

Experience:

CFD Analyst
Altair Engineering
India Pvt. Ltd.,
Chennai, India
2022 - present

- Multiple responsibilities from software design, testing, benchmarking, and support activities for solvers such as **AcuSolve (FEM)** and **nanoFluidX (SPH)**.
- Involved in the design of Graphical User Interfaces to facilitate pre-processing, solution setup, and post-processing.
 - Propose feature requests and create design specification documents.
 - Use agile development tools to initiate, drive and monitor the progress of the feature support activities.
- Testing of solver and tool features supported in every software development cycle before release.
 - Carry out thorough internal testing of the support features.
 - Creation of regression test scripts to identify regressions in the future.
 - Create JIRA tickets for identified and reported issues and help in resolving them.
 - Act as a point of contact for technical details and consultation.
- Customer support activities.
 - Set up and run benchmark and Proof-of-Concept problems requested by customers.
 - For e.g. carried out a benchmark case study of mass-flow rate through an Automated Grill Shutter system in an automobile.
 - Create reports and presentations and communicate software capabilities, problem setup workflow, and benchmark results to customers.
 - For e.g. conducted weekly office hours meetings for customers and internal members on the existing feature and ongoing developmental activities on DOE, optimization, coupled-simulations, etc.
 - Provide training to prospects and customers in the form of technical discussion through Teams meetings, creation of tutorial videos, FAQ documents, and Industry-relevant simulation case studies.
 - For e.g. simulated and presented results in the Altair Global Technical Training seminar on Cabin thermal modeling.
 - Resolve queries, requests, and issues raised by customers through emails and act as a node of communication between the customers and developers.
 - For e.g. led the mesh file export support in OpenFoam format on customer request.

Research Fellow,
Basque Center for Applied Mathematics, Bilbao, Spain
2018-2022

- Initiate and lead projects activities involving mathematical modeling and numerical simulation of complex fluid-structure interaction problems involving discontinuous shear thickening fluids (for blast wave and ballistic protection), viscoelastic, viscoplastic, and thixotropic materials.
- Develop reduced-order modeling techniques for accurate simulation of fluid flow problems.
- Develop, test, and verify numerical models and solvers via thorough validation studies.
- Carry out report generation and journal article preparation, and present research findings in conference talks.

Project Officer,
Centre for Industrial Consultancy and Sponsored Research, IIT Madras, India.
2017-2018

- Carried out the development of numerical algorithms and computational code for fluid-structure interaction under air-blast conditions.
- Developed novel modeling techniques for wall modeling, and accurate capture of jump discontinuities such as shock/blast waves and material interfaces (relevant for multiphase flows).
- Tested, debugged, and evaluated the model and solver performance by simulating validation problems on detonation of explosives, blast wave generation and propagation in air.
- Benchmarked the performance of the solver against Ansys (Autodyn), and OpenFOAM solvers.
- Designed and analysed novel approaches for blast wave mitigation.
- Published articles in reputed international journals and conferences.

Areas of technical expertise:

- Computational Fluid Dynamics, Mesh free methods, Lagrangian/Particle-based simulations.
- Thermo-Fluid Dynamics, Compressible/High-speed flows, Blast and shock wave physics, Multiphase flows, Fluid-structure interaction, Rheology of complex fluids.
- Computer programming in C++, OpenMP, Matlab and Python, comfortable working in both Linux and Windows platforms.
- Altair suite of pre- and post-processing software.

Education:

Ph.D. in Applied Mathematics	Indian Institute of Technology Madras, Chennai, India. CGPA: 9.2/10	2018
Master of Engg. (Aerospace Engineering)	Madras Institute of Technology, Chennai, India. CGPA: 8.6/10	2012
Bachelor of Engg. (Aeronautical Engineering)	Anna University, Chennai, India. CGPA: 7.9/10	2009

Honors and Awards

- Won Institute Research Award for my Ph.D. research work.
- Best Paper award honored by the Shock wave society of India and High energy material society of India.

- Half Time Research Assistantship from the Ministry of Human Resource Development, Govt. of India.
- Elkartek funding of the Basque Government to support collaborative research in strategic fields.

