

AMITY SCHOOL OF ENGINEERING & TECHNOLOGY
(Department of Mechanical Engineering)

REPORT

On

SECOND WORKSHOP ON CFD

2-3rd Nov 2017

Speakers/Resource Persons for the Sessions

- Dr. Atul Sharma (Professor, Mechanical Engineering Department, IIT-Mumbai)
- Dr. Basant Singh Sikarwar (Professor & HOD, Mechanical Engineering Department, ASET, Noida)

The Mechanical Engineering Department, Amity University Uttar Pradesh, Noida, conducted Second Workshop on CFD on 2nd-3rd November 2017 on the theme “Introduction and Essentials of CFD”. The two-day workshop consisting of expert lecture by Dr. Atul Sharma as well as a session of hands-on practice on commercial CFD solvers was organized for B.Tech (pre-final year, final year), M.Tech. and Ph.D students. Over 100 students and 50 faculties from departments of Mechanical Engineering, Nuclear Science, and Aerospace attended the workshop.

Dr. Atul Sharma is currently a professor in the Department of Mechanical Engineering at IIT Bombay. His areas of expertise are Heat Transfer, Fluid Structure Interaction, and Computational Fluid Dynamics. He is co-chair of SERB, Govt of India and has been working as a consultant for various industries for last ten years.

Computational Fluid Dynamics (CFD) being an important subject and skill in industry as well as academia was discussed in-depth during these two days. The workshop was organized to develop interest among students as well as faculty members of the university. Moreover, to motivate them to conduct research activities by utilizing CFD tools. An informal interaction between Dr. Atul Sharma and the faculties of Thermal group of ASET was also organized over dinner where ongoing research as well as project collaboration was briefly discussed. The workshop began with a brief introduction of Dr. Atul Sharma and his achievements in the domain of CFD and Heat Transfer by Dr. Meeta Sharma (Programme Coordinator). She highlighted why CFD is a powerful tool and how it is being implemented in various fields such as automotive,

aerospace, biomedical, energy systems etc. Dr. Basant Singh Sikarwar (Programme Director, HOD Mechanical) emphasized on the importance of the subject as well as skills industries and academia is looking for in graduates. Then, he presented a sapling to Dr. Sharma as a welcome gift.



Figure 1) Sapling given by Prof. Basant Singh Sikarwar to the guest (Prof. Atul Sharma)

Dr. Atul Sharma started the session with an introduction to CFD and the relevance of the subject in a world full of mobile phones, laptops, cameras etc. He explained the fundamentals of CFD including basic terminology, grid generation, fluid flow analysis with analogies to laymen terms such as pixels of a camera, movie etc. He emphasized on presenting CFD analysis through a movie, which can be either scientifically exciting or engineering relevant. He also elaborated on important concepts such as highly complex nature of PDEs formed by equations governing fluid flow and heat transfer – Navier-Stokes equations and Energy Equation. Moreover, their algebraic formulation, etc. using Finite Volume Methods for the audience to get a general idea of the math behind the colorful movies that were shown by him. Dr. Sharma showed some movies of flow analysis over a hydrophobic lotus leaf, heat transfer in a micro-channel etc. along with their graphical representations for quantifying the results of the problems discussed earlier. Dr. Sharma's talk was highly informative and served as a motivation to conduct pioneering research in the domain of Heat Transfer and Fluid Flow using mathematical tools such as CFD. He concluded his lecture by giving a book on CFD fundamentals that he wrote to Dr. Sikarwar. He also provided the link to his website (www.cfdmadeeasy.org) which has study material related to CFD and is open and free for all.

