Mahesh Raveendranatha Panicker *PhD*

Assistant Professor, Electrical Engineering
Indian Institute of Technology Palakkad
Email: mahesh@iitpkd.ac.in
Website: https://iitpkd.ac.in/people/mahesh

Brief Biography

Mahesh Raveendranatha Panicker received his B. Tech. degree in Electrical and Electronics Engineering from Rajiv Gandhi Institute of Technology (Govt. Engineering College, Kottayam) in 2003 (First rank in the Mahatma Gandhi University) and Ph.D. degree from School of Computer Engineering, Nanyang Technological University (NTU), Singapore in 2009. From August 2003 to July 2005, he was a lecturer with Saintgits College of Engineering (Mahatma Gandhi University), Kerala. From August 2008 to July 2010, he was a post-doctoral fellow with centre for high performance embedded systems, NTU, Singapore. In August 2010, he started his career in industry with General Electric (GE) Global Research Centre, Bangalore. He was lead research engineer with GE till April 2017. From May 2017 till May 2018, he was senior chief engineer with Samsung Research Institute, Bangalore.

Mahesh is a Senior Member with IEEE, Six Sigma Green Belt certified and a TRIZ practitioner. He is a recipient of the Early Career Research Award from Science and Engineering Research Board, Government of India in 2019. He has won GE wide technical excellence awards in 2013 and 2015. He has also won silver award for ten or more patents with GE. During his stay in GE, Mahesh has worked on a range of projects, which include portable foetal ECG platform, compressor blade health monitoring program, real-time detection of rotor imbalance in GE transportation locomotive engines, detection of corrosion under insulation in oil/gas pipelines in refineries, nuclear reactor rebar corrosion detection, fMRI-based neuro analytics, GE's software beamforming platform for diagnostic ultrasound imaging and low-cost portable 3D ultrasound.

Mahesh's research interests include signal processing and analytics, reconfigurable computing, and area efficient low power systems with applications in diagnostic ultrasound imaging, biomedical circuits and systems, multi-standard wireless communications and industrial prognostics and health monitoring. Mahesh has published his research findings in 10 international journals, 37 international conferences and 11 patents. Highlights of major research and translational projects are available at http://www.pulseecho.in/. He is a review editor for Frontiers in Neurorobotics and Frontiers in Signal Processing and regular reviewer for Elsevier Pattern Recognition, IEEE Access, IEEE Transactions on Signal Processing, IEEE Transactions on Circuits and Systems - I and II, IEEE Transactions on Vehicular Technology, IEEE Transactions on VLSI Systems, IET Transactions on Signal Processing, Springer Journal of Signal Processing Systems for Signal, Image and Video Technology. He is currently the Vice Chair, IEEE Engineering in Medicine and Biology Society (EMBS) Kerala Chapter and Chair - Sponsorship Committee, IEEE International Symposium on Biomedical Imaging (ISBI) 2022.

In IIT Palakkad, Mahesh has served as a member of Board of Academic Studies and Industry Collaboration and Sponsored Research. He also took a leading role in setting up a Centre for Computational Imaging and the digital VLSI lab at IIT Palakkad.

1. EDUCATION

Ph.D., 2009
School of Computer Engineering, Nanyang Technological University, Singapore
Dissertation topic: Reconfigurable low complexity digital filter banks for software radio receivers (Advisor: Professor Vinod Achutavarrier Prasad)

Bachelor of Technology - B.Tech., 2003 (First Rank in the University)
Department of Electrical and Electronics Engineering, Rajiv Gandhi Institute of Technology (Govt. Engineering College), Mahatma Gandhi University, Kerala, India
Project topic: Microprocessor based Autonomous Robot (Advisor: Professor Dinesh Gopinath)

2. SUMMARY OF WORKING EXPERIENCE

Total Work Experience – 15 years (Teaching: 5 years, Industry: 10 years)

June 2018 – Present: Assistant Professor in Electrical Engineering, Indian Institute of Technology, Palakkad.
Instructor for courses in B. Tech Electrical Engineering and M. Tech System on Chip Design. Involved in research and development of advanced signal processing, analytics, and imaging techniques for diagnostic ultrasound systems. Highlights of major research and translational projects are available at http://www.pulseecho.in/.

