

ADITYA ASHOK BHOSALE

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EDUCATION

University at Buffalo, The State University of New York, School of Engineering and Applied Sciences

Ph.D., Biomedical Engineering

August 2021-June 2025

Thesis: *Advanced RF Hardware Solutions for Improved Imaging Performance and Safety in Ultra-High and Very-Low-Field MRI*

Advisor: Xiaoliang Zhang, Ph.D.

CGPA: 3.56/4.00

University at Buffalo, The State University of New York, School of Engineering and Applied Sciences

M.S., Biomedical Engineering

August 2019-June 2021

Thesis: *Modeling and Simulation of RF Array Systems for Ultra-High Field Magnetic Resonance Imaging*

Advisor: Xiaoliang Zhang, Ph.D.

CGPA: 3.47/4.00

University of Mumbai, MGM's College of Engineering and Technology, Navi Mumbai

B.E., Biomedical Engineering

August 2014-August 2018

CGPA: 7.93/10.00

RESEARCH EXPERIENCE

Dr. Zhang's Biomedical MRI Laboratory, University at Buffalo, Buffalo, New York

Research Assistant, Biomedical Engineering

October 2020 – May 2025

- Designed and optimized 20+ RF coils including dipole, LC loop, CMDM, birdcage, and microstrip-based geometries for varied anatomical targets.
- Conducted 12+ electromagnetic studies using CST, COMSOL, and HFSS, focused on B1⁺ efficiency, SAR reduction, and SNR enhancement.
- Spearheaded multi-channel array development for foot/ankle, knee, head, and finger imaging, including custom 13-, 15-, and 19-channel systems.
- Led the design of dielectric-coated dipole antennas, resulting in 32% electric field reduction and improved transmit field uniformity at 7T.
- Investigated the feasibility of low-temperature and superconducting coils at 70 mT, demonstrating up to 3× improvements in Q-factor.
- Developed workflows for parametric sweeps, Q-factor analysis, and field map post-processing using MATLAB and Python.
- Contributed to open-source MATLAB UI tools for calculating resonant frequency in capacitively-terminated microstrip lines.
- Published 1 first-author peer-reviewed paper, 4 co-authored journal articles, and 4 first-author preprints.
- Co-authored and presented 13+ ISMRM abstracts from 2021 to 2024 across RF coil design, SAR control, and wearable MRI hardware.
- Mentored 3+ junior graduate students on EM simulation platforms, study design, hardware assembly, and experimental validation.

TEACHING EXPERIENCE

University at Buffalo, Buffalo, New York

Teaching Assistant, Biomedical Engineering

August 2022- December 2023

BE493: Research and Design in Biomedical Engineering and BE494: Senior Capstone Design

- Supported BE493/BE494 Capstone Design Courses by mentoring 80+ undergraduate students through biomedical device development, providing guidance on prototyping, and tracking academic progress.
- Assisted with grading and held 1-on-1 meetings to troubleshoot design, fabrication, and implementation challenges during project execution.

PROFESSIONAL EXPERIENCE

Neuro42 Inc., San Francisco, California

RF Engineering Intern

May 2023- August 2023

- Built a 16-leg birdcage coil tuned to 3.00 MHz, achieving -35 dB matching for integration into the GEN-I low-field MRI scanner.
- Developed a 4-channel LC loop array with -28 dB inter-element isolation using geometric overlap.
- Designed a 6-channel figure-8 helmet array with active detuning and DC bias control; performed phantom imaging on the GEN-I scanner.
- Proposed and simulated spiral and figure-8 head coils using CST Studio Suite, optimized for B1⁺ uniformity in dome-constrained head geometries.
- Conducted 9 experimental imaging trials, comparing phased array and solenoid performance; validated improved SNR and spatial coverage.
- Supported 510(k) regulatory submission by conducting hardware validation, S11 tuning, and field distribution analysis.
- Collaborated across hardware, firmware, and mechanical teams to optimize design fit, routing, and thermal performance.
- Trained internal team members on EM simulation platforms (CST, COMSOL) and impedance tuning best practices.
- Contributed to a provisional patent filing for a novel low-field coil architecture for portable neuroimaging.

Cloud nine Maternity Hospitals, Vashi, Navi Mumbai

Biomedical Engineering Intern

September 2018- December 2018

- Calibrated and maintained ventilators, neonatal warmers, defibrillators, NST machines, and other biomedical equipment.
- Performed safety checks, trained clinical staff, and analyzed performance data to enhance equipment reliability and uptime.

