

Niraj Yadav

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Professional Summary:

Accomplished RF Engineer with 7+ years of experience in MRI System Design, Specializing in RF Coils for 1.5T & 3T systems. Expert in PCB design, RF simulations, and project leadership. Looking to use technical and managerial skills globally.

Education:

Master of Engineering - Electronics and Telecommunication Engineering

July' 16 – March' 19

University of Mumbai, St. Francis Institute of Technology, Mumbai

GPA:8.40/10.00

Relevant Coursework: Microwave Engineering, Modern Digital Signal Processing, Statistical Signal Processing, Optical Communication Networks, Next Generation Networks, and Cryptography.

Technical Skillsets:

Theoretical: RF Fundamentals, Antenna Theory, Electromagnetic Theory, MR Fundamentals, RF Coils for MRI.

Software: CST Microwave Studio, MATLAB, Simulink, ANSYS HFSS, Agilent ADS, LT Spice.

Testing: Multimeter, Network/Spectrum/Impedance Analyzer, Function Generator, DC Power Supply, LCR Meter, MRI System and Oscilloscopes.

Troubleshooting: RF Coils for MRI Applications (Volume & Surface) and its subparts (Balun, Decouplers, LNAs /Preamplifiers), Coil Matching Network, Antennas, RF Devices (Hybrid Couplers, Power Combiners/Dividers, RF Switches, RF Filters).

Professional Experience:

PhD Student – RF Coils, Medical University of Vienna

November' 24 – Present

Undertaking coursework, journal club presentations, seminars, and exams as part of the PhD curriculum alongside research activities. Current research focus includes:

- Designing and developing wearable RF coils for breast and head MRI applications, emphasizing flexibility, patient comfort, and high SNR performance.
- Investigating and implementing miniaturized cable trap designs for improved decoupling and reduced bulk in wearable MRI coil arrays.

Senior Electrical Engineer – RF Coils, *Philips Healthcare Innovation Center***February' 22 – October' 24**

Working on RF Receive Coils and RF Subsystems for 1.5T & 3T MR Systems, following is the list of tasks conducted in synchronization:

- Tuned, debugged, and troubleshot RF Coils, Test Jigs, and PCB Assemblies.
- Simulated RF receive array coils using CST MWS for multiple channel configurations to perform sensitivity analysis.
- Performed GAP analysis for legacy coils for both 1.5T & 3T MR systems.
- Drafted, reviewed, and approved documents as per Philips standards.
- Collaborated with suppliers and internal cross-functional teams for smooth execution of transfer projects.
- Identified and mitigated risks associated with components for MR applications.
- Trained engineers in simulating complex coil arrays using CST Microwave Studio.

Design Engineer – RF Coils, *VoxelGrids Innovations Private Ltd.***June' 21 – January' 22**

Worked on RF Receive Coils and RF Subsystems for 1.5T MR Systems, following are the list of tasks which were conducted in synchrony:

- Designed & Developed Torso Array Coil for Human Chest and Abdomen Region.
- Designed & Developed General Purpose Flex Array coil for Human Knee, Ankle, Elbow, and other Extremities which are not covered by other dedicated coils.
- Completed Sensitivity analysis of four, six & eight channel General Purpose Flex Array coil using CST Microwave Studio and Octave/MATLAB.
- Developed and evaluated floating cable traps for surface coil assemblies.
- Performed Theoretical Analysis for selecting components for designing the RF Coils and the PCBAs.
- Troubleshooted PCB Assemblies by referring to Design Files of the existing RF Coils.
- Drafted Requirement Specification, Technical Specification, Safety Specification and other documents.

Research Scientist, *Society of Applied Microwave Electronics Engineering and Research***July' 18 – May' 21**

Worked on Volume Coils (Head, Knee & Body) and RF Subsystems for 1.5T MR Systems, list of tasks:

- Modeled PCB Gerber for Birdcage Coil in Keysight Agilent ADS.
- Developed, evaluated and simulated the Quadrature fed Birdcage coils and supporting microwave subsystems for the 1.5 Magnetic Resonance Imaging system.
- Validated and verified the Flexible/Compact Hybrid Coupler using co-axial cable with inductive and capacitive loading technique.
- Analyzed and supported the single channel surface coil design and microwave systems for MRI applications.
- Developed and assessed the RF Absorptive Switch aligning with the RF Front End for Birdcage Coils.

- Heavily involved in integration of the MRI Transmit/Receive Chain.
- Built and administered the development of the TEM based surface coil for 1.5T MRI system and subsystems.
- Spearheaded the MRI system development with the scientists and cross-functional RF engineering teams by finding and acknowledging the gaps and risks.
- Consistently met the deadlines with the team by managing cross-functional RF projects and training junior engineers with the projects.

Trainee RF Engineer, *Society of Applied Microwave Electronics Engineering and Research* July' 17 – January' 19

Completed my master's Thesis on Body Birdcage Coil for 1.5T MR Systems, following are the list of tasks which were carried out in synchronization:

- Designed & Developed RF Body Coil using CST Microwave Studio.
- Compared the modes of the Birdcage Coil using CST and MATLAB.
- Implemented and Validated hardware portions of the RF Body Coil.
- Simulated, Analyzed and Validated Hybrid coupler, and Balun using Agilent ADS.
- Performed SAR Analysis for the Phantom inside the Body Birdcage Coil.
- Assisted Research scientists with development of MRI systems and subsystems.
- Executed Scans on the phantom, fruits & rats to evaluate the performance of Birdcage Coil using different Pulse sequences.

Certifications:

1. Philips: Schematic Entry Learning Path in Expedition Flow (April 2022)
2. MATLAB Onramp (Jan 2022)
3. Advanced Excel Formulas (April 2023)

Publications:

1. **Niraj Yadav**, I. Kochar, T. K. Bhuiya and R. Harsh, "RF Transmit/Receive Quadrature Fed Body Birdcage Coil for a 1.5T MR System, 2018 second International Conference on Electronics," *Materials Engineering & Nanotechnology (IEMENTech)*, Kolkata, 2018, pp. 1-7. **DOI:** 10.1109/IEMENTECH.2018.8465171
2. Rohit Apurva, **Niraj Yadav**, T K Bhuiya and Rajesh Harsh, "Development of Compact and Flexible Quadrature Hybrid Coupler Using Coaxial Cable with Capacitive Loading for 1.5 T Indigenous MRI System", *Progress in Electromagnetics Research Letters*, Vol. 93, 143–151, 2020. **DOI:** 10.2528/PIERL20072706

Conference Abstracts:

1. **Niraj Yadav**, Miheer Mayekar, Rajesh Harsh, and Vishal Boricha, "Analysis of the effects of Absorptive Switch v/reflective Switch on the performance of Hybrid Coupler designed for Birdcage coil at 1.5T MRI System," **ISMRM 2020**, Sydney, NSW, Australia.
2. Rohit Apurva, **Niraj Yadav**, Miheer Mayekar, Rajesh Harsh, "Miniaturized Quadrature Hybrid Coupler Using Coaxial Cable with Inductive Loading for 1.5T MRI System," **ISMRM 2020**, Sydney, NSW, Australia.
3. **Yadav N**, Nohava L, & Laistler E. (2025). "Performance Comparison of 3T MRI Surface Coils Using Flexible Stranded Wire and Single Copper Wire". *Proceedings of the ISMRM / INDIAN CHAPTER 2025*, Hyderabad, India.

Awards:

Won **First Prize** for presenting and showing the "**MRI Prototype**" on the *Science Day 2019* held at SAMEER Mumbai.