

# ACADEMIC PROFILE



1.	Name	Dr. Arathi T		
2.	Date of Birth & Age	29-04-1985, 32 Years		
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## Details of Educational Qualification

10 <sup>th</sup>	KENDRIYA VIDYALAYA ,CALICUT
12 <sup>th</sup>	KENDRIYA VIDYALAYA ,CALICUT
B.TECH-ELECTRONICS AND COMMUNICATION	CALICUT UNIVERSITY-
M.TECH-REMOTE SENSING AND WIRELESS NETWORK	AMRITA UNIVERSITY

## Details of Doctoral Degree (PhD)

Thesis Title	From	To	College/ Institute	University	Final Viva- Voce Date	Degree Awarded Date
DEVELOPMENT OF EFFICIENT ALGORITHMS FOR FUSION AND 3D RECONSTRUCTION OF MRI/CT IMAGES	01-09-2009	09-12-2015	AMRITA VISHWA VIDYAPEETHAM, ETTIMADAI, COIMBATORE	AMRITA VISHWA VIDYAPEETHAM UNIVERSITY	09-12-2015	21-08-2016

**Details of teaching experience:**

S. No.	Name and Address of Employer	Designation	Pay-Scale & AGP/GP	From	To	Duration	Type of Organization
1	LBS COLLEGE OF ENGINEERING, KASARAGOD		15600-39100/- AGP: 6000/- GP: 65,220/-	07-12-2012	IN SERVICE	4 YEARS & 2 MONTHS	GOVT. OF KERALA UNDERTAKING
2	MES COLLEGE OF ENGINEERING, KUTTIPURAM	ASSISTANT PROFESSOR	15600-39100/- AGP: 6000/- GP: 28,728/-	01-06-2011	06-12-2012	1YEAR&6 MONTHS	PRIVATE SELF-FINANCING
3	AMRITA VISHWA VIDYAPEETHAM, COIMBATORE	ASSISTANT PROFESSOR	15600-39100/- AGP: 6000/- GP: 28,728/-	01-08-2009	31-05-2011	1 YEAR & 10 MONTHS	UNIVERSITY
4	AWH ENGINEERING COLLEGE, CALICUT	LECTURER	Rs. 8000/- CONSOLIDATED	22-08-2006	09-12-2006	4 MONTHS	PRIVATE SELF-FINANCING

**Total teaching experience as Assistant Professor: 10 YEARS.**

**Favorite Subjects:**

1. Signals and Systems
2. Digital Signal Processing
3. Wavelet Theory
4. Microprocessors and Microcontrollers
5. Digital Communication
6. Information Theory and Coding
7. Image Processing

**“3best courses” taught in the last 3years, course outline, teaching plan, novel methods used and student feedback ratings:**

**1. Signals and Systems**

**Course Outline –**

Introduction to signals and systems - Classification of signals - Basic operations on signals - Elementary signals - Concept of system - Properties of systems- Stability, invertability, time invariance - Linearity - Causality - Memory - Time domain description - Convolution - Impulse response - Representation of LTI systems - Differential equation and difference equation representations of LTI systems

Fourier representation of continuous time signals -Fourier transform - Existence of the Fourier integral - FT theorems - Energy spectral density and power spectral density - Frequency response of LTI systems -Correlation theory of deterministic signals - Condition for distortion less transmission through an LTI system - Transmission of a rectangular pulse through an ideal low pass filter - Hilbert transform - Sampling and reconstruction.

Fourier representation of discrete time signals - Discrete Fourier series and Discrete Fourier transform - Laplace transform analysis of systems - Relation between the transfer function and differential equation - Causality and stability - Inverse system - Determining the frequency response from poles and zeros.

Z Transform - Definition - Properties of the region of convergence - Properties of the Z transform - Analysis of LTI systems - Relating the transfer function and difference equation - Stability and causality - Inverse systems - Determining the frequency response from poles and zero.

## **2. Microprocessors and Microcontrollers**

### **Course Outline –**

Intel 8086 processor – Architecture – Memory addressing – Addressing modes – Instruction set – Assembly language programming – Assemblers- Interrupts – Pin configuration – Timing diagrams – Minimum and maximum modes – Multiprocessor configuration.

Interfacing – Interfacing chips – Programmable peripheral interface (8255) – Programmable communication interface (8251) – Programmable timer (8253) – DMA Controller – Programmable interrupt controller (8257) – Keyboard display interface (8279).

