C. V. of Dr. Bijoy S. Mazumder

1. **Name:** Professor Bijoy Singha MAZUMDER

2. **Name of the Institution:**
INDIAN STATISTICAL INSTITUTE (ISI), CALCUTTA

3. **Address**

(a) Official: **Physics and Applied Mathematics Unit**
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Indian Statistical Institute (ISI),
203 B. T. Road, Kolkata - 700 108, INDIA

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4. (a) **Subject:** Applied Mathematics (Fluid Mechanics)

(b) **Specialization:** Simulation of fluvial flows including turbulence and sediment transportation in rivers

(c) Areas of Research: **Turbulence and Sediment transport,**
Particle-size distributions, Flow over sand dunes,
Wave-current interactions,
Flow visualization and image processing,
Convection-diffusion process,

5. Educational Qualifications:

M. Sc. (Applied Math) Indian Institute of Technology (IIT), Kharagpur 1971
D. I. I. T. (Post-M. Sc) from IIT, Kharagpur, 1972
Ph. D. (Applied Mathematics, Fluid Mechanics) from IIT, Kharagpur 1976

6. Professional awards/honors received:

1. Awarded **CSIR JRF & SRF Fellowship** at I. I. T., Kharagpur, India.
2. Awarded **INSA P-D. Fellowship** at Indian Statistical Institute (ISI), Calcutta,
3. **DAAD & DFG Fellowships** to Universities of Karlsruhe and Stuttgart, Germany.
4. **G. M. Nawathe Award** (2002) for best paper in Hydro-2002, Indian Society for Hydraulics (ISH), Pune.
5. **Fellow** of Indian Society for Hydraulics (ISH), Pune.
6. **Founding Member,** World Association of Sedimentation and Erosion Research (WASER), Beijing, China.
7. **Reviewer** of different national and international reputed Journals.
8. **Member** of different National and International Societies (IAHR, WASER, ISTAM, ISH, CMS).
9. **S. N. Gupta Memorial Lecture** in Hydro-2009 at NIT, Jaipur, India.
10. **Invited talks** at IIT, Khargpur (2007, 2008, 2009), Bombay (2007).
11. **Series of Guest Lectures** at the University of Hong Kong, Hong Kong (2009).
12. **Series of invited talks** delivered at different universities in abroad from February to April 2010 **(California Institute of Technology (Caltech), Stanford University, University of California-Davis (UC-Davis), UC-Santa Barbara (UCSB), University of Illinois at Urbana-Champaign (UIUC), Rensselaer Polytechnic Institute (RPI), USA, Simon Fraser University (SFU) -Canada, and many others)**.
13. **Invited talk** at the 13th Asian Congress in Fluid Mechanics-2010 held at Dhaka, Bangladesh.
14. **Invited talk** at the Indo-US Bilateral Workshop on Sedimentation, Erosion, Flooding and Ecological Health of Rivers-2010 held at ISI, Calcutta.
15. **Series of talks** in 2011 on turbulence and sediment transport at I.I.T, Roorkee.
16. **Invited talks** in 2011 on Sediment transport processes at Snow and Avalanche Study Establishment (SASE), Ministry of Defense, Chandigarh, Punjab. .
17. **Editorial Board Member,** Inter. Jour. of Sediment Research, Elsevier Publishers.
18. **Theme Lecture (Invited)** on Resistance to flow due to roughness in rivers at Hydro-2011 held at SVNIT, Surat, India. (December, 2011)
19. **Invited talks** on sediment transport process at King's College, London (2011).
20. **Theme Lecture (Invited)** on flow characteristics over fluvial obstacle scour mark at Hydro-2012 held at IIT, Bombay, India (December 2012).
21. **Series of talks** in 2013 on turbulence and sediment transport at SVNIT, Surat. India

7. Professional activities:

1. **Visiting Scientist** (1984) at the University of Western Ontario (UWO), Canada; University of Minnesota, Minneapolis, USA.
2. **Research Associate** (1989-1992) at the University of Illinois at Urbana-Champaign (UIUC), Illinois, USA.
3. **Guest Scholar** (1994) at ICTP, Trieste, Italy to attend Fluid Mechanics Workshop.
4. **Guest Scholar** (2000) at Tsinghua University, Beijing, China.
5. **Guest Scientist** (2003) at the Technical University of Denmark, University of Sheffield, University of Nottingham, University of Cambridge, UK.
6. **Adjunct Professor** (2005) at Rensselaer Polytechnic Institute (RPI), Troy, NY, USA.
7. **Visiting Scientist** (2010) at Environmental Fluid Mechanics Laboratory, Stanford University, California, and at University of Illinois at Urbana-Champaign (UIUC), USA.
8. **Inducted sophisticated equipment and new techniques** to upgrade the 'Flume Laboratory' into a hi-tech "**Fluvial Mechanics Laboratory"** at ISI, Calcutta to carry on innovative research (interdisciplinary) in the field of turbulence, sediment transport and digital imaging.
9. **Successfully completed several research projects** from ISI, DST, CSIR, NBHM, and DOD on Sedimentological fluid dynamics and digital imaging along with statistician and geologists.
10. **Supervised several research students** (**6 Ph.D. awarded,** 6 Post-Doctoral fellows, 7 Project Assistants, 10 summer project students, at present 2 Ph.D. students working); and two Post-Doctoral students received **Fast Track Young Scientist Fellowship** from DST under his supervision in the Fluvial Mechanics Laboratory.

