

CURRICULUM VITAE

Dr. Benjamin Premkumar

Present Appointment: Professor

Institution: Cambridge Institute of Technology, Bangalore, India

Email: Benjamin.ece@cambridge.edu.in

ACADEMIC QUALIFICATIONS

- **Ph.D.** - University of Idaho, USA
- **M.Sc.** - North Dakota State University (NDSU), USA
- **B.E.** - Indian Institute of Science, Bangalore, India
- **B.Sc.** - Bangalore University, India

Professional Membership: Senior Member, Institute of Electrical and Electronics Engineering (IEEE)

CAREER SUMMARY

Academic Appointments:

- **2025 - Present:** Professor, Cambridge Institute of Technology, Bangalore, India
- **2017-2024:** Associate Professor, Singapore Institute of Technology
- **2013-2016:** Professor, University of Malaya, Malaysia
- **1999-2013:** Associate Professor, School of Computer Engineering, Nanyang Technological University (NTU), Singapore
- **2001-2002:** Associate Professor, SDSMT, USA
- **1998-1999:** Senior Lecturer, NTU Singapore
- **1995-1997:** Lecturer, NTU Singapore
- **1994-1995:** Assistant Professor, Huron University, SD, USA

Leadership Roles at NTU:

- Research Group Leader: Computer Architecture and Digital Systems (1998-2000)
 - R&D Coordinator, Computing Systems Division (2000-2001)
 - Member, R&D Committee (1998-2001)
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TEACHING

Books Authored:

1. **"Principles of Wireless Communications,"** Pearson Education (2004, 2006, 2008 - 3 editions)
2. **"Residue Number Systems: Theory and Implementation"** (Co-author), Imperial College Publishers, 2007

Teaching Expertise: Developed and taught 20+ courses covering Circuit Theory, Digital Signal Processing, Wireless Communications, Computer Architecture, Mobile Communications, and Advanced Digital Communications across undergraduate and graduate levels.

RESEARCH AWARDS & DISTINCTIONS

- **Visiting International Professor:** Global Initiative for Academic Network (GIAN) Program, Government of India (2016)
 - **Visiting Professor:** University of Bournemouth, UK (2015); University of Bedfordshire, UK (2012)
 - **Erskine Fellowship:** University of Canterbury, New Zealand (2004)
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CURRENT RESEARCH AREAS

Wireless Communications: Machine learning for wireless channel anomaly detection, 5G and beyond, Non-orthogonal multiple access techniques

Digital Signal Processing: Compressive sensing, underwater acoustic signal processing for localization and tracking, bio-signal processing

Number Systems for DSP: Residue Number Systems (RNS), Folding Number Systems (FNS)

PATENTS (7)

1. "Method, apparatus and computer readable medium for fast arithmetic in digital logic" (New Zealand, 2006)
2. "High speed analog to digital conversion and signal processing for digital systems" (US Provisional, 2007)
3. "Residue Number System Based Encoding Circuits for Analog to Digital Conversion" (US 61/502,869, 2011)

4. "System For Performing Modular Arithmetic Operation" (PCT/SG2012/000339, 2012)
 5. "RNS Based Analog-to-Digital Conversion and Inner Product Computation" (PCT/SG2012/000160, 2012)
 6. "Thermometer Code Based Modular Arithmetic Operations" (US 61/535,995, 2011)
 7. "Fast Arithmetic in Digital Logic" with I. McLoughlin (2006)
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RESEARCH FUNDING (>\$1.6 Million)

Major Grants:

- **A*STAR-NIH Joint Grant:** S\$628,182 - Intelligent Cellular Network (InCell) (2011)
 - **DSTA:** S\$598,000 - Underwater Acoustic Signal Modeling and Detection (2008)
 - **DSO:** S\$156,000 - Dynamic Spectrum Management (2007)
 - **AcRF Tier 1:** S\$147,000 - Cooperative Communication Algorithms (2008)
 - **ST Microelectronics:** Multiple grants totaling S\$94,000 (2000-2004)
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SUPERVISION & EXAMINATION

