

Dr. MANISH BHAIYYA

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Shri Sant Gajanan Maharaj College of Engineering, Shegaon.
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Professional Summary

- Demonstrated ability to design & execute complex research projects and research methodologies.
- Good Understanding of Micro/Nano-Fabrication methodology to fabricate MEMS-based biosensors for point-of-care.
- Highly analytical and data-driven professional.
- Deep understanding of AI/ML algorithms and statistical models.
- Extensive experience in data analysis, statistical modelling, and research methodologies.

Education

- **Ph.D.** | BITS Pilani | 2023.
- **M.Tech** | VLSI Design | Nagpur University | 2016 | 7.6 CGPA.
- **BE** | ENTC | SGB Amravati University | 2013 | 66%
- **Diploma** | MSBTE | 2010 | 83%
- **SSC** | Maharashtra State Board | 2007 | 79.20%

Prior Work Experience

- December 2025 – November 2025 | **R&D Engineer**, Biosepectronics Pvt. Ltd. Nagpur, India.
- January 2024- November 2024 | **Assistant Professor** | RBU University, Nagpur, India.
- May 2023 – December 2023 | **Post-Doctoral Researcher** | Technion, Haifa, Israel
- June 2020 – July 2023 | **Research Fellow** | BITS Pilani, Hyderabad, India.
- January 2017 – June 2020 | **Assistant Professor** | Shri Sant Gajanan Maharaj College of Engineering Shegaon, Maharashtra, India.

Laboratory Skills

- **Micro/Nano Fabrication:** Screen Printing, Ink-Jet Printing, Laser Writing, 3D printing, and Lithography.
- Prototype development of miniaturized MEMS and Microfluidics PoC devices.

Computer Skills

- **Python**
- **Machine Learning**
- **CAD Modelling & Simulation Software:** CORAL Draw, COMSOL.

Journal Publications (SCIE Indexing)

1. Purshottam J Assudani, Gina George, Ankita Avthankar, Aditya Tiwari, **Manish Bhaiyya**, Madhusudan B Kulkarni Biosensing technologies for foodborne pathogen detection and healthcare: principles, emerging materials, and intelligent platforms, Microchimica Acta, **IF – 4.9 (Q1)**.

