

Krishna Mohan SINGH

Professor
Department of Mechanical Engineering
Indian Institute of Technology
Roorkee-247667, Uttarakhand, INDIA.

Phone: +91-1332-285414 (office)
+91-1332-285497 (home)
+91-9760992027 (mobile)
E-mail: singhfme@iitr.ac.in, singhfme@gmail.com

RESEARCH INTERESTS

- *Fluid Dynamics: Numerical simulation of turbulent flows in complex geometries*
- *Computational Mechanics: Parallel numerical algorithms for continuum problems, mesh free methods.*
- *Modeling, Simulation and CAD of Thermo-fluid and Multiphysics Systems (energy systems)*

EDUCATION

Ph. D.	Indian Institute of Technology, Kanpur	1993	Grade: 9.5/10
M. Tech.	Indian Institute of Technology, Kanpur	1988	Grade: 8.6/10
B. Tech.	Institute of Technology, BHU, Varanasi	1986	Grade: 8.8/10

EMPLOYMENT

17 Dec. 2019 – to date	Professor , Indian Institute of Technology, Roorkee, India.
23 Oct. 2012 – 16 Dec. 2019	Associate Professor , Indian Institute of Technology, Roorkee, India.
01 May 2014 – 30 Apr. 2015	Visiting Senior Researcher , Hitachi Research Laboratory, Hitachi, Ltd., Ibaraki, Japan
03 Sep. 2003 – 22 Oct. 2012	Assistant Professor , Indian Institute of Technology, Roorkee, India.
28 June 2000 – 27 Aug. 2003	Research Assistant , Queen Mary, University of London, London, UK
01 Nov.1999 – 31 Mar. 2000	Assistant Professor , Shinshu University, Nagano, Japan.
06 Nov. 1997 – 31 Oct. 1999	JSPS Post-doctoral Fellow , Shinshu University, Nagano, Japan.
08 May 1995 – 15 Oct.1997	Scientist `C' , Defence Metallurgical Research Lab., Hyderabad, India
14 Dec. 1994 – 05 May 1995	Research Engineer , Transoft International (P) Ltd., Bangalore, India
02 Aug. 1993 – 09 Dec.1994	Senior Project Engineer/Associate , IIT-Kanpur, India.

OTHER PROFESSIONAL EXPERIENCE

Nov 2013 – Dec 2013	Visiting Researcher , Queen Mary, University of London, UK
June 2012 – July 2012	Visiting Researcher , Queen Mary, University of London, UK
Dec. 2010 - Dec.2010	Visiting Researcher , Nagoya University, Nagoya, Japan.
Aug.2006 – Dec.2006	Visiting Researcher , Shinshu University, Nagano, Japan.
May 2005 – July 2005	Visiting Researcher , Shinshu University, Nagano, Japan.

HONORS/AWARDS

- *HIVIPS (Hitachi Research Visit Programs) Fellowship*, Hitachi Research Group, Hitachi Ltd., Japan (2014–2015)
- *Research Exchanges with China and India Award*, Royal Academy of Engineering, UK (2012–2013)
- *Honorary Visiting Lecturer*, Queen Mary, University of London, UK (2003-2007)
- *JSPS Post Doctoral Fellowship (JSPS, Japan)*: 1997-1999
- *Institute Fellowship*, IIT, Kanpur, India: 1986-1993
- *National Merit Scholarship (Govt. of India)*: 1980-86
- *State Merit Scholarship (Govt. of Uttar Pradesh, India)*: 1978 – 1980

RESEARCH PUBLICATIONS IN JOURNALS

Summary

- International Journals: 34; National Journals: 02
- Q1/Q2: 80% (Q1: 26/35, 74%, Q2: 02/35, 6%). Remaining in Society Journals not covered in SJR (IE, IR, JASCOME, JSCES).

