Name: Dr. Arpita Das

Designation: Assistant Professor

Department: Radio Physics and Electronics
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Arpita Das is an Assistant Professor in the Department of Radio Physics and Electronics, University of Calcutta, India since 2008. She did her B.Sc. in Physics Honours from Bethune College, University of Calcutta in 2001. Then she received her B. Tech and M. Tech degrees in Radio Physics and Electronics from the University of Calcutta in the year 2004 and 2006 respectively. She was awarded her Ph.D.(Tech.) degree in the domain of Biomedical Image Processing Techniques from the University of Calcutta in 2012. She was associated with the project work under the Centre of Excellence in Systems Biology and Biomedical Engineering, University of Calcutta, funded by TEQIP, World Bank, MHRD India. She published and reviewed many research articles in the reputed journals, conferences and book chapters. She is a member of IEEE.

Courses Being Currently Taught:

- B.Tech. Theory classes on Analog Circuits (Compulsory)
- B.Tech. Theory classes on Image Processing & Computer Vision (Optional)
- B.Tech. Practical classes on VLSI Design Laboratory (Compulsory)
- M.Tech. Theory classes on Graph theory and Combinatorics (Compulsory)
- M.Tech. Practical Classes on FPGA Laboratory (Compulsory)

Academic Responsibilities:

- Coordinator of B.Tech. 7th and 8th semester courses in ECE
- Coordinator of Ph.D. Admission Committee
- Member of M.Tech. Admission Committee
- Member of AICTE Portal Maintenance for Approval of Engineering Courses
- Member of Data Collection and Verification Committee and NAC

Research Interests and Experience:

Topic (Main): Biomedical Image and Signal Processing Techniques, Multimodal Data Analysis, Machine Learning Algorithms, Identification & Classification of Diseases, Design of Computer Aided Diagnosis Systems.

Topic (Others): FPGA based Hardware Prototyping for Digital Circuits and Systems, Embedded System Design for analyzing Biomedical Data.

List of Significant Research Publications:

Journals:

1. Mayukhmala Jana, **Arpita Das**, "Multimodal Medical Image Fusion using Two-Stage Decomposition Technique to Combine the Significant Features of Spatial Fuzzy Plane and Transformed Frequency Plane", *IEEE Transactions on Instrumentation and Measurement,* vol. 72, pp. 1-10, 2023, Art no. 5005910. [doi: 10.1109/TIM.2023.3240222] (**IF: 5.332**)

2. Nabanita Sinha, Rajesh K. Tripathy, **Arpita Das**, "ECG beat Classification based on Discriminative Multilevel Feature Analysis and Deep Learning Approach", *Biomedical Signal Processing and Control, Elsevier*, vol. 78, 103943, pp. 1-11, Sept. 2022. [https://doi.org/10.1016/j.bspc.2022.103943] (**IF: 5.076**)

3. Nabanita Sinha, **Arpita Das**, "Detection of Obstructive Sleep Apnea using Non-Negative Matrix Factorization based Feature Extraction Approach in Eigen Spectrum Domain" *IEEE Transactions on Instrumentation and Measurement,* vol. 71, pp. 1-9, 2022, Art no. 4002809. [doi: 10.1109/TIM.2022.3151167] (**IF: 5.332**)

4. Nabanita Sinha, **Arpita Das**, "Identification and Localization of Myocardial Infarction based on Analysis of ECG Signal in Cross Spectral Domain using Boosted SVM classifier," *IEEE Transactions on Instrumentation and Measurement,* vol. 70, pp. 1-9, 2021, Art no. 4007409 [doi: 10.1109/TIM.2021.3117663] (**IF: 5.332**)

5. Nabanita Sinha, **Arpita Das**, "Discrimination of Life-Threatening Arrhythmias Using Singular Value, Harmonic Phase Distribution, and Dynamic Time Warping of ECG Signals," *IEEE Transactions on Instrumentation and Measurement*, vol. 70, pp. 1-8, 2021, Art no. 2504508, [doi: 10.1109/TIM.2020.3045190]. (**IF: 5.332**)

6. Nabanita Sinha, **Arpita Das**, "Automatic Diagnosis of Cardiac Arrhythmias based on Three Stage Feature Fusion and Classification Model using DWT", *Biomedical Signal Processing and Control, Elsevier*, Vol. 62, 102066, September 2020. [https://doi.org/10.1016/j.bspc.2020.102066] (**IF: 5.076**)

