

**Curriculum Vitae**  
**August 2009**  
**Surajit Sen**

**Address**

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**Education**

B.Sc (Honors), 1<sup>st</sup> Class, Physics, Presidency College, University of Calcutta, India, 1983;  
Ph.D, Physics, University of Georgia, 1990. Theoretical PhD thesis on transverse dynamics of the Ising model in D dimensions (Advisor: Prof. M.H. Lee)

**Employment**

1994-Present

Faculty member, Department of Physics, SUNY at Buffalo:

Assistant Professor of Physics (1994-2000)

Associate Professor of Physics (2000-2006)

Professor of Physics (2006-Present)

Field of research: Non-equilibrium statistical physics and Nonlinear mechanics - solitary waves granular and other nonlinear systems in 1D and 3D; nonlinear acoustic pumping; quasi-equilibrium and anomalous fluctuations in nonlinear systems; design and studies of metamaterials to control shock waves; harnessing of ocean wave energy; nanoparticle collisions at large impacts; dynamics of complex systems in biology and environmental sciences.

2009-2012

Adjunct Professor of Mathematics, SUNY College at Buffalo (shared NSF-CSUMS grant in Computational Mathematical Sciences)

10/2008

Professional research visit, Department of Chemistry and Biochemistry and Department of Mechanical and Aerospace Engineering, University of California at San Diego

Field of research: Granular Dynamics, Prof. K. Lindenberg and Prof. V. Nesterenko

10/2008

Professional research visit, Department of Applied Physics and Graduate Aeronautics Laboratory (GALCIT), California Institute of Technology, Pasadena

Field of research: Granular potentials, granular metamaterials, with Prof C. Daraio

8/2008

Professional research visit, Department of Physics, University of Paris – East, Marne la Vallee, France

Field of research: Acoustics of granular media with Prof. X. Jia

12/2003

Invited Visiting Professor, Department of Physics, University of Santiago, Chile

Field of research: Dynamics of granular media; Worked on designing experiments on shock propagation in granular media with Prof. F. Melo.

8/1993-8/1994

Research Assistant Professor, Department of Physics, SUNY at Buffalo

Field of research: Non-equilibrium statistical physics, Nonlinear physics; Worked on relaxation processes in spin problems and avalanche dynamics problems

8/1993-8/1994

Research Specialist (Courtesy Appointment), Department of Physics and Astronomy, University of Rochester

Field of research: Non-equilibrium statistical physics, Nonlinear physics; Worked on relaxation processes in spin problems and avalanche dynamics problems

4/1990-8/1993

Postdoctoral Fellowship work, Department of Physics, Michigan State University

Research Associate (1990-1992) with Prof. S.D. Mahanti

Research Assistant Professor (1992-1993)

Field of research: Non-equilibrium statistical physics, Nonlinear physics; Worked on Molecular dynamics studies of 2D systems on substrates, studied avalanches in granular media, studied relaxation functions

6/1989-2/1990

Postdoctoral Fellow, School of Physics, University of Minnesota, Minneapolis with Prof. J.W. Halley

Field of research: High temperature superconductivity; Worked on Role of disorder on the critical temperature of high  $T_c$  superconductors

## Honors

2008

Fellow, American Physical Society

Felicited by Professor E.C.G. Sudarshan for outstanding contributions as President of the American Chapter of the Indian Physics Association, APS March Meeting, New Orleans

2007

Theoretical Physics Seminar Circuit (TPSC) Lecturer at Benares Hindu University, December, 2007. This is a prestigious Indian Government established program to expose students and faculty to outstanding scholarly work at other institutions and is an honor that is seldom extended to a foreign lecturer.

2003

SUNY Chancellor's First Patent Award (Albany, 2003)

2003

Nominated for the Inventor of the Year Award by Niagara Frontier Intellectual Property Law Association and Technical Societies Council of the Niagara Frontier

2001

Named top 100 innovators of Western New York were invited (Invited to Upstate Alliance for Innovation).

1977, 1979

National Scholarship, Government of India

### **Special Appointments to External Organizations and International Activities**

2007-2009

Elected Member, American Physical Society Committee on International Scientific Affairs (CISA).

2007-Present

Member of the Selection Committee of the American Physical Society Beller and Marshak Lectureship Awards

2007-Present

Member of the US Selection Panel of the APS-Indo-US Science and Technology Forum Travel Grant Program

2005-2009

Elected President, American Chapter of Indian Physics Association (ACIPA is a professional society that represents physicists of Indian origin in North America. ACIPA recognizes outstanding achievements through highly competitive and prestigious prizes, and fosters close linkages between the US based physicists of Indian origin and those in India. ACIPA is an affiliate of the Forum on International Physics and a contributor in APS FIP receptions. As ACIPA President I routinely organize large scale journal donation programs between US institutions and economically challenged Indian institutions. Recently organized exchanges were between SUNY and University of Rajasthan and APS and Amrita Vishwa Vidyapeetham).

2001-Present

Chair, American Physical Society Kilambi Ramavataram Fellowship Fund.

This fund partially supports an Indian college level physics faculty member to undergo advanced training in physics teaching in the US for one academic year. Rest of the support comes from partnering institutions who host the Fellow and from the Fulbright Foundation. As Chair, I oversee the Fellow selection process and raise funds and negotiate arrangements with host institutions.

2007-Present

Member of the Organizing Committee, MERLOT International Conference, St. Paul, Minnesota, 2008 (MERLOT – Multimedia Educational Resource for Learning and Online Teaching is the world's largest peer reviewed digital library encompassing all the academic areas. I serve as an associate editor for its Physics Collection and am currently involved in organization of the 2008 MERLOT International Conference).

2004

Panel Member, NASA Panel on Granular Flow

2002-2003

Consultant, American Physical Society Humanitarian De-mining Project – collaborated with Dr Andrew M. Sessler and Dr Irving Lerch to develop an APS study proposal (which was endorsed by the APS Council but eventually not pursued because of lack of funding). During the course of this work I met with officials from the US Senate, the State Department, US Night Vision Command in Fort Belvoir, US Army Corps of Engineers and interviewed many science, technology and policy experts from US and abroad).

2003-Present

Lead Organizer and Indo-US Coordinator, Peer-Reviewed Online K-12 Science Education Project (an Indo-US project that addresses scientific literacy needs of rural children in India. This effort has overseen the organization of an international conference held in Nagpur, India in 2003, established linkages with the American India Foundation, Bharat Gyan Vigyan Samiti, Eklavya, Azim Premji Foundation, Asha Foundation, National Science Teachers Association (USA) and several US companies to enable access of high quality US developed math teaching materials to rural children with limited access to schools in India. The project has received support from the Indo-US Science and Technology Forum in 2003-2004. Partnership of this project with US Department of Education is presently being pursued.)

2003

Consultant, National Aeronautical and Space Administration (NASA) on dust flow in the International Space Station

1991-1996 & 1996-2000

Secretary & Executive Secretary & Newsletter Co-Editor, American Chapter of Indian Physics Association

### **Editorial Appointments**

2004-Present

Editor, International Journal of Modern Physics B

Editor, Modern Physics Letters B

2002-Present

Associate Editor for Physics, Multimedia Educational Resource for Learning and Online Teaching (MERLOT), SUNY representative to Physics board of MERLOT project

### **Conference Organization**

2009 Organizer, Invited Symposium on Biological Physics, American Physical Society, Pittsburgh, PA (speakers: A. Liu, J. Banavar, M. Cieplak, J. Jose)

2005-2009 Member of the Executive Committee, Powders and Grains 2009 (primary international conference on the science and engineering of granular media), Golden, Colorado.

2008-2009 Member of the Organizing Committee, MERLOT International Conference, San Jose, California, 2009

2007-2008 Member of the Organizing Committee, MERLOT International Conference, St. Paul, Minnesota, 2008

- 2006 Co-organizer of "Jainfest: A Conference to Honor the Contributions of Professor Piyare L. Jain," Buffalo, October 19-20.
- 2005 Workshop on Development of Plans for Resource Building for Rural Science Teachers, New Delhi, India, August 23.
- 2003 Member, International Advisory Panel, International Silk Road Conference on Quantum Theory, Partial Differential Equations of Mathematical Physics and their Applications," Tashkent, Uzbekistan, Sept 30-Oct 3, 2003.
- 2003 Organizer (with Prof. Vinod K. Gaur of Indian Inst. of Astrophysics) of Indo-US Workshop on Peer-Reviewed Online K-12 (10+2) Science Education (PROKSE), July 17-20 at the National Environmental Engineering Research Institute, Nagpur, Maharashtra, India
- 2003 Lead organizer (with Dr. Andrew M. Sessler of Lawrence Berkeley Laboratories), Humanitarian Demining Symposia in American Physical Society, April 3-7
- 2002 Lead organizer (with Prof. Melany L. Hunt of California Institute of Technology and Dr. Alan J. Hurd of Los Alamos National Laboratories) of "Symposium MM: Granular Material Based Technologies," Fall 2002 Materials Research Society Meeting in Boston, Mass, December
- 2001 Invited by the Asia-Pacific Center for Theoretical Physics (Seoul, Korea) to be the Lead organizer (with Prof. J. Hong of Seoul National University, Korea and Prof. M. Tokuyama of Tohoku University, Japan) of International Symposium on Slow Dynamical Processes in Nature (November 25-27).
- 2000 Organizer (with Prof. Melany L. Hunt of California Institute of Technology) of "Symposium BB: The Granular State," in the Spring 2000 Meeting of Materials Research Society in San Francisco, Calif. between April 24 and 27.
- 1998 Member, Advisory Committee for the International Workshop on Granular Physics: Statics, Excitations and Dynamics, Organized by the Center for Advanced Studies, The University of New Mexico, Sandia National Laboratories and Los Alamos National Laboratory, Albuquerque, New Mexico

## Press Coverage

**Coverage of research on the extraction of nanodrops of ferrofluids to design ultrafast ferrofluid inkjet printers** (with Nasser A. Ashgriz, Mechanical & Aerospace Engineering and Bernard A. Weinstein, Physics)

1997 UB Research, Vol. 7, No. 1

**Coverage of research on development of weak acoustic shock wave technology for detection of buried metal-poor land mines**

1997 The Ottawa Citizen, December 3

1997 UB Reporter, December 4

1997 The Buffalo News, Front Page, December 8

1997 Interviewed in the 11:00pm Nightly News in Channel 4, Buffalo (CBS Affiliate)

1997 The Financial Times (London, UK), December 12

1998 Business Week, World Watching Segment, February 2

1998 UB Today (A Magazine for Alumni and Friends of the University), Winter 1998 Issue

1998 Interviewed by the "Science Reports" program of the American Institute of Physics

**Coverage of research on the design of a nozzle-free inkjet printer of very high resolution**

1999 UB Reporter, October 7

1999 Inside R&D (Weekly Magazine on Current R&D, Wiley), October 8

1999 Science Magazine (website)

**Coverage of research on shock absorption**

2001 UB Reporter, October 18

2001 United Press International News Release, October 19

2001 American Society of Civil Engineers

2001 Discovery Magazine - CBC-Toronto (planned)

2001 Business Week, November 5, 2001

2001 Financial Times of London, October 2001

2001 BBC Radio (London), November 23-30, 2001 (Interview broadcast)

2002 Newspapers in Argentina, Chile, Indonesia, Spain, Turkey, Vietnam.

**Coverage of award of landmine detection patent**

2002 The Buffalo News (front page – City and Regions Section), August 18

2002 News Release from SUNY-Albany (announcement of this patent award by SUNY Chancellor Robert King), August 11.

2002 Voices of Innovation – Newton's Cradle, October 22, 28

2002 Comment on Observation of depression solitons by Falcon et al. in Phys Rev Lett (Nov 11 issue). Comment appeared in Phys Rev Focus.