1. Ankita Maity and K. M. Singh . Scheduled relaxation Jacobi method as preconditioner of Krylov subspace techniques for large scale Poisson problems. <i>Numerical Heat Transfer, Part B: Fundamentals</i> (Accepted).	Q1
2. Rituraj Singh and K. M. Singh . Stabilised MLS in MLPG method for heat conduction problem. <i>Engineering Computations</i> , 2019. https://doi.org/10.1108/EC-11-2018-0541	Q1
3. Rituraj Singh and K.M. Singh . Interpolating meshless local Petrov-Galerkin method for steady state heat conduction problem. <i>Engineering Analysis with Boundary Elements</i> , 101 , 56-66, 2019.	Q1
4. Jianming Zhang, Baotao Chi, K. M. Singh , YuDong Zhong, Chuanming Ju. A binary-tree element subdivision method for evaluation of nearly singular domain integrals with continuous or discontinuous kernel, <i>Journal of Computational and Applied Mathematics</i> , 362 , 2019, 22-40. https://doi.org/10.1016/j.cam.2019.04.027 .	Q1
5. M. Asif, A. Tariq and K. M. Singh . Estimation of thermal contact conductance using transient approach with inverse heat conduction problem. <i>Heat and Mass Transfer</i> (2019). https://doi.org/10.1007/s00231-019-02617-x	Q1
6. Rituraj Singh and K.M. Singh . On preconditioned BiCGSTAB solver for MLPG method applied to heat conduction in 3D complex geometry. <i>Engineering Analysis with Boundary Elements</i> , 93 , 83-93, 2018.	Q1
7. Rituraj Singh and K.M. Singh . On preconditioned BiCGSTAB solver for MLPG method applied to heat conduction in complex geometry. <i>Numerical Heat Transfer, Part B: Fundamentals</i> , 72 (5), 377-391, 2017.	Q1
8. K. M. Singh , E. J. Avital, J. J. R. Williams, C. Ji, X. Bai and A. Munjiza. On parallel preconditioners for pressure Poisson equation in LES of complex geometry flows. <i>International Journal for Numerical Methods in Fluids</i> , 83 (5), 446–464, 2017.	Q1
9. K. M. Singh , B. K. Gandhi and V. K. Goel. Aerodynamic design of high speed diesel trains for Indian Railways. <i>Indian Railway Technical Bulletin</i> , LXXII (351), 9-18, 2014.	---
10. H. C. Thakur, K.M. Singh and P. K. Sahoo. Phase change problems using MLPG method. <i>Numerical Heat Transfer, Part A: Application</i> , 59 (6), 438 – 458, 2011.	Q1
11. H. C. Thakur, K.M. Singh and P. K. Sahoo. MLPG analysis of nonlinear heat conduction in irregular domains. <i>Computer Modeling in Engineering & Sciences</i> , 68 (2), 117-150, 2010.	Q1
12. B. K. Gandhi and K. M. Singh . Experimental and numerical investigations on flow through wedge shape rib roughened duct”, <i>Journal of Institution of Engineers (India), Mechanical Engineering Division</i> , Vol. 90, 2010, pp 13-18.	Q4
13. H. C. Thakur, K.M. Singh and P. K. Sahoo. Meshless local Petrov-Galerkin method for nonlinear heat conduction problems. <i>Numerical Heat Transfer, Part B: Fundamentals</i> , 56 , 393 – 410, 2009.	Q1
14. A. Mittal, B. K. Gandhi and K. M. Singh . Improvement in design of centrifugal impeller used for oil cooling blower system using CFD - A case study. <i>Proc. IMechE, Part A: Journal of Power and Energy</i> , 223 , 981-989, 2009.	Q2
15. S.B. Prasad, J.S. Saini and K. M. Singh . Investigation of heat transfer and friction characteristics of packed bed solar air heater using wire mesh as packing material. <i>Solar Energy</i> , 83 (5), 773-783, 2009.	Q1
16. K. M. Singh , N. D. Sandham and J. J. R. Williams. Numerical simulation of flow over a rough bed. <i>Journal of Hydraulic Engineering</i> , 133 (4), 386-398, 2007.	Q1
17. K. M. Singh and M. Tanaka. Elementary analytical integrals required in subtraction of singularity method for evaluation of weakly singular boundary integrals. <i>Engineering Analysis with Boundary Elements</i> , 31 , 241-247, 2007.	Q1
18. K. M. Singh , M. Tanaka, Y. Arai and T. Matsumoto. Flexible GMRES solver for boundary element analysis of acoustic fields. <i>Transactions of the Japan Society for Computational Methods in Engineering and Science</i> , 6 (2), 79-84, 2006.	---
19. M. Tanaka, T. Matsumoto, K. M. Singh and K. Kurokawa. A DRBEM for the solution of nonlinear steady-state heat conduction problems in anisotropic solids (study on 2-D cases).	---

<i>Transactions of the Japan Society for Computational Methods in Engineering and Science</i> , 6 (2), 115-120, 2006.	
20. K. M. Singh and J. J. R. Williams. A parallel fictitious domain multigrid preconditioner for the solution of Poisson equation in complex geometry. <i>Computer Methods in Applied Mechanics and Engineering</i> , 194 (45-47), 4845-4860, 2005.	Q1
21. K. M. Singh and J. J. R. Williams. Application of the additive Schwarz method to large scale Poisson problems. <i>Communications in Numerical Methods in Engineering</i> , 20 , 193-205, 2004.	Q1
22. K. M. Singh and M. Tanaka. Dual reciprocity boundary element analysis of transient advection-diffusion. <i>International Journal of Numerical Methods for Heat & Fluid Flow</i> , 13 (5), 633-646, 2003.	Q2
23. K. M. Singh and M. Tanaka. Dual reciprocity boundary element analysis of inverse heat conduction problems. <i>Computer Methods in Applied Mechanics and Engineering</i> , 190 , 5283-5295, 2001.	Q1
24. K. M. Singh and M. Tanaka. On nonlinear transformations for accurate numerical evaluation of weakly singular boundary integrals. <i>International Journal for Numerical Methods in Engineering</i> , 50 (8), 2007-2030, 2001.	Q1
25. K. M. Singh and M. Tanaka. Analytical integration of weakly singular integrals in boundary element analysis of Helmholtz and advection-diffusion equations. <i>Computer Methods in Applied Mechanics and Engineering</i> , 189 (2), 625-640, 2000.	Q1
26. K. M. Singh and M. S. Kalra. Least squares finite element schemes in the time domain. <i>Computer Methods in Applied Mechanics and Engineering</i> , 190 (1-2), 111-131, 2000.	Q1
27. K. M. Singh and M. Tanaka. On exponential variable transformation based boundary element formulation for advection-diffusion problems. <i>Engineering Analysis with Boundary Elements</i> , 24 (3), 225-235, 2000.	Q1
28. M. Tanaka and K. M. Singh . Application of DRBEM and iterative regularization to inverse heat conduction problems. <i>Transactions of the Japan Society for Computational Engineering and Science</i> , 2 , 2000.	---
29. K. M. Singh and M. Tanaka. Dual reciprocity boundary element analysis of nonlinear diffusion: Temporal discretization. <i>Engineering Analysis with Boundary Elements</i> , 23 , pp. 419-433, 1999.	Q1
30. K. M. Singh and M. Tanaka. Analytical evaluation of weakly singular integrals for Helmholtz equation. <i>Transactions of the Japan Society for Computational Engineering and Science</i> , 1 , pp. 161-166, 1999.	---
31. N. Ramakrishnan, K.M. Singh , R.K.V. Suresh, and N. Srinivasan. An algorithm based on total-elastic-incremental-plastic strain for large deformation plasticity. <i>Journal of Materials Processing Technology</i> , 86 , pp. 190-199, 1999.	Q1
32. K. M. Singh and M. S. Kalra. Three and four step least squares finite element schemes in time domain. <i>Communications in Numerical Methods in Engineering</i> , 12 , pp. 425-431, 1996.	Q1
33. K. M. Singh and M. S. Kalra. Time integration in the dual reciprocity boundary element analysis of transient diffusion. <i>Engineering Analysis with Boundary Elements</i> , 18 , pp. 73-102, 1996.	Q1
34. K. M. Singh and M. S. Kalra. Application of cubic Hermitian algorithms to boundary element analysis of heat conduction. <i>International Journal for Numerical Methods in Engineering</i> , 38 , pp. 2639-2651, 1995.	Q1
35. K. M. Singh and M. S. Kalra. On cubic Hermitian interpolation based time integration methods. <i>International Journal for Engineering Analysis and Design</i> , 2 , pp. 1--6, 1995.	---
36. K. M. Singh and M. S. Kalra. Least squares finite element formulation in time domain for the dual reciprocity boundary element method in heat conduction. <i>Computer Methods in Applied Mechanics and Engineering</i> , 104 , pp. 147-172, 1993.	Q1

