

# Department of Mechanical Engineering Indian Institute of Technology Guwahati



## Dr. Satyajit Panda

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### Education:

**Ph. D.** (2009) Department of Mechanical Engineering, Indian Institute of Technology, Kharagpur, India.

**M. E.** (2005) Department of Mechanical Engineering, Jadavpur University, Kolkata, India.

**B. E.** (2003) Department of Mechanical Engineering, Jadavpur University, Kolkata, India.

### Research interests:

- Composite materials and structures.
- Functionally graded materials and structures.
- Smart materials and structures.
- Micromechanics of composite materials.
- Smart (piezoelectric) sensors and actuators.
- Active and/or passive control of structural vibration.
- Nonlinear dynamics and control of structures.
- Finite element method.

### Research publications:

#### Articles in international journals:

- Dubey MK and Panda Satyajit (2019) Shear actuation mechanism and shear-based actuation capability of an obliquely reinforced PFC in active control of annular plates. *Journal of Intelligent Material Systems and Structures*. DOI: 10.1177/1045389X19862638.
- Dubey MK and Panda S (2019) Shear-based vibration control of annular sandwich plates using different piezoelectric fiber composites: A comparative study. *Journal of Sandwich Structures & Materials*, 1099636219838446.
- Panda Satyajit and Dubey MK (2019) A balanced laminate of piezoelectric fiber composite for improved shear piezoelectric actuation of beams. *Mechanics of Advanced Materials and Structures*, 1-13.
- Dubey MK and Panda Satyajit (2018) Electromechanical properties and actuation capability of an extension mode piezoelectric fiber composite actuator with cylindrically periodic microstructure. *Archive of Applied Mechanics*, 88(12):2261-2281.

- Panda Satyajit and Kumar Ambesh (2018) A design of active constrained layer damping treatment for vibration control of circular cylindrical shell structure. *Journal of Vibration and Control*, 24(24):5811-5841.
- Kumar A, Panda Satyajit, Narsaria V and Kumar A (2018) Augmented constrained layer damping in plates through the optimal design of a 0-3 viscoelastic composite layer. *Journal of Vibration and Control*, 24(23):5514-5524.
- Kumar A, Panda, S, Kumar A and Narsaria V (2018). Performance of a graphite wafer-reinforced viscoelastic composite layer for active-passive damping of plate vibration. *Composite Structures*, 186:303-314.
- Kumar A and Panda Satyajit (2017) Optimal Damping in Circular Cylindrical Sandwich Shells With a Three-Layered Viscoelastic Composite Core. *ASME Journal of Vibration and Acoustics* 139(6):061003.
- Kumar ASP, Panda Satyajit and Reddy NH (2017) A comparative study on the smart damping capabilities of cylindrically orthotropic piezoelectric fiber-reinforced composite actuators in vibration control of simply supported/fully clamped isotropic annular plate. *Journal of Intelligent Material Systems and Structures*, 28(13), 1839-1859.
- Panda Satyajit (2016) Performance of a short piezoelectric fiber-reinforced composite actuator in vibration control of functionally graded circular cylindrical shell. *Journal of Intelligent Material Systems and Structures* (doi: 10.1177/1045389X16641219).
- Kumar A and Panda Satyajit (2016) Design of a 1-3 viscoelastic composite layer for improved free/constrained layer passive damping treatment of structural vibration. *Composites Part B: Engineering* 96: 204-214.
- Kumar AMS, Panda Satyajit, Kumar S and Chakraborty D (2015) A design of laminated composite plates using graded orthotropic fiber-reinforced composite plies. *Composites Part B: Engineering* 79: 476-493.
- Kumar ASP, Panda Satyajit and Reddy NH (2015) Smart damping of vibration of annular plates through the design of a cylindrically orthotropic piezoelectric fiber-reinforced composite actuator. *Acta Mechanica* 226: 3151-3176.
- Panda Satyajit, Reddy NH and Kumar ASP (2015) Design and finite element analysis of a short piezoelectric fiber-reinforced composite actuator. *Archive of Applied Mechanics* 85: 691-711.
- Kumar AMS, Panda Satyajit and Chakraborty D (2015) Design and analysis of a smart graded fiber-reinforced composite laminated plate. *Composite Structures* 124: 176-195.
- Kumar AMS, Panda Satyajit and Chakraborty D (2015) Harmonically excited nonlinear vibration of heated functionally graded plates integrated with piezoelectric composite actuator. *Journal of Intelligent Material Systems and Structures* 26: 931-951.
- Panda SP and Panda Satyajit (2014) Micromechanical finite element analysis of effective properties of a unidirectional short piezoelectric fiber reinforced composite. *International Journal of Mechanics and Materials in Design* 11: 41-57.
- Kumar AMS, Panda Satyajit and Chakraborty D (2014) Piezo-viscoelastically damped nonlinear frequency response of functionally graded plates with a heated plate-surface. *Journal of Vibration and Control* (DOI: 10.1177/1077546314532672).
- Kadam PA and Panda Satyajit (2014) Nonlinear analysis of an imperfect radially graded annular plate with a heated edge. *International Journal of Mechanics and Materials in Design* 10: 281-304.
- Panda Satyajit and Gavhane GS (2013) Nonlinear analysis of smart functionally graded annular sector plates using cylindrically orthotropic piezoelectric fiber reinforced composite. *International Journal of Mechanics and Materials in Design* 9: 35-53.
- Panda Satyajit and Ray MC (2012) Active damping of nonlinear vibrations of functionally graded laminated composite plates using vertically/obliquely reinforced 1-3 piezoelectric composite”, *ASME journal of Vibration and Acoustics*, 134: art. no. 021016.