2. Tejrao Panjabrao Marode, Vikas K Bhangdiya, Shon Nemane, Dhiraj Tulaskar, Vaishnavi M Sarad, K Sankar, Sonam Chopade, Ankita Avthankar, **Manish Bhaiyya***, Madhusudan B Kulkarni, "Artificial Intelligence Meets Nail Diagnostics: Emerging Image-Based Sensing Platforms for Non-Invasive Disease Detection", *Bioengineering*, MDPI, MDPI, **IF – 3.9 (Q2)**, 2026.
3. Mayuri Tushar Deshmukh, Yogesh Thakre, Wani H Bisen, K Sankar, Ankita Avthankar, Aniket K Shahade, **Manish Bhaiyya***, Madhusudan B Kulkarni "From Drops to Decisions: AI/ML-Driven Biofluidics for Clinical Diagnostics and Healthcare Intelligence", *Analytical Chemistry*, American Chemical Society, **IF – 6.7 (Q1)**, 2025.
4. Dhiraj P Tulaskar, Battina Sindhu, Nitin Chakole, Rina Parteki, A Anny Leema, P Balakrishnan, Ankita Avthankar, Rangnath Girhe, Madhusudan B Kulkarni, **Manish Bhaiyya*** "AI and ML Empowering 5G and Shaping the 6G Future: Models, Metrics, Architectures, and Applications" *ICT Express*, Elsevier, **IF – 4.3 (Q1)**, 2025.
5. PR Wankhede, Devendra Bhuyar, Shrinivas Zanwar, Rohit Pawar, Mahendra R Jadhav, Nisarg Gandhewar, Madhusudan B Kulkarni, **Manish Bhaiyya***, Hossam Haick" *Artificial Intelligence for Noninvasive Health Diagnostics*", *ACS Sensors*, **IF – 10.4 (Q1)**, 2025.
6. Purshottam J Assudani, Ajit Singh Bhurgy, Sreedhar Kollem, Baljeet Singh Bhurgy, Oqail Ahmad, Madhusudan B Kulkarni, **Manish Bhaiyya***" Artificial intelligence and machine learning in infectious disease diagnostics: a comprehensive review of applications, challenges, and future directions, *Microchemical Journal*, Elsevier, **IF – 5.1 (Q1)**, 2025.
7. Kulkarni Amol S., Sarika Khandelwal, Kavita Manekar, Purshottam J. Assudani, Rangnath Girhe, Madhusudan B. Kulkarni, and **Manish Bhaiyya*** "Portable 3D-printed electrochemiluminescence sensor for simultaneous glucose and lactate monitoring." *Scientific Reports*, *Springer Nature*, **IF – 3.9 (Q1)**, 2025.
8. Barman, S. M., Parakh, A., Leema, A. A., Balakrishnan, P., Avthankar, A., Tulaskar, D. P., & **Manish Bhaiyya*** Single-Molecule Detection Technologies: Advances in Devices, Transduction Mechanisms, and Functional Materials for Real-World Biomedical and Environmental Applications. *Biosensors*, MDPI, **IF – 5.6 (Q1)** 2025.
9. Girhe, R. **Manish Bhaiyya***, Rewatkar, P., Kahar, K., Wankhede, P. R., Kulkarni, A. S. & Balpande, S. (2025). Nanotechnology-Driven Triboelectric Nanogenerators: Materials, Mechanisms, Applications, and Sustainable Pathways to Commercialization. *Journal of Electronic Materials*, Springer Nature, **IF – 2.5 (Q1)**, 2025.
10. Parakh, Arpita, Ashish Awate, Sampa Manoranjan Barman, Rakesh K. Kadu, Dhiraj P. Tulaskar, Madhusudan B. Kulkarni, and **Manish Bhaiyya*** "Artificial Intelligence and Machine Learning for Colorimetric Detections: Techniques, Applications, and Future Prospects." *Trends in Environmental Analytical Chemistry*, Elsevier, **IF – 13.4 (Q1)**, 2025.
11. Balakrishnan, P., A. Anny Leema, N. Jothiaruna, Purshottam J. Assudani, K. Sankar, Madhusudan B. Kulkarni, and **Manish Bhaiyya*** "Artificial intelligence for food safety: from predictive models to real-world safeguards.", *Trends in Food Science & Technology*, **IF – 15.4 (Q1)**, Elsevier, 2025.
12. Kulkarni, Amol S., Sarika Khandelwal, Yogesh Thakre, Jyoti Rangole, Madhusudan B. Kulkarni, and **Manish Bhaiyya*** "A Review on 3D-Printed Miniaturized Devices for Point-of-Care-Testing Applications." MDPI, *Biosensors*, **IF – 5.6 (Q1)**, 2025.