7. Suranjana Mukherjee, **Arpita Das**, "Vague Set Theory based Segmented Image Fusion Technique for Analysis of Anatomical and Functional Images", *Expert Systems with Applications, Elsevier*, Vol. 159, 113592, 2020. [https://doi.org/10.1016/j.eswa.2020.113592] (**IF: 8.665**)

8. Poulomi Das, **Arpita Das**, "Shift Invariant Extrema based Feature Analysis Scheme to Discriminate the Spiculation Nature of Mammograms", *ISA Transactions, Elsevier*, Vol. 103, pp. 156-165, August 2020. [https://doi.org/10.1016/j.isatra.2020.03.018] (**IF: 5.911**)

9. Poulomi Das, **Arpita Das**, "A Fast and Automated Segmentation Method for Detection of Masses using Folded Kernel based Fuzzy C-means Clustering Algorithm", *Applied Soft Computing, Elsevier*, Vol. 85, 105775, 2019. [https://doi.org/10.1016/j.asoc.2019.105775] (**IF: 8.263**)

10. **Arpita Das,** Mahua Bhattacharya, "Study on neurodegeneration at different stages using MR images: computational approach to registration process with optimisation techniques", *Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization*, **Taylor & Francis**, Vol. 5, No. 3, pp. 165-182, 2017. [https://doi.org/10.1080/21681163.2015.1036308].

11. **Arpita Das,** Mahua Bhattacharya, "Development of CAD System for Analysis of Vague Set theory based Contrast Enhancement Technique in Mammograms**", *Int. Journal of Hybrid Intelligent Systems,* Vol. 11, No. 4, pp. 227-240, 2014. [doi: 10.3233/HIS-140191]

12. Mahua Bhattacharya, **Arpita Das**, M. Chanda, "GA Based Multiresolution Fusion of Segmented Brain Images Using PD, T1 and T2 Weighted MR Modalities", *Neural Computing and Applications*, **Springer**, Vol. 21, No. 6, pp. 1433-1447, 2012. [https://doi.org/10.1007/s00521-011-0730-3] (**IF: 5.102**)

13. Mahua Bhattacharya, Naveen Sharma, Vaibhav Goyal, Sagar Bhatia, **Arpita Das**, "A Study on Genetic Algorithm Based Hybrid Softcomputing Model for Benignancy/Malignancy Detection of Masses using Digital Mammogram", *Int. Journal of Computational Intelligence and Applications*, Vol. 10, No. 2, pp. 141-165, 2011. [https://doi.org/10.1142/S1469026811003033]

14. **Arpita Das,** Mahua Bhattacharya, "Affine Based Registration of CT and MR Modality Images of Human Brain using Multiresolution Approaches: Comparative Study on Genetic Algorithm and Particle Swarm Optimization", *Neural Computing & Applications,* **Springer**, Vol. 2, Issue 2, pp: 223 - 237, 2011. **[**https://doi.org/10.1007/s00521-010-0374-8](**IF: 5.102**)

15. Mahua Bhattacharya, **Arpita Das**, "Identification of Microcalcifications and Grading of Masses using Digital Mammogram", *Int. Journal of Medical Engineering and Informatics*, **Inderscience Publication,** Vol. 2, No. 2, pp. 122-138, 2010. [https://doi.org/10.1504/IJMEI.2010.031515**]**

16. Mahua Bhattacharya, **Arpita Das**, "Identification of Tiny and Large Calcification in Breast: A Study on Mammographic Image Analysis", *Int. Journal of Bioinformatics Research and Applications,* **Inderscience Publication,** Vol. 6, Issue 4, pp.418-434, 2010.[doi: 10.1504/IJBRA.2010.036003]

17. Mahua Bhattacharya, **Arpita Das**, "Genetic Algorithm Based Feature Selection in a Recognition Scheme Using Adaptive Neuro Fuzzy Techniques", *Intl. J of Computers, Communications and Control (Automation & Control System),* Vol.5, No. 4, pp: 458 -468, 2010. [doi:10.15837/ijccc.2010.4.2495].

18. Mahua Bhattacharya, **Arpita Das**, "Identification and classification of tumor/cancer lesion appearing in brain using CT and MR images: study on adaptive neuro fuzzy systems", *Int. Journal of Advanced Research in Computer Engineering,* ISSN: 0974-4320, Vol. 3, No. 1, pp. 51-61, June 2009.

