

## Dr. Krishnendu Bhowmik

Assistant Professor

Dept. of Aerospace Engineering & Applied Mechanics (AE&AM)

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### Higher education:

- PhD in Engineering, IEST Shibpur, 2022 (Thesis Title: *Experiments and Finite Element Study on Mechanical Strength of CNT Reinforced Hybrid Composite*)
- MSc (Engineering), Mechanical Engineering, IISc Bangalore, 2007 (Thesis Title: *Experimental and Finite Element Study of Elastic-Plastic Indentation of Rough Surfaces*)
- BE, Mechanical Engineering, IEST Shibpur, 2002

### Major Employments:

- Assistant Professor, AE&AM Dept., IEST Shibpur, since October 2013 to Present
- Technology Specialist, ANSYS Software Pvt. Ltd., Bangalore, July 2012 – September 2013
- Aerospace Engineer, ATKINS India Pvt. Ltd., Bangalore, November 2009 – June 2012
- Mechanical Engineer, Safran Aerospace India Pvt. Ltd., Bangalore, August 2007 – October 2009

### Major courses taught:

- Aerospace Structures, Theory of Elasticity, Engineering Mechanics

### Research interests:

- Composite Structures, CNT reinforced Nanocomposites, Mechanical Behavior of Materials, Finite Element Analysis

### Research supervisions:

- **PhD Student/s: 1 (Ongoing)**

1. Arindam Saha: *Impact Behavior of Hybrid Composite*

- **M. Tech. Thesis: 9 (Completed)**

1. Devbrata Talukder (Reg. No. 2022AMM008): *Mechanical Strength of Fibre Reinforced Composite: A Parametric Study* (2024)
2. Sayan Roy (Reg. No. 321319018): *Delamination of Double Cantilever Composite Beam using Finite Element Analysis* (2021)
3. Pankaj Chauhan (Reg. No. 321318006): *Elastic Moduli of Defective Multi-Walled Carbon Nanotubes: A Finite Element Study* (2020)
4. Shamim Akhtar (Reg. No. 321317022): *Influence of Defects on Elastic Moduli of Graphene Sheets and Carbon Nanotubes using Finite Element Methods* (2019)
5. Rocky Kumar (Reg. No. 321317013): *A Finite Element Approach to Estimate the Flexural Rigidity of Hexagonal Honeycomb Sandwich Structures* (2019)
6. Pranav Kumar (Reg. No. 321316021): *Effective Young's Modulus of Wavy SWCNT Reinforced Nanocomposite: A Finite Element Study* (2018)
7. Jishan Ali (Reg. No. 320416028): *Finite Element Analysis of Along-Wind Response of RC Chimneys with Flexible-Base and Control by Liquid Damper* (Jointly Supervised with Prof. Aparna (Dey) Ghosh, Civil Engineering, 2018)
8. Raj Kumar Kalshyan (Reg. No. 321315013): *Finite Element Study of Laminated Composite Plate under In-Plane Concentrated Load* (2017)
9. Tuhin Nandy (Reg. No. 321314022): *Study of Effective Young's Modulus of Composite Materials* (2016)