2003 Chronicle of Higher Education, April 5, Work on Landmine Detection

2003 UB Reporter May 15, Coverage

### Coverage of experimental observation of “baby” solitary waves

- 2005 UB Reporter, May 26, 2005
- 2005 ScienceDaily.com, June 5, 2005
- 2005 Physorg.com, May 5, 2005
- 2005 Innovations-report.com, May 9, 2005
- 2005 Yahoo News, July 11, 2005
- 2005 Spectroscopy Now (John Wiley & Co.)
- 2005 The Telegraph, Calcutta, India, May 16, 2005

### Articles on Issues of International Significance

#### A. General

1. Surajit Sen, “Physics in India – complex problems and a story of great strides,” International News Column in APS News, Vol. 18, Number 6, June 2009 (<http://www.aps.org/publications/apsnews/200906/international.cfm>).

#### B. Rural Science Education

1. Surajit Sen and Sharmistha Bagchi-Sen, “Science education for rural children: Focus on the developing world,” American Chapter of the Indian Physics Association, Summer 2007 Newsletter ([http://theacipa.org/summer\\_2007.htm](http://theacipa.org/summer_2007.htm)).
2. Surajit Sen, “American Chapter of the Indian Physics Association,” APS Forum on International Physics Newsletter, July 2007, p 10 (<http://www.aps.org/units/fip/newsletters/upload/july07.pdf>).
3. Surajit Sen, “The internet and rural science education in India,” UB International, vol. XIV, No. 2, Fall 2005 (<http://inted.oie.buffalo.edu/news/ubintsFall2005.pdf>).
4. Surajit Sen and Vinod K Gaur, “Report to the Indo-US Forum on Science and Technology on Progress in the Indo –US Workshop on Peer Reviewed Online K-12 (10+2) Science Education, “July 2003, New Delhi, India (can be found online at [http://www.physics.buffalo.edu/~sen/documents/report\\_final.pdf](http://www.physics.buffalo.edu/~sen/documents/report_final.pdf))

#### C. Landmine Detection Technologies for Humanitarian De-mining in Poor Nations

1. Laura E. Gilcrist, Gregory S. Baker, Saravanan Swaminathan, Donald P. Visco, Jr., Ramesh Bharadwaj, Supratik Mukhopadhyay, Krishna Shenai and Surajit Sen “Acoustic interrogation of soil and the remote detection of shallow buried inclusions,” Proceedings of the 5<sup>th</sup> International Midwest Conference on Circuits and Systems and the 5<sup>th</sup> International Northwest Workshop on Circuits and Systems, Montreal, Canada (invited paper), August 5, 2007.
2. Surajit Sen, T.R. Krishna Mohan, Donald P. Visco, Jr., Saravanan Swaminathan, Adam Sokolow, Edgar Avalos and Masami Nakagawa, “Using mechanical energy as a probe for the detection and imaging of shallow buried inclusions in dry granular beds” International Journal of Modern Physics B **19**, No. 18, pp 2951-2974 (2005) [Invited Review]

3. Surajit Sen and Michael J. Naughton, "System for detection of buried objects," U.S. Patent No. 6,418,081 (awarded, July 9, 2002)
4. Michael J. Naughton, Richard Shelton, Surajit Sen and Marian Manciu, "Detection of non-metallic land mines using shock impulses and MEMS sensors," in Proceedings of the 2<sup>nd</sup> International Conference on the Detection of Abandoned Land Mines - MD'98 Institution of Electrical Engineers Conference Publication No. **458**, pp. 249-252 (IEE, London, 1998).
5. Surajit Sen and Ronald L. Woodfin, "Humanitarian de-mining and the quest for better ways of locating buried non-metallic objects," APS Forum on Physics and Society Newsletter, April 2002 (<http://www.aps.org/units/fps/newsletters/2002/april/a2ap02.html>)

#### **D. Development of Globally Accessible Peer Reviewed Materials in Physics**

1. M. Benedict, E. Debowska, B. Eckert, S. Geiner-Walker, H.J. Jodl, L. Mathelitsch, I. Ruddock, E. Sassi, R. Sporcken, T. Bradfield, T. Colbert, B. Mason, T. Meldor, J. Rauber and S. Sen, "Report and recommendations on available multimedia material for electricity and magnetism" Proceedings of the XI<sup>th</sup> European Workshop (MPTL11), Szeged, Online Proceedings of the European Physical Society (2006).
2. M. Benedict, E. Debowska, H.J. Jodl, L. Mathelitsch, R. Sporcken, T. Bradfield, T. Colbert, B. Mason, T. Meldor, S. Sen, P. Sheldon and J. Rauber, "Report and recommendations on available multimedia material for teaching statistical and thermal physics" Proceedings of the X<sup>th</sup> European Workshop (MPTL10), Berlin, Online Proceedings of the European Physical Society (2005).
3. M. Benedict, E. Debowska, H.J. Jodl, L. Mathelitsch, R. Sporcken, T. Bradfield, T. Colbert, L. Keiner, B. Mason, T. Meldor, S. Sen and J. Rauber, "Report and recommendations on available multimedia material for teaching mechanics at school and university level," Proceedings of the IX<sup>th</sup> European Workshop (MPTL 9), Graz, Online Proceedings of the European Physical Society (2004).

#### **Invited Lectures - National and International Conferences**

1. Invited Speaker and Workshop Panelist, Triservice (Army, Air Force and Navy) Workshop on Mechanical Energy Harvesting, Virginia Polytechnic Institute and State University, Blacksburg, VA, August 12, 2009.
2. Invited Speaker, "Conference on Localized Excitations in Nonlinear Systems," Seville, Spain, July, 2009 (conflict with lecture at Powders and Grains 2009, my collaborator Dr T.R. Krishna Mohan from Centre for Mathematical Modeling and Computer Simulations, Bangalore, India delivered the invited lecture on my behalf).
3. US Army Workshop on Systems of Systems, Physical Sciences Laboratory, New Mexico State University, Las Cruces, New Mexico, March 17 – 18, 2009
4. Invited Speaker, International Workshop on Social Network Analysis, National Institute for Science, Technology and Development, Government of India, New Delhi, January 28 – 30, 2009

5. Invited Speaker, Disorder in Complex Systems and in Biology, Benares Hindu University, Varanasi, India, January 9-11, 2009 (denied due to scheduling conflict)
6. Invited Speaker, International Conference on Ultrasonics (ICU), Santiago, Chile, January 11-17, 2009 (denied due to scheduling conflicts)
7. Festschrift for Professor M Howard Lee, Seoul National University, Seoul, Korea, Title: Dynamics and thermodynamics in many body systems where temperature can't be defined, October 2008 (denied due to budgetary constraints)
8. Society for Industrial and Applied Mathematics Workshop, Title: Nonlinear dynamics in granular metamaterials, Rome, Italy, July 21-24, 2008
9. Invited Lecturer, US Air Force Workshop on "Particle Mechanics in Extreme Environments 2008," Title: Mechanical energy propagation in granular systems: basic physics and potential applications, University of Florida REEF Facility, and Eglin Air Force Base, Florida, January 29-31, 2008
10. International Conference on Advances in Energy Research, Title: Ocean waves, mechanical impulses and electrical energy: concept of a simple conversion process (Keynote), December 12-14, 2007, Indian Institute of Technology, Bombay, Mumbai, India
11. American Society of Mechanical Engineers (ASME) Congress, Title: Tapered chain shock absorbers at large impact speeds, in Session on Blast Fragmentation organized by B. LaMattina, G. Subhash and Y. Rajapakse, November 11-15, 2007, Seattle, Washington
12. International Congress on Acoustics, Madrid, Spain, Title: Mechanical energy propagation in granular systems, Sept 2-9, 2007
13. IEEE-MWS-CAS Conference, Ottawa, Canada, Title: Acoustic interrogation of soil and the remote detection of shallow buried inclusions, August 2007 (delivered by L Gilcrist)
14. SUNY Conference on Instructional Technology, SUNY-Plattsburgh, Title: Best of MERLOT Physics, June 1, 2007
15. 17<sup>th</sup> US Army Symposium on Solid Mechanics, Baltimore, Maryland, Title: "Tapered chain granular shock absorption systems" April 3, 2007
16. Southern Workshop on Granular Matter 2006, Vina del Mar, Chile, Title: "Dust Dynamics and Filtration" Sep 13-16, 2006
17. 20<sup>th</sup> Annual American Institute of Aeronautics and Astronautics (AIAA) Microgravity Science and Space Processing for Exploration Symposium, January 9-12, 2006 Reno, Nevada, Titled: "Dust flow through filters: a scaling law for filter clogging" (with T.R. Krishna Mohan, A. Sokolow, M. Nakagawa) (denied due to scheduling conflicts)
18. NASA-Kennedy Space Center Workshop on Granular Media, Cocoa Beach, FL, Titles: "Mechanical energy propagation in granular media," & "Dust filtration and filter jamming." Feb 2-3, 2005

19. NASA-Dust Mitigation Workshop, Colorado School of Mines, Golden, CO, Title: "Dust Filtration" April 20-21, 2005
20. NASA Dust Workshop, Colorado School of Mines. Golden, CO, Title: "Dust filtration" May 17-18, 2005
21. Speaker in Session on MERLOT Editorial Process, SUNY Conference on Instructional Technology, Binghamton, New York, May 23-26, 2005
22. Workshop on Pattern Formation and Transport Phenomena, Joao Pessoa, Brazil August 7-11 (denied due to scheduling conflict), 2005
23. International Conference on Physics Education 2005, New Delhi, India, Title: "Kilambi Ramavataram Fellowship of the American Physical Society – the History and the Future," August 21-26, 2005
24. Speaker in Session on MERLOT Editorial Involvement, SUNY Conference on Instructional Technology, Stony Brook, NY, June 1-3, 2004
25. 9<sup>th</sup> International Conference on Similarity and Diversity, Daejeon, Korea, Title: "Quasi-equilibrium in Nonlinear Chains" June, 17-18, 2004
26. Perspectives on Nonlinear Dynamics (Satellite Conference to StatPhys 23 in Bangalore), Chennai, India, Title: "Solitary Waves in Granular Systems, Fermi-Pasta-Ulam Problem and More" July 12-15, 2004
27. Plenary Speaker, Latin American Workshop on Interdisciplinary Physics, Porto Alegre, Brazil , Title: "When should you change your dust filter: Filter Clogging as a Problem with Fragile Scaling Exponents" (Denied due to scheduling conflicts). August 8-12, 2004
28. Invited Talk at NASA Glenn Research Center Workshop on Dust Mitigation, Cleveland, Ohio, Title: "Clogging of dust filters" December 19, 2004
29. Consortium of the Americas Mini-workshop on Granular Hydrodynamics and Related Topics, Albuquerque, New Mexico, Title: "Energy propagation in Grains and Nonlinear Chains: Leaky Solitary Waves and Quasi-Equilibrium Phases" February 21, 2003
30. American Physical Society April 2003 Meeting, Philadelphia, PA in Symposium on Humanitarian Demining, Title: "Mechanical energy propagation and backscattering in soil: imaging buried land mines" April 5, 2003
31. National Aeronautics and Space Administration Workshop on Fine Particulates in Fluids, Cleveland, Ohio, Title: "Dust: making a mess and cleaning it up" May 5, 2003
32. SUNY Conference on Instructional Technology, Potsdam, New York, Title: Digital Libraries in Physics (Lecture delivered as a Narrated Power Point presentation because of my inability to physically attend the conference), May 30, 2003

