



KNOWLEDGE INCUBATION FOR TEQIP, IIT KANPUR

International Workshop on Sustainable Energy, Power and Propulsion

January 05 - 07, 2015

The 3 day workshop was held at Jadavpur University, Kolkata. Several researchers and engineers from academia, industries and research organizations from worldwide attended this event to discuss major technological advances for sustainable in power, energy, transport and propulsion developments for diverse applications. Special focus was on high speed propulsion, micro-scale power generation and novel combustion concepts using fossil fuels, bio-fuels and their mixtures. This workshop brought together renowned experts from around the globe to share the latest fundamental and applied research innovations on clean energy utilization for a wide range of devices extending from micro scale energy conversion to hypersonic propulsion using fossil and bio-fuels. Experts shared their latest research and development for clean and efficient energy use keeping in mind energy sustainability. Discussions were held to identify key areas of common interest and develop a strategy to promote collaborative research on those focussed areas.

Topics Discussed

- Hypersonics
- High speed combustion for propulsion
- Sustainable development of new fuels, energy and value added products
- Bio-fuels and renewable fuels
- Fuel flexible propulsion and power generation
- Internal combustion engines
- Novel energy conversion technologies (micro-scale combustion, low temperature combustion and distributed combustion)
- New engine combustion concepts
- Thermal management
- Energy, environment and emissions control
- Combustion diagnostics
- Mitigation of combustion instabilities, blowout and flashback
- Solid fuel combustion and gasification
- Fuel reforming Energy-environment nexus

LIST OF SPEAKERS

- Prof. L M Das
- Prof. R P Sharma
- Prof. O N Srivastava
- Prof. Chang Sik Lee
- Prof. A.K. Agarwal
- Prof. Prabir K Bose
- Prof. Suresh K. Aggarwal
- Prof. R.V. Ravikrishna
- Dr. Gabriel D. Roy
- Prof. Hukam Mongia
- Prof. T. Sundararajan
- Prof. S. R. Chakravarthy
- Prof. Ashwani K. Gupta
- Prof. Y. H. Taufiq-Yap
- Dr. Somrat kurdeswan
- Prof. Ramesh Agarwal
- Prof. Sudipta De
- Prof. Amitava Datta
- Dr. Santanu De
- Prof. Amitava Datta
- Dr. Santanu De
- Prof. Abhijit Kushari
- Prof. Achintya Mukhopadhyay
- Prof. Saptarshi Basu
- Prof. Swarnendu Sen
- Prof. Swetoprovo Chowdhuri
- Dr. S. Mani Sarathy
- Dr. V. Ramanujachari
- Prof. Sudarshsan Kumar
- Prof. J.M. Mallikarjuna
- Prof. Anjan Ray
- Prof. V. Arghode

PARTICIPATING INSTITUTES

Institute	Number of Participants
Heritage Institute of Technology	5
MCKV Institute of Engineering	2
IEST Shibpur	6
College of Engineering and Management, Kolaghat	5
NIT Patna	1
Jadavpur University	4
Total	23

Workshop Schedule

January 05, 2015

Time	Event
9:00 AM -10:00 AM	Registrations
10:00 AM – 11:30 AM	Inaugural Session
11:30 AM – 12:00 Noon	Coffee break
12:00 AM – 12:45 PM	Plenary Lecture 1 <i>Dr. Satish Kumar</i>
12:45 PM – 1:30 PM	Plenary Lecture 2 Session chair: Prof. A.K Gupta Hydrogen Engines: Towards Clean Air and Sustainable Energy <i>Prof. L.M Das</i>
1:30 PM – 2:30 PM	Lunch break
2:30 PM – 4:00 PM	Special Session 1 on Hydrogen in Honour of Prof. L. M Das Session chair: Prof. L. M Das
	Hydrogen assisted combustion and emission characteristics of Hydrogen <i>Prof. S.K Aggarwal</i>
	Development of laser ignited hydrogen prototype engine <i>Prof. A.K Agarwal</i>
	Clean power production from wastes and biomass <i>Prof. A. Gupta</i>
4:00 PM – 4:30 PM	Tea break
4:30 PM – 6:30 PM	Special Session 2 on Hydrogen in honour of Prof. L. M Das Session chair: Prof. Y.H Taifiq Yap
	Role of hydrogen in emission reduction and performance trade-off studies in a dual fuel mode diesel engine using EGR <i>Prof. P. K Bose</i>

	Laser-based in-situ diagnostics and numerical simulations of syngas combustion in a Trapped Vortex Combustor <i>Prof. R. V Ravikrishna</i>
	Gaseous fuel for railway engines <i>Dr. Anirudh Gautam</i>

