: Dr. Asha Chaube, CSIR-Indian Institute of Integrative Medicines, Jammu) (Venue: ABLT3, Time: 09:00-11:00 AM, Date: 18th December 2022)		
09:00-09:20 AM	**Invited:** Dr. Pratyoosh Shukla, Banaras Hindu University, Varanasi	Integrated Approaches for Microbial Bioremediation: Future Scope and Applications
09:20-09:40 AM	**Invited:** Dr. Balendu Shekhar Giri, Indian Institute of Technology, Guwahati	Biochar-Based Catalysts for The Abatement of Toxic Pollutants from Water Via Advanced Oxidation Processes
09:40-10:00 AM	**Invited:** Dr. Kashyap Dubey, Jawaharlal Nehru University, New Delhi	How to Treat Cancer Hospital Aqueous Waste?
10:00-10:20 AM	**Invited:** Dr. Priyangshu M Sarma, Innotech Interventions Pvt Ltd, Guwahati, India	Integrated Bio-Electrochemical System for Treatment of Produced Water: Concept to Commercialization

10:20-10:30 AM	Jyoti, Meena Khwairakpam	SEEC2022_096: Disease Suppressiveness in Tomato Plants Post Vegetable Waste Compost and Vermicompost Application.
10:30-10:40 AM	Boda Ravi Kiran, Dr. S. Venkata Mohan	SEEC2022_145: Photosystems and Pigment Profiling of Tetradesmus Sp. Svmiict4 in In Response To High Light Irradiance
Session A-7: Engine Emissions and Control (Session Chair: Prof Amitava Dutta, Jadavpur University) (Venue: ABLT1, Time: 11:30 AM-01:00 PM, Date: 18th December 2022)		
11:30 AM-12:00 PM	**Keynote:** Prof. HSN Murthy	Insitu-hydrogen generation from aluminum water combustion
12:00-12:20 PM	**Invited:** Prof Kirti Bhushan Mishra, IIT Roorkee	Implication in measurement techniques for vehicular emission
12:20-12:30 PM	Dr. Suman Dey, Akhilendra Pratap Singh, Madhujit Deb, Pankaj Kumar Das	SEEC2022_150: Effect of Nanoparticle Additives in Performance-Emission Characteristics Of Higher Biodiesel Blends In A Single Cylinder Diesel Engine
12:30-12:40 PM	M. Krishnamoorthi, Avinash Kumar Agarwal	SEEC2022_056: Emissions Performance of A Gasoline Compression Ignition Engine At Idle And Low-Load Conditions
12:40-12:50 PM	Harmanpreet Singh, Sandeep Kumar, Saroj Kumar Mohapatra	SEEC2022_135: Investigation of The Characteristic Parameters of A Producer Gas Fired Dual Fuel Engine
12:50-01:00 PM	Shashank Shekhar, Avinash Kumar Agarwal	SEEC2022_157: Prototype Development of Methanol (MD95) Powered Compression Ignition Engine
Session B-7: Cleaner Technologies for Pollution Mitigation (Session Chair: Dr. Shihabudheen M. Maliyekkal) (Venue: ABLT2, Time: 11:30 AM-01:00 PM, Date: 18th December 2022)		
11:30 AM-12:00 PM	**Keynote:** Prof. Shantanu Bhattacharya, IIT Kanpur	A Novel AOP Based Effluent Treatment Methodology: Perspectives of Working in An Industrial Setup
12:00-12:20 PM	**Invited:** Dr. Sandeep Kumar, IIT Bombay	Biomass Gasification - Sustainable Technology for Waste to Energy
12:20-12:40 PM	**Invited:** Dr. Parmod Kumar, IIT Mandi	Performance Enhancement of Methanol Reforming Reactor Utilizing Engine Exhaust Heat for Hydrogen Generation
12:40-12:50 PM	Sumona Koley, Siddhant Dash, Ajay S. Kalamdhad, Meena Khwairakpam	SEEC2022_128: Advanced Oxidation Processes: An Approach Towards the Removal of Disinfection By-Products' Precursor
12:50-01:00 PM	Kirtiman Singh, Shantanu Bhattacharya	SEEC2022_155: Design and Development of Improved Wastewater Treatment Plant Using Advanced Oxidation Process
Session C-7: Microbial Processes (Session Chair: Dr. Suresh Kumar Dubey, Banaras Hindu University, Varanasi) (Venue: ABLT3, Time: 11:30 AM-01:00 PM, Date: 18th December 2022)		
