

Resume

Dr. Akila Murugesan

Post-Doctoral Research Associate
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Current Position

Post-Doctoral Research Associate: (Start Date: December 15, 2022)

Current Projects:

1. Design and characterization of transcranial magnetic stimulation coil and its pulse generator for experiments in small animals
2. Experimental setup for estimating the conductivity of human tissues using magnetoacoustic tomography-based magnetic induction (MAT-MI)

Supervisors – Prof. Weng Cho Chew and Dr. Luis J. Gomez

Prior Work Experience

Designation	Organization	Period (Duration)
Senior Research Fellow (SRF)	SSN College of Engineering, Tamilnadu, India	Jul 2021 -Dec 2022(1.5 years)
Junior Research Fellow (JRF)	SSN College of Engineering, Tamilnadu, India	Jan 2018 – Jun 2021(3.5 years)
Assistant Professor	Velammal Engineering College, Tamil Nadu, India	Jun 2014 to Mar 2017 (3 years)
Assistant Professor	Ponjesly College of Engineering, Tamil Nadu, India	Jun 2013 to Apr 2014 (0.8 years)
Software Engineer	Vlink / Accenture, Bloomington, Illinois, USA	Jul 2011 to Oct 2012 (1.25 years)
Software Engineer	Vasa Infotech, Tamil Nadu, Chennai, India	Jun 2008 to Feb 2010 (1.6 years)
Program Analyst	Cognizant Technology Solutions, Tamil Nadu, India	Nov 2005 to Jul 2006 (0.8 years)

Education

Degree	College	University	Score	Duration
Ph. D.	SSN College of Engineering, Tamilnadu, India	Anna University	NA	July 2017 – Nov 2022
M. E.	SSN College of Engineering, Tamilnadu, India	Anna University	86%	July 2006 – June 2008
B. E.	MEPCO Schlenk Engineering College, Tamilnadu, India	Anna University	86%	July 2001 – May 2005

Awards Received

- IEEE Mojgan Daneshmand Grant for the year 2022

Academic Achievements

- Gold Medalist as a Master's and Undergraduate student
- Merit scholarship for the entire duration of the Master's degree
- Finalist in the national design contest organized by the "Inter-University Centre for Astronomy and Astrophysics" for designing a broadband low-frequency antenna element to build a square-kilometer array.

Fellowships

- Junior Research Fellowship from SSN College of Engineering - January 2018 to January 2021
- Senior Research Fellowship under LRDE - July 2021 to January 2023

Skillset

Programming: C, Java, MATLAB

Simulation tools: CST, HFSS, LTSPICE, KICAD, 3D Solidworks

Measurement Experience

- RCS measurements of checkerboard metasurfaces using Keysight Vector Network Analyser (1- 18 GHz)
- S-parameter and radiation pattern measurements of reflectarray and S/X band shared aperture antenna
- E-field measurements in the near field of the coil in a hemispherical pattern mimicking the brain model

Talks delivered

- Tutorial session on "Antenna array theory and polarization using Matlab codes" at Indian Institute of Technology Madras on March 24, 2021
- Tutorial session on "Electromagnetic concepts on Signal Integrity" at SSN College of Engineering on November 7, 2019
- "Finite Difference Time Domain (FDTD) - An overview," at the IEEE Society cluster meeting, Anna University on February 2, 2019
- "Electromagnetic scattering of dielectric cylinders using FDTD" at Indian Institute of Technology Bombay on November 15, 2018

Professional activities

- Executive member of the IEEE APS Madras Chapter (2020-2022)

- Involved in organizing events held by the IEEE APS Madras Chapter during the period 2017-2020
- Reviewed papers for the IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting, IEEE AWPL, IEEE Transactions on Antennas and Propagation, IEEE JERM, and Optics Express

Project

Contributed to proposal writing on "Metasurface based design of S and X band shared aperture phased array antenna" for Defense Research and Development Organization (DRDO). Assigned as the SRF for the project and completed it successfully.