PUBLICATIONS

1st Author Publications:

In Preparation/Submitted:

1. **Aditya A. Bhosale**, Yunkun Zhao, Leslie Ying, Xiaoliang Zhang. Real-Time Catheter Tracking: A Novel Omnidirectional Marker for MRI Applications at 0.55T. (*In preparation*)
2. **Aditya A. Bhosale**, Yunkun Zhao, Divya Gawande, Komlan Payne, Xiaoliang Zhang. Discrete Dielectric Coatings for Length Control and Tunability of Half-Wave Dipole Antennas at 300 MHz Magnetic Resonance Imaging Applications. (*Submitted*)
3. **Aditya A. Bhosale**, Komlan Payne, Xiaoliang Zhang. Towards High-Efficiency RF Coils for Very-Low-Field MRI: Simulation-Based Insights at 70mT. (*Submitted*)

Published:

1. **Aditya A. Bhosale**, Yunkun Zhao, Xiaoliang Zhang. Electric field and SAR reduction in high-impedance RF arrays by using high permittivity materials for 7T MR imaging. *PLOS One* (Accepted: May 2024)

Abstracts:

1. **Aditya A. Bhosale**, Yunkun Zhao, Leslie Ying, Xiaoliang Zhang. Real-Time Catheter Tracking: A Novel Omnidirectional Marker for MRI Applications at 0.55T. *Proceedings of the International Society for Magnetic Resonance in Medicine ... Scientific Meeting and Exhibition* (Accepted: Feb 2025)
2. **Aditya A. Bhosale**, Yunkun Zhao, Komlan Payne, Leslie Ying, Xiaoliang Zhang. Discretely Dielectric-Material Coated Dipole Antenna: Enhanced Tuning and Electric Field Reduction for Safety at 300 MHz. *Proceedings of the International Society for Magnetic Resonance in Medicine ... Scientific Meeting and Exhibition* (Accepted: Feb 2025)
3. **Aditya A. Bhosale**, Xiaoliang Zhang. A Solenoidal Dipole for Human Finger/Small Sample Imaging at 7T MR Imaging: A Comparison Study. *Proceedings of the International Society for Magnetic Resonance in Medicine ... Scientific Meeting and Exhibition*, 32, 7499. (Accepted: Jan 2024)
4. **Aditya A. Bhosale**, Leslie Ying, Xiaoliang Zhang. A numerical investigation of meander and solenoidal dipole antenna array configurations for 7T MR applications. *Proceedings of the International Society for Magnetic Resonance in Medicine ... Scientific Meeting and Exhibition*, 32, 7612. (Accepted: Jan 2024)
5. **Aditya A. Bhosale**, Komlan Payne, Xiaoliang Zhang. Numerical Study of Superconducting, Low Temperature and Room Temperature RF Coils at Ultra-Low Field 70mT/3MHz MRI. *Proceedings of the International Society for Magnetic Resonance in Medicine ... Scientific Meeting and Exhibition*, 32, 7774. (Accepted: Jan 2024)
6. **Aditya A. Bhosale**, Leslie Ying, Xiaoliang Zhang. Investigating the Optimal Number of Channels in an Array System for Human Head Imaging at 7T. *Proceedings of the International Society for Magnetic Resonance in Medicine*, 31, 4075. (Accepted: Feb 2023)
7. **Aditya A. Bhosale**, Leslie Ying, Xiaoliang Zhang. A Systematic Comparison of Different Dipole Antenna Array Configurations for Knee Imaging Applications at 7T. *Proceedings of the International Society for Magnetic Resonance in Medicine ... Scientific Meeting and Exhibition*, 31, 4257. (Accepted: Feb 2023)
8. **Aditya A. Bhosale**, Xiaoliang Zhang. Performance and B1 Efficiency Analysis of Different Dipole Antenna Types at 7T. *Proceedings of the International Society for Magnetic Resonance in Medicine ... Scientific Meeting and Exhibition*, 31, 4255. (Accepted: Feb 2023)
9. **Aditya A. Bhosale**, Leslie Ying, Xiaoliang Zhang. A 15-channel End-coated Half-wave Dipole Antenna Array System for Foot/Ankle/Calf Imaging at 7T. in *Proceedings of the Annual Meeting of ISMRM 2022*. 2022. London, UK. (Accepted: Feb 2022)
10. **Aditya A. Bhosale**, Leslie Ying, Xiaoliang Zhang. An 8-Channel High-permittivity Dielectric Material-Coated Half-Wave Dipole Antenna Array for Knee Imaging at 7T. *Proceedings of the International Society for Magnetic Resonance in Medicine*, 30, 4105. (Accepted: Feb 2022)
11. **Aditya A. Bhosale**, Leslie Ying, Xiaoliang Zhang. Design of a 13-Channel hybrid RF array with field rectification of dielectric material for foot/ankle imaging at 7T. *Proceedings of the International Society for Magnetic Resonance in Medicine*, 30, 4433. (Accepted: Feb 2022)
12. **Aditya A. Bhosale**, Divya Gawande, Xiaoliang Zhang. A Dielectric Material Coated Half-Wave Dipole antenna for Ultrahigh Field MRI at 7T/300MHz. *Proceedings of the International Society for Magnetic Resonance in Medicine*, 30, 4103. (Accepted: Feb 2022)
13. **Aditya A. Bhosale**, Divya Gawande, Xiaoliang Zhang. B1 field flattening and length control of half-wave dipole antenna with discrete dielectric coating. *Proceedings of the International Society for Magnetic Resonance in Medicine*, 30, 4104. (Accepted: Feb 2022)
14. **Aditya A. Bhosale**, Xiaoliang Zhang. High dielectric sheet to reduce electric fields in Self-decoupled radiofrequency coils for magnetic resonance imaging. in *Proceedings of the 29th Annual Meeting of ISMRM*. 2021. (Accepted: Feb 2021)
15. **Aditya A. Bhosale**, Leslie Ying, Xiaoliang Zhang. Design of a 19-Channel hybrid array system for Foot/Ankle Imaging at 7T. in *Proceedings of the 29th Annual Meeting of ISMRM*. 2021. (Accepted: Feb 2021)