11:30 AM-12:00 PM	**Keynote:** Dr. Ramakrishnan Parthasarathi, CSIR-Indian Institute of Toxicology Research, Lucknow	Deriving Adverse Outcome Pathway Framework for Environmental Persistent Chemicals Through Computational Approaches
12:00-12:20 PM	**Invited:** Dr. Nagendra Thakur, Sikkim University, Tadong	Comparative Study of Microbial Diversity and Antibiotic Resistance Profile at Various Temperature Gradients in The Vicinity Of High-Altitude Himalayas
12:20-12:40 PM	**Invited:** Dr. Archana Tiwari, Amity Institute of Biotechnology, Noida	Impact of Carbon Sources on Enhancing Lipid Productivity in Marine Diatoms
12:40-12:50 PM	Sathya Narayanan V, Mugesh S, Nandakumar Arumugam, Jagadeeswaran K S, Pritam Raj, Bharathiraja B	SEEC2022_116: Process Development for The Enhanced Vitamin-B12 Synthesis from A Novel Microorganism
12:50-01:00 PM	Shikha Singh, Kamlesh Singh Yadav	SEEC2022_156: Enzymatic Transformation of Rutin to Quercetin and Rutinose
Session A-8: Coal & Biomass Gasification (Session Chair: Prof Raja Banerjee, IIT Hyderabad) (Venue: ABLT1, Time: 02:00-04:00 PM, Date: 18th December 2022)		
02:00-02:20 PM	**Invited:** Prof Jeewan V Tirkey, IIT BHU	Gasification of waste biomass and application to IC engine
02:20-02:40 PM	**Invited:** Dr Tushar Sharma, RGIPT Amethi	Utilisation of Carbon Dioxide for Oilfield Applications
02:40-03:00 PM	**Invited:** Prof. Satyajit Gupta, IIT Bhilai	2G Bioethanol Production from Organic Waste: An Overview of The Pre-Treatment Process and Case Studies
03:00-03:10 PM	Shruti Vikram, Sandeep Kumar	SEEC2022_112: Sensitivity Analysis of Biomass Gasification for Syngas Generation Under Varying Reactive Media

03:10-03:20 PM	Edin Michael, Santosh Kumar Sriramoju, Saptarshi Majumdar, Debaprasad Shee, Raja Banerjee	SEEC2022_169: Droplet combustion study of reclaimed coal water slurry
03:20-03:30 PM	Reetu Raj, Jeewan Vachan Tirkey, Deepak Kumar Singh	SEEC2022_146: Producer Gas Derived from Co-Gasification of Low-Grade Coal and Waste Mahua Biomass: Engine Application and Optimization
03:30-03:40 PM	Anurag Mishra, Sayak Banerjee, Raja Banerjee	SEEC2022_170: Optimization of Operating Parameters for Biomass Gasification in A Fixed-Bed Downdraft Gasifier
03:40-03:50 PM	Saumitra Thakur, Saket Verma, Saumitra Thakur, Dev Anand Gupta	SEEC2022_143: Effect of Ethanol Blending in A Gasoline-Fueled Si Engine Based on Exergy Analysis
03:50-04:00 PM	Rajneesh Kumar Yadav, R Santhosh, Arun Pattanshetti	SEEC2022_179: Experimental and Numerical Study of Biogas/Air Flames in A Non-Premixed Atmospheric Coaxial Combustor
Session B-8: Environmental Challenges Mitigation (Session Chair: Prof. Sudipta De, Jadavpur University) (Venue: ABLT2, Time: 02:00-04:00 PM, Date: 18th December 2022)		
02:00-02:20 PM	**Invited:** Dr. Dhiraj V Patil, IIT Dharwad	On The United Nations Sustainable Development Goal 7: Affordable and Clean Energy
02:20-02:30 PM	Pramod Kumar; Tabish Nawaz; Swatantra Pratap Singh	SEEC2022_86: Evaluation and Optimization of Electrocoagulation Process for Drill Site Wastewater Treatment
02:30-02:40 PM	Ankit Kumar, Meena Khwairakpam	SEEC2022_129: Vermifiltration: A Decentralized Treatment System for Low Strength Domestic Wastewater Treatment
02:40-02:50 PM	Muktesh Bhatt, Kirti Rajvanshi, Munish Kumar Upadhyay, Johan Gemoets, Paul Campling, Abhas Singh	SEEC2022_186: An Impact Assessment of Agricultural Soil Irrigated with Treated Tannery Wastewater