13. Rushikesh A. Deshmukh, Meghana A. Hasamnis, Madhusudan B. Kulkarni, **Manish Bhaiyya*** "Advancing Indoor Positioning Systems: Innovations, Challenges, and Applications in Mobile Robotics", *Robotica*, Cambridge University Press, **IF – 2.7 (Q2)**, 2025.
14. Amol S Kulkarni, Sarika Khandelwal, Yogesh Thakre, Jyoti Rangole, Madhusudan Kulkarni, **Manish Bhaiyya*** "A Review on 3D Printed Miniaturized Devices for Point-of-Care-Testing Applications". Accepted for Publications, MDPI, *Biosensors*, **IF – 5.6 (Q1)**, 2025.
15. Deshmukh, Mayuri Tushar, P. R. Wankhede, Nitin Chakole, Pawan D. Kale, Mahendra R. Jadhav, Madhusudan B. Kulkarni, and **Manish Bhaiyya*** "Towards Intelligent Food Safety: Machine Learning Approaches for Aflatoxin Detection and Risk Prediction." *Trends in Food Science & Technology*, Trends in Food Science & Technology, **IF – 15.4 (Q1)**, Elsevier, 2025.
16. Pandey, Minal, **Manish Bhaiyya**, Prakash Rewatkar, Jitendra B. Zalke, Nitin P. Narkhede, and Hossam Haick. "Advanced Materials for Biological Field- Effect Transistors (Bio- FETs) in Precision Healthcare and Biosensing." *Advanced Healthcare Materials*, **IF – 9.6 (Q1)**, Wiley, 2025.
17. Palekar, S.; Kalambe, S.; Kalambe, J.; Kulkarni, **Manish Bhaiyya**, "Portable Smartphone-Based 3D-Printed Biosensing Platform for Kidney Function Biomarker Quantification". *Biosensors*, **IF – 5.6 (Q1)**, 2025.
18. Manekar, Kavita, **Manish Bhaiyya**, Meghana A. Hasamnis, and Madhusudan B. Kulkarni. "Intelligent Microfluidics for Plasma Separation: Integrating Computational Fluid Dynamics and Machine Learning for Optimized Microchannel Design." *Biosensors* **IF – 5.6 (Q1)**, MDPI, 2025.
19. Wagh, Mrunali D., Pavar Sai Kumar, **Manish Bhaiyya**, Abhishek Kumar, and Sanket Goel. "Benchmarking single source fabrication approach for chemiluminescence, electrochemiluminescence, and electrochemical techniques: Experimental validation via choline detection." *Sensors and Actuators A: Physical*, **IF – 4.9 (Q1)**, Elsevier, 2025.
20. Singhal, Chirag M., Vani Kaushik, Abhijeet Awasthi, Jitendra B. Zalke, Sangeeta Palekar, Prakash Rewatkar, Sanjeet Kumar Srivastava, Madhusudan B. Kulkarni, and **Manish Bhaiyya**. "Deep Learning-Enhanced Portable Chemiluminescence Biosensor: 3D-Printed, Smartphone-Integrated Platform for Glucose Detection." *Bioengineering*, **IF – 4.9 (Q1)**, MDPI, 2024.
21. Zalke, Jitendra B., **Manish Bhaiyya**, Pooja A. Jain, Devashree N. Sakharkar, Jayu Kalambe, Nitin P. Narkhede, Mangesh B. Thakre, Dinesh R. Rotake, Madhusudan B. Kulkarni, and Shiv Govind Singh. "A Machine Learning Assisted Non-Enzymatic Electrochemical Biosensor to Detect Urea Based on Multi-Walled Carbon Nanotube Functionalized with Copper Oxide Micro-Flowers." **IF – 5.6 (Q1)**, 2024.
22. **Manish Bhaiyya**, Prakash Rewatkar, Amit Pimpalkar, Dravyansh Jain, Sanjeet Kumar Srivastava "Deep Learning-Assisted Smartphone-Based Electrochemiluminescence Visual Monitoring Biosensor: A Fully Integrated Portable Platform", *Micromachines*, MDPI, **IF – 3.0 (Q2)**, 2024.
23. **Manish Bhaiyya**, Debdatta Panigrahi, Prakash Rewatkar, Hossam Haick "Role of Machine Learning Assisted Biosensors in Point-of-Care-Testing For Clinical Decisions", *ACS Sensors*, **IF – 10.4 (Q1)**, 2024
24. Sanjeet Kumar, Amit Kumar Bhagat, **Manish Bhaiyya**, Khairunnisa Amreen, Satish Kumar Dubey, Sanket Goel "A Machine Learning Approach for Simultaneous Electrochemical

