Dr. Ashutosh Anand

Curriculum Vitae

HNo 18A, Road No 7,
New Pundag, Jagarnath Vihar,
Dhurwa Ranchi, Jharkhand, Pincode: 834004
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✉ ashutosa@srmist.edu.in

About Me

Experienced teaching faculty with a demonstrated history of working in the higher education industry. Skilled in Lecturing and Curriculum Development. Expertise in MEMS, and Signal Processing. Strong education professional with a Doctor of Philosophy - PhD focused in Piezoelectric Energy Harvester from BIT Mesra Ranchi. Ready to Learn Unlearn & Relearn.

Experiences

July 2025-Present — **Assistant Professor**, SRM IST NCR Campus, Ghaziabad, UP, India.
Assistant Professor, Department of ECE, College of Engineering

Aug 2021–July 2025 — **Assistant Professor-Senior Scale**, Presidency University, Bengaluru
• Assistant Professor, Department of ECE, College of Engineering •
Subjects taken – Data Communication and Network, Embedded C, Introduction to C, Python, MEMS & Nanotechnology, Digital Electronics, Digital Electronics lab, Digital Design-Theory and Lab, Antenna and Wave Propagation, Analog Electronics, Analog Electronics Lab, Elements of Electronics, Elements of Electronics lab, Information Theory and Coding, Low power VLSI Design, VLSI Design Lab.

Responsibility: University Coordinator to the Innovative Project.
NAAC 1 Coordinator of the Department.
Department Meeting Coordinator
Technical Festival In-charge Coordinator.

Feb 2021-Aug 2021 — **Contractual Faculty- Assistant Professor**, Usha Martin University, Ranchi
• Assistant Professor, Department of ECE • Subjects taken – Digital Electronics, Mathematics I and II, Basic electronics lab.

July 2011-Oct 2015 — **Assistant Engineer**, Technocrats' Engineers
Design, Testing, Maintenance of Product

Feb 2010-June 2011 — **Project Engineer**, Wipro Technology, Bengaluru
• Module Lead for Business Rule Management System in the Product Data Management platform for a leading MNC in Retail domain. • Major project responsibilities included analysis of business requirements, design, development and implementation of client customizations to the Business Rule Management System. • Integrated the Business Rule Management System with other modules of the Product Data Management platform and provided a roadmap for the extension of the Business Rule Management System to accommodate different data formats in future. • Project achievements included an improved B2B experience through an improvement in the quality of the product data being published to the end-user. • Worked on the proof-of-concept and demo from Wipro to a leading MNC in Retail domain.

Research Experiences

Jan 2016 – Jan 2022 — **Ph.D; Prof. (Dr.) Srikanata Pal, BIT Mesra Ranchi and Dr. Sudip Kundu, NIT Rourkela**
Design of MEMS based Piezoelectric Energy Harvester for low power devices
During the PhD, I designed MEMS based piezoelectric energy harvester for low power devices. The research gap of reduction in resonant frequency while miniaturizing the size of EH and increasing the bandwidth of the harvester is the primary motivation behind this work. The objective of the thesis are design of the piezoelectric energy harvester with low resonant frequency, miniaturized the size of the cantilever structure, design of PZ transducer focussing on the higher output voltage and power, and design of wide bandwidth PZ transducer which can efficiently convert the vibrations exist in the ambient environment to electrical energy. In this work, various structural modifiaction have been incorporated in the cantilever structure to reduce the resonant frequency and improves the bandwidth of the harvester while maintaining the small size and the efficiency of the harvester.

May 2014 – June 2015 — **M.E Research; Dr. Mahesh Chandra, BIT Mesra, Ranchi**
Text Independent Speaker Verification Using Gaussian Mixture Model
I worked on it for the development of speaker verification for the practical purpose. The proposed designed system has an accuracy of more than 99%.
Technologies used: Using MATLAB for simulation purposes. Worked on Feature extraction, Feature matching and Classifier model for efficiency calculation.

July 2008 – June 2009 — **B. Tech. Project, Dr. Akhilesh Kumar, NIT Jamshedpur**
Implementation of FIR Filter On FPGA using Distributed Arithmetic • A hardware efficient DA architecture using multiplexers and adders has been proposed and implemented. This method not only reduces the LUT size, but also modifies the structure of the filter to achieve high-speed performance. The proposed filter has designed and synthesized with ISE 2.1.