May 2017 – May 2018: Senior Chief Engineer at Ultrasound Systems, Healthcare and Medical Equipments (HME), Samsung Research Institute, Bangalore, India
Involved in research, development and productization of advanced signal processing, analytics, and imaging techniques for diagnostic ultrasound systems.

Aug 2010 – April 2017: Lead Engineer at Software Sciences and Analytics Research, GE Global Research, John F Welch Technology Centre, Bangalore, India.
Helped in establishing diagnostic ultrasound imaging lab in GE Global Research, Bangalore and in establishing collaboration with General Imaging business, GE Healthcare, Milwaukee. Involved in development of advanced analytics, signal processing algorithms/systems for applications in health care, energy, oil and gas and transportation domains. Filed 10 patents and involved in many of the popular GE products such as diagnostic ultrasound systems, non-invasive neonatal/foetal heart rate monitoring, compressor blade health monitoring (BHM) and Tier4 locomotive prognostics.

Aug 2008 – Jul 2010: Research Fellow at Centre for High Performance Embedded Systems (CHiPES), NTU, Singapore.
Involved in development of novel reconfigurable low complexity spectrum sensing algorithms and architectures for military and cognitive radios.

Nov 2007 – Dec 2007: Sponsored Internship at SUPELEC in the Signal, Communication et Electronique Embarquee (SCEE) team as part of Merlion Project Grant (Dossier No. 9.03.07), France-Singapore Cooperation Platform in Science and Technology.
Involved in development of novel spectrum sensing architectures for cognitive radio.

Aug 2005 – Jul 2008: Teaching Assistant at School of Computer Engineering, NTU, Singapore.
Handled sessions in Instrumentation and Data Acquisition Lab and Digital Systems Lab.

Aug 2003 – Jul 2005: Lecturer at SAINTGITS College of Engineering, Mahatma Gandhi University, Kerala, India.
Taught basic and advanced courses in Electrical and Electronics Engineering.

2. TEACHING:

A. Current Courses:

- Microprocessor Systems: Design and Interfacing (Theory and Lab)
- Digital Image Processing
- Digital Circuits Laboratory

B. Past Courses:

- Sensor Arrays and Imaging
- Analog and Digital Communications
- Control Systems Lab
- Concepts in Engineering Design
- Introduction to Engineering

C. New Courses Developed:

- Microprocessor Systems: Design and Interfacing (B. Tech Year 2, Core) *(Different from conventional microprocessor course where students will first design an 8-bit microcomputer using logic gates and then learn microprocessor systems and interfacing using ARM Cortex M0+ core on FRDM KL25Z series SoC)*
- Digital Circuits Laboratory (B. Tech Year 2, Core) *(Designed the experiments including Verilog implementation on Zybo Zynq board)*
- Digital Image Processing (B. Tech Year 4/Graduate Level, Elective) *(Course deals with real-life dataset (e.g., student acquired dataset, industry CT data, COVID19 Lung Ultrasound Images))*
- Sensor Arrays and Imaging (M. Tech Year 1, Elective) *(Unique course dealing with wave physics, transducer design, array design, beamforming, and imaging)*

D. Teaching Feedback Scores:

Year	Course	Number of Students	Score (Out of 10)
Aug-Nov, 2018	EE3050: Analog and Digital Communications	33	8.9
	EE3125: Control Systems Lab	31	8.8
Jan-May, 2019	EE2080: Microprocessor Systems - Design and Interfacing	33	9.1
Aug-Nov, 2019	EE5005: Digital Image Processing	22	8.73
	EE2170: Digital Circuits Laboratory	55	NA*
Jan-May, 2020	EE2080: Microprocessor Systems - Design and Interfacing	47	NA*
Aug-Nov, 2020	EE5005: Digital Image Processing	49	9.22
	EE2170: Digital Circuits Laboratory	43	NA*
Jan-May, 2021	EE2080: Microprocessor Systems - Design and Interfacing	43	8.69
	EE5527: Sensor Arrays and Imaging	15	9.61

Not Available

D. Graduate Research Student Supervision:

Master of Science (By Research) Student: 1 (Converted to PhD)

