

# ANINDYA CHATTERJEE

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## Education:

Cornell University	Theoretical & Applied Mechanics	PhD	1997
University of Florida	Applied Mathematics	MS	1993
University of Florida	Engineering Mechanics	MS	1993
IIT Kharagpur	Mechanical Engineering	BTech	1989

## Research interests:

Dynamics; vibrations; impact; damping; fatigue; solid mechanics; hysteresis; systems with delays and fractional order dynamics; statistics of engineering test data.

## Teaching:

Statics, dynamics, mechanics of solids, vibrations, control, stability, numerical solutions.

## Positions held:

IIT Kanpur	Professor	July 2012-present
IIT Kharagpur	Professor	2009-2012
Indian Institute of Science	Associate Professor	2005-2009
Indian Institute of Science	Assistant Professor	2000-2005
Penn State University	Postdoctoral scholar	1996-2000
TELCO, Jamshedpur	Graduate engineer trainee	1989-1990

## Other:

Fellow, Indian National Academy of Engineering (INAE)  
Fellow, National Academy of Sciences, India (NASI)  
Associate Editor, ASME Journal of Computational and Nonlinear Dynamics, 2016-19  
Subject Editor, Nonlinear Dynamics

## Book:

*Build and Sustain a Career in Engineering*. Notion Press, Chennai. 2021.  
<https://notionpress.com/read/build-and-sustain-a-career-in-engineering>

## Publications:

### Journals

1. S. Tiwari and A. Chatterjee. Solution of planar elastic stress problems using stress basis functions. *Mathematics and Mechanics of Solids*, to appear.
2. D. V. Manthena, C. P. Vyasarayani and A. Chatterjee. Open-loop centering of a point mass on a horizontally vibrating frictional table. *ASME Journal of Computational and Nonlinear Dynamics*, to appear.
3. D. D. Tandel, C. S. Upadhyay and A. Chatterjee. Design charts for hydraulic twister based aircraft arrester gear. *Mechanics Based Design of Structures and Machines*, to appear. [DOI: 10.1080/15397734.2023.2288184]
4. B. Goswami, K. R. Jayaprakash and A. Chatterjee. Short time angular impulse response of Rayleigh beams. *Journal of Engineering Mathematics*, 2023, vol. 143, article 6. <https://rdcu.be/du5sK> [DOI: 10.1007/s10665-023-10302-6]
5. D. D. Tandel, A. Chatterjee and A. K. Mohanty. Quadrupole ion trap with dipolar DC excitation: Motivation, nonlinear dynamics, and simple formulas. *Nonlinear Dynamics*, 2023, vol. 11, 15837–15852. [DOI: 10.1007/s11071-023-08706-1]
6. J. Shaik, C. P. Vyasarayani and A. Chatterjee. LQR for delayed systems using the Hamiltonian approach and exact closed loop poles. *ASME Journal of Dynamic Systems, Measurement, and Control*, 2023, vol. 145(7), 071002. [DOI: 10.1115/1.4062439]