Jan 2008 – June 2008	**B. Tech. Project, Dr. Amit Prakash, NIT Jamshedpur** **SQUARE SHAPED MICROSRTIP PATCH ANTENNA** Designed a square shaped Micro Strip Patch Antenna of size 2cm each. Also fabricated the same and then tested using Antenna Polar Plot Software. Technologies Used: For software designing and simulation we used HFSS software and after fabrication tested using Antenna Polar Plot Software.

Education

2016–2022	**Doctor of Philosophy (Ph. D) in Electronics and Communication Engineering,– Birla Institute of Technology Mesra, Ranchi (BIT Mesra) Awarded on 27 january 2022** Subject: MEMS, VLSI, Course work CGPA: 8.25/10
2013 – 2015	**Master of Engineering (M.E.) in Electronics and Communication Engineering,–Birla Institute of Technology Mesra, Ranchi (BIT Mesra)** Subject: Instrumentation and Control,–CGPA: 7.79/10; (First Class)
2005 – 2009	**Bachelor of Technology (B. Tech) in Electronics Engineering,– National Institute of Technology (NIT) Jamshedpur** CGPA: 8.25/10 (First Class with Distinction)
2004	**Higher Secondary Examination,– Delhi Public School, Ranchi–CBSE** Marks: 82.4% (First Division)
2002	**Secondary Examination,– Vivekananda Vidya Mandir, Ranchi–CBSE** Marks: 84.4% (First Division)

Research Interests

Hardware Accelerator, Machine Learning, MEMS, Energy Harvester, Sensor Design, Low power VLSI Design, Power Conditioning Circuit

Computational & Experimental Skills

Languages	MATLAB, LaTeX, C/C++, Python
Softwares	Anaconda, Goggle Colab, COMSOL Multiphysics, COVENTORWARE, Cadence Virtuoso, MATLAB, Multisim, HFSS, Xilinx, Visio, Excel-VBA, MS-Word
Summer 2008	Vocational Training, R&D, SAIL, Ranchi

Online Footprints

GOOGLE SCHOLAR	https://scholar.google.com/citations?user=E6CeMDUAAAAJ&hl=en, (Citation=174, H-index-9, I-index-8)
SCOPUS	https://www.scopus.com/authid/detail.uri?authorId=57210555495
RESEARCH GATE	https://www.researchgate.net/profile/Ashutosh-Anand-9/stats
ORCID	https://orcid.org/0000-0003-1988-8022
PUBLONS	https://www.webofscience.com/wos/author/record/AAU-5822-2020
SCIPROFILES	https://sciprofiles.com/profile/ashutoshanand
LinkedIn	https://www.linkedin.com/in/ashutosh-anand-038776b/
Vidwan	https://vidwan.inflibnet.ac.in/profile/268496
Website	https://sites.google.com/view/ashutoshanand/

Research Proposal

1	Energy Harvesting from Mechanical Energy for Powering Smart Sensor, Project Submitted- ECRA VGST (Under process)(Amount -10 Lakh)

Patents

2022	**Dr. Ashutosh Anand**, "IOT BASED SECURED ELECTRONIC VOTING SYSTEM", Application No.202241072862 A, Publication Date : 30/12/2022, INDIA
2025	Dr. Tirthankar Datta, Dr. Monika Saxena, Sushanta Kumar Mohapatra, Dr. Manish Verma, **Dr. Ashutosh Anand**, Dr. Alok Kumar, Mehbub Rahaman Mondal, Avishek Das, Amit Kumar Shrivastava, Dr. Ashok Kumar Tripathi, Dr. Harsh Kuma, "AI-DRIVEN HYBRID QUANTUM KEY DISTRIBUTION FOR SECURE LONG-DISTANCE COMMUNICATION" Application No.202531009602 A, Publication Date : 14/02/2025, India

2025   Dr. Santanu Koley, Saubhik Goswami, Dr. Rohit Kumar Gupta, Dr. Sudakshina Mandal, Dr. Usha Bala Varanasi, Dr. Ashutosh Anand, Manasija Bhattacharya, Soumya Chakravarty, Saheb Santra, Dr. Subhasish Roy "A QUANTUM-RESISTANT LIGHTWEIGHT CRYPTOGRAPHIC PROTOCOL FOR SECURE IoT COMMUNICATION IN LIMITED-RESOURCE ENVIRONMENTS" Application No.202531025466 A, Publication Date : 28/03/2025, India

2025   FUZZY LOGIC DENOISER FOR SALT AND PEPPER NOISE REMOVAL IN DIGITAL IMAGES, Patent Application Number: 202531050024, Published on 20th June 2025