No.	Name	Year of Commencement	Thesis Title	Current Status
1	Madhavanunni A N	2018	Portable Vector Flow Imaging for Ambulatory Scenarios	Converted to PhD on June 2020

Ph.D. Students Presently Supervising: 4

No.	Name	Year of Commencement	Thesis Title	Current Status
1	Gayathri M	2018	Cognitive Ultrasound - Towards Tissue Adaptive Software Beamforming in Ultrasound Imaging	Progressing (1 Transaction, 5 International Conferences)
2	Madhavanunni A N	2020	Portable Vector Flow Imaging for Ambulatory Scenarios	Progressing (3 International Conferences)
3	Pisharody Harikrishnan Gopalkrishnan	2019	Novel Transducer Array Designs for High Frame Rate Ultrasound Imaging	Progressing (1 Patent)
4	Mimisha M Menakath	2020	Underwater High Frame Rate Acoustic Imaging	Progressing

E. Achievements of PhD Students and Undergraduate Final Year Project Students:

- **Ph.D. Student, Madhavanunni A N, <u>has won the 2020 Robert F. Wagner All Conference Best Student Paper Finalist Award</u> at the SPIE Medical Imaging Conference at Houston, USA, September 2020.** https://spie.org/Publications/Proceedings/Volume/11313 *Paper: Madhavanunni A.N. and Mahesh Raveendranatha Panicker, "Triangulation based vector flow imaging with non-steered plane waves for transverse flows", in Proc. of SPIE Medical Imaging 2020, Houston, Feb 2020.*
- **Ph.D. Student, Gayathri M, was one of <u>10 Finalists of the 3 Minute Thesis competition organized as part of IEEE's flagship symposium in Medical Imaging-IEEE ISBI 2021.</u>** https://biomedicalimaging.org/2021/awards/ *Paper: Gayathri M and Mahesh Raveendranatha Panicker, "Towards diffuse beamforming for specular reflectors: A pixel level reflection tuned apodization scheme for ultrasound imaging," in Proc. of IEEE ISBI 2021, Nice, France, April 2021.*
- **B. Tech project student, Roshan P Mathews, <u>won Undergraduate Research and Innovation Awards 2021</u> at IIT Palakkad for excellence in undergraduate research.**

3. RESEARCH

A. Technology Interests:

- Reconfigurable Digital Signal Processing
- Low Power / Area Efficient Circuits and Systems
- Machine/Deep Learning for Imaging/Reconstruction

B. Domain Interests:

- Diagnostic Ultrasound Imaging
- Biomedical Circuits & Systems
- Underwater Acoustic Imaging and Image Processing

- Industrial Prognostics and Health Monitoring

C. Publications: *Please refer Page 8 for detailed list of publications.*

- Published **47 papers** in international refereed journals and international conferences.
- Number of International Journal Papers: 10, Number of International Conference Papers: 37

D. Patents: *Please refer Page 11 for detailed list of patents.*

- Number of Patents: **11** (7 US patents granted and 4 Indian patents filed)

E. Research Grants:

On-going (Active) Research Grants:

No.	Title	Funding Organization	Amount	Duration	Role
1	Investigation of a portable, affordable, and self-guided bedside ultrasound system for tissue and blood velocity imaging	Early Career Research (ECR) award, Science and Engineering Research Board (SERB), India	Rs 49,01,830	March 2019 - March 2022	PI
2	Cognitive Ultrasound Imaging	NVIDIA Corporation	Developer board worth Rs 15,00,000	NA	PI

Past (Completed) Research Grants:

No.	Title	Funding Organization	Amount	Duration	Role
1	An automated lung ultrasound workflow for diagnostic assistance in COVID-19 and beyond	COVID19 Special Core Research Grant, Science and Engineering Research Board (SERB), India	Rs 12,02,960	Aug 2020 - Aug 2021	PI
2	Automated Lung Ultrasound for COVID-19 Screening and Monitoring	CSR Fund - Federal Bank Limited, India	Rs 6,00,000	May 2020 - October 2020	PI
3	Development of a Real Time Spectral Analysis and Filtering System Based on Lyrtech SFF	Temasek Laboratories/DSO National Labs, Defence Science and Technology Agency (DSTA), Singapore	S$ 64,000	Sep 2008 - Sep 2009	Co-PI