- Panda Satyajit (2011) Nonlinear analysis of smart annular plates using cylindrically orthotropic piezoelectric fiber-reinforced composite. *Journal of Intelligent Material Systems and Structures* 22: 1789-1801.
- Panda Satyajit and Ray MC (2009) Active control of geometrically nonlinear vibrations of functionally graded laminated composite plates using piezoelectric fiber reinforced composites. *Journal of Sound and Vibration* 325: 186-205.
- Panda Satyajit and Ray MC (2009) Control of nonlinear vibrations of functionally graded plates using 1-3 piezoelectric composite. *AIAA Journal* 47: 1421-1434.
- Panda Satyajit and Ray MC (2008) Finite Element Analysis for Geometrically Nonlinear Deformations of Smart Functionally Graded Plates Using Vertically Reinforced 1-3 Piezoelectric Composite. *International journal of Mechanics and Materials in Design* 4: 239-253.
- Panda Satyajit and Ray MC (2008) Nonlinear Finite Element Analysis of Functionally Graded Plates Integrated with Patches of Piezoelectric Fiber Reinforced Composite. *Finite Elements in Analysis and Design* 44: 493-504.
- Panda Satyajit and Ray MC (2008) Active Constrained Layer Damping of Geometrically Nonlinear Vibrations of Functionally Graded Plates Using Piezoelectric Fiber Reinforced Composites. *Smart Materials and Structures* 17: art. no. 025012.
- Panda Satyajit and Ray MC (2008) Geometrically nonlinear analysis of smart functionally graded plates integrated with a layer of vertically reinforced 1-3 piezoelectric composite. *Acta Mechanica* 198: 235-251.
- Panda Satyajit and Ray MC (2006) Nonlinear analysis of smart functionally graded plates integrated with a layer of piezoelectric fibre-reinforced composite. *Smart Materials and Structures* 15: 1595-1604.

#### Articles in conference proceedings:

- Reddy Rajidi S, Gupta A and Panda Satyajit (2019) The effective properties of electro-viscoelastic composite using energy method. *Materials Today: Proceedings*, Article Reference-MATPR9671 (In press).
- Reddy Rajidi S and Panda Satyajit (2019) The energy-based method for effective dynamic properties of viscoelastic composite. *Materials Today: Proceedings*, Article Reference-MATPR9674 (In press).
- Panda Satyajit (2015, September) Design and Effective Properties of a Functionally Graded Unidirectional Fiber-Reinforced Composite. In *ASME 2015 Conference on Smart Materials, Adaptive Structures and Intelligent Systems* (pp. V001T01A015-V001T01A015). American Society of Mechanical Engineers.
- Panda Satyajit Panda (2012) Nonlinear flexure and elastic stability of radially graded annular plates with heated plate-edge. *Mechanics of Functional Materials and Structures (ACMFMS 2012)*.
- Panda satyajit, Nandi A and Neogy S (2004) Stabilization of Non-axisymmetric and Anisotropic Rotor System via Liapunov-Floquet Transformation. *Third International Conference on Theoretical, Applied, Computational and Experimental Mechanics (ICTACEM 2004)*.
- Panda Satyajit and Ray MC (2006) Nonlinear deformations of smart functionally graded plates using vertically reinforced 1-3 piezoelectric composite. *52<sup>nd</sup> Congress of Indian Society of Theoretical and Applied Mechanics (ISTAM 2007)*.