8. Teaching and Research Experiences:

Teaching experiences:

I love teaching and research. I can teach Calculus, Numerical analysis, Mathematical methods, Differential equations in undergraduate classes; and Advanced Calculus, Fluid Mechanics, Turbulence, Sediment transport to the Post-graduate research students, who are working for Ph.D. degree and also used to guide the Ph.D. scholars, Post-Doctoral Fellows, Project Linked Personal (PLP) and Project Assistants.

Complete list of publications, books, monographs etc.

(a) Papers accepted/published in journals:

1. Ghoshal K, Mazumder, R. Chakraborty, C. and Mazumder, B. S. (2013) Turbulence, suspension and downstream fining due to flow over sand-gravel beds. ***Int. Jour. of Sediment Research-Elsevier,*** **(Accepted).**
2. Bhattacharyya, A., Ojha, S. P. and Mazumder, B. S. (2013) Evaluation of the saltation process of bed materials by video-imaging under altered bed roughness. ***Earth Surface Processes and Landforms (ESPL),*** **DOI: 10.1002/esp.3370.**

3. Maity H. and Mazumder, B. S. (2012) Contributions of burst-sweep cycles to Reynolds shear stress over fluvial obstacle marks generated in laboratory flume, ***Int. Jour. of Sediment Research-Elsevier***, Vol. 27 (3), 378-387**.**
4. Debnath K., Manik M. K. and Mazumder B. S. (2012) Turbulence statistics of flow over scoured cohesive sediment bed around circular cylinder, ***Advances in Water Resources,*** Vol. 41, 18-28.
5. Mazumder, B. S. and Paul, S. (2012) Dispersion of settling particles in oscillatory turbulent flow subject to deposition and re-entrainment, ***European Journal of Mechanics- B/Fluids,*** Vol. 31, 80-90.
6. Mallik, L., Mazumder, R., Mazumder, B. S., Arima, M. and Chatterjee, P. (2012) Tidal rhythmites in offshore shale: A case study from the Palaeoproterozoic Chaibasa shale, eastern India and implications, ***Marine and Petroleum Geology,*** Vol. 30, 43-49.
7. Mazumder, B. S. and Paul, S. (2012), Dispersion of reactive species with reversible and irreversible wall reactions. ***Heat and Mass Transfer***, ***Springer-Verlag,*** Vol. 48 (6), 933-944. DOI 10.1007/s00231-011-0920-7.
8. Ghoshal, K., Purkait, B. and Mazumder, B. S. (2011) Size distributions in suspension over sand-pebble mixture: An experimental approach. ***Sedimentary Geology,*** Vol. 241, 3-12.
9. Mazumder, B. S., Maity, H. and Chadda, T. (2011) Turbulent flow field over fluvial obstacle marks generated in a laboratory flume, ***Int. Journal of Sediment Research,*** Vol. 26 (1), 62-77.
10. Paul, S. and Mazumder, B. S. (2011), Effects of nonlinear chemical reactions on transport coefficients associated with steady and oscillatory flows through a tube, ***Int. J. of Heat and Mass Transfer,*** Vol. 54, 75-85.
11. Ojha, S. P., and Mazumder, B. S. (2010), Turbulence characteristics of flow over a series of 2-D bed forms in the presence of surface waves, ***Journal of Geophysical Research (JGR)-Earth Surface,*** Vol. 115, F04016, doi: 10.1029/ 2008JF001203.
12. Ghoshal, K., Mazumder, B. S. and Purkait, B. (2010), Grain-size distributions of bed load: Inferences from flume experiments using heterogeneous sediment beds. ***Sedimentary Geology,*** 223(1-2), 1-14.
13. Paul, S. and Mazumder, B. S. (2009) Transport of reactive solutes in unsteady annular flow subject to wall reactions. ***European Journal of Mechanics- B/Fluids,*** 28, 411-419**.**
14. Mazumder, B. S., Pal, D. K., Ghoshal, K. and Ojha, S. P. (2009) Turbulence statistics of flow over isolated scalene and isosceles triangular-shaped bedforms. ***Jour. of Hydraulic Research, IAHR,*** 47(5), 626-637.
15. Paul, S. and Mazumder, B. S. (2008) Dispersion in unsteady Couette-Poiseuille Flows. ***Int. Jour. Engng. Sci.***, 46, 1203–1217.
16. Mazumder, B. S. and Pal, S. (2008) Dispersion in oscillatory Couette flow with absorbing boundaries. ***Int. J. Fluid Mech. Res.***, 35 (5) 475-492.
17. Ojha, S. P. and Mazumder, B. S. (2008) Turbulence characteristics of flow region over a series of 2D dune shaped structures, ***Advances in Water Resources,*** Vol. 31, 561-576.