F. Translational Research:

- Recent work employing lung ultrasound as a continuous monitoring tool to help clinicians in COVID19 which is deployed and available at http://www.pulseecho.in/alus/. The work was covered in detail by national daily Hindu, magazine The Week and in Doordarshan News.
- An automated multi-scale image contrast enhancement algorithm for industrial CT scans has been developed and incorporated into product chain assisted by https://vcxrayindia.com/

4. PROFESSIONAL SERVICE

A. Administrative Appointments

- Member, Board of Industry Collaboration and Sponsored Research, Indian Institute of Technology Palakkad (July 2018 – Till Now)
- Member, Board of Academic Studies, Indian Institute of Technology Palakkad (June 2019 – July 2020)
- Stream Co-ordinator, Electrical Engineering, Indian Institute of Technology Palakkad (June 2019 – July 2020)
- Institute Coordinator DRDO-MoE PhD Fellowship (May 2020 – Till Now)
- Convenor, Centre for Computational Imaging, Indian Institute of Technology Palakkad

B. Professional Activities

- Six Sigma Green Belt Certification
- MATRIZ TRIZ Level 2 Certification (TRIZ Practitioner)
- Senior Member, IEEE
- Vice Chair, IEEE Engineering in Medicine and Biology Society (EMBS) Kerala Chapter
- Chair - Sponsorship Committee, IEEE International Symposium on Biomedical Imaging (ISBI) 2022
- Executive Committee Member, National Institute of Electronics, and Information Technology (NIELIT) Calicut
- Review Board Member, NPOL Kochi
- Regular mentor for internship students funded by Indian Academy of Sciences (1 student in 2019, 1 student in 2020, 3 students in 2021)
- Department Advisory Committee member for
  - Electrical Engineering, Rajiv Gandhi Institute of Technology Kottayam
  - Electrical Engineering, Government Engineering College Idukki
  - Instrumentation and Control Engineering, NSS College of Engineering Palakkad
  - Biomedical Engineering, Sahrudaya College of Engineering Thrissur
- Review Editor, Frontiers in Neurorobotics
- Review Editor, Frontiers in Signal processing
- Member, Technical Committee on Brain-Machine Interface Systems, IEEE Systems, Man and Cybernetics Society
- Member, IEEE Signal Processing Society
- Member, IEEE Circuits and Systems Society
- Member, IEEE Engineering in Medicine and Biology Society
- Member, IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society
- Session Chair, Biomedical Systems, IEEE Region-10 Conference, TENCON 2020 and TENCON 2019
- Program Committee, International Symposium on Electronic System Design (ISED), 2011-2014

- Program Committee, International Conference on Eco-friendly Computing and Communication Systems (ICECCS 2013)
- Program Committee, International Conference on Advances in Computing and Communications (ACC 2013)
- Track Chair, IEEE International Conference on Information, Communications and Signal Processing (ICICS 2009)
- Reviewer of Elsevier Pattern Recognition, IEEE Transactions on Biomedical Circuits and Systems, IEEE Access, IEEE Transactions on Signal Processing, IEEE Transactions on Circuits and Systems - I and II, IEEE Transactions on Vehicular Technology, IEEE Transactions on VLSI Systems, IET Transactions on Signal Processing, Springer Journal of Signal Processing Systems for Signal, Image and Video Technology and International conferences such as BioCAS, EMBC, ISCAS, ICCS, ICICS, TENCON, SPCOM.

