

Krishna Mohan R. Thamattoor

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Retired, on May 31, 2016, from:

CSIR Fourth Paradigm Institute
(*Erstwhile* CSIR Centre for Mathematical Modelling
And Computer Simulation (C-MMACS))
NAL WTC Road (Belur Campus)
Bangalore 560 037, INDIA

Is affiliated to:

Department of Physics
State University of New York at Buffalo
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Buffalo 14260-1500, USA
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Professional Career

- Scientist at C-MMACS (1990-2016).
- Research Scientist, Department of Physics, State University of New York (SUNY) at Buffalo (September, 2002-June, 2004; on sabbatical leave from C-MMACS).
- (Voluntary) Research Scientist, Department of Physics, State University of New York (SUNY) at Buffalo (June, 2004-Sept, 2005).
- Research Scientist, Department of Physics, State University of New York (SUNY) at Buffalo (September, 2005-February, 2006; on leave from C-MMACS).
- Research Scientist, Department of Pharmaceutics, State University of New York (SUNY) at Buffalo (February, 2006- June, 2007; on leave from C-MMACS).
- (Voluntary) Research Scientist, Department of Physics, State University of New York (SUNY) at Buffalo (June, 2007-Sept, 2008).

Research Experience

Granular systems

- Involved with the physics of granular systems and developing prototypes for designed granular materials. This will aid in the development of impulse absorption systems for various purposes ranging from body armour to tank armour. This study started off in 1D and then went on to 3D simulations using Discrete Element Methods (DEM). We have verified the simulation model for low velocities ranging up to 15-20 m/s and are currently looking at the modifications required on the contact forces between grains for shock velocities, i.e. up to 1000 m/s.

List of Publications

1. *Impact Decimation Using Alignment of Granular Spheres*
Mukesh Tiwari, **T. R. Krishna Mohan** and Surajit Sen
International Journal of Modern Physics **B**, Vol. 31, No. 10, 20 Apr 2017,
1742012.
DOI: <http://dx.doi.org/10.1142/S0217979217420127>

2. *Impact Dispersion Using 2D and 3D Composite Granular Packing*
Surajit Sen, **T. R. Krishna Mohan** and Mukesh Tiwari
KONA Powder and Particle Journal, (July, 2016), <http://doi.org/10.14356/kona.2017014>
3. *Decorated Granular Layers for impact Decimation*
Mukesh Tiwari, **T. R. Krishna Mohan** and Surajit Sen
Granular Matter, (Aug, 2016; online 13 May, 2016), DOI 10.1007/s10035-016-0652-y
4. *Drag-Force Regimes in Granular Impact*
Mukesh Tiwari, **T. R. Krishna Mohan** and Surajit Sen
Physical Review E, Vol. 90, 062202 (Dec, 2014), DOI: 10.1103/PhysRevE.90.062202

Lesion dynamics in CNS

- Lesion formation, its development and possible immunological control in Central Nervous System (CNS), in an approximate context of Multiple Sclerosis, was studied on a graph based simulation model of the CNS. The auto-immune aspect was modelled as akin to the burning of peripheral vegetation in the control of wild fires.

List of Publications

1. *Autoimmune Control of Lesion Growth in CNS With Minimal Damage*
R. Mathankumar and **T. R. Krishna Mohan**
Eur. Phys. J. Special Topics, Vol. 222, 769–776 (July 2013), DOI: 10.1140/epjst/e2013-01880-5
arXiv:0708.3271v1 [physics.bio-ph] (2007)
2. *Simulation of Spread and Control of Lesions in Brain*
Krishna Mohan Thamattoor Raman
Computational and Mathematical Methods in Medicine, Vol. 2012, 383546 (2012), 6 pages, DOI:10.1155/2012/383546
3. *A Computational Model for Lesion Dynamics in Multiple Sclerosis of the Brain*
T. R. Krishna Mohan, Surajit Sen and Murali Ramanathan
International Journal of Modern Physics E, Vol. 17, No. 5, May 2008, pp 930-939.