7. B. Goswami and A. Chatterjee. Balancing a stick with eyes shut: Inverted pendulum on a cart without angle measurement. *ASME Journal of Dynamic Systems, Measurement, and Control*, 2023, vol. 145(4), 044502. [DOI: 10.1115/1.4056702]
8. B. Goswami and A. Chatterjee. Semi-implicit integration and data-driven model order reduction in structural dynamics with hysteresis. *ASME Journal of Computational and Nonlinear Dynamics*, 2023, vol. 18(5), 051002. [DOI: 10.1115/1.4057042]
9. D. D. Tandel, P. Wahi and A. Chatterjee. Vibration stabilization by a nonresonant secondary limit cycle oscillator. *Nonlinear Dynamics*, 2022, vol. 11(7), 6043-6062. [DOI: 10.1007/s11071-022-08145-4]
10. A. Kumar, M. Nandagopal, K. Laha and A. Chatterjee. Variability in large-sample post-buckling behavior of two small thin walled structures. *Sadhana*, 2021, vol. 46, article no. 51. [DOI: 10.1007/s12046-021-01577-5]
11. S. Tiwari, C. P. Vyasarayani and A. Chatterjee. Data suggest COVID-19 affected numbers greatly exceeded detected numbers, in four European countries, as per a delayed SEIQR model. *Scientific Reports*, 2021, vol. 11, article no. 8106. [DOI: 10.1038/s41598-021-87630-z]
12. S. Tiwari, C. P. Vyasarayani and A. Chatterjee. Performance limit for base-excited energy harvesting, and comparison with experiments. *Nonlinear Dynamics*, 2021, vol 103(1), 197-214. [DOI: 10.1007/s11071-020-06145-w]
13. A. Shirude, C. P. Vyasarayani and A. Chatterjee. Towards design of a nonlinear vibration stabilizer for suppressing single-mode instability. *Nonlinear Dynamics*, 2021, vol. 103(2), 1563-1583. [DOI: 10.1007/s11071-021-06207-7]
14. A. Kumar and A. Chatterjee. Unequivocally nonconservative results from one method of imperfection quantification in RCC-MR. *ASME Journal of Nuclear Engineering and Radiation Science*, 2021, vol. 7(1), 011801. [DOI: 10.1115/1.4047494]
15. C. P. Vyasarayani and A. Chatterjee. Complete dimensional collapse in the continuum limit of a delayed SEIQR network model with separable distributed infectivity. *Nonlinear Dynamics*, 2020, vol. 101(3), 1653-1665. [DOI: 10.1007/s11071-020-05785-2]
16. C. P. Vyasarayani and A. Chatterjee. New approximations, and policy implications, from a delayed dynamic model of a fast pandemic. *Physica D: Nonlinear Phenomena*, 2020, vol. 414, 132701.[DOI: 10.1016/j.physd.2020.132701]
17. S. Tiwari and A. Chatterjee. Basis functions for residual stresses. *Applied Mathematics and Computation*, 2020, vol. 386, 125468. [DOI: 10.1016/j.amc.2020.125468]
18. S. Singla and A. Chatterjee. Nonlinear responses of an SDOF structure with a light, whirling,