Ph.D. Supervision: 17 as Main Supervisor and Joint Supervisor

Selected Graduated Students:

- Shideh Madadi - Nonlinear techniques for source detection in shallow ocean
- Hari Vishnu - Underwater acoustic source detection using vector sensors
- Vun Chan Hua Nicholas - Number theory signal conversion techniques
- Manju Mathew - Adaptive waveform generation for cognitive radios
- Pham Duc Minh - Folding waveform based number systems

Examination: 25+ Ph.D. theses (internal/external), 12+ Master's theses at institutions including University of Canterbury (NZ), National University of Singapore, IIT Roorkee (India), Multimedia University (Malaysia)

EDITORIAL & PROFESSIONAL SERVICE

Editorial Positions:

- **Associate Editor:** Journal of Circuits, Systems and Signal Processing (Springer), since 2005
- **Editorial Board Member:** Recent Patents on Telecommunications (Bentham), since 2011

- **Service as an External Assessor for Research**

City University of New York

External assessor for evaluating research proposals from the Faculty of City University of New York (2007, 2008, and 2009).

Conference Leadership:

- **Technical Program Chair:** IEEE ISPACS 2014, Malaysia
- **Steering Committee Member:** International Workshop on Smart Wireless Communications (2012-2013)
- **NASA Technical Program Committee Member:** NASA Space Engineering Research Center symposium on VLSI designs for Space Engineering Applications (1991 – 1993)

Reviewer: IEEE Transactions on Circuits and Systems, Signal Processing, VLSI Design, Communications; Journal of Acoustic Society of America

SELECTED PUBLICATIONS

Recent Journal Publications (2012-2025)

1. **I. McLoughlin et al.**, "On the nature and potential of deep noise suppression embeddings," *Circuits, Systems, and Signal Processing*, Springer, May 2025.
2. **R. Mo et al.**, "An Unsupervised TCN-based Outlier Detection for Time Series with Seasonality and Trend," *IEEE Trans. Wireless Communications*, 2024.
3. **X. Zhong, A. Mohammadi, A.B. Premkumar, A. Asif**, "A Distributed Particle Filtering Approach for Multiple Acoustic Source Tracking," *Signal Processing*, Elsevier, vol. 108, pp. 589-603, Mar 2015.
4. **X. Zhong, A.B. Premkumar**, "Multiple Wideband Acoustic Source Tracking in 3-D Space using Distributed Acoustic Vector Sensor Array," *IEEE Sensors Journal*, vol. 14, no. 8, pp. 2502-2514, Aug 2014.
5. **Z. Madadi, G.V. Anand, A.B. Premkumar**, "Three Dimensional Localization of Multiple Acoustic Sources in Shallow Ocean with Non-Gaussian Noise," *Digital Signal Processing*, Elsevier, vol. 32, pp. 85-99, 2014.
6. **Z. Madadi, G.V. Anand, A.B. Premkumar**, "Signal detection in generalized Gaussian noise by nonlinear wavelet denoising," *IEEE Trans. Circuits and Systems Part I*, vol. 60, no. 11, pp. 2973-2986, Nov 2013.
7. **C.H. Vun, A.B. Premkumar**, "A New RNS based DA Approach for Inner Product Computation," *IEEE Trans. Circuits and Systems Part I*, vol. 60, no. 8, pp. 2139-2152, Aug 2013.
8. **X. Zhong, A.B. Premkumar, A.S. Madhukumar**, "Particle Filtering for Acoustic Source Tracking in Impulsive Noise with Alpha-stable Process," *IEEE Sensors Journal*, vol. 13, no. 2, pp. 589-600, Feb 2013.
9. **X. Zhong, A.B. Premkumar**, "Particle Filtering Approaches for Multiple Acoustic Source Detection and 2-D Direction of Arrival Estimation Using a Single Acoustic

Vector Sensor," *IEEE Trans. Signal Processing*, vol. 60, no. 9, pp. 4719-4733, Sep 2012.

10. **D.M. Pham, A.B. Premkumar, A.S. Madhukumar**, "Error Detection and Correction in Communication Channels Using Inverse Gray RSNS Codes," *IEEE Trans. Communications*, vol. 59, no. 4, pp. 975-987, Apr 2011.

