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Area of Interest : Mathematical Modeling, Biomechanics, Synovial joint Mechanics,
Cardiovascular dynamics.

Educational Qualifications:

Ph.D.- Mathematics, HBTI Kanpur (Kanpur University) – 1988

M.Sc.- Mathematics, Kanpur University – 1985

B.Sc.- Mathematics, Physics & Electronics, Kanpur University – 1983

Thesis Title: Analytical study of flow and diffusion in modeled physiological systems.

Supervisor: Prof. P.N. Tandon.

Professional Expeirnce:

- | | |
|-----------------------------------|---|
| (i) As J.R.F. | Pay Rs. 800 (Fixed) +H.R.A. |
| Duration | 6th Jan 1986-25th Nov.1987 |
| Organization | H.B.T.I. Kanpur in the Project “Large scale mathematical modeling in Biomedical systems” sponsored by D.S.T. New Delhi in Mathematics |
| (ii) As Scientist | Pay scale Rs.2200-4000/- |
| Duration | 25th Nov.1987(AN)-7th April |
| Organization | H.B.T.I. Kanpur in the Project “Large scale mathematical modeling in Biomedical systems” sponsored by D.S.T. New Delhi in Mathematics |
| (iii) As Lecturer | In Mathematics Deptt. H.B.T.I. Kanpur |
| Duration | 7th April 1989-6th April 1994 |
| Scale | Rs.2200-4000/- |
| (iv) As Senior Lecturer | In Mathematics Deptt. H.B.T.I. Kanpur |
| Duration | 7th April 1994-6th April 1999 |
| Scale | Rs.10,000-15,200/- |
| (v) As Assistant Professor | In Mathematics Deptt. H.B.T.I. Kanpur |
| Duration | 7th April 1999-continuing |
| Scale | Rs.12,000-18,300/- |

Teaching Experience:

More than 20 years experience.

Specialization in Teaching:

1. Engineering Mathematics
2. Advanced Engineering Mathematics
3. Numerical Analysis
4. Computer Based Numerical & Statistical Techniques
5. Computational Methods

Projects Undertaken:

1. Sponsored research project from Sikander Tanners Ltd. Kanpur

Title of the Project Some problems on heat and mass transfer in Bio System
Period Two Years (Completed)
Amount of Grant Rs. 20,000-]

2. Major research project sponsored by UGC

Title of the Project Mathematical Modeling of the microcirculation.
Period Three Years (Running)
Amount of Grant Rs. 4,82,800-]

Administrative Experience: As Head of Mathematics Department (Three years)
 As Incharge of Mathematics Department(more than one year).
 As Chairperson & Member of BOS (Maths)
 As Member of Academic Council
 As Member of various selection committees

Publications:**A. Books:**

P.N.Tandon,A.K.Kulshrestha and Rekha Agarwal (1987) "Rheological Study of Laminar-Turbulent transition in drag reducing polymeric solution" A Chapter published in Vol. VII. "Rheology and non Newtonian flows" in **Encyclopedia of Fluid Mechanics, Gulf Publishers New Jersey, U.S.A.** Chapter, 15, Page No. 459-477.(1987).

B. Research Papers .

Sl.No.	Title of Paper	Authors	Name & Vol.of Journal&Year	Page no.
1.	Microstructural effects on blood flow through tube with small developing stenosis.	P.N.Tandon and Rekha Agarwal	J. of the Institution of Engr. India, 1986.	
2.	Flow of viscous fluid in	P.N.Tandon	A simple model for human	74-85

	a contracting or expanding pipe.	and Rekha Agarwal	bronchial tube, GANITA 37(2), 1986	
3.	A new model for gel formation on Cartilageous surfaces in normal and pathological states	P.N.Tandon and Rekha Agarwal	Proc. of Fluid Mechanics and fluid power held at srinagar, July, 1987	341-346
4.	A study of nutritional transport in synovial joints	P.N.Tandon and Rekha Agarwal	Published in Int J.of Computer and Mathematics with applications Vol. 27 (1989)	1131-1141
2.	Role of synvial fluid in the functioning of knee joint	P.N.Tandon and Rekha Agarwal	Proc. of 2nd Int. Conf. on physiological fluid dynamics, August, 1987 I.I.T.Madras	245-249
3.	Microstructural and peripheral layer viscosity effects and pulsatile blood flow in complaint tubes	P.N.Tandon, J. Prakash, J.K. Mishra and Rekha Agarwal	Proc. of Fluid Mech. and fluid power symp. held at Srinagar (1987)	335-340
4.	A study of diffusion phenomenon in modelled normal and stenotic capillary tissue exchange system.	P.N.Tandon and Rekha Agarwal	Proc. of Int. Conference on computational methods inflow Analysis, held at japan Sept. 5-9, 1988.	1154-1161
5.	A Mathematical model ofparticle deposition in modelledbronchialrtube	P.N.Tandon and Rekha Agarwal	Proc.ofInt.Conf.on Mathe – meticalModellinginSci. &TechnologyMadras(1988)	81-86
6.	A model for the articulation of ankle joint.	P.N.Tandon Rekha Agarwal and Amita Chayurasia	Proc. of Natl. Conf. on Biomechanics (1988), New Delhi	309-316
7.	Rheological study of laminar turbulent transition in blood flows.	P.N.Tandon and Rekha Agarwal	Proc. of Natl. Conf. of FM and FP. Kanpur December (1988)	330-335
8.	Rheological study of Lubricant gelling in Synovial joints during articulation.	P.N.Tandon, T.S.Pal, P.Nirmla and Rekha Agarwal	Int. J. App. Math Modelling Vol. 12, (1988)	72-77
9.	Physiological Solids and Fluids	P.N.Tandon and Rekha Agarwal	In lecture notes of ISTE summer School on Biosystems Dynamics 15th June-3rd July, (1988) organised by Deptt. of HBTI, Kanpur,	8-29
10.	Flow and diffusion in microcirtation	P.N.Tandon and Rekha Agarwal	In lecture notes of ISTE Summer School on Biosystems Dynamics, 15th	30-39