33. Particles 2003, International Conference on Nanoparticles, Toronto, Canada, Title: "Nanoprinting with Nanoprinters" August 23-26, 2003
34. International Silk Road Conference on Quantum Theory, Partial Differential Equations of Mathematical Physics and their Applications," Tashkent, Uzbekistan, Title: "Quasi-equilibrium state" Sept 30-Oct 3, 2003 (Denied due to scheduling conflicts).
35. Keynote Speaker, Army Workshop on Soil Physics, Santa Fe, New Mexico, Title: "Impulse propagation in Granular Beds," August 27-30, 2003
36. 8<sup>th</sup> Latin American Workshop on Nonlinear Physics 03 (LAWNPO3), Salavor, Bahia, Brazil , Title: "Quasi-equilibrium in Nonlinear Chains", September 28-October 3, 2003
37. Invited Talk at CIMAT – Southern Workshop on Granular Materials, Pucon, Chile, Title: "Mechanical Energy Propagation in Granular Media", December 10-13, 2003
38. Slow Dynamics and the Glass Transition (organized by Arizona State University and Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore, India with NSF Funds), Title: "Memory in the Krumhansl-Schrieffer chain" January 6-9, 2002
39. 8<sup>th</sup> International Conference on Similarity in Diversity, Buffalo, New York; Title: "Minisolitary Waves" May 15-17, 2002
40. Institute Lecturer at the Pan-American Science Institute (PASI) on the "Frontiers of Non-equilibrium Processes," near Bariloche, Argentina, PASI programs are funded largely by NSF; Presented 3 Lectures – 2 lectures on "Impulse Propagation in Granular Media" and 1 lecture on "Continued Fraction Formalism for Relaxation Studies" June 2-13, 2002
41. Condensed Matter Physics in India and Abroad, (organized by S.N. Bose National Center and Bell Laboratories, USA), Calcutta, India, Title: "Impulse propagation and backscattering in granular assemblies "January 2-4, 2001
42. International Conference on Sparsely Connected Systems: Porous and Granular Materials, organized by the Consortium of the Americas for Interdisciplinary Science, San Carlos de Bariloche, Argentina, Title: "Nonlinear acoustics of granular assemblies." March 14-17, 2000
43. 137th Annual Meeting of the Acoustical Society of America, Atlanta, Georgia, Title: "Nonlinear acoustics in granular media." June 2, 2000
44. International Workshop on Granular Media: Statics, Excitation and Dynamics, University of New Mexico, Albuquerque, Title: "Sound and shock propagation in granular beds" June 26, 1998
45. 2<sup>nd</sup> International Conference on the Detection of Abandoned Land Mines, MD'98, Edinburgh, Scotland, United Kingdom , Title: "Detection of non-metallic land mines using shock impulses" October 12-14, 1998

46. Dynamical Processes in Granular Materials: Understanding and Control, at The James Franck Institute, The University of Chicago, Chicago, Illinois on “Nonlinear dynamics in granular columns” May 11-13, 1995
47. STATPHYS II-Calcutta, International Workshop on Statistical Physics of Disordered Systems, organized by the S.N. Bose National Center for Basic Sciences, Calcutta, India, Title: “ $1/t$  relaxation law of a classical particle in anharmonic potentials” August 6 and 11, 1995
48. STATPHYS I-Calcutta, International Workshop on the Statistical Physics of Disordered Solids, Glasses and Polymers, organized by the S.N. Bose National Center for Basic Sciences, Calcutta, India Title: “Conditions for non-ergodicity in Hermitian systems.” December 28, 1991

#### **Invited Lectures –Universities and Laboratories**

1. Physics Department Seminar, Presidency College, University of Calcutta, India, February 3, 2009
2. GALCIT Colloquium (Applied Physics and Aeronautical Engineering), California Institute of Technology, Pasadena, California, Title: Nonlinear dynamics in granular materials, October 31, 2008
3. Physics Colloquium, Department of Physics and Astronomy, The University of Iowa, Title: “When colliding solitary waves break ...,” April 7, 2008
4. Theoretical Physics Seminar Circuit Lecturer (this is the equivalent of a named lecture), Department of Physics (hosted by the Vice Chancellor’s Office), Benaras Hindu University, Varanasi, India, Title: “Consequences of nonlinearity in granular (meta)materials,” December 18, 2007
5. Colloquium, Department of Physics and Astronomy, The University of Georgia, Athens, Georgia, Title: “Consequences of nonlinearity in granular (meta)materials,” October 11, 2007
6. Presentation to UB2020 Scholar’s Meeting, Office of the Vice President for Research, SUNY-Buffalo, “Battle Models” on April 30, 2007.
7. Colloquium, Center for Advanced Studies, University of New Mexico, Albuquerque, NM, Title: “Granular Systems – Shock Transmitters & Shock Absorbers,” April 27, 2007.
8. Invited Presentation on Shock Absorbing Panel Design and Fabrication to DARPA advisory board members, US Army Research Lab – Aberdeen Proving Ground, Maryland, March 20, 2007
9. Special Colloquium, Gifted Math Program, SUNY-Buffalo School of Education, Title: “Fighting a Battle: how do we know who is winning?” March 14, 2007
10. Impact Mechanics Seminar, US Army Research Labs, Aberdeen Proving Grounds, Aberdeen, Maryland, Title: “Impulse dissipation in granular alignments” March 15, 2006

11. Special Colloquium, Gifted Math Program, SUNY-Buffalo, School of Education, Title: "Space exploration, Mars mission and Physics" March 22, 2006
12. Colloquium, Department of Physics, SUNY at Brockport, Title: "Space exploration, Mars mission and Physics" March 24, 2006
13. Colloquium, Department of Physics, SUNY at Brockport, Title: "Impulse absorption by scalable, small tapered granular chains" March 24, 2006
14. Impact Mechanics Seminar, US Army Research Labs, Aberdeen Proving Grounds, Aberdeen, Maryland, Title: "Mechanical energy propagation in tapered granular chain shock absorbers" February 16, 2005
15. ME Seminar, Department of Mechanical Engineering, California Institute of Technology Title: "Mechanical energy propagation in granular systems" May 3, 2005
16. Seminar, Department of Chemistry and Physics, State University of New York - College at Brockport, Title: "Solitary Waves" February 5, 2004
17. Condensed Matter Physics Seminar, Department of Physics, The Pennsylvania State University, University Park, PA, Title: "Solitary Waves" April 20, 2004
18. Seminar, Department of Theoretical Physics, Indian Association for the Cultivation of Science, Kolkata Title: "Mechanical energy propagation in granular systems" July 20, 2004
19. Presentation, Technology Transfer and Licensing Office, SUNY-Buffalo, Title: "Tapered chain shock absorbers" March 28, 2003
20. Colloquium, School of Physics, Jawaharlal Nehru University, New Delhi, India Title: "Sound in Sand" January 10, 2002
21. Colloquium, Department of Physics, University of Houston, Houston, Texas, Title: "Sound in Sand" May 1, 2002
22. Seminar, Department of Geophysics, Colorado School of Mines, Golden, CO, Title: "Impulse Propagation in Granular Media" November 22, 2002
23. Physics Seminar, Department of Chemistry and Physics, State University of New York - College at Brockport Title: "Sound in Sand" February 15, 2001
24. Nonlinear Science Seminar, Department of Physics, Duke University, Durham, North Carolina Title: "More on Sound in Sand" April 16, 2001
25. Microgravity Fluid Physics Division, Glenn Research Center, National Aeronautics and Space Administration, Title: "Impulse Propagation in Granular Beds" July 6, 2001
26. Colloquium at the Department of Physics, University of Utah, Salt Lake City, Utah, Title: "Tapping out Solitary Waves in Bead Chains and Sounding out Landmines," October 25, 2001

27. Condensed Matter Physics Seminar, Department of Physics, University of Utah, Salt Lake City, Utah, Title: "Theoretical Evidence for Ubiquity in Glassy Relaxation," October 26, 2001
28. Colloquium, S.N. Bose National Center for Basic Sciences, Calcutta, India, Title: "Sound in Sand" December 22, 2001
29. Colloquium, S.N. Bose National Center for Basic Sciences, Calcutta, India Title: "Ubiquity of Slow Relaxation in Glassy Systems" December 29, 2001
30. Research Seminar at Alameda Applied Sciences Corporation, San Leandro, California Title: "Nonlinear acoustics in granular media." April 29 and May 10, 2000
31. Presentation at the Office of the Director of Technical Program on Humanitarian Demining, U.S. Army Night Vision Laboratories, Fort Belvoir, Virginia Title: "Nonlinear acoustic detection of buried objects in soil." June 5, 2000
32. Presentation at the Office of Science and Technology, Countermine Team, U.S. Army Night Vision Laboratories, Fort Belvoir, Virginia, Title: "Nonlinear acoustic detection and imaging of buried objects in soil: applications to humanitarian demining" August 11, 2000
33. Physics Colloquium, Maharaja Sayajirao University of Baroda, Vadodara, India Title: "Propagation and backscattering of impulses in granular media." December 8, 2000
34. Research Seminar at the Eastman Kodak Company, Rochester, New York Title: "Ejection of ferrofluid grains from a ferrofluid using nonlinear acoustic impulses." May 12, 1999
35. Seminar, Explosives Technology Group, Sandia National Laboratories, Albuquerque, New Mexico, Title: "Sound and shock propagation in granular beds" June 24, 1998
36. Institute of Mechanics of Materials Seminar, Department of Applied Mechanics and Engineering Science, University of California at San Diego, California Title: "Soliton-like objects in granular beds and humanitarian demining: The role of nonlinear science and fancy tuning forks in dealing with a crisis in the developing world." December 16, 1998
37. Seminar in Department 1841, New Materials: Theory and Validation, Sandia National Laboratories, Albuquerque, New Mexico, Title : "Soliton-like objects in granular beds and humanitarian demining: The role of nonlinear science and fancy tuning forks in dealing with a crisis in the developing world." December 18, 1998
38. Statistical Physics Seminar, Department of Physics, Syracuse University, Syracuse, New York Title: "Avalanches in dissipative grain piles: a story of dynamics near criticality" April 11, 1997
39. Seminar, Advanced Materials Laboratory, Sandia National Laboratories, Albuquerque, New Mexico, Title: "Nonlinear dynamics in packed granular columns" April 17, 1997
40. Seminar, Environmental Laboratory, U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi , Title: "Soliton-like objects in Hertzian beds" August 13, 1997

41. Seminar, Asia Pacific Center for Theoretical Physics, Korea Advanced Institute of Science and Technology, Seoul, Korea Title: "Soliton-like objects in granular beds: can they help detect metal-poor land mines?" August 21, 1997
42. Seminar, Asia Pacific Center for Theoretical Physics, Korea Advanced Institute of Science and Technology, Seoul, Korea, Title: "A model Hamiltonian which yields stretched-exponential decay" August 25, 1997
43. Colloquium, Department of Physics, State University of New York at Albany, Albany, New York Title: "From metastability to instability in granular media" February 9, 1996
44. Seminar, Federal Energy Technology Center, U.S. Department of Energy, Morgantown, West Virginia Title: "Nonlinear dynamics in packed granular columns" April 19, 1996
45. Colloquium, Department of Physics, West Virginia University, Morgantown, West Virginia Title: "From metastability to instability in granular media: the story of dynamics near criticality" April 19, 1996
46. Condensed Matter Physics Seminar, Department of Physics and Astronomy, Michigan State University, East Lansing, Michigan Title: "Granular media: between the liquid and solid states" May 15, 1995
47. Condensed Matter Physics Seminar, Department of Physics, Carnegie-Mellon University, Pittsburgh, Pennsylvania Title: "Dynamics of dry granular media" October 5, 1995
48. Colloquium, Department of Physics, State University of New York at Buffalo, Buffalo, New York Title: "Atomistic simulations of 2D systems on substrates" February 11, 1994
49. Materials Science Seminar, Department of Theoretical Physics and The Clarendon Laboratory, The University of Oxford, Oxford, United Kingdom Title: "Atomistic simulations of 2D systems on substrates" May 17, 1994
50. Colloquium, Department of Physics, The Bose Institute, The University of Calcutta, Calcutta, India Title: "Atomistic simulations of 2D systems on substrates" June 21, 1994
51. Condensed Matter Physics Seminar, Department of Physics, Kansas State University, Manhattan, Kansas Title: "Avalanches in Granular Media" February 8, 1993
52. Condensed Matter Physics Seminar, Department of Physics and Brockhouse Institute for Materials Research, McMaster University, Hamilton, Ontario, Canada, Title: "Long time dynamics in many body systems using continued fractions" May 11, 1993
53. A.L. Laskar Memorial Colloquium, Department of Physics and Astronomy, Clemson University, Clemson, South Carolina, Title: "Some recent developments in non-equilibrium many body physics." September 5, 1991
54. Condensed Matter Physics Seminar, Department of Physics, Indian Institute of Science, Bangalore, India Title: "On the low temperature structure of graphite intercalation compounds." December 11, 1991