References:

- | | |
|---|---|
| 1) Prof. B. S. V. Patnaik
Dept. of Applied Mechanics
Indian Institute of Technology Madras
Chennai, India
E-mail: bsvp@iitm.ac.in | 2) Prof. Marco Ellero
CFD Modelling and Simulation Group
Basque Center for Applied Mathematics,
Bilbao, Spain
E-mail: mellero@bcamath.org |
|---|---|

List of Publications:

Conference presentations

- Jose Ruiz-Lopez, S. S. Prasanna Kumar, A. Vazquez-Quesada, M. Ellero, Simulations of highly concentrated frictional suspensions with a Sommerfeld-number-dependent friction coefficient, The Annual European Rheology Conference (2021).
- S. S. Prasanna Kumar, A. Vazquez-Quesada, M. Ellero, Study of inter-particle slip effects on the rheology of a dense non-colloidal suspension, 18th International Congress on Rheology, Rio de Janeiro, Brazil (2020).
- S. S. Prasanna Kumar, A. Vazquez-Quesada, M. Ellero, A conservative fast lubrication dynamics method for the simulation of dense non-colloidal suspensions with particle spin, 18th International Congress on Rheology, Rio de Janeiro, Brazil (2020).
- S. S. Prasanna Kumar, K. Ramamurthi and B. S. V. Patnaik, Blast mitigation using combination of foam and trap gaps, 5th National Symposium on Shock Waves, Chandigarh, India (2018).
- R. Yogeshwaran, S. S. Prasanna Kumar, K. Ramamurthi and B. S. V. Patnaik, One Dimensional Characterization of Blast Mitigation using Foam with a Face Plate, 5th National Symposium on Shock Waves, Chandigarh, India (2018).
- P. Suresh, S. S. Prasanna Kumar and B. S. V. Patnaik, The effect of density estimation on the conservativeness in Smoothed Particle Hydrodynamics, American Physical Society, Division of Fluid Dynamics Meeting, (2015).
- S. S. Prasanna Kumar and B. S. V. Patnaik, Skewed kernel function approach for simulation of shock fronts using SPH, 10th International SPH European Research Interest Community (SPHERIC) workshop, Parma, Italy (2015).
- S. S. Prasanna Kumar and B. S. V. Patnaik, Modelling and simulation of blast load mitigation device(s), 40th Fluid Mechanics and Fluid power conference, Hamirpur, India (2013).
- S. S. Prasanna Kumar and S. Thanigaiaarasu, Characterisation of low velocity impact damages of GFRP and CFRP composites through destructive and non-destructive evaluation, Students for the Exploration and Development of Space, Vellore, India (2012).

Journals articles

- JA Ruiz-Lopez, SS Prasanna Kumar, A Vazquez-Quesada, J de Vicente, and M. Ellero (2023), Tribological variable-friction coefficient models for the simulation of dense suspensions of rough polydisperse particles, Journal of Rheology 67 (2), 541-558.

- S. S. Prasanna Kumar, A.Vazquez-Quesada and M. Ellero (2021), A fully conservative quick lubrication dynamics method for simulation of non-colloidal suspensions with particle spin, *Journal of Computational Physics*, 427, 110001.
- S. S. Prasanna Kumar, A. Vazquez-Quesada and M. Ellero (2020), Numericinvestigation of the rheological behavior of a dense particle suspension in a biviscous matrix using a lubrication dynamics method, *Journal of Non-Newtonian Fluid Mechanics*, 281, 104312.
- P. Suresh, S. S. Prasanna Kumar and B. S. V. Patnaik (2019), A comparative study of two different density estimation techniques for multiphase flow simulations using SPH, *International Journal of Computational Methods in Engineering Science and Mechanics*, 20:1, 29-47.
- S. S. Prasanna Kumar and B. S. V. Patnaik (2018), A multimass correction for multicomponent fluid flow simulation using smoothed particle hydrodynamics, *International Journal of Numerical Methods in Engineering*, 113(13), 1929-1949.
- S. S. Prasanna Kumar, K. Ramamurthi and B. S. V. Patnaik (2018), Prediction of air blast mitigation in an array of rigid obstacles using Smoothed Particle Hydrodynamics, *Physics of Fluids*, 30(4), 046105.
- S. S. Prasanna Kumar, K. Ramamurthi and B. S. V. Patnaik (2018), Numerical study of a foam - shock trap based blast mitigation strategy using Smoothed Particle Hydrodynamics, *Physics of Fluids*, 2018, 30(8), 086102.
- S. S. Prasanna Kumar, B. S. V. Patnaik and G.R. Liu (2017), A skewed kernel approach for simulation of shock fronts using SPH, *International Journal of Numerical Methods in Engineering*, 111(4), 383-400.