

Name: Manju Mathew



**Nationality:** Indian (Passport No.P4068323)

**Date of Birth:** 04-08-1979

**Sex:** Female

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**Languages:**

English, Malayalam, Hindi

### **Career Objectives**

- To use my technical and professional potentials to achieve organizational goals.
- To apply my academic and research proficiency to develop innovations in technology with the ultimate goal of betterment of mankind.
- To build an academic/research career as a faculty in a leading academic and research institute and contribute towards high quality technical education.

### **Educational Qualifications**

- Advanced Diploma in Artificial Intelligence, Jan 2020, National Institute of Electronics and Information Technology (NIELIT), Kerala, India, Score -96%
- Doctor of Philosophy (PhD), Dec2012, School of Computer Science and Engineering (SCSE), Nanyang Technological University (NTU), Singapore.

### **Specialization: Wireless Communication**

Courses undertaken as part of PhD	Grade/Grade Point(out of 5)
<b>Academic Year 2006-Term 1</b>	
Digital Communication Systems	3.5
Object Oriented Software Development	3.5
<b>TGPA</b>	<b>3.5</b>
<b>Academic Year 2006-Term 2</b>	
Advanced Digital Signal Processing	5
Advanced Digital System Design	4.5
<b>TGPA</b>	<b>4.75</b>
<b>Academic Year 2007 –Term 1</b>	
Wireless Communications	<b>5</b>
Statistical signal Processing	<b>3.5</b>
<b>TGPA</b>	<b>4.25</b>

- Bachelor of Technology (B.Tech), April 2002 in EE , Mahatma Gandhi University, Kerala

Semester	GPA (out of 10)
S1S2	8.1
S3	8.3
S4	8.4
S5	8.2
S6	8.5
S7	8.4
S8	8.5
<b>CGPA</b>	<b>8.35</b>

### **PhD Research Profile**

- PhD, December 2012, (Matric No.: G0602477A), School of Computer Science and Engineering (SCSE), NTU.
- **Title:** Adaptive Transmission schemes of Cognitive radio for Dynamic Spectrum Access
- **Supervisor:** Dr. Benjamin Premkumar, Associate Professor, School of Computer Science and Engineering, NTU.
- **Description:** By exploiting the existence of unused bands in the spectrum called 'spectrum holes' Cognitive Radio (CR) promotes reliable communication and efficient utilization of radio spectrum. To make this a reality, it is required to create a communication waveform that adaptively fits into the free band and causes least interference to active legacy users. The work presented in the dissertation focuses on adaptive transmission technologies for CR using wavelets and multiwavelets. The proposed methods insure minimum interference to adjacent users together with multi-user support to implement efficient DSA networks. A detailed review on the already proposed transmission schemes for CR available in literature is described in the first part. The proposed single carrier and multi carrier modulation techniques for CR with multiple access capability are outlined there onwards. The system models and simulation results are discussed in detail. The first proposal is the system model of multicarrier multiple access transmission scheme using standard wavelet packet transforms. The orthogonal sub bands generated by the wavelet packet transform are used as data subcarriers of CR nodes. A modified carrier assignment scheme is proposed which acts as the spectrum decision and allocation block of CR. The system incorporates the flexibility and orthogonality of wavelet packet modulation and the multi-user support of Orthogonal Frequency Division Multiple Access (OFDMA). The error performance of the scheme is evaluated using existing wavelets and is compared with OFDMA. Scalar wavelets for wireless communication are explored well in the past and hence we focus more on multiwavelets in the preceding chapters. As a preliminary work, B spline based multiwavelets of multiplicity three are investigated. A multiuser CR network with spline multiwavelets of different orders is considered. Single carrier modulation is employed and the performance under different channel conditions is analyzed. The orthogonality of multiwavelets together with short support in time domain gives an efficient single carrier multi user CR system for free spectrum access. Finally, to further improve spectrum efficiency and performance, multifilter bank based CR transceiver for multiuser network is proposed. Multiwavelet packet modulation is rarely considered in wireless communication but this multidimensional modulation has adaptability and spectrum efficiency. The implementation can be done with vector extension of Mallat's algorithm which insures acceptable computational complexity. A simple and reliable spectrum sensing is implemented for CR using multifilter banks at virtually no additional computational cost.

### **Research Interests**

- Digital Signal Processing
- Wireless Communication
- Underwater acoustic imaging
- Machine learning and Data Analytics

**Programming Skills: Python, R, C, MATLAB, C++**

### **Recent Employment:**

#### **Visiting faculty,**

Department of Computer Science and Engineering,  
Indian Institute of Information Technology, Ranchi

Duration: One Semester ( August 2021 to December 2021)

