

CURRICULUM VITAE

Dr. Sachin Kumar Singh
Associate Professor
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1. **EXPERIENCE**

Associate Professor, Department of Mechanical Engineering, **IIT (ISM) Dhanbad**
(April 2022- present)

Assistant Professor, Department of Mechanical Engineering, **IIT (ISM) Dhanbad**
(February 2015 – April 2022)

Assistant Professor, Dept. of Mechanical Engineering, **Tezpur University, Tezpur, Assam, India** (July 2010 - February 2015)

2. **EDUCATION**

PhD (Mechanical Engineering)
Indian Institute of Technology, Guwahati, India
PhD in vibration-based condition monitoring (2005-2012)
Thesis title: Identification of multiple cracks in a shaft system

M. Tech (Machine Design)
Indian Institute of Technology, Guwahati, India
M. Tech. in Machine Design (2003-2005)
M. Tech thesis: Noise source identification of workshop machinery

BE (Mechanical Engineering)
University Institute of Technology, Barkatullah University, Bhopal, India
B.E. in Mechanical Engineering (1999-2003)

3. **RESEARCH INTEREST:** Rotor dynamics, Machinery condition monitoring, Signal processing in mechanical systems, Machine Learning

4. SPONSORED PROJECTS

Sl No	Project Title	Amount in Rs. (Lakh)	Role	Funding Agency	Duration	Status
1	Early detection of bearing fault and fatigue crack in a rotor system	31.3	PI	DST SERB	36 months (2016-2019)	Completed
2	Detection of faults in a rotor system	2.0	PI	TEQIP III	24 months (2017-2019)	Completed
3	Development of a wind turbine condition monitoring system using signal processing and machine learning techniques	40.30	PI	DST	2024-2027	Ongoing

5. Courses Taught: Engineering Graphics, Engineering Mechanics, Solid Mechanics, Machine Design, Dynamics and Vibration of Machinery, Control Systems, Rotor Dynamics, Optimization Theory, FEM

6. PhD Guidance: Completed: 05, Ongoing: 02

7. Short Term Courses Organised

Sl No.	Name of Short Term Course	Funding Agency	Consultancy Number	Amount Rs. (Lakhs)	Duration	CI/Co-CI
1.	Condition monitoring and failure analysis of Machines	Participants from Academic and Industry	CONS/3768/17-18	1.38	March 21-24, 2018	CI with Dr. Shibayan Sarkar Singh (as Co-CI)

8. PUBLICATIONS

Journals:

1. S. K. Singh and R. Tiwari, Identification of a multi-crack in a shaft system using transverse frequency response functions, Mechanism and Machine Theory 2010; 45 1813-1827.
2. S. K. Singh and R. Tiwari, detection and localisation of multiple cracks in a stepped shaft, Fatigue and Fracture of Engineering Materials and Structures 2012; 36 85-91.
3. S. K. Singh and R. Tiwari, Detection and localisation of multiple cracks in a shaft system: an experimental investigation, Measurement, 2014; 53 182-193.

4. D. K. Das, J. Sarkar, S. K. Singh, "Effect of sample size, temperature and strain velocity on mechanical properties of plumbene by tensile loading along longitudinal direction: A molecular dynamics study", *Computational Materials Science*, 2018; 151 196-203.
5. K. Kumar, S. Shukla, S. K. Singh, "A combined approach for weak fault signature extraction of rolling element bearing using Hilbert envelop and zero frequency resonator", *Journal of Sound and Vibration*, 2018; 419, 436-451.
6. P. Mishra, S. K. Singh, V. Ranjan, S. Singh, A. Vidyarthi, Performance Evaluation of Jaipur Knee Joint through Kinematics and Kinetics Gait Symmetry with Unilateral Transfemoral Indian Amputees, *Journal of Medical Systems* (2019) 43, <https://doi.org/10.1007/s10916-019-1181-0>
7. A. Kumar, S. K. Singh, Milling tool wear prediction using spindle motor current signal, *International Journal of Condition Monitoring*, 2019, 9(2), pp. 35-41
8. S. Shukla, S. K. Singh, D. Mitra, An Efficient Heart Sound Segmentation Approach using Kurtosis and Zero Frequency Filter Features, *Biomedical Signal Processing and Control*, 2019, 57, 101762, <https://doi.org/10.1016/j.bspc.2019.101762>
9. S. Sachan, S. Shukla, S. K. Singh, Two level de-noising algorithm for early detection of bearing fault using wavelet transform and zero frequency filter, *Tribology International*, 2020, 143, <https://doi.org/10.1016/j.triboint.2019.106088>
10. R. Nigam, S. K. Singh, Crack detection in a beam using wavelet transform and photographic measurements, *Structures*, 2020, 25, 436-447, <https://doi.org/10.1016/j.istruc.2020.03.010>
11. P. Mishra, S. K. Singh, V. Ranjan, S. Singh, A. Pandey, H. Sharma, Measurement of spine parameters and possible scoliosis cases with surface topography Techniques: A case study with young Indian males, *Measurement*, 2020, 161, 107872, <https://doi.org/10.1016/j.measurement.2020.107872>
12. K. Kumar, S. Shukla, S. K. Singh, Early detection of bearing faults using minimum entropy deconvolution adjusted and zero frequency filter, *Journal of Vibration and Control*, (February 2021) <https://doi.org/10.1177/1077546320986368>
13. R. Kumar, S. K. Singh, Crack detection near the ends of a beam using wavelet transform and high resolution beam deflection measurement, *European Journal of Mechanics - A/Solids* 2021, 88, <https://doi.org/10.1016/j.euromechsol.2021.104259>
14. R. Kumar, R. Nigam, S. K. Singh, Selection of suitable mother wavelet along with vanishing moment for the effective detection of crack in a beam, *Mechanical Systems and Signal Processing*, 2022, 163, 108136, <https://doi.org/10.1016/j.ymssp.2021.108136>
15. R. Nigam, S. K. Singh, Crack detection in a beam using curvatures and digital image measurements. *Meccanica*, 2022, 57(9), 2199-2211, <https://doi.org/10.1007/s11012-022-01568-8>
16. R. Kumar, S. K. Singh, A variance-based approach for the detection and localization of cracks in a beam. *Structures*, 2022, 44, 1261-1277, <https://doi.org/10.1016/j.istruc.2022.08.068>

