

Seyed Sina Vaezi

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Research Interest

- Computational Electromagnetics
- Quantum Electrodynamics

Education

- 2023–present **Ph.D. in Electrical Engineering - Purdue University, West Lafayette, IN, US**, Supervisor: Prof. Weng Cho Chew, Co-Supervisor: Prof. Luis Javier Gomez.
- 2010–2013 **M.Sc. in Electrical Engineering, Tabriz University, Tabriz, Iran**, Supervisor: Dr. Saeid Nikmehr.
Thesis Title: Design and Implementation of a New Artificial Magnetic Conductor (AMC) for Wireless Systems and Investigation of its Applications in Antennas and Microwave Devices
- 2006–2010 **B.Sc. in Electrical Engineering, Tabriz University, Tabriz, Iran**, Supervisor: Dr. Saeid Nikmehr.

Work Experience

- 2016–2022 **Board Member**, Tavan Tarh Pasargad, Tabriz, Iran.
- 2018–2022 **Consultant and Project Leadership**, Tabriz Urban Railway Organization (TURO), Tabriz, Iran.
- 2016–2018 **Consultant**, Railbandar Engineering Advisory Company, Tehran, Iran.
- 2013–2016 **Consultant and Project Leadership**, Tabriz Urban Railway Organization (TURO), Tabriz, Iran.
- 2010 **Internship**, Applied Science Center for Telecommunications, Tabriz, Iran.

Teaching Experience

- Fall 2023 **Course TA**, *Electromagnetic Field Theory*, (Purdue University).
- Spring 2023 **Course TA**, *Electromagnetic Field Theory*, (Purdue University).
- Spring 2023 **Group Leader and Presenter**, *Literature Review Seminars on Electromagnetics*, (Purdue University).
- 2017–2021 **Instructor**, *Course: Introduction to Electrical Engineering (Four semesters)*, (Tabriz University).
- 2014–2020 **Laboratory Management**, *Antenna and Microwave Laboratory*, (Tabriz University).

- 2010–2013 **Laboratory TA**, *Antenna and Microwave Laboratory*, (Tabriz University).
 Fall 2018 **Instructor**, *Course: Physics Olympiad*.
 2010–2013 **Course TA**, *Advanced Engineering Mathematics*, (Tabriz University).
 Fall 2013 **Course TA**, *Metamaterials*, (Tabriz University).
 2010–2013 **Course TA**, *Antennas and Propagation*, (Tabriz University).
 Fall 2010 **Course TA**, *Microwaves (Power Dividers and Directional Couplers)*, (Tabriz University).
 Fall 2006 **Course TA**, *General Mathematics*, (Tabriz University).

Skills

CAD Tools HFSS, CST, GAMESH, COMSOL, ADS, AWR, OrCAD, Altium Designer
 Programming C/C++; MATLAB, JAVA

Accomplished Projects

- Design,
 Simulation,
 and
 Fabrication
- X-band bowtie microstrip antenna grounded by an AMC reflector
 - 0.5-1mT Helmholtz coil for the proliferation of dental pulp stem cells
 - 3.5 GHz ultra-wideband Low-Noise Amplifier
 - Dual-band high-efficiency power amplifier using CRLH lines
 - C-Band microstrip array antenna (6.8-7GHz) with side-lobe level of -23dB
 - X-Band microwave amplifier
 - 2-18GHz double-ridged horn antenna
 - 2.5 GHz 3dB branch-line directional microstrip coupler
- Programming
 & Theoretical
 Analysis
- Multiple scattering from multiple nested spheres using vector spherical wave functions
 - Particle swarm optimization for inverse scattering problem
 - Full-wave analysis of microstrip T-junction using Method of Moments
 - Broadband high-power microwave amplifier design tool
 - Plasmonic hybridization in graphene nano-particles
 - Harmonic rejection of microstrip antennas
 - Anechoic chamber for Microwave & Antenna Lab. at Tabriz University

Selected Graduate Level Courses

Quantum Mechanics I and II, Computational Bio-Electromagnetics, Computational Electromagnetics

Journal Publications

- Published S. S. Vaezi, S. Nikmehr, and A. Pourziad, "Nano-Antenna Synthesis for Arbitrary Far-Field Radiation Pattern and Polarization Based on Vector Spherical Wave Functions Expansion", *Applied Optics*, 2020

- Published S. S. Vaezi, S. Nikmehr, and A. Pourziad, "Nano-Antenna Synthesis for End-Fire and Pencil-Beam Far-Field Radiation Patterns Using Vector Spherical Wave Functions", IET Microwaves, Antennas & Propagation, 2020
- Under Review S. S. Vaezi and L. J. Gomez "Novel Volume Integral Equation Approach for Low-Frequency E-Field Dosimetry of High-Contrast Media with Application to Transcranial Magnetic Stimulation", IEEE Transactions on Magnetics
- In Submission "An Accelerated Method to Analyze The Acoustic Wave Scattering by an inhomogeneous Medium Using Hybrid Fast Multipole Method"
- In Submission "Theoretical Synthesis of Irregular Array of Plasmonic Nano-Spheres to Enhance Absorption of Solar Cells"
- In Submission "Theoretical Design of Reconfigurable Artificial Magnetic Conductor for Microstrip Antennas"
- In Preparation "A Tutorial on Transcranial Magnetic Stimulation"
- In Preparation "Conditions for Numerically Accurate Integral Equation Approach for Transcranial Magnetic Stimulation"

Conferences

- Published S. S. Vaezi, S. Nikmehr, and A. Pourziad, "Synthesis of Nano-Antennas for desired Far-Field Radiation Patterns Using Vector Spherical Wave Functions", West Asian Symposium on Optical and Millimeter-wave Wireless Communication (WASOWC), 2020
- Published S. S. Vaezi, S. Nikmehr, and A. Pourziad, "Enhanced Absorption of Solar Cells by Graphene-Based Nano-Antenna Array", the 27th Iranian Conference on Electrical Engineering (ICEE), 2019

Professional Activities

- Manuscript Review, Journal of Nature, Scientific Reports
- Manuscript Review, Journal of OSA, Optics Express
- Manuscript Review, Journal of OSA, Applied Optics

Honors and Awards

- 2010–2013 Graduate Scholarship, University of Tabriz
- 2006–2010 Undergraduate Scholarship, University of Tabriz

Language Skills

English (Professional Fluency, IELTS Score: 7.5), Turkish (Native), Persian (Native)