SPONSORED RESEARCH AND CONSULTANCY PROJECTS

A. SPONSORED RESEARCH PROJECTS AS PI (03)

S.No.	Title	Sponsoring Agency	Amount	Start Date	End Date	Co-PI (if any)
1.	Development of an Algorithm for Automatic Generation of Busbar Shape and Layout Design	Hitachi India Pvt Ltd.	INR 27.67 Lakh	Oct. 2019	On-going (Sept. 2021)	Dr. Ganesh B. Kumbhar, EED
2.	CFD for Moving Boundary Problems*	Hitachi Ltd., Japan	JPY 150 Lakh*	May 2014	April 2015	Dr N. Nonaka, Hitachi Research Lab., Hitachi Ltd., Japan
3.	Computational Flow Study of a Conceptual Large Scale Tidal Turbine**	Royal Academy of Engineering, UK	GBP 6000	June 2012	Dec 2013	E. J. Avital (UK PI), Queen Mary Univ of London

*Awarded under HIVIPS Program of Hitachi Ltd.; indicated budget is an approximate allocation under a larger head called GSK Program (for futuristic research) provided to and administered by Hitachi Research Lab. Closure report of the project:

K. M. Singh. *Immersed Boundary Method for CFD Analysis of Moving Boundary Problems in OpenFOAM*. Hitachi Ltd., Research & Development Group, Center for Technology Innovation, Japan, April 2015.

** Awarded under Royal Academy Research Exchange with China and India Scheme; administered by Queen Mary, University of London. Relevant closure report:

K. M. Singh and E. Avital. *Computational Flow Study of a Conceptual Large Scale Tidal Turbine*. Royal Academy of Engineering, UK, 2014.

B. SPONSORED RESEARCH PROJECTS AS Co-PI (02)

S.No.	Title	Sponsoring Agency	Amount	Start Date	End Date	PI, Co-PI (if any)
1.	Investigation on Flow Instabilities in Draft Tube at Off-Design Operation of Hydraulic Turbines	Central Power Research Institute, New Delhi	Rs 175 Lacs	Oct. 2017	On-going	Prof. B. K. Gandhi (PI)
2	High Performance Computing Facility for CFD Simulation of Thermo-Fluid Problems	DST, Govt. of India (FIST Grant)	Rs 44 Lacs	2008 (2015*)	2013 (2020*)	The Head, MIED (PI)

* Period of availability of the HPC facility in CFD Lab., MIED, IITR (March 2015 to Feb. 2020)

C. CONSULTANCY PROJECTS (06)

S. No	Title	Sponsoring Agency	Amount	PI/Co-PI	Start Date	End Date	Co-PI (if any)
1.	CFD Analysis of CW System of MEJA Thermal Power Project (2x660 MW)	Flowmore Ltd./ NTPC	Rs. 5.70 Lacs	Co-PI	June 2015	Sept. 2016	Prof. B. K. Gandhi (PI)
2.	Study and Design of Ventilation System of Traffic Tunnel of Larji HEP	HP State Electricity Board	Rs. 4.412 Lacs	Co-PI	Nov. 2010	Oct. 2011	Prof. B. K. Gandhi (PI)
3.	Study of Aerodynamic Behavior of Passenger Trains and Development of Aerodynamic Profiles of Coaches and Locomotives to Reduce Wind Resistance	RDSO, Lucknow	Rs. 17.47 Lacs	Co-PI	April 2008	Dec. 2009	Prof. V. K. Goel (PI) Prof. B. K. Gandhi
4.	CFD Analysis of Sump Model for Re-circulating Cooling Water System for MA-DMF Plant of M/s Chemanol	Simon India Ltd., New Delhi	Rs. 3.37 Lacs	Co-PI	Oct. 2007	Mar. 2008	Prof. B. K. Gandhi (PI)
5.	Investigation on Flow Induced Stresses in the Centrifugal Fans Used for Transformer Oil Cooling	Northern Railways, Ghaziabad	Rs. 2.20 Lacs	Co-PI	Nov. 2005	Aug. 2006	Prof. B. K. Gandhi (PI)
6.	Automatic Quadrilateral Grid Generation in 2-D	University of Ulsan, Korea	Rs. 0.96 Lacs	Co-PI	April 2004	April 2005	Prof. B. K. Gandhi (PI)