2025   SYSTEM FOR ENHANCEMENT OF LOW CONTRAST GRAY SCALE IMAGE USING FUZZY LOGIC AND SIGMOID FUNCTION, Patent Application Number: 202531050016, Published on 24th June 2025

Books

2024   **Dr. Ashutosh Anand**, " Piezoelectric Energy Harvester: Applications and Research Advances " ASIN : B0DKY31M6J, Publisher : Notion Press (25 October 2024), Language : English, Paperback : 118 pages, ISBN-13 : 979-8896100485 (BOOK)

Journals

2025   **Ashutosh Anand**. "A review on the performance enhancement techniques of piezoelectric energy harvesters." Nanomaterials and Energy, Volume 14 Issue 2, June 2025, pp. 1-22, DOI: 10.1680/jnaen.23.00109 (Scopus)

2023   **Ashutosh Anand**, and Manish Kumar. "Tapered substrate thickness to enhance the performance of a piezoelectric energy harvester." Nanomaterials and Energy 11, no. 3&4 (2023): 67-79 (Scopus)

2023   Kumar, Manish, Shatakshi Singh, Sunggon Kim, **Ashutosh Anand**, Shatrudhan Pandey, SM Mozammil Hasnain, Adham E. Ragab, and Ahmed Farouk Deifalla. "A hybrid model based on convolution neural network and long short-term memory for qualitative assessment of permeable and porous concrete." Case Studies in Construction Materials 19 (2023): e02254. (SCI)

2022   **Ashutosh Anand**, Srikanta Pal, and Sudip Kundu. "Bandwidth and Power Enhancement in the MEMS Based Piezoelectric Energy Harvester using Magnetic Tip Mass" Bull. Pol. Ac.: Tech., 2022, DOI: 10.24425/bpasts.2021.137509. **(SCIE)**

2022   Kumar, Manish, Jitu Kujur, Rajeshwari Chatterjee, Somnath Chattopadhyaya, Shubham Sharma, Shashi Prakash Dwivedi, Ambuj Saxena, S. Rajkumar, and **Ashutosh Anand**. "Corrosion Zones of Rebar in High-Volume Fly-Ash Concrete through Potentiodynamic Study in Concrete Powder Solution Extracts: A Sustainable Construction Approach." Advances in Civil Engineering 2022 **(SCIE)**.

2022   Kumar, Manish, Ashutosh Anand, Rajeshwari Chatterjee, Shubham Sharma, Tushar Kanti Maiti, Shashi Prakash Dwivedi, Ambuj Saxena, Changhe Li, and Elsayed Mohamed Tag Eldin. "Investigation on Carbonation and Permeability of Concrete with Rice Hush Ash and Shop Solution Addition." Materials 15, no. 17 (2022): 6149 **(SCIE)**.

2021   **Ashutosh Anand**, Srikanta Pal, and Sudip Kundu. "Multi-perforated energy efficient piezoelectric energy harvester using improved stress distribution". IETE Journal of Research, 2021. DOI: 10.1080/03772063.2021.1913071. **(SCI)**

2020   **Ashutosh Anand**, Sourav Naval, Prasun Kumar Sinha, Nikhil Kumar Das, and Sudip Kundu. "Effects of coupling in piezoelectric multi-beam structure." Microsystem Technologies 26, no. 4 (2020): 1235-1252. **(SCI)**

2020   Sourav Naval, Prasun Kumar Sinha, Nikhil Kumar Das, **Ashutosh Anand**, Sudip Kundu, "Wideband Piezoelectric Energy Harvester design using parallel connection of multiple beams", International Journal of Nanoparticles, Inderscience Publishers, August 2019, Volume 12, Issue 3, pp 206-223, ISSN online 1753-2515 DOI: 10.1504/IJNP.2020.109545 **(SCOPUS)**

2019   **Ashutosh Anand**, and Sudip Kundu. "Design of a spiral-shaped piezoelectric energy harvester for powering pacemakers." Nanomaterials and Energy 8, no. 2 (2019): 139-150. **(ESCI)**

2022   Anand, Ashutosh. "Piezoelectric Energy Harvester for IOT Application." Medicon Engineering Themes Volume 3 Issue 2 August 2022

Conference Proceedings

2025   Natya S, **Ashutosh Anand** "Monitoring and Mapping vegetation dynamics using Sentinel-2 imagery" In IEEE Conference Proceedings,IATMSI-2025, at ABV-IIITM Gwalior, India (Accepted and Presented)

2024   Kumar, Arvind, Faiza Tasneem, **Ashutosh Anand**, S. Natya, Akshaya M. Ganorkar, Rakesh Chowdhury, and Mahesh Chandra. "Study of speech/music classification for Kannada language." In AIP Conference Proceedings, vol. 2966, no. 1. AIP Publishing, 2024.

