DR. ABINI M. A.

Associate Professor, Electronics and Communication Engineering

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EXPERIENCE

Associate Professor
KMEA College of Engineering
Jan 2026 – Present

- Deliver postgraduate and advanced undergraduate courses across core ECE domains including DSP, VLSI, Embedded Systems, Communication Systems, and Instrumentation.
- Lead laboratory design, evaluation, and modernization for DSP, VLSI, Embedded Systems, and Microcontroller applications.
- Supervise advanced UG and PG research projects in deep learning, medical imaging, FPGA design, and embedded solutions.
- Mentor students for research publications and guide them in presenting papers at international conferences and journals.
- Contribute to curriculum enhancement, outcome-based education implementation, and academic strategy planning.
- Support accreditation, academic audits, and quality assurance aligned with NBA and NAAC standards.
- Provide academic leadership, mentoring junior faculty, and coordinating departmental academic activities.
- Drive continuous improvement initiatives to enhance student performance and research output.

Assistant Professor
KMEA College of Engineering
July 2012 to Dec 2025

- Delivered undergraduate and postgraduate courses across core ECE subjects including Electronic Circuits, Digital Electronics, DSP, Embedded Systems, Microprocessors, Microcontrollers, Communication Systems, Network Theory, Antenna and Wave Propagation, Power Electronics, Instrumentation, and VLSI.
- Designed, conducted, and evaluated laboratory courses for DSP, VLSI, Embedded Systems, Microcontroller, Communication Systems, Power Electronics, and Circuits.
Guided more than sixty undergraduate and postgraduate projects
- in deep learning, medical imaging, FPGA design, and embedded applications.
- Achieved consistently high student pass percentages through structured mentoring and academic performance tracking.
- Published Scopus indexed and peer reviewed journal papers while mentoring students to co-author international publications.
- Served as Class Mentor with responsibility for academic counseling, performance monitoring, and student development guidance.
- Supported departmental accreditation and quality assurance activities including course outcome mapping, documentation, and academic audits.

Assistant Professor
Adi Shankara Institute of Science and Technology
June 2011 to June 2012

- Delivered specialized instruction in Programmable Logic Devices and FPGA based system design.
- Handled Digital Electronics, Circuits, and VHDL laboratories ensuring outcome-based learning delivery.
- Guided student mini projects and major projects in FPGA and VHDL implementation.
- Contributed to institutional academic excellence with consistent pass percentages above eighty percent.

PROFILE SUMMARY

Senior academic professional with fifteen years of teaching and research experience in Electronics and Communication Engineering. Doctoral researcher specializing in deep learning architectures for medical image analysis, supported by extensive international and internal journal publications, Springer book chapters, IEEE conference papers, and a registered Indian design patent. Demonstrated- ed expertise in curriculum delivery, laboratory development, student mentoring, interdisciplinary research supervision, and academic quality assurance. Recognized journal review- er and active contributor to AICTE ATAL and faculty development initiatives. Seeking a senior faculty role in a reputed teaching and research institution to contribute to academic excellence, innovation, and institutional growth.

AREAS OF EXPERTISE

- Deep Learning and Medical Imaging
- Machine Learning and Computer Vision
- Diabetic Retinopathy Detection
- Biomedical Signal Processing
- VLSI Design and FPGA Systems
- Embedded Systems and IoT
- Digital Signal Processing
- Explainable Artificial Intelligence
- Healthcare AI Applications

TECHNICAL SKILLS

- EDA and Simulation Tools Xilinx ISE
- System Generator
- ModelSim
- Quartus
- LT Spice
- Mentor FPGA Advantage
- Programming and Software Python
- MATLAB
- Keil
- Code Composer Studio
- Hardware Platforms Spartan FPGA Boards
- TMS320C67XX DSP
- 8085 Microprocessor
- 8051 Microcontroller
- Operating Systems Linux, Windows

EDUCATION

Doctor of Philosophy Electronics and Communication Engineering

Karunya Institute of Technology and Sciences, Coimbatore

Dec 2025

Master of Business Administration Operations Management

Indira Gandhi National Open University

CGPA 7.0.

Master of Technology VLSI and Embedded Systems

TocH Institute of Science and Technology under CUSAT

CGPA 8.51.