Teaching/ Lecturing Experience

- Tutorial sessions for an undergraduate course, Principles of Communication Systems, taught by my Ph.D. supervisor
- Lecture classes and laboratory sessions for my Ph. D supervisor's Antenna Engineering course for graduate students
- Taught undergraduate courses such as Communication Systems, Optical Communication, Control Systems, and Digital Signal Processing

Ph.D. Research Summary

My Ph.D. thesis is titled "**Analysis and Design of broadband checkerboard metasurfaces for RCS Reduction.**" As part of my research, the following works have been performed

- An optimization approach to further enhance the bandwidth of already reported broadband checkerboard metasurfaces (See paper [5] under the list of publications)
- Modified design criteria to design low-cost broadband checkerboard metasurfaces [4]
- Examination of array size on the RCS reduction bandwidth of checkerboard metasurfaces [1]
- Investigations on mutual coupling in checkerboard metasurfaces, including mutual coupling mitigation techniques [10] and prediction of mutual coupling incorporated bandwidth in checkerboard metasurfaces [11]
- Equivalent circuit model-based estimation of RCS reduction bandwidth taking account of mutual coupling effects [9]
- Synthesis of RCS reduction metasurfaces using Conjugate match Algorithm [7]

List of Publications:

Journals

- [1] **A. Murugesan** and K. T. Selvan, "On the effect of array size on the RCS reduction bandwidth of checkerboard metasurfaces," *Frequenz*, vol. 77, no. 5-6, pp. 273-279, 2023
- [2] **A. Murugesan**, D. Natarajan, S. Abishek, V. Lingasamy, K. Hariharan, and K. T. Selvan, "A Broadband dual-polarized Magneto-Electric Dipole Antenna Element for Low-Frequency Astronomical Arrays," *The Applied Computational Electromagnetics Society*, pp.78-84, 2022.
- [3] **A. Murugesan**, K. T. Selvan, A. Iyer, K. V. Srivatsav, and A. Alphones, "A Review of

- Metasurface-Assisted RCS Reduction Techniques," *Progress In Electromagnetics Research B*, vol. 94, pp. 75-103, 2021.
- [4] **A. Murugesan**, D. Natarajan, and K. T. Selvan, "Low-Cost, Wideband Checkerboard Metasurface for Monostatic RCS Reduction," *IEEE Antennas and Wireless Propagation Letters*, vol. 20, no. 4, pp. 493-497, April 2021.
- [5] **A. Murugesan** and K. T. Selvan, "On further enhancing the bandwidth of wideband RCS reduction checkerboard metasurfaces using an optimization algorithm," *International Journal of RF and Microwave Computer-Aided Engineering*, vol.31, no. 7, July 2021.

Conferences

- [6] P. Baskaran, **A. Murugesan**, R. Yashwanth, A. Kedar and K. T. Selvan, "An S/X band Shared Aperture Antenna," *2022 IEEE Microwaves, Antennas, and Propagation Conference (MAPCON)*, Bangalore, India, 2022, pp. 841-846
- [7] **A. Murugesan**, D. Rohit, R. Samyuktha, and K. T. Selvan, "Conjugate Match algorithm based synthesis of RCS reduction metasurfaces," presented at the *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting, 2022*.
- [8] **A. Murugesan**, S. Shyam Krishna, and K. T. Selvan, "Angular response analysis of broadband RCS reduction checkerboard metasurfaces," presented at the *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting, 2022*.
- [9] **A. Murugesan**, Nanda Gopalan S M, Ramkarthick A, Nevhedhithaa J, and K. T. Selvan, "Estimation of reflection phase due to a pair of Jerusalem Cross elements using an equivalent circuit model," presented at the *IEEE WAMS 2022 – Wireless, Antenna, and Microwave Symposium*, NIT Rourkela, 2022.
- [10] **A. Murugesan** and K. T. Selvan, "Toward improved prediction of RCS reduction bandwidth of checkerboard metasurfaces," in *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Marina Bay Sands, Singapore, 2021.
- [11] **A. Murugesan**, A. Ramkarthick, J. Nevhedhithaa, and K. T. Selvan, "Bandwidth Enhancement of RCS Reduction Checkerboard Metasurfaces by Mutual Coupling Mitigation," in *International Applied Computational Electromagnetics Society Symposium (ACES), 2021: IEEE*, pp. 1-4.
- [12] V. Lingasamy, **A. Murugesan**, and K. T. Selvan, "On the conceptual equivalence of reflectarray and conductor-backed artificial lens," *2017 IEEE Applied Electromagnetics Conference (AEMC)*, 2017, pp. 1-2.
- [13] **A. Murugesan**, V. Lingasamy, and K. T. Selvan, "A study on Q of printed antennas as radiators and as reflectarray elements," *2017 IEEE International Conference on Antenna Innovations & Modern Technologies for Ground, Aircraft and Satellite Applications (iAIM)*, 2017, pp. 1-4.
- [14] **A. Murugesan**, P. Anusha, M. Sindhu, and K. T. Selvan, "Examination of PSO, GA-PSO and ACO algorithms for the design optimization of printed antennas," *IEEE Applied Electromagnetics Conference (AEMC), 2017*, pp. 1-2.