RESEARCH SUPERVISION

Ph. D. Theses (10: 7 completed, 3 on-going)

S.No.	Thesis Title	Year awarded	Name of Scholar	Co-supervisor (s) (if any)
1.	Heat and Fluid Flow in Low Porosity Wire Mesh Packed Bed Solar Air Heater with Cross Flow	2009	Shashi Bhushan Prasad	Prof. J. S. Saini
2.	Meshless Local Petrov-Galerkin Method for Phase Change Problems	2010	Harishchandra Thakur*	Prof. P. K. Sahoo
3.	Study on Turbulent Flows in Open Channels	2012	Kesheo Prasad	Prof. C. S. P. Ojha
4.	Experimental and Numerical Investigation of Thermal Contact Conductance	2013	Mohammad Asif	Dr. A. Tariq
5.	Investigation of Swirl in Pump Sump Intakes and its Control	2015	Bhupesh Jain	Prof. Z. Ahmed
6.	Improved MLPG Method for Large Scale Heat Transfer Problem	2018	Rituraj Singh	--
7.	Development of Parallel Navier-Stokes Solver for LES of flow over Marine Turbine	2019	Ankita Maity	--
8.	Large Eddy Simulation of High Speed Compressible Flow	On-going	Uttam Singh Rajput	--
9.	Numerical Study of Formation and Mitigation of Vortex Rope in Elbow Draft Tube	On-going	Subodh Khullar	Prof. B. K. Gandhi Prof. Michel J. Cervantes (Sweden)
10.	Parallel MLPG Method	On-going	Abhishek Kumar Singh	--

M. Tech. Theses (25)

S.No.	Thesis Title	Year awarded	Name of Scholar	Co-supervisor (s) (if any)
1.	Measurement and Numerical Simulation of Turbulent Flow over a Rough Surface	2005	Sumedh P. Pawar	Prof. B. K. Gandhi
2.	Development and Application of an Immersed Boundary Fictitious Domain Solver for Navier-Stokes Equation in Complex Geometry	2005	L.Venugopal Reddy	Prof. P. K. Sahoo
3.	Combustion Analysis of Liquid Fuel within Porous Media Radiant Burner	2005	Satbir Singh Sehgal	Prof. R. P. Gakkhar (Main Guide)
4.	Numerical Investigation of Heat Transfer in Solar Air Heater Duct with Transverse Ribs	2006	Rakesh Kumar	Prof. B. K. Gandhi
5.	Numerical Investigation of Heat Transfer and Fluid Flow Characteristics in Solar Air Heater Duct with Chamfered Ribs	2006	Shyam S. Gupta	Prof. B. K. Gandhi

6.	Emission Studies on Porous Media Combustion Burner	2006	Prateek K. Jain	Prof. R. P. Gakkhar (Main Guide)
7.	Computer-aided Design of Aerodynamic Shape of High-Speed Trains	2007	Nitin Gupta	Prof. B. K. Gandhi, Prof. A. Gairola
8.	Modeling and Theoretical Investigation of Combustion in a Porous Inert Media	2008	Rituraj Singh	Prof. R. P. Gakkhar (Main Guide)
9.	Determination of Kinetic Parameters for the Combustion of Jatropha based Bio-Diesel	2008	Ajay	Prof. R. P. Gakkhar (Main Guide)
10.	Numerical Simulation of Turbulent Flow over High Speed Locomotive	2008	Muley Kiran Kumar A.	----
11.	Meshfree Methods for Thermo-mechanical Problems	2008	Salendra Kumar Mittal	Prof. B. K. Mishra
12.	Body Shape Optimization of Indian Railways Diesel Loco WDP-4GM and Passenger Cars for Higher Speeds	2009	Lokender Singh	Prof. B. K. Gandhi
13.	Design and Development of Aerodynamic Braking System for High Speed Trains	2010	Siddhartha Jain	Prof. B. K. Gandhi
14.	Performance Characteristics of Centrifugal Slurry Pump Handling Solid Liquid Mixtures	2010	Jaywant S. Pawar	Prof. B. K. Gandhi (Main Guide)
15.	Thermoeconomic Optimization of a Tri-generation System Using Exergy Splitting Method	2010	Wolduamlak Beyene	Prof. P. K. Sahoo (Main Guide)
16.	Numerical Simulation for Flow of Liquid through a Centrifugal Impeller	2011	Praveen K. Singh	Prof. B. K. Gandhi
17.	Estimation of Performance Characteristics of Hydraulic Turbine using CFD	2011	Tarun	Prof. B. K. Gandhi
18.	Numerical Simulation of Pollutant Dispersion in a Long Highway Tunnel	2011	Harish Kumar	Prof. B. K. Gandhi
19.	Design of Suitable Ventilation System for a Long Highway Tunnel using CFD	2012	Jitendra Kumar	Prof. B. K. Gandhi
20.	Thermal Design and Simulation of a Natural Draft Cooling Tower	2014	Venkata Sasidhar P	Dr. K. Murugesan (Main Guide)
21.	Performance Analysis of Solar Assisted Ground Coupled Heat Pump System	2014	Tarun	Dr. K. Murugesan (Main Guide)
22.	Simulation and Analysis of Performance of a Marine Current Turbine in Free Surface Flow	2017	Krishnendu Sanyal	---
23.	Study of Flow Field and Erosion Wear in Pipelines and Bends of Slurry Transportation using CFD	2018	Jesim Hashmy	Prof. B. K. Gandhi (Main Guide)
24.	Numerical Simulation of Erosion in Francis Turbine	2019	Amit Kumar	Prof. B. K. Gandhi (Main Guide)
25.	Numerical Simulation of Vortex Rope and its Mitigation in Francis Turbine	2019	Shubham Porwal	Prof. B. K. Gandhi