Introduction to 80386 – Memory management unit – Descriptors, selectors, description tables and TSS – Real and protected mode – Memory paging – Special features of Pentium processor – Branch prediction logic Superscalar architecture

Intel 8051 microcontroller – architecture –ports, timers, interrupts, serial data transmission, instruction set -programming

## **3. Wavelet Theory**

### **Course Outline –**

Generalized Fourier theory, Fourier transform, STFT, Time-frequency analysis, Theory of Frames: Bases, Definition of frames, Frame projector.

Wavelets: Basic functions, Admissibility conditions, CWT, DWT, Multiresolution analysis, Dilation equation, wavelet equation, Compactly supported orthonormal bases, Necessary and sufficient conditions for orthonormality, Regularity: Smoothness and approximation order.

Splines: Cardinal B-spline MRA, sub-band filtering schemes, compactly supported wavelet bases, Fast wavelet transform algorithms – relation to filter banks, wavelet packets.

Biorthogonality and biorthogonal basis, Biorthogonal system of wavelets – construction, The Lifting scheme.

Sl. No	Course	Program me	Novel Methods Used	Term Papers	Group Activity	Student Feedback Ratings
1.	Signals and Systems	B.Tech	Relating signal processing to linear algebra and teaching.	NIL	MATLAB based implementation of Nyquist sampling theorem.	9.71
2.	Microprocessors and Microcontrollers	B.Tech	Use of ppt.	NIL	NIL	9.63
3.	Wavelet Theory	M.Tech	Relating signal processing to linear algebra and teaching. Give the geometrical interpretation of the concepts in wavelets, rather than just giving equations and doing derivations.	Latest papers on Wavelet based application in image processing where made to be presented as term papers.	1. Basic Haar and Daubechies (db4, db6 and db8) wavelets were generated in MATLAB.  2. Comparison of wavelet and wavelet packet analysis	9.68

**Participation in Faculty development programs:**

<b>Sl. No.</b>	<b>Year</b>	<b>Nature of Training</b>	<b>Duration</b>	<b>Organization where training was provided</b>
1	2021	KTU SPONSORED FACULTY DEVELOPMENT PROGRAMME ON DEEP LEARNING FOR IMAGE AND VIDEO APPLICATION	3 DAYS	LBS COLLEGE OF ENGINEERING KASARAGOD
2	2019	KTU SPONSORED FACULTY DEVELOPMENT PROGRAMME ON DEEP LEARNING	3 DAYS	LBS COLLEGE OF ENGINEERING KASARAGOD
3	2019	KTU SPONSORED FDP ON GRID INTERACTIVE SYSTEMS PROTECTION & CONTROL TEQIP – II SPONSORED FACULTY	5 DAYS	LBS COLLEGE OF ENGINEERING KASARAGOD
4	2017	DEVELOPMENT PROGRAMME ON PROGRAMMING LANGUAGES AND SOFTWARE FOR MATHEMATICS	5 DAYS	COLLEGE OF ENGINEERING, TRIKARIPPUR, CHEEMENI
5	2016	ISTE-SHORT TERM TRAINING PROGRAM ON BIG DATA COMPUTING	6 DAYS	LBS COLLEGE OF ENGINEERING, KASARAGOD
6	2016	ISTE-SHORT TERM TRAINING PROGRAM ON VLSI-SIGNAL PROCESSING SYSTEMS	6 DAYS	LBS COLLEGE OF ENGINEERING, KASARAGOD
7	2013	TEQIP – II SPONSORED NATIONAL LEVEL FACULTY DEVELOPMENT PROGRAMME ON EMBEDDED SYSTEMS	5 DAYS	COLLEGE OF ENGINEERING, VADAKARA

### Post Held at various levels

University Level	APJ Abdul Kalam Technological University -Member in the Boards of Studies of Research
Institution level	Member of the committee constituted for applying for TEQIP  Course chairperson for first year Engineering Physics  Development of syllabus for M.Tech in VLSI Design and Signal Processing
Department Level	Timetable in-charge Placement in-charge DSP lab curriculum for M.Tech. Miniproject coordinator Purchase committee member Liason Officer GATE Coaching coordinator

### Faculty development programs and Conferences organized:

Sl No	From	To	Title of the Program	Sponsoring Agency
1	15.6.2021	17.6.2021	DEEP LEARNING FOR IMAGE AND VIDEO APPLICATION	Kerala Technological university

Sl. No.	From	To	Title of the Program	Sponsoring Agency/Self-financed
1	16/09/2010	17/09/2010	Amrita ACM – W Women in Computing Conference (Co-ordination Committee)	ACM-W
2	25/02/2014	26/02/2014	nCORETech14 (Program Committee)	LBS Centre for Science and Technology
3	10/02/2016	11/02/2016	nCORETech15 (Technical Committee)	LBS Centre for Science and Technology

