



**FMFP 2014**

5<sup>th</sup> International and 41<sup>st</sup> National Conference  
on Fluid Mechanics and Fluid Power

12<sup>th</sup> December to 14<sup>th</sup> December, 2014



# Information Brochure

5<sup>th</sup> International and 41<sup>st</sup> National Conference on  
Fluid Mechanics and Fluid Power  
December 12-14, 2014



Indian Institute of Technology Kanpur  
Kanpur (UP) 208016 India

FOR LATEST UPDATED INFORMATION PLEASE RECHECK THE WEBSITE

[www.iitk.ac.in/fmfp14](http://www.iitk.ac.in/fmfp14)

## Welcome to FMFP-2014

The National Society for Fluid Mechanics and Fluid Power ([FMFP](#)) is a registered Society that has been functioning quite successfully over the past 42 years. One of the Society's main activities is to conduct the annual Fluid Mechanics and Fluid Power (FMFP) Conference. Once in four years, the conference is organized at the international level. The aim of the conference is to bring together national and international experts on a common platform and share the state of the art on various topics related to fluid mechanics and fluid power. The previous editions of the international conference were held at IIT Delhi, IIT Roorkee, IIT Bombay and IIT Madras. The next international conference will be held at [IIT Kanpur](#) from December 12<sup>th</sup> to December 14<sup>th</sup>, 2014.



*Organizing Institute: IIT Kanpur*

## Organizing Committees

### **Patron**

Dr. Indranil Manna, Director, IIT Kanpur

### **Organising Secretary:**

Dr. P. K. Panigrahi, Department of Mechanical Engineering, IIT Kanpur

### **Local Organizing Committee (IIT Kanpur)**

Dr. A. K. Agarwal, Dept. of Mechanical Engineering, IIT Kanpur

Dr. S. Bhattacharya, Dept. of Mechanical Engineering, IIT Kanpur

Dr. D. Das, Dept. of Aerospace Engineering, IIT Kanpur

Dr. M. K. Das, Dept. of Mechanical Engineering, IIT Kanpur

Dr. A. De, Dept. of Aerospace engineering, IIT Kanpur

Dr. P.S. Ghoshdastidar, Dept. of Mechanical Engineering, IIT Kanpur

Dr. Y. M. Joshi, Dept. of Chemical Engineering, IIT Kanpur

Dr. S. Khandekar, Dept. of Mechanical Engineering, IIT Kanpur

Dr. A. Kumar, Dept. of Mechanical engineering, IIT Kanpur

Dr. A. Kushari, Dept. of Aerospace Engineering, IIT Kanpur

Dr. P. K. Mohapatra, Dept. of Civil Engineering, IIT Kanpur

Dr. A. Mandal, Dept. of Aerospace Engineering, IIT Kanpur

Dr. S. Mittal, Dept. of Aerospace Engineering, IIT Kanpur

Dr. P. Munshi, Dept. of Mechanical and Nuclear Engineering, IIT Kanpur

Dr. K. Muralidhar, Dept. of Mechanical Engineering, IIT Kanpur

Dr. S. Panda, Dept. of Chemical Engineering, IIT Kanpur

Dr. K. Poddar, Dept. of Aerospace Engineering, IIT Kanpur

Dr. A. K. Saha, Dept. of Mechanical Engineering, IIT Kanpur

Dr. S. Sarkar, Dept. of Mechanical Engineering, IIT Kanpur

Dr. I. Sharma, Dept. of Mechanical Engineering, IIT Kanpur

Dr. R. Srivastava, Dept. of Civil Engineering, IIT Kanpur

Dr. N. Tiwari, Dept. of Chemical Engineering, IIT Kanpur

Dr. S. Tripathi, Dept. of Civil Engineering, IIT Kanpur

Dr. P. Wahi, Dept. of Mechanical Engineering, IIT Kanpur

## Conference Details

### Language

The official language of the FMFP-2014 is English.

### Venue

The venue of the conference is the campus of [Indian Institute of Technology Kanpur](#), Kanpur, India. Lectures/ Presentations/ sessions will be held in the Lecture Hall Complex located inside the campus.

### Topics/Tracks:

The conference aims to be a platform for reporting both fundamental and applied issues of fluid mechanics and fluid power. The overall themes of the conference are classified into the following tracks:

#### **A. Fundamental Issues and Perspectives in Fluid Mechanics**

This track deals with various fundamental issues and perspectives in fluid mechanics. Topics of interest in this track include, but are not limited to:

1. Boundary-layer flows
2. Separated flows
3. Unsteady and pulsating flows
4. Bifurcation and hysteresis
5. Supersonic and hypersonic flows
6. Vortex dynamics

#### **B. Measurement Techniques and Instrumentation**

This track deals with current information on state-of-the-art measurement techniques devoted to different areas of fluid flow measurements. This track includes the following topics and any other related topics of interest.