- driven, untuned pendulum. *International Journal of Mechanical Sciences*, 2020, vol. 168, 105305. [DOI: 10.1016/j.ijmecsci.2019.105305]
19. A. Bhattacharjee and A. Chatterjee. Restitution modeling in vibration-dominated impacts using energy minimization under outward constraints. *International Journal of Mechanical Sciences*, 2020, vol. 166, 105215. [DOI: 10.1016/j.ijmecsci.2019.105215]
  20. A. Bhattacharjee, K. Shah and A. Chatterjee. Unifying averaged dynamics of the Fokker-Planck equation for Paul traps. *Physics of Plasmas*, 2019, vol. 26(1), 012302. [DOI: 10.1063/1.5063409]
  21. A. Kumar and A. Chatterjee. On one imperfection estimation method for thin shell buckling in the design code RCC-MR. *ASME Journal of Nuclear Engineering and Radiation Science*, 2019, vol. 5(4), 042001. [DOI: 10.1115/1.4042117]
  22. H. Kanchwala and A. Chatterjee. ADAMS model validation for an all-terrain vehicle using test track data. *Advances in Mechanical Engineering*, 2019, vol. 11(7), 1-18. [DOI: 10.1177/1687814019859784]
  23. H. Kanchwala and A. Chatterjee. Rationally derived three-parameter models for elastomeric suspension bushings: theory and experiment. *Journal of Testing and Evaluation*, 2019, vol. 47(2), 1271-1294. [DOI: 10.1520/JTE20170102]
  24. A. Bhattacharjee, A. K. Mohanty and A. Chatterjee. Expansion of Preisach density in magnetic hysteresis using general basis functions. *Applied Mathematics and Computation*, 2019, 341, 418-427. [DOI: 10.1016/j.amc.2018.09.009]
  25. K. Jose, A. Chatterjee, and A. Gupta. Acoustics of Idakkā: An Indian snare drum with definite pitch. *Journal of the Acoustical Society of America*, 2018, vol. 143(5), 3184-3194. [DOI: 10.1121/1.5038111]
  26. A. Bhattacharjee and A. Chatterjee. Transverse impact of a Hertzian body with an infinitely long Euler-Bernoulli beam. *Journal of Sound and Vibration*, 2018, vol. 429, 147-161. [DOI: 10.1016/j.jsv.2018.04.040]
  27. S. Biswas and A. Chatterjee. A two-state hysteresis model for bolted joints, with minor loops from partial unloading. *International Journal of Mechanical Sciences*, 2018, vol. 140, 506-520. [DOI: 10.1016/j.ijmecsci.2018.03.021]
  28. S. Balija, S. Biswas and A. Chatterjee. Stability aspects of the Hayes delay differential equation with scalable hysteresis. *Nonlinear Dynamics*, 2018, vol. 93(3), 1377-1393. [DOI: 10.1007/s11071-018-4266-2]
  29. S. Dharmadhikari and A. Chatterjee. An engineering-design oriented exploration of human excellence in throwing. *Sadhana*, 2018, vol. 43:28. <http://rdcu.be/IKu6> [DOI: 10.1007/s12046-018-0788-z]
  30. S. Maiti, R. Bandyopadhyay and A. Chatterjee. Vibrations of an Euler-Bernoulli beam with hysteretic damping arising from dispersed frictional microcracks. *Journal of Sound and Vibration*, vol. 412, 2018, 287-308. [DOI: 10.1016/j.jsv.2017.09.025]
  31. A. Bhattacharjee and A. Chatterjee. Interplay between dissipation and modal truncation in ball-beam impact. *ASME Journal of Computational and Nonlinear Dynamics*, vol. 12(6), 2017, 061018. [DOI: 10.1115/1.4036830]
  32. R. Bandyopadhyay, S. Maiti, A. Ghosh and A. Chatterjee. Overhead water tank shapes with depth-independent sloshing frequencies for use as TLDs in buildings. *Structural Control and Health Monitoring*, 2017. [DOI: 10.1002/stc.2049]
  33. H. Kanchwala and A. Chatterjee. A generalized quarter car modeling approach with frame flexibility and other nonlocal effects. *Sadhana*, vol. 42(7), 2017, 1175-1192. [DOI: 10.1007/s12046-017-0675-z]
  34. S. Biswas, P. Jana and A. Chatterjee. Hysteretic damping in an elastic body with frictional microcracks. *International Journal of Mechanical Sciences*, vol. 108-109, 2016, 61-71. [DOI: 10.1016/j.ijmecsci.2016.01.029]
  35. S. Rakshit and A. Chatterjee. Scalar generalization of Newtonian restitution for simultaneous impact. *International Journal of Mechanical Sciences*, vol. 103, 2015, 141-157. [DOI: 10.1016/j.ijmecsci.2015.08.019]
  36. S. Biswas and A. Chatterjee. A two-state hysteresis model from high-dimensional friction.