- Detection of Dopamine and Serotonin in an Optimized Carbon Thread-based Miniaturized Device" IEEE Sensors Journal, **IEEE, IF - 4.5 (Q1)**, 2024.
25. Abhishek Kumar, Dravyansh Jain, Janhvi Bahuguna, **Manish Bhaiyya**, Satish Kumar Dubey, Arshad Javed, Sanket Goel "Machine learning assisted and smartphone integrated homogeneous electrochemiluminescence biosensor platform for sample to answer detection of various human metabolites" Biosensors and Bioelectronics, Elsevier, **IF – 10.5 (Q1)**, 2023.
 26. **Manish Bhaiyya**, Sanjeet Kumar Srivastava, Prasant Kumar Pattnaik, Sanket Goel" Closed-Bipolar Mini Electrochemiluminescence Sensor to Detect Various Biomarkers: A Machine Learning Approach" IEEE Transactions on Instrumentation and Measurement, IEEE, **IF- 5.9 (Q1)**, 2023.
 27. Naqvi, Tania K., Abhilash Bajpai, Sarthak Dwivedi, **Manish Bhaiyya**, Sanket Goel, and Prabhat K. Dwivedi. "Flexible, label free and low-cost paper-based microfluidic SERS substrates for thiram detection." Sensors and Actuators A: Physical, **IF – 4.9 (Q1)**, Elsevier, 2023.
 28. Kahar, Kamlesh, Ram Dhekekar, **Manish Bhaiyya**, Sanjeet Kumar Srivastava, Prakash Rewatkar, Suresh Balpande, and Sanket Goel. "Optimization of MEMS-based Energy Scavengers and output prediction with machine learning and synthetic data approach." Sensors and Actuators A: Physical, **IF – 4.9 (Q1)**, Elsevier, 2023.
 29. Kazi M Alam, Pawan Kumar, Narendra Chaulagain, **Manish L Bhaiyya**, Guy M Bernard, Sanket Goel, Vladimir K Karthik Shankar "Unusual electronic properties of cellulose nanocrystals conjugated to cobalt phthalocyanine: long-lived charge separation and visible-light-driven photocatalytic activity" The Journal of Physical Chemistry C, American Chemical Society, **IF – 3.2 (Q1)**, 2023.
 30. Srivastava Sanjeet Kumar, **Manish Bhaiyya**, Sohan Dudala, Chitranjan Hota, and Sanket Goel. "A Machine Learning Approach for Electrochemiluminescence Based Point of Care Testing Device to Detect Multiple Biomarkers." Sensors and Actuators A: Physical, **IF – 4.9 (Q1)**, Elsevier, 2025.
 31. **Manish Bhaiyya**, Prasant Kumar Pattnaik, and Sanket Goel. "Smartphone Integrated 3D-Printed Standalone Electrochemiluminescence Platform for Cholesterol Detection." IEEE Transactions on Instrumentation and Measurement, IEEE, **IF- 5.9 (Q1)**, 2023.
 32. **Manish Bhaiyya**, Prakash Rewatkar, Prasant Kumar Pattnaik, and Sanket G. Goel. "Novel 3D Printed Single Electrode-based Portable and Miniaturized Electrochemiluminescence Platform to Detect Lactate from Human Serum." Journal of Micromechanics and Microengineering, Springer Nature, **IF – 2.1 (Q2)**, 2022.
 33. **Manish Bhaiyya**, Pavar Sai Kumar, Prasant Kumar Pattnaik, Karthik Shankar, and Sanket Goel. "Stereolithography 3D Printed Electrochemiluminescence Platform with Random Grade Graphite Electrode: Detection of H₂O₂ and Cholesterol using a Smartphone." IEEE Sensors Journal, **IEEE, IF - 4.5 (Q1)**, 2022.
 34. **Manish Bhaiyya**, Saumya Gangrade, Prasant Kumar Pattnaik, and Sanket Goel. "Laser Ablated Reduced Graphene Oxide on Paper to Realize Single Electrode Electrochemiluminescence Standalone Mini platform Integrated With a Smartphone." IEEE Transactions on Instrumentation and Measurement, IEEE, **IF- 5.9 (Q1)**, 2022.