B. Invited Talks

- "Diagnostic Ultrasound– The Journey from Imaging to Therapy and Beyond," IEEE Malabar Hub Webinar Series #62 - 05th Aug 2021.
- "Introduction to Convolutional Neural Networks and Applications in Image Processing," 3-day Workshop on Generative Adversarial Networks (GANArt 2021) @ NIT Calicut, 20 - 22, May 2021.
- "Diagnostic Ultrasound Imaging Systems Overview and Advances", 7th National Seminar on ADVANCES IN SCIENTIFIC AND INDUSTRIAL INSTRUMENTATION (ASCII), CUSAT, 24th March 2021.
- "Neural Networks for Diagnostic Ultrasonic Imaging", ATAL FDP on Applications of AI in Healthcare", Model Engineering College Kochi, 25th Feb 2021.
- "Introduction to Convolutional Neural Networks and Applications in Image Processing", ATAL FDP on Machine Learning and Deep Learning: A Hands -On Approach, CUSAT, 9th December 2020.
- "IoT for Biomedical (Imaging)", ATAL FDP on Secure Internet of Things (IoT), IIT Palakkad, 19th October 2020
- "Lung Ultrasound Imaging for COVID19, From Physics to Neural Networks", IEEE Computer Society and IEEE Student Chapter Webinar, NIT Trichy, 15th August 2020.
- "Deep learning and Biomedical Applications", Faculty Development Program on Artificial Intelligence and Machine Learning for Biomedical Applications", Sahrudaya College of Engineering, 17th July 2020.
- "Digital Signal Processing -Journey from Physical Models to Statistical Models", Workshop on Implementation of Signal Processing Algorithms on DSP Processors", PSG Coimbatore, 16th December 2019.
- "From the physical world to the digital world: enabling machine learning driven by domain knowledge", IEEE SPS Kerala Section - Colloquium on ML with Signal Processing for Data Analytics", CUSAT, Kochi, 28th September 2019.
- "Signal Processing in The Era of Big Data", National Conference on Communication, Computing and System Design (NC33SD'19), PSGiTech, Coimbatore, 19th March 2019.
- "Compressive Sampling - A Paradigm Shift in Digital Signal Processing", Workshop on Advances in Signal and Image Processing, GITAM University, Visakhapatnam, Feb 2014.
- "Advances in Industrial Digital Signal Processing", Technical Quality Improvement Program (TQIP) for Faculty on Advances in Digital Systems, Cochin University of Science and Technology (CUSAT),
- Kochi, June 2011.
- "Reconfigurable Low Complexity Digital Filters", Military Radio Lecture Series, NTU, Singapore, Feb 2009.
- "Reconfigurable Low Complexity Spectrum Sensing", Visitor Lecture Series, SUPELEC, Rennes, France, Dec 2008.
- "Reconfigurable Low Complexity Digital Filter Banks for Software Radio Receivers", Graduate Students Workshop organized by IEEE CAS society, Singapore, September 2007.

PUBLICATIONS

Journals:

Under Review

1. Arpan Tripathi, Abhilash Rakkunedeth, **Mahesh Raveendranatha Panicker**, Jack Zhang, Naveenjyote Boora, Jacob Jaremko, Yale Tung Chen, Kiran Vishnu Narayan, Kesavadas C, "Physics Driven Domain Specific Transporter Framework with Attention Mechanism for Ultrasound Imaging", under review in IEEE Transactions on Medical Imaging.
2. Roshan P Mathews, **Mahesh Raveendranatha Panicker**, Abhilash R Hareendranathan, Yale Tung Chen, Jacob L Jaremko, Brian Buchanan, Kiran Vishnu Narayan, Kesavadas C, Greeta Mathews, "Unsupervised multi-latent space reinforcement learning framework for video summarization in ultrasound imaging", under review in Elsevier Medical Image Analysis. arxiv link: https://arxiv.org/abs/2109.01309
3. Jinu Joseph, **Mahesh Raveendranatha Panicker**, Yale Tung Chen, Kesavadas Chandrasekharan, Vimal Chacko Mondy, Anoop Ayyappan, Jineesh Valakkada and Kiran Vishnu Narayan, "covEcho-Resource Constrained Lung Ultrasound Video Analysis Tool for Faster Triaging and Active Learning", under review in IEEE Access.
4. Adithya Sineesh and **Mahesh Raveendranatha Panicker**, "Edge Preserved Universal Pooling: Novel Strategies for Pooling in Convolutional Neural Networks," under review in Elsevier Pattern Recognition Letters.
5. Madhavanunni A. N. and **Mahesh Raveendranatha Panicker**, "A Nonlinear High-Resolution Beamforming for Plane Wave Ultrasound Flow Imaging," under review (major revision) in IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control. arxiv link: https://arxiv.org/abs/2108.02688
6. Gayathri M and **Mahesh Raveendranatha Panicker**, "Introducing Introspective Transmission for Reflection Characterization in High Frame-Rate Ultrasound Imaging," under review in IEEE Transactions on Medical Imaging. arxiv link: http://arxiv.org/abs/2107.08069
7. Rachala Rohith Reddy and **Mahesh Raveendranatha Panicker**, "Hand-Drawn Electrical Circuit Recognition using Object Detection and Node Recognition," under review in Springer Nature Computer Sciences. arxiv link: https://arxiv.org/abs/2106.11559
8. Arjun, Aniket Singh Rajpoot, **Mahesh Raveendranatha Panicker**, "Subject Independent Emotion Recognition using EEG Signals Employing Attention Driven Neural Networks," under review in Elsevier Biomedical Signal Processing and Control. arxiv link: https://arxiv.org/abs/2106.03461
9. **Mahesh Raveendranatha Panicker**, Yale Tung Chen, Gayathri M, Madhavanunni A N, Kiran Vishnu Narayan, C Kesavadas and A P Vinod, "An Approach Towards Physics Informed Lung Ultrasound Image Scoring Neural Network for Diagnostic Assistance in COVID-19", under review in Springer Signal Image and Video Processing. arxiv link: https://arxiv.org/abs/2106.06980