- Royal Society Open Science*, vol. 2, 2015, 150188. [DOI: 10.1098/rsos.150188]
37. N. Sharma, T. Vimal and A. Chatterjee. Unexpectedly low angular extent of journal bearing pressures: experiment and theory. *Zeitschrift für angewandte Mathematik und Physik (ZAMP)*, vol. 66(2), 2015, 455-471. [DOI: 10.1007/s00033-014-0409-6]
  38. B. U. Taskar, D. Dasgupta, V. Nagarajan, S. Chakraborty, A. Chatterjee and O. P. Sha. CFD aided modeling of anti-rolling tanks towards more accurate ship dynamics. *Ocean Engineering*, vol. 92, 2014, 296-303. [DOI: 10.1016/j.oceaneng.2014.09.035]
  39. P. Jana and A. Chatterjee. Computational prediction of modal damping ratios in thin-walled structures. *Journal of Sound and Vibration*, vol. 333(26), 2014, 7125-7134. [DOI: 10.1016/j.jsv.2014.08.028]
  40. A. Chatterjee. A simple wage-talent curve illustrates several aspects of higher technical education. *Current Science*, vol. 107(2), 2014, 189-194.
  41. P. Jana and A. Chatterjee. An internal damping formula derived from dispersed elasto-plastic flaws with Weibull-distributed strengths. *International Journal of Mechanical Sciences*, vol. 87, 2014, 137-149. [DOI: 10.1016/j.ijmecsci.2014.06.007]
  42. S. Biswas and A. Chatterjee. A reduced-order model from high dimensional frictional hysteresis. *Proceedings of the Royal Society of London A*, vol. 470, 2014, 20130817. [DOI: 10.1098/rspa.2013.0817]
  43. S. Srivastava and A. Chatterjee. Planar oscillations of a boat in a tank. *International Journal of Mechanical Sciences*, vol. 79, 2014, 152-161. [DOI: 10.1016/j.ijmecsci.2013.11.019]
  44. A. Chatterjee. Better rank assignment in multiple-choice entrance exams. *Current Science*, vol. 105(2), 2013, 193-200.
  45. S. Das and A. Chatterjee. Numerical stability analysis of linear incommensurate fractional order systems. *ASME Journal of Computational and Nonlinear Dynamics*, vol. 8(4), 2013, 041012:1-6. [DOI: 10.1115/1.4023966]
  46. P. Jana and A. Chatterjee. Modal damping in vibrating objects via dissipation from dispersed frictional microcracks. *Proceedings of the Royal Society of London A*, vol. 469(2152), 2013, Article number 20120685. [DOI: 10.1098/rspa.2012.0685]
  47. A. Bhattacharjee and A. Chatterjee. Dissipation in the Bouc-Wen model: small amplitude, large amplitude and two-frequency forcing. *Journal of Sound and Vibration*, vol. 332(7), 2013, 1807-1819. [DOI: 10.1016/j.jsv.2012.10.026]
  48. S. Das and A. Chatterjee. Simple recipe for accurate solution of fractional order equations. *ASME Journal of Computational and Nonlinear Dynamics*, vol. 8(3), 2013, 031007:1-7. [DOI: 10.1115/1.4023009]
  49. A. Chatterjee and A. Chatterjee. Use of the Fréchet distribution for UPV measurements in concrete. *Nondestructive Testing and Evaluation International*, vol. 52, 2012, 122-128. [DOI: 10.1016/j.ndteint.2012.07.003]
  50. V. R. Dabiru and A. Chatterjee. A linear S-N curve with load dependent variance and explicit failure probability. *Journal of Testing and Evaluation*, Paper ID: JTE104419, 2012. [DOI: 10.1520/JTE104419]
  51. K. Nandakumar, M. Wiercigroch and A. Chatterjee. Optimum energy extraction from rotational motion in a parametrically excited pendulum. *Mechanics Research Communications*, vol. 43, 2012, 7-14. [DOI: 10.1016/j.mechrescom.2012.03.003]
  52. V. M. Karanam and A. Chatterjee. Common underlying steering curves for motorcycles in steady turns. *Vehicle System Dynamics*, vol. 49(6), 2011, 931-948. [DOI: 10.1080/00423114.2010.483282]
  53. A. Basak, K. Nandakumar and A. Chatterjee. Decoupled three dimensional finite element computation of thermoelastic damping using Zener's approximation. *Meccanica*, vol. 46(2), 2011, 371-381. [DOI: 10.1007/s11012-010-9318-8]
  54. S. J. Singh and A. Chatterjee. Unified Galerkin- and DAE-based approximation of fractional order systems. *ASME Journal of Computational and Nonlinear Dynamics*, vol. 6(2), 2011, art. no. 021010. [DOI:10.1115/1.4002516]
  55. K. Nandakumar, P. Wahi and A. Chatterjee. Infinite dimensional slow modulations in a delayed model for orthogonal cutting vibrations. *Nonlinear Dynamics*, vol. 62, 2010, 705-716.

