SANTABRATA CHAKRAVARTY

Designation: Professor of Mathematics

Affiliation: Department of Mathematics
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Date of Birth: April 08, 1955

Educational Qualifications: M.Sc., D.I.I.T., Ph.D.

Specializations: Biomechanics, Bio-fluid Mechanics, Continuum Mechanics, Mathematical Ecology / Biology

Title of Ph. D. Thesis: Studies on the Biomechanics of the Cranial Vault

Research Advisor: Professor J. C. Misra

Research Project (UGC Sponsored) Completed: "Studies on the Mechanics of Arterial System" (during 1988 – 1991)

Academic Records:

Exams. Passed	College/ Institute	Subject	Year	Class / Grade
B. Sc. (Hons.)	Burdwan Raj College (Under The University of Burdwan)	Mathematics	1975	FIRST CLASS
M. Sc.	IIT Kharagpur	Mathematics	1977	FIRST CLASS
D.I.I.T.	IIT Kharagpur	Mathematics (Plasticity & Rheology)	1978	GRADE A
Ph. D. (Sc.)	IIT Kharagpur	Mathematics	1983	

Memberships of Academic Bodies:

- American Mathematical Society (AMS)
- Calcutta Mathematical Society (CMS)

Publications in Refereed Journals:

Journal of Biomechanics, Rheologica Acta, Acta Mechanica, International Journal of Engineering Science, International Journal of Nonlinear Mechanics, Archiv of Applied Mechanics, Mathematical and Computer Modelling, Journal of Mechanics in Medicine and Biology, Journal of Medical Engineering and Technology, Journal of Computational and Applied Mathematics, Journal of Applied Mathematics and Physics (ZAMP), Applied Mathematics and Computation, International Journal of Computer Mathematics, Korea-Australia Rheology Journal, Journal of Applied Mathematics and Applications, Mathematical Modelling and Analysis, The Australian Journal of Mathematical Analysis and Applications, International Journal of Heat and Mass Transfer, Computer Methods in Biomechanics and Biomedical Engineering, International Journal of Computational Methods, Computers in Biology and Medicine, Journal of Computer and Mathematics with Applications, International Journal for Numerical Methods in Fluids, Mathematical Biosciences, International Journal of Ecological Economics and Statistics, Nonlinear Analysis Modelling and Control

Reviewer of International Journals:

- **Journal of Mechanics in Medicine and Biology**
- **Mathematical Modeling and Analysis**
- **Medical Engineering and Physics**
- **Numerical Methods for Partial Differential Equations**
- **Applications and Applied Mathematics**
- **International Journal of Biomathematics**
- **Computers and Mathematics with Applications**
- **Chemical Engineering Communications**
- **Journal of Biomechanics**

Research Publications:

- **Sarifuddin, *S. Chakravarty* and P. K. Mandal : Numerical simulation of Casson fluid flow through differently shaped arterial stenoses , ZAMP (Accepted on October 2013).**

- **M. Haque, N. Ali and S. Chakravarty: Study of a Tri-trophic Prey-dependent Food Chain Model of Interacting Populations, Mathematical Biosciences (Accepted on July, 2013).**

- **Sarifuddin, S. Chakravarty and P. K. Mandal: Physiological Flow of Shear-Thinning Viscoelastic Fluid Past an Irregular Arterial Constriction, Korea Australia Rheology Journal , Vol.25, No.3, 163 – 174 (2013).**

- **S. Rahman and *S. Chakravarty:* A Predator-Prey Model with Disease in Prey, Nonlinear Analysis: Modeling and Control, Vol.18, No.2, 191 - 209 (2013).**

- **Sarifuddin, *S. Chakravarty* and P. K. Mandal : Heat Transfer to Micropolar Fluid Flowing Through an Irregular Arterial Constriction, International Journal of Heat and Mass Transfer, Vol.56, 538 - 551 (2013).**

