SURENDRA VERMA

Curriculum Vitae

Department of Mechanical and Industrial Engineering
Toronto Metropolitan University
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Website
Github *Linkedin* *Google Scholar*

Education

12 July 2016 – 15 Nov 2021	**PhD**, *Composite Structures*, **Thesis**: 14 Dec 2021, **Viva-Voce:** 6 June 2022. Department of Aerospace Engineering Indian Institute of Technology Kharagpur, Kharagpur, West Bengal -721302, India
CGPA:	8.00/10
22 July 2010 – 1 Feb 2016	**Dual Degree (B.Tech + M.Tech)**, *Aerospace Engineering*, **Degree**: 30 July 2016. Department of Aerospace Engineering Indian Institute of Technology Kharagpur, Kharagpur, West Bengal -721302, India
CGPA:	7.06/10
19 May 2010	**Higher Secondary Examination**, *Kiddy's Corner School*, Gwalior. Mathematics, Physics, Chemistry, English, Physical Education
Percentage:	75 %
29 May 2008	**Secondary Examination**, *Kiddy's Corner School*, Gwalior. Mathematics, Science, Social Science, English, Sanskrit
Percentage:	77 %

Research Interest

Structures	Rotating blade with preset and pretwist, Curved panel, Folded, Stiffened
Materials	Functionally Graded Material (FGM), Piezoelectric, Sandwich, and Laminated
Methods	Isogeometric analysis (IGA), Finite element analysis (FEA), and Analytical
Analysis	**Bending analysis** – Stress calculation; **Dynamics analysis** – Free Vibration, Transient, Steady-State; **Buckling analysis** – Linear buckling, Post-buckling, Nonlinear buckling with/without imperfection; Analysis under hygrothermal environment

Skills

Programming	Python, MATLAB, C, C++, Mathematica, R, CLISP
Scripting	Latex, HTML,CSS, JavaScript, PHP, MySQL, React, ReactNative
Tools	LyX, Inkscape, Git, GitHuB, Photoshop, Blender
Package	ANSYS APDL
Platform	Windows, Linux (Ubuntu, Fedora)

Professional Experience

Toronto Metropolitan University

1, Dec, 2022 – 31, Oct 2024 **Post-Doctoral Research Fellow**, *Department of Mechanical and Industrial Engineering*, Toronto Metropolitan University, Toronto, Ontario, Canada.
Structural analysis of rotating and hyperelastic structures.

Advisor: Dr. Donatus Oguamanam (*Website*)

Punjab Engineering College

27, July, 2022 – 30, Nov, 2022 **Assistant Professor on contract**, *Aerospace Engineering Department*, Punjab Engineering College, Chandigarh, India.
My responsiblity includes performing administrative responsibility, research work, and teaching to both under gradate and post-graduate student in the aerospace engineering department.

Indian Institute of Technology Kharagpur

July, 2016 – Nov, 2021 **Teaching Assistant during PhD**, *Department of Aerospace Engineering*, Indian Institute of Technology Kharagpur, Kharagpur, West Bengal, India.
Teaching assistant in various undergraduate courses: Finite Element Methods, Aerospace Structure, Mechanics, Aerospace Structure, and Structure laboratory

Instructor: **Prof. B. N. Singh, Prof. D. K. Maiti, Dr. M. K. Laha, Dr. Mira Mitra, Dr. Anup Ghosh, and Dr. Akshay Prakash** (*Website*)

July, 2014 – May, 2015 **Teaching Assistant during Dual Degree**, *Department of Aerospace Engineering*, Indian Institute of Technology Kharagpur, Kharagpur, West Bengal, India.
Teaching assistant in two undergraduate courses: Mechanics and Engineering Drawing

Instructor: **Dr. M. K. Laha, and Dr. Anup Ghosh** (*Website*)

Research Experience

Indian Institute of Technology Kharagpur

15, Dec, 2022 – 25, July, 2022 **Research Intern**.
Develop regression model to predict bending and buckling analysis of multilayered composite structures using Deep-Learning.

Advisor : **Dr. Pawan Goyal** (*Website*)

July, 2016 – Nov, 2021 **PhD Thesis**, *Nonlinear Bending and Buckling Analysis of Laminated and Sandwich Curved Panels in Hygrothermal Environment*.
Geometrically nonlinear finite element model is developed for the bending and buckling analysis of multilayered composite curved panel under hygrothermal envioronment.
A generalized C0 finite element model is formulated and coded into MATLAB for nonpolynomial shear deformation theory (NPSDT) incorporating both von Karman and Green-Lagrange nonlinearity.
Predicted the bending response of curved composite panel using inverse hyperbolic shear deformation theory (IHSDT) and third-order shear deformation theory(TSDT).
Linear buckling, post-buckling, and nonlinear buckling response subjected to mechanical in-plane load and thermal load is analyzed extensively.
Navier type analytical and 3D elasticity results are also obtained for composite plates and panels to validate the accuracy of present FEM results.

Advisor : **Prof. B. N. Singh** (*Website*) and **Prof. D. K. Maiti** (*Website*)

July, 2014 – May, 2015 **M.Tech Thesis**, *Development of Flat Shell Element*.
Developed MATLAB program for flat shell element using superimposition of in-plane and bending effect.
Analyzed Standard Benchmarked problems using developed four noded quadrilateral flat shell element.

Advisor : **Dr. Anup Ghosh**, *Associate Professor (Website)*

July, 2013 – May, 2014 **B.Tech Thesis**, *Free Vibration and Buckling Analysis of Beam and Plate Structure*.
Developed MATLAB program to find natural frequency and mode shapes of beams and plates.
Developed MATLAB program to find critical buckling load for beam and plates under different boundary conditions.

Advisor : **Prof. P. K. Datta** *(Retired)*

Patent

Filled **A holder for stirrer**, Inventor: Rabindra Prasad; Co-Inventors: Harikishor Kumar, Parshant Kumar, Abha Gupta, and Surendra Verma. Application No. 202211036036

To be filled **Fabrication of Low-Cost Localized Metallic Foam via Friction Stir Processing**, Inventor: Rabindra Prasad; Co-Inventors: Harikishor Kumar, Parshant Kumar, Abha Gupta, Surendra Verma, and Nitesh Kumar Sinha.

Publications

Journal Articles

Linear and nonlinear bending and buckling analysis of multilayered composite curved panels due to mechanical load using HSDTs
Isogeometric free vibration analysis of rotating preset laminated and functionally graded plates using cubic IGA-TSDT model nonlinear quasi-static approach

Accepted Effect of porosity on stability analysis of bidirectional FGM skew plate via Higher order shear deformation theory and RBF approach, International Journal of Steel Structures

2024 Surendra Verma, Abha Gupta, Rabindra Prasad, and Donatus Oguamanam. Nurbs-based isogeometric formulation for linear and nonlinear buckling analysis of laminated composite plates using constrained and unconstrained tsdts. *Aerospace Science and Technology*, page 109561. Elsevier BV, September 2024.

2024 Smruti Ranjan Sahoo, Surendra Verma, and B. N. Singh. Bending analysis of functionally graded plates under mechanical and thermal environment using non-polynomial shear deformation theory. *International Journal of Advances in Engineering Sciences and Applied Mathematics*. Springer Science and Business Media LLC, May 2024.

2023 Surendra Verma, Abha Gupta, Babu Ranjan Thakur, Donatus Oguamanam, and BN Singh. A unified buckling formulation for linear and nonlinear analysis of laminated plates using penalty based c0 fem-hsdt model. *International Journal of Non-Linear Mechanics*, page 104619. Elsevier, 2023.

2023 Nikul Jani, G. Chakraborty, and Surendra Verma. Parametrically excited microcantilever beam under large deflection and mass sensing. *Meccanica*, volume 58, pages 933–957. Springer Science and Business Media LLC, apr 2023.

2022 Abha Gupta, Surendra Verma, and Anup Ghosh. Static and dynamic NURBS-based isogeometric analysis of composite plates under hygrothermal environment. *Composite Structures*, volume 284, page 115083. Elsevier BV, mar 2022.

2021 Surendra Verma, Babu Ranjan Thakur, B.N. Singh, and D.K. Maiti. Geometrically nonlinear flexural analysis of multilayered composite plate using polynomial and non-polynomial shear deformation theories. *Aerospace Science and Technology*, volume 112, page 106635. Elsevier BV, may 2021.

2021 Babu Ranjan Thakur, Surendra Verma, B.N. Singh, and D.K. Maiti. Geometrically nonlinear dynamic analysis of laminated composite plate using a nonpolynomial shear deformation theory. *International Journal of Non-Linear Mechanics*, volume 128, page 103635. Elsevier BV, jan 2021.

2021 Babu Ranjan Thakur, Surendra Verma, B.N. Singh, and D.K. Maiti. Dynamic analysis of flat and folded laminated composite plates under hygrothermal environment using a nonpolynomial shear deformation theory. *Composite Structures*, volume 274, page 114327. Elsevier BV, oct 2021.

2020 Babu Ranjan Thakur, Surendra Verma, B.N. Singh, and D.K. Maiti. Dynamic analysis of folded laminated composite plate using nonpolynomial shear deformation theory. *Aerospace Science and Technology*, volume 106, page 106083. Elsevier BV, nov 2020.

Book Chapters

2022 Babu Ranjan Thakur, Surendra Verma, D. K. Maiti, and B. N. Singh. Effect of hygrothermal environment on dynamic behaviour of folded laminated composite plate. In *Aerospace and Associated Technology*, pages 112–117. Routledge, sep 2022.

In Conference Proceedings

2024 A unified buckling formulation for linear and nonlinear analysis of laminated plates using penalty based C0 FEM-HSDT model, CSME 2024 at University of Toronto

2022 Smruti Ranjan Sahoo, Surendra Verma, and BN Singh. Bending analysis of functionally graded plates under mechanical and thermal environment using non-polynomial shear deformation theory. In *Proceedings of the 67th International Congress of ISTAM*. Indian Society of Theoretical and Applied Mechanics (ISTAM), dec 2022.

2019 Babu R. Thakur, Surendra Verma, Bhrigu N. Singh, and Dipak K. Maiti. Dynamic analysis of laminated composite plate using non-polynomial shear deformation theory under hygrothermal environment. In *AIAA Scitech 2019 Forum*. American Institute of Aeronautics and Astronautics, January 2019.

Awards/ Honors/ Fellowships/ Recognitions/ Contribution

* Reviewer of peer reviewed SCI journal:
  - Thin-Walled Structures, Elsevier (*Website*)
  - Journal of Aerospace Engineering, ASCE (*Website*)
  - Mechanics of Composite Materials, Springer (*Website*)

Mechanics of Advanced Composite Structures, Semnan University (*Website*)

Dec, 2022 - Oct, 2024 Toronto Metropolitan University Postdoctoral fellowship

2016 - 2021 MHRD fellowship during PhD program

2014 - 2015 MHRD fellowship during Dual Degree program

Position of Responsibility

Aug, 2022 – 30, Nov, 2022 **Technical Committee Member of 35th National Convention of Aerospace Engineers and National Conference on Smart Materials and their applications in Aerospace Industries**, *Punjab Engineering College, Chandigarh*, (Website).

Aug, 2022 – 30, Nov, 2022 **Website Head of 35th National Convention of Aerospace Engineers and National Conference on Smart Materials and their applications in Aerospace Industries**, *Punjab Engineering College, Chandigarh*, (Website).

April, 2013 – July, 2015 **Website Coordinator of Department of Aerospace Engineering for 3 years**, *Department of Aerospace Engineering, IIT Kharagpur*.