[DOI: 10.1007/s11071-010-9755-x]

56. S. J. Singh and A. Chatterjee. Beyond fractional derivatives: local approximation of other convolution integrals. *Proceedings of the Royal Society of London A*, vol. 466, 2010, 563 - 581. [DOI: 10.1098/rspa.2009.0378]
57. K. Nandakumar and A. Chatterjee. Nonlinear secondary whirl of an overhung rotor. *Proceedings of the Royal Society of London A*, vol. 466, 2010, 283 - 301. [DOI: 10.1098/rspa.2009.0262]
58. V. R. Dabiru, V. R. Ranganath, U. Ramamurty and A. Chatterjee. Variable stress ratio in cumulative fatigue damage: Experiments and comparison of three models. *Proc. IMechE Part C, Journal of Mechanical Engineering Science*, vol. 224(2), 2010, 271 - 282. [DOI: 10.1243/09544062JMES1579]
59. K. Nandakumar and A. Chatterjee. Continuation of limit cycles near homoclinic points using splines in phase space. *Nonlinear Dynamics*, vol. 57(3), 2009, 383 - 399. [DOI: 10.1007/s11071-008-9449-9]
60. A. Roy and A. Chatterjee. Vibrations of a beam in variable contact with a flat surface. *ASME Journal of Vibration and Acoustics*, vol. 131(4), 2009, 041010. [DOI: 10.1115/1.3086930].
61. I. Chakraborty, A. K. Mohanty and A. Chatterjee. Localized waves along a line of masses on a plate: propagation and sub-exponential attenuation. *Proceedings of the Royal Society of London A*, vol. 464, 2008, 2229-2246. [DOI: 10.1098/rspa.2008.0051]
62. P. Mahadevan, C. S. Jog and A. Chatterjee. Modal projections for synchronous rotor whirl. *Proceedings of the Royal Society of London A*, vol. 464(2095), 2008, 1739-1760. [DOI: 10.1098/rspa.2007.0139]
63. N. Patil, P. Mahadevan and A. Chatterjee. A constructive empirical theory for metal fatigue under block cyclic loading. *Proceedings of the Royal Society of London A*, vol. 464(2093), 2008, 1161-1179. [DOI: 10.1098/rspa.2007.0109]
64. S. J. Singh and A. Chatterjee. DAE-based solution of nonlinear multiterm fractional integrodifferential equations. *Journal Européen des Systèmes Automatisés*, vol. 42(6-8), 2008, 677-688.
65. P. Wahi and A. Chatterjee. Self-interrupted regenerative metal cutting in turning. *International Journal of Non-Linear Mechanics*, vol. 43, 2008, 111-123.
66. R. Mourya and A. Chatterjee. Anomalous frictional behavior in collisions of thin disks revisited. *ASME Journal of Applied Mechanics*, vol. 75, 2008, 024501-3. [DOI: 10.1115/1.2793131]
67. D. Joshi, P. Mahadevan, A. Marathe and A. Chatterjee. Unimportance of geometric non-linearity in analysis of flanged joints with metal-to-metal contact. *International Journal of Pressure Vessels and Piping*, vol. 84(7), 2007, 405-411.
68. P. K. Tallapragada, A. K. Mohanty, A. Chatterjee and A. G. Menon. Geometry optimization of axially symmetric ion traps. *International Journal of Mass Spectrometry*, vol. 264(1), 2007, 38-52.
69. A. K. Mohanty, K. Chakraborty and A. Chatterjee. A combinatorial optimization problem for high order PODs with few sensors. *ASME Journal of Vibration and Acoustics*, vol. 129(2), 2007, 252-255.
70. P. R. Basu-Mandal, A. Chatterjee and J. Papadopoulos. Hands-free circular motions of a benchmark bicycle. *Proceedings of the Royal Society of London A*, vol. 463, 2007, 1983-2003.
71. N. Rajanbabu, A. Chatterjee and A. G. Menon. Motional coherence during resonance ejection of ions from Paul traps. *International Journal of Mass Spectrometry*, vol. 261, 2007, 159-169.
72. N. Rajanbabu, A. Marathe, A. Chatterjee and A. G. Menon. Multiple scales analysis of early and delayed boundary ejection in Paul traps. *International Journal of Mass Spectrometry*, vol. 261, 2007, 170-182.
73. A. Chatterjee and D. Chatterjee. Analytical investigation of hydrodynamic cavitation control by ultrasonics. *Nonlinear Dynamics*, vol. 46(1-2), 2006, 179-194.
74. S. Gorthi, A. Mohanty and A. Chatterjee. Cantilever beam electrostatic MEMS actuators beyond pull-in. *Journal of Micromechanics and Microengineering*, vol. 16, 2006, 1800-1810.
75. A. Marathe and A. Chatterjee. Asymmetric Mathieu equations. *Proceedings of the Royal Society of London A*, vol. 462 (2070), 2006, 1643-1659.
76. S. J. Singh and A. Chatterjee. Galerkin projections and finite elements for fractional order