- **B. Tech. Thesis: 10 (Completed)**

## Recent publications:

### International Journals:

- K. Bhowmik, N. Khutia, M. Tarfaoui, A. Basu, S. Akhtar, S. Dey, A. Roy Chowdhury, *Influence of CNT defects on the elastic modulus of nanocomposite: multiscale simulation*, J. Mater. Eng. Perform., 32:2356–2369 (2023) [Science Citation Index Expanded] <https://doi.org/10.1007/s11665-022-07287-1>
- K. Bhowmik, N. Khutia, M. Tarfaoui, M. Jana, K. Das, T. Roy, A. Bandyopadhyay, A. Roy Chowdhury, *Influence of Multiwalled Carbon Nanotube (MWCNT) on Progressive Damage of Epoxy/Carbon Fiber Reinforced Structural Composite*, Polym. Compos., 43:7751–7772 (2022) [Science Citation Index] <https://doi.org/10.1002/pc.26877>
- K. Bhowmik, T. Mukhopadhyay, M. Tarfaoui, N. Khutia, A. Roy Chowdhury, K. Lafdi, *Damage modeling of MWCNT reinforced Carbon/Epoxy composite using different failure criteria: A comparative Study*, Appl. Phys. A 128:549 (2022) [Science Citation Index] <https://doi.org/10.1007/s00339-022-05670-2>
- A. Banerjee, M.P. Khan, A. Barui, P. Datta, A. Roy Chowdhury, K. Bhowmik, *Finite Element Analysis of Influence of Cyclic Strain on Cells Anchored to Substrates with Varying Properties*, 60, 171–187, Med. Biol. Eng. Comput. (2022) [Science Citation Index] <https://doi.org/10.1007/s11517-021-02453-4>
- K. Bhowmik, S.K. Basantia, T. Roy, A. Bandyopadhyay, N. Khutia, A. Roy Chowdhury, *Mechanical properties of MWCNT reinforced epoxy nanocomposites: experimental, micromechanical and numerical study*, J. Inst. Eng. India Ser. D, 103:575–586 (2022) [Scopus] <https://doi.org/10.1007/s40033-022-00358-6>

### Book Chapters:

- K. Bhowmik, H. Ambati, N. Khutia, A. Roy Chowdhury, *Prediction of Elastic Constants of Spiral MWCNT Reinforced Nanocomposites by Finite Element Analysis*, In: Maiti D.K. et al. (eds) Recent Advances in Computational and Experimental Mechanics, Vol–II, 37, 449–458, Lect. Notes Mech. Eng. (2022) [Scopus] [https://doi.org/10.1007/978-981-16-6490-8\\_37](https://doi.org/10.1007/978-981-16-6490-8_37)
- P. Chauhan, K. Bhowmik, *Effect of Stone-wales defects on elastic moduli of Multi-walled Carbon Nanotubes using nanoscale continuum modeling*, In: Maity D. et al. (eds) Recent Advances in Computational and Experimental Mechanics, Vol–I, 35, 425–434, Lect. Notes Mech. Eng. (2022) [Scopus] [https://doi.org/10.1007/978-981-16-6738-1\\_35](https://doi.org/10.1007/978-981-16-6738-1_35)
- K. Bhowmik, S. Akhtar, R. K. Kalshyan, N. Khutia, A. Roy Chowdhury, *CNT Reinforced Laminated Composite under In-Plane Tensile Loading: A Finite Element Study*, Mater. Sci. Forum, 978:323–329 (2020) [Scopus] <https://doi.org/10.4028/www.scientific.net/msf.978.323>

### Conference Papers:

- P. Chauhan, K. Bhowmik, *Estimation of Elastic moduli of defective Multi-walled Carbon Nanotubes by Finite Element Approach*, 64rd congress of ISTAM, December 09-12, 2019, IIT Bhubaneswar
- S. Roy, R. Kumar, K. Bhowmik, *A Study on Flexural Rigidity of Hexagonal Honeycomb Sandwich Structures using Finite Element Analysis*, 64rd congress of ISTAM, December 09-12, 2019, IIT Bhubaneswar
- M. P. Khan, K. Bhowmik, A. Barui and A. Roy Chowdhury, *Finite element modelling of cytoskeletal components under varying loads and elastic properties*, 63rd congress of ISTAM, December 20-23, 2018, Dayananda Sagar University, Bengaluru
- K. Bhowmik, S. Akhtar, N. Khutia, A. Roy Chowdhury, *Directional Young's Modulus of SWCNT Reinforced Nanocomposite by Finite Element Analysis*, 1st International Conference on Processing and Characterization of Materials (ICPCM–2018), December 08-10, 2018, NIT Rourkela, Odisha
- S. Datta, N. Dana, S. Bhagat, K. Bhowmik, A. Roy Chowdhury, *Achieving Desired Modulus by Varying Pore Parameters using Finite Element Analysis*, International Conference on Recent Innovations & Developments in Mechanical Engineering (IC-RIDME 2018), November 08-10, 2018, NIT Meghalaya, Shillong
- K. Bhowmik, T. Nandy, P. Kumar, N. Khutia, A. Roy Chowdhury, *Prediction of Directional Young's Modulus of Particulate Reinforced MMC using Finite Element Methods*, IOP Conf. Ser.: Mater. Sci. Eng., 377 012057 (2018) [Scopus] <https://doi.org/10.1088/1757-899X/377/1/012057>
- K. Bhowmik, P. Kumar, N. Khutia, A. Roy Chowdhury, *Estimation of Effective Directional Strength of Single Walled Wavy CNT Reinforced Nanocomposite*, IOP Conf. Ser.: Mater. Sci. Eng., 338 012016 (2018) [Scopus] <https://doi.org/10.1088/1757-899X/338/1/012016>