			June-3rd July, organised by Deptt. of mathematics HBTI, Kanpur (1988)	
11.	Flow and diffusion in Synovial Joints.	P.N.Tandon and Rekha Agarwal	In lecture notes of ISTE Summer School on Biosystems Dynamics, 15th June-3rd July, organised by Deptt. of mathematics HBTI, Kanpur (1988)	93-105
12.	Analysis of coupled heat and Vapour Transport Mechanism in a modelled Bronchial Tube	P.N.Tandon and Rekha Agarwal and O.P.Rama	42nd Annual meeting of Indian Institute of Chemical Engineers held at Vadodara on 18th-19 th Dec. (1988)	
13.	A Biphasic model of Articular Cartilage in reference to human joint articulation.	Rekha Bali	Proc. Of In Int. Conf. on Mathematical modelling from 29th May-1st June, 1995 at University Brunei,	212-215
14.	A model of Ankle joint.	Rekha Bali and Amita Chaurasia	Proc. of Int. Conf. on Mathematical modelling from 29th May-1st June, 1995, 1995 at University Brunei, Brune	216-219
15.	A study on Temperature regulation in synovial Joint.	Rekha Bali and P.N.Tandon	Tribology letters, U.S.A	209-213
16.	A Model for lubrication of Knee joints	Rekha Bali and A.K.Shukla	Advances in Biomechanics" Conference on Biomechnics Jan. 14-16, 1998, Bhopal,	194-199
17.	A Mathematical Model for Ankle Joint.	Rekha Bali, Amita Chaurasia and P.N. Tandon	Proc. of International Conference on Mathematical Modelling of Non-Linear Systems held at IIT Kharagpur from 9th-11th Dec. Vol.1	291-303
18.	Rheological effect of synovial fluid on nutritional transport.	Rekha Bali and A.K.Shukla	Tribology letters Vol. 9, No.3-4 (2000)	233-239
19.	A biphasic model for hip joints replacement	Rekha Bali and A.K.Shukla	Tribology letters (2002) Vol. No. 3, SWITZERLAND	187-195
20.	A simple model for temp. regulation in synovial joint	Rekha Bali and A.K.Shukla	. Ultra Scientist of Physical Science Vol. No. 15 No. 1, 2003	109-116
21.	A study of Nutritional transport in pulsatile Blood flows through time dependent stenotic tube	P.N.Tandon Rekha Bali, S.U.Siddiqui and A.K.Shukla	Ultrascientist of Physical Sciences Vol. 16(2) M.(2004)	199-204

22.	A model for Knee joint articulation.	Rekha Bali, Amita Chaurasia A.K.Shukla, and P.N. Tandon	Ultra Scientist of Physical Sciences Vol. 15 (3) M (2003)	267-278
23.	A Non linear model for lubrication in synovial joints	Rekha Bali, A.K. Shukla and S.K. Sharma	UltraScientist of Physical Sciences Vol 16 (3) M (2004)	333-342
24.	Effect of magnetic filed in lubrication of Synovial joints.	Rekha Bali, and S.K. Sharma	Tribology letters, U.S.A. (2005)	281-287
25.	Effect of Magnetic field on blood flow through capillary .	Rekha Bali, and Shraddhya Dubey	Ultra Science Vol. 19 (2) M (2007)	319-326
26.	Effect of Magnetic field on Resistance to blood flow in stenotic artery	Rekha Bali and Usha Awasthi	Applied Mathematics and computation Vol.188 (2007)	1635-1641
27.	A Mathematical model for oxygen transport in capillary-tissue Exchange system in the presence of Magnetic field.	Rekha Bali and Usha Awasthi	International Journal of Physical Science Vol.20 (3) (2008)	593-604
28.	A Mathematical model for red cell motion in narrow capillary surrounded by tissue	Rekha Bali, Swati Mishra and Shraddhya Dubey	Applied Mathematics and computation Vol.196, Issue-1 (2008)	193-199
29.	Effect of Glycocalyx on Red blood Cell Motion in Capillary surrounded by Tissue.	Rekha Bali, Swati Mishra and P.N.Tandon	Applications & Applied Mathematics in International Journal (AAM) Vol. 4 No. 1 (2009)	134-148
30.	A Biphasic model for Artificial replacement in human knee joint	Rekha Bali, A.K. Shukla and S.K. Sharma	International Journal of Applied Mechanics and Engineering Vol. 14 No. 3 (2009)	633-643
31.	Viscoelastic effects on the unsteady Convective diffusion in a Synovial fluid of human joints	Rekha Bali, and S.K. Sharma	International Journal of Theoretical and Applied Mechanics Vol. 4 No. 2 (2009)	119-134

Overseas Visits:

1. Attended International conference on Mathematical modeling held at Brunei University Darussalam from 29th May- 1st June 1995.
2. Attended 9th International symposium on Transport phenomenon in Thermal fluids engineering held at Singapore from June 25-28, 1996.