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I. Education:

Ph.D.	Mechanical Engineering Purdue University, W. Lafayette IN, May 1998
M.S.	Mechanical Engineering Purdue University, W. Lafayette IN, August 1994
B. Tech.	Mechanical Engineering Indian Institute of Technology, Madras, India, July 1992

II. Professional Experience:

02/20 to present	Dean, Alumni and Corporate Relations, IIT Madras
09/18 to 02/20	Dean, International & Alumni Relations, IIT Madras
05/17 to 10/21	Professor-in-charge and Director, IIT Madras Incubation Cell
07/14 to present	Professor, Dept. of Applied Mechanics, IIT Madras
10/12 to 10/15	Advisor, Co-curricular affairs, IIT Madras.
07/10 to 07/14	Asso. Professor, Dept. of Applied Mechanics, IIT Madras
01/07/10 to 12/07/10	Asso. Professor, Dept. of Mech. Engg., Tennessee Tech. Univ.
07/05 to 07/10	Asst. Professor, Dept. of Mech. Engg., Tennessee Tech. Univ.
07/04 to 07/05	Research Fellow, Lehigh University, Bethlehem PA
05/02-06/04:	General Manager, **Excel India**, Hyderabad (Entrepreneur)
12/97-05/02	Design and Research Engineer, **Goodrich Corporation** (Delavan Spray Technologies, Bamberg, SC, USA)
08/92-05/98	Graduate Assistant, Purdue University, W. Lafayette, IN

III. Key highlights of professional career:

- Built a robust alumni and corporate CSR connect with IIT Madras having achieved best-in-the-country fundraise of over Rs. 300Cr during the last three years.
- Ideated and co-created Nirmaan, the pre-incubator of IIT Madras. This has enabled over 125 start-ups that have gained entrepreneurship experience.
- Ideated and launched a pan-India Science and Technology magazine, *IIT Madras Shaastra* to feature the best of Indian science and tech. The magazine has been well received by the country including the Vice-President of India.
- Oversaw the growth of IIT Madras Incubation Cell as Professor-in-charge and Board member to become the best tech incubator in the country with over 220 start-ups.
- Worked with DRDO to design mission-critical elements of Kaveri Gas Turbine engine
- Created India's first model to understand the onset of stampedes in dense crowds.

IV. Industry experience

12/97-08/02 Design and Research Engineer, **Goodrich Corporation** (Delavan Spray Technologies, Bamberg, SC, USA)

- *SPRA 2000 PROJECT* – Spray Pattern Recognition Automation to automatically and rapidly test spray nozzles online.
- Developed a customer-centered combustion lab at Delavan Spray Technologies to study pollutant formation and noise.

08/02-06/04: General Manager, **Excel India**, Hyderabad, India,

- Designed a line of spray nozzles for continuous steel casting cooling applications

V. Refereed Journal Publications: (Publication count: 59, Citation count: 1425, h-index: 18)

1. Acharya, A. S., Deevi, S., Dhivyaraja, K., Tangirala, A. K. and Panchagnula, M. V., Spatiotemporal microstructure of sprays: Data science-based analysis and modelling. *Journal of Fluid Mechanics* **2021**, *912* A19.
2. Mallik, A. K., Mukherjee, S. and Panchagnula, M. V., An experimental study of respiratory aerosol transport in phantom lung bronchioles. *Physics of Fluids* **2020**, *32(11)*, 111903
3. Vadivukkarasan, M., Dhivyaraja, K., Panchagnula, M.V., Breakup morphology of expelled respiratory liquid: From the perspective of hydrodynamic instabilities. *Physics of Fluids* **2020**, *32*(9), 094101.
4. Akella, V.S., Rajesh, R., Panchagnula, M.V., Lévy walking droplets. *Physical Review Fluids* **2020**, *5*(8), 084002.
5. Khan, F.U., Panchagnula, M.V., Velusamy, K., Experimental and computational investigations of gas entrainment in SFR due to rotation of partially submerged pump shaft. *Annals of Nuclear Energy* **2020**, 143, 107413.
6. Mallik, A.K., Sharma, T.P., Roy, A., Panchagnula, M.V., Seshadri, S., Phase Doppler particle Analyzer (PDPA) characterization and modeling of sprays from orthogonally interacting water and air jets, *Journal of Flow Visualization and Image Processing* **2020**, *27*(2), 199-217.
7. Chakravarty, A., Patankar, N.A., Panchagnula, M.V., Aerosol transport in a breathing alveolus. *Physics of Fluids* **2020**, *31*(12), 121901.
8. Vadivukkarasan, M., Panchagnula, M.V., Destabilization characteristics of three dimensional Rayleigh–Taylor mechanism on a cylindrical interface. *Meccanica* **2020** *55*(1), 69-86.
9. Gidituri, H.; Akella, V. S.; Vedantam, S.; Panchagnula, M. V., Phase separation in binary fluid mixtures with symmetric and asymmetric Schmidt numbers: A DPD study. *Journal of Chemical Physics* **2019,** *150*(23) 234903.
10. Gidituri, H.; Panchagnula, M. V.; Pototsky, A., Dynamics of a fully wetted Marangoni surfer at the fluid-fluid interface. *Soft Matter* **2019,** *15* (10), 2284-2291.

