Madavan Raja Viswanath

Location: San Leandro, CA

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Education

Texas A&M University, *College Station, Texas* GPA: 3.6

Doctor of Philosophy in Electrical Engineering *Dec 2025(Defended)*

Relevant Courses: Magnetic Resonance Engineering, Principles of MRI, Introduction to MRI and MRS, Phased Arrays, Antenna and Propagation, Antenna theory and techniques, RF and Microwave Engineering, Electromagnetic Theory, Neuro-Electronics System, Microwave IC and Circuits, Low Noise Electronic Design, Introduction to MEMS

Amrita School of Engineering, *Coimbatore, India* GPA: 3.5

Bachelor of Technology in Electronics and Communication Engineering *Jun 2017*

Relevant Courses: Digital Electronics, Electromagnetics, and Wave Propagation, Transmission Lines and Radiating Systems, Antenna System and Design, Microwave and Antenna Lab

Technical Skills

Programming Languages	:	Python, MATLAB, LabVIEW
Electromagnetic Simulation Software	:	Remcom XFdtd, Ansys HFSS
Circuit Design and Schematic Capture	:	Quartus Prime, Multisim, KiCad
Other Skills	:	RF Hardware and System Design, MRI Safety Assessment, GUI Design

Projects

Approaches to B1 Mapping for Multi-Nuclei Ongoing

- Fabricate a **flexible, cost-effective, and multi-frequency** B1 field measurement, mapping, and homogenization methodologies for **UHF proton and LH/HF X-nuclei**
- Accomplish study **without an MR scanner**, resolve electromagnetic interference issues associated with **multiple field-measuring probes**, and mitigate **hyperpolarization** concerns for X-nuclei
- Possible extension to **E field and temperature** measurements, facilitating specific absorption rate (SAR) calculations

Deep Learning in Cerebral Magnetic Resonance Imaging At 7T For Advanced Diagnostics May 2021 - Sep 2022

- Produce **non-pTx images at 7T** with uniform contrast in **brain** regions where it is otherwise difficult to identify small lesions
- Worked with College of Medicine at TAMU and Houston Methodist Research Institute (HMRI) to provide **brain simulation data at 7T and 3T**
- Provided corrupt data, ground truth data, and bench-top-MR-scanner independent data to train the AI

A Rapid Field MR Scanner Independent Measurement System for Phased Arrays Jun 2020 – Dec 2021

- Create a **fast field measuring bench-top system** which is an MR scanner and network analyzer independent for arbitrary shaped coils and liquid phantoms
- Capable of multi-phase settings for **parallel transmit coils**
- Objective to measure B fields to solve **inhomogeneity and shimming issues**

A modular approach to designing a Multi-Coil Interface Box for a Siemens 7T MAGNETOM Terra Jun 2020 – Jul 2021

- Design an **interface box for a Siemens 7T** MAGNETOM Terra system
- The same box can be used for **linear 1H, linear 31P, quad 1H, and quad 31P** by using different modules for each of the coils
- Undergone **in-vivo liver testing** at Houston Methodist Research Institute(HMRI)

Design of Multi-Mode Circular Array using Butler Matrix in HFSS Sep 2017 – Dec 2017

- Dealt with the design of **4 and 8 element multimode circular arrays** in **HFSS** for a beamforming network using 4x4 and 8x8 **Butler Matrices** and compared with the theoretical results

Design of Tin Can Antenna for RF Based Disdrometer using Software Defined Radio Aug 2016 – May 2017

- Dealt with the design of an antenna from a tin can using various parameters based on the requirements for an **RF-based disdrometer**
- Headed a team of 4 and analyzed data using **GNU Radio** and **Universal Software Radio Peripheral(USRP)** as the Software Defined Radio (SDR)

Work Experience

RF MRI Scientist Aug 2024 – Present
Promaxo, Inc. *Oakland, California*

- Designed and optimized **RF coils** for a **one-sided, 0.06T ultra-low-field MRI system** with a **permanent Z gradient**, improving system efficiency and imaging quality
- Collaborated with Product and Imaging teams to **troubleshoot and test RF hardware**, ensuring seamless integration and functionality within the system
- Utilized simulation tools, including **Remcom XFdtd**, to refine coil designs, achieving enhanced performance and compliance with system requirements

Teaching Assistant Jan 2019 – May 2024
Texas A&M University *College Station, Texas*

- Taught lab and supervised the project for **ESET 219-Digital Electronics** for around **80 students** every semester
- Assigned as a **Writing Course instructor**, which included tasks such as grading lab tasks and reports for technical and writing content
- Tutored students in the basics of digital logic using schematic capture software like **Multisim and Quartus Prime** using FPGA boards like **Basys 3 Artix-7 and DE10-Lite Altera MAX 10**
- Oversaw an **FPGA-based line follower robot** demonstrations and organized races for the same

Engineering Intern Jun 2020 – Aug 2020
ScanMed LLC *Omaha, Nebraska*

- Worked with the **Repair-and-Engineering teams** to analyze and restore several damaged commercial coils using various RF equipment like a **network analyzer** and **custom-built test units**
- Designed and engineered a **3T Upper Airway MRI coil** in collaboration with the University of Iowa, Iowa City.