**Research Scholars Guided:**

Sl. No	Research Degree	Name of Scholar	Title of Thesis	Year of award	Co-guide	Status
1	M.Tech	Laxmipriya K	A vector quantization and moment based filtering method for lung cancer detection	2016	NIL	COMPLETED
2	M.Tech	Aathira K	Automated Reversible data hiding with Contrast enhancement of ultrasound images	2016	NIL	COMPLETED
3	M.Tech	Sujitha P	Sparse Image denoising in ultrasound images	2017	NIL	COMPLETED
4	Mtech	Archana	Sparse transform based online video denoising using block-matching and ICA	2021	NIL	COMPLETED
5	M.Tech	Sruthi T	Brain Image Segmentation using Convolutional Neural Networks	2018	NIL	COMPLETED

**Details of Publications/Conference Papers:**a) **Journal Papers:**

Sl. No.	Authors	Title of the paper	Name of Journal	Volume & Year	Pages	Citation Count	Journal Impact factor
1.	Arathi T, Latha Parameswaran	An Image Fusion Technique using Slantlet transform and Phase congruency for MRI/CT	International Journal of Biomedical Engg. & Technology	13, 2013	87-103	02	SCOPUS indexed
2.	Arathi T, Latha Parameswaran	Image reconstruction from 2D stack of MRI/CT to 3D using Shapelets	International Journal of Engg. & Technology	06, 2014	2595-2603	0	SCOPUS indexed
					469-	0	Impact

3.	Arathi T, Latha Parameswaran	A Computationally efficient edge preserving MRI/CT image fusion technique using complex wavelet transform and phase congruency fusion rule	European Journal of Scientific research	112, 2013	483		factor of 0.713, based on the information in the SCOPUS database.
4.	Sreedevi V. P., Arathi T, K.P Soman	Lifting Factorization in MAPLE	International Journal of recent trends in Engineering & Technology	01, 2009	123-127	0	-
5	Arathi.T,Rahul.C	Effective utilization of multi median variance-independent component analysis on medical image denoising	INT. J. OF MEDICAL ENGINEERING AND INFORMATICS (IJMEI) PUBLISHER: INDERSCIENCE (SCOPUS INDEXED)	2020	ACCEPTED		SCOPUS INDEXED
6	DR.ARATHI.T MR.RAHUL.C	MRI DENOISING: A SPARSE ICA BASED DICTIONARY LEARNING APPROACH	INT. J. OF MEDICAL ENGINEERING AND INFORMATICS (IJMEI) PUBLISHER: INDERSCIENCE (SCOPUS INDEXED)	2021	ACCEPTED		SCOPUS INDEXED



7	DR.ARATHI.T ARCHANA	Sparse transform based online video denoising using block-matching and ICA	SOLID STATE TECHNOLOGY	2020 Volume: 63 Issue: 3	ACCEP TED		(SCOPUS INDEXED)
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**Papers Presented in Scopus Indexed International Conferences:**

Sl. No.	Title of the Paper	Name of the Conference	Venue & Date	Citation Count	Impact Factor
1	A method for Image representation using Slantlet Transform and Phase Congruency	<i>Proceedings of the 2014 International Conference on Interdisciplinary Advances in Applied Computing, ACM.</i>	10 <sup>th</sup> & 11 <sup>th</sup> October, 2014, Coimbatore.	01	ACM Digital Library
2	Image representation method based on Complex Wavelet Transform and Phase Congruency, with Automatic Threshold Selection	<i>Proceedings of the International Conference on Biology, Medical Physics, Medical Chemistry, Biochemistry and Biomedical, BIOMED, Venice, Italy, (SCOPUS).</i>	28 <sup>th</sup> to 30 <sup>th</sup> September, 2013, Italy.	00	-
3	Slantlet Transform and Phase congruency based Image Compression	<i>AICWIC'13, ACM, Proceedings published by International Journal of Computer Applications, ACM, IJCA.</i>	9 <sup>th</sup> to 11 <sup>th</sup> January, 2013, Coimbatore.	02	-
4	A study of reconstruction algorithms in computerized tomographic images	<i>Proceedings of the 1st Amrita ACM-W Celebration on Women in Computing in India, ACM.</i>	16 <sup>th</sup> & 17 <sup>th</sup> September, 2010, Coimbatore.	00	ACM Digital Library
5	Spline Biorthogonal Wavelet Design	<i>International Conference on Information and Communication Technologies, Springer.</i>	7 <sup>th</sup> to 9 <sup>th</sup> Septemebr 2010, Kochi, Kerala.	00	Springer
6	Performance Measures for Fusion of Multiple Input Images	<i>International Conference on Advances in Computing, Control, &amp; Telecommunication Technologies, IEEE.</i>	28 <sup>th</sup> & 29 <sup>th</sup> December 2009, Trivandrum, Kerala.	00	IEEE Xplore digital library
7	Framelet Based Image Fusion for the Enhancement of Cloud Associated Shadow areas in Satellite Images	<i>International Conference on Advances in Computing, Control, &amp; Telecommunication Technologies, IEEE.</i>	28 <sup>th</sup> & 29 <sup>th</sup> December 2009, Trivandrum, Kerala.	01	IEEE Xplore digital library
8	Daubechies-Lagarias Algorithm--A Simplified Approach	<i>International Conference on Advances in Computing, Control, &amp; Telecommunication Technologies, IEEE.</i>	28 <sup>th</sup> & 29 <sup>th</sup> December 2009, Trivandrum, Kerala.	01	IEEE Xplore digital library
9	Performance evaluation of information theoretic image fusion metrics over quantitative metrics	<i>International Conference on Advances in Recent Technologies in Communication and Computing, IEEE.</i>	27 <sup>th</sup> & 28 <sup>th</sup> October 2009, Kottayam, Kerala.	07	IEEE Xplore digital library
10	An Intriguing Property of Scaling Function in Wavelet Theory and its Verification Using Daubechies-Lagarias Algorithm	<i>International Conference on Advances in Recent Technologies in Communication and Computing, IEEE</i>	27 <sup>th</sup> & 28 <sup>th</sup> October 2009, Kottayam, Kerala.	00	IEEE Xplore digital library