18. Mazumder, B. S., Bhattacharya, A. and Ojha, S. P. (2008) Near-bed particle motion due to turbulent flow using image processing technique, ***Journal of Flow Visualization and Image Processing,*** Vol. 15(1), 1-15.
19. Mondal, K. K. and Mazumder, B. S. (2008) Dispersion of fine settling particles from an elevated source in an oscillatory turbulent flow, ***European Journal of Mechanics-B/Fluids,*** Doi: 10.1016/j. euromechflu.2007.11.005. 1-19.
20. Mazumder B.S. and Ojha S.P. (2007) Turbulence Statistics of flow due to wave-current interaction, ***Flow Measurements and Instrumentation***, Vol. 18, 129-138.
21. Ghoshal K. and Mazumder B.S. (2006) Velocity and concentration distribution in sediment-mixed fluid: An approach with mixing length concept, ***ISH Journal of Hydraulic Engng.,*** Vol. 12(3), 21-29.
22. Mzumder B.S., Das S.K. and Das S. N. (2006) Computation of return flows due to navigation traffics in restricted waterways, ***International Journal of Sediment Research,*** Vol. 21(4), 249-260.
23. Mazumder B.S., Pal D.K., Ghoshal, K. and Ojha S.P. (2006) Contributions of burst-sweep cycles to Reynolds shear stress over the waveform structures, ***ISH Journal of Hydraulic Engng,*** Vol. 12(2), 66-77.
24. Mazumder R. and Mazumder B.S. (2006) Statistical characterization of circulation patterns and direction of turbulent flow over a waveform structure, ***Environmetrics,*** Vol. 17(5), 417-434.
25. Mondal K.K. and Mazumder B.S. (2006) On dispersion of settling particles from an elevated source in an open-channel flow, ***J. Comput. Applied. Math.*** 193(1), 22-37.
26. Mazumder B.S. and Ghoshal K. (2006) Velocity and concentration profiles in uniform sediment-laden flow, ***Applied Mathematical Modelling,*** 30, 164-176.
27. Mazumder B.S. and Mondal K.K. (2005) On solute transport in oscillatory flow through an annular pipe with reactive wall and application to Catheterized artery, ***Quarterly J. Mech.and Applied Math. (QJMAM)****, 58(3),* 349-365.
28. Ghoshal K. and Mazumder B.S. (2005) Sediment-induced stratification in turbulent open-channel flow, ***Envirometrics,*** 16 (7), 673-686.
29. Mazumder B.S., Ghoshal, K. and Dalal, D.C. (2005) Influence of bed roughness on sediment suspension: Experimental and theoretical studies, ***J. of Hydraulic Research,IAHR***, 43(3), 245-257.
30. Mazumder B.S. and Mondal K.K. (2005) On solute dispersion in a pipe of annular cross- section with absorption boundary, ***Z. Angew. Math. Mech. (ZAMM),*** 85(6), 422-430.
31. Mazumder, B.S., Ray, RN and Dalal, D.C. (2005) Size distributions of suspended particles in open channel flow over sediment beds, ***Environmetrics,*** 16(2), 149-165.
32. Mondal, K. K. and Mazumder, B. S. (2005) On contaminant dispersion in pulsatile flow through a channel with absorbing walls, ***Int. J. of Non-Linear Mechanics,*** 40, 69-81.
33. Mazumder, B. S. and Dalal, D. C. (2003) Saltation layer of particles in water flows related to transport stage, ***Nordic Hydrology,*** 34(4), 343-360.
34. Mazumder, B. S. and Ghoshal, K. (2002) Velocity and suspension concentration in sediment mixed fluid, ***Int. Jour. of Sediment Research,*** 17(3), 219-231.
35. Mazumder, B. S. and Bandyopadhyay, S. (2001) On solute dispersion from an elevated line-source in an open channel flow, ***J. Engng. Math.,*** 40(2), 197- 209.