19. Mahua Bhattacharya, **Arpita Das**, "Soft Computing Based Decision Making Approach for Tumor Mass Identification in Mammogram", *Int. Journal of Bioinformatics Research,* Vol. 1, Issue 2, pp. 37-46, 2009. [ISSN : 0975-3087 (Print), E-ISSN : 0975-9115 (Online)]

20. **Arpita Das,** Mahua Bhattacharya, "A Novel Vague Set Approach for Selective Contrast Enhancement of Mammograms using Multiresolution", *Int. Journal of Biomedical Science and Engineering*, Scientific Research, USA, Vol. 2, pp. 575-581, December 2009. [doi: 10.4236/jbise.2009.28083]

Conference Proceedings:

[1] P. Das and **A. Das**, "Interlayer Textural Variabilities to Study the Benignancy/Malignancy of Brain Tumors using MR Modalities Images", *2022 IEEE Kolkata Section Conference (CALCON)*, 10-11 Dec. 2022, pp. 1-6.

[2] M. Jana, S. Basu and **A. Das**, "Fusion of Multimodal Images using Parametrically Optimized PCNN and DCT based Fourier Analysis," *2022 IEEE Delhi Section Conference (DELCON)*, 2022, pp. 1-7, [doi: 10.1109/DELCON54057.2022.9753411].

[3] M. Jana, S. Basu and **A. Das**, "NSCT-DCT based Fourier Analysis for Fusion of Multimodal Images," *2021 IEEE 8th Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON)*, 2021, pp. 1-6. [doi: 10.1109/UPCON52273.2021.9667618].

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[5] S. Mukherjee and **A. Das**, "Parametrically Optimized Pulse Coupled Neural Network for Analysis of Multimodal Medical Images," *IEEE 2021 International Conference on Advances in Electrical, Computing, Communication and Sustainable Technologies (ICAECT)*, Bhilai, India, 2021, pp. 1-6. [doi: 10.1109/ICAECT49130.2021.9392491].

[6] P. Das and **A. Das**, "Adaptive Gabor Filtering using Grey Wolf Optimization for Enhancement of Brain MRI," *2020 IEEE International Women in Engineering (WIE) Conference on Electrical and Computer Engineering (WIECON-ECE)*, 26th-27th Dec. 2020, Bhubaneswar, India, pp. 356-359. [doi: 10.1109/WIECON-ECE52138.2020.9397926].

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Processing Conference (IMVIP-07), ISBN: 0-7695-2887-2, pp. 98-105, 5-7 Sept, 2007 in NUI Maynooth, Co, Kildarem Ireland, UK.

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Book Chapters

1. S. Banerjee, S. Roy, **A. Das** (2021) "Fusion-Based Multimodal Brain Tumor Detection Using Convolution Neural Network", Advances in Medical Physics and Healthcare Engineering. Lecture Notes in Bioengineering, Chapter-19, pp. 183-194, Springer, Singapore. [https://doi.org/10.1007/978-981-33-6915-3_19].

2. N. Sinha, **A. Das** (2021), "Robust Detection of Atrial Arrhythmias Using Sub-modules of Different Feature Predictors", Advances in Medical Physics and Healthcare Engineering. Lecture Notes in Bioengineering, Chapter-3, pp 17-28, Springer, Singapore. [https://doi.org/10.1007/978-981-33-6915-3_3].

3. D. Mukherjee, **A. Das** (2021), "Gabor Filter Based Automated Enhancement of Brain Tumors", Advances in Medical Physics and Healthcare Engineering. Lecture Notes in Bioengineering, Chapter-8, pp. 71-80, Springer, Singapore. [https://doi.org/10.1007/978-981-33-6915-3_8].

4. K. Das, **A. Das** (2021), "Segmentation of Brain Tumor Using Cluster Validity Index-Based Fuzzy C-Means Algorithm", Advances in Medical Physics and Healthcare Engineering. Lecture Notes in Bioengineering. Chapter-6, pp. 45-56, Springer, Singapore. [https://doi.org/10.1007/978-981-33-6915-3_6].

5. S. Mukherjee, **A. Das** (2021), "Normalized Average Gradient-Based Fusion Method in Shearlet Domain for Studying the Prognosis of Alzheimer's Disease", Advances in Medical Physics and Healthcare Engineering. Lecture Notes in Bioengineering, Chapter-4, pp. 29-35, Springer, Singapore. [https://doi.org/10.1007/978-981-33-6915-3_4].

