

# BASURAJ BHOWMIK

## PERSONAL DATA

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## EDUCATION

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JULY 2015 - OCTOBER 2018 | **Ph.D.** in STRUCTURAL ENGINEERING, **Indian Institute of Technology**, Guwahati, India  
Thesis: "Online structural damage detection using first order eigen perturbation techniques"  
Coursework GPA: 9.63/10.00

JULY 2011- MAY 2015 | **B.Tech** in CIVIL ENGINEERING, **National Institute of Technology**, Agartala, India  
Thesis: "Flexure and shear characteristic study of natural and artificial fibre reinforced polymer in retrofitted reinforced concrete beam"  
Cumulative GPA: 9.27/10.00

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## ACADEMIC APPOINTMENTS

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JANUARY 2020- MAY 2020 | **Co-Lecturer** at UNIVERSITY COLLEGE DUBLIN, Ireland  
*Undergraduate course: Mechanics for Engineers (MEEN10030)*  
Introductory mechanics module which provides fundamental foundation for engineering students who will subsequently study more advanced topics including applied dynamics, mechanics of solids and structures, and mechanics of fluids.

SEPTEMBER 2019- DECEMBER 2019 | **Co-Lecturer** at UNIVERSITY COLLEGE DUBLIN, Ireland  
*Graduate course: Advanced Vibrations (MEEN41040)*  
Advanced course on conceptual models and numerical techniques related to vibrations and dynamics of structures.

MARCH 2019 - FEBRUARY 2021 | **Postdoctoral Research Fellow** at UNIVERSITY COLLEGE DUBLIN, Ireland  
*Project: WindPearl*  
**Project Manager**, responsible for managing the team's day-to-day work, and increasing the team presence from a global standpoint. Actively involved in creating improved methods for early and accurate downtime detection for a range of Irish wind farms.

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## POSITIONS OF RESPONSIBILITY

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<b>SUPERVISION &amp; MENTORING</b> MAY 2020 - PRESENT MARCH 2019 - PRESENT MAY 2019 - AUGUST 2019	Mentoring <b>1 summer intern</b> from IEST Shibpur, India. Supervision of <b>4 PhD</b> students in an informal capacity. Mentored <b>2 summer interns</b> from INP-ENSEEIH, France.
<b>ACADEMIC ADMINISTRATION</b> MARCH 2021 JULY 2020 MAY 2020 MAY 2020  APRIL 2020 JANUARY 2020 - PRESENT SEPTEMBER 2019 - PRESENT	<b>1<sup>st</sup> BJUT-UCD Research Symposium</b> , Session Moderator <b>10<sup>th</sup> EWSHM 2020, Palermo, Italy</b> , Special Session Chair <b>ASCE EMI and PMC Conference, New York, USA</b> , Chair of the mini-symposium MS-243 <b>45<sup>th</sup> International JVE Conference, Dublin, Ireland</b> Scientific Committee member and Chair of the Special session on SHM <b>ASCE EMI Conference, Durham, UK</b> , Chair of the mini-symposium MS-81 Engineering Category Judge, <b>The Global Undergraduate Awards (UA)</b> <b>COST Action (CA18203)</b> , Management Committee member.

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## RESEARCH INTERESTS

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| 1. Real time structural health monitoring and damage detection | 4. Probabilistic modeling                         |
| 2. Structural dynamics and recursive modal identification      | 5. Infrastructure reliability and risk assessment |
| 3. Eigen perturbation techniques for dynamical systems         | 6. Stochastic structural dynamics and FEM         |

## INDUSTRIAL SERVICE

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AUG 2018-FEB 2019 | **Mechanical Developer** at SIEMENS, Gurgaon, India (*Turbine mechanical integrity*)

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## AWARDS

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1. **MILCA Award for Academics**, Confederation of Indian Industries (CII), India, January 2021.
2. **Research Excellence Award**, MaREI – SFI Research Centre for Energy, Climate and Marine research and innovation, Ireland, November 2020.
3. Visiting Researcher, University of Oulu, Finland, **Erasmus Staff Scholarship Program**, December 2-6, 2019.
4. **MHRD Merit Scholarship**, IIT Guwahati–July 2015 to October 2018.

## RESEARCH

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### Authored Books

1. **B Bhowmik**, B Hazra, V Pakrashi, "Real-time structural health monitoring of vibrating systems". *CRC Press*, expected - June 2021.

### Book chapters

1. **B Bhowmik**, S Quqa, MGR Sause, V Pakrashi, MG Droubi, "Signal Processing – Structural Health Monitoring Damage Detection Systems for Aerospace". *Springer*, expected - June 2021.
2. MP Limongelli, E Manoach, S Quqa, PF Giordano, **B Bhowmik**, V Pakrashi, A Cigada "Vibration Response-based damage detection – Structural Health Monitoring Damage Detection Systems for Aerospace". *Springer*, June 2021.