36. Ray, R. N. and Mazumder, B. S. (2001) Hall effects on hydromagnetic liquid falling flim, ***Int. J. Non-Linear Mechanics,*** 36, 1263-1267.
37. Mazumder, B. S. and Dalal, D. C. (2000) Contaminant dispersion from an elevated time-dependent source, ***J. Comput. Applied Maths.,*** 126(1-2),185-205.
38. Bandyopadhyay, S. and Mazumder, B. S. (1999) On contaminant dispersion in unsteady generalized Couette flow, ***Int. J. Eng. Sci.,*** 37, 1407-1423.
39. Bandyopadhyay, S. and Mazumder, B. S. (1999) Unsteady convective diffusion in pusatile flow through a channel, ***Acta Mechanica,*** 134(1-2), 1-16.
40. Dalal D.C. and Mazumder B.S. (1998) Unsteady convective diffusion in visco-elastic fluid flowing through a tube, ***Int. J. Non-linear Mechanics***, 33(1),135-150.
41. Bhowmik N.G., Xia R., Mazumder B.S. and Soong T.W. (1995) Return flows in rivers due to navigation traffic, ***J. Hydr. Engng., ASCE***, 121(12), 914-918.
42. Bhowmik N.G., Xia R., Mazumder B.S. and Soong T.W. (1995) Distribution of turbulent velocity fluctuations in a natural river***, J. Hydraul. Res., IAHR,*** 33, 649-661.
43. Mazumder, B. S. (1994) Grain-size distribution in suspension from bed materials, ***Sedimentology,*** 41, 271-277.
44. Mazumder, B. S. and Xia, R. (1994) Dispersion of pollutants in an asymmetric flow through a channel, ***Int. J. Engng. Sci.,*** 32(9), 1501-1510.
45. Mazumder, B. S., Bhowmik N. G. and Soong T.W. (1993) Turbulence in rivers due to a navigation traffic, ***J. Hydraulic Engng. ASCE,*** 119, 581-597.
46. Mazumder, B. S. and Das S. K. (1992) Effect of boundary reaction on solute dispersion in pulsatile flow through a tube, ***J. Fluid Mech.,*** 239, 523-549.
47. Mazumder, B. S. (1991) An exact solution of oscillatory Couette flow in a rotating system, ***Trans. ASME, J. Applied Mech.,*** 58, 1104-1107.
48. Ghosh, J. K., Sengupta, S. and Mazumder B. S. (1991) Experimental-theoretical approach to interpretation of grain-size frequency distributions, ***In: Principles, Methods and Applications of Particle Size Analysis,*** Syvitski, J.P.M. ed., Cambridge University Press, 1991, pp.264-279.
49. Mazumder, B.S. and Das S.K. (1989) Dispersion of contaminant in oscillatory flow through a pipe - Computation of moments, ***Acta Mechanica,*** 80, 151-156.
50. Das S.K. and Mazumder B.S. (1989) Dispersion of reactive solute in liquid flowing through a tube, ***Int. J. Engng. Sci.,*** 27(10), 1203-1209.
51. Mukherjee, A. and Mazumder, B. S. (1988) Dispersion of contaminants in oscillatory flows, ***Acta Mechanica,*** 74, 107-122.
52. Ghosh, J.K., Mazumder B.S. Saha M.R. and Sengupta S. (1986) Deposition of sand by suspension currents: Experimental and theoretical studies, ***J. Sedimentary Petrology,*** 56, 57-66.
53. Mukherjee A. and Mazumder B.S. (1986) Buoyancy effect on dispersion of solute in a flow through a horizontal channel, ***Acta Mechanica***, 58, 137-152.
54. Mazumder B.S. and Dandapat B.S. (1984) Unsteady free and forced convective diffusion, ***Int. J. Engng. Sci.,*** 22, 247-252.
55. Ghosh J.K., Mazumder B.S. and Sengupta S. (1981) Methods of computation of suspended load from bed materials and flow parameters, ***Sedimentology,*** 28, 781-791.

56. Mazumder B.S. (1981) Taylor diffusion for natural convective flow through a vertical channel, ***Int. J. Engng. Sci.***, 19, 771-777.
57. Ghosh J.K. and Mazumder B.S. (1981) Size distribution of suspended particles-unimodality, symmetry and lognormality, In: ***Statistical Distributions in Scientific Work,*** 6, 21-32.
58. Mazumder B.S. (1979) Dispersion of solute in combined free and forced convective flow through a channel, ***Acta Mechanica***, 32, 211-216.
59. Mazumder B.S. (1977) Combined effects of hall current and rotation on hydromagnetic flow over an oscillating porous plate, ***Int. J. Engng. Sci.,*** 15, 601-606.
60. Jana R.N., Mazumder B.S. and Datta N. (1977) MHD Couette flow and heat transfer in a rotating system, ***J. Phys. Soc. Japan,*** 42, 1034-1039.
61. Gupta, A.S. and Mazumder B.S. (1977) Taylor diffusion in a falling film of a non-Newtonian liquid, ***Int. J. Heat Mass Transfer,*** 20, 341-343.
62. Mazumder B.S. (1977) Effect of wall conductance on hydromagnetic flow and heat transfer in a rotating channel, ***Acta Mechanica,*** 28, 85-99.
63. Mazumder B.S., Gupta, A.S. and Datta, N. (1976) Flow and heat transfer in hydromagnetic Ekman layer on a porous plate with hall effects, ***Int. J. Heat Mass Transfer,*** 19, 523-527.
64. Mazumder B.S., Gupta, A.S. and Datta N. (1976) Hall effects on combined free and forced convective hydromagnetic flow through a channel ***Int. J. Engng. Sci.,*** 14, 285-292.
65. Mazumder B.S. and Datta N. (1976) Hall effects on hydromagnetic free convection past an infinite porous flat plate, ***J. Math. Phys. Sci.,*** 10, 59-68.
66. Mazumder B.S., Gupta, A.S. and Datta N. (1975) Hall effects on the flow of a conducting fluid past an oscillating porous plate, ***J. Technology,*** 19, 1-10.
67. Datta N. and Mazumder B.S. (1974) MHD source flow between two parallel porous disks one of which is rotating, ***Ind. J. Phys.,*** 48, 1105-1116.