11. Godavarthi, V.; Dhivyaraja, K.; Sujith, R. I.; Panchagnula, M. V., Analysis and classification of droplet characteristics from atomizers using multifractal analysis. *Scientific Reports* **2019,** *9* (1).
12. Gurram, S. S.; Raja, S.; Mahapatra, P. S.; Panchagnula, M. V., On the brachistochrone of a fluid-filled cylinder. *Journal of Fluid Mechanics* **2019,** *865*, 775-789.
13. Kulkarni, A.; Thampi, S. P.; Panchagnula, M. V., Sparse Game Changers Restore Collective Motion in Panicked Human Crowds. *Physical Review Letters* **2019,** *122* (4).
14. Pawar, S. A.; Panchagnula, M. V.; Sujith, R. I., Phase synchronization and collective interaction of multiple flamelets in a laboratory scale spray combustor. *Proceedings of the Combustion Institute* **2019,** *37* (4), 5121-5128.
15. Vadivukkarasan, M.; Panchagnula, M. V. Rayleigh-Taylor instability induced liquid atomization. *Lecture Notes in Mechanical Engineering*, **2017**; Vol. Part F8, pp 135-144.
16. Vadivukkarasan, M.; Panchagnula, M. V. Combined Rayleigh-Taylor and Kelvin-Helmholtz instabilities on an annular liquid sheet. *Journal of Fluid Mechanics* **2017,** *812*, 152-177.
17. Swaminathan, K.; Panchagnula, M. V. Spreading and hole formation in natural oil films on aqueous solutions. *Colloids and Surfaces A: Physicochemical and Engineering Aspects* **2017,** *520*, 796-804.
18. Siddharth, K. S.; Panchagnula, M. V.; Tharakan, T. J. Effect of gas swirl on the performance of a gas-centered swirl co-axial injector. *Atomization and Sprays* **2017,** *27* (8), 741-757.
19. Siddharth, K. S.; Panchagnula, M. V.; John Tharakan, T. Feature Correlation Velocimetry for Measuring Instantaneous Liquid Sheet Velocity. *Journal of Fluids Engineering, Transactions of the ASME* **2017,** *139* (9).
20. Mohan, A.; Reddy, S. A.; Sachan, A.; Sarma, K. V. S.; Kumar, D. P.; Panchagnula, M. V.; Srinivasa Rao, P. V. L. N.; Kumar, B. S.; Krishnaprasanthi, P. Authors' response. *Indian Journal of Medical Research* **2017,** *145* (April), 573-574.
21. Mahapatra, P. S.; Kulkarni, A.; Mathew, S.; Panchagnula, M. V.; Vedantam, S. Transitions between multiple dynamical states in a confined dense active-particle system. *Physical Review E* **2017,** *95* (6).
22. Gidituri, H.; Anand, D. V.; Vedantam, S.; Panchagnula, M. V. Dissipative particle dynamics study of phase separation in binary fluid mixtures in periodic and confined domains. *Journal of Chemical Physics* **2017,** *147* (7).
23. Deevi, S. V.; Janardan, N.; Panchagnula, M. V. Shapes of Splattered Drops. *Langmuir* **2017,** *33* (18), 4592-4600.
24. Vadivukkarasan, M.; Panchagnula, M. V. Helical modes in combined Rayleigh–Taylor and Kelvin–Helmholtz instability of a cylindrical interface. *International Journal of Spray and Combustion Dynamics* **2016,** *8* (4), 219-234.

25. Pawar, S. A.; Vishnu, R.; Vadivukkarasan, M.; Panchagnula, M. V.; Sujith, R. I. Intermittency route to combustion instability in a laboratory spray combustor. *Journal of Engineering for Gas Turbines and Power* **2016,** *138* (4).
26. Mohan, A.; Aparna Reddy, S.; Sachan, A.; Sarma, K. V. S.; Prabath Kumar, D.; Panchagnula, M. V.; Srinivasa Rao, P. V. L. N.; Siddhartha Kumar, B.; Krishnaprasanthi, P. Derivation & validation of glycosylated haemoglobin (HbA1c) cut-off value as a diagnostic test for type 2 diabetes in South Indian population. *Indian Journal of Medical Research* **2016,** *144* (August), 220-228.
27. Mahapatra, P. S.; Mathew, S.; Panchagnula, M. V.; Vedantam, S. Effect of size distribution on mixing of a polydisperse wet granular material in a belt-driven enclosure. *Granular Matter* **2016,** *18* (2).
28. Karthiga Devi, S. G.; Panchagnula, M. V.; Alladi, M. Designing aerosol size distribution to minimize inter-subject variability of alveolar deposition. *Journal of Aerosol Science* **2016,** *101*, 144-155.
29. Janardan, N.; Panchagnula, M. V. Onset of sliding motion in sessile drops with initially non-circular contact lines. *Colloids and Surfaces A: Physicochemical and Engineering Aspects* **2016,** *498*, 146-155.
30. Mahapatra, P. S.; Mukhopadhyay, A.; Panchagnula, M. V. In *Dispersion of Polydisperse Droplets in a Pulsating Flow Field*, Procedia IUTAM, 2015, pp 242-248.
31. Janardan, Nachiketa; Panchagnula, Mahesh V.; Bormashenko, E. D. W. A. R. D. Liquid marbles: Physics and applications. *Sadhana - Academy Proceedings in Engineering Sciences* **2015,** *40* (3), 653-671.
32. Bonkinpillewar, P. D.; Kulkarni, A.; Panchagnula, M. V.; Vedantam, S. A novel coupled fluid–particle DEM for simulating dense granular slurry dynamics. *Granular Matter* **2015,** *17* (4), 511-521.
33. Panchagnula, M. V.; Sojka, P. E.; Bajaj, A. K. The effect of viscosity and convection on the stability of annular liquid sheets. *Atomization and Sprays* **2014,** *24* (11), 949-976.
34. Kolakaluri, R.; Subramaniam, S.; Panchagnula, M. Trends in multiphase modeling and simulation of sprays. *International Journal of Spray and Combustion Dynamics* **2014,** *6* (4), 317-356.
35. Janardan, N.; Panchagnula, M. V. Effect of the initial conditions on the onset of motion in sessile drops on tilted plates. *Colloids and Surfaces A: Physicochemical and Engineering Aspects* **2014,** *456* (1), 238-245.
36. Anantharaju, N.; Panchagnula, M. V. Experimental and computational study of triple line shape and evolution on heterogeneous surfaces. *Colloids and Surfaces A: Physicochemical and Engineering Aspects* **2014,** *455* (1), 19-27.
37. Rayapati, N. P.; Panchagnula, M. V.; Peddieson, J. Application of population balance model to combined atomization and evaporation processes in dense sprays. *Atomization and Sprays* **2013,** *23* (6), 535-553.

