Professor Srinivasan Gopalakrishnan

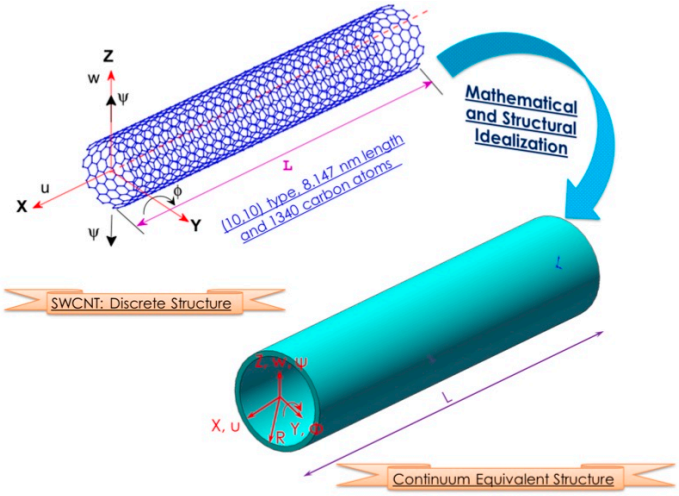

Figure 1 Mathematical and structural idealization of the single walled carbon nanotube (SWCNT) showing the degree of freedom defined on both the discrete structure and its equivalent continuum structure.

From: S. Narendar and S. Gopalakrishnan, "Nonlocal continuum mechanics formulation for axial, flexural, shear and contraction coupled wave propagation in single walled carbon nanotubes", Latin American Journal of Solids and Structures, Vol. 9, pp 497-513, 2012

See:
https://www.researchgate.net/scientific-contributions/2053700640_S_Gopalakrishnan

Department of Aerospace Engineering
Indian Institute of Science

Selected Publications:

Books:

Srinivasan Gopalakrishnan, Abir Chakraborty and Debiprosad Roy Mahapatra, Spectral Finite Element Method: Wave Propagation, Diagnostics and Control in Anisotropic and Inhomogeneous Structures, Springer, 2008, 440 pages

Srinivasan Gopalakrishnan and Mira Mitra, Wavelet Methods for Dynamical Problems, with Applications to Metallic, Composite, and Nano-Composite Structures, CRC Press, 2010, 298 pages

Gopalakrishnan, S. and Narendar, S., Wave Propagation in Nanostructures: Nonlocal Continuum Mechanics Formulations, Springer Science and Business Media, Switzerland, 2013, 359 pages

Journal Articles, etc.:

Garg, R.M. and Gopalakrishnan, S. (1974), An Experimental Investigation of Wall Loads in Wheat Silos. Indian Concrete Jnl., No. 10, pp 308-13.

Chakraborty A, Mahapatra DR, Gopalakrishnan S: Finite element analysis of free vibration and wave propagation in asymmetric composite beams with structural discontinuities. Compos. Struct 2002,55(1):23–36.

Mahapatra DR, Gopalakrishnan S (2003) A spectral finite element model for analysis of axial-flexural-shear coupled wave propagation in laminated composite beams. Compos Struct 59:67–88

Chakraborty, A., Gopalakrishnan, S., and Reddy, J. N., 2003, "A New Beam Finite Element for the Analysis of Functionally Graded Materials," Int. J. Mech. Sci., 45, pp. 519–539.

A. Nag, D. R. Mahapatra, S. Gopalakrishnan, and T. S. Sankar, "A spectral finite element with embedded delamination for modeling of wave scattering in composite beams," Composites Science and Technology, vol.