55. Colloquium, Department of Physics, Indian Institute of Science, Bangalore, India Title: "Quantum spin dynamics of the Transverse Ising and XY models." December 13, 1991
56. Theory Seminar, Department of Applied Mathematics, Center for Advanced Study in Applied Mathematics, University College of Science and Technology, The University of Calcutta, Calcutta, India Title: "Time evolution in quantum spin systems." December 31, 1991
57. Condensed Matter Physics Seminar, Department of Physics and Astronomy, Michigan State University, East Lansing, Michigan Title: "The transverse dynamics of the Ising model." January 11, 1990

#### **Public Lectures:**

1. Public Lecture at the Western New York Science and Technology Forum of SUNY-Buffalo, Title: "Battles – just what is winning anyway?" October 31, 2007
2. Provost's Summer Lecture, State University of New York at Buffalo, Title: "Detection of Abandoned Land Mines" June 5, 2003
3. Land Mine Lecture, Rotary Club International, Calcutta, India, Title: "Detection of Abandoned Land Mines" July 21, 2003
4. College of Arts and Sciences Featured Lecture, State University of New York at Buffalo, Title: "Incorporating nonlinearity: new possibilities in basic science and high technology." October 2, 2002
5. Public lecture at the Western New York Science and Technology Forum of SUNY-Buffalo (The primary audience of this lecture was high school teachers) Title: "Land mines" January 5, 2000
6. Science Alumni Lecture, Faculty of Natural Science and Mathematics, State University of New York at Buffalo, Buffalo, New York, Title: "Detection of land mines: a scientific perspective" January 28, 1998

#### **Grant Support**

##### Research Grants

Title: Computational study of "breathing" type processes in driven, confined, granular alignments

PI: Surajit Sen

Amount: \$210,000 (3 years), 100% Physics

Source: Army Research Office – Solid Mechanics Division

Person Months Committed to the Project: 1.2 summer months

Period: 2008-2011

Title: CSUMS: URGE to compute

PI: J Ringland & J Carbonara, co PI: S. Sen, E.B. Pitman and D. Moore-Russo

Amount: \$1,100,000 (5 years), 20% Physics (currently ranked #2 among ~40 proposals)

Source: National Science Foundation

#### Past Support

Title: Roles of Intelligence, Exposure, Strategy and Weapons in Model Battles

PI: Surajit Sen

Source: Army Research Office – Mathematics Division

Amount: \$50,000 (STIR)

Person Month Committed to the Project: 1 summer month

Period: 7/2007-2/2009

Title: Study of Absorption of Long-lived Shocks by Tapered Granular Chains

PI: Surajit Sen

Source: Army Research Office – Solid Mechanics Division - Add-on for ARO Grant 49038.

Amount: \$ 50,000

Person Month Committed to the Project: 1 summer month

Period: 7/2007-12/2007 – renewed / paper work in progress

NASA – Dust Mitigation Project

(This was a subcontract of a \$15 Million NASA Contract No. NNM05AA88C Awarded to Colorado School of Mines, PI: Masami Nakagawa)

Amount: \$400,000 (Cost of Project at SUNY-Buffalo)

Period:\* April 2005- March 2009\* (This is one of the 84 major initiatives recently suspended by NASA)

National Science Foundation - Division of Engineering, Dynamic Systems and Control, Civil and Mechanical Systems

Title: "Impulse propagation in granular beds"

Amount: \$ 186,000 Sen's share was 100%

Period: September 2000 - August 2004

U.S. Department of Energy - Sandia National Laboratories

Title: "Particle dynamical study of stress fluctuations and acoustic propagation in granular assemblies"

Amount: \$ 27,159, Sen's share was 100%,

Period: May 1998- August 2002

U.S. Army Corps of Engineers

Title: "Detection of small, buried, metal-poor objects using acoustic backscattering in shallow granular beds: Simulational and experimental studies" (Co-PI: M.J. Naughton)

Amount: \$ 28,579, Sen's share was 75%

Period: July 1997 - December 1998

#### Internal Grants

UB2020 Scholar's Fund (with Co-PI as Murali Ramanathan) – A physical model for lesion dynamics in multiple sclerosis

Amount: \$ 15,000, Sen's share is 50%

Period: March 2006 – May 2007

IRCAF (SUNY-Buffalo) on Nanoscale self assembly and grain ejection (with Hao Zeng, Physics and David Watson, Chemistry)

Amount: \$ 25,000, Sen's share is 25%

Period: November 2004-October 2005.

Office of the Vice-President, SUNY-Buffalo, Multidisciplinary Pilot Project Award

Title: "An ultrafast ferrofluid drop printer using a novel technique for high resolution printing" (Co-PIs: N.A. Ashgriz, Mechanical and Aerospace Engg and B.A. Weinstein, Physics)

Amount: \$ 20,000, Sen's share was 50%

Period: May 1996 - December 1997

All University Research Initiation Grant, Michigan State University (PI: S.D. Mahanti, Co-PI: S. Sen)

Title: "Dynamics of Martensitic phase transformations"

Amount: \$ 8998

Period: January 1991 - December 1991

Support for Conference Organization

Indo-US Workshop on Peer Reviewed Online K-12 (10+2) Science Education (PROKSE)

US-India Science and Technology Forum (funded by National Academy of Sciences, USA and Department of Science and Technology, India) Grant of \$38,000 in support of the US-India Workshop on Peer-Reviewed Online K-12 (10+2) Science Education, Nagpur, Maharashtra, India, July, 2003. Co-PI: Professor Vinod K. Gaur, Indian Institute of Astrophysics and Centre for Mathematical Modelling and Analysis and Computer Simulations, Bangalore, India.

Materials Research Society Symposium MM: Granular Material Based Technologies"

MRS Symposium Funding (Organizers: Sen, Hunt and Hurd)

U.S. Department of Energy - Basic Energy Sciences (Co-PI: Melany Hunt, Calif. Inst. of Tech., Alan J. Hurd, Los Alamos National Labs, Robert Pachavis, MRS), support for Materials Research Society Symposium

Title: "Symposium MM: Granular Material Based Technologies"

Amount: \$ 5,000

Period: December 2002-November 2003.

Schlumberger-Doll Research (PI: Melany Hunt, Calif. Inst. Tech., Alan J. Hurd, Los Alamos National Labs, Robert Pachavis, MRS) support for Materials Research Society Symposium

Title: "Symposium MM: Granular Material Based Technologies"

Amount: \$ 1500

Period: December 2002-November 2003

National Aeronautics and Space Administration (Co-PI: Robert Pachavis, MRS) to support Materials Research Society Symposium

Title: " Symposium MM: Granular Material Based Technologies "

Amount: \$ 3,000 (1 year)

APCTP International Symposium on "Slow Dynamical Processes in Nature"

Korean Government and Asia Pacific Center for Theoretical Physics, Seoul, Korea for Organizing the International Workshop on Slow Dynamical Processes in Nature, November 25-27, 2001, Seoul, Korea.

Amount: \$ 25,000.  
 Period: October 2001-February 2002

Materials Research Society Symposium BB titled "The Granular State"  
 U.S. Department of Energy - Sandia National Laboratories (Co-PI: Melany Hunt, Calif. Inst. of Tech., Robert Pachavis, MRS), support for Materials Research Society Symposium  
 Title: "Symposium BB: The Granular State"  
 Amount: \$ 2500  
 Period: April 2000-March 2001

Schlumberger-Doll Research (PI: Melany Hunt, Calif. Inst. Tech., Robert Pachavis, MRS) support for Materials Research Society Symposium  
 Title: "Symposium BB: The Granular State"  
 Amount: \$ 1000  
 Period: April 2000-March 2001

Materials Research Society (Co-PI: Melany Hunt, Calif. Inst. Tech., Robert Pachavis, MRS), support for Materials Research Society Symposium  
 Title: "Symposium BB: The Granular State"  
 Amount: \$ 2500  
 Period: April 2000-March 2001

National Science Foundation - Division of Materials Research (Co-PI: Robert Pachavis, MRS) to support Materials Research Society Symposium  
 Title: "Symposium BB: The Granular State"  
 Amount: \$ 3,000 (1 year)

## **Publications<sup>1,2</sup>**

### **Inventions and Patent Disclosures**

1. Krishna Shenai, Nathan Jack, Supratik Mukhopadhyay, and Surajit Sen, "Wireless sensor network for simplified and automated remote geophysical exploration," Intellectual property disclosure filed to Utah State University and to SUNY-Buffalo on February 15, 2007.
2. Surajit Sen, "Device and concept for novel shock absorbing structures," Provisional patent, Serial Number 60/411,361 (USPTO), File Number 11520.0283 (Hodgson Russ LLP), Docket number R-5698 (SUNY-Buffalo), filed on September 17, 2002. This invention was not pursued by SUNY for Non-provisional patent.
3. Surajit Sen and Michael J. Naughton, "System for detection of buried objects," U.S. Patent No. 6,418,081 (awarded, July 9, 2002)

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<sup>1</sup> Press coverage on selected research are mentioned in <http://www.physics.buffalo.edu/~sen/press-coverage.htm>

<sup>2</sup> Professor J. Hong of Seoul National University and I have committed (signed a contract) to write a review article on the Physics of Solitary Waves in Granular Media with the journal "Physics Reports" (Impact factor = 14.742, Science Citation Index, Category = Physics, Multidisciplinary).

**Edited Volumes:**

1. Surajit Sen, Melany L. Hunt and Alan J. Hurd, Editors, "Granular Material Based Technologies," Materials Research Society Symposium Proceedings Volume **759** (Materials Research Society, Warrendale, PA, 2003).
2. Surajit Sen, Jongbae Hong and Michio Tokuyama, Editors, Proceedings of the International Symposium on Slow Dynamical Processes in Nature, Physica A Vol. **315** (special issue), November 15, 2002.
3. Surajit Sen and Melany Hunt, Editors, "The Granular State," Materials Research Society Symposium Proceedings Volume **627** (Materials Research Society, Warrendale, PA, 2001)

**Publications<sup>3</sup>**

## Refereed Journals

**2009**

116. Diankang Sun, Chiara Daraio and Surajit Sen\*  
"On the nonlinear contact forces between two solids of revolution"  
Europhysics Letters (7/2009)
115. Robert P. Simion, Adam Sokolow and Surajit Sen\*  
"Breathing in a Driven Granular Chain"  
Applied Physics Letters (accepted and in press, 2009)
114. Surajit Sen and T.R. Krishna Mohan  
"Dynamics of Metastable Breathers in Nonlinear chains in acoustic vacuum"  
Physical Review E **79**, 036603(2009)
113. Edgar Avalos+ and Surajit Sen\*  
"How solitary waves collide in discrete granular alignments"  
Physical Review E **79**, 046607 (2009)
112. Robert L. Doney+, Juan H Agui,# and Surajit Sen\*  
"Controlling energy transport through granular chains – the decorated, tapered chain"  
Journal of Applied Physics in press (2009)
111. Diankang Sun, Edgar Avalos, Robert L. Doney, Robert P. Simion, Adam Sokolow and Surajit Sen  
"Nonlinear, statistical and applied physics of solitary waves in granular systems,"  
M. Nakagawa and S. Luding Eds., Powders and Grains 2009, AIP Conf. Proc. **1145**, pp 431-435 (2009)
110. Linda Shanahan and Surajit Sen  
"Gradually infiltrating enemy territory – strategy against disorder,"

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<sup>3</sup> Names of students and postdocs are indicated by "+", of collaborators by "#" and of the senior author is indicated by "\*"

Proceedings of the International Conference on Social Network Analysis 2009, New Delhi, India (accepted and in press, 2009).