**Conferences/Workshops attended:**

Sl. No.	From	To	Title of the program	Organized by
1	16/09/2010	17/09/2010	AMRITA ACM-W WOMEN IN COMPUTING CONFERENCE	ACM
2	19/11/2011	19/11/2011	RESEARCH METHODOLOGY WORKSHOP	IEEE
3	21/02/2012	24/02/2012	WORKSHOP ON COMPUTER VISION AND IMAGE PROCESSING	IETE
4	09/01/2013	11/01/2013	2 <sup>ND</sup> EDITION OF AMRITA INTERNATIONAL CONFERENCE OF WOMEN IN COMPUTING	ACM
5	26/04/2013	27/04/2013	NATIONAL CONFERENCE ON INTELLIGENT COMPUTING	ACM
6	06/02/2014	08/02/2014	4 <sup>TH</sup> EDITION OF NATIONAL WORKSHOP ON COMPUTER VISION AND IMAGE PROCESSING	IETE

**Resource person at various workshops:**

Sl. No:	Details of the workshop/STTP	Topic taken	Year
1	IETE sponsored workshop on 'Wavelets and its Applications'	Fundamentals of wavelets	October, 2016
2	STTP in 'VLSI Design and Signal Processing'	Fundamentals of Linear Algebra for Signal and Image Processing	March 2016
3	National workshop on 'Computer Vision and Image Processing'	Wavelet Families	2014
4	4 <sup>th</sup> edition of the National workshop on 'Computer Vision and Image Processing'	Review of Mathematical Foundations for Image Processing	2012
5	Workshop on 'Image Processing and MATLAB Programming'	MATLAB-Image Processing Toolbox	2010
6	Workshop on 'Image Processing Techniques'	Image Fusion	2009

**Sponsored Project:**

SL NO	Sponsoring Agency	Title of the Project	Period	Amount	Status	Principal Investigator/ Co-investigator
1	CERD KTU-RESEARCH SEED MONEY	Deep Learning based Optimized Computer Aided Detection for Retinal Disease Screening	3 YEAR	1,00,000	SANCTIONED	Principal Investigator

**Awards / Distinctions won:**

1. **UNIVERSITY LEVEL FIRST RANK FOR M.TECH**
2. RESOURCE PERSON FOR VARIOUS WORKSHOPS:
3. BEST PAPER AWARD AT THE 2<sup>ND</sup> EDITION OF AMRITA INTERNATIONAL CONFERENCE OF WOMEN IN COMPUTING.
4. MY PHD WORK HAS OBTAINED APPRECIATION FROM THE RENOWNED RADIOLOGIST, DR. KRISHNA KIRAN, AT DR. SHAJI'S MRI & MEDICAL RESEARCH CENTRE, CALICUT.
5. MY PHD WORK ON IMAGE FUSION AND 3D RECONSTRUCTION OF MRI/CT IMAGES, IS BEING WORKED UPON TO MAKE A TOOLKIT FOR AIMS HOSPITAL, COHCIN, KERALA, AS