January 6, 2015

Time	Event
9:00 AM – 11:00 AM	Innovations in Combustion-I Session chair: Prof. C.S Lee
	Process Simulation and Maximization of Energy Output in Chemical-Looping Combustion and Chemical Looping with Oxygen Uncoupling using ASPEN Plus <i>Prof. R. Agarwal</i>
	From Turbulent Flame Speed to Flame Particle Tracking: Global and Local Viewpoints to Analyze Turbulence-Flame Interaction <i>Prof. Swetoprovo Chowdhuri</i>
	Dynamic Characterization of Laboratory-Scale Thermal Pulse Combustor <i>Prof. Swarnendu Sen</i>
	Bringing the premixed-diffusion flame divide <i>Prof. S. R. Chakravarthy</i>
11:00 AM – 11:15 AM	Tea break
11:15 AM – 1:15 PM	Liquid Bio-fuels Session chair: Prof. H.C Mongia
	Progress and prospects of dimethyl ether (DME) as an alternative fuel for automotive vehicles <i>Prof. Chang Sik Lee</i>
	Catalytic Conversion Of Triglycerides To Green Liquid Biofuels <i>Prof. Y. H. Taufiq-Yap</i>
	Combustion Chemistry of Future Fuels for Future Engines <i>Dr. S. Mani Sarathy</i>
	Instabilities in Burning Droplets <i>Prof. Saptarshi Basu</i>
1:15 PM – 2:15 PM	Lunch break
2:15 PM – 4:15 PM	Innovations in Renewable and sustainable Energy Session chair: Prof. T. Sundararajan
	Distributed Generation for Sustainability in Indian Power Sector: Role of Biomass <i>Prof. Amitava Datta</i>
	Sustainable Development of Green and Clean Waste to Energy City <i>Dr. Somrat Kurdeswan</i>
	Sustainable Multi-Generation: Performance Evaluation and Two Case Studies <i>Prof. Sudipta De</i>
4:15 PM – 5:15 PM	Tea break/ Poster

January 7, 2015

Time	Event
9:30 AM – 11:00 AM	Innovations in Propulsion Systems Session chair: Prof. S.K Aggarwal
	Modeling of high altitude testing for large area ratio rocket motors <i>Prof. T. Sundararajan</i>
	An Art of Developing Aviation Engine Combustion Technologies and Products <i>Prof. Hukam Mongia</i>
	Novel Engines for Efficient Energy Conversion <i>Dr. Gabriel D. Roy</i>
	R&D Issues in Scramjet Engine <i>Dr. V. Ramanujachari</i>
11:00 AM – 11:45 AM	Tea break/ Poster
11:45 AM – 1:15 PM	Innovations in Sprays Session chair: Dr. V. Ramanujachari
	Liquid Jet Breakup in swirling cross flows <i>Prof. Abhijit Kushari</i>
	Development of Novel Fuel Injectors for Gas Turbine Combustors <i>Prof. Achintya Mukhopadhyay</i>
	Large Eddy Simulation of Reacting Sprays <i>Dr. Santanu De</i>
	Flameless combustion with liquid fuels <i>Prof. Sudarshsan Kumar</i>
1:15 PM – 2:15 PM	Lunch break
2:15 PM – 4:15 PM	Innovations in Combustion-II Session chair: Dr. G.D Roy
	In-Cylinder Flow studies in IC Engines using PIV <i>Prof. J.M Mallikarjuna</i>
	Stabilization and Impingement Heat Transfer Characteristics of Premixed Laminar Flames in an Array <i>Prof. Anjan Roy</i>
	Development and of Colorless Distributed Combustion (CDC) for Gas Turbine Application <i>Prof. V. Arghode</i>
4:15 PM – 4:30 PM	Tea break
4:30 PM – 6:00 PM	Panel discussion + Valedictory Session Moderator: Dr. A.K Gupta

**Challenges and Opportunities for Future Research
Collaborations in Combustion**

*Panelists: G.D Roy, Prof. Yap, Prof. Chang Sik Lee, Prof. Abhijit
Kushari, Prof. Amitava Datta*

OUTCOME

The Workshop on Sustainable Energy, Power and Propulsion provided a platform for scientific exchange of information amongst scientists from the international scientific community worldwide.

- This workshop helped the participants to identify key novel technologies that show promise for viable options for improved, efficient and sustainable utilization of fossil fuels and bio-fuels during energy conversion for power and propulsion applications.
- It brought the awareness to participants so that they know the topics of significant importance to work on in their professional careers.
- The workshop also offered networking opportunities in common areas of interest and create pathways and opportunities for future international collaborations
- It stressed upon the idea that focussed research and development efforts are needed to develop and deploy energy conversion technologies.
- The event emphasized that energy and environment sustainability would require a multi-pronged approach involving development and utilization of new and renewable fuels, design of fuel-flexible combustion systems that can be easily operated with the new fuels, and develop novel and environmentally friendly technologies for improved utilization of fuels.