38. Prabhala, B. R.; Panchagnula, M. V.; Vedantam, S. Three-dimensional equilibrium shapes of drops on hysteretic surfaces. *Colloid and Polymer Science* **2013,** *291* (2), 279-289.

39. Panchagnula, M. Editorial. *International Journal of Spray and Combustion Dynamics* **2013,** *5* (2), i-ii.

40. Bhosale, P. S.; Panchagnula, M. V. Sweating liquid micro-marbles: Dropwise condensation on hydrophobic nanoparticulate materials. *Langmuir* **2012,** *28* (42), 14860-14866.

41. Rayapati, N. P.; Panchagnula, M. P.; Peddieson, J.; Short, J.; Smith, S. Eulerian multiphase population balance model of atomizing, swirling flows. *International Journal of Spray and Combustion Dynamics* **2011,** *3* (2), 111-135.

42. Vempati, B.; Panchagnula, M. V.; Öztekin, A.; Neti, S. Combined buoyancy and viscous effects in liquid-liquid flows in a vertical pipe. *Acta Mechanica* **2010,** *210* (1-2), 1-12.

43. Rayapati, N. P.; Bhamidipati, S.; Peddieson, J.; Panchagnula, M. V. Analytical solutions for particulate pipe flows with fragmentation, evaporation, and diffusion. *Mechanics Research Communications* **2010,** *37* (6), 604-610.

44. Rayapati, N. P.; Bhamidipati, S.; Peddieson, J.; Panchagnula, M. V. Analytical solutions for convective fragmentation. *Mechanics Research Communications* **2010,** *37* (8), 712-716.

45. Prabhala, B.; Panchagnula, M.; Subramanian, V. R.; Vedantam, S. Perturbation solution of the shape of a nonaxisymmetric sessile drop. *Langmuir* **2010,** *26* (13), 10717-10724.

46. Kwon, Y.; Choi, S.; Anantharaju, N.; Lee, J.; Panchagnula, M. V.; Patankar, N. A. Is the Cassie-Baxter formula relevant? *Langmuir* **2010,** *26* (22), 17528-17531.

47. Boovaragavan, V.; Ramadesigan, V.; Panchagnula, M. V.; Subramanian, V. R. Continuum representation for simulating discrete events of battery operation. *Journal of the Electrochemical Society* **2010,** *157* (1), A98-A104.

48. Bhosale, P. S.; Panchagnula, M. V. On synthesizing solid polyelectrolyte microspheres from evaporating liquid marbles. *Langmuir* **2010,** *26* (13), 10745-10749.

49. Panchagnula, M. V. Trends in science and engineering output from China and India. *Current Science* **2009,** *97* (12), 1707-1708.

50. Anantharaju, N.; Panchagnula, M. V.; Vedantam, S. Asymmetric wetting of patterned surfaces composed of intrinsically hysteretic materials. *Langmuir* **2009,** *25* (13), 7410-7415.

51. Anantharaju, N.; Panchagnula, M.; Neti, S. Evaporating drops on patterned surfaces: Transition from pinned to moving triple line. *Journal of Colloid and Interface Science* **2009,** *337* (1), 176-182.

52. Vedantam, S.; Panchagnula, M. V. Constitutive modeling of contact angle hysteresis. *Journal of Colloid and Interface Science* **2008,** *321* (2), 393-400.

53. Bhosale, P. S.; Panchagnula, M. V.; Stretz, H. A. Mechanically robust nanoparticle stabilized transparent liquid marbles. *Applied Physics Letters* **2008,** *93* (3).

54. Vempati, B.; Panchagnula, M. V.; Öztekin, A.; Neti, S. Numerical investigation of liquid-liquid coaxial flows. *Journal of Fluids Engineering, Transactions of the ASME* **2007,** *129* (6), 713-719.

55. Vedantam, S.; Panchagnula, M. V. Phase field modeling of hysteresis in sessile drops. *Physical Review Letters* **2007,** *99* (17).

56. Panchagnula, M. V.; Vedantam, S. Comment on how Wenzel and Cassie were wrong by Gao and McCarthy. *Langmuir* **2007,** *23* (26), 13242.

57. Anantharaju, N.; Panchagnula, M. V.; Vedantam, S.; Neti, S.; Tatic-Lucic, S. Effect of three-phase contact line topology on dynamic contact angles on heterogeneous surfaces. *Langmuir* **2007,** *23* (23), 11673-11676.

58. Panchagnula, M. V.; Sojka, P. E. Spatial droplet velocity and size profiles in effervescent atomizer-produced sprays. *Fuel* **1999,** *78* (6), 729-741.