Published

1. Gayathri M and **Mahesh Raveendranatha Panicker**, "Towards A Pixel-Level Reconfigurable Digital Beamforming Core for Diagnostic Ultrasound Imaging," *IEEE Transactions on Biomedical Circuits and Systems*, vol. 14, no. 3, pp. 570-582, June 2020.
2. **Mahesh, R.**, and A. Prasad Vinod. "An area-efficient non-uniform filter bank for low overhead reconfiguration of multi-standard software radio channelizers." *Journal of Signal Processing Systems* 64, no. 3 (2011): 413-428
3. **Mahesh, R.**, and A. Prasad Vinod. "A low-complexity flexible spectrum-sensing scheme for mobile cognitive radio terminals." *IEEE Transactions on Circuits and Systems II: Express Briefs* 58.6 (2011): 371-375.

4. **Mahesh, R.**, and A. Prasad Vinod. "Low complexity flexible filter banks for uniform and non-uniform channelisation in software radios using coefficient decimation." *IET circuits, devices & systems* 5.3 (2011): 232-242.
5. **Mahesh, R.**, and A. Prasad Vinod. "Reconfigurable low area complexity filter bank architecture based on frequency response masking for nonuniform channelization in software radio receivers." *IEEE Transactions on Aerospace and Electronic Systems* 47.2 (2011): 1241-1255.
6. **Mahesh, R.**, and A. Prasad Vinod. "New reconfigurable architectures for implementing FIR filters with low complexity." *IEEE Transactions on computer-aided design of integrated circuits and systems* 29.2 (2010): 275-288.
7. **Mahesh, R.**, et al. "Filter bank channelizers for multi-standard software defined radio receivers." *Journal of signal processing systems* 62.2 (2011): 157-171.
8. Jimson Mathew, **Mahesh, R.**, A. P. Vinod and Edmund M-K. Lai. "Realization of low power high-speed channel filters with stringent adjacent channel attenuation specifications for wireless communication receivers." *IEICE transactions on fundamentals of electronics, communications and computer sciences* 91.9 (2008): 2564-2570.
9. **Mahesh, R.**, and A. Prasad Vinod. "Reconfigurable frequency response masking filters for software radio channelization." *IEEE Transactions on Circuits and Systems II: Express Briefs* 55.3 (2008): 274-278.
10. **Mahesh, R.**, and A. Prasad Vinod. "A new common subexpression elimination algorithm for realizing low-complexity higher order digital filters." *IEEE transactions on computer-aided design of integrated circuits and systems* 27.2 (2008): 217-229.