109. Taehyong Kim+, Aidong Zhang#, Woo-Chang Hwang+, Murali Ramanathan\*, and Surajit Sen\*  
 “Damage isolation via strategic self-destruction: a case study in 2D random networks,”  
Europhysics Letters **86**, 24002-1-24002-5 (2009).

## 2008

108. Linda Shanahan# and Surajit Sen\*  
 “Simulation of a battle on a lattice – determining a winner”  
International Journal of Modern Physics E **17**, pp 924-929 (2008) (Invited paper)

107. T.R. Krishna Mohan+, Surajit Sen\* and Murali Ramanathan\*  
 “A computational model for lesion dynamics in multiple sclerosis in the brain”  
International Journal of Modern Physics E **17**, pp 930-939 (2008) (Invited paper)

106. Taehyong Kim+, Woochang Hwang+, Aidong Zhang\*, Surajit Sen\* and Murali Ramanathan\*  
 “Multi-agent model analysis of the containment strategy for avian influenza in South Korea,”  
IEEE Conference Proceedings on Bioinformatics and Biomedicine, 2008, BIBM '08, pp. 335-338 (IEEE, Philadelphia, 2008)

105. Surajit Sen\*, Jong bae Hong\*, Jonghun Bang+, Edgar Avalos+ and Robert Doney+  
 “Solitary waves in granular chains”  
Physics Reports **462**, pp 21-66 (2008) [Impact Factor = 20.263]

## 2007

104. Surajit Sen\*, A. Sokolow+, R.P. Simion+, D. Sun+, R.L. Doney+, M. Nakagawa#, J.H., Agui, Jr.# and K. Shenai#, Ocean waves, mechanical impulses and electrical energy: concept of a simple conversion process, Advances in Energy Research 2007 (Macmillan, Delhi, 2007), pp 329-334

103. Edgar Avalos+, Robert L. Doney+ and Surajit Sen\*  
 “Interaction of solitary waves in confined granular alignments and the quasi-equilibrium state”  
Chinese Journal of Physics **45**, 666-674 (2007)

102. Stephane Job#, Francisco Melo#, Adam Sokolow+ and Surajit Sen\*  
 “Solitary wave trains in granular chains: experiments, theory and simulations”  
Granular Matter **10**, 13-20 (2007) [Impact Factor = 1.9]

101. Laura E. Gilcrist+, Gregory S. Baker\* and Surajit Sen\*  
 “Preferred frequencies for three unconsolidated Earth materials”  
Applied Physics Letters **91**, 254103 (2007)

100. Laura E. Gilcrist+, Gregory S. Baker\*, Saravanan Swaminathan+, Donald P. Visco, Jr.+, Ramesh Bharadwaj#, Supratik Mukhopadhyay#, Krishna Shenai\* and Surajit Sen\*  
 “Acoustic interrogation of soil and the remote detection of shallow buried inclusions,”  
IEEE Northeast Workshop on Circuits and Systems, NEWCAS 2007, pp 758-761 (2007). (Invited refereed paper)

99. Surajit Sen

“Mechanical energy propagation in granular alignments: basic physics and applications”

Proceedings of the 19<sup>th</sup> International Conference on Acoustics (Invited, published as refereed electronic proceedings in a CD) Madrid, Spain, 2007

98. Saravanan Swaminathan<sup>+</sup>, Donald P. Visco<sup>#</sup> and Surajit Sen<sup>\*</sup>

“Detection of shallow buried objects in dry granular beds using mechanical energy”

Applied Physics Letters **90**, 154107 (2007). [Impact Factor = 4.308]

97. Adam Sokolow<sup>+</sup> and Surajit Sen<sup>\*</sup>,

“Exact solution of ballistic dynamics through random layered systems and number triangles,”

Annals of Physics **322**, 2104-2113 (2007) [Impact Factor = 2.596]

96. Adam Sokolow<sup>+</sup>, Emily G. Bittle<sup>+</sup> and Surajit Sen<sup>\*</sup>,

“Formation of solitary wave trains in granular alignments,”

Europhysics Letters **77**, 24002-1-24002-4 (2007) [Impact Factor = 2.352]

95. Edgar Avalos<sup>+</sup>, Jan M.M. Pfannes<sup>+</sup>, T.R. Krishna Mohan<sup>+</sup> and Surajit Sen<sup>\*</sup>,

“A numerical study of the dynamics of the surface grain in a granular chain and the role of gravity”

Physica D **225**, pp. 211-218 (2007).

94. M. Benedict, E. Debowska, B. Eckert, S. Feiner-Valkier, H.J. Jold, L. Mathelitsch, E. Sassi, R. Sporken,

T. Bradfield, T. Colbert, B. Mason, T. Melder, J. Rauber and S. Sen, “Report and recommendations on

available multimedia material for solid state, nuclear and particle physics,” Proceedings of the XII<sup>th</sup> European Workshop (MPTLXII), Wroclaw, Online Proceedings of the European Physical Society (2007).

## 2006

93. Surajit Sen,

“A tutorial on solving the Liouville equation: a formalism and an example,”

Physica A **360**, pp 304-324 (2006) (published online in July 2005) [Invited Review] [Impact Factor = 1.369]

92. Robert L. Doney<sup>+</sup> and Surajit Sen<sup>\*</sup>

“The decorated, tapered, highly nonlinear granular chain”

Physical Review Letters **97**, pp. 155502-1-155502-4 (2006) [Impact factor: 7.218]

91. M. Benedict<sup>#</sup>, E. Debowska<sup>#</sup>, B. Eckert<sup>#</sup>, S. Geiner-Walker<sup>#</sup>, H.J. Jodl<sup>#</sup>, L. Mathelitsch<sup>#</sup>, I. Ruddock<sup>#</sup>,

E. Sassi<sup>#</sup>, R. Sporken<sup>#</sup>, T. Bradfield<sup>#</sup>, T. Colbert<sup>#</sup>, B. Mason<sup>\*</sup>, T. Meldor<sup>#</sup>, J. Rauber<sup>#</sup> and S. Sen

“Report and recommendations on available multimedia material for electricity and magnetism”

Proceedings of the XI<sup>th</sup> European Workshop (MPTL XI), Szeged, Online Proceedings of the European Physical Society (2006).

## 2005

90. Adam Sokolow<sup>+</sup>, Jan M.M. Pfannes<sup>+</sup>, Robert L. Doney<sup>+</sup>, Masami Nakagawa<sup>#</sup>, Juan H. Agui<sup>#</sup> and Surajit Sen<sup>\*</sup>,

“Impulse absorption in small tapered chains,”

Applied Physics Letters **87**, 254104 (3 pages) (2005) [Impact Factor = 4.308]

89. Robert L. Doney<sup>+</sup> and Surajit Sen<sup>\*</sup>,  
 “Impulse absorption by tapered horizontal alignments of elastic spheres,”  
Physical Review E **72**, pp 041304-1-041304-11 (2005) [Impact Factor = 2.352]<sup>4</sup>

88. Surajit Sen<sup>\*</sup>, T.R. Krishna Mohan<sup>+</sup>, Donald P. Visco, Jr.<sup>+</sup>, Saravanan Swaminathan<sup>+</sup>, Adam Sokolow<sup>+</sup>,  
 Edgar Avalos<sup>+</sup> and Masami Nakagawa<sup>#</sup>  
 “Using mechanical energy as a probe for the detection and imaging of shallow buried inclusions in dry  
 granular beds”  
International Journal of Modern Physics B **19**, No. 18, pp 2951-2974 (2005) [Invited Review] [Impact  
 Factor = 0.361]

87. Surajit Sen<sup>\*</sup>, Jan M.M. Pfannes<sup>+</sup> and T.R. Krishna Mohan<sup>+</sup>,  
 “The quasi-equilibrium state: a tale of certain soundless systems,”  
J. of Korean Physical Society vol. **46**, 571-573 (2005). [Invited contribution to Special Issue] [Impact  
 Factor = 1.383]

86. T.R Krishna Mohan<sup>+</sup> and Surajit Sen<sup>\*</sup>,  
 “A new equilibrium phase in discrete nonlinear chains,”  
Pramana – J. of Physics vol. **64**, 423-431 (2005). [Invited contribution to Special Issue] [Impact Factor =  
 0.301]

85. Stephane Job<sup>+</sup>, Francisco Melo<sup>#</sup>, Adam Sokolow<sup>+</sup> and Surajit Sen<sup>\*</sup>,  
 “How Hertzian solitary waves interact with boundaries in a 1D granular medium,”  
Physical Review Letters vol. **94**, 178002-1-178002-4 (2005). [Impact Factor = 7.218]

84. Surajit Sen<sup>\*</sup> and Sharmistha Bagchi-Sen<sup>#</sup>  
 “Science education for rural children: focus on the middle schools in the developing world”  
Proceedings of the International Conference on Physics Education 2005, New Delhi, India (World  
 Scientific, Singapore, in press).<sup>5</sup>

83. Robert L. Doney<sup>+</sup> and Surajit Sen,  
 “Shock mitigation for blast protection using tapered Hertzian chains”  
Proceedings of the 22<sup>nd</sup> International Ballistics Symposium, Vol. 9, Vancouver, Canada, November 2005  
 Eds. W.J. Flis, and B.R. Scott, (DESTech Publications, Lancaster, PA, 2005), pp. 702-708.

82. M. Benedict<sup>#</sup>, E. Debowska<sup>#</sup>, H.J. Jodl<sup>#</sup>, L. Mathelitsch<sup>#</sup>, R. Sporcken<sup>#</sup>, T. Bradfield<sup>#</sup>, T. Colbert<sup>#</sup>, B.  
 Mason<sup>\*</sup>, T. Meldor<sup>#</sup>, S. Sen<sup>#</sup>, P. Sheldon<sup>#</sup> and J. Rauber<sup>#</sup>  
 “Report and recommendations on available multimedia material for teaching statistical and thermal  
 physics”  
Proceedings of the Xth European Workshop (MPTL X), Berlin, Online Proceedings of the European  
 Physical Society (2005).

<sup>4</sup>Journal Impact Factors are obtained whenever possible from Science Citation Index. When a listing was not found  
 in Science Citation Index, the following website was used: <http://www.sciencegateway.org/impact/if02a.html>.