6. S. Mukherjee, **A. Das** (2021) "Relative Global Optimum-Based Measure for Fusion Technique in Shearlet Transform Domain for Prognosis of Alzheimer's Disease", In: Deshpande A., Estrela V.V., Razmjooy N. (eds) Computational Intelligence Methods for Super-Resolution in Image Processing Applications. Springer, Cham. Chapter-15, pp 279-291. [https://doi.org/10.1007/978-3-030-67921-7_15].

7. P. Das, **A. Das** (2021), "Automatic Detection and Classification of Enhanced Brain Tumor Using Machine Learning Algorithm", Computers and Devices for Communication, Lecture Notes in Network and Systems, Springer Nature Singapore, Chapter 6, Vol. 147, 2021. [doi: 10.1007/978-981-15-8366-7_6]

8. S. Mukherjee, **A. Das** (2021), "An Artificially Intelligent Fusion Approach for Prognosis of Alzheimer's Disease", Computers and Devices for Communication, Lecture Notes in Network and Systems, Springer Nature Singapore, Chapter 7, Vol. 147, 2021. [doi: 10.1007/978-981-15-8366-7_7].

9. S. Mukherjee, **A. Das** (2020), "Effective Fusion Technique using FCM based Segmentation Approach to Analyze Alzheimer's Disease ", Smart Healthcare Analytics in IoT Enabled Environment, Intelligent

Systems Reference Library, Chapter-6, Vol. 178, Springer Nature Switzerland AG, 2020. [doi: 10.1007/978-3-030-37551-5]

10. P. Das, R. Rajak, **A. Das** (2020), "Application of AI for Computer Aided Diagnosis System to Detect Brain Tumor", Chapter- 10, Handbook of Research on Disease Prediction Through Data Analytics and Machine Learning, IGI Global, pp. 185-204, October 2020. [ISBN13: 9781799827429; ISBN10: 1799827429 ; E-ISBN13: 9781799827436 ; DOI: 10.4018/978-1-7998-2742-9.ch010]

11. D. Mukherjee, K. Das, **A. Das** (2020), "Design of a Simple and Low Cost Calculator in the Laboratory using FPGA", Chapter-21, Encyclopedia of Information Science and Technology, Fifth Edition, IGI Global, pp. 271-289, September 2020. [ISBN13: 9781799834731; ISBN10: 1799834735; E-ISBN13: 9781799834748; DOI: 10.4018/978-1-7998-3479-3.ch021]

12. A. Chattaraj, **A. Das** (2018), "A Novel Kernel Based Fuzzy Clustering Approach to Identify Masses in Mammograms" Chapter-3, Expert System Techniques in Biomedical Science Practice, IGI Global, pp. 46-69, 2018. [ISBN13: 9781522551492 (print), E-ISBN13: 9781522551508]

13. **A. Das**, (2018) "Automatic Mask Alignment for Optical Lithography using GA and PSO based Image Registration Technique", Chapter-27, Handbook of Research on Emergent Applications of Optimization Algorithms, IGI Global, pp. 637-655, 2018. [ISBN13: 9781522529903 (print), E-ISBN13: 9781522529910]

14. M. Bhattacharya and **A. Das,** (2013), "Study on Human Brain Registration Process Using Mutual Information and Evolutionary Algorithms", Chapter-10, Computational Intelligence in Image Processing, Springer**,** pp: 187-199, 2013. [ISBN: 978-3-642-30620-4 (print), E-ISBN: 978-3-642-30621-1]

15. **A**. **Das** and M. Bhattacharya (2011), "Computerized Decision Support System for Mass Identification in Breast Using Digital Mammogram: A Study on GA Based Neuro Fuzzy Approaches", Chapter-53, *Software Tools and Algorithms for Biological Systems*, *Springer book series*, Advances in Experimental Medicine and Biology, AEMB, Springer, Vol. 696, Part 6, pp: 523 - 533, 2011. [ISBN: 978-1-4419-7045-9 (Print) 978-1-4419-7046-6 (Online)]

16. M. Bhattacharya and **A. Das** (2011)**,** "Multimodality Medical Image Registration and Fusion Techniques using Mutual Information and Genetic Algorithm Based Approaches", Chapter-44, *Software Tools and Algorithms for Biological Systems, Springer book series*, Advances in Experimental Medicine and Biology, AEMB, Springer, Vol. 696, Part 6, pp: 441-449, 2011. [ISBN: 978-1-4419-7045-9 (Print) 978-1-4419-7046-6 (Online)]