Conferences:

1. Arjun, Aniket Singh Rajpoot and **Mahesh Raveendranatha Panicker**, "Introducing Attention Mechanism for EEG Signals: Emotion Recognition with Vision Transformers," in *Proc. of 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, Online, Oct 2021.
2. Roshan P Mathews and **Mahesh Raveendranatha Panicker**, "Towards Fast Region Adaptive Ultrasound Beamformer for Plane Wave Imaging Using Convolutional Neural Networks," in *Proc. of 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, Online, Oct 2021.
3. Gayathri M and **Mahesh Raveendranatha Panicker**, "Pixel Intensity Vector Field: An Inside Out Approach of Looking at Ultrasound Reflections from the Lung at High Frame Rates" in *Proc. of 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, Online, Oct 2021.
4. Madhavanunni A.N. and **Mahesh Raveendranatha Panicker**, "An Angle Independent Depth Aware Fusion Beamforming Approach for Ultrafast Ultrasound Flow Imaging," in *Proc. of 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, Online, Oct 2021.
5. Gayathri M and **Mahesh Raveendranatha Panicker**, "Intensity Vector Field: a Tool for Visualization and Characterization of Tissue Reflections in High Framerate Ultrasound Imaging," in *Proc. of IEEE IUS 2021*, Online, Sep 2021.
6. **Mahesh Raveendranatha Panicker**, Yale Tung Chen, Gayathri M, Madhavanunni A N, Kiran Vishnu Narayan, C Kesavadas and A P Vinod, "Employing acoustic features to aid neural networks towards platform agnostic learning in lung ultrasound imaging", in *Proc. of IEEE ICIP 2021*, Alaska, Sep 2021.
7. Gayathri M and **Mahesh Raveendranatha Panicker**, "Towards diffuse beamforming for specular reflectors: A pixel level reflection tuned apodization scheme for ultrasound imaging," in *Proc. of IEEE ISBI 2021*, Nice, France, April 2021.
8. Gayathri M and **Mahesh Raveendranatha Panicker**, "Delay Multiply and Sum based Selective Compounding for Enhanced Ultrasound Imaging," in *Proc. of IEEE TENCON 2020*, Osaka, Japan, Nov. 2020
9. Mohit Singh, **Mahesh Raveendranatha Panicker**, Rajagopal K V, "Towards Bone Aware Image Enhancement in Musculoskeletal Ultrasound Imaging," in *Proc. of IEEE TENCON 2020*, Osaka, Japan, Nov. 2020

10. Gayathri M and **Mahesh Raveendranatha Panicker**, "VLSI architectures for Delay Multiply and Sum Beamforming in Ultrasound Medical Imaging," in *Proc. of IEEE SPCOM 2020*, Bangalore, July 2020.

11. Madhavanunni A.N. and **Mahesh Raveendranatha Panicker**, "Directional beam focusing based dual apodization approach for improved vector flow imaging," in *Proc. of IEEE ISBI 2020*, Iowa City, April 2020.

12. Madhavanunni A.N. and **Mahesh Raveendranatha Panicker**, "Triangulation based vector flow imaging with non-steered plane waves for transverse flows," in Proc. of *SPIE Medical Imaging 2020*, Houston, Feb 2020.

13. Samhitha Rachakonda and **R. Mahesh**, "Automated Noise Detection and Classification for Unsupervised ECG Analysis Systems Using CEEMD and Wavelet Packet Decomposition," in *Proc. of TENCON 2019*, Kochi, Oct 2019.

14. **Mahesh, R.**, P. Bhushan, Ek Tsoon Tan, J. Suresh, M. Radhika, M. Luca, M. Rakesh, "Improving neighbourhood voxel correlation in resting state fMRI using BOLD signal decomposition," in *Proc. of OHBM 2016*, Geneva, Switzerland, June 2016.

15. P. Bhushan, **Mahesh, R.**, Ek Tsoon Tan, J. Suresh, M. Radhika, M. Luca, M. Rakesh, "Spatiotemporal denoising in resting state fMRI," in *Proc. of OHBM 2016*, Geneva, Switzerland, June 2016.

16. P. Bhushan, **Mahesh, R.**, M. Radhika, J. Suresh, "Group NMF analysis for resting state fMRI," in *Proc. of ISMRM 2016*, Singapore, May 2016

17. **R. Mahesh**, P. Bhushan, Ek Tsoon Tan, J. Suresh, "Blind functional clustering of resting state fMRI using non-negative matrix factorization," in *Proc. of OHBM 2015*, Hawaii, June 2015.