CONFERENCE PAPERS AND REPORTS

A. CONFERENCE PAPERS (43)

1. Subodh Khullar, **K. M. Singh**, B. K. Gandhi and M. J. Cervantes. Effect of axial water jet size and velocity on unsteady pressure pulsations in a decelerating swirling flow. FMFP2018 - Paper no. 235, *Proc. of the 7th International and 45th National Conference on Fluid Mechanics and Fluid Power*, December 10-12, 2018, IIT Bombay, Mumbai, India.
2. Ankita Maity and **K. M. Singh**. Evaluation of scheduled relaxation Jacobi method as solver and preconditioner for numerical solution of pressure Poisson equation. FMFP2017–paper no. 289, *Proc. of 44th National Conference on Fluid Mechanics and Fluid Power*, December 14-16, 2017, Amrita University, Amritapuri Campus, Kollam, Kerala.
3. Rituraj Singh and **K. M. Singh**. A new SRJ preconditioner in BICGSTAB solver for MLPG method. FMFP2016–paper no. 80, *Proc. of the 6th International and 43rd National Conference on Fluid Mechanics and Fluid Power*, December 15-17, 2016, MNNIT, Allahabad.
4. Ankita Maity and **K. M. Singh**. A Poisson solver with scheduled relaxation Jacobi as pre-conditioner. FMFP2016–paper no. 432, *Proc. of the 6th International and 43rd National Conference on Fluid Mechanics and Fluid Power*, December 15-17, 2016, MNNIT, Allahabad.
5. **K. M. Singh**, N. Nonaka and U. Oh. Immersed boundary method for CFD analysis of moving boundary problems in OpenFOAM. *Proc. of the ASME 2015 International Mechanical Engineering Congress & Exposition (IMECE2015)*, November 13-19, 2015, Houston, Texas.
6. Rituraj Singh and **K. M. Singh**. Iterative solvers for meshless Petrov Galerkin (MLPG) method applied to large scale engineering problems. *Proc. of the ASME 2015 International Mechanical Engineering Congress & Exposition (IMECE2015)*, November 13-19, 2015, Houston, Texas.
7. **K. M. Singh**, E. J. Avital, J. J. R. Williams, C. Ji and A. Munjiza. Parallel pressure Poisson solvers for LES of complex geometry flows. *Proc. of ASME-JSME-KSME 2015 Joint Fluids Engineering Conference (AJKFluids2015)*, July 26-31, 2015, Seoul, Korea.
8. B. Jain, Z. Ahmad and **K. M. Singh**. Computational Fluid Dynamics: A design tool for multiple pump intakes. *HYDRO 2013 International*, December 4-6, 2013, IIT Madras, Chennai.
9. Mohammad Asif, A. Tariq and **K. M. Singh**. Inverse heat conduction problem for estimating thermal contact conductance of nominally flat metallic contact. *2nd National Conference on Advances in Heat Transfer and Fluid Dynamics (Under TEQIP-II)*, March 23-24, 2013, AMU, Aligarh, India.
10. **K. M. Singh**. Aerodynamics of high speed trains: State of art and Indian perspective. *Proc. of National Conference on Recent Advances in Mechanical Engineering (RAME-2013)*, 5 & 6 October, 2013, Quantum School of Technology Roorkee.
11. P. K. Sahoo, B. Wolduamlak and **K. M. Singh**. Exergoeconomic optimisation of a cogeneration system using exergy splitting method. *Proc. of ECOS 2013 - The 26th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems*, July 16-19, 2013, Guilin, China
12. B.K. Gandhi, Jitendra Kumar and **K.M. Singh**. Numerical simulation of flow field and pollutant dispersion in a long highway tunnel with semi-transverse ventilation. *Proc. International Conference on Advances in Electrical and Mechanical Engineering (ICAEME'2012)*, December 18-19, 2012 Phuket, Thailand.
13. Tarun, B. K. Gandhi and **K. M. Singh**. Prediction of pressure pulsations in Francis turbine. *Proc. of 38th National Conference on Fluid Mechanics and Fluid Power (FMFP-2011)*, December 15-17, 2011, MANIT, Bhopal.
14. Harish Kumar, **K. M. Singh** and B. K. Gandhi. Numerical simulation of flow field and pollutant dispersion in a long highway tunnel. *IASTED International Conference on Modeling, Simulation and Identification (MSI 2011)*, November 5-7, 2011, Pittsburgh, USA.
15. Tarun Parashar, B. K. Gandhi and **K. M. Singh**. Numerical simulation of flow through a Francis turbine. *IASTED International Conference on Modeling, Simulation and Identification (MSI 2011)*, November 5-7, 2011, Pittsburgh, USA.

