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EDUCATION

Ph.D., Electrical Engineering August 2008
University of Michigan, Ann Arbor
GPA: 8.07/9.00 **(A = 8.0, A+ = 9.0)**

M.S., Electrical Engineering December 2003
University of Michigan, Ann Arbor
GPA: 8.44/9.00 (**A = 8.0, A+ = 9.0)**
Major: Applied Electromagnetics, **Minor:** Mathematics

B.S., Electrical Engineering February 2001
Sharif University of Technology, Tehran, Iran
GPA: 17.43/20.00

RESEARCH EXPERIENCE

Postdoctoral Research Fellow September 2008-Present
Radiation Laboratory, University of Michigan

Research Assistant Fall 2003-Summer 2008
Radiation Laboratory, University of Michigan
Supervisor: Professor Mahta Moghaddam
Dissertation (Forward and Inverse Models of Electromagnetic Scattering from Layered Media with Rough Interfaces): *This work addresses the problem of electromagnetic scattering from layered dielectric structures with rough boundaries and the associated inverse problem of retrieving the subsurface parameters of the structure using the scattered field. To this end, a forward scattering model based on the Small Perturbation Method (SPM) is developed to calculate the first-order spectral-domain bistatic scattering coefficients of a two-layer rough surface structure. SPM requires the boundaries to be slightly rough compared to the wavelength, but to understand the range of applicability of this method in scattering from two-layer rough surfaces, its region of validity is investigated by comparing its output with that of a first principle solver that does not impose roughness restrictions. The Method of Moments (MoM) is used for this purpose. Finally, for retrieval of the model parameters of the layered structure using scattered field, an inversion scheme based on the Simulated Annealing method is investigated and a strategy is proposed to address convergence to local minimum.*

Research Assistant Fall 2001-Fall 2002
Radiation Laboratory, University of Michigan
Supervisor: Professor John Volakis

HONORS AND AWARDS

Departmental Fellowship Winter 2008
University of Michigan

Young Scientist Award June 2005
International Union of Radio Science (URSI)
Awarded for the paper "Inversion of Subsurface Properties of a Layered Medium with Rough Boundaries," XXVIIIth General Assembly of International Union of Radio Science, New Delhi, India, October 2005.

Michigan Teaching Fellow Summer 2005
University of Michigan
Awarded to graduate students who successfully completed the nationally-recognized "Preparing Future Faculty Seminar," sponsored by the Horace H. Rackham School of Graduate Studies and the Center for Research on Learning and Teaching.

Departmental Fellowship Summer 2002
University of Michigan

PUBLICATIONS AND PRESENTATIONS

Refereed Journal Articles

J1. A. Tabatabaeenejad and M. Moghaddam, "Study of Validity Region of Small Perturbation Method for Two-Layer Rough Surfaces," *IEEE Geoscience and Remote Sensing Letters*, in press.

J2. A. Tabatabaeenejad and M. Moghaddam, "Inversion of Subsurface Properties of Layered Dielectric Structures with Random Rough Interfaces," *IEEE Trans. on Geoscience and Remote Sensing*, vol. 47, no. 7, pp. 2035-2046, July 2009.

J3. A. Tabatabaeenejad and M. Moghaddam, "Bistatic Scattering from Three-Dimensional Layered Rough Surfaces," *IEEE Trans. on Geoscience and Remote Sensing*, vol. 44, no. 8, pp. 2102-2114, August 2006.

Refereed Conference Publications

C1. A. Tabatabaeenejad and M. Moghaddam, "Comparison of Gaussian and Rayleigh Noise Models in Inversion of Subsurface Parameters of Layered Rough Surfaces Using Simulated Annealing," in *Proc. IEEE IGARSS*, Cape Town, South Africa, July 2009.

C2. A. Tabatabaeenejad and M. Moghaddam, "Sensitivity Analysis of the Simulated Annealing Method to Measurement Noise for the Inversion of Subsurface Parameters of Two Layer Rough Surfaces," in *Proc. IEEE IGARSS*, Boston, Massachusetts, July 2008.

C3. A. Tabatabaeenejad and M. Moghaddam, "Inversion of a Layered Rough Surface Model: Maximizing the Number of Retrievable Parameters for the Design of Future Subsurface Sensing Radar Systems," in *Proc. IEEE IGARSS*, Barcelona, Spain, July 2007.

C4. A. Tabatabaeenejad and M. Moghaddam, "Inversion of Parameters of a Layered Rough Surface by a New Approach to the Simulated Annealing Method," in *Proc. IEEE IGARSS*, Denver, Colorado, August 2006.

C5. A. Tabatabaeenejad and M. Moghaddam, "Scattering of Electromagnetic Waves from an N-Layer Dielectric Structure with Slightly Rough Boundaries," in *Proc. IEEE AP-S International Symposium*, Albuquerque, New Mexico, July 2006.