Equipartition in FPU system

- The question of equipartition in nonlinear systems had been studied in the classic FPU problem and continues to hold attention even today with many aspects still to be resolved. Furthermore, the FPU system has also been shown to sustain *Intrinsic Localized Modes (ILMs)/Breathers* with applications in a wide variety of systems. We studied the asymptotic state in the FPU system and its relation to the initial perturbation; also, the effect of boundary conditions were also studied. A type of quasi-equilibrium has been postulated with solitary waves as the basic stable entities in the asymptotic state.

List of Publications

1. *Dynamics of Metastable Breathers in Nonlinear Chains in Acoustic Vacuum*
Surajit Sen and **T. R. Krishna Mohan**
Physical Review **E**, Vol. 79, No. 3, 1 January 2009, pp 036603-1–8.
2. *The Quasi-Equilibrium Phase of Nonlinear Chains*
T. R. Krishna Mohan and Surajit Sen
Pramana— Journal of Physics, Vol. 64, No. 3, Mar 2005, pp 423-431.
3. *The Quasi-Equilibrium State: A Tale of Certain Soundless Systems*
Surajit Sen, Jan M. M. Pfannes and **T. R. Krishna Mohan**
Journal of Korean Physical Society, Vol. 46, 15 Mar 2005, pp 577-579.
4. *The Quasi-Equilibrium Phase in Nonlinear 1D Systems*
Surajit Sen, **T. R. Krishna Mohan** and Jan M. M. Pfannes
Physica A, Vol. 342, 2004, pp 336-343

Impulse propagation in 1D granular system

- In a study of the problem of acoustic imaging of subsurface objects buried in soil, a toy model (1D simulation) of impulse propagation in soil was studied, and we were able to show that the toy model is able to mimic some significant aspects of the system. In particular, it was shown that the growth in backscattering, through which the imaging is carried out, follows similar patterns in 1D; two types of impulse propagation were identified as possible— an exchange version similar to ballistic propagation and an equipartition version where interaction leads to sharing of energy between interacting particles.
In an effort to carry out detailed 3D simulations, randomly deposited sand beds were constructed and studies of impulse propagation carried out.

List of Publications

1. *A Numerical Study of the Dynamics of the Surface Grain in a Granular Chain and the Role of Gravity*
Edgar Avalos, Jan M. M. Pfannes, **T. R. Krishna Mohan** and Surajit Sen
Physica **D**, Vol. 225, 15 Jan 2007, pp 211-218.
2. *Using Mechanical Energy as a Probe for the Detection and Imaging of Shallow Buried Inclusions in Dry Granular Beds*
Surajit Sen, **T. R. Krishna Mohan**, D. P. Visco, Jr., S. Swaminathan, , Adam Sokolow, Edgar Avalos and Masami Nakagawa
International Journal of Modern Physics **B**, Vol. 19, No. 18, 20 Jul 2005, pp 2951-2974.
3. *Impulse Penetration into Idealized Granular Beds: Behavior of Cumulative Surface Kinetic Energy*
D. P. Visco, Jr., S. Swaminathan, **T. R. Krishna Mohan**, Adam Sokolow and Surajit Sen
Phys. Rev. E 70, 15 November 2004, pp 051306-1-051306-7.
4. *Impulse Backscattering in Granular Beds: Introducing a Toy Model*
T R Krishna Mohan and Surajit Sen

Phys. Rev. E 67 (Rapid Communications), No. 6, June 2003, pp 060301-1–060301-4(R).

Earthquake dynamics

- The problem of modelling earthquake dynamics was addressed from the perspectives of nonlinear dynamics and self-organised criticality. The possibility of incorporating the hierarchical (fractal) nature of the lithosphere into the slider block dynamics and how this heterogeneity will affect the statistics was addressed.