Bachelor of Technology Electronics and Communication Engineering

KMEA Engineering College under Mahatma Gandhi University

81.56 Percent

RESEARCH PROFILE

Doctoral Thesis

Deep Learning Architectures for Detection and Classification of Diabetic Retinopathy.

Supervisor

Dr S Sridevi Sathya Priya, Associate Professor, Department of ECE, Karunya Institute of Technology and Sciences.

RESEARCH PUBLICATIONS

INTERNATIONAL JOURNALS

1. **Abini M. A**, S. Sridevi Sathya Priya "A Novel Deep Learning Approach for Diabetic Retinopathy Classification Using Optical Coherence Tomography Angiography" Multimedia Tools and Applications, 2025. doi.org/10.1007/s11042-025-20708-2 **[Scopus]**

2. **Abini M.A**, S.Sridevi Sathya Priya "Detection and Classification of Diabetic Retinopathy Using Modified Inception V3"International Journal of Bioautomation, Vol. 29, No. 1, pp. 77–92, 2025. doi: 10.7546/ijba.2025.29.1.001004 **[Scopus]**

3. **Abini M.A**, S.Sridevi Sathya Priya "Multistage Classification of Diabetic Retinopathy in Fundus Images Using Hybrid Capsule Networks "Journal of Multiscale Modelling, Vol. 16, No. 3, 2025. doi.org/10.1142/S1756973725500064 [ESCI]

4. **Abini M.A**, S.Sridevi Sathya Priya. "Automatic Detection and Classification of Diabetic Retinopathy from Optical Coherence Tomography Angiography Images Using Deep Learning – A Review"AJSE, Vol. 23, No. 3, pp. 277–297, 2025. 10.53799/ajse.v23i3.1361 **[Scopus]**

5. **Abini M.A**, J.M.R.S. Vinod Kumar, Bushara A.R., Abubeker K.M., Smitha K.M., , "Explainable Artificial Intelligence for Detecting Lung Cancer"Informatyka Automatyka Pomiary w Gospodarce i Ochronie Środowiska, Vol. 15, No. 1, 2025. 10.35784/iapgos.6626 **[Scopus]**

6. **Abini M.A**, S.Sridevi Sathya Priya "SEMS-DRNet: Attention Enhanced Multi-Scale Residual Blocks with Bayesian Optimization for Diabetic Retinopathy Classification "Research on Biomedical Engineering, Vol. 41, No. 4, 2025. 10.1007/s42600-025-00434-2 **[Scopus]**

7. **Abini M.A**, S.Sridevi Sathya Priya. "Ensemble Models for Diabetic Retinopathy Detection and Classification Using Vision Transformers and Capsule Networks with Advanced Feature Extraction Techniques "Australian Journal of Electrical & Electronics Engineering, 2025. 10.1080/1448837X.2025.2539557 **[Scopus]**

8. **Abini M.A**, S.Sridevi Sathya Priya "Deep Learning Based Diabetic Retinopathy Classification of Augmented Fundus Images Using Convolutional Neural Networks" International Journal of Image and Graphics, 2025. 10.1142/S0219467827500409 **[ESCI]**

9. **Abini M.A** "FPGA Based Implementation of Replica Correlation Using Xilinx System Generator for High Performance Signal Processing Applications" International Journal of Advanced Research in Electrical and Electronics Engineering, 2025.

10. **Abini M.A** "High Performance FPGA Based Complex Demodulator for Real Time Signal Processing Using Xilinx System Generator "International Journal of Research and Analytical Reviews, Vol. 12, No. 1, 2025.

11. **Abini M.A** "Design and Implementation of CORDIC Based Sine and Cosine Generators Using Xilinx System Generator "International Research Journal of Engineering and Technology (IRJET), Vol. 12, No. 2, 2025.

12. **Abini M.A**, Afreetha Afzal, Rushda Kulsu Naseer, Muhammed Arshaq, Rameez K.M., "Deep Learning Based Automated Detection and Classification of Plant Leaf Diseases Using Convolutional Neural Networks "International Journal of Innovative Research in Computer and Communication Engineering, 2025.