63, no. 15, pp. 2187–2200, 2003.
Chakraborty, A., and Gopalakrishnan, S., 2003, “A Spectrally Formulated Finite Element for Wave Propagation Analysis in Functionally Graded Beam,” Int. J. Solids Struct., 40, pp. 2421–2448
Chakraborty A., Gopalakrishnan S.: A higher-order spectral element for wave propagation analysis in functionally graded materials. Acta Mech. 172, 17–43 (2004)
Mira Mitra, S. Gopalakrishnan and M. Seetharama Bhat, “Vibration control in a composite box beam with piezoelectric actuators”, Smart Materials and Structures, Vol. 13, pp 676-690, 2004
M. Murthy, D. R. Mahapatra, K. Badarinarayana and S. Gopalakrishnan , A refined higher order finite element for asymmetric composite beams, Compos. Struct. 67 (1) (2005) 27–35.
Agarwal, S., Chakraborty, A. and Gopalakrishnan, S. (2006), "Large deformation analysis for anisotropic and inhomogeneous beams using exact linear static solutions", Compos. Struct., 72(1), 91-104.
Mira Mitra and S. Gopalakrishnan, “Wave propagation analysis in carbon nanotube embedded composite using wavelet based spectral finite elements”, Smart Materials and Structures, Vol. 15, pp 104-122, 2006
K.G. Vinod, S. Gopalakrishnan and R. Ganguli, “Wave propagation characteristics of rotating uniform Euler-Bernoulli beams”, Computer Modeling in Engineering and Science, Vol. 16, No. 3, pp 197-208, 2006
A. Chakraborty and S. Gopalakrishnan, “A spectral finite element model for wave propagation analysis in laminated composite plate,” Journal of Vibration and Acoustics-Transactions of the ASME, vol. 128, no. 4, pp. 477–488, 2006.
M. Mitra and S. Gopalakrishnan, “Wavelet based spectral finite element modeling and detection of delamination in composite beams”, Proc. R. Soc. A, Vol. 462, pp 1721-1740, 2006
Ali R, Mahapatra DR, Gopalakrishnan S. “A Quasi 3-D Approach to Modeling and Analysis of Constrained Piezoelectric Thin Film”. Acta Materialia. Vol. 54, pp 5529-5540, 2006
M.V.V. S. Murthy, S. Gopalakrishnan and P.S. Nair, “A new locking free higher order finite element formulation for composite beams”, CMC, Vol. 5, No. 1, pp 43-61, 2007
Mira Mitra and S. Gopalakrishnan, “Vibrational characteristics of single-walled carbon nanotube: Time and frequency domain analysis”, Journal of Applied Physics, Vol. 101, 114320, 2007
Mira Mitra and S. Gopalakrishnan, “Wave propagation in imperfectly bonded single walled carbon nanotube-polymer composites”, Journal of Applied Physics, Vol. 102, 084301, 2007
Mira Mitra and S. Gopalakrishnan, “Wavelet spectral element for wave propagation studies in pressure loaded axisymmetric cylinders”, Journal of Mechanics of Materials and structures, Vol. 2, No. 4, pp 753-772, 2007
K.G. Vinod, S. Gopalakrishnan, and R. Ganguli, Free Vibration and Wave Propagation Analysis of Uniform and Tapered Rotating Beams Using Spectrally Formulated Finite Elements, Int. J. Solids Struct., vol. 44, no. 18–19, pp. 5875–5893, 2007.
M. Mitra and S. Gopalakrishnan, “Wave propagation analysis in anisotropic plate using wavelet spectral element approach,” Journal of Applied Mechanics, Transactions ASME, vol. 75, no. 1, Article ID 014504, pp. 1–6, 2008.
Naik, G.N., Gopalakrishnan, S. and Ganguli, R., 2008, "Design optimization of composites using genetic algorithms and failure mechanism based failure criterion", Composite Structures, Vol. 83, pp. 354-367
Narendar S, Gopalakrishnan S (2009) Nonlocal scale effects on wave propagation in multi-walled carbon nanotubes. Comput Mater Sci 47(2):526–538
R. Gangadharan, G. Prasanna, M. R. Bhat, C. R. L. Murthy, and S. Gopalakrishnan, “Acoustic emission source location in composite structure by Voronoi construction using geodesic curve evolution,” The Journal of the Acoustical Society of America, vol. 126, no. 5, pp. 2324–2330, 2009.
Narendar S., Gopalakrishnan S.: Nonlocal scale effects on ultrasonic wave characteristics of nanorods. Phys. E 42, 1601 (2010)