35. **Manish Bhaiyya**, Prasant Kumar Pattnaik, and Sanket Goel. "Multiplexed and simultaneous biosensing in a 3D-printed portable six-well smartphone operated electrochemiluminescence standalone point-of-care platform." *Microchimica Acta*, Elsevier, **IF – 5.1 (Q1)**, 2022.
36. **Manish Bhaiyya**, Madhusudan B. Kulkarni, Prasant Kumar Pattnaik, and Sanket Goel. "Internet of things- enabled photomultiplier tube- and smartphone- based electrochemiluminescence platform to detect choline and dopamine using 3D- printed closed bipolar electrodes." *Luminescence*, Wiley, **IF – 3.0 (Q1)**, 2022.
37. Kahar, Kamlesh, **Manish Bhaiyya**, Ram Dhekekar, Gopal Gawande, Suresh Balpande, and Sanket Goel. "MEMS-based energy scavengers: journey and future." *Microsystem Technologies*, Springer Nature, **IF – 1.8 (Q3)**, 2022.
38. **Manish Bhaiyya**, Manish, Prasant Kumar Pattnaik, and Sanket Goel. "A brief review on miniaturized electrochemiluminescence devices: From fabrication to applications." *Current Opinion in Electrochemistry*, Elsevier, **IF – 6.9 (Q1)**, 2021.
39. **Manish Bhaiyya**, Prasant Kumar Pattnaik, and Sanket Goel. "Simultaneous detection of Vitamin B₁₂ and Vitamin C from real samples using miniaturized laser-induced graphene based electrochemiluminescence device with closed bipolar electrode." *Sensors and Actuators A: Physical*, **IF – 4.9 (Q1)**, Elsevier, 2021.
40. **Manish Bhaiyya**, Prasant Kumar Pattnaik, and Sanket Goel. "Electrochemiluminescence sensing of vitamin B₁₂ using laser-induced graphene based bipolar and single electrodes in a 3D-printed portable system." *Microfluidics and Nanofluidics*, Springer Nature, **IF – 2.5 (Q2)**, 2021.
41. **Manish Bhaiyya**, Prasant Kumar Pattnaik, and Sanket Goel. "Miniaturized electrochemiluminescence platform with laser-induced graphene-based single electrode for interference-free sensing of dopamine, xanthine, and glucose." *IEEE Transactions on Instrumentation and Measurement*, IEEE, **IF- 5.9 (Q1)**, 2021.
42. **Manish Bhaiyya**, Prasant Kumar Pattnaik, and Sanket Goel. "Portable electrochemiluminescence platform with laser-induced graphene-based U-shaped bipolar electrode for selective sensing of various analytes." *IEEE Transactions on Electron Devices*, IEEE, **IF- 2.9 (Q2)**, 2021.
43. **Manish Bhaiyya**, Prakash Rewatkar, Mary Salve, Prasant Kumar Pattnaik, and Sanket Goel. "Miniaturized electrochemiluminescence platform with laser-induced graphene electrodes for multiple biosensing." *IEEE Transactions on NanoBioscience*, IEEE, **IF- 3.7 (Q1)**, 2021.
44. Balpande, Suresh S., **Manish Bhaiyya**, and R. S. Pande. "Low- cost fabrication of polymer substrate- based piezoelectric microgenerator with PPE, IDE and ME." *Electronics Letters*, **IF – 0.8 (Q3)**, 2017.