1. Instrumentation
2. Velocity measurement: Laser Doppler velocimetry, Hot-wire/hot-film anemometry, PIV, Holography etc.
3. Scalar measurement: Pressure, density, temperature, species
4. Multiphase flow measurement
5. Force measurement
6. Flow visualization
7. Experimental hydraulics

### **C. Computational Fluid Dynamics**

This track is intended to provide a platform for presenting recent advancements in the development and application of various computational fluid dynamics techniques i.e. Direct Numerical Simulation (DNS), Large-Eddy-Simulation (LES), hybrid RANS/LES methodologies, finite volume, finite difference and Finite Element Method (FEM) etc. Various applications of CFD in the fields of aerodynamics, aero-acoustics, propulsion, combustion, and biomedical engineering are covered. The following topics and any other related topics are included in this track.

1. Incompressible and compressible flows
2. Internal and external flow
3. High resolution schemes
4. Turbulence modeling
5. Mesh-less simulation

### **D. Instability, Transition and Turbulence**

This track seeks fundamental research contributions to instability, transition and turbulent flows for enhancing our basic understanding on transition and turbulent flows. Topics of interest in this track include, but are not limited to:

1. Flow instability and transition
2. Turbulent flows: issues and perspectives
3. Wall bounded turbulent flow
4. Turbulent jet, wake and shear layer
5. Turbulence modeling
6. Flow visualization and coherent structures
7. Turbulence mixing and heat transfer
8. Atmospheric turbulence

### **E. Turbomachinery**

The goal of this track is to provide a platform for presenting recent developments in aerodynamics and hydrodynamics in the area of turbomachinery flows. This track includes the following topics and any other relevant topics.

1. Gas turbines
2. Hydraulic turbines
3. Compressors, pumps and fans
4. Wind turbines
5. Micro turbines/compressors/pumps
6. Experimental and computational analysis
7. Unsteady flows, stator-rotor interactions

8. Aerothermal analysis of blades, blade cooling
9. Transition and turbulence

### **F. Multiphase Flows**

This track provides opportunity for the presentation of results obtained using novel measuring techniques, recent theoretical developments and models, as well as the latest computational algorithms for understanding of multiphase flows. This track deals with the following topics and any other related topics of interest.

1. Liquid-solid flows (Sediment transport)
2. Cavitation
3. Porous media flows
4. Solid liquid flows with phase change
5. Bubble and droplet dynamics
6. Atomization and sprays

### **G. Fluid-Structure Interaction and Flow-Induced Noise**

This track covers theoretical, experimental and numerical investigations of various fluid-structure interaction and flow induced noise applications for problems in automotive, aircraft, biomedical, civil and other engineering applications. Topics of interest in this track include, but are not limited to:

1. Fluid-structure interaction
2. Oscillatory flows
3. Chaos and chaotic advection
4. Flow control
5. Acoustics in compressible and incompressible fluid flow

### **H. Microfluidics**

This track provides means for reporting the latest developments in the usage of fluid flow for micro- and nano-devices in mechanical, chemical, aerospace, and biological applications. The following topics and any other relevant topics are included in this track.

1. Electro kinetic flows
2. Capillarity and wetting
3. Bio MEMS
4. Flows in Biosensor
5. Multiphase flows and heat transfer
6. Microfluidic instability
7. Micro-scale experimental techniques

## **I. Bio-inspired Fluid Mechanics**

This track provides an opportunity to present recent developments in the general area of bio-inspired fluid mechanics and engineering. Topics of interest in this track include, but are not limited to

1. Insects, birds and fish locomotion
2. Bio-fluidics (micro/macro)
3. Drug delivery systems

## **J. I. C. Engines and Gas-turbines**

This track deals with understanding and control of the spatial-temporal properties of the flows in IC engines and gas turbines. The following topics and any other relevant topics are included in this track.

1. Turbulent reactive flows in aeroengines and rockets
2. IC Engines and combustion
3. Modeling and simulation
4. Combustion in Gas turbine
5. Atomization and sprays

## **K. Specialized Topics**

Topics of interest for various specialized tracks are as follows

1. Non Newtonian flows
2. Transport Phenomena in Materials Processing and Manufacturing Processes
3. MHD and EHD flows
4. Granular flows
5. Power plant engineering
6. Nuclear reactor thermal hydraulics

## Instruction for Author

### Call for papers:

Original research articles broadly within the scope of the conference topics, written in English language, are solicited. The topics/tracks of the conference are available in [conference details](#). Authors will have to sign a declaration of originality at the time of final submission.