02:50-03:00 PM	Rashmi Ranjan, Swatantra Pratap Singh	SEEC2022_158: Fabrication of Thin Film Composite Membrane for Desalination: Effect of Parameters On Membrane Performance
03:00-03:10 PM	Syed Arwa A. Balkhi, Shaik Mahamad Allabakshi, P S N S R Srikar, Reetesh Kumar Gangwar, Shihabudheen M. Maliyekkal	SEEC2022_172: Atmospheric Pressure Non-Thermal Plasma: A Chemical-Free Approach for Antibiotics Degradation in Wastewater
03:10-03:20 PM	Prajakta Ramteke, Asmita S. Jadhav Sunit K. Singh and Nitin K. Labhsetwar	SEEC2022_109: Aluminium-Iron Oxide Based Adsorbent for Effective Selenium Remediation Form Drinking Water: Batch and Column Adsorption Studies
03:20-03:30 PM	Abins Aziz, Bijily Balakrishnan, M. Nityadharan, And Shihabudheen M. Maliyekkal	SEEC2022_136: Calcium-Doped Chitosan-Go Nanocomposite Film with Enhanced Tensile Strength and Flexibility
03:30-03:40 PM	Sanjay Singh, Ayushi Khare, Sanjeev Chaudhari	SEEC2022_99: Mechanistic Aspects of Temperature Effect on Fluoride Uptake by Un-Calciend Synthetic Hydroxyapatite
03:40-03:50 PM	Shaik Mahamad Allabakshi, P S N S R Srikar, Reetesh Kumar Gangwar, Shihabudheen M. Maliyekkal	SEEC2022_175: Energy Efficient Degradation of Dye in Wastewater by A Novel Photo-Plasma Reactor
Session C-8: Biofuels and Biorefineries (Session Chair: Grzegorz Piechota, Gpchem Laboratory of Biogas Research and Analysis, Poland) (Venue: ABLT3, Time: 02:00-04:00 PM, Date: 18th December 2022)		
02:00-02:20 PM	**Invited:** Dr. Samuel L Rokhum, National Institute of Technology, Silchar	Sustainable Production of Biodiesel Using Functional Material as A Heterogeneous Catalyst
02:20-02:40 PM	**Invited:** Dr. Baskar Gurunathan, St. Joseph's College of Engineering, Chennai	Production of Biodiesel from Food Waste Using a Citrus Fruit Peel Biochar Catalyst
02:40-03:00 PM	**Invited:** Dr. Asha Chaubey, CSIR-Indian Institute of Integrative Medicines, Jammu	Rare Streptomyces Spp. From NW Himalayas and Their Therapeutic Applications

03:00-03:20 PM	**Invited:** Dr. Dipesh S Patle, Motilal Nehru National Institute of Technology Allahabad	Simultaneous Optimization of Economic, Environmental, And Safety Criteria for Algal Biodiesel Process Retrofitted Using Dividing Wall Column and Multistage Vapor Recompression for Sustainable Development
03:20-03:30 PM	Tamilarasan K, Aswin Sidhaarth Kr	SEEC2022_051: Biohydrogen Production from Macroalgae Via Sonic-Biosurfactant Disintegration - An Energy-Efficient Approach
03:30-03:40 PM	Indrajeet Yadav, Sanjay Kumar	SEEC2022_180: Photosynthetic Production of Isoprene by Genetically Engineered Cyanobacteria for Biofuel Application
03:40-03:50 PM	Sourav Khanra, Anuradha, Muthu Kumar Sampath	SEEC2022_088: Deep Eutectic Solvents for The Pretreatment of Lignocellulose Feedstocks As Bio Refinery Process
Session B-9: Pollution and Climate Change: Challenges and Priorities. (Session Chair: Dr. Harish Phuleria, IIT Bombay) (Venue: ABLT4, Time: 10:15 AM-12:15 PM, Date: 17th December 2022)		
10:15-10:35 AM	**Invited:** Dr. Niraj Sah, FEV India Pvt Ltd	Current Trends in Hydrogen Internal Combustion Engine
10:35-10:55 AM	**Invited:** Dr. Kirpa Ram, IESD BHU	Chemistry As a Sustainable Solution to Curb Environmental Pollution: Challenges and Way Forward
10:55-11:05 AM	Ravindra Singh, Alok Sinha	SEEC2022_139: Phthalate Pollution in The Aqueous Environment and Their Removal Technologies.