13. **Abini M.A**, A.R. Bushara "Secure and Compliant Machine Learning in the Cloud for Healthcare" International Journal of Science and Engineering Applications, Vol. 14, No. 2, pp. 38–44, 2025.

14. **Abini M.A**, Dr. Saju A. Naeema Nazar, "Integrating Advanced Technologies for Enhanced Health Monitoring and Management"NeuroQuantology, 2024.

15. **Abini M.A** "Intelligent Underwater System for Health Monitoring and Communication to Enhance Marine Worker Safety and Performance "International Journal of Progressive Research in Engineering Management, 2025.

16. **Abini M.A**, N. Sudheer, T.A. Reema, C.N. Rislath, K.A. Rizwana , "Library Robo Using IoT" International Journal of Advance Research and Innovative Ideas in Education, 2020.

17. **Abini M.A**, N. Nazar, K.R. Rahul, , R.R. Chandran, A. Saju, J. David "Pothole Patrol: Harnessing Machine Learning for Automated Detection and Filling" at Library Progress Conference, 2024.

18. **Abini M.A**, Divya Lakshmi P, Sharan K.S, Sulphiya V. N, "A Comprehensive Deep Learning Based System for Real Time Sign Language Recognition and Translation Using Raspberry Pi," International Journal of Computer Trends and Technology (IJCTT), vol. 72, no. 12, pp. 8-16, 2024. Crossruff, https://doi.org/10.14445/22312803/ IJCTT- V72I12P102.

INTERNATIONAL CONFERENCES

1 **Abini M.A**, S.Sridevi Sathya Priya "Detection and Classification of Diabetic Retinopathy Using Pretrained Deep Neural Networks "at International Conference on Innovations in Engineering and Technology, 2023, 1–7. doi.org/10.1109/ICIET57285.2023.10220715. **[Scopus]**

2. **Abini M.A**, S.Sridevi Sathya Priya "A Deep Learning Framework for Detection and Classification of Diabetic Retinopathy in Fundus Images Using Residual Neural Networks "at 9th International Conference on Smart Computing and Communications (ICSCC), 2023. 55–60.doi.org/10.1109/ICSCC59169.2023.10335079. **[Scopus]**

3. **Abini M.A**, Safana Rafeeque" Performance Comparison of Skin Cancer Detection and Classification Using CNN "at IEEE International Conference on Signal Processing and Informatics, 2024. 10.1109/SPICES62143.2024.10779825. **[Scopus]**

4. **Abini M.A**, A.Vinod,S.Rafeeque,,T.S.Manju,M.S.Noushad "MobileNet-Enhanced Skin Cancer Detection and Classification Using Dermatoscopic Images"at IEEE International Conference on Smart Power Control and Renewable Energy, 2024. doi: 10.1109/ICSPCRE62303.2024.10674858. **[Scopus]**

5. **Abini M.A**, R.K.Naseer,A.Afzal,M.Arshaq,R.K.M "Automobile Slot Booking and Parking SystemUsingESP8266" at IEEE International Conference, 2024. 10.1109/I- SMAC61858.2024.10714586. **[Scopus]**

6. **Abini M.A**, K. B. Nandhakishor, Fathima. K. A and K. A. F. Fida, "Driver Drowsiness Detection Using Haar Cascade Classifier," 2025 International Conference on Electronics, AI and Computing (EAIC), Jalandhar, India, 2025, pp. 1-6, doi: 10.1109/EAIC66483.2025.11101307. **[Scopus]**

7. **Abini M.A**, R.K. Naseer, A. Afzal, M. Arshaq, R.K.M., "RiViT – Rice Leaf Disease Identification and Classification Using Vision Transformer (ViT)"at 4th International Conference on Advances in Computing, Communication and Networking, 2025. 10.1109/ACCESS65134.2025.11135614.**[Scopus]**

8. **Abini M.A**, S.Sridevi Sathya Priya, "A Survey on Computer Aided Systems for Diabetic Retinopathy Detection and Classification using Deep Learning," 2025 International Conference on Electronics and Renewable Systems (ICEARS), Tuticorin, India, 2025, pp. 1475-1480, doi: 10.1109/ICEARS64219.2025.10940665. **[Scopus]**

9. **Abini, M. A.**, & Sridevi Sathya Priya, S. (2024). "Performance comparison of ResNet architectures for diabetic retinopathy detection and classification". Engineering Advances 2024: First International Conference, Pravara Rural Engineering College, Loni, Maharashtra, India. (In association with Technology Research and Innovation Centre, Accra Technical University, and Academy of Nanotechnology and Waste Water Innovations).