### Stage #1: Preliminary Paper (Extended Abstract) Submission:

- The authors should submit an extended abstract before the deadline. They need to submit the final manuscript subsequently for external review.

### Stage #2: Full Paper Submission :

- The maximum page limit for full paper is 10 pages.
- Format of the Extended Abstract is available in the conference website.
- Template of Full paper Submission is available in the conference website.
- The authors will directly present their work at the conference as per the format recommended by the committee (oral presentation or poster presentation).
- All full-length manuscripts received in time, will be provided in electronic format at the time of the conference.
- Efforts are on to indentify a reputed international publisher who will bring out the proceedings of the conference. Details on the publication procedure will be notified in the conference website as soon as it is finalized.
- At least one of the authors must register per full-length paper/poster.
- Tentative schedule of the conference is available in the conference website.

**Note: The Online submission can be done through the following link:**

<http://www.iitk.ac.in/fmfp14>



## Important Dates

<b>Abstract submission opens</b>	1st January 2014
<b>Abstract submission deadline</b>	15th February 2014
<b>Abstract acceptance notification</b>	10th March 2014
<b>Submission of full length draft paper for review</b>	19th May 2014
<b>Author notification of draft paper acceptance</b>	19th July 2014
<b>Submission of revised draft paper for review (if required)</b>	31st July 2014
<b>Notification of final acceptance</b>	25th August 2014
<b>Submission of final paper</b>	15th September 2014
<b>Early bird registration deadline</b>	15th October 2014
<b>Date of Conference</b>	12th -14th December 2014

## Registration

### Indian participants:

Registration fee includes conference kits, tea/coffee and food.

Registration Fee	Academic Institute (Rs.)	Industry/R&D Organization (Rs.)	Students (Rs.)	Accompanying Person (Rs.)
Before Oct. 15, 2014	7,000/-	10,000/-	3000/-	3500/-
After Oct. 15, 2014	9,000/-	12,000/-	4000/-	4000/-

### Indian participants (FMFP Members):

Registration fee includes conference kits, tea/coffee and food.

Registration Fee	Academic Institute (Rs.)	Industry/R&D Organization (Rs.)	Accompanying Person (Rs.)
Before Oct. 15, 2014	6,000/-	9,000/-	3000/-
After Oct. 15, 2014	8,000/-	11,000/-	3500/-

Food (Breakfast, Lunch & Dinner) will be provided from 12th December to 14th December 2014.

### Foreign participants:

Registration fee includes conference kits, tea/coffee and food (Breakfast, Lunch & Dinner) from 12th-14th December 2014.

Category	Before Oct. 15, 2014	After Oct. 15, 2014
Regular	USA \$ 350	USA \$ 400
Students	USA \$ 200	USA \$ 250
Accompanying Person	USA \$ 150	USA \$ 200

**The registration for the conference will be carried out using the online portal of the conference.**

## Invited Speakers



**Prof. E. J. Gutmark**

Ohio Eminent Scholar

Dept. of Aerospace Engineering and Engineering Mechanics

University of Cincinnati,

799 Rhodes Hall,

Cincinnati, OH 45221-0070, USA



**Prof. M. Hanif Chaudhry**

Mr. & Mrs. Irwin B. Kahn Professor,

Associate Dean (International Programs and Continuing Education),

College of Engineering and Computing,

University of South Carolina, Columbia, SC 29208, USA



**Prof. S. "Bala" Balachandar**

William F. Powers Professor,

Dept. of Mechanical and Aerospace Engineering

University of Florida,

Gainesville, USA



**Prof. Haecheon Choi**

Professor and Chair of School of Mechanical and Aerospace

Engineering,

Director of the Center for Turbulence and Flow Control Research

Seoul National University

San 56-1 Shinlim-Dong, kwanak-Ku

151-744 Seoul, South Korea

## Invited Speakers



**Prof. Jocelyn Bonjour**

Director, Center for Thermal Sciences  
BâtSadi Carnot  
9 rue de la physique  
INSA-Lyon, Villeurbanne  
69621 France



**Prof. Sumanta Acharya**

L. R. Daniel Professor  
Director, Turbine Innovation and Energy Research (TIER) Center  
Director, Integrated Graduate Education Research & Training on CFD  
Mechanical Engineering Department  
Louisiana State University  
Baton Rouge, LA 70803-6413, USA



**Prof. Ing.hab Markus Raffel**

Head of Department  
German Aerospace Center  
Institute of Aerodynamics and Flow Technology  
Helicopters  
Bunsenstr. 10  
37073 Göttingen, Germany



**Prof. M.G. Worster**

DAMTP, CMS  
University of Cambridge  
Wilberforce Road  
Cambridge CB3 0WA  
England

## Venue/Accommodation

### Venue:

The venue of the conference is the campus of [Indian Institute of Technology Kanpur](#), Kanpur, India. Lectures/ Presentations/ sessions will be held in the Lecture Hall Complex located inside the campus.