- derivatives. *Nonlinear Dynamics*, vol. 45, 2006, 83-206.
77. A. Marathe and A. Chatterjee. Wave attenuation in weakly nonlinear periodic structures using harmonic balance and multiple scales. *Journal of Sound and Vibration*, vol. 289(4-5), 2005, 871-888.
  78. P. Wahi and A. Chatterjee. Asymptotics for the characteristic roots of delayed dynamic systems. *ASME Journal of Applied Mechanics*, vol. 72(4), 2005, 475-483.
  79. P. Wahi and A. Chatterjee. Regenerative tool chatter near a codimension-2 Hopf point using multiple scales. *Nonlinear Dynamics*, vol. 40(4), 2005, 323-338.
  80. K. Nandakumar and A. Chatterjee. Higher order pseudoaveraging via harmonic balance for strongly nonlinear oscillations. *ASME Journal of Vibration and Acoustics*, vol. 127(4), 2005, 416-419.
  81. A. Chatterjee. Statistical origins of fractional derivatives in viscoelasticity. *Journal of Sound and Vibration*, vol. 284(3-5), 2005, 1239-1245.
  82. P. Wahi and A. Chatterjee. Galerkin projections for delay differential equations. *ASME Journal of Dynamic Systems, Measurement and Control*, vol. 127(1), 2005, 80-87.
  83. K. Nandakumar and A. Chatterjee. Resonance, parameter estimation, and modal interactions in a strongly nonlinear benchtop oscillator. *Nonlinear Dynamics*, vol. 40(2), 2005, 149-167.
  84. S. L. Das and A. Chatterjee. Second order multiple scales for oscillators with large delay. *Nonlinear Dynamics*, vol. 39, 2005, 375-394.
  85. A. Chatterjee. Mathematics in Engineering. *Current Science*, vol. 88(3), 2005, 405-414.
  86. P. Wahi and A. Chatterjee. Averaging oscillations with small fractional damping and delayed terms. *Nonlinear Dynamics*, vol. 38(1-4), 2004, 3-22.
  87. S. J. Singh and A. Chatterjee. Non-intrusive measurement of contact forces during vibration dominated impacts. *ASME Journal of Dynamic Systems, Measurement and Control*, vol. 126(3), 2004, 489-497.
  88. K. Nandakumar and A. Chatterjee. The simplest resonance capture problem, using harmonic balance based averaging. *Nonlinear Dynamics*, vol. 37, 2004, 271-284.
  89. A. Chatterjee. The short time impulse response of Euler Bernoulli beams. *ASME Journal of Applied Mechanics*, vol. 71, 2004, 208-218.
  90. G. T. Abraham, A. Chatterjee and A. G. Menon. Escape velocity and resonant ion dynamics in Paul trap mass spectrometers. *International Journal of Mass Spectrometry*, vol. 231(1), 2004, 1-16.
  91. V. R. Sonti and A. Chatterjee. Acausality alleviation via nonlinear future prediction in feedforward control of vibrations. *International Journal of Acoustics and Vibration*, vol. 8(3), 2003, 181-189.
  92. A. Chatterjee. Harmonic balance based averaging: Approximate realizations of an asymptotic technique. *Nonlinear Dynamics*, vol. 32, 2003, 323-343.
  93. S. L. Das and A. Chatterjee. Multiple scales via Galerkin projections: Approximate asymptotics for strongly nonlinear oscillations. *Nonlinear Dynamics*, vol. 32, 2003, 161-186.
  94. G. T. Abraham and A. Chatterjee. Approximate asymptotics for a nonlinear Mathieu equation using harmonic balance based averaging. *Nonlinear Dynamics*, vol. 31, 2003, 347-365.
  95. A. Chatterjee and J. P. Cusumano. Asymptotic parameter estimation via implicit averaging on a nonlinear extended system. *ASME Journal of Dynamic Systems, Measurement and Control*, vol. 125, 2003, 11-18.
  96. A. Chatterjee, J. P. Cusumano and D. Chelidze. Optimal tracking of parameter drift in a chaotic system: Experiment and theory. *Journal of Sound and Vibration*, vol. 250(5), 2002, 877-901.
  97. D. Chelidze, J. P. Cusumano and A. Chatterjee. Dynamical systems approach to damage evolution tracking, Part 1: The experimental method. *ASME Journal of Vibration and Acoustics*, vol. 124, 2002, 250-257.
  98. J. P. Cusumano, D. Chelidze and A. Chatterjee. Dynamical systems approach to damage evolution tracking, Part 2: Model-based validation and physical interpretation. *ASME Journal of Vibration and Acoustics*, vol. 124, 2002, 258-264.
  99. A. Chatterjee, R. Pratap, C. K. Reddy and A. Ruina. Persistent passive hopping and juggling