16. Kesheo Prasad, C.S.P. Ojha, **K. M. Singh**. Velocities in non-uniform flow on closely packed rough bed. *Proc. of National Conference on Recent Advances in Civil Engineering (RACE-2011)*, October 14-16, 2011, Varanasi, pp. 88-94.
17. Kesheo Prasad, C.S.P. Ojha, **K. M. Singh**. Evolution of some resistance law for non-uniform accelerated flow over closely packed rough bed. *Proc. of National Conference on Recent Advances in Civil Engineering (RACE-2011)*, October 14-16, 2011, Varanasi, pp. 137-143.
18. Siddharth Jain, Lokender Singh, B. K. Gandhi and **K. M. Singh**. Experimental investigation on aerodynamic shape of Indian Railway train with diesel loco WDP-4GM: A case study. *ENERSTATE-2010 International Conference on Clean Energy Technologies and Energy Efficiency for Sustainable Development*, Dehradun, December 27-29, 2010.
19. Lokender Singh, B. K. Gandhi, **K. M. Singh**. Aerodynamic Shape Optimization of Existing Diesel Loco WDP 4GM and Passenger Cars of Indian Railways. *Proc. International Conference on Advances in Mechanical Engineering (ICAME 2009)*, SVNIT, Surat.
20. S. B. Prasad, J. S. Saini, and **K. M. Singh**. Effect of porosity on the performance of wire mesh packed bed solar air heater. *Proc. of International Conference on Emerging Research and Advances in Mechanical Engineering (ERA 2009)*, Velammal Engineering College, Chennai, 302-307, 2009.
21. S. B. Prasad, J. S. Saini, and **K. M. Singh**. Investigation of enhancement of thermal performance of packed bed solar air heater using wire mesh as packing material. *19th National & 8th ISHMT-ASME Heat and Mass Transfer Conference*, JNTU Hyderabad, India, January 3 - 5, 2008.
22. H. C. Thakur and **K.M. Singh**. Meshfree methods and their applications. *National Conference on State of Art Technologies in Mechanical Engineering*, October 2007, G.B. Pant Technical University, Pant Nagar.
23. H. C. Thakur and **K.M. Singh**. Meshless local Petrov-Galerkin method (a truly meshfree method): An overview. *IAWS-CFD 2007 (Indo-Australian Workshop on A CFD Approach on Fluid Flow, Heat and Mass Transfer & CFD Applications in Multidisciplinary Areas)*, 12-14 April, 2007, IIT-Roorkee.
24. S. S. Gupta, B. K. Gandhi and **K. M. Singh**. Numerical investigation of heat transfer and fluid flow characteristics in solar air heater duct with chamfered ribs mounted on absorber plate. *National Seminar on CFD - The New Third Dimension in Flow Analysis and Thermal Design*, May, 7-8, 2007, Rajiv Gandhi Technological University, Bhopal.
25. A. Mittal, A. P. Gupta, B. K. Gandhi and **K. M. Singh**. CFD analysis of an axial-centrifugal flow system used for transformer oil cooling. *National Seminar on CFD - The New Third Dimension in Flow Analysis and Thermal Design*, May, 7-8, 2007, Rajiv Gandhi Technological University, Bhopal.
26. S. S. Sehgal, R. P. Gakkhar and **K. M. Singh**. Liquid fuel combustion within submerged flame porous burner. *19th National Conference on IC Engines and Combustion*, Dec. 21-23, 2005, Annamalainagar.
27. Singh, K.M., Sandham, N.D. and Williams, J.J.R., Flow over a rough bed. *UK Turbulence Consortium Workshop*, Beaulieu, New Forest, UK, Sep. 22-23, 2004.
28. Williams, J. J. R. and Singh, K. M., Structure of the turbulent flow over a rough bed. *The 6th International Conference on Hydrosience and Engineering (ICHE-2004)*, Brisbane, Australia, May 30-June 3, 2004. (Invited paper).
29. **K. M. Singh** and J. J. R. Williams. A fictitious domain multigrid preconditioner for the solution of Poisson equation in complex geometry. *XIII National Conference of Indian Society of Mechanical Engineers (ISME-2003)*, IIT-Roorkee, Dec. 30-31, 2003, Roorkee (Paper no. TH-122).
30. **K. M. Singh** and J. J. R. Williams. Direct numerical simulation of flow over a rough bed. *Shallow Flows*, Gerhard H. Jirka, Wim S.J. Uijtewaal (Eds.), (Chapter 36), Taylor and Francis, 2004.
31. M. Tanaka and **K. M. Singh**. Application of DRBEM and iterative regularization to inverse heat conduction. In *Proc. of the International Symposium on Inverse Problems in Engineering Mechanics (ISIP200)* (Nagano, Japan), Elsevier, 2000.
32. M. Tanaka and **K. M. Singh**. A semi-numerical method based on singularity subtraction and nonlinear transformation for singular boundary integrals. In *Proc. of the 16th JASCOME Symposium on BEM*, pages 87-92. JASCOME, Tokyo, Japan, 1999.
33. **K. M. Singh** and M. Tanaka. Analytical evaluation of weakly singular boundary integrals for advection-diffusion equation. In C. A. Brebbia and H. Power, editors, *Boundary Elements XXI*, pp.