Papers Submitted for publications:

68. Mazumder, B. S. and Sarkar, K. (2012) Turbulent flow characteristics and drag over 2-D forward facing dune-shaped structures with two different stoss-side slopes, **Communicated.**
69. Pal D. K. and Mazumder B. S. (2012) Mean flows and turbulence over trough regions between a pair of asymmetric and a pair of symmetric waveform structures, **Communicated.**
70. Maity H. and Mazumder, B. S. (2012). Turbulence statistics of flow over crescentic scour structures generated by short cylinders, **Communicated.**
71. Sarkar, K. and Mazumder, B. S. (2012) Turbulent flow and its spectral analysis over the trough region formed by a pair of adjacent forward facing waveform structures, **Communicated.**

Five more papers are on sediment-fluid interactions under preparation with students and will be submitted to the journals very soon.

(b) Chapters contributed to books:

1. Mazumder, B. S., Ghoshal, K. and Dalal D.C. (2004) Effect of bed roughness on suspended sediments, **In:** ***Shallow Flows,*** (Jirka & Uijttewaal eds), Balkema Publishers, Leiden, The Netherlands, 2004, pp.503-509.
2. Purkait, B. and Mazumder, B. S. (2000), Grain size distribution – a probabilistic model for Usri river sediment, Bihar, India, ***In: Stochastic Hydraulics,*** Wang & Hu (eds), Balkema, Rotterdam, 2000, pp.291-297.
3. Ghosh, J. K., Sengupta, S. and Mazumder B. S. (1991) Experimental-theoretical approach to interpretation of grain-size frequency distributions, ***In: Principles, Methods and Applications of Particle Size Analysis,*** Syvitski, J.P.M. ed., Cambridge University Press, 1991, pp.264-279.
4. Ghosh J.K. and Mazumder B.S. (1981) Size distribution of suspended particles-unimodality, symmetry and lognormality, In: ***Statistical Distributions in Scientific Work,*** 6, 21-32.

(c) Articles published in seminars, symposia, conference volumes,

1. Maity H. and Mazumder B. S. (2011) Plane-wise conditional shear stress statistics over scour marks generated in a laboratory flume, *Proc. HYDRO-2011 on Hydraulics and Water Resourses, Indian Society for Hydraulics (ISH),* SVNIT, Surat 2011, p. 517-524.
2. Mazumder, B. S. and Sarkar K. (2011) Turbulent flow over 2-D forward facing dunes of two different shapes. *Proc. HYDRO-2011 on Hydraulics and Water Resourses, Indian Society for Hydraulics (ISH),* Pune, SVNIT, Surat, 2011, p. 812-819.
3. Iyer K. S. S., Das S. K. and Mazumder B. S. (2006), Non-Markovian modelling of fluid flow: Moments and probability frequency representation, *Fluid Mech. in Industry and Environment, ISI, Kolkata,* (Dandapat & Mazumder eds), Research Publishing, 2006, pp.147-151.
4. Ghoshal, K. and Mazumder, B. S. (2005), Velocity and concentration distributions in a sediment-laden flow using modified mixing length, *HYDRO-2005, Indian Society for Hydraulics*, Pune, 2005, pp. 617-625.
5. Mazumder, B. S., Pal, D. K., Ghoshal, K. and Ojha, S. P. (2004), Turbulence characteristics over artificial waveforms and its implication on sediment transport, In: Proceedings of International Conference on *Hydraulic Engineering: Research and Practice*, 2004, I.I.T., Roorkee, pp. 204-214.
6. Mazumder, B. S., Pal, D. K., Ghoshal, K. and Ojha, S. P. (2004), Turbulent statistics of flow over waveform structures, *HYDRO-2004, Indian Society for Hydraulics,* Pune, 2004.
7. Ghoshal, K. and Mazumder, B. S. (2003), Stratification effects in a sediment-laden turbulent flow, *HYDRO-2003, Indian Society for Hydraulics, Pune,* 2003, pp. 161-165.
8. Mazumder, B. S. and Bandyopadhaya, S. (2003) Longitudinal dispersion of settling of particles in oscillatory turbulent shear flows, In: *Environmental Pollution,* Singh & Yadava (eds), Allied Publishers Pvt. Ltd., 2003, pp. 326-332.
9. Mazumder, B. S., Ghoshal, K. Mondal, K. K. and Pal, D. K. (2003), Measurements of turbulent flow over an artificial wave form in an open channel by 3-D Acoustic Doppler Velocimeter, *HYDRO-2003, Indian Society for Hydraulics,* Pune, 2003, pp. 398-405.