59. Lund, M. T.; Jian, C. Q.; Sojka, P. E.; Gore, J. P.; Panchagnula, M. V. The influence of atomizing gas molecular weight on low mass flowrate effervescent atomizer performance. *Journal of Fluids Engineering, Transactions of the ASME* **1998,** *120* (4), 750-754.

60. Panchagnula, M. V.; Sojka, P. E.; Santangelo, P. J. On the three-dimensional instability of a swirling, annular, inviscid liquid sheet subject to unequal gas velocities. *Physics of Fluids* **1996,** *8* (12), 3300-3311.

61. Bush, S. G.; Bennett, J. B.; Sojka, P. E.; Panchagnula, M. V.; Plesniak, M. W. Momentum rate probe for use with two-phase flows. *Review of Scientific Instruments* **1996,** *67* (5), 1878-1885.

Invited editorials and correspondence (non-peer reviewed)

1. Panchagnula, M.V., *Atomization modeling challenges.* International Journal of Spray and Combustion Dynamics, 2013. **5**(2): p. I-II.
2. Mohan, A., and Panchagnula, M.V., *Translational research in neglected tropical diseases: looking beyond the boundaries!* Journal of Clinical Science and Research, 2012. **2**(6) p. 3-5
3. Panchagnula, M.V., *Trends in science and engineering output from China and India.* Current Science, 2009. 97(12): p. 1707-1708.

Invited talks and colloquia

1. M.V. Panchagnula, S*weating liquid marbles: the route to continuous production.* 8th International Conference on materials technologies and modeling, Ariel University, Samaria, Israel, Aug 2014 (to be delivered)

2. M.V. Panchagnula, *Hysteresis induced three-dimensional drops.* 8th International Conference on materials technologies and modeling, Ariel University, Samaria, Israel, Aug 2014 (to be delivered)
3. M.V. Panchagnula, *Flow of wet granular material in a lid driven cavity.* 40th National Conference on Fluid Mechanics and Fluid Power, NIT Hamirpur, 2013
4. M.V. Panchagnula, *Surface tension induced natural phenomenon*. Sri Venkateswara Institute of Medical Sciences, Tirupati, Institute Colloquium, 2012
5. M.V. Panchagnula, *Wetting hysteresis*. Jawaharlal Nehru Center for Advanced Scientific Research Colloquium, 2012
6. M.V. Panchagnula, S. Vedantam , N. Anantharaju and S. Neti, *Modeling surface topography induced ultrahydrophobic behavior*, Presented to the Multiphysics Symposium, McMAT, Austin TX, 2007
7. M.V. Panchagnula, *Surface topology induced ultrahydrophobic behavior*, Presented to the Dept. of Mechanical Engineering, Indian Institute of Science, 2006.

Selected International conference proceedings and presentations

1. N Sethukumar, A Bajaj, M Panchagnula, Bifurcations in the motion of articulated tubes conveying fluid, with an end mass, APS Division of Fluid Dynamics Meeting Abstracts, P31. 007, 2021
2. K Mukesh, R Tripathi, MV Panchagnula, R Rengaswamy, Machine learning analysis of the exhaled human breath, APS Division of Fluid Dynamics Meeting Abstracts, H01. 004, 2020
3. Pawar, S. A.; Vishnu, R.; Vadivukkarasan, M.; Panchagnula, M. V.; Raman, S. Intermittency route to combustion instability in a laboratory spray combustor, Proceedings of the ASME Turbo Expo, 2015.
4. N. Janardan and M.V. Panchagnula, “Sliding of non-circular drops on inclined planes”, Sixth international conference on Contact angle, Wettability and Adhesion, Bethlehem PA, U.S.A., 2014
5. G. Manoharan, A. Mandyam, A. Kakkozha, A. Kolappan, K. Vajapeyajula, M.V. Panchagnula and S. Vedantam, “Experimental study of dense bi-disperse granular flow through a pipe with a ninety degree bend”, 3rd International Conference on Materials and Modeling, Warsaw Poland, 2013
6. P.D. Bonkinpillewar, S. Vedantam and M.V. Panchagnula, “Flow of Wet Granular Material in a lid Driven Cavity”, Seventh M.I.T. Conference on Computational Fluid and Solid Mechanics, Massachusetts Institute of Technology, U.S.A., 2013
7. N. Janardan and M.V. Panchagnula, “Shapes of non-circular drops on inclined hysteretic surfaces”, Bulletin of the American Physical Society, APS DFD Conference, 2013 (paper accepted but not presented due to a sudden personal issue)
8. M.V. Panchagnula and P. Bhosale, “Sweating Liquid Micro-Marbles: Drop wise condensation on hydrophobic particulate materials”, APS Meeting Abstracts, Paper No. 11009, APS DFD Conference, 2011