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34. **K. M. Singh** and M. Tanaka. An alternative boundary element formulation for steady state advection-diffusion problems. In *Proc. of the 9th BEM Technology Conference (BTEC-99)*, pages 69-74. JASCOME, Tokyo, Japan, 1999.
 35. **K. M. Singh** and M. Tanaka. On accurate evaluation of boundary element integrals for advection-diffusion and Helmholtz equations. In *Proc. of the 15th JASCOME Symposium on BEM*, pages 1-6. JASCOME, Tokyo, Japan, 1998.
 36. **K. M. Singh** and M. Tanaka. Application of DRBEM to convection-dominated transient convection-diffusion problems. In *Proc. of the 76th JSME Conference, Volume 2*, pages 179-180. JSME, Sendai, Japan, 1998.
 37. **K. M. Singh** and M. Tanaka. Application of DRBEM to transient advection-diffusion problems. In *Proc. of the 53rd JASCOME Forum, Volume BEM 98-53*, pages 1-12. JASCOME, Tokyo, Japan, September 30 1998.
 38. **K. M. Singh** and M. Tanaka. Dual reciprocity BEM for advection-diffusion problems: Temporal discretization aspects. In *Proc. of the 8th BEM Technology Conference (BTEC-98)*, pages 79-84. JASCOME, Tokyo, Japan, 1998.
 39. N. Ramakrishnan, R. K. V. Suresh, **K. M. Singh** and N. Srinivasan. A viscoplastic - type constitutive basis for large deformation plasticity. *Plasticity and Impact Mechanics (IMPLAST'96)*, Tata McGraw Hill, New Delhi, 1996.
 40. N. V. Rao, N. Ramakrishnan and **K. M. Singh**. Generation of finite element mesh for microstructural geometry using image-processing techniques. In M. Vidyasagar, editor, *Intelligent Robotic Systems (Proc. ISIRS'95)*, pages 106-112, Tata McGraw Hill, New Delhi, 1996.
 41. **K. M. Singh** and M. S. Kalra. Hermitian interpolation based time integration methods for DRBEM in transient diffusion. In *Proc. 1st ASME-ISHMT Conference and 12th National Heat and Mass Transfer Conference*, pages 559-564. Tata McGraw Hill, New Delhi, 1994.
 42. **K. M. Singh** and M. S. Kalra. A dual reciprocity boundary element method in transient heat conduction with nonlinear boundary conditions. In *Proc. 10th National Heat and Mass Transfer Conference*, pages 467-474. Indian Society for Heat and Mass Transfer, 1989.
 43. **K. M. Singh** and M. S. Kalra. A least squares time integration scheme for the dual reciprocity BEM in transient heat conduction. In R. W. Lewis and K. Morgan, editors, *Numerical Methods in Thermal Problems VI*, pp. 216-226. Pineridge Press, Swansea, UK, 1989.

B. RESEARCH/DESIGN/CLOSURE REPORTS (13)

1. B.K. Gandhi and **K. M Singh**. *CFD Analysis of CW System of MEJA Thermal Power Project*. Flowmore Ltd./NTPC India Ltd, 2016.
2. K. M. Singh. *Immersed Boundary Method for CFD Analysis of Moving Boundary Problems in OpenFOAM*. Hitachi Ltd., Research & Development Group, Center for Technology Innovation, Japan, 2015
3. K. M. Singh and E. Avital. *Computational Flow Study of a Conceptual Large Scale Tidal Turbine*. Royal Academy Research Exchange with China and India Scheme, 2014.
4. B.K. Gandhi and **K. M Singh**. *Study and Design of Ventilation System of Traffic Tunnel of Larji HEP*. HP State Electricity Board, 2011.
5. V. K. Goel, B.K. Gandhi and **K. M Singh**. *Aerodynamic Behavior of Passenger Trains and Avelopment of Aerodynamic Profiles of Coaches and Locomotive to Reduce Wind Resistance*. RDSO, Lucknow. Final Report on RDSO Consultancy Project, RDSO, Luck now, India, 2009.
6. B.K. Gandhi and **K. M Singh**. *Analysis of Sump Model for Recirculating Cooling Water System for MA-DMF Plant of M/S Chemanol*. M/S Simon India Ltd, 2008.
7. B.K. Gandhi and **K. M Singh**. *Investigation on Flow Induced Stresses in the Centrifugal Fans Used for Transformer Oil Cooling*. Northern Railways, Ghaziabad, India, 2007.
8. B.K. Gandhi and **K. M Singh**. *Automatic Quadrilateral Grid Generation in 2D* Final Report on Korean Consultancy Project for Ulsan University, Korea, 2004.