<sup>5</sup> There appears to have been some problem with regard to publication of this volume. The work appears here -  
 American Chapter of the Indian Physics Association, Summer 2007 Newsletter  
 ([http://theacipa.org/summer\\_2007.htm](http://theacipa.org/summer_2007.htm))

**2004**

81. Surajit Sen<sup>\*</sup>, T.R. Krishna Mohan<sup>+</sup> and Jan M.M. Pfannes<sup>+</sup>,  
 “The quasi-equilibrium phase in nonlinear 1D systems”  
Physica A vol. **342**, pp. 336-343 (2004). [Invited contribution to Special Issue]. [Impact Factor = 1.369]
80. Surajit Sen,  
 “Nanoprinting with Nanoprinters: Concept of a novel inkjet printer with possible applications in the invisible tagging of objects,”  
J. of Dispersion Science and Technology, vol\_25, no. 4, pp. 523-528 (2004) [Invited contribution to Special Issue]. [Impact Factor = 0.444]
79. D.P. Visco, Jr.<sup>+</sup>, S. Swaminathan<sup>+</sup>, T.R. Krishna Mohan<sup>+</sup>, Adam Sokolow<sup>+</sup> and Surajit Sen<sup>\*</sup>,  
 “Impulse penetration into idealized granular beds: Behavior of cumulative surface kinetic energy,”  
Physical Review E vol. **70**, pp 051306-1-051306-7(2004). [Impact Factor = 2.352]
78. T.R. Krishna Mohan<sup>+</sup>, Surajit Sen<sup>\*</sup> and M. Nakagawa<sup>#</sup>,  
 “Removing dust from confined air volumes – a toy model,”  
Proceedings of International Conference on Environmental Systems, Colorado Springs, July 2004  
 (Electronic Publication as a CD, SAE, Pittsburgh, 2004).
77. A. Sokolow<sup>+</sup>, Surajit Sen<sup>\*</sup> and M. Nakagawa<sup>#</sup>,  
 “Periodic dynamics in driven granular chain systems,”  
Proceedings of International Conference on Environmental Systems, Colorado Springs, July 2004  
 (Electronic Publication as a CD, SAE, Pittsburgh, 2004).
76. M. Benedict<sup>#</sup>, E. Debowska<sup>#</sup>, H.J. Jodl<sup>#</sup>, L. Mathelitsch<sup>#</sup>, R. Sporcken<sup>#</sup>, T. Bradfield<sup>#</sup>, T. Colbert<sup>#</sup>, L. Keiner<sup>#</sup>, B. Mason<sup>\*</sup>, T. Meldor<sup>#</sup>, S. Sen<sup>#</sup> and J. Rauber<sup>#</sup>  
 “Report and recommendations on available multimedia material for teaching mechanics at school and university level”  
Proceedings of the IXth European Workshop (MPTL IX), Graz, Online Proceedings of the European Physical Society (2004).

**2003**

75. T.R. Krishna Mohan<sup>+</sup> and Surajit Sen<sup>\*</sup>,  
 “Impulse backscattering in granular beds: Introducing a toy model,”  
Physical Review E (Rapid Communications) vol. **67**, pp. 060301-1-060301-4 (R)(2003).[Impact Factor = 2.352]
74. Jan Pfannes<sup>+</sup>, Surajit Sen<sup>\*</sup>, Soumya Chakravarti<sup>#</sup> and Farhat Surve<sup>+</sup>  
 “Energy absorption and recovery in tapered granular chains: small chains and low tapering,” Eds. S. Sen, M. L. Hunt and A.J. Hurd, “Granular Material Based Technologies,” Materials Research Society Symposium Proceedings Vol **759**, pp. 147-154 (MRS, Warrendale, 2003).
73. Surajit Sen<sup>\*</sup>, D.P. Visco, Jr.<sup>+</sup> and T.R. Krishna Mohan<sup>+</sup>,  
 “Impulse backscattering based detection and imaging of shallow buried objects,” Eds. S. Sen, M. L. Hunt and A.J. Hurd, “Granular Material Based Technologies,” Materials Research Society Symposium Proceedings. Vol **759**, pp. 65-72 (MRS, Warrendale, 2003).

72. Surajit Sen<sup>\*</sup>, S. Chakravarti<sup>#</sup>, D.P. Visco, Jr.<sup>+</sup>, M. Nakagawa,<sup>#</sup> J. Agui, Jr.<sup>#</sup> and D.T. Wu<sup>#</sup>,  
 "Impulse propagation in granular systems,"  
Proceedings of PASI on Modern Challenges in Statistical Mechanics, American Inst of Physics Conference Proceedings, vol. **658**, pp. 357-379 Eds. V.M. Kenkre and K. Lindenberg (AIP, New York, 2003).

## 2002

71. Felicia S. Manciu<sup>+</sup> and Surajit Sen<sup>\*</sup>,  
 "Secondary solitary wave formation in generalized Hertz chains,"  
Physical Review E **66**, pp. 016616-1 -016616-11 (2002). [Impact Factor = 2.352]

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## 2000

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## 1999

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### 1996

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**1993**

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**1992**

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9. Hyangsuk Seong<sup>+</sup>, Surajit Sen, Tahir Çagin<sup>#</sup> and S.D. Mahanti<sup>\*</sup>,  
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## 1991

6. Surajit Sen<sup>\*</sup>, Tahir Çagin<sup>#</sup>, Hyangsuk Seong<sup>+</sup> and S.D. Mahanti<sup>#</sup>,  
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 [Proceedings of Workshop on Computer Simulations in Condensed Matter, The University of Georgia, Athens, Georgia, February, 1991]
5. Surajit Sen<sup>\*</sup>, S.D. Mahanti<sup>#</sup> and Zhi-Xiong Cai<sup>+</sup>,  
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4. Surajit Sen,  
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**1990**

2. J.W. Halley<sup>\*</sup>, Stephen Davis<sup>+</sup> and Surajit Sen,  
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Physica B vol. **165&166**, pp. 999-1000 (1990).  
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**1985**

1. Surajit Sen,  
“A statistical mechanical approach to mass density fluctuations in the Early Universe,”  
Lettere al Nuovo Cimento vol. **44**, pp. 270-274 [This journal does not exist any more. It has been merged with Europhysics Letters. No Impact Factor is hence available]

**Reports:****2005**

Report to US Army Research Laboratory, Aberdeen Proving Ground, Maryland, titled “Ordered Granular Media for Shock Mitigation,” (Robert Doney<sup>+</sup> & Surajit Sen<sup>\*</sup>), ARL-TR 3612, May 2005, Aberdeen Proving Grounds, Maryland [These contributions are refereed by the US Army Technical Report Editors].

**2003**

Report to the Indo-US Forum on Science and Technology on Progress in the Indo –US Workshop on Peer Reviewed Online K-12 (10+2) Science Education, July 2003, New Delhi, India (can be found online at [http://www.physics.buffalo.edu/~sen/documents/report\\_final.pdf](http://www.physics.buffalo.edu/~sen/documents/report_final.pdf))

## Professional Service & Outreach

2009	Outreach Committee Member and participant – International Year of Astronomy celebrations in Physics Department
2008, 2009	Research mentoring for Erie BOCES Program students Melissa Judson (2008) and Emily Bowser (2009) of Clarence High School
2007 Spring	Instructor in Freshman Discovery Seminar titled, “The Nonlinear World”
2007 Fall	Instructor in Freshman Discovery Seminar titled, “The Nonlinear World”
2007-2010	Member, American Physical Society Committee on International Scientific Affairs
2006-2009	Organizing/Advisory Committee, Powders and Grains 2009
2005	Panelist, Book Forum, Addison-Wesley, March 19, San Francisco, CA
2002-2003	Book Reviewer for Prentice-Hall (9 <sup>th</sup> Grade Physics Textbook)
2002-2003	Principal Investigator, APS Study “The detection of anti-personnel landmines for humanitarian de-mining: evaluation of technologies” (with A.M. Sessler, Lawrence Berkeley Labs)
2000	Selected to be a member of the Upstate Alliance for Innovation (the project is funded by the National Science Foundation and sponsored by SUNY-Buffalo, University of Rochester, Rochester Institute of Technology and the cities of Buffalo and Rochester).
2000-Present	Reviewer, Physica D (Amsterdam).
2007	Reviewer, Ultrasonics
2000	Nominated by the Topical Group on Statistical and Nonlinear Physics of the American Physical Society for election to the Executive Committee as a Member-at-large
1998-Present	Reviewer, Journal of the American Institute of Aeronautics and Astronautics (U.S.A.)
1998	Member, Advisory Committee for the International Workshop on Granular Physics: Statics, Excitations and Dynamics, Organized by the Center for Advanced Studies, The University of New Mexico, Sandia National Laboratories and Los Alamos National Laboratory, Albuquerque, New Mexico
1997	Visiting Scholar (August 1997), Asia Pacific Center for Theoretical Physics, Korea Advanced Institute of Science and Technology, Seoul, Korea
1999-Present	Reviewer, U.S.-Israel Binational Science Foundation research proposals
1997-Present	Reviewer, United States Department of Energy - Office of Basic Energy Sciences research proposals
1996-Present	Reviewer, Division of Condensed Matter Physics - Materials Theory research proposals, National Science Foundation
1996	Book Review for Bartlett & Jones Inc.
1996-Present	Reviewer, American Chemical Society - Petroleum Research Fund
1992-Present	Reviewer, Physical Review A, B and E and Physical Review Letters (U.S.A.)
1990-Present	Reviewer, Journal of Physics: Condensed Matter, Journal of Physics A: Mathematical and General, Europhysics Letters (Institute of Physics, U.K.)

## Academic Service at SUNY-Buffalo

2007-Present	Member, Provost’s Task Force to plan the creation of a UB Institutional Repository
2007-Present	Member, Vice Provost for Undergraduate Education Committee on Freshman Seminars
2007-Present	Member, Barry M. Goldwater Scholarship Committee, SUNY-Buffalo
2000-Present	Member of the Council on International Studies and Programs at SUNY-Buffalo
1998-Present	Team Member, Qualifying Examination Administration Committee
1995-Present	Member, Graduate Studies Committee, Department of Physics

2004-2005	Chair, Biological Physics Search Committee (members: J.T. Ho, A. Markelz, G. Snyder, H. Zeng)
2004-2006	Chair, Graduate Recruitment Committee
2003	Organizer, Head Start 2003: A UB Physics Symposium, November 1, 2003 (this program invites talented undergraduates from regional institutions to UB to recognize them for their research accomplishment and to provide a forum for them to present their work)
2003	Member, Physics Dept. Library Task Force
2002-2004	Member, Advisory Committee to the Chair, Department of Physics
2002-2003	Member, Undergraduate Studies Committee
2000-2002	Member, Technology Advisory Panel, (Physical Sciences and Technology) Office of the Provost, SUNY-Buffalo
1999	Invited member of a panel organized by the Dean, College of Arts and Sciences, State University of New York at Buffalo, to assess and forecast "research productivity and potential for expansion," of the College over the next several years
1999	Chair & Organizer, Symposium titled, "Modern Science and Technology (MOST) I," for the High School Students and Physics, Chemistry and Biology Teachers of Western New York, November 20, 1999 at the State University of New York at Buffalo
1998	Chair & Organizer Western New York/UB Physics Workshop for High School Physics Teachers, Jeanette Martin Room, May 9, 1998, State University of New York at Buffalo
1998-2004	Chair, Outreach Committee, Department of Physics
1997-1998	Member, Alumni and Corporate Sponsors Committee, Department of Physics
1997-1998	Departmental Special Assignment, Physics in the 21 <sup>st</sup> Century Program, Department of Physics
1997-1999	Member, Advisory Committee to the Chair, Department of Physics (Elected)
1996-1997	Member, Computing Committee, Department of Physics
1995-1996	Representative Senator (Alternate) from the Department of Physics, Faculty Senate, State University of New York at Buffalo
1994-1996	Coordinator, World Wide Web Project, Department of Physics
1995-1997	Chair, Seminar Committee, Department of Physics
1994-Present	Organizer, Many Body Theory & Statistical Physics Seminar Series, Department of Physics
1994-1995	Library Liaison of the Department of Physics

#### **Conference Presentations (National Meetings, Non Refereed)<sup>6</sup>**

American Physical Society March Meeting, Pittsburgh, PA, March 16-20, 2009

Titled: "Granular breathing"

Surajit Sen, Robert P. Simion and Adam Sokolow

American Physical Society March Meeting, New Orleans, Louisiana, March 11-15, 2008

Titled: "Battle between an insurgent army and an advanced army – focus on strategy"

Linda Shanahan and Surajit Sen

American Physical Society March Meeting, New Orleans, Louisiana, March 11-15, 2008

Titled: "Breathing phenomena in driven, confined granular chains"

Linda Shanahan and Surajit Sen

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<sup>6</sup> Presentations made by S. Sen unless indicated otherwise.

