

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-May 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-May 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

Graduate Researcher, Biomedical Engineering

October 2020 – Present

- 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 ¹³C 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, **Adivya A. Bhosale**, Xiaoliang Zhang. Design of Multichannel Two-row Quadrature Transceiver 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, **Adivya 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, **Adivya 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, **Adivya 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, **Adivya 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, **Adivya 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, **Adivya A. Bhosale**, Leslie Ying, Xiaoliang Zhang. Design of a Highly Decoupled Compact Dual-tuned Transceiver RF Coil Arrays for ¹H MRI and ³¹P 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, **Adivya 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)

HONORS & AWARDS

Educational Stipend, 2021 ISMRM & SMRT Annual Meeting & Exhibition	2021
Educational Stipend, ISMRM-ESMRMB & ISMRT 31st Annual Meeting, London, England, UK	2022
Educational Stipend, 2023 ISMRM & ISMRT Annual Meeting & Exhibition, Toronto, ON, Canada	2023
SEAS Dean's Graduate Achievement Award Nominee, University at Buffalo, Buffalo, New York	2024
Outstanding Graduate Award for Academic Achievement, Department of Biomedical Engineering, University at Buffalo, New York	2025

REFERENCES

Xiaoliang Zhang
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 SUNY Empire Innovation Professor, Department of Biomedical Engineering
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