- **S. Rahman and S. Chakravarty : Persistence and Global Stability Analysis of an Eco-epidemiological Model of the Salton Sea, International Journal of Ecological Economics and Statistics , Vol. 30, No. 3, 83 – 102(2013).**

- **S. Sen and *S. Chakravarty*: A Theoretical Study on Constricted Flow Phenomena in Arteries, Korea Australia Rheology Journal , Vol. 24, 287 - 295 (2012).**

- **Md. A. Ikbal, *S. Chakravarty,* Sarifuddin and P. K. Mandal : Unsteady Analysis of Viscoelastic Blood Flow Through Arterial Stenosis. Chemical Engineering Communications , Vol. 199, 40 – 62 (2012).**

- **Md. A. Ikbal, *S. Chakravarty,* Sarifuddin and P. K. Mandal : Numerical Simulation of Mass Transfer to Micropolar Fluid Flow Past a Stenosed Artery, International Journal for Numerical Methods in Fluids , Vol. 67, Issue 11, 1655 – 1676 (2011).**

- **N. Mustapha, N. Amin, *S. Chakravarty* and P. K. Mandal : Unsteady Magnetohydrodynamic Blood Flow Through Irregular Multi-stenosed Arteries. Computers in Biology and Medicine,Vol. 39 (2009), 896 -906.**

- **Md. A. Ikbal, *S. Chakravarty* and P. K. Mandal : Two-Layered Micropolar Fluid Flow Through Stenosed Artery: Effect of Peripheral Layer Thickness. Journal of Computer and Mathematics with Applications,Vol. 58 (2009), 1328 – 1339.**

- **Sarifuddin, *S. Chakravarty* and P. K. Mandal : Effect of Heat and Mass Transfer of Non-Newtonian Flow -- Links to Atherosclerosis. International Journal of Heat and Mass Transfer, Vol. 52 (2009), 5719 - 5730.**

- **Sarifuddin, *S. Chakravarty* and P. K. Mandal : Effect of Asymmetry and Roughness of Stenosis on Non-Newtonian Flow Past an Arterial Segment. International Journal of Computational Methods, Vol. 6 (2009), 361 – 388.**

- ***S. Chakravarty* and S. Sen : A Mathematical Model of Blood Flow in a Catheterized Artery With a Stenosis. Journal of Mechanics in Medicine and Biology, Vol. 9 (2009), 377 - 410 .**

- **S. Sen and *S. Chakravarty* : Dynamic Response of Wall Shear Stress on the Stenosed Artery. Computer Methods in Biomechanics and Biomedical Engineering, Vol. 12 (2009), 523 - 529.**

- **Md. A. Ikbal, *S. Chakravarty*, Kelvin, K. L. Wong, J. Mazumdar and P. K. Mandal : Unsteady Response of Non-Newtonian Blood Flow Through a Stenosed Artery in Magnetic Field. Journal of Computational and Applied Mathematics, Vol. 230 (2009), 243 - 259.**

- **Sarifuddin, *S. Chakravarty*, P. K. Mandal and H. I. Andersson : Mass Transfer to Blood Flowing Through Arterial Stenosis. Zeitschrift Fur Angewandte Mathematik Und Physik (ZAMP), Vol. 60 (2009), 299 - 323.**

- ***S. Chakravarty* and S. Sen : Analysis of Pulsatile Blood Flow in Constricted Bifurcated Arteries with Vorticity - Stream Function Approach. Journal of Medical Engineering and Technology, Vol. 32 (2008), 10 - 22.**

- **N. Mustapha, *S. Chakravarty*, P. K. Mandal and N. Amin : Unsteady Response of Blood Flow Through a Couple of Irregular Arterial Constrictions to Body Acceleration. Journal of Mechanics in Medicine and Biology, Vol. 8 (2008), 395 - 420.**