American Physical Society March Meeting, Denver, Colorado, March 5-8, 2007

Titled: "Quasi-equilibrium in tapered chains"

Robert L. Doney and Surajit Sen

American Physical Society March Meeting, Denver, Colorado, March 5-8, 2007

Titled: "What decides if a smarter army can win a battle?"

Linda Shanahan and Surajit Sen (presented by Shanahan)

American Physical Society March Meeting, Baltimore, Maryland, March 13-17, 2006

Titled: "The solitary wave collision problem in granular alignments"

Edgar Avalos, Surajit Sen, Jan Pfannes and T.R. Krishna Mohan

American Physical Society March Meeting, Baltimore, Maryland, March 13-17, 2006

Titled: "The decorated tapered chain as a granular shock absorber"

Robert Doney , Surajit Sen , Dorian DiCocco (presented by Doney)

American Physical Society March Meeting, Baltimore, Maryland, March 13-17, 2006

Titled: "Shock absorption by small, scalable, tapered granular chains"

Jan Pfannes , Adam Sokolow , Robert Doney , Masami Nakagawa , Juan Agui , Surajit Sen

American Institute of Chemical Engineers (AIChE) Annual Meeting

October 30-November 4, 2005, Cincinnati, Ohio

Titled: "Landmine detection in granular beds: Behavior of Cumulative Surface Kinetic Energy" (with S. Swaminathan and D.P. Visco, Jr.) Presentation to be made by Saravanan Swaminathan (presented by Visco)

American Physical Society, March Meeting, 2000

Minneapolis, Minnesota

Titled: Ejection of ferrofluid grains from a ferrofluid using nonlinear acoustic impulses" (with Felicia Manciu and Marian Manciu)

Titled: "Dynamics of a gravitationally loaded chain of elastic beads" (with Victoria Tehan, Marian Manciu and Alan J. Hurd)

Titled: "Impulse Propagation in Disordered Hertzian Chains" (with Marian Manciu and Alan J. Hurd)

American Physical Society, March Meeting, 1999

Atlanta, Georgia

Titled: "Solitons and soliton-like objects in granular media: I propagation and dispersion" (with Marian Manciu) [Bull. Am. Phys. Soc. Vol. 44, p. 440 (1999)]. (Presentation made by M. Manciu)

Titled: "Solitons and soliton-like objects in granular media: II Backscattering from buried inclusions" (with Marian Manciu) [Bull. Am. Phys. Soc. Vol. 44, 440 (1999)]. (Presentation made by M. Manciu)

Titled: "Soliton-like objects in disordered granular assemblies" (with Marian Manciu and Alan J. Hurd) [Bull. Am. Phys. Soc. Vol. 44, 440 (1999)]. (Presentation made by M. Manciu)

American Physical Society, March Meeting, 1998

Los Angeles, California

Titled: "Stretched-exponential-like relaxation of an impurity in a  $s=1/2$  XY chain" (with T.D. Biersch) [Bull. Am. Phys. Soc. Vol. 43, 112 (1998)]

Titled: "Attempts at modeling a heat bath (with D.P. Visco, Jr.) [Bull. Am. Phys. Soc. Vol. 43, 359 (1998)]

Titled: "Solitons in Hertzian chains and columns" (with M. Manciu) [Bull. Am. Phys. Soc. Vol. 43, 525 (1998)]

Titled: "Soft-solitons in Hertzian chains with embedded impurities" (with M. Manciu) [Bull. Am. Phys. Soc. Vol. 43, 525 (1998)]

Titled: "Particle diffusion at subcritical slopes in a grain pile" (M. Diaz-Avila and S. Pal) [Bull. Am. Phys. Soc. Vol. 43, 620 (1998)]

American Physical Society, March Meeting, 1997

Kansas City, Kansas

Titled: "Instabilities in model grain piles I: Weak dissipation and robust scaling" (with S. Pal) [Bull. Am. Phys. Soc. Vol. 42, 404 (1997)] (Presentation made by S. Pal)

Titled: "Instabilities in model grain piles II: Strong dissipation and fragile scaling" (with S. Pal) [Bull. Am. Phys. Soc. Vol. 42, 404 (1997)] (Presentation made by S. Pal)

Titled: "Propagation of acoustic perturbations in granular columns" (with S. Pal, R.S. Sinkovits and J.D. Wright) [Bull. Am. Phys. Soc. Vol. 42, 330 (1997)] (Presentation made by S. Pal)

Titled: "Dynamical simulation of a possible hexatic phase in a colloidal system with  $1/r^3$  interactions" (with T. Çağın) [Bull. Am. Phys. Soc. Vol. 42, 36 (1997)] (Presentation made by T. Çağın)

American Physical Society, March Meeting, 1996

St. Louis, Missouri

Titled: "Avalanche size distributions in 2D grain piles: An extensive Molecular Dynamics study" (with S. Pal) [Bull. Am. Phys. Soc. Vol. 41, 385 (1996)]

Titled: "2D Systems on random pinning potentials: A Molecular Dynamics study of a fragile glass phase" (with Z.-X. Cai) [Bull. Am. Phys. Soc. Vol. 41, 412 (1996)]

Titled: "Slow algebraic relaxation of a classical particle in anharmonic potentials landscapes and its consequences" (with R.S. Sinkovits) [Bull. Am. Phys. Soc. Vol. 41, 487 (1996)]

American Physical Society, March Meeting, 1995

San Jose, California

Titled: "Relaxation in single impurity Heisenberg chain at  $T \rightarrow \infty$ " [Bull. Am. Phys. Soc. Vol. 40, 390 (1995)]

Titled: "Nonlinear dynamics in disordered granular column" (with R.S. Sinkovits) [Bull. Am. Phys. Soc. Vol. 40, 606 (1995)] (Presentation made by R.S. Sinkovits)

Titled: "Memory of the classical double-well oscillator" (with J.C. Phillips and S. Chakravarti) [Bull. Am. Phys. Soc. Vol. 40, 649 (1995)]

Titled: "Avalanches: Onset and nonlinearity" (with S. Pal) [Bull. Am. Phys. Soc. Vol. 40, 725 (1995)]

American Physical Society, March Meeting, 1994

Pittsburgh, Pennsylvania

Titled: "Screened Coulomb overlayers on a substrate with random pinning: Structure and dynamics" (with Z.-X. Cai and D.O. Welch) [Bull. Am. Phys. Soc. Vol. 39, 554 (1994)]

Titled: "Relaxation in a Transverse Ising chain with next nearest neighbor interactions" (with D.E. Kuhl, C.N. Hoff and D.A. McGrew) [Bull. Am. Phys. Soc. Vol. 39, 663 (1994)]

Titled: "Time-dependent behavior of the Krumhansl-Schrieffer model of displacive structural phase transitions" (with J.C. Phillips) [Bull. Am. Phys. Soc. Vol. 39, 909 (1994)]

American Physical Society, March Meeting, 1993

Seattle, Washington

Titled: "Molecular Dynamics simulations of packing and avalanches in granular media" (with R.S. Sinkovits and E.S. Oran) [Bull. Am. Phys. Soc. Vol. 38, 739 (1993)]

Titled: "Thermally activated dynamics of the classical double-well oscillator: Analytical and numerical study" (with S. Chakravarti, J.C. Phillips and S.D. Mahanti) [Bull. Am. Phys. Soc. Vol. 38, 760 (1993)]

Titled: "Dynamical spin pair correlations near a static magnetic impurity in a  $s=1/2$  Heisenberg chain" (with A.K.B. Engebretson, V.L. Gates and L.I. McCann) [Bull. Am. Phys. Soc. Vol. 38, 463 (1993)]

Titled: "Asymptotic behavior of dynamical correlations via perturbative analysis of infinite continued fractions" (with J.C. Phillips) [Bull. Am. Phys. Soc. Vol. 38, 683 (1993)]

Titled: "Onset of avalanches in granular media: Simulation and theory" (with N. Mousseau and G. Overney) [Bull. Am. Phys. Soc. Vol. 38, 738 (1993)]

Meeting of the Canadian Physical Society, July 1992

Windsor, Ontario, Canada

Titled: "Nonlinear resonances and chaos at the onset of avalanches in granular media" (with N. Mousseau and G. Overney) (Presentation made by N. Mousseau)

American Physical Society, March Meeting, 1992

Indianapolis, Indiana

Titled: "Melting on a corrugated substrate: A Molecular Dynamics study of a repulsive screened Coulomb system" (with T. Çağın, H. Seong, S.D. Mahanti) [Bull. Am. Phys. Soc. Vol. 37, 452 (1992)]

Titled: "Long time dynamics via numerical evaluation of infinite continued fractions (with Z.-X. Cai and S.D. Mahanti) [Bull. Am. Phys. Soc. Vol. 37, 69 (1992)]

Titled: "Domains and domain walls in graphite intercalation compounds" (with H. Seong, T. Çağın and S.D. Mahanti) [Bull. Am. Phys. Soc. Vol. 37, 177 (1992)]

Titled: "Spin dynamics in a two-dimensional Transverse Ising model" (with J. Florencio, Jr. and Z.-X. Cai) [Bull. Am. Phys. Soc. Vol. 37, 448 (1992)]

Titled: "Study of avalanches via molecular dynamics" (with N. Mousseau and G. Overney) [Bull. Am. Phys. Soc. Vol. 37, 322 (1992)]

American Physical Society, March Meeting, 1991

Cincinnati, Ohio

Titled: "On the low temperature structure of  $\text{RbC}_{24}$  stage 2 graphite intercalation compounds" (with H. Seong, S.D. Mahanti and T. Çağın) [Bull. Am. Phys. Soc. Vol. 36, 1000 (1991)].

Titled: "A theorem for dynamical systems with localized excitations" (with M.H. Lee) [Bull. Am. Phys. Soc. Vol. 36, 495 (1991)]

Titled: "On the transition from surface spin to bulk spin relaxation in a  $s=1/2$  nearest neighbor XY chain" (with S.D. Mahanti and Z.-X. Cai) [Bull. Am. Phys. Soc. Vol. 36, 894 (1991)] (Presentation made by S.D. Mahanti)

Titled: "Exact dynamics of the surface spin in the  $s=1/2$  semi-infinite XY chain" [Bull. Am. Phys. Soc. Vol. 36, 495 (1991)]

Titled: "When can an infinite continued fraction be truncated?" (with Z.-X. Cai) [Bull. Am. Phys. Soc. Vol. 36, 560 (1991)]

American Physical Society, March Meeting, 1989

St. Louis, Missouri

Titled: "Transverse dynamics of Ising, XY and Transverse Ising spin chains" (with M.H. Lee) [Bull. Am. Phys. Soc. Vol. 34, 932 (1989)].

Commonwealth Campus Conference,

The Pennsylvania State University, November 1987, University Park, Pennsylvania

Titled: "Dynamics of some spin systems" (with J. Florencio, Jr. and M.H. Lee) (Presentation by J. Florencio, Jr.)