Jan, 2013 – May, 2015 **Website Head of RK Hall of Residence for 2 year**, *RadhaKrishnan Hall of Residence, IIT Kharagpur*.

July, 2012 – May, 2013 **Mess Auditor and Vice-Captain of Illumination of RK Hall of residence for 1 year**, *RadhaKrishnan Hall of Residence, IIT Kharagpur*.

27, Jan, 2012 – 30, Jan, 2012 **Sub Head of Annual Techno Management Fest of IIT Kharagpur in 2nd year**, *RadhaKrishnan Hall of Residence, IIT Kharagpur*.

Course Taught

UG Courses at PEC Chandigarh

S. No.	Course Title & Code	No.of Times	Autumn	Spring	Developed by me
1	Solid Mechanics	1	2022	-	No
2	Vibration and Aeroelasticity	1	2022	-	No

Short Term Courses/ Webinar Attended/ Delivered

PDEU University, Dept. of Mechanical Engineering

Aug, 25, 2024 **Five Day Skill Development Workshop on Computational Fluid Dynamics (Hybrid Mode)**.

I delivered a 2 hour talk on Finite Element Method for Heat Transfer.

IIT Hyderabad, Dept. of Civil Engineering

Feb, 19 – 21, 2020 **Short course on Nonlocal Mechanics Approaches for Modelling Localized Deformations (NMAMLD)**.

Lecture was delivered by the Prof. J. N. Reddy of the University of Texas, College Station, USA.

Learned about the basic of the non-classical continuum to model the mechanics of the nano structures.

NIT Warangal, Dept. of Mechanical Engineering

Nov, 11 – 15, 2019 **GIAN Course on Isogeometric analysis (IGA): Basis and Advanced Application**.
Lecture was delivered by the pioneer of Isogeometric Analysis, Prof. A. Reali of the University of Pavia, Italy.
Learned the nuances of the advanced Isogeometric Analysis approach.
Awarded Grade B.

Internships and Projects

May, 2013 **Summer Intership**, HAL Kanpur.
Gained experience about the various manufacturing and testing of the different composite structural components.

Sept, 2013 **Trainee**, *Department of Aerospace Engineering*, IIT Kanpur.
Gained hand on experience on demonstration of stability modes such as phugoid mode, Dutch roll, stalling and controls of propeller aircraft Hansa-3.
Calculated centre of gravity, neutral point, maneuvering point, rate of climb and side slip coefficient for propeller aircraft Hansa-3 and Cessna.

July, 2014 – May, 2015 **Inventory Management Software**, *Department of Aerospace Engineering*, IIT Kharagpur.
Developed offline UI using PHP which allows lab in-charge to keep records of all issued items to students and allow modification to items data and user accounts.
Established system is currently handing data of 400 students in Aero modelling Laboratory, Department of Aerospace, IIT Kharagpur.

Jan, 2013 – March, 2013 **Mess Monitoring System**, *RK Hall*, IIT Kharagpur.
Developed Java Software using Swing which process and records inputs data through smart card.
Engineered input device to read QR code data using cam and convert it to input format to the software.
After successfully implementation, system able to cut costs by INR 210000 in a year

Jan, 2013 – March, 2013 **Library Management System**, *RK Hall*, IIT Kharagpur.
Designed an online user interface using PHP allowing user to list issued/reserved/available in hall library.
Established system was used by 630 students in Radhakrishnan Halls of residence, IIT Kharagpur.

Memberships

Aeronautical Society of India.

The institution of Engineers (India).

Extra-Curricular Activities

2022 **Sarathi Academy**, Developing free education material for students (*Website*).

2017 **Susamskar Foundation**, Working with Susamskar Foundation, an NGO, which instill the value education in the young minds (*Website*).

References

Prof. B. N. Singh
Professor
Department of Aerospace Engineering
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Prof. D. K. Maiti
Professor
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Prof. Pawan Goyal
Associate Professor
Department of Computer Science and Engineering
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