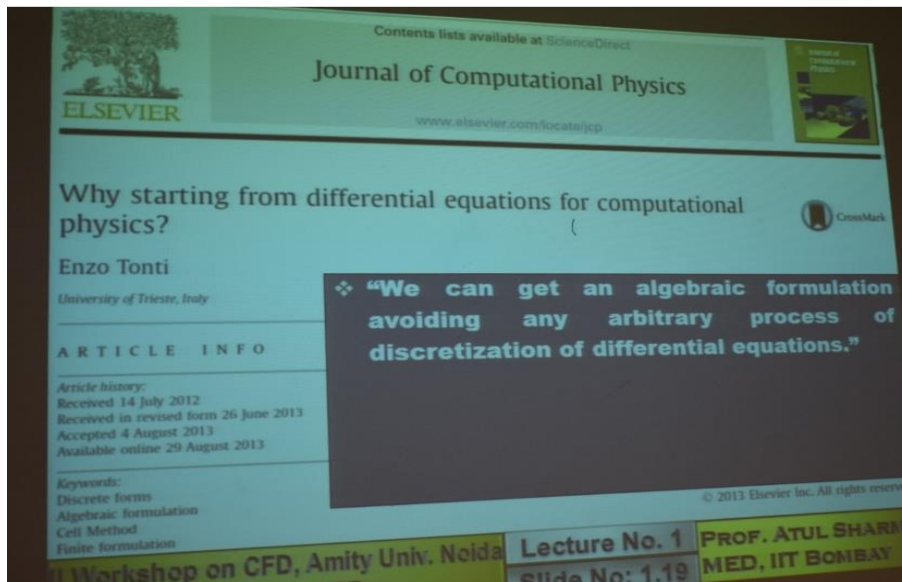


Figure 2) Dr. Atul Sharma giving a lecture on computational techniques used to analyze fluid flow and heat transfer.

Day 2 of the workshop was a hands-on practice session of commercial CFD software ANSYS ICEM CFD and ANSYS Fluent to students as well as faculty members conducted in the CFD Lab of Amity University Uttar Pradesh. Simple problems such as 2-D heat conduction, laminar pipe flow etc. were solved step by step for students to get familiar with the software. Dr. Sikarwar explained the type of problems that can be solved using these tools. He also motivated the students to extend their ongoing research by conducting a CFD analysis as a part of their ISR/minor/major projects.

Some pictures of the event are attached below:



Figure 3) Opening remarks given by workshop coordinator Dr. Meeta Sharma welcoming Dr. Atul Sharma.



Figure 4) Dr. Atul Sharma and Dr. B.S. Sikarwar along with faculty members of Mechanical Engineering, ASET.

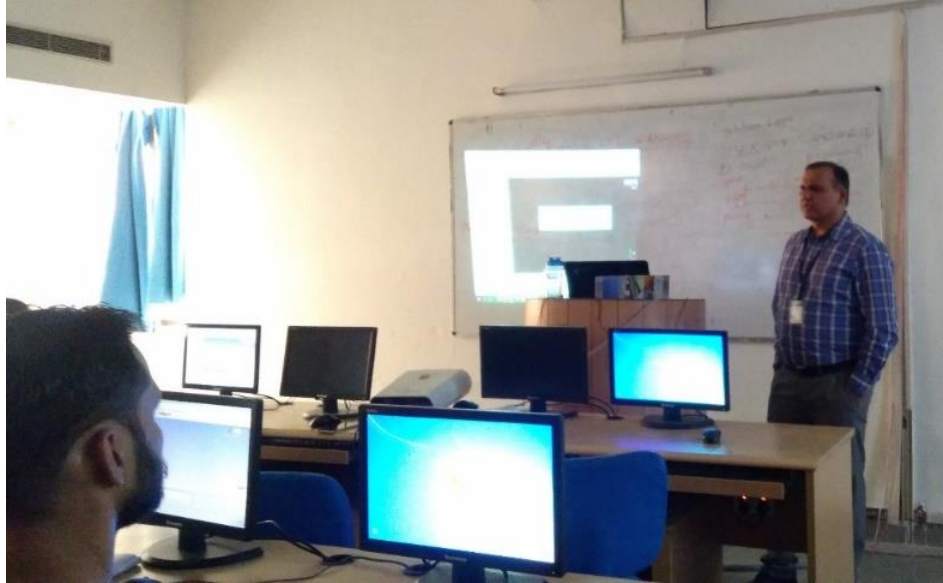


Figure 5) Dr. Basant Singh Sikarwar conducting hands-on practice session on Day 2 of the workshop.



Figure 6) Dr. Basant Singh Sikarwar discussing about scope of CFD in various domains relating to projects of students and faculties.



Figure 7) Closing session of 2nd CFD Workshop with students of CFD Club and faculty members.

Outcomes of the Workshop

Dr. Atul Sharma and Dr. Basant Singh Sikarwar gave students an opportunity to learn about the scope and applications of Computational Fluid Dynamics (CFD). The outcomes of the workshop are as following:

- It developed the basic understanding on the role of CFD in heat transfer applications for energy systems.
- Students got familiar with the on-going multi-dimensional research in the area of CFD.
- Dr. Atul Sharma was impressed to see the enthusiasm of students towards CFD.
- Analysis involving simple as well as complex geometries was discussed.
- Dr. Sharma and Dr. Sikarwar discussed about the prospects of research collaborations of IIT Bombay and Amity University Uttar Pradesh.
- A month-long CFD workshop was discussed during the sessions, which would help students solve CFD problems with ease.