In the Name of God

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EDUCATION

Visiting Research Scholar: ***University of Michigan***, Summer 2010- Summer 2011.
on Time-Domain Integral Equation Methods
Advisor: Dr. Eric Michielssen

Postdoctoral Fellow: ***University of Tehran***, Summer 2012 – Summer 2013.
on Analysis of Microwave Integrated Circuits Using Time-Domain Integral Equation Methods
Advisor: Dr. Reza Faraji-Dana

Ph.D.: ***University of Tehran***, Fall 2007 – Summer 2012, ***GPA: 19.3/20***
Communication Engineering, Fields and Waves
Thesis: ***Time Domain Analysis of Microwave Integrated Circuits Using Complex-Time Green's Functions.***
Advisor: Dr. Reza Faraji-Dana
Ph.D. Thesis Grade: Excellent

M.Sc.: ***University of Tehran***, Fall 2005 – Summer 2007, ***GPA: 18.5/20***
Communication Engineering, Fields and Waves
Thesis: ***Time Domain Analysis of Wire Antennas and Microstrip Lines Using Complex-Time Green's Functions.***
Advisor: Dr. Reza Faraji-Dana
M.Sc. Thesis Grade: 20/20

B.Sc.: ***University of Tehran***, Fall 2001 – Summer 2005, ***GPA: 17.4/20***
Electrical Engineering, Communication
Project: ***Radiation of a Current Element in the Presence of Left-Handed Materials.***
Advisor: Dr. Mahmoud Shahabadi
B.Sc. Project Grade: 20/20

Pre-university Certificate, 2001, Shahid Motahhari College, Tehran, Iran, ***GPA: 19.3/20***

High School Diploma, 2000, Alborz High School, ***GPA: 19.1/20***

HONORS

2007	Ranked 1st in University of Tehran Ph.D. program entrance exam on Communications Engineering.
2005	Ranked 1st in nation-wide Azad university M.Sc. program contest on Medical Rays.
2001	Ranked 196th among more than 360'000 participants in the nation-wide universities undergraduate entrance exam.
1997	Ranked 2nd in the first National Mathematics Olympiad among all students of Tehran guidance schools.

RESEARCH INTERESTS

- **Metamaterials and Metasurfaces**
- **Dyadic Green's Functions of EM structures**
- **Scattering and Inverse Scattering**
  - *EM Scattering from Objects with Arbitrary Geometries*
- **Optics and Photonics**
- **Basic Theorems and Concepts in Electromagnetics**
- **Computational Electromagnetics**
  - *Integral Equation (IE)- Based Methods*
  - *Development of Powerful in-House Software Packages Using Parallel Programming Techniques*
  - *Fast IE Solvers in both Frequency- and Time-Domain*
  - *CPU and GPU-based Parallel Computation for Multi-scale EM Simulations*
  - *Finite Difference (FD)- Based Methods (FDFD, FDTD, ...)*
  - *Hybrid Methods*
- **Analysis of Planar Microwave and Millimeter-wave Circuits**
  - *Multilayered Green's Functions (GFs)*
  - *Sommerfeld Integrals*
  - *Time-Domain Green's Functions (TDGFs) of Layered Media*
  - *Complex-Time Green's Function*
  - *Hybrid Complex-Time and Finite-Difference Generated TDGFs of Stratified Media*
- **Microwave and Millimeter-wave Passive and Active Components and Circuits**
- **Antenna Design and Measurement**
  - *Wideband Antenna Design*
  - *Antenna Measurement Techniques*
- **5G Wireless Communication Systems**

PUBLICATIONS

Journal papers

[1] M. Norouzi, S. Jarchi, M. Ghaffari-Miab, M. Esfandiari, S. Koziel, S. Reisenfeld, and A. Lalbakhsh, "3D Metamaterial Ultra-Wideband Absorber for curved surface," *Scientific Reports*, vol. 13, no. 1043, pp. 1-12, 2023.

[2] S. A. Sahafi, M. Ghaffari-Miab, and S. Souri, "An Efficient and Highly Accurate Singularity Extraction Method for the Evaluation of Transient Potentials of Stratified Media," *IET Microwaves, Antennas & Propagation*, vol. 17, no. 4, pp. 319-327, 2023.

[3] S. A. Sahafi, M. Ghaffari-Miab, "Dyadic Green's Function of Perfect Electromagnetic Conductor Rectangular Waveguides and Cavities," *IEEE Transactions on Antennas and Propagation,* vol. 71, no. 1, pp. 902-909, 2023.