Secondary Author Publications:

Published:

1. Yunkun Zhao, **Aditya A. Bhosale**, Xiaoliang Zhang. A multimodal axial array resonator and its application in radiofrequency (RF) volume coil designs for low-field open magnetic resonance imaging (MRI). *Quantitative Imaging in Medicine and Surgery (Accepted: 2024)*
2. Yunkun Zhao, **Aditya A. Bhosale**, Xiaoliang Zhang. Multimodal surface coils for low field MR imaging. *Magnetic Resonance Imaging (Accepted: 2024)*
3. Komlan Payne, Yunkun Zhao, **Aditya A. Bhosale**, Xiaoliang Zhang. Dual-tuned Coaxial-transmission-line RF coils for Hyperpolarized ^{13}C and Deuterium ^2H Metabolic MRS Imaging at Ultrahigh Fields. *IEEE Transactions on Biomedical Engineering (Accepted: 2023)*
4. Komlan Payne, **Aditya A. Bhosale**, Xiaoliang Zhang. Double cross magnetic wall decoupling for quadrature transceiver RF array coils using common-mode differential-mode resonators. *Journal of magnetic resonance (Accepted: 2023)*

Abstracts:

1. Komlan Payne, Yunkun Zhao, **Aditya A. Bhosale**, Xiaoliang Zhang. Eight-channel dual-tuned coaxial transmission line coils array for human head imaging at 10.5 Tesla. *Proceedings of the International Society for Magnetic Resonance in Medicine , Scientific Meeting and Exhibition.*, 32, 6266. **(Accepted: Jan 2024)**
2. Komlan Payne, Yunkun Zhao, **Aditya A. Bhosale**, Xiaoliang Zhang. Design of Multichannel Two-row Quadrature Transceive Array for Ultrahigh field MR Imaging. *Proceedings of the International Society for Magnetic Resonance in Medicine. Scientific Meeting and Exhibition*, 32, 6166. **(Accepted: Jan 2024)**
3. Yunkun Zhao, **Aditya A. Bhosale**, Xiaoliang Zhang. Coupled stack-up volume RF coils for low-field MR imaging. *Proceedings of the International Society for Magnetic Resonance in Medicine, Scientific Meeting and Exhibition*, 32, 3395. **(Accepted: Jan 2024)**
4. Yunkun Zhao, **Aditya A. Bhosale**, Xiaoliang Zhang. Multimodal surface coils for low-field MR imaging. *Proceedings of the International Society for Magnetic Resonance in Medicine ... Scientific Meeting and Exhibition*, 32, 6412. **(Accepted: Jan 2024)**
5. Yunkun Zhao, **Aditya A. Bhosale**, Xiaoliang Zhang. Multimodal surface coils for small animal MR imaging at ultrahigh fields. *Proceedings of the International Society for Magnetic Resonance in Medicine ... Scientific Meeting and Exhibition*, 32, 8448. **(Accepted: Jan 2024)**
6. Komlan Payne, **Aditya A. Bhosale**, Yunkun Zhao, Xiaoliang Zhang. Design of dual-band Coaxial-transmission-line coils with independent tuning capabilities. *Proceedings of the International Society for Magnetic Resonance in Medicine ... Scientific Meeting and Exhibition.*, 31, 4080. **(Accepted: Feb 2023)**
7. Komlan Payne, **Aditya A. Bhosale**, Yunkun Zhao, Xiaoliang Zhang. High impedance quadrature receivers array for magnetic resonance skin imaging at 7T. *Proceedings of the International Society for Magnetic Resonance in Medicine ... Scientific Meeting and Exhibition*, 31, 3900. **(Accepted: Feb 2023)**
8. Komlan Payne, **Aditya A. Bhosale**, Leslie Ying, Xiaoliang Zhang. Design of a Highly Decoupled Compact Dual-tuned Transceiver RF Coil Arrays for ^1H MRI and ^{31}P MRSI at 7T. *Proceedings of the International Society for Magnetic Resonance in Medicine ... Scientific Meeting and Exhibition.*, 31, 3912. **(Accepted: Feb 2023)**
9. Komlan Payne, **Aditya A. Bhosale**, Leslie Ying, Xiaoliang Zhang. Quadrature Transceiver RF Arrays Using Double Cross Magnetic Wall Decoupling for Ultrahigh field MR Imaging. *Proceedings of the International Society for Magnetic Resonance in Medicine ... Scientific Meeting and Exhibition.*, 31, 3722. **(Accepted: Feb 2023)**