In another approach to the same problem, theory of graphs was used to study the network properties of earthquake events in Himalayas.

List of Publications

1. *Earthquake Correlations and Networks: A Comparative Study*
T. R. Krishna Mohan and Revathi, P. G.
Physical Review **E**, Vol. 83, 046109 (2011), DOI:10.1103/PhysRevE.83.046109,
15 Apr 2011
2. *Network of Earthquakes and Recurrences Therein*
T. R. Krishna Mohan and Revathi, P. G.
Journal of Seismology, Vo. 15, No. 1, pp 71–80 (2011), DOI: 10.1007/s10950-010-9208-5.
(Published online 8 Sep 2010; Jan 2011 issue)
3. *Network of Recurrent Events— A Case Study of Japan*
P. G. Revathi and **T. R. Krishna Mohan**
Advances in Geosciences, Vol. 26: Solid Earth (2010), pp 55–67.

Bioremediation system

- The problem of bioremediation was studied where a model involving a coupled system of ordinary and partial differential equations in three variables (substrate, oxygen and biomass) was studied and compared with laboratory studies done at a different CSIR laboratory. The ODEs model the macropores of soil aggregates where convective flow dominates and the PDEs model the micropores where diffusion dominates.

List of Publications

1. *A Case Study of Bioremediation of Petroleum-Hydrocarbon Contaminated Soil at a Crude Oil Spill Site*
B K Gogoi, N N Dutta, P Goswami and **T R Krishna Mohan**
Advances in Environmental Research, Vol. 7, No. 4, June 2003, pp 767-782.
2. *Bioremediation of Contaminated Soil Beds and Groundwater— A Simulation Study*
T R Krishna Mohan
Sadhana, Vol. 24, Parts 1 & 2 , Feb & April 1999, pp 41-52

Chaotic systems

- In study of chaos, two different systems were studied- climate system and biochemical oscillations in a part of the metabolic network. Various types of dynamical behaviours are possible in the metabolic system with coupled positive and negative feedbacks— steady states, periodic oscillations, chaotic oscillations and other complex oscillations. Bifurcation patterns among them were studied in a two-parameter control space. A precise dimension analysis of data from deep sea ice cores was carried out to ascertain the complexity of the climate system.

List of Publications

1. *Bifurcations and Chaos in a Model Biochemical Reaction Pathway*
T R Krishna Mohan
International Journal of Bifurcation and Chaos, Vol. 8, No. 2, Feb 1998, pp 381-394
2. *Chaos : A New Paradigm for Comprehending Nature*
T R Krishna Mohan
Current Science, Vol 71, No 5, 10 Sept 1996, pp 349-352
3. *Dimension Analysis of Climatic Data*
T R Krishna Mohan, J Subba Rao and R Ramaswamy
J. Climate, Vol 12, No 9, Sept 1989, pp 1047-57

Model for clogging of air filters

- Dust control in finite air volumes at zero gravity was studied with applications in air quality maintenance in Space Station-like environments. The work focussed on filter clogging as a function of time and studied the relationship between dust particle sizes and clogging rates. It turns out that clogging is a function of the particle sizes and a threshold parameter that models the stickiness of filters; interestingly enough, there is a scaling law underlying the clogging behaviour as a function of the two parameters.

List of Publications

1. *Removing Dust from Confined Air Volumes- a Toy Model*
T. R. Krishna Mohan, Surajit Sen and M. Nakagawa
Proceedings of International Conference on Environmental Systems
Colorado Springs, July 2004 (Electronic Publication as a CD, SAE, Pittsburgh, 2004)
2. *Dust Control in Finite Air Volumes at Zero Gravity - Mean-Field Like Analysis*
T. R. Krishna Mohan, and Surajit Sen
arXiv:cond-mat/0404219 [cond-mat.dis-nn], 2004

Modelling of Indian transport sector

- In a study of the growth of Indian transport sector, annual data pertaining to the infrastructure, demand and supply of rail, road and air sectors, on an all India basis, was taken up for study; data for about four decades were available. Simple mathematical models like the

exponential growth model was found to fit the data very well and predictions were made for two decades to come. The study was covered by leading national newspapers in editorials. A subsequent study was also carried out after a decade to ascertain the goodness of the predictions that had been made with excellent results.