10. **Abini, M. A.**, & Sridevi Sathya Priya, S. (2024). "A computer-aided diagnostic system for diabetic retinopathy detection and classification of retinal fundus images based on deep convolutional networks". International Conference on Advanced Computing, Communication and Electrical Systems (ICACCESS 2024), KMEA Engineering College, Edathala.

11. **Abini, M. A.**, & Sridevi Sathya Priya, S. (2025). "SwinNeXt-DRNet: A Hybrid ConvNeXt and Swin Transformer Framework for Diabetic Retinopathy Detection Using Optical Coherence Tomography Angiography Images". 9th International Joint Conference on Advances in Computational Intelligence (IJCACI 2025),Washington University of Science and Technology (WUST), Alexandria, United States and RV Institute of Management (RVIM), Bangalore, India. **[Scopus]**

SPRINGER BOOK CHAPTERS

1. **Abini M.A.**, & Sridevi Sathya Priya, S. (2025). "Advanced Capsule Networks for Accurate Detection and Classification of Diabetic Retinopathy from Fundus Images". In: Manoharan, S., Tugui, A., Perikos, I. (eds) Proceedings of 5th International Conference on Artificial Intelligence and Smart Energy. ICAIS 2025. Information Systems Engineering and Management, Vol 41. Springer, Cham. https://doi.org/10.1007/978-3-031-90478-3_37. **[Scopus]**

2. **Abini, M.A.**, Sridevi Sathya Priya, S. (2025). DRDResNet-A Deep Learning Model for Diabetic Retinopathy Detection and Classification. In: Kanhe, A., Balanethiram, S., Hsiung, PA., Jayakody, D.N.K. (eds) Advances in VLSI, Signal Processing and Wireless Communication. IEdTC 2023. Lecture Notes in Electrical Engineering, vol 1323. Springer, Singapore. doi.org/10.1007/978- 981-96-1587-2_12. [Scopus] [Best Paper Award]

3. **Abini, M.A.**, Priya, S.S.S. (2025). An Augmented Efficient Net Based Deep Learning Model for Diabetic Retinopathy Detection and Classification. In: Soni, B., Saini, P., Verma, G.K., Gupta, B.B. (eds) Beyond Artificial Intelligence. AICTA 2023. Lecture Notes in Networks and Systems, vol 1326. Springer, Singapore. https://doi.org/10.1007/978-981-96-4170-3_26. **[Scopus]**

4. Binish, M.C., **Abini, M.A.**, Thomas, V. (2026). MRI-Based Detection of Focal Cortical Dysplasia Using 3D Convolutional Neural Networks and Attention Mechanisms. In: Bhateja, V., Biju, S.M., Udgata, S.K. (eds) Information System Design: AI and ML Applications. ISDIA 2025. Lecture Notes in Networks and Systems, vol 1565. Springer, Singapore. https://doi.org/10.1007/978-981-95-0375-9_21. **[Scopus]**

PATENTS

Abini M.A, Dr. R. S. Vinod Kumar, Dr. T. Gopalakrishnan, Dr. S. S. Kumar, Dr. G. Deepa, Ms. A. R. Bushara, Mr. R. Kishor, and Dr. Shahin M. Abdulla filed a design patent entitled "Lung Cancer Testing Device." The design was registered and published by the Patent Office, Government of India, with Design No. 387710-001, under Class 24-01. The design registration date is 06/06/2023 and the certificate was issued on 23/08/2023.