11:05-11:15 AM	Sadichha Jagadale, Dr. Hemant Bherwani, Hemant Bherwani, Amit Bansiwal,	SEEC2022_114: Role of CCUS Technologies in The Implementation of Circular Economy Strategies in India
11:15-11:25 AM	Kartik Srivastava, Rr Sahoo	SEEC2022_154: Thermoelectric Generators for Waste Heat Utilization: Means to Reduce Fossil Fuel Consumption and Produce Electricity
11:25-11:35 AM	Anshul Yadav	SEEC2022_166: UV-Cleaning PVDF-CO-HFP Tio2 Incorporated Membranes for Effective Removal of Dyes from Textile Industry Wastewater
11:35-11:45 AM	Raj Vardhan Patel, Anshul Yadav	SEEC2022_165: Experimental Study and Numerical Optimization for Removal of Methyl Orange Using Polytetrafluoroethylene Membrane in Vacuum Membrane Distillation Process
11:45-11:55 AM	Shivani Singh, Dr. Rahul Dev	SEEC2022_171: Design and Assessment of Solar Photovoltaic System: A Case Study
11:55 AM-12:05 PM	Shweta Rawat, Sanjay Kumar	SEEC2022_178: Investigations on Thermochemical Conversion of Wastewater Grown Microalgae Residue to Assess Bioenergy Potential
12:05-12:15 PM	Ayush Singh, Roshan Vilasrao Mankhair, Munish Kumar Chandel	SEEC2022_183: Determining Material Recovery Potential of Dumpsites in A Developing Country
Session C-9: Human Health & Environmental Sustainability (Session Chair: Dr. Kamlesh Choure, AKS University, Satna) (Venue: ABLT4, Time: 01:30-03:30 PM, Date: 17th December 2022)		
01:30-01:50 PM	**Invited:** Dr. Jay Shankar Singh, Babasaheb Bhimrao Ambedkar University, Lucknow	Microbial Services in Energy and Environmental Sustainability
01:50-02:10 PM	**Invited:** Dr. Suresh Kumar Dubey, Banaras Hindu University, Varanasi	Cellulose Degradation Using Bacteria Isolated from Agro-Ecosystem
02:10-02:30 PM	**Invited:** Dr. Prabhanshu Tripathi, CSIR-Indian Institute of Toxicology Research, Lucknow	Artificial Sweetener Induced Modulation of Gut Microbiota Compromises Intestinal Barrier Functions
02:30-02:50 PM	**Invited:** Dr. Budhi Sagar Tiwari, Institute of Advanced Research, Gandhinagar, India	Requirement of Active Chloroplast for The Salinity Induced and Photo-Modulated Programmed Cell Death in Rice
02:50-03:00 PM	Yamini Javvadi, Dr S Venakata Mohan	SEEC2022_108: Deciphering the Dynamics Patterns of Microbial Antibiotic Resistance Genes (Args) Through Long-Term Wastewater Based Epidemiological Study
03:00-03:10 PM	Sai Nandhini R1, Mugesh S, Ajay G1, Sathya Narayanan V1, Bharathiraja B2	SEEC2022_117: Effect of Cofactor Engineering On 3-Hp Synthesis from Glycerol Using Recombinant Escherichia Coli
03:10-03:20 PM	Pallavi Shukla, Dr. Aradhana Mishra, Priya Verma, Ashutosh Tripathi, Ved Prakash Giri, Navinit Kumar, Vinita Tiwari	SEEC2022_070: Potential of Herbal Nanoemulsion for Disruption of Methicillin Resistant Staphylococcus Aureus

Session C-10: Sustainable Food & Agri Biotechnology (Prof Praveen Kumar) (Venue: ABLT4, Time: 04:00-06:00 PM, Date: 17th December 2022)		
04:00-04:20 PM	**Invited:** Dr. Aradhana Mishra, National Botanical Research Institute, Lucknow	Biotransformation of the Phytopathogen Fusarium Sp. Regarding Substrate Utilization Pattern by The Intervention of Biocontrol Pbe-8 During Wilt Disease in Tomato
04:20-04:40 PM	**Invited:** Dr. Dev Mani Pandey, Birla Institute of Technology, Mesra, Ranchi	Impact of Soil Acidity Stress in Rice: A Computational and Molecular Approach
04:40-05:00 PM	**Invited:** Dr. Vinod Sangwan, CCS Haryana Agricultural University, Hisar	Potential of Biofortified Crop Varieties Towards Food Quality and Sustainable Agriculture