[4] M. Esfandiari, A. Lalbakhsh, P. Nasiri Shehni, S. Jarchi, M. Ghaffari-Miab, H. Noori Mahtaj, S. Reisenfeld, M. Alibakhshikenari, S. Koziel, and S. Szczepanski, "Recent and Emerging Applications of Graphene-based metamaterials in Electromagnetics," *Materials & Design,* vol. 221, no. 110920, pp. 1-12, 2022.

[5] M. Esfandiyari, A. Lalbakhsh, S. Jarchi, M. Ghaffari-Miab, H. Noori Mahtaj, and R. Simorangkir, "Tunable Terahertz Filter/Antenna-Sensor Using Graphene-based Metamaterials," *Materials & Design,* vol. 220, no. 110855, pp. 1-10, 2022.

[6] M. Hesari-Shermeh, M. Ziaee-Bideskan, M. Ghaffari-Miab, B. Abbasi-Arand, and K. Forooraghi, "Dyadic Green's Function of a Perfect Electromagnetic Conductor Sphere," *IEEE Transactions on Antennas and Propagation,* vol. 69, no. 6, pp. 3419-3426, 2021.

[7] H. Lotfalizadeh and M. Ghaffari-Miab, "Dyadic Green's function of partially filled graphene-loaded rectangular waveguides," *IET Microwaves, Antennas & Propagation,* vol. 15, no.14, pp. 1785-1798, 2021.

[8] S. Eslamzadeh, M. Ghaffari-Miab, and B. Abbasi-Arand, "Design of a broadband metamaterial-based acoustic lens using elaborated carpet cloak strategy," *Applied Physics A,* vol. 127, no. 12:897, pp. 1-8, 2021.

[9] M. Dehghan, M. Moravvej-Farshi, M. Jabbari, G. Darvish, and M Ghaffari-Miab, "Bistable Terahertz Switch designed by Integration of a Graphene Plasmonic Crystal into Fabry-Perot Resonator," *IEEE Journal of Selected Topics in Quantum Electronics,* vol. 27, no. 1, pp. 1-6, 2021.

[10] M. Esfandiari, S. Jarchi, P. Nasiri-Shehni, and M. Ghaffari-Miab, "Enhancing the sensitivity of a transmissive Graphene-Based Plasmonic Biosensor," *Applied Optics*, vol. 60, pp. 1201-1208, 2021.

[11] L. Sabri, M. Shahabadi, K. Forooraghi, and M. Ghaffari-Miab, "Interaction of two guided-mode resonances in an all-dielectric photonic crystal for uniform SERS," *Optics Express*, vol. 28, no. 7, pp. 10467-10476, 2020.

[12] S. R. Miri-Rostami, M. Ghaffari-Miab, "Finite Difference Generated Transient Potentials of Open-Layered Media by Parallel Computing Using OpenMP, MPI, OpenACC, and CUDA," *IEEE Transactions on Antennas and Propagation,* vol. 67, no. 10, pp. 6541-6550, 2019.

[13] K. Masumnia-Bisheh, K. Forooraghi, M. Ghaffari-Miab, and C. Furse, "Geometrically Stochastic FDTD Method for Uncertainty Quantification of EM Fields and SAR in Biological Tissues," *IEEE Transactions on Antennas and Propagation,* vol. 67, no. 12, pp. 7466-7475, 2019.

[14] A. Mokdad, P. Azmi, N. Mokari, M. Moltafet, and M. Ghaffari-Miab, "Cross-Layer Energy Efficient Resource Allocation in PD-NOMA Based H-CRANs: Implementation via GPU," *IEEE Transactions on Mobile Computing*, vol. 18, no. 6, pp. 1246-1259, 2019.

[15] K. Masumnia-Bisheh, K. Forooraghi, and M. Ghaffari-Miab, "Electromagnetic Uncertainty Analysis Using Stochastic FDFD Method," *IEEE Transactions on Antennas and Propagation*, vol. 67, no. 5, pp. 3268-3277, 2019.

[16] S. R. Miri-Rostami, M. Mozaffarzadeh, M. Ghaffari-Miab, A. Hariri, and J. V. Jokerst, "GPU-Accelerated Double Stage Delay Multiply and Sum Algorithm for fast Photoacoustic Tomography using LED Excitation and Linear Arrays," *Ultrasonic Imaging*, vol. 41, no. 5, pp. 301-316, 2019.

[17] L. Sabri, M. Shahabadi, M. Ghaffari-Miab, and K. Forooraghi, "Multilayer Dielectric Substrate for Improved Raman Spectroscopy," *Optics Communications*, vol. 451, pp. 255-259, 2019.

[18] M. Esfandiyari, S. Jarchi, and M. Ghaffari-Miab, "Channel capacity enhancement by adjustable graphene-based MIMO antenna in THz band," *Optical and Quantum Electronics* 51:137, no. 5, pp.1-11, 2019.