PROFESSIONAL MEMBERSHIPS

• Institution of Engineers India (IEI)
• Institution of Electronics and Telecommunication Engineers (IETE)

WORKSHOP CONDUCTED

• Three Day Workshop on "Advancements in Artificial Intelligence from Artificial Neural Networks and Deep Learning to Natural Language Processing with Transformers and Large Language Models"
• Organized by Department of Electronics and Communication Engineering, KMEA Engineering College in association with Institution of Engineers IE
  04 July 2024 to 06 July 2024

Faculty Development Programs Workshops and Technical Training Attended

Advanced Artificial Intelligence and Machine Learning Techniques for Medical Imaging Applications
AICTE Training and Learning ATAL Academy at KMEA Engineering College
18 August 2025 to 23 August 2025

Optimisation Techniques for Machine Learning Artificial Intelligence and Data Science
ATAL FDP, Rajagiri School of Engineering and Technology
08 January 2024 to 13 January 2024

Deep Learning for Beginners
Centre for Artificial Intelligence, TKM College of Engineering, Kollam
26 August 2022 to 31 August 2022

AI and ML Industry Practices and Perspectives
Vidya Centre for AI and Research
12 September 2022 to 16 September 2022

Machine Learning for Interdisciplinary Engineering Applications Blended Hybrid FDP
ATAL FDP, Department of Computer Science, Cochin University of Science and Technology
12 September 2022 to 23 September 2022

Machine Learning for Beginners
KMEA Engineering College
10 February 2023 to 12 February 2023

Mathematics for Machine Learning
Abdul Kalam Technological University
30 June 2021 to 16 July 2021

Data Science
AICTE Training and Learning ATAL Academy
27 January 2020 to 30 January 2020

Python for Engineers
IETE organized by Department of Electronics and Communication Engineering
26 April 2021 to 30 April 2021

System Engineering
AICTE Training and Learning ATAL Academy Online Elementary FDP
21 June 2021 to 25 June 2021

Speech Audio and Image Processing using Deep Learning Techniques Research Issues Innovation and Applications
AICTE Training and Learning ATAL Academy Online Elementary FDP
18 October 2021 to 22 October 2021

FPGA Based Deep Learning Applications in Signal Processing
AICTE Training and Learning ATAL Academy Online Elementary FDP
05 July 2021 to 09 July 2021

Control Systems
MHRD
02 December 2014 to 12 December 2014

Academic Research Methods and Strategies Funding and Publishing in Indexed Journals
Abdul Kalam Technological University
28 July 2021 to 30 July 2021

CMOS Mixed Signal and Radio Frequency VLSI Design
MHRD
30 January 2017 to 04 February 2017

Intelligent and Energy Efficient LED Lighting Systems
KMEA Engineering College
13 August 2014 to 14 August 2014

Electronics in Medical Diagnosis
AISAT Engineering College
06 May 2013 to 17 May 2013

Akash for Education
MHRD
10 November 2012 to 11 November 2012

Analog Electronics
MHRD
04 June 2013 to 14 June 2013

Advanced Computing Communication and Electrical Systems
IETE and CSI
24 March 2017 to 25 March 2017

Internet of Things Trends and Challenges
IEEE and IETE
09 May 2016 to 10 May 2016

Raspberry Pi with Open CV
SNGIST Engineering College
22 December 2016 to 23 December 2016

RESEARCH & AUTHOR IDENTIFIERS

• ORCID ID: 0009 0005 2419 7770
• Scopus Author ID: 59712327000

PROJECTS

FPGA Based Furnace Automation System
Designed and implemented an FPGA based industrial furnace automation controller enabling high speed processing and concurrent control operations.

DSP Module Implementation Using FPGA
Developed VHDL based signal generators, filters, demodulators, and replica correlators.
Project executed at NPOL DRDO under the Ministry of Defence India.

LANGUAGES

• English: Fluent
• Malayalam: Fluent
• Hindi: Fluent

PERSONAL DETAILS

Date of Birth: 14 June 1987
Nationality: Indian
Gender: Female
Marital Status: Married
Passport No: AB655837

REFERENCES

Dr Manju Bhaskar
R & D Manager
Marine Electricals (India) Limited, Ernakulam, India
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sudheermanju@gmail.com

Mr. Elamana Yusef Asraf
Deputy Manager HSE& Safety advisor
National University, Sultanate of Oman
+968-97007857
asrafelamanayusef@gmail.com

Mr. Rameez Ahammed
Associate Principal Dry Utility Engineer
Atkins Réalis, Dubai
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