List of Publications

1. *Modelling the Transport Sector in India*
N Somasekhara, **T R Krishna Mohan**, K Rajaram and K S Yajnik
J. Sc. Ind. Res, Vol 51, Aug-Sept 1992, pp 696-708

Computer Experience

Nearly 30 years of experience. I am well versed with programming in Pascal, C, C++, FORTRAN, Basic etc. I have also supervised projects in C++; some knowledge of HTML also has been gained. I have worked with PCs, Workstations (Unix based) and Macs extensively. I have also worked with various softwares like Matlab, Mathematica, Maple, SPSS, SAS, IMSL, NAG, Numerical Recipes, etc.

Honorary Citations

- Coverage of research conducted on *Bioremediation of Petroleum-Hydrocarbon Contaminated Soil at a Crude Oil Spill Site* (with B. K. Gogoi, N. N. Dutta and P. Goswami of Regional Research Laboratory, Jorhat, Assam, India) appeared in :
Underground Tank Technology Update (UTTU), Vol. 17 No. 4, July/August, 2003, pp 12-14. (uttu.engr.wisc.edu)
“UTTU is an electronic bimonthly publication of College of Engineering Professional Development, University of Wisconsin-Madison. UTTU supplies useful information to federal, state and local officials working with groundwater technology, and other interested technical specialists.”
This study continues to attract citations and is the maximum cited from C-MMACS.

Workshops and Conferences Organised

1. Member, Organising Committee
International Conference on Nonlinear Dynamics & Brain Functioning
Co-organised by NIMHANS, JNCASR, IISc, C-MMACS
Indian Institute of Science (IISc), Bangalore, Feb 5-11, 1998
2. *CSIR TAB Workshop on Virtual Reality*
Center for Artificial Intelligence and Robotics (CAIR), Bangalore, Sep 17-19, 1997
3. *CSIR TAB Workshop on Complex Systems (Chaos)*
C-MMACS/N.A.L., Bangalore June 26-29, 1996

Membership of Technical Committees

- Co-ordinator, Expert Committee for Seismic Network in Karnataka, 1994-95

- Convenor, CSIR Technical Advisory Board (TAB) (Physical, Earth & Marine Sciences and Technology), 1995-97
- Convenor, CSIR Joint-TAB (Chemical & Physical) Committee for Studying Problem of Arsenic Contamination in Drinking Water Wells of W. Bengal, 1995-96

Sponsored Projects Executed

- DST project on *Hierarchical Lattices for Nonlinear Dynamical Models for Earthquake Processes*; 3 years project sanctioned in 1997 and extended by another year upto 2001.
- CSIR project on *Shock mitigation using tapered granular alignments (Civilian Applications)*; 2 yrs project, 2010-12.
- DRDO project on *Shock mitigation using tapered granular alignments (Defence Applications)*, 3yrs project further extended by 1yr, 2011-15.

