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Environmental and Occupational Health

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Citizenship Status: **US Citizen**

Fields of Expertise:

Computational Fluid Dynamics, Atmospheric & Environmental sciences, Combustion and Emissions

Experience:

- August 07 – to date Professor, Environmental and Occupational Health, University of South Florida, Tampa, Florida
- April 98 – August 07 Senior Scientist at the Ohio Supercomputer Center (OSC), Columbus, Ohio and Graduate Faculty, Graduate Program in Environmental Science, The Ohio State University (OSU).
- June 97-April 98 Technical Consultant at Caterpillar Inc. (On leave from Ohio Supercomputer Center).
- Oct. 87 – May 97 Senior Scientist and head of the Computational Reactive Mechanics Program at the Ohio Supercomputer Center, Columbus, Ohio.
- Jan. 69 -- Oct. 87 Professor (80-87), Associate Professor (76-80), Assistant Professor (69-76 and 65-66) at the Indian Institute of Technology, Bombay (India), Department of Mathematics.
- June 66-Sep. 68 NAS-NRC Research Associate at NASA Langley Center, Hampton, VA; theory development and analysis of plasma waves in turbulent magnetic fields

Professional Societies:

American Institute of Aeronautics and Astronautics (Associate Fellow)
Combustion Institute, Society for Industrial and Applied Mathematics
American Geophysical Union, American Meteorological society

Education:

Ph.D. (Mathematics)	1964	Indian Institute of Technology (IIT), Bombay (India)
Dissertation Title:		<i>Fluid Flow & Heat Transfer through Channels</i>
Master degree	1960	Agra University, Agra (India) Ist Division

Advisor on **nine** doctoral projects

Advisor on **five** Master degree projects

Interpersonal Traits:

Strength in interpersonal communications, extensive and successful collaborations, ability to integrate opinions and contributions of others in collaborative work, success in directing programs and projects and managing subordinates.

Other Professional Activities:

P.I. for

3 industrial projects,

1 NSF project,

2 USAID projects, **CDC project** (current)

Human Health Risk Evaluation of Air Pollutants in India: Modeling of Air Pollutants

An Indo-US Collaborative project on Environmental and Occupational Health

CO-PI for one NSF project and one Indo-US Forum for Science and Technology project.

Served on the NASA review panel for information Technology;

Reviewer for professional journals in Fluid Dynamics, environmental science, plasma physics

Have made more than 100 presentations as invited talks at academic institutions and research laboratories and as contributed and invited papers in technical meetings.

Have more than 65 publications in fluid flow, heat transfer, plasma, combustion, and parallel computing in professional journals and proceedings of the scientific meetings.

Publications:

1. Mittal, M. L., Unsteady hydrodynamic flows in an annular channel, *Applied Scientific Research B* 10 (1963) 86-90.
2. Gupta, S. C., Mittal, M. L., Laminar unsteady MHD flow in an annular channel under a radial magnetic field, *Applied Scientific Research B* 11 (1964) 161-175.
3. Mittal, M. L., Heat Transfer by laminar flow in a circular pipe under a transverse magnetic field, *International Journal of Heat and Mass Transfer* 7 (1964) 239-246.
4. Mittal, M. L., A note on the instabilities of collisionless plasma in the presence of a shear magnetic field, *Plasma Physics* 11 (1969) 1024-1027.
5. Mittal, M. L., Bhat, A. N., Effect of ion-slip currents on MPD electric power generator, *Proceedings of Symposium on Plasma Physics and MHD*, Bhabha Atomic Research Center, Bombay (1974) 1-12.
6. Mittal, M. L., Masapati, G. H., Rao, B. N., Entrance flow in a MHD channel with Hall and ion-slip currents, *AIAA Journal* 14 (1976) 1768-1770.
7. Mittal, M. L., Prahalad, Y. S., Plasma waves in a stochastic magnetic field, *Physics Letters* 58A (1976) 395-396.
8. Mittal, M. L., Prahalad, Y. S., Govinda Thirtha, D., Effect of noise on the Parametric amplification of Alfvén waves, *Plasma Physics* 18 (1976) 801-807.
9. Mittal, M. L., Bhat, A. N., Heat exchange in a MHD channel with allowance for the ion slippage, *High Temperature* 15 (1977) 719-729. (Translated from Russian *Toplofijeka Vysokih Temperature* 15 (1977) 852-865)
10. Mittal, M. L., Bhat, A. N., Heat transfer by a developing MHD flow with Hall and ion-slip currents, *Proceeding of the 4th National Conference on Heat and Mass Transfer*, Roorkee University, Roorkee (1977) 247-253.
11. Mittal, M. L., Masapati, G. H., Electric power fluctuations in MHD generator, *Letters in Applied and Engineering Physics* 5 (1977) 141-153.
12. Mittal, M. L., Prahalad, Y. S., Parametric amplification of Alfvén waves, *Plasma Physics* 19 (1977) 39-46.
13. Mittal, M. L., Prahalad, Y. S., Alfvén waves in a stochastic magnetic field, *Journal of Plasma Physics* 11 (1977) 147-151.
14. Rao, B. N., Mittal, M. L., Boundary layer with a traveling magnetic field and Hall currents, *Journal of Applied Physics* 49 (1978) 4718-4721.
15. Mittal, M. L., Sarma, P.L., End effects in magnetohydrodynamic channel due to Hall currents, *AIAA Journal of Energy* 2 (1978) 126-128.
16. Mittal, M. L., Bhat, A. N., One-dimensional flow of real gas in a diverging channel with generalized Ohm's law, *Energy Research* 2 (1978) 247-263.
17. Bhat, A. N., Mittal, M. L., Effect of Hall and ion-slip currents in heat transfer with uniform wall heat flux in the developing flow region, *Mechanics Research Communications* 5 (1978) 121-126.
18. Prahalad, Y. S., Mittal, M. L., Interaction of three coherent waves in a plasma in a stochastic magnetic field, *Plasma Physics* 20 (1978), 165-169.
19. Mittal, M. L., Prahalad, Y. S., Plasma waves in a stochastic magnetic field, *Physics Letters* 65A (1978) 117-118.
20. Mittal, M. L., Masapati, G. H., Rohatgi, V. K., Performance of MHD generator in the inlet region, *Energy Research* 3 (1979) 189-199.
21. Mittal, M. L., Sarma, P.L., Current distribution at the end regions of a MHD channel, *AIAA Journal of Energy* 3 (1979) 181-183.
22. Mittal, M. L., Govinda Thirtha, D., Nonlinear hydromagnetic waves in two-electron temperature plasma, *Acta Physica Hungarica* 46 (1979) 31-37.
23. Bhat, A. N., Mittal, M. L., Forced convective heat transfer in a MHD channel with Hall and ion slip currents, *Applied Scientific Research* 35 (1979) 251-264.
24. Sarma, P.L., Mittal, M. L., Rohatgi, V. K., End effects with a slowly varying magnetic field in a