17. Vikash Kumar, Sachin Kumar Singh, Volume Optimization of Two-Stage Helical Gear Train Using Differential Evolution Algorithm, Journal of Scientific & Industrial Research (2024), 83(2), Pages 130-138, 2024, DOI: <https://doi.org/10.56042/jsir.v83i2.5029>

18. Nigam R, Kumar R, Singh SK. Numerical and experimental investigation on crack detection in a beam using maximal overlapping discrete wavelet transform. Structural Health Monitoring. 2024; 23(5):2942-2962. doi:10.1177/14759217231214939

19. P Chauhan, S K Singh, A multi-frequency approach for the fault identification of bearings and gears based on frequency shifting and narrowband filtering. *Nondestructive Testing and Evaluation*, (2024) 1–34. <https://doi.org/10.1080/10589759.2024.2433034>

Book chapter:

1. S. K. Singh, R. Tiwari and S. Talukdar, A multi-crack identification algorithm based on forced vibrations from a shaft system, IUTAM symposium on emerging trends in rotor dynamics IUTAM book series 2011; Volume 1011, 505-513, DOI: 10.1007/978-94-007-0020-8_42.

2. Gupta R. B., Singh S. K. (2019) Detection of Crack and Unbalancing in a Rotor System Using Artificial Neural Network. In: Prasad A., Gupta S., Tyagi R. (eds) Advances in Engineering Design. Lecture Notes in Mechanical Engineering. Springer, Singapore

Conference:

1. S. K. Singh and R. Tiwari, A novel normalization procedure of quadratic coefficients in a multi-crack identification algorithm for a shaft system, IFToMM International conference on rotor dynamics, Sept. 12-15, 2010, KIST, Seoul, South Korea.

2. S. K. Singh and R. Tiwari, Multi-crack identification using forced responses from a rotor system, international conference on vibration engineering and technology of machinery, VETOMAC-VI, Dec. 13-15, 2010, IIT Delhi, New Delhi, India.

3. S. K. Singh and A. D. Sahasrabudhe, Noise source identification of workshop machinery, All india seminar on active and passive noise control, November 11-13, 2009, Guwahati, India.

4. S. K. Kakoty, A. Hussain, S. K. Singh, Combating sound pollution at drilling rig of OIL India Limited, All india seminar on active and passive noise control, November 11-13, 2009, Guwahati, India.

5. S. Sachan, A. K. Paswan and S. K. Singh, " Detection of faults in a Rotor System integrated with Active Magnetic Bearing", 5th National Symposium on Rotor Dynamics(NSRD 2017), Department of Mechanical Engineering and Department of Electrical Engineering IIT Patna, India, (12-13 Dec'17). (Paper ID-13)

6. K. Kumar, S. Shukla, S. K. Singh, A Hilbert envelope and comb filter based method for early detection of bearing fault, 5th National Symposium on Rotor Dynamics (NSRD 2017), Department of Mechanical Engineering and Department of Electrical Engineering IIT Patna, India, (12-13 Dec'17).

7. Ramnivas Kumar, Sachin K Singh "Crack Detection in a Shaft Using wavelet Transform", 3rd National conference on mining equipment new challenges and Applications (MENTCA-

2018), department of Mining Machinery Engineering. IIT (ISM) Dhanbad, India, (9-10 Feb'18). (Paper ID- men_2018/27).

8. Ravi Nigam, Sachin kumar Singh, "Detection of crack in shaft by using Finite Difference Method", 3rd National conference on mining equipment new challenges and Applications (MENTCA-2018), department of Mining Machinery Engineering. IIT (ISM) Dhanbad, India, (9-10 Feb'18).

9. Ravi Nigam, and S. K. Singh, Crack detection in a shaft using finite difference technique, IOP Conference Series: Materials Science and Engineering, Volume 624, 1st International Conference on Mechanical Power Transmission 11–13 July 2019, Chennai, India, DOI: [10.1088/1757-899x/624/1/012012](https://doi.org/10.1088/1757-899x/624/1/012012)