Meeting of the Southeastern Section of the American Physical Society, December, 1985

Athens, Georgia

Title: "Some comments on non-perturbative modeling of mass density fluctuations in the Early Universe" [Bull. Am. Phys. Soc. Vol. 30, 1779 (1985)]

**Research Supervision:****High School Students**

Emily Bowser (2009)

Clarence High School, Clarence, NY

Project: Nonlinear dynamics of symmetrically perturbed granular alignments with an odd number of grains

Melissa Judson (2008),

Clarence High School, Clarence, NY

Project: Nonlinear Impulse penetration into layered systems

**Undergraduate Students**

Aharon Festinger, NSF-URGE Fellow (Current)

Pursuing BS, Physics & BS, Math

Project: Nonlinear acoustics of granular beds

2007-Present

Nicholas DeMeglio, NSF-URGE Fellow (Current)

Pursuing BS, Mathematical Physics

Project: Solitary waves in Nonlinear Lattices

2008-Present

Rebecca Hager, NSF-URGE Fellow (Current)

Pursuing BS, Mathematics

Project: Battle Modeling

2009-Present

Matthew Westley, NSF-URGE Fellow (Current)

Pursuing BS, Mathematical Physics

Project: Battle Modeling

2009-Present

Jorge Mok, NSF-URGE Fellow (Current)

Pursuing BS, Mathematics

Project: Battle Modeling

2009-Present

Yoichi Takato, BS (Mech Engg, Yamaguchi Univ), collaborative with J Lechman and G.S. Grest at Sandia National Labs.

Pursuing BS, Physics

Project: Quasi-equilibrium state in Hertz systems and nanoscale collisions

2009-Present

Avner Averman, McNair Scholar with Surajit Sen (McNair Mentor) (Current)

Pursuing BS, Physics

Project: Battle Studies  
2007-2008

Justin Reynard,  
Pursuing PhD in Chemistry  
UG Projects: Dust flow simulations, Study of the physics of bowling  
2007-2008

Nirmit Kumar  
Pursuing BS, Biophysics  
Projects: Dust accumulation measurements  
2008 summer

Adam Sokolow,  
BS, Physics & Mathematics, SUNY-Buffalo, 2005, currently pursuing PhD as a Graduate Fellow, Physics Department, Duke University  
Projects: Dust growth in environments, Shock absorption in loaded tapered chains  
(received outstanding research award of the College of Arts & Sciences, SUNY-Buffalo for his work on secondary solitary waves, April 2005)  
2002-2006

Jacob H. Miner,  
pursuing PhD in Physics at University of Washington, Seattle  
UG Projects: Size distribution measurements of particulates in a fluid through the filtration process, Quasi-equilibrium studies in granular systems  
2003-2003

Emily G. Bittle,  
Pursuing PhD in Physics at the University of Kentucky  
Project: Controlling the production of solitary waves in Hertz chains  
left SUNY-Buffalo in 2004 to continue her BS at SUNY-Geneseo but continued to collaborate  
2001-2004

Laura E Gilcrist,  
Completed Ph.D in Geology and BS in Geology with Physics minor, pursuing JD at SUNY Buffalo School of Law  
Project: Energy propagation and backscattering in layered systems  
2002-2009

Dorian DiCocco,  
Completed BS, Mechanical Engineering, Current position is unknown  
Project: Fabrication of tapered chain shock absorbers  
2004-2005

Kristie Beamer,  
Completed BS, Civil and Environmental Engineering, Current position is unknown  
Project: Fabrication of tapered chain shock absorbers  
2004-2005

Arvin Chang, UB NYSSISM Student from Yorktown Heights, NY  
 Worked on relaxation of nonlinear oscillators  
 BS in Computer Science from Harvard University in 2001, works for a Silicon Valley startup.  
 1998

David J. Schummer,  
 Worked on topological defects in 2D systems  
 Graduated with a B.A. in Philosophy from SUNY-Buffalo in 1999. Current position is unknown.  
 1996

Tony Ng,  
 Worked on relaxation of nonlinear oscillators  
 Completed his B.S. in Physics from Stanford University in 2000. Current position is unknown.  
 1995

Cynthia J. Rudin,  
 Worked on avalanches in granular media  
 PhD in Computational Fluid Dynamics at Princeton University, Associate Research Scientist at the Center  
 for Computational Learning Systems, Columbia University.  
 1995-1996

James C. Phillips at Michigan State University  
 Worked on non-convergent infinite continued fractions  
 (currently a scientist at Beckman Inst, University of Illinois, Urbana)  
 Mr. Phillips was a finalist (among the 5 top nominees) in the Apker Award Competition of the American  
 Physical Society on the basis of work done under my supervision. He presented an invited talk at the  
 APS Washington Meeting in April 1993 on the research he did under my supervision. Apker Award is  
 given to the outstanding undergraduate in Physics in the United States.  
 Currently Senior Research Programmer, Beckman Inst., University of Illinois at Urbana  
 1992

### **Graduate Students**

Yoichi Takato (collaborative with Gary S. Grest and Jeremy Lechman at Sandia National Labs)  
 Research: Nanoparticle collisions at large impact speeds

Dian Kang Sun, Ph.D candidate, to complete in 2009  
 Research Topic: Elastic forces and Metamaterials

Robert Paul Simion, Ph.D candidate (Current)  
 Research Topic: Strongly nonlinear granular dynamics of several grain systems

Linda Shanahan, Ph.D candidate (Current)  
 Research Topic: Study of battle type problems with applications in conflicts and biology and  
 environment

Taehyong Kim, Ph.D candidate, Computer Science (Current),<sup>7</sup>  
 Research Topic: Computational problems with networks in biology

Laura E. Gilcrist, Ph.D Geology (Co-advisor with Gregory S. Baker), defended PhD thesis in April 2009.  
 Research Topic: Acoustics of Soil Beds at Ultra-shallow Depths  
 Currently pursuing JD at UB Law School

Robert Doney, Ph.D, Completed January 2007  
 Research Topic: Shock Absorption by Tapered Chain Systems  
 Currently: Scientist, Army Research Lab, Aberdeen Proving Grounds, Maryland.

Jan M.M. Pfannes, M.S., Completed in 5/2003  
 M.S. Thesis Title: "Energy propagation in granular chains"  
 Currently: Completed PhD in Astronomy at University of Würzburg, Germany  
 Currently: High School Math, Science and Rowing Teacher at Rontgen Gymnasium, Germany

Felicia S. Manciu, Ph.D candidate (1999-2001), completed PhD with Prof. B.D. McCombe  
 Currently: Assistant Professor of Physics, University of Texas at El Paso

Marian Mihai Manciu, Ph.D, Completed in 8/2000  
 Ph.D Thesis Title: "Nonlinear Acoustics in Granular Beds"  
 Currently: Assistant Professor of Physics, University of Texas at El Paso

Victoria N. Tehan, M.S., Completed in 5/1999  
 M.S. Thesis Title: "Dynamics in a Gravitationally Loaded Chain of Elastic Beads"  
 Currently: Quality Control Engineer, Delphi Automotive Systems, Lockport, NY

Thomas D. Blersch, M.A., Completed in 8/1997  
 M.A. Thesis Title: "Relaxation in Impure  $s=1/2$  Spin Chains"  
 Currently: Systems Programmer, American Federation of Teachers, Washington, DC

#### **Postdoctoral Fellows:**

Edgar Avalos, Fulbright Fellow from Mexico at SUNY-Buffalo from Universidad Autonoma de Mexico  
 Postdoctoral Research Fellow at National Central University, Taiwan, 2006-2009  
 Tenure track Lecturer, Departamento di Fisica, Universidad de Santiago de Chile, 2009-present  
 2005-2006

T.R. Krishna Mohan, Senior Scientist at Centre for Mathematical Modelling and Computer Simulations  
 Institute Mathematical Modelling Sciences, Bangalore, India  
 2002-2004 and 2005-2006, 2006-2007 (shared with Prof. M. Ramanathan in Pharmaceutical Sciences)

Farhat I. Surve, Lecturer at SUNY – Buffalo, APS Kilambi Ramavataram Fellow and Reader at Nowrosjee  
 Wadia College, University of Pune, India (part time Postdoctoral Fellow, NSF supported)  
 2002 (Fall)

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<sup>7</sup> (Advisor: Aidong Zhang in Computer Science but this student's publications and mentoring has been done by me and Murali Ramanathan since 2007).

**Collaborators:**

1. Juan H. Agui, Jr, Scientist, NASA – Glenn Research Center, Cleveland, Ohio
2. Erma Anderson, National Science Teachers Association, Washington, DC
3. Gregory S. Baker, Jones/Bibbee Endowed Assistant Professor of Geology, University of Tennessee at Knoxville
4. Robert P. Behringer, Duke Professor of Physics, Duke University
5. Christopher E. Brennen, Richard L and Dorothy Hayman Professor of Mechanical Engineering, California Institute of Technology
6. Soumya Chakravarti, Professor of Physics, California State Polytechnic University
7. Chiara Daraio, Assistant Professor of Aeronautics and Applied Physics, California Institute of Technology
8. Robert L. Doney, US Army Aberdeen Proving Grounds, Army Research Labs, Aberdeen, Maryland
9. Heidi and Philip Gibson, US Army Research Development and Engineering Command, Natick Soldier Center, Natick, Massachusetts
10. Don Jacobs, Research Associate Professor and Founding Director of Center for Advanced Technologies in Education, Graduate School of Education, SUNY-Buffalo
11. Xiaoping Jia, Professor of Physics, University of Paris – East, France
12. Stephane Job, Assistant Professor of Physics, Institut Supérieure de Mécanique de Paris, France
13. Bruce Mason, Associate Professor of Physics, University of Oklahoma
14. Scott May, U.S. Department of Education, Washington, DC
15. Francisco Melo, Professor and Chair of Physics, University of Santiago, Chile
16. Masami Nakagawa, Associate Professor of Mining Engineering, Colorado School of Mines
17. Murali Ramanathan, Associate Professor of Pharmaceutical Sciences, SUNY-Buffalo
18. Robert S. Sinkovits, Scientist/Staff Member, San Diego Supercomputer Center, University of California at San Diego, San Diego, California
19. Donald P. Visco, Jr. Associate Professor of Chemical Engineering, Tennessee Technological University
20. Otis Walton, Scientist, Lawrence Livermore National Labs, Livermore, California

**Thesis Committee Member for the Following Students:**

1. Laura Gilcrist, Ph.D (Geology, 2009); Advisor: Gregory S. Baker (Committee member and a co-advisor on her theoretical work)
2. David Henry, Ph.D (Science Education, 2000); Advisor: Prof. Rodney L. Doran, Learning and Instruction, SUNY-Buffalo.
3. David L. Morabito, Ph.D (Physics, 1998); Advisor: Prof. Shigeji Fujita, Physics, SUNY-Buffalo.
4. Chih-yu Chao, Ph.D (Physics, 1997); Advisor: Prof. John T. Ho, Physics, SUNY-Buffalo,
5. How-wen Jou, Ph.D (Electrical & Computer Engg, 1996); Advisor: Prof. A.M. Kriman, Electrical Engineering, SUNY-Buffalo
6. Hung-chang Chiu, Ph.D (Chemical Engineering, SUNY-Buffalo, 1995); Advisor: Prof. David Kofke, Chemical Engineering SUNY-Buffalo

**Courses Taught**

Freshman and sophomore courses on College Physics (algebra based) and University Physics (calculus based), Thermal Physics (junior/senior levels), Electrodynamics (grad level, Jackson based) and Statistical Mechanics (grad and advanced grad levels) and Advanced Topics courses on Nonlinear Dynamics and Non-equilibrium Statistical Mechanics. In addition I have organized and co-taught off-load courses for high school science teachers at SUNY Buffalo.