Teaching Assistant Jan 2019 – May 2019
Texas A&M University *College Station, Texas*

- Taught labs and managed grading for **ESET 455-Wireless Transmission Systems** and **ESET 350-Analog Electronics**
- Trained students in fundamentals of **microwaves and cellular communications** using equipment from **Pasco and EDX Signal Pro** for simulations
- Assisted students in understanding basic semiconductor devices by training them to design various circuits using an **NI ELVIS** and to use equipment like oscilloscopes and signal generators for testing

Student Technician Sep 2018–Dec 2018
Green Lab, Texas A&M University *College Station, Texas*

- Worked on **MOSFET and PIN diode-based RF switches** for controlling the heating of **carbon nanotube (CNT) sheets**
- Provided RF and electromagnetic assistance to other CNT-based projects

RF Intern May 2018–Aug 2018
Micro Systems Engineering *Lake Oswego, Oregon*

- Designed a **GUI interface** for computing parameters like transfer functions based on **RF heating measurements** of different lead types and pathways for various **pacemakers and defibrillators** for **1.5 and 3 Tesla MRI systems**
- **ZMT MITS** was utilized for measurements, and **Sim4Life** was utilized for simulated data to evaluate and compare **E Field and SAR**

Grader Sep 2017 – Dec 2017, Feb 2018 – May 2018
Texas A&M University *College Station, Texas*

- Dealt with the grading of homework and quizzes and guided students for courses **ECEN 214-Electrical Circuit Theory** and **ECEN 451-Antenna Engineering**

Publications

PAPERS

- **M. Raja Viswanath** and S. M. Wright, "Rapid MR Scanner Independent B1 Field Measurement System for Phased Arrays," in 2022 44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), Jul. 2022, pp. 1460–1463.
- W. Alam, S. Reineke, **M. Raja Viswanath**, et al., "A flexible 16-channel custom coil array for accelerated imaging of upper and infraglottic airway at 3 T," Magnetic Resonance in Medicine, vol. 89, no. 5, pp. 2117–2130, 2023.

ABSTRACTS

- R. Jin, M. Shokrekhodaei, M. Gomes, **M. Raja Viswanath** et al., "3D Localization of needle in a low-field one-sided scanner through birdcage design and spatiotemporal encoding, " presented at ISMRM 2025.
- V. Venkidu, **M. Raja Viswanath** et al., "MRI B1 Optimization using Coupled Coil Modal Analysis," presented at ISMRM 2025.
- K. Selvaganesan, V. Venkidu, **M. Raja Viswanath** et al., "Design of a local transmit RF-resonator with enhanced local B1+-field for improved abdominal imaging in a single-sided low-field system," presented at ISMRM 2025.
- J. Hou, **M. R. Viswanath** et al., "A Hardware Approach to Automatic Phase Correction in Receive-only Frequency Translation," presented at ISMRM 2023.
- W. Alam, R. Z. Rusho, S. Reineke, **M. Raja** et al., "A novel 16 channel flexible coil for highly accelerated upper-airway MRI," presented at ISMRM 2021.

PATENTS

- S. King, R. Jin, M. Shokrekhodaei, **M. Raja Viswanath** et al. 2025. System and Methods for Needle Localization During Prostate Biopsy. 63/762,590, filed April 22nd, 2025. Patent pending.
- S. King, V. Venkidu, **M. Raja Viswanath** et al. 2025. Coupled Transmit Coil System for Single-Sided MRI and Methods of Use Thereof. 63/794,136, filed April 24th, 2025. Patent pending.

Honors and Awards

Graduate Student Research and Presentation Travel Award Jul 2022
Issued by Graduate and Professional Studies, Texas A&M University, College Station, Texas

MRI Scholarship Sep 2018
Issued by Dr. Steven M. Wright, Electrical and Computer Engineering Department, Texas A&M University, College Station, Texas

Graduate Merit Scholarship Sep 2017
Issued by Electrical and Computer Engineering Department, Texas A&M University, College Station, Texas

Activities

Indian Graduate Students Association Aug 2021 – Aug 2024
Vice President of Marketing and Public Relations

- Headed a team of 6 to manage external sponsorship of the organization, which helps to conduct various events at no cost to the students
- Helped new incoming students to get subsidized rates in various aspects such as housing and banking
- Headed a team of 4 to collaborate with other cultural organizations at TAMU

Indian Graduate Students Association Sep 2019 – Aug 2021
Vice President of Events

- Main lead behind various events held for Indian graduate students like Indian festivals (Holi and Diwali), Bollywood Dance Night, collaborative events with other international organizations, and participation in exhibitions like the Brazos Valley World Fest

- Have had audiences up to 600 people, with the current team and volunteers amounting to around 80 personnel

Anokha 2K17 Technical and Cultural Fest Nov 2016 – Mar 2017
Senior Team Manager, Registration

Anokha 2K16 Technical and Cultural Fest Nov 2015 – Feb 2016
Team Manager, Registration