- is possible even with plastic collisions. *International Journal of Robotics Research*, vol. 21(7), 2002, 621-634.
100. S. L. Das and A. Chatterjee. Multiple scales without center manifold reductions for delay differential equations near Hopf bifurcations. *Nonlinear Dynamics*, vol. 30, 2002, 323-335.
  101. S. L. Das and A. Chatterjee. An alternative stability analysis for the simplest walker. *Nonlinear Dynamics*, vol. 28(3), 2002, 273-284.
  102. A. Chatterjee. An introduction to the proper orthogonal decomposition. *Current Science*, vol. 78(7), 2000, 808-817.
  103. J. P. Cusumano and A. Chatterjee. Steps towards a qualitative dynamics of damage evolution. *International Journal of Solids and Structures*, vol. 37, 2000, 6397-6417.
  104. M. Garcia, A. Chatterjee and A. Ruina. Efficiency, speed, and scaling of two-dimensional passive-dynamic walking. *Dynamics and Stability of Systems*, vol. 15(2), 2000, 75-99.
  105. M. Garcia and A. Chatterjee. Small slope implies low speed for McGeer's passive walking machines. *Dynamics and Stability of Systems*, vol. 15(2), 2000, 139-157.
  106. A. Chatterjee, J. P. Cusumano and J. D. Zolock. On contact-induced standing waves in rotating tires: Experiment and theory. *Journal of Sound and Vibration*, vol. 227(5), 1999, 1049-1081.
  107. A. Chatterjee. On the realism of complementarity conditions in rigid body collisions. *Nonlinear Dynamics*, vol. 20, 1999, 159-168.
  108. A. Chatterjee. Asymptotic solution for solitary waves in a chain of elastic spheres. *Physical Review E*, vol. 59(5), 1999, 5912-5919.
  109. J. Calsamiglia, S. W. Kennedy, A. Chatterjee, A. Ruina and J. Jenkins. Anomalous frictional behavior in collisions of thin disks. *ASME Journal of Applied Mechanics*, vol. 66, 1999, 146-152.
  110. A. Chatterjee and A. Ruina. Two interpretations of rigidity in rigid body collisions. *ASME Journal of Applied Mechanics*, vol. 65, 1998, 894-900.
  111. A. Chatterjee and A. Ruina. A new algebraic rigid body collision law based on impulse space considerations. *ASME Journal of Applied Mechanics*, vol. 65, 1998, 939-951.
  112. M. Garcia, A. Chatterjee, A. Ruina and M. J. Coleman. The simplest walking model: Stability, complexity, and scaling. *ASME Journal of Biomechanical Engineering*, vol. 120, 1998, 281-288.
  113. M. J. Coleman, A. Chatterjee and A. Ruina. Motions of a rimless spoked wheel: A simple three-dimensional system with impacts. *Dynamics and Stability of Systems*, vol. 12(3), 1997, 139-160.
  114. N. Fitz-Coy and A. Chatterjee. Actuator placement in multi-degree-of-freedom vibration simulators. *Shock and Vibration*, vol. 1(3), 1994, 279-287.