Lecture Hall Complex

### Lodging and boarding:

All registered participants are expected to stay together in the [Institute Guest House](#) at nominal cost, during the conference. Sharing preferences may be indicated during the online registration process. Depending on the availability of rooms against the demand, outside accommodation will be arranged in hotels. Student participants will be accommodated in post-graduate hostels of the institute. More details about the accommodation will be provided in the conference website in future.



Institute Guest House



Hostel (Hall-8)

## How to Reach:

### **Travel: How to reach Kanpur**

Kanpur, a major city of the state of Uttar Pradesh, situated in the Gangetic plain, is well-connected by rail, road and air to all the parts of the country.

**Air travel:** The nearest airport is Amousi International Airport, Lucknow, about 75 kms from the IITK campus (about 2.5 hrs drive).

All international participants are advised to travel by air till Lucknow (provided they are not taking pre-conference tours and reaching Kanpur by other means). They can arrive at Lucknow, preferably via Indira Gandhi International Airport, Delhi (flight time 1 hour). Direct flights to Lucknow airport are also available from Mumbai (Bombay), Kolkata (Calcutta), Chennai (Madras) and Hyderabad. Lucknow is also connected by direct international flights to the middle east.

Several airlines are presently operating in the inland sector (Delhi-Lucknow or Bombay-Lucknow): Air India, Jet Airways, Jet Connect, Spice Jet, Indigo.

**Rail travel:** Another option is to travel to Delhi by Air followed by rail travel to Kanpur (CNB) Railway station. The railway station is at a distance of about 15 km from the IITK campus. Public transports such as auto-rickshaw (about Rs. 180) and taxi (about Rs. 300) from the station are available. Interested participants are advised to make railway reservation well in advance.

### **Weather at Kanpur**

The weather at Kanpur in December is expected to be cold. Day-time temperatures are expected to range from 10-20°C. The night temperatures may be between 8-15°C.

## Pre/Post Conference Tours

To help you plan your trip to India, please find below some suggestions for Pre-/Post conference tours. The travel agent, M/s Pearl International Tours and Travels Pvt. Ltd. has an office inside the campus of IIT Kanpur to serve the community on standard commercial terms and conditions.

Mr. Miraj Alam  
Branch Manager (Stationed at IIT Kanpur Campus)  
Mobile: +91-98390-999-13, Landline: +91-512-259 6510 , 259 6511  
Email: [miraj.alam@pearlmail.com](mailto:miraj.alam@pearlmail.com)

You are kindly advised to directly contact the travel agent for more details as well as for booking the trips, as per your choice and convenience. You may like to choose some other company also, based on your choice or preference. All payments/charges/costs associated with Pre-/Post Conference tours are to be directly settled between you and the travel agent. On request, the travel agent will provide details for fund transfer. In your communication, please indicate to the travel agent that you are a participant of FMFP-2014 at IIT Kanpur.

**Note:** The organizing committee of FMFP-2014 is not responsible for any commercial dealings which you make with the suggested travel agent/ any other agent. The suggested travel agent is not responsible for conference registration process and/or accommodation charges during the conference period. All FMFP2014 related official financial transactions are completely independent to the business which you undertake with the suggested travel agent.

### **Suggested Pre-Conference Tours**

1. [Delhi - Agra - Kanpur](#)
2. [Delhi - Jaipur - Kanpur](#)
3. [Delhi - Varanasi - Khajuraho - Kanpur](#)

### **Suggested Post-Conference Tours**

1. [Kanpur - Agra - Delhi](#)
2. [Kanpur - Agra - Jaipur - Delhi](#)
3. [Kanpur - Khajuraho - Varanasi – Delhi](#)

More information is available in the official website of India Tourism  
(<http://www.incredibleindia.org>)

**Incredible!ndia**

## Activities for Accompanying Person

The conference organizers propose to arrange the following activities for the accompanying persons based on the interest. Some of the activities will require additional payment.

1. Campus Tour (Part Bus and Part walk)
2. City Tour/ Shopping Tour
3. Bithoor trip/ Shivragpur trip
4. Mehendi / Heena art
5. Herbal massage/ face massage/ pedicure/ manicure/ on demand
6. Helicopter/Glider ride (weather permitting)



*Gliding Club, IIT Kanpur*