- **Md. A. Ikbal, *S. Chakravarty* and P. K. Mandal : An Unsteady Peristaltic Transport Phenomenon of Non-Newtonian Fluid -- A Generalised Approach. Applied Mathematics and Computation, Vol. 201 (2008), 16 - 34.**

- **Sarifuddin, *S. Chakravarty*, P. K. Mandal and G. C. Layek : Numerical Simulation of Unsteady Generalised Newtonian Blood Flow Through Differently Shaped Distensible Arterial Stenoses. Journal of Medical Engineering and Technology, Vol. 32 (2008), 385 - 399.**

- **S. Sen and *S. Chakravarty* : A Nonlinear Unsteady Response of Non-Newtonian Blood Flow Past an Overlapping Arterial Constriction. Journal of Mechanics in Medicine and Biology, Vol. 7 (2007), 463 - 489.**

- **P. K. Mandal, *S. Chakravarty* and A. Mandal : Numerical Study on the Unsteady Flow of Non-Newtonian Fluid Through Differently Shaped Arterial Stenoses. International Journal of Computer Mathematics, Vol. 84 (2007), 1059 - 1077.**

- ***S. Chakravarty*, P. K. Mandal, A. Mandal and N. Amin : Effect of Body Acceleration on Unsteady Pulsatile Flow of Non-Newtonian Fluid Through a Stenosed Artery. Applied Mathematics and Computation, Vol. 189 (1) (2007), 766 - 779.**

- ***S. Chakravarty*** **and S. Sen : Analysis of the Flow-Field in Stenosed Bifurcated Arteries Through a Mathematical Model. The Australian Journal of Mathematical Analysis and Applications, Vol. 3 (2006), 1 - 23.**

- ***S. Chakravarty*** **and S. Sen : A Mathematical Model of Blood Flow and Convection Diffusion Processes in Constricted Bifurcated Arteries. Korea Australia Rheology Journal, Vol. 18 (2006), 51 - 65.**

- ***S. Chakravarty*** **and S. Sen : Dynamic Response of Heat and Mass Transfer in Blood Flow Through Stenosed Bifurcated Arteries. Korea Australia Rheology Journal, Vol. 17 (2005), 47 - 62.**

- ***S. Chakravarty*****, P. K. Mandal and Sarifuddin : Effect of Surface Irregularities on Unsteady Pulsatile Flow in a Compliant Artery. International Journal of Nonlinear Mechanics, Vol. 40 (2005), 1268 - 1281.**

- **J. C. Misra and *S. Chakravarty* : Modelling of Head Impact Problems, Ch. I Edited Vol. "Mathematical Models for Bioengineerng and Probabilistic Systems", J. C. Misra (Editor), Narosa Publishing House, New Delhi (India), pp 1 - 26 (2005).**

- ***S. Chakravarty*****, Sarifuddin and P. K. Mandal : An Unsteady Flow of Two-Layered Blood Stream Past a Tapered Flexible Artery Under Stenotic Conditions. Computational Methods in Applied Mathematics, Vol. 4 (2004), 391 - 409.**

- ***S. Chakravarty*****, P. K. Mandal and A. Mandal : Numerical Simulation of Unsteady Two-Layered Pulsatile Blood Flow in a Stenosed Flexible Artery : Effect of Peripheral Layer Viscosity. Mathematical Modelling and Analysis, Vol. 9 (2004), 99 - 114.**

- ***S. Chakravarty*****, P. K. Mandal and A. Mandal : Mathematical Model of Pulsatile Blood Flow in a Distensible Aortic Bifurcation Subject to Body Acceleration. International Journal of Engineering Science, Vol. 38 (2004), 215 - 238.**

- ***S. Chakravarty*** **and P. K. Mandal : Two-Dimensional Blood Flow Through Tapered Arteries Under Stenotic Conditions. International Journal of Nonlinear Mechanics, Vol. 35 (2000), 779 - 793.**

- ***S. Chakravarty*** **and A. K. Sannigrahi : A Nonlinear Mathematical Model of Blood Flow in a Constricted Artery Experiencing Body Acceleration. Mathematical and Computer Modelling, Vol. 29 (1999), 9 - 25.**

- ***S. Chakravarty*** **and A. K. Sannigrahi : An Analytical Estimate of the Flow-**

Field in a Porous Stenotic Artery Subject to Body Acceleration. International Journal of Engineering Science, Vol. 36 (1998), 1083 - 1102.