- MHD channel with segmented electrodes, *Energy Research* 4 (1980) 81-89.
25. Sarma, P.L., Mittal, M. L., End Effects in a MHD channel with diverging electrode walls, *Energy Conversion and Management* 20 (1980) 41-47.
 26. Bhat, A. N., Mittal, M. L., Heat Transfer in a MHD channel with uniform wall heat flux - Effects of Hall and ion-slip currents, *International Journal of Heat and Mass Transfer* 23 (1980) 919-926.
 27. Masapati, G. H., Mittal, M. L., Thermal boundary layers in a MHD power generator, *Proceedings of Fifth National Heat and Mass Transfer Conference, Hyderabad, India* (1980) 369-372.
 28. Prahalad, Y. S., Mittal, M. L., Waves in a Magnetoplasma with stochastic magnetic field, *Journal of Plasma Physics* 23 (1980) 311-320.
 29. Mittal, M. L., Prahalad, Y. S., Govinda Thirtha, D., The acceleration and diffusion of charged particles in a stochastic magnetic field, *Journal of Physics A (Mathematical and General)* 13 (1980) 1095-1099.
 30. Prahalad Y. S., Govinda Thirtha, D., Mittal, M. L., Evolution of Alfvén waves in a stochastic magnetic field, *IEEE Transactions of Plasma Science* PS-8 (1980) 22-25.
 31. Govinda Thirtha, D., Mittal, M. L., Nonlinear magnetoacoustic waves in a weakly homogeneous plasma, *Canadian Journal of Physics* 58 (1980) 110-115.
 32. Rao, B. N., Mittal, M. L., Magnetohydrodynamic boundary layer on a wedge, *ASME Journal of Applied Mechanics* 48 (1981) 656-659.
 33. Mittal, M. L., Gowda, G. Paran, Transport coefficients for a weakly chemically reacting plasma *Proceedings of sixth National Heat and Mass Transfer Conference, I.I.T. Madras, India, (1981)* 1-5.
 34. Mittal, M. L., Gowda, G. Paran, James, M. I., Nataraja, H. R., Gupta, G. P., Rohatgi, V.K., Ionizational non-equilibrium effects in closed cycle MHD generators, *Proceedings of VIII International Conference on MHD Electric Power Generation, Moscow* (1983) 281-284.
 35. Mittal, M. L., Rao, B.N., Boundary-layer on electrode walls, *Energy Conversion and Management* 23 (1983) 237-240.
 36. Mittal, M. L., Masapati, G. H., The stability analysis of a magnetohydrodynamic channel flow with anisotropic conductivity, *Journal of Mathematical and Physical Sciences*, 17 (1983) 524-544.
 37. Rao, B. N., Mittal, M. L., Nataraja, H. R., Hall effects in a boundary layer flow, *Acta Mechanica* 49 (1983) 147-151.
 38. Rao, B. N., Mittal, M. L., MHD Boundary layer in a diverging channel, *Indian Journal of Technology* 22 (1984) 365-368.
 39. Gowda, G. Paran., Mittal, M. L., Gupta, G. P., Rohatgi, V. K., Effects of ionizational non-equilibrium on the electron density across the non-equilibrium MHD channel, *Energy Research* 8 (1984) 263-269.
 40. Mittal, M. L., Prahalad, Y. S., Alfvén-ion cyclotron instability in the presence of high frequency turbulence, *Nuclear Fusion* 24 (1984) 1129 - 1136.
 41. Masapati, G. H., Mittal, M. L., Unsteady magnetohydrodynamic flow with variable flow rate, *Indian Journal of Technology* 23 (1985) 119-122.
 42. Gupta, G. P., Rohatgi, V. K., Gowda, G. Paran., Mittal, M. L., Radiation and ionizational non-equilibrium effects on the electron number density in a non-equilibrium MHD duct, *Energy Conversion and Management* 25 (1985) 115-118.
 43. Gupta, G. P., Rohatgi, V. K., Gowda, G. Paran., Mittal, M. L., Radiative energy loss and the electric conductivity in a non-equilibrium MHD generator, *AIAA Journal of Propulsion and Power* 1 (1985) 211-215.
 44. James, M. I., Mittal, M. L., Gupta, G. P., Rohatgi, V. K., Electric Potential behavior in segmented Faraday-type MHD generators, *Energy Conversion and Management* 25 (1985) 211-215.
 45. Nataraja, H. R., Mittal, M. L., Rao, B. N., Boundary layer flow with variable tensor electric conductivity, *Acta Mechanica* 551 (1985) 211-215.
 46. Mittal, M. L., Gowda, G. Paran., Transport Coefficients of a chemically reacting plasma, *Journal of Applied Physics* 59 (1986) 1042-1047.
 47. Rao, B.N., Naidu, V. G., Mittal, M. L., Laminar MHD compressible boundary layer at a wedge, *International Journal of Engineering Science* 24 (1986) 1303-1310.