Earlier Significant Publications (2000-2011)

11. **A.B. Premkumar, E.L. Ang, E.M-K. Lai**, "Improved Memoryless RNS Forward Converter based on Periodicity of Residues," *IEEE Trans. Circuits and Systems II*, vol. 53, no. 2, pp. 133-137, Feb 2006.
12. **Anand Mohan, A.B. Premkumar**, "RNS to binary converters for two four moduli sets," *IEEE Trans. Circuits and Systems*, vol. 54, no. 6, pp. 1245-1254, Jun 2007.
13. **L. Zhiwei, A.B. Premkumar, A.S. Madhukumar**, "Receive antenna selection for MIMO-SM systems with linear MMSE receivers," *IEEE Trans. Wireless Communications*, vol. 6, no. 2, pp. 417-423, Mar 2007.
14. **A.B. Premkumar, A.S. Madhukumar, C.T. Lau**, "MAC units for Matched Filters in DS CDMA Systems," *IEEE Trans. Broadcasting*, vol. 48, no. 1, pp. 52-57, Mar 2002.
15. **A.B. Premkumar**, "A Formal Framework for conversion from Binary to Residue Numbers," *IEEE Trans. Circuits and Systems II*, vol. 49, no. 2, pp. 1-10, Feb 2002.

Selected Recent Conference Publications

16. **Ronghong Mo**, Yiyang Pei, Sumei Sun, A. B. Premkumar, Neelakantam V Venkatarayalu, Sudhakara Rao Yepuri, "Environment-aware AoD and AoA Prediction for Wireless Networks Utilizing Machine Learning," Singapore 2024, IEEE APWCS, Japan, Aug 2021
17. **Rui Zhen Tan**, Neelakantam Venkatarayalu, Indriyati Atmosukarto, A. B. Premkumar, Tict Eng Teh, Kyu Kyu Thinn, Ming Xue, "Supervised Image Retrieval and Ranking Technique for Lock-in Thermography Images" International Symposium of the physical and failure analysis of integrated circuits, Singapore, Aug–Sept, 2022.
18. **Mo Rong Hong**, Pei Yiyang, Neelkantam Venkatarayalu, Nathaniel Pereira, A. B. Premkumar and Sun Sumei, "An unsupervised TCN based outlier detection for time series with seasonality and trend," IEEE APWCS, Japan, Aug 2021.
19. **C.H. Vun, A.B. Premkumar, W. Zhang**, "Sum of Products: Computation using Modular Thermometer Codes," IEEE ISPACS, Malaysia, Dec 2014.
20. **X. Zhong, A. Mohammadi, A.B. Premkumar, A. Asif**, "A Distributed Particle Filter for Acoustic Source Tracking Using an Acoustic Vector Sensor Network," IEEE ICSSNIP, Singapore, Apr 2014.
21. **R. Mo et al.**, "An unsupervised TCN based outlier detection for time series with seasonality and trend," IEEE APWCS, Japan, Aug 2021.

22. R.Z. Tan et al., "Supervised Image Retrieval and Ranking Technique for Lock-in Thermography Images," IEEE IPFA, Singapore, Aug-Sept 2022.

23. Z. Madadi, G.V. Anand, A.B. Premkumar, "3-D source Localization in shallow ocean with Non-Gaussian noise using a linear array of acoustic vector sensors," IEEE ISSPA, Montreal, Jul 2012.

INVITED PRESENTATIONS

- **Keynote Speaker:** IET International Workshop on Smart Wireless Communications (SWICOM 2012), University of Manchester/Bedfordshire, UK, May 2012
- **Keynote Speaker:** International Workshop on Recent Advances in Networking, Security and Forensics, Luton, UK, May 2012
- **Plenary Speaker:** International Conference on VLSI and Communication, Kerala, India, Apr 2007
- **Symposium Speaker:** Center for Development of Advanced Computing, Bangalore, India, Dec 2014

For a Complete List of Publications, please visit: