

**Dr. P.S. Balaji**  
**Asst. Professor, Dept. of Mechanical Engineering, NIT Rourkela**

**Official Address**

Department of Mechanical Engineering  
NIT Rourkela ([www.nitrkl.ac.in](http://www.nitrkl.ac.in))  
Rourkela, Odisha, India-769008  
(+91) 7395979565  
Mail ID: [psbalaji@nitrkl.ac.in](mailto:psbalaji@nitrkl.ac.in), [aerobala@gmail.com](mailto:aerobala@gmail.com)

**EDUCATION**

**Doctor of Philosophy**, School of Civil and Mechanical Engineering,  
**Curtin University**, Australia 2014 – 2017  
Research Title: “*An Analytical and Experimental Study on Wire Rope Isolators for Vibration Isolation of Equipment and Structures*”.

**Master of Technology, (MTech)**, Design, Department of Mechanical Engineering  
CGPA: 9.3, University Second 2010–2012  
**National Institute of Technology (NIT)**, Allahabad, India

**Bachelor of Engineering, (BE)**, Aeronautical Engineering,  
Aggregate: 82%, First Class 2004–2008  
**Hindustan Institute of Technology and Sciences**, (Anna University), Chennai, India

**PROFESSIONAL EXPERIENCE**

*Department of Mechanical Engineering* Feb 2018 – Till today  
**National Institute of Technology (NIT)**, Rourkela, India  
(Assistant Professor)  
*Responsibility*: Teaching and Research

*Department of Mechanical Engineering* June 2017 – Feb 2018  
**SRM University**, Chennai, India  
Research Assistant Professor  
*Responsibility*- Teaching and Research

*Department of Mechanical Engineering* Aug 2016 – May 2017  
**National Institute of Technology (NIT)**, Warangal, India  
(Adhoc Faculty)  
*Responsibility*: Teaching and Research

*Department of Mechanical Engineering* Aug 2013 – Nov 2013  
**GITAM University**, India  
(Assistant Professor)  
*Responsibility*: Teaching and Research

*Department of Mechanical Engineering* June 2012 – July 2013  
**RK University**, India

(Assistant Professor)

*Responsibility:* Teaching and Research

*Industry*

July 2008 – Aug 2009

**Taneja Aerospace and Aviation Limited (TAAL) Technologies, India**

(Design Engineer)

## RESEARCH AND CONSULTANCY PROJECTS

1. **Balaji P.S (PI)**, “Design and Development of a Mechanical Metamaterial with Quasi-Zero-Stiffness behavior for Vibration Control applications” Science and Engineering Research Board (SERB) under CRG grant, Government of India, **Rs. 20 Lakhs** , Nov 2020-Nov 2023 (On-Going).
2. **Balaji P.S (PI)**, “Design of Negative stiffness mechanism-based vibration isolation system” Indian Space and Research Organization (ISRO), Government of India, **Rs. 16 Lakhs** Sep 2020-Sep 2022 (On-Going).
3. D.P.Jena (PI), **Balaji P.S (Co-PI)**, “Design and Analysis of VTOL UAV” Yotec Bangalore, **Rs 7.7 Lakhs (Approx. 9500 USD)** July 2021- July 2022 (On-Going).
4. Srinivas J (PI), **Balaji P.S (Co-PI)**, S.K. Das (Co-PI), DRK. Parhi (Co-PI), “**Drone Aeromechanics**” MeitY, Govt. Of India, **Rs 1.55 Crores**, March 2023- March 2028 (On-Going).

## JOURNAL PUBLICATIONS

1. P Banerjee, S Dalela, **PS Balaji**, S Murugan, LA Kumaraswamidhas, “Simultaneous vibration isolation and energy harvesting using quasi-zero-stiffness-based metastructure”, Acta Mechanica, 1-23, 2023. <https://doi.org/10.1007/s00707-023-03553-y>
2. K Ramar, LA Kumaraswamidhas, **PS Balaji**, A Agasthian, “Whole Body Vibration Impact Assessment on Dumper Operator Using Computational Learning Technique”, International Journal of Precision Engineering and Manufacturing 24(2), 219-238, 2023. <https://doi.org/10.1007/s12541-022-00732-0>
3. KVJ Bhargav, PS Balaji, RK Sahu, JK Katiyar, “Exemplary approach using tool rotation-assisted  $\mu$ -ECDM for CFRP composites machining”, Materials and Manufacturing Processes, 38(3), 271–283, 2023. <https://doi.org/10.1080/10426914.2022.2072879>
4. KVJ Bhargav, KR Pyla, **PS Balaji**, RK Sahu, “Micromachining of Al7075 alloy using an in-situ ultrasonicated  $\mu$ -ECDM system”, Materials and Manufacturing Processes, 1-13, 2023. <https://doi.org/10.1080/10426914.2023.2187822>
5. KVJ Bhargav, PS Balaji, RK Sahu, “Micromachining of borosilicate glass using an electrolyte-sonicated- $\mu$ -ECDM system”, Materials and Manufacturing Processes,38(1), 64–771-14, 2023. <https://doi.org/10.1080/10426914.2022.2089893>
6. KVJ Bhargav, **PS Balaji**, RK Sahu, M Leblouba, “Experimental investigation on machining characteristics of titanium processed using electrolyte sonicated  $\mu$ -ECDM system” Scientific Reports 12 (1), 15540, 2022. <https://doi.org/10.1038/s41598-022-20001-4>

7. M Leblouba, **PS Balaji**, ME Rahman, “Wire Rope Isolators for the Vibration Protection of Heavy Equipment: Exploratory Research”, *Buildings*, 12(12), 2212, 2022. <https://doi.org/10.3390/buildings12122212>
8. M Leblouba, **PS Balaji**, ER Muhammad, “Quasi-static cyclic behavior of wire rope isolators: comprehensive experimental study and improved mathematical modeling” *Heliyon* 8(10), e10944, 2022. <https://doi.org/10.1016/j.heliyon.2022.e10944>
9. S Dalela, **PS Balaji**, DP Jena, “A review on application of mechanical metamaterials for vibration control” *Mechanics of advanced materials and structures* 29(22), 3237-3262, 2022. <https://doi.org/10.1080/15376494.2021.1892244>
10. S Dalela, **PS Balaji**, DP Jena, “Design of a metastructure for vibration isolation with quasi-zero-stiffness characteristics using bistable curved beam”, *Nonlinear Dynamics* 108(3), 1931-1971, 2022. <https://doi.org/10.1007/s11071-022-07301-0>
11. KVJ Bhargav, P Shanthan, **PS Balaji**, RK Sahu, SK Sahoo, “Generation of microholes on GFRP composite using ES- $\mu$ -ECDM system”, *CIRP Journal of Manufacturing Science and Technology* 38, 695-705, 2022. <https://doi.org/10.1016/j.cirpj.2022.06.015>
12. KVJ Bhargav, PS Balaji, RK Sahu, JK Katiyar, “Multi-response optimization and effect of tool rotation on micromachining of PMMA using an in-house developed  $\mu$ -ECDM system”, *CIRP Journal of Manufacturing Science and Technology* 38, 473-490, 2022. <https://doi.org/10.1016/j.cirpj.2022.05.020>
13. S Suman, **PS Balaji**, K Selvakumar, LA Kumaraswamidhas, “Nonlinear vibration control device for a vehicle suspension using negative stiffness mechanism”, 9, 957–966, 2021. <https://doi.org/10.1007/s42417-020-00275-6>
14. **PS Balaji**, M Leblouba, ME Rahman, LH Ho, “Static lateral stiffness of wire rope isolators”, *Mechanics Based Design of Structures and Machines* 44(4), 462-475, 2016. <https://doi.org/10.1080/15397734.2015.1116996>
15. **PS Balaji**, L Moussa, ME Rahman, LH Ho, “An analytical study on the static vertical stiffness of wire rope isolators”, *Journal of Mechanical Science and Technology*, 30, 287-295, 2016. <https://doi.org/10.1007/s12206-015-1232-5>
16. M Leblouba, S Altoubat, M Ekhlasur Rahman, **PS Balaji**, “Elliptical leaf spring shock and vibration mounts with enhanced damping and energy dissipation capabilities using lead spring”, *Shock and Vibration*, 2015. <https://doi.org/10.1155/2015/482063>
17. **PS Balaji**, L Moussa, ME Rahman, LT Vuia “Experimental investigation on the hysteresis behavior of the wire rope isolators”, 29, 1527–1536, 2015. <https://doi.org/10.1007/s12206-015-0325-5>
18. **PS Balaji**, V Yadava, “Three dimensional thermal finite element simulation of electro-discharge diamond surface grinding”, *Simulation Modelling Practice and Theory* 35, 97-117, 2013. <https://doi.org/10.1016/j.simpat.2013.03.007>

## BOOK

Karthik Selva Kumar and **Balaji P.S.** “Applications and Techniques for Experimental Stress Analysis” IGI Global, Jan 2020, ISBN:9781799816904, DOI: <http://dx.doi.org/10.4018/978-1-7998-1690-4>

## REVIEWER EXPERIENCE

Scientific Reports Nature, Mechanical Systems and Signal Processing, Acta Mechanica, Mechanica, Journal of Vibration Engineering and Technologies, Physica Scripta, Materials Research Express, Engineering Reports etc.

## COURSES TAUGHT

UG: System Dynamics and Control, Composite Material, Dynamics and Design of Machines

PG: Experimental Stress Analysis, Nonlinear Dynamics

## THESIS SUPERVISION

B.Tech	M.Tech	PhD (PI)
14	10	05

- (a) **PhD student (Inst. Scholar): KVJ Bhargav**, Dr. P.S. Balaji (Guide NIT Rourkela), Dr. R.K. Sahu (Co-guide, NIT Surathkal), Thesis Title : Development Of  $\mu$ -ECDM System With Different Process Modes For Machining Of Micro Features And Nanoparticles Synthesis Research Area: ECDM manufacturing process, Joined: July 2018. **Graduated : March 2023**
- (b) **PhD student (Inst. Scholar): Srajan Dalela**, Dr. P.S. Balaji (Guide), Dr. D.P. Jena (Co-guide), Research Area: Non-linear vibration & Structural metamaterial, Joined: July 2018.  
**Current status : Preparing for Thesis submission (Expected in September 2023)**
- (c) **PhD student (Inst. Scholar): Payal Banerjee**, Dr. P.S. Balaji (Guide), Dr. S. Murugan (Co-guide), Research Area: Nonlinear Vibration Energy Harvesting, Joined: July 2019.  
**Current status : Completed Progress seminar in March 2023**
- (d) **PhD student (JRF Scholar): Pyla Prasad**, Dr. P.S. Balaji (Guide), Research Area: Nonlinear Vibration Control, Joined: Feb 2022. Funded by DST SERB under CRG.  
**Current status : Completed Registration seminar in May 2023**
- (e) **PhD student (Industry Sponsor): Jitendra Kumar Dixit**, Dr. P.S. Balaji (Guide), Research Area: Vibration Condition Monitoring, Joined: Aug 2020.  
**Current status : Course Work completed and Preparing for Comprehensive Exam.**

## ADMINISTRATIVE EXPERIENCE

- Vice President, Student Activity Centre (2020-2023)
- Member of Intellectual Property and Innovation Centre ( 2022- Till date)
- Member of Accreditation and Ranking Cell ( 2022 – Till date)
- PIC of UG Students (2020-2022)
- Co-Ordinator for NBA Accreditation of M.Tech (Machine Design and Analysis) and B.Tech (Mechanical Engineering) (2019- till date)

## **AWARD AND RECOGNITIONS**

- Received fully funded scholarship to pursue my PhD at Curtin university Australia, 2014.
- Received grants from Accelerate Vignan Karyashala during the years 2021 and 2023.
- Received grants from CSIR to conduct short term course, 2019.
- Received best faculty advisor award in 2022, from NIT Rourkela.
- Awarded with MHRD Fellowship for Master programme at NIT Allahabad [2010-2012]
- Have developed innovative nonlinear systems and have filled 2 patents
- Have published research work in the Scientific Reports, Nature.
- My PhD work is recognized as potential research output by Malaysian government under ERGS scheme.
- Under my guidance as main supervisor one PhD student have successfully defend his thesis.

## **LAB DEVELOPMENT @ NIT Rourkela**

- Lab Name : *Materials and Wave Propagation Lab (MWPL)*
- Facility Developed from External funding:
  - Shaker system with Power Amplifier
  - DAQ system with software
  - Triaxial Accelerometers
  - Impedance head
- In-house development of  $\mu$ -Electrochemical Discharge Machining ( $\mu$ -ECDM) for Micromachining and Nanoparticle synthesis.

**NO OF WORKSHOP/ SHORT TERM COURSES CONDUCTED : 04**

(Updated on July 2023)

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