### Journal Publications

1. M Krishnan, **B Bhowmik**, AK Tiwari, B Hazra (2017), "Online damage detection using recursive principal component analysis and recursive condition indicators". *Smart Materials and Structures, IOP Science Publications*, 26(8), pp. 085017
2. M Krishnan, **B Bhowmik**, B Hazra & V Pakrashi (2018), "Real time damage detection using recursive principal components and time varying auto-regressive modeling". *Mechanical Systems and Signal Processing, Elsevier*, 101, 549–574
3. **B Bhowmik**, M Krishnan, B Hazra & V Pakrashi (2019), "Real time unified single and multi channel structural damage detection using recursive singular spectrum analysis." *Structural Health Monitoring, SAGE*, 18 (2): 563-589
4. PC Fitzgerald, A Malekjafarian, **B Bhowmik**, LJ Prendergast, P Cahill, CW Kim, B Hazra, V Pakrashi and EJ OBrien (2019). "Scour Damage Detection and Structural Health Monitoring of a Laboratory-Scaled Bridge Using a Vibration Energy Harvesting Device. Sensors." *Sensors, MDPI Publishing*, 19(11), 2572
5. **B Bhowmik**, T Tripura, B Hazra and V Pakrashi (2019). First order eigen perturbation techniques for real time damage detection of vibrating systems: Theory and applications. *Applied Mechanics Reviews, ASME*, 71(6)
6. T Tripura, **B Bhowmik**, V Pakrashi and B Hazra (2020), "Real time damage detection of degrading systems". *Journal of Structural Health Monitoring, SAGE Publications*, vol. 19(3), 810-837. doi: 10.1177/1475921719861801
7. **B Bhowmik**, T Tripura, B Hazra and V Pakrashi (2020), "Robust linear and nonlinear structural damage detection using recursive canonical correlation analysis". *Mechanical Systems and Signal Processing, Elsevier*, vol. 136, pp. 106499
8. **B Bhowmik**, T Tripura, B Hazra and V Pakrashi (2020), "Real time structural modal identification using recursive canonical correlation analysis and application towards online structural damage detection". *Journal of Sound and Vibration, Elsevier*, vol. 468, pp. 115101
9. P Mucchielli, **B Bhowmik**, B Hazra and V Pakrashi (2020), "Higher-order stabilised perturbation for recursive eigen-decomposition estimation". *Journal of Vibration and Acoustics, ASME*, 142(6): 061010
10. **B Bhowmik**, B Hazra, M OByrne, B Ghosh and V Pakrashi (2021), "Real-Time Damping Estimates of a pedestrian foot-bridge". *Journal of Vibroengineering*, vol. 23(1)
11. **B Bhowmik**, B Hazra and V Pakrashi (2021), "A framework for online blind modal identification based on recursive simultaneous diagonalization". *Mechanical Systems and Signal Processing, Elsevier*, under-review
12. P Mucchielli, **B Bhowmik**, V Pakrashi and B Ghosh (2021), "Real-time accurate detection of wind turbine downtime – an Irish perspective". *Renewable Energy, Elsevier*, under-review
13. S Panda, **B Bhowmik** and B Hazra (2021), "An error-corrected recursive singular spectrum analysis for real-time filtering and diagnosis of vibrating systems". *International Journal of Mechanical Sciences, Elsevier*, under-review
14. **B Bhowmik**, F Okosun, S Guerin, V Pakrashi (2021), "A Statistical Approach for Vibration-Based Leak monitoring in Water Pipes with Energy Harvesting Sensors". *Philosophical Transactions of the Royal Society: Part A, Royal Society*, under review

## Conference Publications

1. **B Bhowmik**, M Krishnan, B Hazra and V Pakrashi, "Online Damage Detection using Recursive Principal Component Analysis". *X International Conference on Structural Dynamics, EURODYN 2017*, Sapienza Universita di Roma, Italy.
2. **B Bhowmik** and B Hazra, "Smart structural damage detection using principal component analysis". *13<sup>th</sup> International Conference on Vibration Problems, ICOVP 2017*, Indian Institute of Technology, Guwahati, India.
3. **B Bhowmik**, B Hazra and V Pakrashi, "Online damage detection using recursive principal component analysis and time varying auto regressive modeling", *1<sup>st</sup> International conference on Structural Integrity for Offshore Energy Industry, 2018*, Aberdeen, UK.
4. **B Bhowmik**, B Hazra & V Pakrashi, "Real time structural damage detection using recursive singular spectrum analysis", *13<sup>th</sup> International Conference on Applications of Statistics and Probability in Civil Engineering, 2019*, Seoul, South Korea.
5. **B Bhowmik**, T Tripura, B Hazra and V Pakrashi, "Damage detection under progressive operational degradation of structures in real time", *8<sup>th</sup> International Operational Modal Analysis Conference 2019*, Copenhagen, Denmark.
6. **B Bhowmik** and B Hazra, "Real time structural damage detection in the presence of deterministic operational power line noise", *8<sup>th</sup> International Operational Modal Analysis Conference (IOMAC), 2019*, Copenhagen, Denmark.
7. **B Bhowmik**, B Hazra and V Pakrashi, "Real-Time Damping Estimates of a pedestrian footbridge", *8<sup>th</sup> Irish Transport Research Network Conference (ITRN), 2019*, Belfast, Northern Ireland.
8. V Pakrashi, **B Bhowmik**, JMG Sopena, P Mucchielli and B Ghosh, "Wind Power Prediction and Early downtime Detection for Ireland", *4<sup>th</sup> Civil Engineering Research Association of Ireland (CERI) conference, 2020*, Cork, Ireland.
9. V Pakrashi, W Qiu, M O'Byrne, P Cahill, **B Bhowmik**, B Ghosh, "Fish Farm Monitoring for Blue Growth", *4<sup>th</sup> Civil Engineering Research Association of Ireland (CERI) conference, 2020*, Cork, Ireland.
10. **B Bhowmik**, B Hazra, V Pakrashi, "Real-time Monitoring of Built Infrastructure Systems", *International Conference on Engineering Vibration (ICOEV), 2020*, Aberdeen, UK.