#### Patent

U.S. patent no. 6,567,752 B2; with J. P. Cusumano and D. Chelidze; through the Penn State Research Foundation. *General method for tracking the evolution of hidden damage or other unwanted changes in machinery components and predicting remaining useful life*. 2003.

#### **Past Ph.D. Students:**

1. Ashok Kumar, 2022. IIT Kanpur. Thesis: *Studies in thin shell buckling: Experiments, computations and design implications*.
2. Sankalp Tiwari, 2022. IIT Kanpur. Thesis: *Basis functions for residual stresses*.
3. Arindam Bhattacharjee, 2019. IIT Kanpur. Thesis: *New approximations in vibroimpact problems*.
4. S. Biswas, 2018. IIT Kanpur. Thesis: *Low dimensional descriptions of high dimensional frictional hysteresis*.
5. H. Kanchwala, 2017. IIT Kanpur. Thesis: *Studies in simplified dynamic modeling and characterization of vehicle suspensions*.
6. P. Jana, 2014. IIT Kharagpur. Thesis: *Modal damping prediction for vibrating solids: Con-*

*stitutive models and finite element computations.* (After I moved to IIT Kanpur, the thesis was formally jointly guided by me and Anirvan Dasgupta of Kharagpur.)

7. K. Nandakumar, 2010. IISc. Thesis: *A study of four problems in nonlinear vibrations via the method of multiple scales.* (I guided the thesis until submission at IISc, then left for IIT Kharagpur. Final formalities including the defense were handled by A. Ghosal of IISc.)
8. Pradeep Mahadevan, 2009. IISc. Thesis: *A prestress based approach to rotor whirl.*
9. Satwinder Jit Singh, 2008. IISc. Thesis: *New solution methods for fractional order systems.*
10. Pradipta Ranjan Basu-Mandal, 2008. IISc. Thesis: *Studies on the dynamics and stability of bicycles.*
11. Amol Marathe, 2008. IISc. Thesis: *A study of four nonlinear systems with parametric forcing.*
12. Pankaj Wahi, 2006. IISc. Thesis: *A study of delay differential equations with applications to machine tool vibrations.*
13. N. Rajanbabu, 2006. IISc. Co-advised with A. G. Menon (ISU). Thesis: *Nonlinear dynamics of resonances in, and ejection from, Paul traps.*

### **Prior industrial consulting work:**

1. For Crompton Greaves (Nashik): modeling and simulation of a three phase circuit breaker using ADAMS (through a TCS-IISc consultancy cell called APDAP, located at IISc)
2. For KLR Industries (Hyderabad): modeling and simulation of impact and vibrations in a pneumatic hammer (through APDAP; see above)
3. For TVS Motor Co. (Hosur): discussions on motorcycle dynamics and handling
4. For BEML (Kolar Gold Fields): noise measurement from a 40-ton bulldozer (with VR Sonti of IISc)
5. For MerlinHawk Associates (Bangalore): algorithm for reduction of helicopter vibrations (with Mythily Ramaswamy and Seema Nanda of TIFR, Bangalore)
6. For CMERI (Durgapur): advice on modeling of statistics of UPV measurements for NDT in concrete (with Baidurya Bhattacharya of IIT Kharagpur)
7. For Usha Martin (Kolkata): advice on stress and deformation analysis in a cradle used for holding 40-ton reels during transport (with Vikranth Racherla of IIT Kharagpur)
8. For Usha Martin (Kolkata): advice on a testing program to quantify internal damping in steel wire ropes (with AK Mallik, formerly of IIT Kanpur)
9. For Tega Industries (Kolkata): advice on weight reduction and redesign of trommels (with Vikranth Racherla of IIT Kharagpur; my role in this project was minor).
10. For Hector Beverages (Paper Boat drinks): advice on reduction of leakages in filling and capping processes, operational aspects, and design improvements, in their plants in Manesar and Mysore, and co-packer plants in Fazilka and Hyderabad.
11. For Mitsubishi Electric Research Laboratories (MERL), Cambridge, MA: development and analysis of contact models and mechanics of complex manipulation processes.
12. For ATI Motors (Bengaluru): advice on design, dynamics and stability of autonomous vehicles.