9. J. J. R. Williams, N. D. Sandham and **K. M. Singh**. *Numerical Simulation of Flow over a Rough Bed*. Final Report on EPSRC, UK Grant GR/M85241/01, November 2003. (This project was rated 'outstanding' by UK EPSRC Review Committee.)
10. **K. M. Singh** and M. Tanaka. *Development of Boundary Element Computational Simulator for Environmental Problems*. JSPS Research Report (P97334), November 1999, Shinshu University, Nagano, Japan.
11. **K. M. Singh** and N. Ramakrishnan. *Unstructured Mesh Generation in Arbitrarily Complex Planar Regions using GEOM2D*. DMRL Technical Report: DMRL TR 97 217, May 1997, DMRL, Hyderabad, India.
12. **K.M. Singh**. *Least Squares Finite Element Formulations in Time Domain with Applications in Boundary Element Analysis*. PhD thesis, Indian Institute of Technology, Kanpur, India, 1993.
13. **K.M. Singh**. *Application of dual reciprocity BEM in nonlinear transient heat conduction*. Master's thesis, Indian Institute of Technology, Kanpur, India, 1988.

PROFESSIONAL AFFILIATIONS / ACTIVITIES

A. MEMBERSHIP OF PROFESSIONAL SOCIETIES

- Fellow, Institution of Engineers, India
- Member of the American Society of Mechanical Engineers (ASME)
- Senior Member of the American Institute of Aeronautics and Astronautics (AIAA)

B. JOURNAL REVIEWS

Reviewer for many international journals in Computational Mechanics/Fluid Dynamics, e.g.

- (i) International Journal for Numerical Methods in Engineering
- (ii) Engineering Analysis with Boundary Elements
- (iii) International Journal of Numerical Methods for Heat & Fluid Flow
- (iv) Numerical Heat Transfer
- (v) ASME Journal of Fluids Engineering
- (vi) ASCE Journal of Hydraulic Engineering,

C. SHORT TERM COURSES

- Two week short term course on "Computational Fluid Dynamics" under Faculty Development Program sponsored by AICTE, MHRD, Govt. of India, June 2008.
- One week short term course on "Computational Fluid Dynamics" under Quality Improvement Program sponsored by AICTE, MHRD, Govt. of India, July 2009.
- One week short term course on "Tools and techniques of CFD" under Quality Improvement Program sponsored by AICTE, MHRD, Govt. of India, July 2010.
- Three days short term course on "Computational Fluid Dynamics" jointly organized with Institution of Engineers (India), Roorkee Local Chapter, August 2010.
- One week short term course on "Computational Fluid Dynamics" under Quality Improvement Program sponsored by AICTE, MHRD, Govt. of India, February 2016.
- One week short term course on "Computational Fluid Dynamics" under Quality Improvement Program sponsored by AICTE, MHRD, Govt. of India, February 2018.

TEACHING/ACADEMIC EXPERIENCE

A. CURRICULUM DEVELOPMENT

Member of the Committees on Curriculum Development for Undergraduate and Post-graduate Courses at

- IIT-Roorkee (2004-2010) and
- Shinshu University, Nagano, Japan (1999-2000).

B. WEB/VIDEO COURSES (under NPTEL program of MHRD, Govt. of India)

- Developed a web course on Computational Fluid Dynamics
- Developing a video course on Computational Fluid Dynamics

C. TEACHING

• Undergraduate Courses

1. Fluid Mechanics (Autumn 2012, Spring 2004, 2005, 2006)
2. Fluid Mechanics and Machinery (Autumn 2007)
3. Thermodynamics (Spring 2009, 2010; Autumn 2010; Spring 2018, 2019)
4. Manufacturing Techniques (Autumn 2009, 2010)
5. Computer Graphics (Autumn 2011, 2012)
6. Computer Systems and Programming (Spring 2005, 2006, 2007, 2008, 2010, 2011, 2012, 2013; Summer 2007; Autumn 2013, 2015, 2018, 2019)

• Post-graduate Courses

1. Advanced Fluid Mechanics (Autumn 2007, 2008, 2009, 2019)
2. Computational Fluid Dynamics and Heat Transfer (Spring 2007, 2008, 2009; Autumn 2016, 2017, 2018)
3. Modeling and Simulation (Autumn 2004, Spring 2010, Spring 2014)
4. Advanced Heat Transfer (Autumn 2005)
5. Advanced Thermodynamics (Autumn 2003)
6. Solar Energy (Autumn 2013)
7. Convective Heat Transfer (Spring 2017)

MANAGEMENT & INSTITUTIONAL DEVELOPMENT

a) Dept./ Centre's Level:

1. O. C. CFD Laboratory (2006 onwards)
2. O. C. Placement (2004-2011)
3. Dy. Superintendent Examinations/Superintendent Examinations (2004-12)
4. Member, DASC (2008-2010, 2012-2014)
5. Member, DRC (2010-2012)
6. Coordinator, B. Tech. Projects (Thermal) (2012-2014, 2016-...)
7. Faculty Advisor, Mechanical (2012-2014)

b) Institute Level:

1. Dy. Chief Advisor, Students Club (2016-2017)
2. Staff Advisor, Modeling and Robotics (2012-2014)
3. Staff Advisor, Yoga (2009-2013)
4. Member, Organizing Committee for 48th Inter IIT Sports Meet 2012
5. Institute Representative for JEE/GATE Examinations

LABORATORY DEVELOPMENT

Obtained a FIST grant from DST for development of a CFD Laboratory for numerical simulation of flow and heat transfer problems pertinent to energy systems. The laboratory consists of the following hardware and software acquired and implemented in 2015:

- A small high-performance computing cluster (HPC) with 128 cores, 512 GB RAM and 20 TB total storage
- 5-year unlimited core license of CFD software Star-CCM+
- Open-source CFD library OpenFOAM
- Graphic workstations