## KEYNOTE LECTURES AND INVITED TALKS

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1. Talk on "3 Thought Tools for Downtime Detection – WindPearl's take on Irish turbines", **WindPearl Day**, Dublin, Ireland, April - 1, 2021.
2. Talk on "Real-time Monitoring Strategies of Dynamical Systems", *1<sup>st</sup> BJUT-UCD Research Symposium*, Dublin, Ireland, March 8-12, 2021.
3. Invited *expert lecture* on "Traditional and contemporary methods in Structural Health Monitoring", **G.H. Raisoni College of Engineering and Management**, Pune, India, Feb - 2021.
4. *Pecha Kucha* presentation on "Recursive eigen perturbation and industrial associations", **MIT-Senseable City Lab**, Massachusetts Institute of Technology, USA, July-21, 2020.
5. Invited talk on "Real-time damage detection – Myth busters", **Now for something completely different**, University College Dublin Energy Institute, Ireland, June-26, 2020.
6. Keynote lecture at the Workshop on Recent Trends in Structural Engineering, **National Institute of Technology, Agartala**, India, December 14-18, 2019.
7. Talk on "First order eigen perturbation concepts in real time monitoring", **International Training School**, University College Dublin, Ireland, October 10-11, 2019.
8. Invited talk on "Real time monitoring of built infrastructure using first order perturbation techniques", **National Construction Summit**, Ireland, March-14, 2019.

## ENTREPRENEURIAL ENGAGEMENTS

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NOVEMBER 2020 - PRESENT	Project Management Professional (en route), <b>PMI-USA</b>
JANUARY 2020 - JUNE 2020	Pre-Commercialization Accelerator Programme, <b>NDRC</b>

## WORKSHOPS—ORGANIZED AND ATTENDED

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1. 2-day workshop—*Organized* the International Training School on **Real Time Monitoring of Dynamical Systems**, University College Dublin, Ireland, October 10-11, 2019.
2. 2-day workshop on addressing Irelands Climate Action Plan, **ESIPP**, Galway, Ireland, June 13-14, 2019.
3. 1-day workshop on **Predictive Maintenance** at TU Dublin, Ireland, May-24, 2019.
4. Outreach program on the **Technology Day**, Analog Devices, Cork, Ireland, May-21, 2019.

## EDITORIAL SERVICE

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APRIL 2021 - PRESENT	Journal reviewer, Journal of Experimental Techniques, <b>Springer</b>
MARCH 2021 - PRESENT	Journal reviewer, Journal of Engineering Structures, <b>Elsevier</b>
MARCH 2021 - PRESENT	Journal reviewer, Journal of Smart Materials and Structures, <b>IOP Publications</b>
MARCH 2021 - PRESENT	Journal reviewer, Journal of Vibration and Acoustics, <b>ASME</b>
DECEMBER 2020 - PRESENT	Journal reviewer, Journal of Structural Health Monitoring, <b>SAGE Publications</b>
OCTOBER 2020 - PRESENT	Journal reviewer, Journal of Sound and Vibration, <b>Elsevier</b>
SEPTEMBER 2020 - PRESENT	Journal of Risk and Uncertainty in Engineering Systems Part B: Mechanical Engineering, <b>ASME</b>
JULY 2020 - PRESENT	Topic Editor, Journal of Applied Mechanics, <b>MDPI Publications</b>
OCTOBER 2019 - PRESENT	Journal reviewer, IEEE Sensors Journal, <b>IEEE Sensors Council</b>
AUGUST 2019 - PRESENT	Journal reviewer, Journal of Structural Integrity and Maintenance, <b>Taylor &amp; Francis</b>
JULY 2019 - PRESENT	Journal reviewer, Journal of Infrastructure Asset Management, <b>ICE Publishing</b>
MAY 2019 - PRESENT	Journal reviewer, <b>ASCE</b> Journal of Bridge Engineering
MAY 2019 - PRESENT	Journal reviewer, Mechanical Systems and Signal Processing, <b>Elsevier</b>
MAY 2019 - PRESENT	Journal reviewer, Journal of Engineering and Computational Mechanics, <b>ICE Publishing</b>

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