9. N.P. Rayapati, M.V. Panchagnula and J. Peddieson, "Eulerian multiphase population balance model", 24th European Conference on Liquid Atomization and Sprays Systems, Estoril, Portugal, 2011
10. N. Anantharaju, M.V. Panchagnula and S. Vedantam, "Computational study of moving triple lines", APS Division of Fluid Dynamics Meeting Abstracts, APS DFD Conference, 2009
11. B. Prabhala, M.V. Panchagnula, S. Vedantam and V. Subramanian, "The shape of a sessile drop", APS Division of Fluid Dynamics Meeting Abstracts, APS DFD Conference, 2009
12. N. Anantharaju, M.V. Panchagnula, and S. Vedantam, "Length scale effects in wetting of chemically heterogeneous surfaces", Paper No. BG0007, American Physical Society – Division of Fluid Dynamics annual conference, San Antonio TX, 2008
13. M.V. Panchagnula, N.P. Rayapati and J. Peddieson "Multiphase multi-velocity discrete population balance model of fragmenting particulate flows", Paper No. HG0007, American Physical Society – Division of Fluid Dynamics annual conference, San Antonio TX, 2008
14. K.C. Gahan, P.S. Bhosale, M.V. Panchagnula, "Dynamics of transparent nanoparticulate liquid marbles", Paper No. MG0006, American Physical Society – Division of Fluid Dynamics annual conference, San Antonio TX, 2008
15. P.S. Bhosale and M.V. Panchagnula, "Properties and Potential Applications of Liquid Marbles", Poster No. 187aa, AIChE annual meeting, Philadelphia PA, 2008
16. P.S. Bhosale, M.V. Panchagnula and H.A. Stretz, "Mechanically Robust Nanoparticle Stabilized Transparent Liquid Marbles", Paper No. 322c, AIChE annual meeting, Philadelphia PA, 2008
17. N. Anantharaju, M.V. Panchagnula and S. Neti , "Evaporating drops on micropatterned superhydrophobic surfaces: Transition from pinned to moving contact line", TPH-20, US-46, 19th National & 8th ISHMT-ASME Heat and Mass Transfer Conference, Hyderabad India , 2008
18. S. Bhamidipati, M.V. Panchagnula and J. Peddieson, "Discrete population balance modeling of a plug flow atomizer", Paper No. TPH-19, US-45, 19th National & 8th ISHMT-ASME Heat and Mass Transfer Conference, Hyderabad India, 2008
19. B. Vempati, M.V. Panchagnula, A. Oztekin and S. Neti , "Flow regimes of Newtonian fluids in vertical co-axial flows", IMECE2006-14111, ASME International Mechanical Engineering Conference and Exposition, Chicago IL, 2006
20. S. Bhamidipati, M.V. Panchagnula and J. Peddieson, "Eulerian Multi-fluid Model of Air Blast Atomization", IMECE2006-14729, ASME International Mechanical Engineering Conference and Exposition, Chicago IL, 2006.
21. V.L. Orekhov and M.V. Panchagnula, "Non-intrusive technique for measuring instability wave amplitudes at simplex swirl atomizer exit", IMECE2006-15270, ASME International Mechanical Engineering Conference and Exposition, Chicago IL, 2006

22. J.S. Perisetty, M.V. Panchagnula and J. Cui, "Development of a CFD model of a swirl stabilized spray combustor", IMECE2006-14867, ASME International Mechanical Engineering Conference and Exposition, Chicago IL, 2006
23. S. Kandlakunta and M.V. Panchagnula, "Laser induced fluorometry and velocimetry", IMECE2006-14980, ASME International Mechanical Engineering Conference and Exposition, Chicago IL , 2006
24. N. Anantharaju, M.V. Panchagnula, W. Kimsey , S. Neti and S. Tatic-Lucic, "Surface topography induced ultrahydrophobic behavior: effect of three-phase contact line topology",IMECE2006-15266, ASME International Mechanical Engineering Conference and Exposition, Chicago IL , 2006
25. B. Vempati, M.V. Panchagnula, A. Oztekin and S. Neti, "Numerical Investigation of Liquid-Liquid Co-axial Flows", IMECE2005-80085, ASME IMECE 2005, Orlando FL, 2005.
26. J.H. Colistra, M.V. Panchagnula, A. Oztekin, S. Neti and J.C. Chen, "Interfacial Dynamics of Two layer Couette Flow: Gravity enhanced Kelvin-Helmholtz instability", FEDSM2005-77459, ASME Fluids Engineering Division Conference, Houston TX , 2005.
27. M.V. Panchagnula and Vic Turk, "A study of smoke formation mechanisms and smoke measurement: repeatability and reproducibility error characterization," 6th Oil heat Technology Conference, Brookhaven National Laboratory, 1999
28. M.V. Panchagnula, P.E. Sojka and A.K. Bajaj, "Nonlinear perturbation growth in annular liquid sheets," 11th ILASS Conference, Sacramento , CA , May 1998.
29. M.V. Panchagnula and P.E.Sojka, "A Linear instability analysis of an inviscid swirling annular liquid sheet", 8th Annual Conference of the Institute of Liquid Atomization and Spray Systems, , San Francisco, CA, May 1996.
30. M.V. Panchagnula, P.J. Santangelo and P.E. Sojka, "The instability of an inviscid annular sheet of liquid", 7th Annual Conference of the Institute of Liquid Atomization and Spray Systems, Troy, MI May 1995.
31. J.J. Sutherland, M.V. Panchagnula, P.E. Sojka, "Effervescent atomization at Low Air to Liquid Ratios", 7th Annual Conference of the Institute of Liquid Atomization and Spray Systems, Troy, MI, May 1995.
32. M.T. Lund, C.Q. Jian, P.E. Sojka, J.P. Gore, M.V. Panchagnula, "The effect of atomizing gas molecular weight on effervescent atomization generated sprays", ASME Winter Annual Meeting, New Orleans , LA , 1993

National conference presentations and publications

33. K. Dhivyaraja, A. Mukhopadhyay, M. V. Panchagnula, "Dynamics of Intersecting Sprays", 40th National Conference on Fluid Mechanics and Fluid Power, NIT Hamirpur, Himachal Pradesh, India, December 12-14, 2013