Reports

1. *Contact Area Distribution between Two Rough Surfaces*
T R Krishna Mohan
C-MMACS Research Report CM 0206, Jul, 2002
2. *Growth Patterns of Road Vehicle Populations in India*
T R Krishna Mohan and K S Yajnik
C-MMACS Research Report CM 0205, Jul, 2002
3. *Details of Projects Undertaken during 1996-2001*
T. Pasupathi, M. B. Ananda and **T. R. Krishna Mohan**
C-MMACS Technical Report CM 0103, May, 2001
4. *Knowledge Creation and Dissemination during 1988-2000*
A. Stella Margaret, S. Sita and **T R Krishna Mohan**
C-MMACS Project Document CM 0002, Dec, 2000
5. *Model for Bioremediation of Oil Contaminated Soil System— A Simulation Study*
C-MMACS Project Document CM 9806, December, 1998
T R Krishna Mohan
6. *C-MMACS Database on Indian Transportation (Version 1.0)*
C-MMACS Report CM TR 9401, January 1994
Umejuveria, **T R Krishna Mohan**
7. *Growth of Transport Sector in India: A Modelling Exercise*
C-MMACS Report TM CM 9301, Aug 1993
N Somasekhara, **T R Krishna Mohan**, K Rajaram and K S Yajnik

Conference Presentations

1. *Drag Force Regimes in Granular Impact Simulation Study*
Mukesh Tiwari, **T. R. Krishna Mohan** and Surajit Sen

Engineering Mechanics Institute Conference (EMI 2015) Stanford University, California, USA
Stanford, USA, Jun 16–19, 2015

2. *Differential Equation Models and Cybernetic Models*
T. R. Krishna Mohan
National Conference on Emerging Trends in Mathematical Sciences and Engineering Applications (ETMSEA)
Dept. of Mathematics, University College of Engineering
JNTU, Kakinada, India, 23rd–24th May, 2014.
3. *Differential Equation Models*
T. R. Krishna Mohan
International Conference on Mathematical Computation and Modelling
The Madura College, Madurai, India
Madurai, India, 6th Jan, 2014.
4. *Graph Theoretical Approach to Lesional Topologies in CNS*
Mathankumar Raja and **T. R. Krishna Mohan**
8th Conference on Nonlinear Systems and Dynamics (CNSD)
Indian Institute of Technology, Indore, India
Indore, India, Dec 11–14, 2013.
5. *Energy Propagation in Granular Alignment with Sharp Contact Interfaces*
Kumaragouda Gowder and **T. R. Krishna Mohan**
8th Conference on Nonlinear Systems and Dynamics (CNSD)
Indian Institute of Technology, Indore, India
Indore, India, Dec 11–14, 2013.
6. *An Exploration of Complexity— Dynamics of Central Nervous System*
Mathankumar Raja and **T. R. Krishna Mohan**
International Conference on Perspectives in Nonlinear Dynamics(PNLD)
University of Hyderabad (UoH), India
Hyderabad, India, July 15–18, 2013.
7. *Dynamics of Myelin Regeneration on Growth of MS Lesions in Brain*
Mathankumar Raja and **T. R. Krishna Mohan**
7th Conference on Nonlinear Systems and Dynamics (CNSD)
Indian Institute of Science Education and Research (IISER), Pune, India
Pune, India, July 12–15, 2012.
8. *Dynamics of Metastable Breathers in Nonlinear Chains in Acoustic Vacuum.*
T. R. Krishna Mohan and Surajit Sen
International Conference on Perspectives in Nonlinear Dynamics (PNLD)
Indian Institute of Science, Bangalore, India
IISc, Bangalore, Aug 26–29, 2010.
9. *Networks of Earthquakes and Identification of Recurrences*
T. R. Krishna Mohan and Revathi, P. G.
7th Annual Meeting of Asia Oceania Geosciences Society (AOGS)

Hyderabad International Convention Centre, India
Hyderabad, India, Jul 5–9, 2010.