05:00-05:20 PM	**Invited:** Dr. Sapna Sharma, Shri Ram Swaroop Memorial University, Lucknow	Phytochemicals Modulate Membrane Integrity in Metabolic Disorders
05:20-05:40 PM	**Invited:** Dr. Kamlesh Choure, AKS University, Satna	Role of Microbial Consortia for Making Quality Compost to Reduce the Load of Spent Mushroom Substrate
05:40:05:50 PM	Kumar Saurabh, Rudrodip Majumdar	SEEC2022_098: Conceptualizing Integrated Life-Cycle Management for Sustainable and Optimal Utilization of Used Cooking Oil (UCO)
05:50-06:00 PM	Karan Kumar, Vijayanand S. Moholkar	SEEC2022_149: Unravelling the Genomic Differences Between Solventogenic Species Clostridium Acetobutylicum Atcc824 and Clostridium Pasteurianum Atcc6013
Session C-11: Biofuels and Biorefineries (Prof Indu Shekar Thakur) (Venue: ABLT4, Time: 09:00-11:00 AM, Date: 18th December 2022)		
09:00-09:20 AM	**Invited:** Dr. Ajay Kumar Pandey, Chhatrapati Shahu Ji Maharaj University, Kanpur:	Integrated Biorefinery Process Design for Co-Production of Bioethanol and Biogas Using Molasses and Lignocellulosic Biomass
09:20-09:40 AM	**Invited:** Dr. R. Praveen Kumar, Arunai Engineering College, Tiruvannamalai	Current Trends and Progress of Heterogenous Nano Catalysts for The Production of Biodiesel from Microalgae
09:40-10:00 AM	**Invited:** Dr. N Stalin, Anna University, Tiruchirapalli	Enhancement of Bioreactor Activities by Operating Parameters Optimization Methods in Biofuel Production
10:00-10:20 AM	**Invited:** Dr. Anjana Pandey, Motilal Nehru National Institute of Technology Allahabad, Prayagraj	Algal Feedstock as Potential Biowaste for Mitigation of Organic Carbon and Generation of Bioenergy and Useful Products: A Solution for Circular Bio Economy
10:20-10:30 AM	Kankana Saikia, Samuel Lalthazuala Rokhum	SEEC2022_105: Transesterification of Jatropha Curcas Oil for The Sustainable Production of Biodiesel by A Sulphonated Cellulose Derived Catalyst
10:30-10:40 AM	Viksit Singh Padam, Kancharana Venkata, Krishna Chaitanya	SEEC2022_067: Production of Biodiesel Using Microalgae
Session B-10: Energy and Environment (Session Chair: Prof. Swatantra Pratap Singh, IIT Bombay) (Venue: ABLT4, Time: 11:30 AM-01:00 PM, Date: 18th December 2022)		
11:30-11:50 AM	**Invited:** Dr. Nikhil Sharma, MNIT Jaipur	Particulate Emission Characterization for Automotive Applications
11:50 AM-12:00 PM	Shweta Singh, Atul Dhar, Satvasheel Powar	SEEC2022_187: Cradle to Gate Life Cycle Assessment of Mono-Crystalline Silicon Technology Considering Manufacturing in India
12:00-12:10 PM	Kunwar Abhishek Singh, Manoj Kumar Tiwari	SEEC2022_138: Analyzing Long-Term Surface Water Changes In Uttar Pradesh Utilizing Google Earth Engine
12:10-12:20 PM	Jitendra Panchiwala, Dilip Swami, B. R. Andharia	SEEC2022_190: A Review on Salt Yield Improvement Techniques and Applicability of Heat Exchangers: In the Context of The Salt Production
12:20-12:30 PM	Shweta Chaubey, Anshul Yadav, Vinod K Shahi	SEEC2022_160: Antifouling and Antibacterial Properties of Curcumin-Enriched Surfactant Nanoparticles Modified Polysulfone Membranes
12:30-12:40 PM	Ankita Singh, Onkar Singh	SEEC2022_184: Parametric Study of SOFC-HAT-ORC Based Combined Power System
12:40-12:50 PM	Dev Anand Gupta, Saket Verma, Saumitra Thakur	SEEC2022_107: Exergy Analysis Based Optimization Technique Applied to A Spark Ignition Engine
12:50-01:00 PM	Vasudev D. Chaudhari, D Deshmukh	SEEC2022_148: High compression ratio and extended load operation of gasoline-diesel and methanol-diesel fueled reactivity-controlled compression ignition (RCCI) engine