34. R. B. Supekar and M.V. Panchagnula, "Analytical solution to the motion of a fluid filled cylinder down an inclined plane", 40th National Conference on Fluid Mechanics and Fluid Power, NIT Hamirpur, Himachal Pradesh, India, December 12-14, 2013
35. K. Swaminathan and M. V. Panchagnula, "Drop spreading in partially miscible liquids", Indian Conference on Applied Mechanics (INCAM), IIT Madras, Tamil Nadu, India, July 4-6,2013
36. Vadivukkarasan. M., and M. V. Panchagnula, "Non-axisymmetric breakup of an inviscid liquid jet", Indian Conference on Applied Mechanics (INCAM), IIT Madras, Tamil Nadu, India, July 4-6,2013
37. N. Janardan and M. V. Panchagnula, "Sessile drops on inclined hysteretic surfaces: A study of the onset of motion", Indian Conference on Applied Mechanics (INCAM), IIT Madras, Tamil Nadu, India, July 4-6,2013

VI. Awards, Recognition and Prizes

1. American Chemical Society Certificate of Appreciation for dedicated service to the peer review process, 2011
2. Marquis Who's Who in America; Who's Who, 2011
3. TTU Sigma Xi award for best research paper, 2008
4. Who's Who in Higher Education, 2006
5. Member, Editorial board, *International Journal of Spray and Combustion Dynamics*, Metapress publication

Patents filed

1. Rebala, P., Srinivasan, K., and Panchagnula, M.V., *An electrolysis assisted atomization process.*, Patent Application No. 4438/CHE/2013 dated 30/09/2013

   The idea of using electrolysis to assist atomization was conceived by Prof. K. Srinivasan. Mr. Pranay Rebala was a Dual Degree student who worked on the project. My contribution was to design an end device that produced a good spray. This device received a bubbly flow mixture as input and produced a spray as its output.

2. Bhosale, P.S., and Panchagnula, M.V., *Liquid micro-marbles and a process and applications of encapsulated liquids in particulate materials.* Patent application no. 4108/CHE/2012 dated 01/10/2012

   The concept of producing liquid micro-marbles was first observed by Dr. Prasad Bhosale who was a student working with me. Together, we fine-tuned the process to a batch throughput liquid encapsulation device, where the energetic efficiencies were also quantified.

VII. Research guidance

PhD student and postdoctoral researcher guidance completed

S. No.	Deg.	Name of scholar (Degree granting univ.)	Title of thesis	Co-guide	Grad. year
1.	Ph.D.	Bhaskar Vempati (Lehigh Univ.)	Stability of liquid-liquid flows	Profs. Öztekin & Neti	2006
2.	Ph.D.	Neeharika Anantharaju (Tennessee Tech. Univ.)	Wetting by moving triple lines		2010
3.	Ph.D.	Narayana P. Rayapati (Tennessee Tech. Univ.)	Eulerian modeling of air blast atomization	Prof. J. Peddieson	2010
4.	Ph.D.	M. Vadivukkarasan (IIT Madras)	Stability of cylindrical liquid sheets		2017
5.	Ph.D.	Nachiketa Janardan (IIT Madras)	Onset of motion in sessile drops		2017
6.	Ph.D.	Karthiga Devi S.G. (IIT Madras)	Towards personalized pulmonary drug delivery	Prof. A. Mohan	2018
7.	Ph.D.	K. Swaminathan (IIT Madras)	Spontaneous emulsification dynamics of natural oil films		2018
8.	Ph.D.	Samadhan Pawar (IIT Madras)	Experimental investigation of the effect of self-excited acoustic oscillations in a one-dimensional spray combustor	Prof. R.I. Sujith	2018
9.	Ph.D.	K.S. Siddharth	Near nozzle structure in gas centered swirl co-axial atomizers		2018
10.	Ph.D.	Harinadha Gidituri	Modeling active and passive separating mixtures	Prof. Andrey Pototsky	2018
11.	Ph.D.	K. Dhivyaraja	MEMS atomizer spray characterization	Prof. Srinivas Tadigadapa	2019
12.	Postdoc	Srivallabha Deevi	Multiphase modeling of droplet laden jets		2015-17

		(Ph.D. IISc, Bangalore, India)			
13.	Postdoc	Pallab Simha Mahapatra (Ph.D. Jadavpur Univ.)	Multiphase modeling of granular flows		2016 -17
14.	Postdoc	V. Sathish Akella (Ph.D., Brandeis University)	Marangoni propulsion and Levy walks		2016 -20
15.	Post doc	Aranyak Chakravarty (Ph.D. Jadavpur University)	Modeling of deep lung aerosol dynamics		2018 -20
16.	Post doc	S.G. Karthiga Devi (Ph.D. IIT Madras)	Phase-II human subject trials of Nuclear imaging of aerosol deposition	Prof. A. Mohan, MD, PhD	2019
17.	Postdoc	K. Dhivyaraja (PhD IIT Madras)	Spray characterization of micro-machined atomizers	Prof. Srinivas Tadigadapa (Penn State)	2020

MS/M.Tech. student guidance completed

S. No.	Deg.	Name of scholar (Degree granting univ.)	Title of thesis	Co-guide	Grad. year
1.	M.S.	Neeharika Anantharaju (Tennessee Tech. Univ.)	Surface topology induced ultrahydrophobic behavior: effect of three phase contact line		2007
2.	M.S.	Sahithi Kandlakunta (Tennessee Tech. Univ.)	Laser-induced fluorometry and velocimetry: towards implementing quantum dots as combustion fluorophores		2007
3.	M.S.	Nagraj Perisetty (Tennessee Tech. Univ.)	Development of CFD model for a swirl stabilized spray combustor		2008
4.	M.S.	Srimani Bhamidipati (Tennessee Tech. Univ.)	Eulerian Multi-Fluid Model of Fragmenting Droplet Laden Flows	Prof. J. Peddieson	2009