2023   Alam, Intekhab,**Ashutosh Anand**, and G. N. Mamatha. "MEC Enabling Private Over 5G." In 2023 International Conference on Power Energy, Environment & Intelligent Control (PEEIC), pp. 883-887. IEEE, 2023.

2023   **Ashutosh Anand**, G. N. Mamatha, and Awakash Mishra. "5G'S Effect on Industry Digital Transformation and Productivity." In 2023 International Conference on Power Energy, Environment & Intelligent Control (PEEIC), pp. 874-878. IEEE, 2023.

2023   **Ashutosh Anand**, and Vinay Kumar SB. "5G-VANET Edge-Assisted Data Exchange." In 2023 International Conference on Power Energy, Environment & Intelligent Control (PEEIC), pp. 879-882. IEEE, 2023

2022   Natya, S., C. Manu, and **Ashutosh Anand**. "Deep Transfer Learning with RESNET for Remote Sensing Scene Classification." In 2022 IEEE International Conference on Data Science and Information System (ICDSIS), pp. 1-6. IEEE, 2022.

2022   **Anand, A.**, Dash, S.K., Datta, K., Prasad, D., Pal, S., Nath, V. (2023). A 2–10 GHz Common Gate UWB Low Noise Amplifier in 90 nm CMOS. In: Nath, V., Mandal, J.K. (eds) Microelectronics, Communication Systems, Machine Learning and Internet of Things. Lecture Notes in Electrical Engineering, vol 887. Springer, Singapore. https://doi.org/10.1007/978-981-19-1906-0_27

2022   Prasad, D., **Anand, A.**, Sateesh, V.A., Surshetty, S.K., Nath, V. (2023). Accident Avoidance and Detection on Highways. In: Nath, V., Mandal, J.K. (eds) Microelectronics, Communication Systems, Machine Learning and Internet of Things. Lecture Notes in Electrical Engineering, vol 887. Springer, Singapore. https://doi.org/10.1007/978-981-19-1906-0_44

2022   Kumar, Arvind, Neela Chattoraj, and **Ashutosh Anand**. "Design of Multi-slotted Trapezoidal Cantilever for Low Frequency Devices." In 2022 IEEE International Conference on Distributed Computing and Electrical Circuits and Electronics (ICDCECE), pp. 1-7. IEEE, 2022.

2021   **Ashutosh Anand**, Geetanjali Singh, Abhishek Pandey, Srikanta Pal, Sudip Kundu, "L-shaped Piezoelectric energy harvester for low frequency application", 2021 Devices for Integrated Circuit (DevIC) (IEEE Conference), Kalyani, India, 19th-20th, May, 2021.

2020   **Ashutosh Anand**, Srikanta Pal, Sudip Kundu, "Stress Enhancement in the piezoelectric cantilever with Tapered substrate and piezoelectric layer thickness", July 2020, MCCS-2020, **Scopus book series**, Springer conference (Book chapter)

2020   Yash Gupta, **Ashutosh Anand**, Vijay Nath, Srikanta Pal, "CMOS VCO: A Review", Sep 2020, SECS-2020, Scopus book series, Springer conference (Book chapter)

2019   **Ashutosh Anand**, Sudip Kundu, Design of Mems Based Piezoelectric Energy Harvester for Pacemaker, 2019 Devices for Integrated Circuit (DevIC) (IEEE Conference), Kalyani, India, 23rd-24th, March, 2019

2019   **Ashutosh Anand**, Sudip Kundu, Improvement of Output Power in Piezoelectric Energy Harvester under Magnetic Influence, 2019 Devices for Integrated Circuit (DevIC) (IEEE Conference), Kalyani, India, 23rd-24th, March, 2019

2019   Sourav Naval, Prasun Kumar Sinha, Prasun Kumar Sinha, **Ashutosh Anand**, Sudip Kundu, Bandwidth Increment of Piezoelectric Energy Harvester using Multi-beam Structure, 2019 Devices for Integrated Circuit (DevIC) (IEEE Conference), Kalyani, India, 23rd-24th, March, 2019.

