SGR IFOP sponsored Lecture Series:

High Fidelity Computational Fluid Dynamics Simulations for Marine Applications

Objectives: The use of massively parallel computers in computational fluid dynamics (CFD) simulations for marine applications has achieved progress in several research institutions across the world. The lectures and hands-on lab sessions will focus on discussions of the current-state-of art in CFD numerical methods and modeling, and open research questions.

Organizers: Dr. Shanti Bhushan, Assistant Professor and Associate Director, Mississippi State University (SB)
Dr. Anil Kumar Dash, Assistant Professor, KIIT University, Bhubaneswar (AKD)
Dr. Vishwanath Nagarajan, Associate Professor, IIT Kharagpur (NV)
Prof. Om Prakash Sha, Professor, IIT Kharagpur (OPS)

Dates: December 10 -15, 2018

Venue: Department of Ocean Engineering and Naval Architecture
IIT Kharagpur, Kharagpur 721 302, West Bengal India

Sponsor: Shri Gopal Rajgarhia International Faculty Outreach Programme (SGR IFOP)

Agenda:

Day	Time	Topic
Day 1, 10th Dec.	0930 – 1145†	Numerical methods for two-phase Navier Stokes Equations (SB)
	1400– 1700	Overview of OpenFOAM structure (SB/NV)
Day 2, 11th Dec.	0930 – 1030	Geometric characteristics and Numerical modeling of ship/ propeller (OPS)
	1045 - 1200	Turbulence and air-water interface modeling (SB)
	1400 – 1700	SnappyHex Mesh generation for barehull (SB/NV)
Day 3, 12th Dec.	0930 – 1145†	Grid topology and resolution requirements (SB)
	1400 – 1700	OpenFoam Simulation set-up, job submission, and results (SB/NV/AKD)
Day 4, 13th Dec.	0930 – 1145†	Numerical modeling of cycloidal propeller (NV)
	1400 – 1530	Fluid structure interaction of propeller blade (AKD)
	1600 – 1730	Supercomputer application in CFD (SB)
Day 5, 14th Dec.	0930 – 1145†	Vortical and Turbulence Structures in Ship flows (SB)
	1400 – 1700	OpenFoam simulation for rotating domain using sliding mesh (SB/NV/AKD)
Day 6, 15th Dec.	0930 – 1145†	Numerical uncertainty, verification and validation of CFD (SB)
	1400 – 1700	Code development using OpenFOAM (SB/NV)

†Lectures will of 1 hour duration with 15 min break.

Dr. Shanti Bhushan is currently an Assistant Professor in the Department of Mechanical Engineering, and Associate Director of Advanced Vehicular Systems at Mississippi State University. He received PhD in Aerospace Engineering from Mississippi State University, worked as Post-Doctoral research associate at Duke University, and as Assistant and Associate Research Scientist at University of Iowa. His research interests cover the wide area of Computational Fluid Dynamics (CFD) with emphasis in turbulent flow modeling and simulation. He has published over 70 papers in peer-reviewed journals, conferences and book chapters.

Dr. Anil Kumar Dash did his B. Tech in Civil Engineering from CET Bhubaneswar in 2008, M.Tech in Structural (Civil) Engineering from NIT Rourkela in 2010 and PhD from Dept. of Ocean Engineering & Naval Architecture, IIT Kharagpur in 2016. His current areas of interest and research are: Ship Maneuvering; Non-linear dynamics; Fluid-structure interaction; Finite Element Analysis of Plate and Shell.

Dr. Vishwanath Nagarajan is an Associate Professor in the Department of Ocean Engineering and Naval Architecture, IIT Kharagpur. His broad area of research is Ship and Fluid Dynamics. He has supervised numerous undergraduate and postgraduate research projects, besides guiding Ph. D. students. He has published several papers in peer reviewed international journals and international conferences. He is actively involved in sponsored research and technical consultancy projects.

Dr. O. P. Sha is a professor in the Department of Ocean Engineering and Naval Architecture. He was Dean, Continuing Education from October 2013 to September 2016 at the Indian Institute of Technology, Kharagpur, India. He teaches a wide variety of subjects at the Institute and his main areas of interest include ship design and production, CAD/CAM and high performance vehicles. He is involved in a number of sponsored research and industrial consultancy projects.
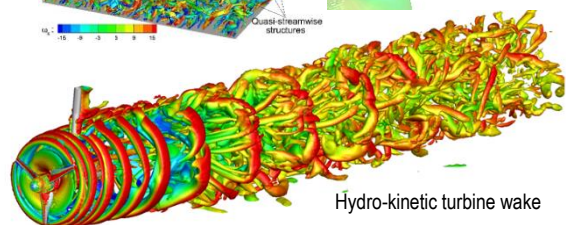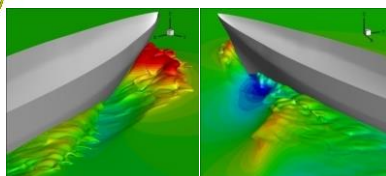
5415 at β = 20° Vortical structures
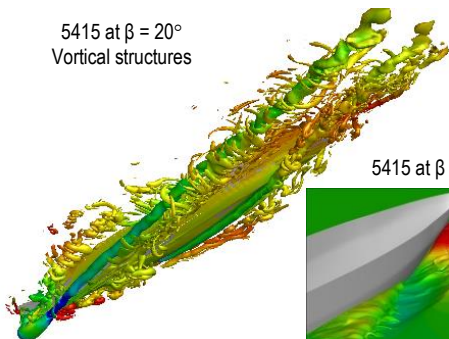
Boundary-layer coherent structures