18. P. Bhushan, **R. Mahesh**, Ek Tsoon Tan, J. Suresh, "Optimal wavelet basis selection for resting state fMRI analysis," in *Proc. of OHBM 2015*, Hawaii, June 2015.

19. Smitha K. G., A. P. Vinod and **R. Mahesh**, "Reconfigurable area and power efficient I-Q mapper for adaptive modulation," in *Proc. of 54th IEEE International MidWest Symposium on Circuits and Systems (MWSCAS)*, Seoul, South Korea, August 2011.

20. Smitha K. G., **R. Mahesh** and A. P. Vinod, "Challenges in digital filter bank implementation from a cognitive radio perspective - A review," in *Proc. of Asia-Pacific Signal and Information Processing Association (APSIPA) Annual Summit and Conference*, Singapore, December 2010.

21. **R. Mahesh** and A. P. Vinod, "Reconfigurable discrete Fourier transform filter banks for variable resolution spectrum sensing," in *Proc. of IEEE International Conference on Communication Systems*, November 2010, Singapore.

22. **R. Mahesh** and A. P. Vinod, "Reconfigurable discrete Fourier transform filter banks for multistandard channelizers," in Proc. of IEEE International Conference on Signal Processing and Communications, Bangalore, India, July 2010. (SPCOM 2010). *[Citations: 5]*

23. S. J. Darak, A. P. Vinod, **R. Mahesh** and E. M-K. Lai "A reconfigurable filter bank for uniform and non-uniform channelization in multi-standard wireless communication receivers," in *Proc. of the 17th IEEE International Conference on Telecommunications*, Doha, Qatar, April 2010. (ICT 2010).

24. **R. Mahesh**, A. P. Vinod, B. Y. Tan and E. M-K. Lai, "A tree-structured non-uniform filter bank for multistandard wireless receivers," in *Proc. of IEEE International Symposium on Circuits and Systems*, Taiwan, May 2009. (ISCAS 2009).

25. S. T. Gul, **R. Mahesh**, C. Moy, A. P. Vinod and Jacques Palicot, "A graphical approach for the optimization of SDR channelizers," in *Proc. of URSI (International Union of Radio Science) General Assembly*, Chicago, USA, August 2008.

26. **R. Mahesh** and A. P. Vinod, "Reconfigurable filter banks for software defined radio receivers – An alternative low complexity design to conventional DFT filter banks," in *Proc. of URSI (International Union of Radio Science) General Assembly*, Chicago, USA, August 2008.

27. **R. Mahesh**, A. P. Vinod, Christophe Moy and Jacques Palicot, "A low complexity reconfigurable filter bank architecture for spectrum sensing in cognitive radios," in *Proc. of 3rd International Conference on Cognitive Radio Oriented Wireless Networks and Communications*, Singapore May 2008. (CROWNCOM 2008).

28. Smitha K. G., **R. Mahesh** and A. P. Vinod, "A reconfigurable multi-stage frequency response masking filter bank architecture for software defined radio receivers," in *Proc. of IEEE International Symposium on Circuits and Systems*, Seattle, USA, May 2008. (ISCAS 2008).
29. **R. Mahesh** and A. P. Vinod, "Coefficient decimation approach for realizing reconfigurable finite impulse response filters," in *Proc. of IEEE International Symposium on Circuits and Systems*, Seattle, USA, May 2008. (ISCAS 2008).
30. Jimson Mathew, **R. Mahesh**, A. P. Vinod and E. M-K. Lai, "Realization of low power highspeed channel filters with stringent adjacent channel attenuation specifications for software radio receivers," in *Proc. of Sixth IEEE International Conference on Information, Communications and Signal Processing*, Singapore, December 2007. (ICICS 2007).
31. **R. Mahesh** and A. P. Vinod, "A new low complexity reconfigurable filter bank architecture for software radio receivers based on interpolation and masking technique," in *Proc. of Sixth IEEE International Conference on Information, Communications and Signal Processing*, Singapore, December 2007. (ICICS 2007).
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