10. *Dynamics of Metastable Breathers in Nonlinear Chains in Acoustic Vacuum*
T. R. Krishna Mohan and Surajit Sen
Localized Excitations in Nonlinear Complex Systems (LENCOS)
University of Sevilla, Spain
Sevilla, Spain, Jul 14–17, 2009.
11. *Cybernetics of Auto-Immunity in Multiple Sclerosis*
T. R. Krishna Mohan, Surajit Sen and Murali Ramanathan
Symposium on 50+ Years of High Energy Physics @ UB
Department of Physics, State University of New York at Buffalo
Buffalo, New York, USA, Oct 20-21, 2006.
12. *The Solitary Wave Collision Problem in Granular Alignments*
Edgar Avalos, **Surajit Sen**, Jan M. M. Pfannes and T R Krishna Mohan
Americal Physical Society March Meeting
Baltimore, Maryland, Mar 13-17, 2006.
13. *Removing Dust from Confined Air Volumes- a Toy Model*
T. R. Krishna Mohan, Surajit Sen and **Masami Nakagawa**
International Conference on Environmental Systems, Colorado Springs, USA, July 2004
14. *The Quasi-equilibrium Phase in Nonlinear 1D Systems*
Surajit Sen, T R Krishna Mohan and Jan M. M. Pfannes
VIII Latin American Workshop on Nonlinear Phenomena
Salvador, Bahia, Brazil, Sep 28-Oct 3, 2003.
15. *Impulse Penetration based Detection and Imaging of Shallow Buried Objects*
Surajit Sen, Donald P. Visco Jr. and T R Krishna Mohan
“Symposium MM: Granular Material-Based Technologies”
Fall 2002 Materials Research Society Symposium
Boston, Massachusetts, USA, Dec 2-3, 2002.
16. *Bioremediation of Contaminated Soil Beds and Groundwater— A Simulation Study*
T R Krishna Mohan
The Inauguration of Indian Society for Mathematical Modelling And Computer Simulation (ISMMAACS)
National Aerospace Laboratories (N. A. L.), Bangalore, India, Dec 1996.
17. *Simulation Models for Modelling Bioremediation of Contaminated Soil Beds and Ground Water*
K S Yajnik, **T R Krishna Mohan**, N N Dutta and R K Mathur
NISA User’s Conference
Indian Institute of Science (IISc), Bangalore, India, Dec 1995.
18. *Growth of Indian Transport Sector: Does Exponential Model Apply Even After Four Decades ?*
T R Krishna Mohan and K S Yajnik

*IMACS International Symposium on Mathematical Modelling
And Scientific Computing*
Bangalore, India, Dec 7-11, 1992.

19. *Characterisation of Complex Behaviour in a Generalised
Biochemical Reaction Sequence*
T R Krishna Mohan and Somdatta Sinha
National Seminar on Mathematical Modelling in Biology and Chemistry
Center for Cellular and Molecular Biology (CCMB), Hyderabad, India, Dec 17-20,
1991.
20. *Correlation Dimension Analysis and Data Requirements*
T R Krishna Mohan, J Subba Rao and R Ramaswamy
Workshop on Chaos
S. N. Bose National Centre for Basic Sciences, Calcutta, India, 1989.

Invited Talks and Seminars

1. *Nonlinear Dynamics and Chaos— An Overview*
Department of Physics and Department of Chemistry, Buffalo State College, Buffalo,
New York, USA, 10 Apr, 2006
2. *Feedback Loops in Metabolic Oscillations*
Department of Pharmaceutics, State University of New York at Buffalo, Buffalo,
New York, USA, 10 Jan, 2006
3. *Nonlinear Dynamics*
Set of 5 lectures in *C-MMACS Course on Mathematical Modelling and Computer
Simulation*
C-MMACS, Bangalore, 6-10 Jun, 2005
4. *Aspects of Nonlinear Dynamics*
Set of 5 lectures in *C-MMACS Course on Mathematical Modeling and Computer S
imulation*
C-MMACS, Bangalore, 14-18 Mar, 2005
5. *Elements of Nonlinear Dynamics*
One Day Seminar on Mathematical Modelling and Computer Simulation
Air Force Software Development Institute, Bangalore, 13 Jan, 2005
6. *Overview of Nonlinear Dynamics*
Two Day Workshop on Mathematical Modeling and Computer Simulation
MES College, Bangalore, Sep, 2004
7. *Growth Patterns of Road Vehicle Populations in India*
In-house seminar, C-MMACS, 13 Aug, 2002
8. *Nonlinear Dynamics and Chaos*
Set of 5 lectures in *Training Programme for Newly Recruited Scientists of NIO in
Mathematical Modelling and its applications*
C-MMACS, Bangalore, 1-31 Jul, 2002

