



Dr Punit Kumar Singh

**Assistant Professor, Department of Bioengineering, Faculty of Engineering,
Integral University, Lucknow**

(+91-8840760836, punitsingh@iul.ac.in)

([Google Scholar](#) | [Orcid ID](#) | [Scopus](#))

PROFILE

- Ph.D. in Electronics Engineering from Dr. A.P.J. Abdul Kalam Technical University.
- M.Tech in Biomedical Engineering from Vellore Institute of Technology (VIT), Vellore.
- Expertise in biomedical image processing, biosignal processing, medical device design, and hardware co-design.
- Research focus on studying human lower limb articular cartilage using MRI techniques.
- Extensive teaching experience with a passion for biomedical research and innovation.
- Proficient in computational techniques and signal processing for medical applications.
- Published multiple research papers in leading international journals.
- Co-author of several book chapters in biomedical fields.
- Active contributor to patentable research in medical imaging.
- Engaged in professional development, faculty training, and continuous learning in advanced biomedical instrumentation.

RESEARCH INTEREST:

- Biomedical Image Processing: Specializing in segmentation and analysis of medical images, particularly MRI, for the study of cartilage and osteoarthritis.
- Biosignal Processing: Analyzing and interpreting biomedical signals for healthcare applications.
- Medical Device Design & Hardware Co-Design: Developing innovative biomedical devices and designing hardware for medical applications.
- MEMS (Micro-Electro-Mechanical Systems): Focus on designing biomedical micro-devices for medical applications.
- Medical Electronics: Researching and developing electronic systems for healthcare, including sensor interfacing and telemetry.
- Computational Techniques: Utilizing MATLAB, LabVIEW, and other computational tools for medical imaging and signal processing.
- IoT in Healthcare: Exploring the integration of IoT-based devices for advanced sensing and medical imaging technologies.

SUMMARY OF RESEARCH ACCOMPLISHMENT:

- Ph.D. Thesis: Investigated the effect of physical activities on the structural properties of human lower limb articular cartilage using MRI image processing techniques.

- Published Research: Authored and co-authored several papers in international journals, including BMC Medical Imaging, Biomedical and Pharmacology Journal, and Oman Journal of Ophthalmology, focusing on medical imaging, cartilage analysis, and ophthalmology.
- Patents: Co-inventor of a patent (Indian Patent No. 32/2023/202311049425) related to advanced medical imaging technologies.
- Book Chapters: Contributed to multiple book chapters on IoT-Based Devices and Advanced Sensing in Image Processing.
- Collaborative Research: Worked with national research institutes like DIPAS, DRDO, and King George Medical University on projects related to medical devices and biomedical engineering.
- Medical Device Innovation: Designed a BIOMEMS cantilever for medical applications, advancing micro-device design for biomedical use.
- Segmentation Techniques: Developed automatic segmentation algorithms (Watershed and Canny Edge Detection) for knee cartilage analysis from MRI images.

PROFESSIONAL MEMBERSHIP:

- Asian Society for Medical Imaging Engineers
- American Society of Medical Imaging.

COURSE TAUGHT:

- Medical Image Processing
- Biomechanics
- Biosignal Processing
- Bioinstrumentation
- Biomaterials
- Embedded System
- Rehabilitation Engineering

ADMINISTRATIVE/DEPARTMENTAL RESPONSIBILITY

- Course Coordinator of B.Tech and M.Tech Biomedical Engineering.
- Member of proctorial Board.
- Admission coordinator in the Department of Bioengineering.

STUDENTS SUPERVISION

- Priya Agarwal, "Quantitative estimation of total amino acid in blood serum sample using ninhydrin paper based microfluidics and a digital scanner", *M. Tech Dissertation*, Integral University, 2023.
- Shalini Singh, "Quantitative estimation of total amino acid in blood serum sample using istatin paper based microfluidics and a digital scanner", *M. Tech Dissertation*, Integral University, 2023.
- Aliyu Abubakar, "IoT based remote patient monitoring system", *M. Tech Dissertation*, Integral University, 2024.

PUBLISHED/GRANT PATENTS

1. Device for detecting diseased leaves in plant by image processing
2. Automatic computer vision-based accident detection system through image processing and video

- surveillance using deep learning algorithms
3. Artificial intelligence based blood pressure dropping system for avoidance of cardiovascular-diseased using data mining and machine learning techniques for health care management
 4. Artificial intelligence and machine learning based detection and prevention of malarial parasites in blood using CNN-DEEP learning algorithms for health care management systems
 5. AI based safe healthcare system for fertility preservation for young woman with cancer using cloud and machine learning algorithms
 6. IOT based device for mentally alerting alzheimer's patients as illustrated
 7. Artificial intelligence based smart forheart sound detection andclassification using signal processing and machine learning algorithms to avoid heart attack and other heart diseases.
 8. Portable solar-powered water purifier
 9. AI base device for skin cancer detection
 10. Artificial intelligence based smart healthcare system to estimate and monitoring the amount of glucose in the blood of a diabetic person, Medication dosage and identifying high risk using machine learning algorithms
 11. Artificial intelligence based heart rate monitoring device for sports training
 12. AI based approach for detecting,quantifying,and visualizing the evolution of any research field using deep learning algorithms

PUBLISHED/ACCEPTED SCI/SCOPUS RESEARCH PAPERS

- Singh, P., Nagaria, D., Pandey, P., Sharma, G. (2018). Segmentation of Knee MRIs for Osteoarthritis Initiative - A Review. *BMC Medical Imaging*, 14, 206-212. DOI: 10.1186/s12880-018-0267-8
 - Chaturvedi, P., Chauhan, A., & Singh, P. K. (2018). An assessment of variation in macular volume and RNFL thickness in myopes using OCT and their significance for early diagnosis of primary open-angle glaucoma. *Oman Journal of Ophthalmology*, 11(3), 241. DOI: 10.4103/ojo.OJO_70_2018
 - Singh, P., Nagaria, D., Pandey, P., Sharma, G. (2017). PC Analysis of MR Images of Human Knee Joints to Measure Femoral Cartilage Thickness. *Biomedical and Pharmacology Journal*, 10(4), 1843-1846. DOI: 10.13005/bpj/1292
 - Singh, P., Pandey, P., Sharma, G. (2017). Watershed Algorithm and Adaptive Threshold Canny Edge Detection Based Automatic Segmentation of Tibio Femoral Cartilage from MRI Images. *Biosciences Biotechnology Research Asia*, 14(2), 843-852. DOI: 10.13005/bbra/2499
 - Singh, P. K., & Singh, S. (2022). Computer-aided knee joint MR image segmentation—An overview. In *Computational Intelligence in Healthcare Applications* (pp. 55-70). DOI: 10.1201/9781003185180-5
 - Singh, P. K., & Usaman, H. (2022). Benchmarking of Medical Imaging Technologies. In *Advanced Sensing in Image Processing and IoT* (pp. 297-318). CRC Press. DOI: 10.1201/9781003179417-16
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