C6. A. Tabatabaeenejad and M. Moghaddam, "Inversion of Subsurface Properties of a Layered Medium with Rough Boundaries," in *Proc. XXVIIIth General Assembly of International Union of Radio Science*, New Delhi, India, October 2005.

C7. M. Moghaddam, L. Pierce, **A. Tabatabaeenejad**, and E. Rodriguez, "A Prototype VHF/UHF Tower Radar for Subsurface Sensing: System Description and Data Inversion Results," in *Proc. XXVIIIth General Assembly of International Union of Radio Science*, New Delhi, India, October 2005.

C8. A. Tabatabaeenejad and M. Moghaddam, "Backscattering of Electromagnetic Waves from Layered Rough Surfaces and Its Application in Estimating Deep Soil Moisture," in *Proc. IEEE IGARSS*, Anchorage, Alaska, September 2004.

Conference Presentations

P1. A. Tabatabaeenejad and M. Moghaddam, "Forward and Inverse Models of Electromagnetic Scattering from Layered Media with Rough Interfaces," *PIERS 2008*, Boston, Massachusetts.

P2. Y. Goykhman, **A. Tabatabaeenejad**, and M. Moghaddam, "Inversion of Subsurface Soil Moisture Using Iterative Synthetic Aperture Focusing and Simulated Annealing: Application to Field Data," *North American Radio Science Meeting*, Ottawa, Canada, July 2007.

P3. M. Moghaddam, Y. Goykhman, and **A. Tabatabaeenejad,** "Estimating Forest Parameters and Underlying Layers of Soil Moisture with Low-Frequency Radar," *IEEE IGARSS*, Barcelona, Spain, July 2007.

P4. A. Tabatabaeenejad, M. Moghaddam, and E. Michielssen, "Derivation of Validity Region of SPM Solution of One-Dimensional Two-Layer Rough Surfaces," *IEEE IGARSS*, Barcelona, Spain, July 2007.

P5. M. Moghaddam, **A. Tabatabaeenejad**, and C. Kuo, "Forward and Inverse Scattering Models for Radar Remote Sensing of Planetary Subsurfaces," *AGU Fall Meeting*, San Francisco, CA, December 2006.

P6. A. Tabatabaeenejad, M. Moghaddam, and E. Michielssen, "SPM Simulations of One-Dimensional Two-Layer Rough Surfaces: Accuracy and Validity," *USNC/URSI National Radio Science Meeting*, Albuquerque, New Mexico, July 2006.

P7. A. Tabatabaeenejad and M. Moghaddam, "An Enhanced and Robust Method for Inversion of Subsurface Properties of Layered Media with Rough Interfaces," *National Radio Science Meeting*, Boulder, Colorado, January 2006.

P8. M. Moghaddam and **A. Tabatabaeenejad**, "Coherent Model for VHF Scattering from Mixed Forests on Multilayer Rough Ground," *USNC/URSI National Radio Science Meeting*, Washington, DC, July 2005.

TEACHING AND MENTORING EXPERIENCE

Graduate Student Mentor Winter 2006
College of Engineering, University of Michigan
The Graduate Student Mentors at the College of Engineering are a group of experienced Graduate Student Instructors (GSIs) who serve as consultants and teaching mentors to the rest of the GSI population in the College of Engineering.

Graduate Student Instructor Consultant Summer 2005
English Language Institute, University of Michigan
GSI Consultants are experienced graduate student instructors who mentor prospective graduate student instructors by providing feedback and insight during practice teaching and feedback events.

Graduate Student Instructor for Electromagnetics II Winter 2005
Electrical Engineering and Computer Science, University of Michigan

Graduate Student Instructor for Advanced Engineering Electromagnetics Fall 2003
Electrical Engineering and Computer Science, University of Michigan

Graduate Student Instructor for Introduction to Electronic Circuits Winter 2003
Electrical Engineering and Computer Science, University of Michigan

Graduate Student Instructor for Advanced Engineering Electromagnetics Fall 2002
Electrical Engineering and Computer Science, University of Michigan

GRADUATE LEVEL COURSES

Electrical Engineering: Advanced Engineering Electromagnetics, Numerical Methods in Electromagnetics, Antenna Theory and Design, Scattering from Rough Surfaces and Random Media, Microwave Remote Sensing, Microwave Measurements Laboratory, Electromagnetic Scattering.

Mathematics: Scientific Computing, Fourier Analysis, Asymptotic Methods, Complex Variables, Advanced Calculus.

PROFESSIONAL MEMBERSHIPS AND ACTIVITIES

Reviewer, IEEE Transactions on Geoscience and Remote Sensing; IEEE Transactions on Antennas and Propagation; IEEE International of Geoscience and Remote Sensing Symposium (IGARSS)

Member, IEEE Geoscience and Remote Sensing Society; Society for Industrial and Applied Mathematics (SIAM); American Geophysical Union (AGU); American Society for Engineering Education (ASEE)

REFERENCES

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Department of Mathematics, University of Michigan
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