### Ph. D. students:

Sl. no.	Name of scholar	Thesis title/area of research	Status
(1)	M. S. Aravinda Kumar	Design and Non-linear Frequency Response Analysis of Smart Functionally Graded Plates using a 1-3 Piezoelectric Composite.	Thesis defended (Completed)
(2)	A. Srinivas Pavan Kumar	Active control of annular plates through the design of extension/shear mode PFC actuators.	Thesis defended (Completed)
(3)	Ambesh Kumar	Design of a 1-3/0-3 viscoelastic composite layer for Augmented active/passive constrained layer damping of structural vibration.	Thesis defended (Completed)
(4)	Manish K. Dubey	Design and applications of shear/extension mode PFC actuators in vibration control of annular plates.	Thesis submitted
(5)	Abhay Gupta	Design of viscoelastic composites for passive or active-passive control of structural vibration.	Ongoing
(6)	R. S. Reddy	Nonlinear dynamics of fluid conveying pipes.	Ongoing
(7)	Nitin Kumar	Nonlinear dynamics and control of structures.	Ongoing

### M. Tech project supervision:

Sl. No.	Name of scholar	Thesis title/area of research	Status
(1)	Abhay Bodake	Geometrically nonlinear analysis of FG plates and panels	Completed, 2010
(2)	Bijoy V. More	Nonlinear analysis of non-axisymmetric smart annular plates	Completed, 2010
(3)	Gavhane G. Sopan	Nonlinear analysis of smart FG annular sector plates using cylindrically orthotropic piezoelectric composite actuator	Completed, 2011
(4)	Sagar S. Bharamal	Nonlinear finite element analysis of smart FG hollow shafts under torsion	Completed, 2011
(5)	Saikat Bhowmik	Nonlinear analytical solutions for flexure of FG shell panels integrated with a piezoelectric composite layer	Completed, 2012
(6)	Sawangikar S. Sandeep	On the performance of cylindrically orthotropic 1-3 piezoelectric composite distributed actuator in vibration	Completed, 2012

		control of annular plates	
(7)	Kadam P. Ashoke	Geometrically nonlinear analysis of radially graded annular plates with a heated edge	Completed, 2012
(8)	Sandeep Kumar	Effective elastic properties of graded unidirectional continuous fibre-reinforced composite	Completed, 2013
(9)	Padawale N. Damodhar	Nonlinear free and forced vibration of radially graded annular plates with heated edges	Completed, 2013
(10)	Pankaj Rawat	Nonlinear frequency response analysis of a smart FG cylindrical shell under a heated shell surface	Completed, 2014
(11)	Janaswamy T. S. Sarma	Design of a viscoelastic composite for enhanced unconstrained layer damping of structural vibration	Completed, 2014
(12)	Panathula C. Sekhar	Reduction of stress concentration through the design of a particulate graded patch	Completed, 2015
(13)	Vibhooti N. Mishra	Effective visco-electro-elastic properties of polymer based piezoelectric fiber-reinforced composite	Completed, 2015
(14)	Adarsh Shrivastava	Design of FRC laminates under transient thermal load	Completed, 2016
(15)	Rajidi S. Reddy	Design of microstructure of piezo-visco composite for active-passive damping of structural vibration	Completed, 2016
(16)	Parthasarathi Mohapatra	Numerical homogenization of d33 MFC with interdigitated electrode-fingers	Completed, 2017
(17)	Bhanu Pratap Patel	Analytical solutions for flexural vibration of annular plates integrated with a layer of the piezoelectric actuator	Completed, 2017
(18)	Souvik Karmakar	Design of a viscoelastic composite layer with graphite inclusion for improved free/constrained layer damping treatment of structural vibration	Completed, 2018
(19)	Shaikh A. S. Malek	Shear actuation of a beam element	Completed, 2018
(20)	Saurabh Kumar	A shell theory based finite element formulation for modelling three-dimensional deformation of thin pipes/tubes using one-dimensional	Completed, 2019

		beam element	
(21)	Kapil Kumar	A finite element formulation for analysis of fluid conveying sandwich pipes	Completed,2019
(22)	Amit Kumar Mangoliwala	Stress analysis of curved beam with varying curvature	Ongoing
(23)	Prasant Mishra	Effects of arbitrary geometric imperfection on the dynamics of a beam element	Ongoing
(24)	Sachin V	Damping of vibration of curved beam	Ongoing

### **B. Tech project supervision:**

<b>Sl no.</b>	<b>Name of scholar</b>	<b>Thesis title/area of research</b>	<b>Status</b>
(1)	N. H. Reddy	Design and actuation capability of a short active fiber composite actuator	Completed 2015
(2)	Ramnath Vijaykumar Pillai	Analysis of a Graded Fiber Reinforced Composite Laminate	Completed 2015
(3)	Jatin Kumar Mangal	On the passive control of flutter of composite plates	Ongoing
(4)	Himanshu Verma		Ongoing