Ishan Sharma

Assistant Professor
Department of Mechanical Engineering,
Indian Institute of Technology Kanpur,
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Education

Ph.D. Theoretical and Applied Mechanics, August 2004
Cornell University, Ithaca, NY, USA.
Thesis: *Rotational dynamics of deformable ellipsoids with applications to asteroids*
Co-Advisors: *Joseph A. Burns, James T. Jenkins*

B.Tech., Mechanical Engineering, May 1999
Indian Institute of Technology, Kanpur, India.

Research

I am interested in modelling diverse natural and man-made mechanical phenomena and processes employing tools from continuum mechanics, dynamical systems and applied mathematics. Some specific problems include impacts on granular beds, saltation, mechanics of deep-sea anchoring, visco-elastic contact, simplified laws for rolling contact, using mean-field theories to characterize closely packed granular assemblies, and reduced order modelling of deformable bodies with application to planetary science.

Academic Experience

Visitor October 2003
Issac Newton Institute of Mathematical Sciences, Cambridge University, UK.

Research Fellow September 2004 - 06
Institute of Theoretical Geophysics, Department of Applied Mathematics and Theoretical Physics, Cambridge University, UK.

Visitor November 2006
CNRS/Saint-Gobain, Surface du Verre et Interfaces Saint-Gobain, Paris, FRANCE.

Assistant Professor September 2006 -
Department of Mechanical Engineering, IIT Kanpur, INDIA.

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Publications

Sharma, I., J. A. Burns and C. -Y. Hui 2005. Nutational damping in solids of revolution. *Mon. Not. R. Astron.* **359**, 79-92.

Sharma, I., J. T. Jenkins, and J. A. Burns 2006. Tidal encounters of of ellipsoidal granular asteroids with planets. *Icarus* **83**, 312-330.

LaRagione, L., V. Prantil and I. Sharma 2008. A simplified model for inelastic behavior of an idealized granular material. *Int. J. Plasticity* **24**, 168-189.

Sharma, I., J. T. Jenkins and J. A. Burns 2008. Dynamical passage to approximate equilibrium shapes for spinning, gravitating rubble asteroids. Accepted for publication in *Icarus*.

Sharma, I. 2008. Equilibrium shapes of weak satellites: The Darwin and Roché ellipsoids for rubble-pile ellipsoids. Accepted for publication in *Icarus*.

Submitted

Sharma, I., H. E. Huppert 2008. A simple model for deep penetrating anchors. *Ocean Engineering*

In Preparation

Sharma, I., Hui, C.-Y., *Loading and unloading of visco-elastic half spaces.*

Sharma, I., *Equilibrium shapes of rubble-pile binaries.*

Refereed Proceedings

Sharma, I., Jenkins, J.T., and Burns J.A., *Equilibrium shapes of ellipsoidal soil asteroids*, Powders and Grains 2005, 429-432.

Proceedings

Sharma, I., Burns, J.A., and Hui C.-Y., 2001 *Nutational damping in solids of revolution*, BAAS 33, 1114.

Sharma, I., Jenkins, J.T., and Burns J.A., 2003 *Rotational dynamics of a deformable symmetric ellipsoid*, BAAS 35, 1034

Talks

Dynamics of granular asteroids, October 27-31, Workshop on Geophysical Granular and Particle-Laden Flows at Bristol, organised by the Issac Newton Institute of Mathematical Sciences, Cambridge University, UK.

Dynamics of granular asteroids, January 30 - February 4, 2004, Arecibo Asteroid Dynamics Workshop, Arecibo, Peurto Rico.

Equilibrium shapes and the Roche limit of cohesionless ellipsoidal soil asteroids, March 22 2005, TU Delft, Netherlands.

Equilibrium shapes of ellipsoidal soil asteroids, July 2005, Powders and Grains, Stuttgart, Germany.

Awards

McMullen Fellowship, Cornell University 1999
National Math Olympiad, India 1994
National Talent Scholarship, Government of India 1993
State Science Scholarship 1993

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