Hair-pin structures

Quasi-streamwise structures
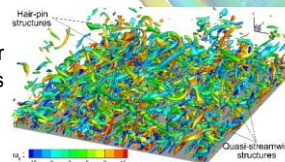
5415 at β = 20° bow wave breaking

Hydro-kinetic turbine wake

Pedagogy

Lectures will be delivered through audio-visual presentation, group activity, structure exercise, and case analysis. Participants are advised to bring their laptop (with WiFi internet connectivity) for classroom usage. Laptop may be installed with Ubuntu OS and OpenFoam (opensource CFD toolbox).

No of Participants: 40 (Seats are available on first-cum-first basis)

COURSE FEES

Course Fees for Industry participants = Rs. 10,000/-

Faculty from Colleges = Rs. 2500/-

Research Scholar/ Graduate Students = Rs. 500/-

No fees for participants from IIT Kharagpur

GST 18% Extra For All Categories Mentioned Above.

Course fees should be paid in form of *Demand Draft in favour of CEP-STC, IIT Kharagpur, payable at Kharagpur or through online bank transfer through NEFT. The bank account details are provided at the end of this form.*

TA & DA

No TA/DA for any participants

Accommodation

10 nos. AC double bedrooms are available in the main guesthouse. They will be offered on first come first serve basis. Other participants may apply for accommodation in student hostels or hotels outside campus. Participants have to pay for their food and lodgings.

Venue of the Programme

Department of Ocean Engineering & Naval Architecture, IIT Kharagpur, Kharagpur, 721 302, West Midnapur, West Bengal

How to Apply

Interested participants should download and submit the application form with required information in a prescribed format given below, and send it to the coordinator as per the mailing address.

Mailing Address

Dr. Vishwanath Nagarajan, Associate Professor, Course Coordinator, STC on *High Fidelity Computational Fluid Dynamics Simulations for Marine Applications*

Department of Ocean Engineering and Naval Architecture

Indian Institute of Technology Kharagpur

Kharagpur- 721302, West Bengal, India Tel: 03222-283 782 (o), Mob: 8016727912 Fax: 03222-255 303/ 282 284 Email: vishwanath_n@naval.iitkgp.ernet.in

Important Dates

Last date for receiving application (with course fee)	05th Dec 2018
Intimation to participants	07th Dec 2018

<div align="center">**Application Form**</div>

SGR IFOP Sponsored STC on "High Fidelity Computational Fluid Dynamics Simulations for Marine Applications"

10 - 15 December 2018

Organized by Dept. of Ocean Engineering & Naval Architecture

1. Name:

2. Age:

3. Sex:

4. Work Experience:

5. Designation:

6. Name of the Institution /Organization:

7. Address for communication:

8. Highest academic qualification:

9. Phone No:

10. Fax No.:

11. Email:

12. For Self / Industry Sponsored Candidate:

DD No.:   Date: Amount: or   NEFT money transfer details (in a separate sheet)

Date: Signature of Applicant

Approval for Candidates/ Sponsorship

We approve the above applicant as a candidate / sponsor for the STC on **High Fidelity Computational Fluid Dynamics Simulations for Marine Applications** being organized by IIT Kharagpur during 10 – 15th December 2018.

Date: Signature and Seal of Approving/Sponsoring Authority

Payment Mode

The payment can be made through cheque / demand draft drawn in favor of "CEP-STC, IIT Kharagpur", payable at Kharagpur, INDIA. The payment can also be made through electronic fund transfer. The bank details are as follows:

Account Name: CEP-STC, IIT Kharagpur

Account Number: 955 622 0000 2955

Bank Name: SYNDICATE BANK

Bank Branch Name: SRIC, IIT KHARAGPUR (Branch Code: 9556)

Bank Address: IIT KHARAGPUR, KHARAGPUR- 721 302, MEDINIPUR DIST. (W. B.), INDIA, (Telephone No: +91-3222 255221)

Swift Code: SYN BIN BB 120

IFSC CODE   SYNB0009556

PAN No.:   AAAJI0323G

MICR Code   721025103

Branch Code   009556