Reviewer of International/National Journals/Conferences

o Review of Scientific Instruments – AIP Publication.
o APL Photonics – AIP Publication.
o AIP Advances
o Journal of Applied Physics
o Energy (Proceedings of the ICE)
o Applied Sciences, MDPI
o Microwave Review
o e-Prime - Advances in Electrical Engineering, Electronics and Energy
o Energy technology
o Microsystem technologies
o IEEE International Conference on Distributed Computing and Electrical Circuits and Electronics (ICDCECE-2022)
o IEEE International Conference on Data Science and Information System (ICDSIS - 2022)

ASSOCIATE EDITOR

o Member of the review board of the journal Medicon Microbiology (MCMI) an open-access journal.
o Member of the advisory board of the journal MC Engineering Themes an open-access journal.

Membership of Scientific Societies

Senior IEEE Member

IEEE Nanotechnology Council, IEEE Council of Electronic Design Automation, IEEE System Council, IEEE Sensor Council, IEEE Council of RFID, IEEE council of Superconductivity, IEEE Young Professional

Life Member:ISSS- Institute of Smart Structures and Systems

Associate Member (Electronics and Communication Engineering)Institution of Engineers: Kolkata, INDIA, IN

CONFERENCE/ WORKSHOP/ WEBINAR/ FDP CONDUCTED

- Delivered a lecture on the title "Piezoelectric energy harvester for medical devices" in a 2-day workshop on "MEMS based health care technologies" organised by the ECE department of BIT Mesra Ranchi on 1st and 2nd August 2024.
- IEEE ICRISST 2024 as Technical and Exhibit Chair under IEEE Bangalore Chair on 15-16th March 2024.
- I have participated and served as volunteer in the 5th International Conference on Microelectronics Computing & Communication Systems (MCCS- 2020) organized by IETE & ISVE at Advanced Regional Telecom Training Centre, BSNL, Hazaribagh Road, Ranchi-835217, Jharkhand, India during July 11 -12th, 2020.
- I have participated and served as volunteer in the 1st 1st International Science Exhibition Congress Symposium (SECS-2020) organized by IETE & ISVE at Advanced Regional Telecom Training Centre, BSNL, Hazaribagh Road, Ranchi-835217, Jharkhand, India during Sep 12 -13th, 2020.
- I have participated and moderated a Technical Session in the 1st International Conference on Nanoelectronics, Machine Learning, Internet of Things & Computing Systems (NMIC-2021) organized by IETE & ISVE at Advanced Regional Telecom Training Centre, BSNL, Hazaribag Road, Ranchi-835217, Jharkhand, India during March 13 -14th, 2021.
- I have participated and moderated the technical session in the 6 th International Conference on Microelectronics, Computing, Communication Systems (MCCS-2021) organized by ISVE Ranchi at Advanced Regional Telecom Training Centre, BSNL, Hazaribagh Road, Ranchi-835217, Jharkhand, India during July 17 -18th , 2021 in Virtual Mode.
- I have participated and moderated the technical session in the 2nd International Conference on Microelectronics, Communication Systems, Machine Learning & Internet of Things (MCMI-2021) organized by ISVE Ranchi at Advanced Regional Telecom Training Centre, BSNL, Hazaribag Road, Ranchi-835217, Jharkhand, India during Oct 23 -24th, 2021 in Virtual Mode.
- I have conducted as the head coordinator a circuit simulation competition "Electro-Abhiyantran" for the students of department of ECE and EEE at Presidency University on 3rd December'2021.
- I have given a one-day webinar at Presidency University on the topic "Design of MEMS based energy harvester" on 8th january'2022.
- I have participated and moderated the technical session in the 7th International Conference on Nanoelectronics, Circuits & Communication Systems (NCCS-2021) organized by ISVE Ranchi at Advanced Regional Telecom Training Centre, BSNL, Hazaribagh Road, Ranchi-835217, Jharkhand, India during Jan 29-30th , 2022 in Virtual Mode.
- I have conducted as a coordinator in the five-day national level FDP at Presidency University Bengaluru on "Advances on MEMS, RF MEMS, and signal processing" help between 12th Feb to 17 Feb'2022.
- I am participated as a Resource Person in five-day national level FDP at Presidency University Bengaluru on "Advances on MEMS, RF MEMS, and signal processing" help between 12th Feb to 17 Feb'2022.
- The coordinators of IEEE (ICDCCOM 2014) conference held in BIT Mesra.