10. Bhattacharya, R. N., Dalal, D. C., Ghosh, J. K. and Mazumder, B. S. (2000), Comparison of diffusion based approaches to sediment transport with a stochastic interpretation, *In: Stochastic Hydraulics 2000*, Wang & Hu (eds), Balkema, Rotterdam, 2000, pp.255-261.
11. Mazumder, B. S. (1995) Bed roughness and saltating heights of particles over moving sand beds, *Proc. of 6th Int. Symp. on River Sedimentation*, New Delhi, 1995, pp.485-500.
12. Bhowmik, N. G., Soong, T. W. and Mazumder, B. S. (1992) Return flows in Large Rivers associated with navigation traffic, *Proc. of National Conference HY. DIV/ASCE,* Baltimore, MD, 1992, pp.760-765.
13. Mazumder, B. S., Bhowmik, N. G. and Soong, T. W. (1991), Turbulence and Reynolds stress distribution in a natural river, *Proc. of National Conference HY. DIV/ASCE,* Nashville, Tennesse, 1991, pp.906-911.
14. Bhowmik, N. G. and Mazumder, B. S. (1990), Physical forces generated by barge-tow traffic within a navigable waterway, *Proc. of the National Conference HY. DIV/ASCE,* San Diego, California, 1990, No. 1, pp.604-609.
15. Mazumder, B. S. (1990), Computation of grain-size distribution of suspended load from bed materials, *Proc. of Int. Conf. on Physical Modelling of Transport and Dispersion, M. I. T.*, Cambridge, USA, 1990, pp.118.1-118.6.
16. Mukherjee, A. and Mazumder, B. S. (1986), Diffusion in an oscillatory channel flow, *Proc. of 3rd Asian Congress of Fluid Mech.,*Tokyo-Japan, Matsui,T. ed., 1986, pp.252-255.
17. Ghosh, J. K., Mazumder, B. S., Saha, M. and Sengupta, S. (1984) Deposition from suspension: experimental and theoretical studies, *In: Stochastic Hydraulics, IAHR, Urbana*, Illinois, USA, 1984, pp.55-64.
18. Mazumder, B. S., Gupta, A. S. and Datta, N. (1976), Hydromagnetic flow due to blowing through a side of a vertical channel, *In: Bull. Adv. Math. Silver Jubilee year, Indian Institute of Technology,* Kharagpur, 1976.

(d) Books-authored or edited

1. **Ecological Health of Rivers-2010**, Edited by B. S. Mazumder and N. G. Bhowmik, Indian Statistical Institute Publications, (2010), pp. 1-297.
2. **Fluid Mechanics in Industry and Environment**, Edited by: B. S. Dandapat and B. S. Mazumder, *Research Publishing, Chennai,* (2006), pp. 1-293.

(e) Monographs / Reports

1. Mazumder, B. S., Ghoshal, K. and Dalal, D. C. (2001), Influence of bedroughness on sediment suspension: ISI Flume Laboratory Data, *Tech. Report no. PESD/Flume /2/ 2001, pp. 1-65.*
2. Bhowmik, N. G., Soong, D., Adams, J. R., Mazumder, B. S. and Xia, R. (1998), Physical changes associated with navigation traffic on the Illinois and Upper Mississippi Rivers, *Prepared by Illinois State Water Survey for U. S. G. S.,* E*nvironmental Management Technical Center, Onalaska, Wisconsin, July 1998,* LTRMP 98-S001, 205pp.
3. Bhowmik, N. G., Soong, D., Adams, J. R., Mazumder, B. S. and Xia, R. (1998),

Physical changes associated with navigation traffic on the Illinois and Upper Mississippi Rivers (Appendices), *Prepared by Illinois State Water Survey for U. S. Geological Survey,* Environmental Management Technical Center, Onalaska, Wisconsin, July 1998. LTRMP 98-S001 A. Appendices I-XXII.

4. Mazumder, B. S., Dittrich, A. and Koll, K. (1997), Measurement of velocity profiles over gravel-bed surfaces by Laser Doppler Anemometer (LDA), 1997, Report submitted *Institute fur Wasserbau, University of Karlsruhe, Germany*.
5. Ghosh, J. K., Mazumder, B. S. and Sengupta, S. (1979), Methods of computation of suspended load from bed materials and flow parameters, *Flume Project Tech. Rep. no. 1/79, Indian Statistical Institute,* Calcutta, pp.35.