48. Mittal, M. L., Nataraja, H. R., Naidu, V. G., Fluid flow and heat transfer in a MHD duct, *International Journal of Heat and Mass Transfer* 30 (1987) 527-535.
49. Naidu, V. G., Mittal, M. L., Rao, B. N., Boundary layer heat transfer with electromagnetic fields, *Acta Mechanica* 68 (1987) 277-286.
50. Walton, E. K., Mittal, M. L., Estimation of the electromagnetic properties of dielectric material layers, *Journal of Wave-Material Interaction* 2 (1987) 123-134.
51. Gupta, G. P., Mittal, M. L., Convective instability of Alfvén-ion cyclotron waves in finite beta turbulent plasma with anisotropic ions, *Nuclear Fusion* 27 (1987) 1488-1491.
52. Naidu, V.G., Rao, K.S., Mittal, M.L., Rao, B.Nageswara, Laminar Compressible MHD Boundary Layers, *Forschung im Ingenieurwesen Bd.55* (1989) 196-198.
53. M. Kuthirakulathu, M. L. Mittal, and R. Shivpuri, Nonisothermal 3-D finite difference simulation of cavity filling during the die casting process, *Proceedings, 1991 ASME Winter Meeting, Atlanta, Georgia, (1991), 49 -62*
54. *U. Ghia and M. L. Mittal, Turbulent mixing for coal combustion, *Combustion Fundamentals and Applications - Proceedings of the 1991 Central State Section, (1991) pp. 65 - 71*
55. *R.H. Essenhigh and M.L. Mittal, Generalized flame profiles using simple kinetics, *Combustion Fundamentals and Applications - Proceedings, 1991 Central State Section, Combustion Institute, (1992) 98 - 101*
56. *C. F. Bender, R. H. Essenhigh, U. Ghia, and M. L. Mittal, Numerical simulation of pulverized coal combustion and emission, *Proceedings, 206th American Chemical Society, Division of Fuel Chemistry, (1993), 66-72*
57. *C. F. Bender, R. H. Essenhigh, A. M. Mescher, and M. L. Mittal, Behavior of coal particles in flames - A numerical simulation, *Proceedings, The Eleventh Annual International Pittsburgh Coal Conference, (1994), Sept. 12-16, 316-321*
58. *C. F. Bender, P. F. Buerger, R. H. Essenhigh, and M. L. Mittal, High performance computing and coal combustion research, *High Performance Computing-GRAND CHALLENGES IN COMPUTER SIMULATION, (1994), 64-69*
59. *C. F. Bender, R. H. Essenhigh, and M. L. Mittal, Numerical simulation of particle behavior in hot furnace atmosphere, *Combustion Research and Industrial Practice: From Equations to Equipment, (1995), Proceedings, American Flame Research Committee, 1-19*
60. *C. F. Bender, P. F. Buerger, M. L. Mittal, and T. J. Rozmajzl, Fluid Flow in an axisymmetric Sudden-Expansion Geometry, *Parallel Computational Fluid Dynamics: Implementation and Results using Parallel Computers, (1996), 363-370*
61. M. L. Mittal and T. J. Rozmajzl, Numerical simulation of two-phased fluid flow for combustion, (1996) *AIAA 96-0708 -An AIAA publication*
62. M.L. Mittal and R.H. Essenhigh, Particle Behavior in a Hot Furnace Atmosphere: A Numerical Simulation, (1997) Under review for publication
63. M.L. Mittal, and J.D. Schweickart, A Fluid Flow Simulation on MPP Platforms, *Proceedings of Eighth SIAM Conference on Parallel Processing for Scientific Computing, (1997) March 14-17, 1997 Minneapolis, Minnesota*
64. M. Mittal and C. Sharma, Estimates of Emissions of Trace Atmospheric Gases, Particulate Matter and Soot Carbon from Coal Fired Thermal Power Plants in India, (Accepted for publication in **Chemosphere**)
65. M. L. Mittal, C. Sharma, N. V. Iyer, and C. Y. Deshpande, Estimation of Exhaust Emissions from Vehicular Transport in India, (under review)
66. M. L. Mittal, P.G. Hess, S.L. Jain, B.C. Arya, and C. Sharma, Surface zone in the Indian Region, *Atmospheric Environment*, 41 (2007) 6572-6584
67. M. L. Mittal, Rita Pandey, and C. Sharma, Air Pollutants and Agricultural Productivity, (**Physiology and Molecular Biology of Plants, 14 (1) 2008**)
68. M. L. Mittal and C. Sharma, Surface Ozone Concentrations in the Indian region and its Impact on Agricultural Yields, (under review)

- The authors list in publications 54 to 60 is put in *alphabetical* order