5.	M.S.	Anoop Kota (Tennessee Tech. Univ.)	Discrete particle model-based simulations of air-blast sprays		2009
6.	M.S.	Bharadwaj Prabhala (Tennessee Tech. Univ.)	The shape of a sessile drop		2010
7.	M. Tech.	Vimal Thomas	Inception of cavitation in hydraulic oil systems	Prof. Dhiman Chatterjee	2012
8.	M. Tech.	Anil Sayana	Statistical analysis of PDPA experimental data		2012
9.	M.S.	Pavan D. Bonkinpillewar (IIT Madras)	Simulation of wet granular flow in a lid driven cavity	Prof. S. Vedantam	2013
10.	M.Tech	Udaykiran Mylabathula (IIT Madras)	Study of condensation on PDMS substrates for enhanced solar still applications		2013
11.	M.S.	Ajinkya Kulkarni	Phase transition in passive and active granular suspensions		2017
12.	M.S.	Arnab Kumar Mallik	Spray interaction in a cross flow		2020
13.	M.S.	Tushar Pratim Sharma	Time series analysis of spray dynamics	Prof. Arun Tangirala	2020

Currently enrolled research scholars (Degrees in progress)

S. No.	Degree	Name of the scholar	Title of thesis	Co-guide	Year of regn.
1	Ph.D.	Faizan Ulla Khan	Gas entrainment in rotating liquid pools		2012
2	Ph.D.	Syed Ahmed	Dynamics of dense human crowds	Prof. Sumesh Thampi	2018
3	Ph.D.	Mukesh K.	Fluid mechanics of breathing using machine learning	Prof. Raghunathan Rengaswamy	2018
4	Ph.D.	Navaneetha Krishnan	Dynamics of a spinning ball		2020
5	Ph.D.	Debjit Kundu	Understanding the role of lung asymmetric branching		2020
6	M.S.	Avinash Gupta	Physics of a bouncing ball		2019

VIII. Selected Sponsored Research Projects:

1. Panchagnula, M.V. (PI) and Peddieson, J. (Co-PI), *Modeling air blast atomization*. Project sponsor: Goodrich Aerospace Corporation. Duration: 03/2007 - 02/2009. Value: $225,000. (Work performed at Tennessee Tech University)
    a. Developed a first principles model of secondary atomization and validated against experimental data.
    b. This model completed a missing link in providing a fully virtual simulation environment of aircraft engine combustors. In addition, the model replaced a highly empirical and subjective method of designing spray nozzles with a more scientific approach.
    c. My role was to develop the population balance modeling framework and implement it in a commercial CFD package, FLUENT®. Prof. Peddieson developed the multiphase mathematical framework as well as analytical solutions for validating the CFD solutions.
2. Panchagnula, M.V. (PI), *Near-nozzle spray structure in semi-cryogenic sprays*. Project sponsor: ISRO. Duration: 10/2011 – 10/2014. Value: Rs. 39.55 lakhs
    a. The project is on time and on budget, slated for completion in 10/2014.
    b. Established a high speed imaging facility and used it to study sprays, which are of importance to ISRO's semi-cryogenic engine development.
    c. Developed a combined Rayleigh-Taylor, Kelvin-Helmholtz linear instability analysis model of the primary atomization process.
3. Sujith, R.I. (PI), Panchagnula, M.V. (Co-PI) and Chakravarthy, S.R. (co-PI), *An experimental and computational study of screech in afterburners*. Sponsor: DRDO. Duration: 11/2013 - 11/2017. Value: Rs. 257.36 lakhs
    a. My role is to help develop the spray transport and secondary atomization sub-model. These processes are responsible for the fuel dispersion in the afterburner.
4. Sundararajan, T. (PI) + 27 others*, Joint National Centre for Combustion Research & Development.* Sponsor: DST. Duration: 12/2011 - 12/2016. Value: Rs. 41.5 crores
    a. As part of this national initiative, we are together involved in developing the infrastructure to study grand challenge problems related to combustion.
    b. My role in this project is to steer the spray group research as well as to identify spray related problems that are of interest to the industry.
    c. Our research group is also involved in developing a microspray array (μSpray) technology that we believe could disrupt the current use of single point dense spray injectors and lead the industry towards lean-burning, staged and ultra-efficient combustion systems.

5. Sen, A.K., (PI) and Panchagnula, M.V. (Co-PI), *Development of Electrospray based MEMS microthruster*. Sponsor: ISRO. Duration: 28/10/2013 – 27/10/2016. Value: Rs. 39.8 Lakhs
    a. My role in this project is to develop a virtual model of the electrospray formation as well as a prototype electrospray system to be integrated into the microthruster.
6. Panchagnula, M.V. (PI), Satyanarayanan Seshadri, Vagesh D. Naraismhamurthy and Srikrishna Sahu *Airblast atomizer development for next gen engine*. Sponsor: DRDO. Duration: 2016 – 2021. Value: Rs. 243 Lakhs