9. Details of Ph.D. supervision:

1) **Koeli Ghoshal received Ph.D. (2004) from Jadavpur University on** "On velocity and suspension concentration in a sediment-laden flow: Experimental and theoretical studies"**.**
2) **Subhasis Bandyopadhaya received Ph.D. (2005) from Jadavpur University on** "On contaminant dispersion in laminar and turbulent flows".
3) **Kajal Kumar Mondal received Ph.D. (2006) from Jadavpur University on** "Mass transfer phenomena in steady and unsteady flows"**.**
4) **Satya Prakash Ojha received Ph. D. (2009) from Jadavpur University on** "Combined wave-current flow: An experimental & theoretical study with its implication on sediment transport".
5) **Suvadip Paul received Ph.D. (2010) from Jadavpur University on** "Dispersion phenomena in laminar and turbulent flows".
6) **Dibyendu Kumar Paul received Ph.D. (2012) from Jadavpur University on** "Investigations of flow and sediment movement affected by waveform structures".
7) **Haradhan Maity will submit the thesis for Ph.D. (2013) in Calcutta University on "**Turbulent flow field over fluvial obstacle marks: Experimental and theoretical studies".
8) **Kaushik Sarkar** is working for Ph.D. on forward facing dune like structures.

Six PD-Fellows and Seven Project Assistants worked with Professor Mazumder. Now Two Ph.D. students are working for their Ph.D.

10. Details of academic administrations:

1). **Worked as Head (2008-2011)** of the Physics and Applied Mathematics Unit (PAMU), ISI, Calcutta,
2)**. Worked as a Member** of Ph.D./D. Sc. Committee of Mathematics at ISI, Calcutta.
3). **Worked as Chairman** of Research Scholar Selection Committee at ISI, Calcutta
4). **Worked as Member** of Selection Committee of Research Scholars.
5). **Worked as Organizing Secretary** of several International Conferences /Workshops held at ISI, Calcutta.
6). **Worked as In-Charge** of the Fluvial Mechanics Laboratory at ISI, Calcutta.
7)**. Working as Principal Investigator (PI)** of several Research Projects.

8). **Worked as Examiner** of Several Ph.D. thesis,
9). **Worked as External Expert** in Selection Committees in several institutes/Universities.
10). **Working as External Expert** to the Study Team in **Kolkata Port Trust.**

11. Development of Fluvial Mechanics Laboratory and interdisciplinary research activities at ISI Calcutta:

Soon after his Ph.D. Degree (1976) from the Indian Institute of Technology (IIT), Kharagpur in Applied Mathematics (Fluid Mechanics), Bijoy S. Mazumder joined the Indian Statistical Institute (ISI), Calcutta to work on the problems of sedimentological fluid dynamics with Professor Supriya Sengupta, Geologist and Professor J. K. Ghosh, Statistician. Since then, he has been working on various problems in Applied Fluid Mechanics of inter-disciplinary nature, in the areas of **Particle-size distributions, Turbulence, Fluvial sediment transport, Wave-current interactions, Convection-diffusion process, Flow visualization and image processing, Navigation hydraulics.** He took initiatives and was instrumental to upgrade the existing laboratory, named as **Fluvial Mechanics Laboratory (FML)** at ISI Calcutta with sophisticated equipment (like 3-D Micro acoustic Doppler velocimeters (ADV), Ott Laboratory Current meter, High-speed Motion Scope (HSMS) Camera of 1000fps, Electromagnetic discharge meters (EDM), Acoustic Bed Profiler (ABP) with 24 transducers, C. C. D. Camera, Wave-maker & Wave-absorber, etc), which provide the measurements for experimental fluid mechanics to study turbulence and sediment transport. **He has developed a hi-tech laboratory to elucidate various processes pertaining to geological processes of sedimentation in a basin.** Financial support had been provided by ISI, INSA, DST, DOD, NBHM and CSIR. Gradually the laboratory has achieved its fame nationally and internationally for its outstanding works with respect to the objectives of carrying out interdisciplinary research on statistical, geological, mathematical and experimental fluid mechanics work associated with sediment-fluid interactions and various kinds of sediment transport problems. Scientists from India and abroad often come to visit the laboratory and show their interest on the well-equipped laboratory set up, the standard scientific data and the published works in international reputed journals. The methodologies used for the above investigations are related to the applied fluid mechanics, statistics, geology, and hydraulic engineering; and the results of these investigations are of use to sedimentologists, geographers, hydraulic engineers and oceanographers interested in turbulence, sediment transport, and bedform dynamics. Now he is in a position to use the innovative ideas to the large river systems, like Bhagirathi River, in collaboration with Dr. Nani G. Bhowmik, River Engineer, Illinois State Water Survey, University of Illinois at Urbana-Champaign (UIUC), USA.

Moreover, mass transport phenomena in laminar and turbulent flows with or without suspended particles have been one of Mazumder's major areas of research. These are the work with his research scholars leading to joint publications. The stream-wise dispersion of tracer materials released in an oscillatory flow through an annular pipe (termed as catheterized artery) with reversible and irreversible reaction has been studied analytically using a method of homogenization. Numerical simulations have been made by Mazumder

jointly with his students to investigate the stream-wise dispersion of passive contaminant molecules released in a time-dependent laminar / turbulent flows through a tube/channel in presence of boundary absorption or a catalytic reaction at the wall, which causes a depletion of contaminant in the flow. It was shown how the mixing of cross-sectional integrated concentration of contaminant molecules is influenced by the frequency of pressure pulsation and the heterogeneous reaction at the boundary. The mean concentration distribution is approximated by Edgeworth series expansion using the first four central moments. The problem initially was studied in connection with the boundary absorption or detention, which causes the depletion of contaminants in the flow. Later it was found many important applications in physiological fluid dynamics, chemical and biomedical engineering. The results of the above studies are useful to the medical practitioners working in the domain of catheterized artery.