[19] M. Dehghan, M. Moravvej-Farshi, M. Ghaffari-Miab, M. Jabbari, and G. Darvish. "Ultra-compact Spatial Terahertz Switch Based on Graphene Plasmonic-Coupled Waveguide," *Plasmonics,* vol. 14, no. 6, pp. 1335-1345, 2019.

[20] K. Masumnia-Bisheh, M. Ghaffari-Miab and K. Forooraghi, "Dyadic Green's Function of a Conical Cavity With Impedance Spherical Cap," *IEEE Transactions on Antennas and Propagation*, vol. 66, no. 11, pp. 6015-6022, 2018.

[21] B. Janjan, D. Fathi, M. Miri, and M. Ghaffari-Miab, "Ultra-wideband high-speed Mach–Zehnder switch based on hybrid plasmonic waveguides," *Applied Optics*, vol. 56, pp. 1717-1723, 2017.

[22] K. Masumnia-Bisheh, M. Ghaffari-Miab, and B. Zakeri. "Evaluation of Different Approximations for Correlation Coefficients in Stochastic FDTD to Estimate SAR Variance in a Human Head Model," *IEEE Transactions on Electromagnetic Compatibility*, vol. 59, no. 2, pp. 509-517, 2017.

[23] M. Ahmadi, K. Forooraghi, R. Faraji-Dana, and M. Ghaffari-Miab, "Two-Dimensional Sub-diffraction-limited Imaging by an Optimized Multilayer Superlens," *Journal of the Optical Society of Korea*, vol. 20, pp. 653-662, 2016.

[24] M. Ghaffari-Miab, F. Valdes, R. Faraji-Dana, and E. Michielssen, "Time-Domain Integral Equation Solver for Planar Circuits over Layered Media Using Finite Difference Generated Green's Functions," *IEEE Transactions on Antennas and Propagation,* vol. 62, no. 6, pp. 3076-3090, 2014.

[25] M. Ghaffari-Miab, F. Valdes, R. Faraji-Dana, and E. Michielssen, "Time-Domain Integral Equation Solver Using Variable-Order Temporal Interpolators," *Applied Computational Electromagnetics Society (ACES) Journal,* vol. 29, no. 2, pp. 116-123, 2014.

[26] F. Valdes, M. Ghaffari-Miab, F. P. Andriulli, K. Cools, and E. Michielssen, "High-order Calderon Preconditioned Time Domain Integral Equation Solvers," *IEEE Transactions on Antennas and Propagation,* vol. 61, pp. 2570-2588, 2013.

[27] M. Ghaffari-Miab, Z. H. Firouzeh, R. Faraji-Dana, R. Moini, S. H. H. Sadeghi, and G. A. E. Vandenbosch, "Time-domain MoM for the analysis of thin-wire structures above half-space media using complex-time Green's functions and band-limited quadratic B-spline temporal basis functions," *Engineering Analysis with Boundary Elements,* vol. 36, pp. 1116-1124, 2012.

[28] M. H. Haddad, M. Ghaffari-Miab, and R. Faraji-Dana, "Transient analysis of thin-wire structures above a multilayer medium using complex-time Green's functions," *Microwaves, Antennas & Propagation, IET,* vol. 4, pp. 1937-1947, 2010.

[29] M. Ghaffari-Miab, A. Farmahini-Farahani, R. Faraji-Dana, and C. Lucas, "An efficient hybrid swarm intelligence-gradient optimization method for complex time Green's functions of multilayer media," *Progress in Electromagnetics Research, PIER,* vol. 77, pp. 181–192, 2007.

Conference Papers and Abstracts

[30] M. Hamidi, H. Khayam-Nekoei, and M. Ghaffari-Miab, "Dyadic Green's Function of a Cylindrical Isotropic Metasurface," in *20th International Conference on Microwave Techniques (COMITE),* Brno, Czech Republic, 2021, pp. 1-5.

[31] S. R. Miri-Rostami, M. Mozaffarzadeh, A. Hariri, J. V. Jokerst, and M. Ghaffari-Miab, "OpenACC GPU implementation of double-stage delay-multiply-and-sum algorithm: toward enhanced real-time linear-array photoacoustic tomography," *Proc. SPIE 10878, Photons Plus Ultrasound: Imaging and Sensing*, San Francisco, CA, 2019, pp. 1-7.

[32] K. Masumnia-Bisheh, K. Forooraghi, and M. Ghaffari-Miab, "Stochastic Finite Difference Frequency Domain Method," *IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, Boston, MA, 2018, pp. 2315-2316.