Conferences

1. Ayushh Khaire, Bidipta Rana, Abhijeet Awasthi, Sangeeta Palekar, **Manish Bhaiyya**, Jayu Kalambe "Graphite Electrode Based Bipolar Electrode Electrochemiluminescence Portable Platform for Point-of-Care-Testing Applications" 2025 IEEE Applied Sensing Conference (APSCON), Hyderabad, India.
2. Abhishek Kumar, **Manish Bhaiyya** and Sanket Goel, Insight Into 3D Printed Eight well Electrochemiluminescence Biosensing Platforms with Shared Cathode: Towards Multiplexed

Sensing, 3rd International Conference on Micro/Nanoelectronics Devices, Circuit and Systems (MNDCS-2023), NIT Silchar, Assam, India

3. **Manish Bhaiyya**, P. K. Pattnaik and S. Goel, Smartphone Integrated 3D-Printed Standalone ECL Platform for Cholesterol Detection, 2022 IEEE International Symposium on Medical Measurements and Applications (MeMeA), 2022, Messina, Italy.
4. **Manish Bhaiyya**, Prasant K Pattnaik, and Sanket Goel, 3D-Printed Closed Bipolar Electrochemiluminescence Device for Cholesterol Detection, Novel Materials and Technologies for Energy Applications, BITS Pilani, Hyderabad, Feb 2022.
5. **Manish Bhaiyya**, Prasant K Pattnaik, and Sanket Goel, Miniaturized Portable Handheld Electrochemiluminescence Imaging, oral presentation at ECS PRiME 2020, Oct 2020.
6. **Manish Bhaiyya**, Suresh Balpande and Gopal Gawande, Design and Development of Ambient Harvester with Aluminum Foil Interdigitated Electrodes, orally Presentation at Eight ISSS International Conference on Smart Structures & Systems (ISSS 2017), July 5-7, IISC Bengaluru, India.
7. **Manish Bhaiyya**, Suresh Bapande, and Rajesh Pande, Design of Flexible Substrate Based Energy Scavenger for Sensor Node, 19th National Seminar on Physics and Technology of Sensors (NSPTS-19), 2016.
8. **Manish Bhaiyya**, Poonam Gawatre, Suresh Balpande, and Rajesh S. Pande. "Copper mesh electrodes-based energy harvester." In 2016 IEEE Students' Technology Symposium (TechSym), pp. 126-130. IEEE, 2016.

Book Chapters

1. **Manish Bhaiyya**, Prasant Kumar Pattnaik, Sanket Goel "Cloth and Paper-Based Miniaturized Electrochemiluminescence Platforms" Miniaturized Electrochemical Devices: Advanced Concepts, Fabrication, and Applications, CRC Press (2023)
2. Pavar Sai Kumar, Abhishek Kumar, **Manish Bhaiyya**, Sanket Goel "Micro Electromechanical Systems (MEMS) Practical Lab Manual", John Wiley & Sons, Inc.
3. Pavar Sai Kumar, Abhishek Kumar, **Manish Bhaiyya**, Sanket Goel "Laser Processing- Micro Electromechanical Systems (MEMS) Practical Lab Manual", John Wiley & Sons, Inc.
4. Sanjeet Kumar, Abhishek Kumar, KS Deepak, **Manish Bhaiyya**, Aniket Balapure, Satish Kumar Dubey, Sanket Goel "Electrode Fabrication Techniques- Micro Electromechanical Systems (MEMS) Practical Lab Manual", John Wiley & Sons, Inc.
5. Abhishesh Pal, Pavar Sai Kumar, Sreerama Amrutha Lahari, Sonal Fande, Abhishek Kumar, **Manish Bhaiyya**, Sohan Dudala, RN Ponnalagu, Satish Kumar Dubey, Sanket Goel "Microfluidic Devices- Micro Electromechanical Systems (MEMS) Practical Lab Manual", John Wiley & Sons, Inc.

Patent

- **Title:** Electrochemiluminescence Biosensing Devices
- **Inventors:** Sanket Goel and Manish Bhaiyya
- **Status:** Indian Patent filed, Application No: 202211054481, Oct-2022

Ongoing/completed Projects during the last 5 years: -

- **Project Title:** ML-Assisted Paper-Based Chemiluminescence Biosensor for Choline Quantification in Infant Milk: Toward Portable Nutritional Quality Monitoring,
- **Sponsored By:** Biospectronics Private Limited, Nagpur.

➤ **Duration:** Aug 2024 – Aug 2026