- K. Bhowmik, P. Kumar, N. Khutia, A. Roy Chowdhury, *Evaluation of Directional Strength of SWCNT Reinforced Nanocomposites: A Finite Element Study*, Mater. Today Proc., 5:20528–20534 (2018) [Scopus] <https://doi.org/10.1016/j.matpr.2018.06.430>

#### Conference/ Workshop/Seminar/Course work organized and attended:

- Participated as a *Session Chair*, International Conference on Mechanical Design and Manufacturing (1st ICMDM), Dept. of Mechanical Engineering, IEST Shibpur, April 27-28, 2023
- Participated short-term course on “*Atomistic Modelling of Solids: Theory & Applications*”, Dept. of Mechanical Engineering, IIT Indore, December 21-25, 2020
- Organized two days’ workshop as a coordinator on VSSC ISRO’S “*FEAST<sup>SMT</sup> - Finite Element Analysis of Structures FEA Technology*”, AE&AM Dept., IEST Shibpur, August 01-02, 2019
- Presented a paper entitled *Evaluation of Directional Strength of SWCNT Reinforced Nanocomposites: A Finite Element Study*, ICMPC 2018, Dept. of Mechanical Engineering, GRIET, Hyderabad, March 16-18, 2018
- Presented a paper entitled *Prediction of Directional Young's Modulus of Particulate Reinforced MMC using Finite Element Methods*, ICMMRE-2017, Dept. of Mechanical Engineering, SMIT, Sikkim, December 8-10, 2017
- Participated two days’ workshop on “*Biomechanics, Implants and Related Medical Devices*”, AE&AM Dept., IEST Shibpur, March 14-15, 2017
- Organized two days’ workshop as a *co-coordinator* on “*Astrodynamics and Aerospace Materials*”, AE&AM Dept., IEST Shibpur, August 10-11, 2016
- Attended two days’ workshop on “*Tribology Frontiers Workshop*” at IEST Shibpur, August 03-04, 2016.
- Attended two weeks workshop on “*Materials Characterization: Principles and Practices*”, Dept. of Metallurgy and Materials Engineering, IEST Shibpur, July 25 - August 05, 2016
- Attended one week course on “*Research Methodology*” at IEST Shibpur in November, 2014.
- Attended five days seminar on “*Foundation Skills in Integrated Product Development (FSIPD)*”, NASSCOM, Bengaluru, March 18-22, 2014
- Participated “*RC Aircraft Workshop*”, AE&AM Dept., BESU, Shibpur, 15th - 16th February 2014
- *Faculty in charge* on “*58th congress of ISTAM*”, AE&AM Dept., BESU, Shibpur, December 12-18, 2013
- Attended one day “*Workshop on Aeromodelling*”, AE&AM Dept., BESU, Shibpur jointly with The Aeronautical Society of India, Kolkata branch, November 8, 2013

#### Awards/Achievements:

- Best Paper Award for the paper entitled *Prediction of Directional Young's Modulus of Particulate Reinforced MMC using Finite Element Methods*, International Conference on Mechanical, Materials and Renewable Energy (ICMMRE 2017), December 08-10, 2017, SMIT, Sikkim

#### Membership of professional bodies:

- Life Member of The Aeronautical Society of India (M.AeSI): Membership Number: M-20574

#### Consultancy Projects Completed:

- *Impact Analysis of Away from Reactor Spent Fuel Facility at KKNPP 1&2*, Development Consultants Private Limited, Kolkata -700091, (2017-2018), Amount: 10 Lakh

#### Personal Information:

Sex : Male  
 Marital Status : Married  
 Languages Known : English, Hindi and Bengali  
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