9. *Fractal Aspects of Sedimentation*
Contact Course in Basin Modelling
C-MMACS, Jun 9, 2000
10. *Chaos: A New Paradigm for Describing Nature*
School of Social Sciences, M. G. University, Kottayam on 16 Mar, 1998
11. *Nonlinear Dynamics: Deterministic Chaos*
KGF First Grade College Science Association
Oorgaum, KGF 563 002, January 5, 1998
12. *Fractal Aspects of Sedimentary Basins*
AEG Workshop on Basin Modelling Course
C-MMACS, Bangalore, November 10-14, 1997
13. *Chaotic Dynamics and Predictability*
TROPMET-97: Monsoon, Climate and Agriculture
C-MMACS, Feb 10-14, 1997
14. *Simulation model for Bioremediation*
First Annual meeting of ISMMACS C-MMACS/NAL, Bangalore, Dec 17-18, 1996
15. *Modelling of Earthquake Dynamics*
C-MMACS, Sep 12, 1996.
16. *Time Series Analysis*
in *CSIR TAB Workshop on Complex Systems (Chaos)*
C-MMACS/NAL, Bangalore, June 26-29, 1996
17. *Long Term Trends in Indian Transport Sector: Use of Models for Forecasting*
SAARC seminar on Transport Policy for SAARC Countries
New Delhi, Feb 13-15, 1995
18. *Chaotic Dynamics and Predictability*
Intensive Course on Modelling of Oceanic and Atmospheric Processes
C-MMACS/NAL, Bangalore, Nov 7-16, 1994
19. *Characterisation of the Dynamics of a Model Biochemical Reaction Pathway*
Center for Cellular and Molecular Biology (CCMB), Hyderabad, April 21, 1993
20. *Unstable Periodic Orbits*
Seminar on Fractals and their Applications
School of Mathematics, University of Hyderabad, Feb 21-23, 1991
21. *Degrees of Freedom in Climate Dynamics*
Physical Research Laboratory (PRL), Ahmedabad, 1989

Thesis/Dissertations Supervised— Ph. D.

- Ms. Revathi, P. G.
Thesis title: *A Network Approach to Understanding Earthquake Phenomenon Employing Correlated Earthquakes*
July 2010, Faculty of Physics, Bangalore University

Thesis/Dissertations Supervised— Graduate and Master's level

1. *Shock Absorption by Granular Systems*
A. Siva Sankar
B. E. (Mechanical Engg.) Thesis, July 2012
College of Engineering, Anna University, Guindy, Chennai, Tamil Nadu 600 025
2. *Contact Area Distribution between Rough Surfaces*
S. S. Mummigatti
M. Tech (Comp. Sci. & Engg.) Thesis, Apr 2002
Manipal Institute of Technology, Manipal 576119
3. *Modelling of Diffusive Flow of Amino Acid through Membrane and Molecular Orbital Calculations of Certain Optically Active Compounds and Chiral Polymers*
Bornali Saikia
Ph. D. Thesis Chapter (Oct 2001), Dibrugarh University, Dibrugarh 786004
Regional Research Laboratory, Jorhat 785006
4. *Modelling of Esterification and Trans-Esterification Reactions*
Swapnali Hazarika
Ph. D. Thesis Chapter (Oct 2001), Dibrugarh University, Dibrugarh 786004
Regional Research Laboratory, Jorhat 785006
5. *Moving Grid Methods for Bioremediation*
A. N. Navaneeth
B. Tech. (Chem. Engg.) Thesis, Aug, 2001
Visweswaraya Institute of Technology, Bangalore
6. *Computation of Overlap Areas of Fractal Lines*
T. R. Preethi
M. Sc. (Comp. Sci.) Dissertation, Apr 2001
C.M.S. College of Science & Commerce, Coimbatore 641006.
7. *Fragmentation Processes— An Overview of Models*
Shubham Basu and Nitai Utkarsh
B. Tech. Thesis, Jun 2000
Institute of Technology, Banaras Hindu University, Varanasi 221005
8. *Developing an MS Windows Application Program Using C++ for the Analysis of Non-Linear Dynamical Systems (Ver 2.0)*
C. Ponnusamy
M. C. A. thesis, Jul 1996
V. H. N. S. N. College, Virudhunagar 626001