[33] S. R. Miri-Rostami, M. Ghaffari-Miab, "Fast computation of finite difference generated time-domain Green's functions of layered media using OpenAcc on graphics processors", in *25th Iranian Conference on Electrical Engineering (ICEE)*, Tehran, Iran, 2017, pp. 1596-1599.

[34] M. Gholizadeh, M. Ghaffari-Miab, "Analytical Solution of the Electric Field of a Line Source Embedded in a Cylinderical Mu and Epsilon Near Zero Metamaterial," in *25th Iranian Conference on Electrical Engineering (ICEE)*, Tehran, Iran, 2017, pp. 2024-2027.

[35] S. Souri, M. Ghaffari-Miab, "On Singularity Extraction of Time-Domain Green's Functions of Layered Media," *in 8th International Symposium on Telecommunications (IST)*, Tehran, 2016, pp. 208-211.

[36] M. Ghaffari-Miab, R. Faraji-Dana, and E. Michielssen, "Time-Domain Green's Functions of Layered Media Using Modified Complex-Time Method," *10th European Conference on Antennas and Propagation (EUCAP)*, Davos, Switzerland, 2016, pp. 1-4.

[37] M. Ghaffari-Miab, F. Valdes, R. Faraji-Dana, and E. Michielssen, "Time-Domain Integral Equation Solver for Planar Structures in Layered Media," *Antennas and Propagation and USNC/URSI National Radio Science Meeting, IEEE International Symposium on*, Lake Buena Vista, FL, 2013, p. 46.

[38] Z. H. Firouzeh, M. Ghaffari-Miab, R. Moini, S. H. H. Sadeghi, R. Faraji-Dana, and G. A. E. Vandenbosch, "Time-Domain MoM for the Scattering Analysis of Thin-Wire Structures within a Ground Using Band-Limited Second-Order Lagrange Temporal Basis Functions," in *20th Iranian Conference on Electrical Engineering (ICEE)*, Tehran, Iran, 2012, pp. 1102-1107.

[39] A. N. Askarpour, M. Ghaffari-Miab, R. Faraji-Dana, F. Valdes, and E. Michielssen, "TDIE Solver Based on Novel Closed-Form Time-Domain Green's Functions for Half-Space Problem," in *15th International Symposium of ANtenna Technology and applied ElectroMagnetics (ANTEM)*, Toulouse, France, 2012, pp. 1-4.

[40] M. Ghaffari-Miab, F. Valdes, and E. Michielssen, "Time-Domain Integral Equation Solver for Planar Circuits over Layered Media Using Finite Difference Generated Green's Functions," *IEEE International Symposium on Antennas and Propagation and USNC/URSI National Radio Science Meeting*, Spokane, WA, 2011.

[41] F. Valdés, M. Ghaffari-Miab, F. P. Andriulli, K. Cools, J. D. Kotulski, and E. Michielssen, "High-Order Calderón Multiplicative Preconditioner for Time Domain Electric Field Integral Equations," *IEEE International Symposium on Antennas and Propagation and USNC/URSI National Radio Science Meeting*, Spokane, WA, 2011.

[42] M. Ghaffari-Miab, S. M. H. Haddad, and R. Faraji-Dana, "A new fast and accurate time domain formulation of the method of moment (TD-MoM) for thin-wire antennas," in *IEEE Asia Pacific Microwave Conference (APMC)*, Singapore, 2009, pp. 72-75.

TEACHING EXPERIENCE

Spring 2017-2023 "**Numerical Methods in Electromagnetics**", Tarbiat Modares University.

Fall 2015-2022 "**Dyadic Green's Functions in Electromagnetics**", Tarbiat Modares University.

Spring 2015, Fall 2015-2021 "**Fiber Optics**", Tarbiat Modares University.

Fall 2014, Spring 2016-2017 "**Fourier Optics**", Tarbiat Modares University.

Spring&Fall 2013-2014 "**Differential Equations**", University of Tehran.

Spring&Fall 2013, Spring 2014-2015 "**Physics II** (Electricity and Magnetism)", University of Tehran.

Spring 2013-2014 "**Physics II Lab**", University of Tehran.

ENGINEERING PRACTICE

- Design and fabrication of Microwave Components and Circuits at Fara Afrand Co. (2009)
- RF & Microwave Measurement: Active Participation in setting up the Type-approval Antenna Measurement Laboratory at the University of Tehran. I have contributed the following accomplished tasks:
    - CTIA (performance of wireless communication devices) test procedures according to Standards
    - Far field antenna measurement
    - Dielectric constant measurement of liquids
    - Certified Training for ISO 17025; Quality Management for Measurement Laboratories
- Deputy head of Bio-Electromagnetics Lab, University of Tehran (Fall 2011)