- ***S. Chakravarty*** **and P. K. Mandal : An Analysis of Pulsatile Flow in a Model Aortic Bifurcation. International Journal of Engineering Science, Vol. 35 (1997), 409 - 422.**

- ***S. Chakravarty*** **and P. K. Mandal : A Nonlinear Two-Dimensional Model of Blood Flow in an Overlapping Arterial Stenosis Subject to Body Acceleration. Mathematical and Computer Modelling, Vol. 24 (1996), 43 - 58.**

- ***S. Chakravarty*****, A. Datta and P. K. Mandal : Effect of Body Acceleration on Unsteady Flow of Blood Past a Time-Dependent Arterial Stenosis. Mathematical and Computer Modelling, Vol. 24 (1996), 57 - 74.**

- ***S. Chakravarty*****, A. Datta and P. K. Mandal : Analysis of Nonlinear Blood Flow in a Stenosed Flexible Artery. International Journal of Engineering Science, Vol. 33 (1995), 1821 - 1837.**

- ***S. Chakravarty*** **and P. K. Mandal : Mathematical Modelling of Blood Flow Through an Overlapping Arterial Stenosis. Mathematical and Computer Modelling, Vol. 19 (1994), 59 - 70.**

- ***S. Chakravarty*** **and A. K. Sannigrahi : Effect of Body Acceleration on the Blood Flow in an Irregular Stenosed Artery. Mathematical and Computer Modelling, Vol. 19 (1994), 93 - 103.**

- ***S. Chakravarty*** **and A. Datta : Dynamic Response of Stenotic Blood Flow in Vivo. Mathematical and Computer Modelling, Vol. 16 (1992), 3 - 20.**

- ***S. Chakravarty*** **and A. Datta : Pulsatile Blood Flow in a Porous Stenotic Artery. Mathematical and Computer Modelling, Vol. 16 (1992), 35 - 54.**

- ***S. Chakravarty*** **and B. Laha : Effects of Twist on the Generated Stress Field in an Artery. Archiv of Applied Mechanics, Vol. 62 (1992), 73 - 82.**

- ***S. Chakravarty*** **and A. Datta : Dynamic Response of Arterial Blood Flow in the Presence of Multistenoses. Mathematical and Computer Modelling, Vol. 13 (1990), 37 - 55.**

- ***S. Chakravarty*** **and A. Datta : Effects of Stenosis on Arterial Rheology Through a Mathematical Model. Mathematical and Computer Modelling, Vol. 12 (1989), 1601 - 1612.**

- ***S. Chakravarty*** **and A. Ghosh Chowdhury : Response of Blood Flow Through**

an Artery Under Stenotic Condition. Rheologica Acta, Vol. 27 (1988), 418 - 427.

- ***S. Chakravarty* : Pulsatile Blood Flow Through Arterioles. Rheologica Acta, Vol. 26 (1987), 200 - 207.**

- ***S. Chakravarty* :Effects of Stenosis on the Flow Behaviour of Blood in an Artery. International Journal of Engineering Science, Vol. 25 (1987), 1003 - 1016.**

- **J. C. Misra and *S. Chakravarty* : Flow in Arteries in the Presence of Stenosis. Journal of Biomechanics, Vol. 19 (1986), 907 - 918.**

