Sumedh **Yadav**

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Education

Indian Institute of Technology Kharagpur — *Kharagpur, India*

B.Tech. (Hons.) and M.Tech. dual degree in Mechanical Engineering — *July 2012 - May 2017*

- Graduated with CGPA 9.17/10, ranked among top 5% of the batch and institute

Agrawal Public School, Indore — *Indore, India*

All India Secondary School Examination — *May 2010*

- Scored CGPA 9.4/10

Skills

Programming	Python, C/C++, FORTRAN, shell scripting, LaTeX
Parallel standards	Message Passing Interface (MPI), OpenMP, CUDA C
Softwares	ubuntu, Windows, MATLAB, Paraview, Visit, Salome, OpenFOAM, COMSOL

Research Experience

S and I Engineering Solutions Pvt. Ltd. — *Bengaluru, India*

SandI CFD Fellow — *May 2017 - PRESENT*

- Updated the front-end-preprocessor (FEP) code with shared memory based parallelism, resulting in 2-3.5 times faster computation.
- Algorithm and code development aimed at a distributed data system (MPI) for unstructured mesh hole-cutting mesh modification.
- Hole cutting mesh modification is embedding meshes in a background mesh, cutting overlapping part of the background mesh and establishing a connectivity among them. Demo case here

Numerical Simulation Lab (Institute Chair Prof. Suman Chakraborty), IIT Kharagpur — *Kharagpur, India*

Research Assistant — *July 2016 - May 2017*

- Use of an advected field mathematical model to simulate vesicle dynamics mimicking in-vitu red blood cell behaviour.
- Use of the open source C++ finite element library deal.ii for advanced numerical schemes, and use of the open source scientific computing toolkits Trilinos, PETSc.
- Use of OOP, Templates, STL in C++ for building the numerical solver.
- Interesting results here. Synopsis along with abstract here.

Institute of Combustion Technology (Prof. Heinz Pitsch), RWTH Aachen University — *Aachen, Germany*

Research Intern — *May 2016 - July 2016*

- Project named Data Analysis of DNS Multiphase Temporal Jet (jet video).
- Statistical analysis namely favre average, turbulent kinetic energy, energy budgets-(document) of jet data.
- Use of fortran subroutines to add aforementioned post-processing computation in state-of-the-art solver CAIO (from the Stanford University).

Gas Dynamics Laboratory (Prof. Prasanta Kumar Das, Dean in Research), IIT Kharagpur — *Kharagpur, India*

Undergradute Research Assitant — *Jan. 2016 - Apr. 2016*

- Use of a new multi-grid formulation for the lattice boltzmann method to simulate wall bounded turbulent channel flow using large eddy simulation.
- Use of high mesh resolution (of different levels) near wall and coarse elsewhere resulting in efficient utilization of computing resources.
- Presentation slides here.

Gas Dynamics Laboratory (Prof. Prasanta Kumar Das, Dean in Research), IIT Kharagpur — *Kharagpur, India*

Undergradute Research Assitant — *Sep. 2015 - Jan. 2016*

- Physical and geometric parameters analysis of numerical simulations (using my updated code) of two bubbles' gravity assited rising and coalescence.
- Bubble interactions have significant impact on the shape and motion of bubbles.
- Dynamics of bubbles in a swarm are considerably different from that of an isolated bubble.

Institute of Catalysis Research and Technology, Karlsruhe Institute of Technology *Karlsruhe, Germany*

Research Intern *May 2015 - July 2015*

- Simulation work on chemical spreading of droplets (visuals), bubble interaction with solid surfaces (visuals) and bubble dynamics.
- I setup test cases on a beta-version multiphase solver 'phaseFieldFoam' in OpenFOAM-extend.
- Grid convergence analysis and parameter (physical and numerical both) scope analysis pointed out short-comings of the solver and turned out to be critical for the project.
- Results were presented by my guide Dr. Woerner Martin at the 9th International Conference on Multi-phase Flows (ICMF), Florence.
- Certificate here

Gas Dynamics Laboratory (Prof. Prasanta Kumar Das, Dean in Research), IIT Kharagpur *Kharagpur, India*

Undergradute Research Assitant *April 2014 - Jan. 2015*

- Developed numerical code to simulate bubble coalescence dynamics using a phase field model.
- Simulations under gravity in rectangular columnar geometry, highlighted role of dimensionless numbers namely Bond Number and Morton Number in determining bubble shape and size, velocity profiles and vorticity profiles.
- Certificate here

Research Communications

9th International Conference on Multiphase Flows *Florence, Italy*

Participant and Presenter *May 2016*

- Principal-authored poster titled 'Effects of Physical and Geometrical Parameters on Coalescence of Two Bubbles'. Copy here
- Participation Certificate here

5th International and 42nd National Conference on Fluid Mechanics and Fluid Power *India*

Participant and Presenter *Dec. 2015*

- Principal-authored paper titled 'Simulation Of Bubble Coalescence Using Free Energy Lattice Boltzmann Method'. Copy here

International Conference on Convective Heat and Mass Transfer *India*

Participant and Presenter *Dec. 2015*

- Second-authored paper titled 'Large Eddy Simulation using Sigma-Model and Lattice Boltzmann Method'. Copy here.
- Awarded best paper award for my presentation. Certificate here

Related Coursework

Subject No	Name of Subject	No of semesters	Grade scored (out of 10)
MA20102	Numerical solution of Ordinary and PDE	1	9
MA20103	Partial Differential Equations	1	10
IM41082	Operations Research	1	10
MA20101	Transform Calculus	1	10
CS11001	Programming and Data Structure	1	8
MA10001	Mathematics	2	8
ME60012	Computational Fluid Mechanics	1	9
ME40601	Systems and Controls	1	10
ME40103	Simulation of Mechanical Systems	1	9

Performance description of each grade:
8 = Good, 9 = Very Good, 10 = Excellent

Honors & Scholarships

International

2016 **DAAD-WISE scholarships,** yearly 150 recipients across India from thousands of applications. *Germany*

2016 **University of Alberta Research Experience Scholarship,** competitive scholarship to pursue research intern at the University of Alberta, Canada. *Canada*

2015 **Mitacs Globalink Research Internship Scholarship,** yearly 250 recipients across India from thousands of applications. *Canada*

Domestic

2017 **Recipient of SandI Fellowship in CFD,** one or two across India. *India*

2016-2017 **Recipient of half-time teaching assistantship (based on academic excellence),** INR 12400/- per month. *IIT Kharagpur*

2012-2016 **Recipient of Merit (MCM) Scholarship for four consecutive years,** INR 60,000/- per annum. *IIT Kharagpur*

2012 **99.2 percentile,** Indian Institute of Technology - Joint Entrance Exam 2012. *India*