Narendar S., Gopalakrishnan S.: Theoretical estimation of length dependent in-plane stiffness of single walled carbon nanotubes using the nonlocal elasticity theory. J. Comput. Theor. Nanosci. 7(11), 2349 (2010)
Narendar S., Gopalakrishnan S.: Investigation of the effect of nonlocal scale on ultrasonic wave dispersion characteristics of a monolayer graphene. Comput. Mater. Sci. 49, 734-742 (2010)
Narendar S., Gopalakrishnan S.: Ultrasonic wave characteristics of nanorods via nonlocal strain gradient models. J. Appl. Phys. 107, 084312 (2010)
Narendar S., Gopalakrishnan S.: Strong nonlocalization induced by small scale parameter on terahertz flexural wave dispersion characteristics of a monolayer graphene. Phys. E 43, 423–430 (2010)
Narendar S., Gopalakrishnan S.: Terahertz wave characteristics of a single-walled carbon nanotube containing a fluid flow using the nonlocal Timoshenko beam model. Phys. E 42, 1706 (2010)
Narendar S, Gopalakrishnan S. Nonlocal wave propagation in rotating nanotube. Results Phys 2011;1:17–25.
Kishor D.K., Ganguli R., Gopalakrishnan S.: Uncertainty analysis of vibrational frequencies of an incompressible liquid in a rectangular tank with and without a baffle using polynomial chaos expansion. Acta Mech. 220(1-4), 257–273 (2011)
S. Narendar and S. Gopalakrishnan , Scale effects on buckling analysis of orthotropic nanoplates based on nonlocal two-variable refined plate theory, Acta Mech. 223 (2) (2011) 395–413.
Omkar, S., Senthilnath, J., Khandelwal, R., Naik, G.N., Gopalakrishnan, S.: Artificial Bee Colony (ABC) for multi-objective design optimization of composite structures. Appl. Soft Comput. 11(1), 489–499 (2011)
Narendar S, Roy Mahapatra D, Gopalakrishnan S. Prediction of nonlocal scaling parameter for armchair and zigzag single-walled carbon nanotubes based on molecular structural mechanics, nonlocal elasticity and wave propagation. International Journal of Engineering Science, 2011, 49(6): 509–522
Narendar, S.; Gopalakrishnan, S. Nonlocal flexural wave propagation in a embedded graphene. Int. J. Comput 2012, 6, 29–36.
Deepak BP, Ganguli R, Gopalakrishnan S. Dynamics of rotating composite beams: a comparative study between CNT reinforced polymer composite beams and laminated composite beams using spectral finite elements. Int J Mech Sci 2012;64(1):110–126.
S. Narendar and S. Gopalakrishnan, “Scale effects on buckling analysis of orthotropic nanoplates based on nonlocal two-variable refined plate theory”, Acta Mechanica, Vol. 223, No. 2, pp 395-413, February 2012
S. Narendar and S. Gopalakrishnan, “Nonlocal continuum mechanics formulation for axial, flexural, shear and contraction coupled wave propagation in single walled carbon nanotubes”, Latin American Journal of Solids and Structures, Vol. 9, pp 497-513, 2012
S. Narendar and S. Gopalakrishnan , Temperature effects on wave propagation in nanoplates, Compos. Part B, Eng. 43 (2012) 1275–1281.
Satish N, Narendar S, Gopalakrishnan S (2012) Thermal vibration analysis of orthotropic nanoplates based on nonlocal continuum mechanics. Phys E Low Dimens Syst Nanostruct 44:1950–1962
Narendar, S., Gupta, S.S. and Gopalakrishnan, S. (2012), "Wave propagation in single-walled carbon nanotube under longitudinal magnetic field using nonlocal Euler-Bernoulli beam theory", Appl. Math. Model., 36(9), 4529-4538.
T.J. Prasanna Kumar, S. Narendar, and S. Gopalakrishnan, Thermal Vibration Analysis of Monolayer Grapheme Embedded in Elastic Medium Based on Nonlocal Continuum Mechanics, Compos. Struct., vol. 100, pp. 332–342, 2013.
Ajith, V. and Gopalakrishnan, S. [2013] “ Wave propagation in a porous composite beam: Porosity determination, location and quantification,” International Journal of Solids and Structures 50(3), 556–569
N. Nanda, S. Kapuria, and S. Gopalakrishnan, “Spectral finite element based on an efficient layerwise theory for wave propagation analysis of composite and sandwich beams,” Journal of Sound and Vibration, vol. 333, no. 31, pp. 20–27, 2014

S. Narendar and S. Gopalakrishnan, “A nonlocal continuum mechanics model for analyzing the terahertz flexural wave dispersion characteristics of a monolayer graphene embedded in elastic medium”, International Journal for Computational Methods in Engineering Science and Mechanics, Vol. 15, No. 1, pp 62-68, 2014
D. Samaratunga, R. Jha and S. Gopalakrishnan, Wave propagation analysis in adhesively bonded composite joints using the wavelet spectral finite element method, Compos. Struct. 122 (2015) 271–283.
Samaratunga, D., Jha, R., Gopalakrishnan, S.: Wavelet spectral finite element for modeling guided wave propagation and damage detection in stiffened composite panels. Struct. Health Monit. 15, 317–334 (2016)
B. Raja Sekhar, S. Gopalakrishnan and M.V.V.S. Murthy, “Time domain spectral element method to study response of a sandwich beam with compliant core subjected to under water explosion”, Procedia Engineering, Vol. 173, pp 1515-1522, 2017