

Harkirat Singh

CONTACT INFORMATION	Solid Mechanics Brown University Barus and Holley, 184 Hope street Providence, RI 02906.	Email: harkirat_singh@brown.edu Website: www.harkirat-singh.com
RESEARCH INTERESTS	Computational Mechanics	
EDUCATION	Brown University <i>Ph.D. in Solid Mechanics</i> <i>MS in Solid Mechanics</i> Advisor: Prof. David Hennan	2018 - present 2018
	Indian Institute of Technology (IIT), Kanpur <i>Bachelor's and Master's (Dual degree) in Mechanical Engineering</i> Advisors: Prof. Pankaj Wahi	2016
RESEARCH EXPERIENCE	Graduate Student Researcher Advisor: Prof. David Henann <i>Solid Mechanics, Brown University</i>	2018 - present
	Research Assistant Advisor: Prof. Venkatesan <i>Department of Aerospace, IIT Kanpur</i>	2016-17
	Research Assistant Advisor: Prof. Pankaj Wahi <i>Mechanics & Applied Mathematics Group, IIT Kanpur</i>	2015-16
AWARDS / HONORS	Poster award at SES conference President Fellowship at Brown University 4 year Doctoral fellowship at UBC (<i>*declined</i>) Cambridge India Ramanujan Scholarship (<i>*declined</i>)	2021 2017-20 2017 2017
WORKING PAPERS	<i>Pressure sensitive non-local behaviour in hydrogel suspension.</i> <i>A predictive continuum model for coupled size segregation and flow in dense granular materials.</i>	
JOURNAL PUBLICATIONS	Harkirat Singh and Pankaj Wahi. <i>Non-planar vibrations of a string in the presence of a boundary obstacle.</i> Journal of Sound and Vibration, 389, 326-349. [PDF] Harkirat Singh and Pankaj Wahi. <i>Role of curvatures in determining the characteristics of a string vibrating against a doubly curved obstacle.</i> Journal of Sound and Vibration, 402, 1-13. [PDF]	
CONFERENCES	Society of Engineering Science (SES) Annual Meeting, Texas, US. <i>Talk.</i> Gordan Reserch Conference, Granular Matter, Stonehill college, US. <i>Poster.</i> [Poster] American Physics Society (APS) March Meeting, Chicago, US. <i>Talk.</i> [Link] Society of Engineering Science (SES) Annual Meeting. <i>Virtual.</i> [Poster] 9th European Nonlinear Dynamics Conference, Budapest, Hungary. <i>Talk.</i> [Paper] International Congress of Theoretical and Applied Mechanics , Montreal, Canada. [Poster] International Conference on Structural Nonlinear Dynamics and Diagnosis, Marrakesh, Morocco. <i>Talk.</i> [Paper] International Conference on Advances in Dynamics, Vibrations and Control, NIT Durgapur, India. <i>Talk.</i> [Paper]	2022 2022 2022 2021 2017 2016 2016 2016

PHD THESIS	Constitutive modeling for size segregation and flow in granular materials (May' 18 - Present) <i>Supervisor:</i> David Henann, Brown University <ul style="list-style-type: none"> • Developed continuum scale model that predicts segregation and flow simultaneously • Developed finite deformation plasticity framework and implemented as Abaqus UEL • Performed discrete element modeling (DEM) simulations to test the continuum model 	
MASTERS THESIS	Modeling the dynamics of the string vibrating against a rigid obstacle (May '15 - Jul '16) <i>Supervisor:</i> Pankaj Wahi, IIT Kanpur <ul style="list-style-type: none"> • Used extended Hamilton's principle to derive the equations of motion and Galerkin projection method to discretize the system . • Used Floquet theory to perform the stability analysis of nonlinear equations with periodic coefficients. 	
TECHNICAL SKILLS	<i>Computational:</i> Finite element analysis, Structural analysis, Numerical methods, Molecular dynamics. <i>Programming languages:</i> MATLAB, Python, Fortran, C(introductory). <i>Softwares:</i> Abaqus, Lammmps, Mathematica, Ovito, Maple. .	
TEACHING EXPERIENCE	Teaching assistant for Advanced Solid Mechanics (ENGN 1750)	(Sep '20 - Dec '20)
	Teaching assistant for Mechanics of Solids and Structures (ENGN 0310)	(Sep '19 - Dec '16)
RELEVANT COURSES	Continuum Mechanics Computational Mechanics Fracture Mechanics Non-Linear Vibration	Solid Mechanics Plasticity Stress Waves in Solids Aeroelasticity
EXTRA- CURRICULAR ACTIVITIES	<ul style="list-style-type: none"> • Vice President of Indian community, Brown University • Member of Hostel Executive Committee, IIT Kanpur • Captain of the Volleyball Team in Intramurals, IIT Kanpur 	(Sep '18 - May '19) (Aug '12 - Apr '13) (Sep '11 - Nov '11)
REFERENCE	David Henann Professor, Solid Mechanics, Brown University Pradeep Guduru Professor, Solid Mechanics, Brown University Pankaj Wahi Professor, Mechanical Engineering, IIT Kanpur	Email: david_henann@brown.edu Email: pradeep.guduru@brown.edu Email: wahi@iitk.ac.in