### **Professional Experience**

**Associate Professor**, SAINTGITS College of Engineering, Kerala ( presently autonomous)  
(06.01.2015 to 01.01.2018).

**Job description:** Employed in the Department of Electrical and Electronics Engineering

**Assistant Professor**, Holy Kings College of Engineering and Technology, Kerala (Dec.2012 to April 2014):

**Served as lecturer in** SAINTGITS College of Engineering, Kerala (February 2005-July 2006).

### **Publications**

#### **Peer-reviewed Journals**

- Manju Mathew, A. B. Premkumar and Lau, C.T., "Multi-user Interference and Cross Correlation Effects of Spline Multi-wavelets Based Cognitive Radio Network," *Journal of Communications: Special Issue on Interference Management in 4G Wireless Networks*, Vol.7, No.9, 2012.
- Manju Mathew, A. B. Premkumar and Lau, C.T., "Spectrum Efficient Cognitive Radio Transceiver Using Multi-wavelet Filters," *ISRN Journal of Communications and Networking*, International Scholarship Research Network, vol. 2012, Article Id 607825, 13 pages, 2012.
- Anila R Pillai, Manju Mathew., "Sequence current based fault detection in compensated lines," *International Journal of Advanced Research in Electrical, Electronics, and Instrumentation Engineering*, Vol.4, Issue 9, 7502-7508 (2015).
- Anuvind R Krishnan, Manju Mathew., "A Grid-Connection Control Scheme of TEG System Using Hysteresis Current Control Method For Controlling Reactive Power of Power System," *International Journal of Innovative Research in Technology (IJIRT)*, Volume 3, Issue 3, 68-74. (2016).

#### **International Conference papers:**

- Manju Mathew, A. B. Premkumar and A S Madhukumar., "A study on the performance of Multi-filter Bank Based Cognitive Radio Transceiver for Multi-user Applications," *IEEE International Conference on Communication Systems (ICCS)*, November 2012.
- Manju Mathew, A. B. Premkumar and Lau, C.T., "Multi-wavelets Based Multi-user Cognitive Radio Network," *IEEE International Conference on Communication Systems (ICCS)*, November 2010
- Manju Mathew, A. B. Premkumar and Lau, C.T., "Multiple Access Scheme for Multi User Cognitive Radio based on Wavelet Transforms," *IEEE Vehicular Technology Conference (VTC)*, Spring, IEEE, May 2010.
- Manju Mathew, A. B. Premkumar and Lau, C.T., "Pulse Based Adaptive Carrier Waveform Generation for Cognitive Radio Applications," *IEEE International Conference on Cognitive Radio Oriented Wireless Networks and Communications*, IEE, 2008.
- Manju Mathew, A. B. Premkumar and Lau, C.T., "An Adaptive Waveform Generation Technique for Cognitive Radio," *IEEE Vehicular Technology Conference (VTC)*, Spring, IEEE, 2008.

### **Workshops/Conference Organizer**

- Chaired the session on “Filters and Signal Processing applications” of ICETES '13 held at M A College of Engineering in Dec 2013.
- Served as the Conference Proceeding Committee Head of ICETTAS 2015 held at SAINTGITS during May 2015
- Two Day workshop on “Blue tooth-controlled Robotics” for U.G. students “Robo Zest 2016” (Selected as best faculty coordinator)
- Two Day workshop on “Gesture controlled robots” for U.G students “RoboZest 2017” (Received special Appreciations as faculty coordinator)
- Expert talk on “Evolution of Wireless Sensor Networks” for UG and PG students, On 20<sup>th</sup> August 2016
- Seminar on “Body area networks” for B.Tech students on 15<sup>th</sup> October 2016

### **Theory courses Taught**

1. Introduction To Electrical Engineering (S1EEE)
2. Electro Magnetic Theory (S<sub>3</sub> EEE)
3. Computer Programming (S<sub>4</sub> EEE)
4. DC Machines and Transformers(S<sub>4</sub>EEE)
5. Digital Electronics ((S<sub>3</sub> EEE)
6. Signals & Systems (S<sub>5</sub> EEE)
7. Computer Organization & Architecture (S<sub>3</sub>ECE )
8. Electrical Power Transmission (S<sub>6</sub> EEE)
9. Digital Signal Processing (S<sub>6</sub> EEE)
10. Electrical System Design (S<sub>8</sub>EEE)
11. Soft Computing Techniques in Power Systems (S2M.Tech-Power Systems)

### **Practical Sessions Handled**

1. Computer Programming Lab (S4EEE)
2. Integrated Circuits Lab (S5EEE)
3. Electrical Machines Lab (S8EEE)
4. Digital Electronics and Logic Design (As part of teaching assistantship in NTU, Singapore)
5. Computer Organization and Architecture Lab (S3ECE)

### **References**

1. **Dr. Benjamin Premkumar, Associate Professor, Singapore Institute of Technology, 10, Dover Drive, Singapore, [Benjamin.Premkumar@singaporetech.edu.sg](mailto:Benjamin.Premkumar@singaporetech.edu.sg) +65 65921434**
2. **Dr. A S Madhukumar, Associate Professor, School of Computer Science and Engineering, Nanyang Technological University, Singapore, [asmadhukumar@ntu.edu.sg](mailto:asmadhukumar@ntu.edu.sg), +65 67906272**
3. **Dr. Sudhan Majhi, Associate Professor, Department of Electrical Communication Engineering, Indian Institute of Science, Bangalore, India, [smajhi@iisc.ac.in](mailto:smajhi@iisc.ac.in)**