KORAK SARKAR

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RESEARCH INTERESTS

Structural Dynamics, Solid Mechanics, Rotary Wing Aeroelasticity, Analytical Modeling, Inverse Problems, Finite Element Analysis, Random Vibrations

EDUCTATION

Doctor of Philosophy	2016	Department of Aerospace Engineering **Indian Institute of Science, Bangalore, India** <u>Thesis</u>: Inverse problems in free vibration analysis of rotating and non-rotating beams and its application to random eigenvalue characterization <u>Advisor</u>: Prof. Ranjan Ganguli
Master of Science (Engineering)	2012	Department of Aerospace Engineering **Indian Institute of Science, Bangalore, India** GPA=6.5/8.0 <u>Thesis</u>: Closed-form solutions for rotating and non-rotating beams: an inverse problem approach <u>Advisor</u>: Prof. Ranjan Ganguli
Bachelor of Engineering	2009	Department of Mechanical Engineering **Jadavpur University, Kolkata, India** GPA=8.04/10.00

PROFESSIONAL EXPERIENCE

Assistant Professor	Aug 2021 – Present	Department of Mechanical Engineering, **Indian Institute of Technology (IIT)** Kharagpur, India
Temporary Faculty	Nov 2020 – Jul 2021	Department of Aerospace Engineering & Applied Mechanics, **Indian Institute of Engineering Science & Technology (IIEST)**, Shibpur, India
SERB Indo-US Research Fellow	Jan 2018 – Jan 2020	School of Aerospace Engineering, **Georgia Institute of Technology**, Atlanta, USA
Research Associate	Mar 2016 – Dec 2017	Department of Aerospace Engineering, **Indian Institute of Science (IISc)** Bangalore, India

HONORS & AWARDS

- o Prof Chintakindi V Joga Rao Medal for best PhD Thesis in the Department of Aerospace Engineering, Indian Institute of Science, Bangalore 2018.
- o SERB Indo-US Postdoctoral Fellowship 2017-2018, by the Science and Engineering Research Board (SERB) & Indo-US Science and Technology Forum (IUSSTF), Govt. of India.
- o International Travel Support-2014 by DST (Department of Science & Technology), Govt. of India.

PUBLICATIONS

- o Refereed Journal Papers = 11
- o Conference Papers = 7

See **Appendix A** for list of publications

EDUCATIONAL CONTRIBUTION

- o PhD = 1 Ongoing
- o Master's Thesis Project = 3 Completed, 3 Ongoing
- o Taught several courses and labs

See **Appendix B** for details

JOURNAL PAPER REFEREE

- o AIAA Journal
- o Applied Mathematical Modelling
- o Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science
- o Journal of Vibration Engineering & Technologies

CONFERENCE COMMITTEE MEMBERSHIPS

- o Organizing Committee, International Webinar on "Advances in Aerospace Engineering", IIEST Shibpur, March 19-20, 2021

APPENDIX A: LIST OF PUBLICATIONS

REFEREED JOURNAL PUBLICATIONS

1. **K. Sarkar** & R. Ganguli, "Rotating beams and non-rotating beams with shared eigenpair for pinned-free boundary condition", *Meccanica*, Vol. 48, No. 7, pp. 1661-1676, 2013

2. **K. Sarkar** & R. Ganguli, "Closed-form solutions for non-uniform Euler-Bernoulli free-free beams", *Journal of Sound and Vibration*, Vol. 332, No. 23, pp. 6078-6092, 2013

3. **K. Sarkar** & R. Ganguli, "Tailoring the second mode of Euler-Bernoulli beams: an analytical approach", *Structural Engineering and Mechanics*, Vol. 51, No. 5, pp. 773-792, 2014

4. **K. Sarkar** & R. Ganguli, "Modal tailoring and closed-form solutions for rotating non-uniform Euler-Bernoulli beams", *International Journal of Mechanical Sciences*, Vol. 88, pp. 208-220, 2014

5. **K. Sarkar** & R. Ganguli, "Closed-form solutions for axially functionally graded Timoshenko beams having uniform cross-section and fixed-fixed boundary condition", *Composites Part B: Engineering*, Vol. 58, pp. 361-370, 2014

6. **K. Sarkar** & R. Ganguli, "Analytical test functions for free vibration analysis of rotating nonhomogeneous Timoshenko beams", *Meccanica*, Vol. 49, No. 6, pp. 1469-1477, 2014

7. **K. Sarkar**, R. Ganguli, D. Ghosh & I. Elishakoff, "Closed-form solutions and uncertainty quantification for gravity-loaded beams", *Meccanica*, Vol. 51, No. 6, pp. 1465-1479, 2016

8. **K. Sarkar** & R. Ganguli, "Benchmark analytical solutions from beams with shared eigenpair", *International Journal of Mechanical Sciences*, Vol. 106, pp. 245-253, 2016

9. **K. Sarkar**, R. Ganguli & I. Elishakoff, "Closed-form solutions for non-uniform axially loaded Rayleigh cantilever beams", *Structural Engineering and Mechanics*, Vol. 60, No. 3, pp. 455-470, 2016

10. S. Bhat, **K. Sarkar**, R. Ganguli & I. Elishakoff, "Slope-inertia model of non-uniform and inhomogeneous Bresse-Timoshenko Beams", *AIAA Journal*, Vol. 56, No. 10, pp. 4158-4168, 2018

11. **K. Sarkar**, R. Ganguli, D. Ghosh & I. Elishakoff, "Random eigenvalue characterization for free vibration analysis of axially-loaded Euler-Bernoulli beams", *AIAA Journal*, Vol. 56, No. 9, pp. 3757-3765, 2018

INTERNATIONAL CONFERENCE PUBLICATIONS

1. **K. Sarkar** & R. Ganguli, "Modal tailoring and closed-form solutions for rotating beams", *Proceedings of the 69th American Helicopter Society Annual Forum*, Phoenix, Arizona, USA, May 21-23, 2013

2. **K. Sarkar** & R. Ganguli, "Closed-form Solutions for Rotating Non-homogeneous Timoshenko Beams", *Proceedings of the 39th European Rotorcraft Forum*, Moscow, Russia, September 3-6, 2013

3. **K. Sarkar**, R. Ganguli & I. Elishakoff, "Closed-form Solutions for Rotating Cantilever Non-uniform Rayleigh Beams", *Proceedings of the 3rd Asian-Australian Rotorcraft Forum*, Melbourne, Australia, December 18-19, 2014

4. **K. Sarkar**, R. Ganguli, D. Ghosh & I. Elishakoff, "Random Eigenvalue Analysis for the Free Vibration of Rotating Beams Using Inverse Problem Approach," *58th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Grapevine, Texas, USA, January 9-13, 2017

5. M. Gupta, **K. Sarkar** & D. Hodges, "3-D Stress-Strain Histories for Composite Beams under Nonlinear Transient Structural Analysis", *AIAA Scitech Forum & Exposition*, San Diego, California, USA, January 7-11, 2019

6. M. Gupta, **K. Sarkar** & D. Hodges, "Dynamic Analysis of Nonlinear Composite Beams with 3-D Structural Damping", *AIAA Scitech Forum & Exposition*, San Diego, California, USA, January 7-11, 2019

7. A. Das, S. Pal, **K. Sarkar**, and A. Karmakar, "A Study on Vibration Characteristics of Cantilever Conical Shell Made of FG Sandwich Material with Porosity and Thermal Effect", *International Conference on Theoretical Applied Computational and Experimental Mechanics (ICTACEM)*, IIT Kharagpur, West Bengal, India, December 20-22, 2021

APPENDIX B: EDUCATIONAL CONTRIBUTIONS

PHD STUDENTS

1. **Ravi Prakash Prajapati**, 2022-present

MTECH / DUAL DEGREE STUDENTS

1. **Ashishsingh Bharatbhai Solanki**, Dual Degree 2022
   Topic: Reliability based design optimization of helicopter rotor blades

2. **Joru Sai Kumar**, Dual Degree 2022
   Topic: Inverse problem in multi-degree-of-freedom systems using Machine Learning

3. **Vishal Saha Chowdhury**, Dual Degree 2022
   Topic: Closed-form solutions for Rayleigh free-free beams using inverse problem approach

4. **Apurva Sunil Rangari**, MTech, Under progress
   Topic: Slope-inertia Timoshenko beam model for rotating beams

5. **Dipannoy Dhar**, MTech, Under progress
   Topic: Polynomial type finite element analysis for Rayleigh beams

6. **Komati Eddy Nithin Reddy**, MTech, Under progress
   Topic: Functionally graded rotating beam modeling

TEACHING

Indian Institute of Engineering Science & Technology (IIEST), Shibpur:

1. **Mechanics** (UG 1st year): *Autumn 2020-21*
2. **Drawing Practice** (UG 1st year): *Autumn 2020-21, Spring 2020-21*
3. **Fluid Mechanics Lab** (Mining 2nd year): *Spring 2020-21*

Indian Institute of Technology (IIT) Kharagpur:

1. **Dynamics** (UG 2nd year): *Autumn 2021-22, Autumn 2022-23*
2. **Design & Dynamics Laboratory** (PG 1st year): *Autumn 2021-22*
3. **Do-it-Yourself (DIY) Project** (UG 1st year): *Autumn 2021-22*
4. **Vibration of Structures** (PG elective): *Spring 2021-22, Spring 2022-23*
5. **Basic Engineering Mechanics** (UG 1st year): *Spring 2021-22*
6. **Engineering Drawing & Computer Graphics** (UG 1st year): *Autumn 2021-22*