EVENTS CONDUCTED

- The Organiser of 24 hours Software Hackathon "PAC HACK" at Presidenct University" on 13-14th September 2024- (300 Participants across India)
  - The Organiser of Student Design Challenge - Contestarium at Presidency University in the month of Febuaray and March 2024.
  - The coordinators of the circuit simulation competition "ELECTRO-ABHIYANTRAN"
- Innovatex: Student Design Challenge - As Organiser
- Innovatex 2: Student Design Challenge (Inter College Student Competition) - As Organiser
- Contestairum 2024: Student Design Challenge-Hardware Hackathon, Software Hackathaon, & Idea Pitch - As Organiser
- Innovative project Expo and setting the world book of record
- The head coordinator of the event "Morph"(circuit simulation") in technical fest in year 2008 at NIT Jamshedpur.
- The coordinators of college fest team at NIT Jamshedpur in 4th year.

CONFERENCE / WORKSHOP ATTENDED

- One day workshop on TCAD Industry-Academia Interaction (TCADIAI-2014) at BIT Mesra, Ranchi on 6th March 2014.

- Hands on training on micro-fabrication techniques under INUP program at the IISC Bangalore from 26 November to 6 December 2018.
- **DevIC**- IEEE conference at Kalyani government Engineering College Kolkata on 23-24 march 2019.
- MCCS-2020 conference at BSNL Ranchi on 12-13 July, 2020.
- SECS-2020 conference at BSNL Ranchi on September, 2020.
- **DevIC**- IEEE conference at Kalyani government Engineering College Kolkata on May 2021.

Honours & Awards

Dec-2019	UGC-NET– Assistant Professor (NTA)
July 2018	UGC-NET– Assistant Professor
July'2013-July'2015	GATE Fellowship for the M. Eng. study at BIT Mesra, MHRD, Govt. of India
2013	Qualified GATE 2013
2014	Qualified GATE 2014
2017	Qualified GATE 2017
2019	Qualified GATE 2019
2002	Class 10th topper of my school with more than 90% mark in three subjects.
2000	2nd prize in Quiz organized at Ram Krishna Mission (V.V.M, Ranchi)

References

- **Dr. Sudip Kundu**
  Assistant Professor, Electronics and Communication Engineering
  National Institute of Technology Rourkela, India
  kundu.sudip@gmail.com
- **Dr. Neela Chattoraj**
  Associate Professor, Electronics and Communication Engineering
  Birla Institute of Technology Mesra Ranchi India
  nchattoraj@bitmesra.ac.in
- **Dr. Srikanta Pal**
  Professor, Electronics and Communication Engineering
  Birla Institute of Technology Mesra Ranchi, India
  spal@bitmesra.ac.in

PERSONAL DETAILS

Permanent Address	HNo-18A, Road no 7, New Pundag, Jagarnath Vihar, Dhurwa, Ranchi, India, Pin-834004
Native Address	Village- Madhuban, PO- Dohat Narayan, PS- Baheri, Darbhanga, Bihar, Pin-847105
Date of Birth	29-10-1987
Marital Status	Married
Parents	Mr Ramnath Singh & Mrs. Dharmshila Devi
Spouse Name	Mrs. Prity Mandal
Nationality	Indian

RESEARCH STATEMENT

I am assistant professor at Presidency university Bangalore in the department of Electronics and Communication Engineering. My research statement is given below which is consists of my present work and the plans for future work in this area.

Current work: Energy harvesting MEMS sensor

In the recent era, energy harvesting is becoming a promising solution to recharge the commonly used batteries in low-power electronic devices such as wireless sensor nodes (WSNs). The conventional batteries which have a limited lifespan need to be replaced or recharged regularly. In some applications where the WSNs are less accessible, replacing the batteries in WSNs is becoming difficult. So, devices having embedded energy harvesting systems are in high demand. Ideally, they have an infinite lifetime. Piezoelectric (PZ) or Tribo-elelctric based energy harvesters may be a potential solution for powering such devices. These PZ/triboelectric energy harvesters convert available ambient mechanical vibration energy to electrical energy. One of the main advantages of these energy harvesters is that using the Micro Electro Mechanical system (MEMS) based technology size of these energy harvesters is becoming so small that they can be easily integrated with the WSNs.

Under mechanical vibration, these device vibrates with respect to its original position and generates alternating output voltage. If the resonant frequency of the designed beam is close to the ambient vibrations, the displacement of the beam is maximum and hence it generates maximum power output. This work focuses on the design of MEMS energy harvesters to obtain the maximum possible voltage and power outputs from them for the wide frequency range.

Lab resources/Tools required: Cadence Virtuoso, COMSOL, MATLAB, COVENTORWARE