- **J. C. Misra and *S. Chakravarty* : Dynamic Response of a Head-Neck System to an Impulsive Load. Mathematical Modelling, Vol. 6 (1985), 83 - 96.**
- **J. C. Misra and *S. Chakravarty* : A Poroelastic Spheroidal Shell Model for Studying the Problem of Head Injury. Journal of Mathematical Analysis and Applications, Vol. 103 (1984), 323 - 343.**

- **J. C. Misra and *S. Chakravarty* : A Study on Rotational Brain Injury. Journal of Biomechanics, Vol. 17 (1984), 459 - 466.**

- **J. C. Misra and *S. Chakravarty* : Dynamic Response of Arterial Walls in Vivo. Journal of Biomechanics, Vol. 15 (1982), 317 - 324.**

- **J. C. Misra and *S. Chakravarty* : A Free Vibration Analysis for the Human Cranial System. Journal of Biomechanics, Vol. 15 (1982), 635 - 645.**

- **J. C. Misra and *S. Chakravarty* : Stability of Fluid-Filled Shells --- Mathematical Models for Human Head. Acta Mechanica, Vol. 44 (1982), 159 - 168.**

- **J. C. Misra and *S. Chakravarty* : Effect of Solar Radiation on Human Head. International Journal of Engineering Science, Vol. 20 (1982), 445 - 454.**

- **J. C. Misra and *S. Chakravarty* : Study of Compressibility in Vascular Rheology. Rheologica Acta, Vol. 19 (1980), 381 - 388.**

- **J. C. Misra, *S. Chakravarty* and K. Roychoudhury: An Analytical Estimate of the Wall Stresses in Carotid Arteries, Proc. Silver Jubilee Congress, ISTAM, December 17 – 20 (1980), pp 176 – 178.**

Supervised Ph. D. Theses:

- **" SOME ANALYTICAL STUDIES ON STENOSED BLOOD VESSELS ", Written by *Dr. ANANTADEB DATTA* (1991)**

- **" SOME ANALYTICAL STUDIES ON BIORHEOLOGICAL ASPECTS OF BLOOD FLOW THROUGH THE ARTERIES UNDER STENOTIC CONDITIONS ", Written by *Dr. PRASHANTA KUMAR MANDAL* (1995)**

- **" SOME MATHEMATICAL MODELS OF STENOSED ARTERIAL BLOOD FLOW ", Written by *Dr. ASHIS KUMAR SANNIGRAHI* (1998)**

- **"STUDIES ON MATHEMATICAL MODELS OF ARTERIOSCLEROTIC BLOOD FLOW ", Written by *Dr. ARABINDA MANDAL* (2007) (Awarded in May 2008)[Jointly With Dr. P. K. Mandal]**

- **" SOME STUDIES ON THE BIOMECHANICS OF THE ARTERIAL BIFURCATION THROUGH MATHEMATICAL MODELS ", Written by *Dr SUBIR SEN* (2007) (Awarded in April 2008)**

- **" SOME PROBLEMS OF THE BIOMECHANICS OF BLOOD FLOW IN ARTERIES ", Written by *Dr. SARIFUDDIN* (2008) [Jointly With Dr. P. K. Mandal] (Awarded in December 2009)**

- **" SOME MODEL STUDIES ON NON-NEWTONIAN BIOFLUID FLOW THROUGH BLOOD VESSELS ", Written by Dr. Md. Asif Ikbal (2010) [Jointly With Dr. P. K. Mandal](Submitted on Aug. 22, 2010)(Awarded in March 2011)**

Supervised M. Sc. Project Work:

- **"*Dynamic Response of an Eco-Epidemiological Model System" by* Shambo Shekhar Ghosh (2013 –2014) (Communicated for Publication)**

- **"*A Prey-Predator Model System with a Prey Refuge" by* Pradip Das (2013 – 2014)**

- **" *Stability Analysis of a Prey-Predator Model System with Dormancy of Predator " by* Suchitra Pal (2013 – 2014)**

- **" *Dynamical Complexity of a Prey-Predator Model System"* by Jharna Mal (2013 – 2014)**