9. *Developing an MS Windows Application Program Using C for the Analysis of Non-Linear Dynamical Systems (Ver 2.0)*
V. Ganesh Babu
M. Sc. (Comp. Sci.) Thesis, Jul 1996
V. H. N. S. N. College, Virudhunagar 626001
10. *Medicinal and Aromatic Plants Information System*
Binu Jos
M. C. A. Thesis, Jul 1996
Maharaja College for Women, Perundurai 638052
11. *Case Study of Open GL and Development of a 3D Visualization Utility*
K. S. Sameer
B. E. (Comp. Engg.) Thesis, Aug 1996
Nitte Mahalinga Adyanthaya Memorial Institute of Technology, Nitte 574110
12. *Developing an X-Windows Application Program Using MOTIF for the Analysis of Non-Linear Dynamical Systems (Ver 1.0)*
M. Muthuvel
M. Sc. (Comp. Sci.) Thesis, Jul 1995
V. H. N. S. N. College, Virudhunagar 626001
13. *Developing an MS Windows Application Program Using C++ for the Analysis of Non-Linear Dynamical Systems (Ver 1.0)*
P. K. Pakeer Mohideen Jailani
M. Sc. (Comp. Sci.) Thesis, Jul 1995
V. H. N. S. N. College, Virudhunagar 626001
14. *Developing an MS Windows Application Program Using C for the Analysis of Non-Linear Dynamical Systems (Ver 1.0)*
R. Yogeswaran
M. Sc. (Comp. Sci.) Thesis, Jun 1995
V. H. N. S. N. College, Virudhunagar 626001
15. *Developing an MS Windows Application Program for the Analysis of Non-Linear Dynamical Systems*
A. Murugesan
M. Sc. (Comp. Sci.) Thesis, Jun 1994
V. H. N. S. N. College, Virudhunagar 626001

Academic Degrees

B. Sc. (Physics with Chemistry & Mathematics) (Bachelor's Degree, 1976) Malabar Christian College, Kozhikode (Calicut) (Calicut University, Kerala, India)

M. Sc. (Physics with Environmental Science) (Master's Degree, 1978) School of Environmental Sciences (Jawaharlal Nehru University, New Delhi, India)

M. Phil (Biophysics) (Pre-Ph. D., 1982) -do-

Ph. D. (Physics, 1988) -do-

M. Phil. dissertation : *A Study of Quantum Mechanical 'Molecular Machines' for Energy Transduction in Biological Systems— Applied to Sliding Filament Theory of Muscle Contraction* In the dissertation, I reviewed the status of the second law of thermodynamics with respect to 'molecular energy machines' consisting of single molecules; Maxwell's demon was also discussed. Application of solitons to muscle contraction was studied.

Ph. D. thesis : *Study of the Underlying Dynamics of Complex Atmospheric and Biological Systems— Search for an Attractor*. In the above thesis, I discussed mainly the limitations of chaotic time series analysis, particularly the problems of ascertaining fractal dimensions reliably. I looked at climatic data (deep sea core data), weather data (rainfall data of Indian monsoons) and, also, at a model for generating sequence data (similar to genome sequences) from an algorithm based on chaotic dynamics.