Selected consultancy projects

7. Panchagnula,M.V. (PI), *High power density hydraulics.* Sponsor: Eaton corporation. Duration: 01/05/2012 – 30/04/2013. Value: Rs. 80,000.
8. Sivakumar, M.S., Arockiarajan, A., Vedantam, S., and Panchagnula, M.V., *Training and consultancy on inelasticity of materials – modeling and analysis.* Sponsor: HCL Technologies. Duration: 01/03/2012 – 30/09/2012. Value: Rs. 1,57,500.
9. Panchagnula, M.V. (PI) and Chatterjee, D., (Co-PI), *Investigation of cavitation inception in oil hydraulics.* Sponsor: Eaton corporation. Duration: 16/08/2012 – 30/09/2014. Value: Rs. 24 lakhs
    a. The objective of this project is to develop insight into how cavitation or bubble formation in a more general sense is inhibiting increasing operating *rpm* of oil hydraulic pumps for increase of throughput.
    b. My role in this project is to understand cavitation mechanisms in hydraulic oils and suggest ways of scaling up cavitation information from lab scale to the industry. In addition, I will be involved in employing laser diagnostic tools to differentiate between degassing and cavitation.
    c. The results from this work are being assimilated into Eaton's process of performing CFD modeling.
10. Sivakumar, M.S. (PI), Arockiarajan, A. (Co-PI), Vedantam, S. (Co-PI), and Panchagnula, M.V. (Co-PI), *FEA using advanced material models and related projects.* Sponsor: HCL Technologies. Duration: 13/03/2012 – 12/03/2015. Value: Rs. 1,91,000.
11. Panchagnula, M.V. (PI) and Chatterjee, D., (Co-PI), Microspray based high power density cooling strategies. Sponsor: Eaton corporation. Duration: 16/04/2014 – 15/04/2016. Value: Rs. 34.5 lakhs
12. Panchagnula, M.V. (PI) Demonstration of microspray based high power density cooling. Sponsor: Eaton corporation. Duration: 16/04/2017 – 15/04/2018. Value: Rs. 20 lakhs

13. Rengaswamy R. (PI) and Mahesh V. Panchagnula (Co-PI), Development of ML Tools for Cricket Data Analysis. Sponsor: ESPN. Duration: Dec 2018- Dec 2020. Value: Rs. 46 lakhs
14. Rengaswamy R. (PI) and Mahesh V. Panchagnula (Co-PI), Data analytics tools for RCB. Sponsor: Royal Challengers Bangalore. Duration: Dec 2020- Dec 2021. Value: Rs. 29.66 lakhs

IX. Other Activities - Text books, Monographs and Conferences

1. Co-organizer (with Dr. Alex Brown, Sandia National Labs) of the ASME K-11 Committee on Fire and Combustion track for ASME International Mechanical Engineering Conference and Exposition, 2008. The track involved over 120 papers in several parallel sessions
2. Co-organizer (with Prof. S. Vengadesan) of a STTP Short Term Course on "Research Topics in Fluid Dynamics" with about 30 participants, 2012.
3. Co-organizer (with Prof. R.I. Sujith) of an Indo-US workshop titled, "Frontiers of Liquid Atomization". Sponsored by Indo-US Science and Technology Forum. This was the first workshop in India on sprays and brought together 20 international and 25 Indian scientists.
4. NPTEL video course on "Liquid Atomization and Spray Systems" with over 43,000 views
5. Proposal Review Panelist, NSF, Combustion and Plasma Program, Nanoscale Interdisciplinary Research Teams (NIRT) Program and Centers of Research Excellence in Science and Technology (CREST) Program
6. Co-chair, ASME IMECE 2005
7. Organizer, ASME Forum on Liquid Atomization and Spray Combustion, Chicago IL, November 2005

X. Important student and administration centered service roles

1. *Head, Fluid Mechanics Group, Dept. of Applied Mechanics.* (Mar 2012- Mar 2015)
    a. Help in the administration and maintenance of the lab as well as in developing lab infrastructure.
    b. Help in organizing student- faculty technical interaction sessions at the lab scale.
2. *Advisor, Co-curricular affairs, IIT Madras.* (Oct 2012 – Oct 2015)
    a. I was the faculty interface to ensure smooth organization of the student-organized technical festivals, Shaastra, 2013 and Shaastra, 2014.
    b. I steered the students to introduce a more transparent system of decision making, which I believe will ultimately lead to wider student ownership of the IIT Madras festivals.
    c. I helped the student team of the Center for Innovation, IIT Madras to develop their plan and vision for the growth of the Center.
        i. This included implementing a process to measure participation

and success as well as its use in planning.

ii. The student participation at CFI roughly tripled in the past two years (which is primarily due to the student team's own efforts).

d. The following were some of the new initiatives that were taken up by the student team of CFI during the past two years.

i. *Idea 2 Innovation (i2i):* A team project program structured for the second and third academic year students to take ideas towards prototyping and potentially towards productizing them.

ii. Mentored student teams towards patenting good ideas – *two* students-only patents are in the process of being filed.

iii. Mentored the growth of HyperVerge Inc., a start-up that is based on original work performed at CFI. The student company is currently located in the IITM Research Park.

XI. Other relevant academic information

Thesis reviewer for students of the following universities

1. Indian Institute of Science, Bangalore
2. Indian Institute of Technology Madras, Chennai
3. Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore

Selection of journals served as peer reviewer

4. Contact angle, wettability and adhesion
5. Journal of Enhanced Heat Transfer
6. Langmuir
7. Journal of Colloid and Interface Science
8. Surface Science
9. IEEE Journal on Thermal Components and Packaging Technologies
10. ASME Journal of Fluids Engineering
11. Applied Surface Science
12. Physics of Fluids
13. International Journal of Spray and Combustion Dynamics
14. Atomization and Sprays
15. International Journal of Advances in Engineering Science and Applied Mathematics
16. International Journal of Heat and Mass Transfer
17. ACS Nano
18. Colloids and Surfaces A: Physicochemical and engineering aspects