Mazumder has been receiving continuously the financial support for research projects from the Earth Systems Science (ESS) of the DST and Physical Sciences and Engineering Sciences of CSIR. He visited several places in India and abroad; and interacted with different scientists of different disciplines.

12. Details of participation of internally and externally funded projects during last 6 years:

1) Project Title: Turbulent and incipient suspensions due to bursting and their sedimentological implications: An experimental study.

Investigator(s)
(a) Professor B.S.Mazumder (P.I.), ISI, Calcutta
(b) Professor J.K. Ghosh, ISI, Calcutta
(c) Professor Chandan Chakraborty, ISI, Calcutta
Project Status: **Completed** (Duration from November 2002 - October 2006)
Funding Agent: **DST New Delhi, Total Cost: Rs. 25.77 Lakhs**.

2) Project Title: Influence of bedforms on turbulent characteristics and its implications to sedimentology: An experimental study.
Investigator(s)
(a) Professor B.S.Mazumder (P. I.), ISI, Calcutta
(b) Professor J.K. Ghosh, ISI, Calcutta
(c) Professor Chandan Chakraborty, ISI, Calcutta

Project Status: **On-going** (Date of start: 01/09/2008 to continuing)
Funding Agent: **DST New Delhi, Total Cost: About Rs. 36.00 Lakhs** till now, and one more year is extended with financial support up to September 2013.

3) Project Title: Image–processing technique to study the particle behavior in the near-wall region of turbulent open-channel flow.
Principal Investigator: Professor B. S. Mazumder, ISI, Calcutta

Project Status: **Completed** (Duration from 06/09/2006 to Sept. 2009).
Funding Agent: **CSIR New Delhi, Total Cost: About Rs. 8.00 Lakhs.**

4) Project Title: Particle-fluid interactions at turbulent boundary layer flow over smooth/rough surface using digital imaging techniques.

Principal Investigator: Professor B. S. Mazumder, ISI, Calcutta

Project Status: **On-going** (Date of Commencement: 19/01/2010 to……).
Funding Agent: **CSIR New Delhi, Total Cost: About Rs. 10.00 Lakhs**

5) Project Title: Sediment transportation and deposition under combined wave and unidirectional currents: experimental and theoretical studies.

Principal Investigator: Professor B. S. Mazumder, ISI, Calcutta

Project Status: **Completed** (Duration from 1/4/2006 to 31/03/10)
Funding **Agent: ISI Calcutta, Total Cost: About Rs. 14.00 Lakhs**

6) Project Title: Experimental investigations on the genesis of obstacle marks and their implications for the generation of current crescents
Principal Investigator: Professor B. S. Mazumder, ISI, Calcutta

Project Status: **On-going** (Date of start: 01/04/2010 upto 31/10/2011)
Funding Agent: **ISI Calcutta, Total Cost: About Rs. 10.00 Lakhs.**

IMPORTANCE of the projects: *These significant contributions have great potential relevance to the applications for the solution of practical problems in the field of river sedimentation (both geologically ancient and modern), siltation of reservoir, deciphering of palaeo-hydraulic conditions from the grain-size distribution of deposits and the fluvial obstacle scour marks preserved in the geological record, estimation of suspended load from heterogeneous sediment beds of different bed roughness, influence of 'secondary points of separation' on stream bank erosion, impact of river traffic on sediment concentration, bank erosion and aquatic life, and influence of contaminants on biological processes. The results of these papers generate extremely encouraging responses from geologists, fluid dynamists, statisticians, geographers and engineers for development of judicious theoretical modeling and verification with the experimental data.*

13. Scientific review:

Mazumder has reviewed manuscripts of scientific papers for the following journals:

1. Journal of Applied Mechanics, Trans. ASME
2. Sedimentology
3. International Journal of Sediment Research
4. Journal of Hydraulic Engineering, ASCE
5. Calcutta Mathematical Society
6. Journal of Technology

7. Chemical Engineering Communications
8. Acta Mechanica
9. Advances in Water Resources
10. Environmetrics
11. Journal of Heat and Mass Transfer
12. Indian Journal of pure and Applied Mathematics,
13. Meccanica
14. European Journal of Mechanics B/Fluid
15. Journal of Hydrological Engineering, ASCE
16. Applied Mathematics Letter,
17. River Research and Application
18. International Journal of Heat and Mass Transfer
19. Environmental Fluid Mechanics
and lot of others.