Ya-Qiu Jin

Professor and Director
Key Laboratory of Wave Scattering and Remote Sensing Information (MoE)

BIOGRAPHY

Ya-Qiu Jin graduated from Peking University, Beijing, China in 1970, and received the M.S., E.E., and Ph.D. degrees from the Massachusetts Institute of Technology, Cambridge, USA in 1982, 1983 and 1985, respectively. All the degrees are from electrical engineering.

He was a Research Scientist with the Atmospheric and Environmental Research, Inc., Cambridge MA, USA (1985); a Research Associate with the City University of New York (1986-1987); a Visiting Professor with the University of York, U.K. (1993-1994) sponsored by the U.K. Royal Society; a Visiting Professor with the City University of Hong Kong (2001); and a Visiting Professor with Tohoku University, Japan (2005). He held the Senior Research Associateship at NOAA/NESDIS awarded by the USA National Research Council (1996).

He is currently a Chair Professor of Fudan University, Shanghai, China, and the founder Director of the Key Laboratory of Wave Scattering and Remote Sensing Information. He has been appointed as the Principal Scientist for the China State Key Basic Research Project (2001-2006) by the Ministry of National Science and Technology of China to lead the remote sensing program in China.

He has published more than 600 papers in refereed journals and conference proceedings and 11 books, five of which are in English [*Electromagnetic Scattering Modeling for Quantitative Remote Sensing* (World Scientific, 1994), *Information of Electromagnetic Scattering and Radiative Transfer in Natural Media* (Science Press, 2000), *Theory and Approach for Information Retrieval from Electromagnetic Scattering and Remote Sensing* (Springer, 2005), and, as the Editor, *Wave Propagation, Scattering and Emission in Complex Media* (World Scientific and Science Press, 2004) and *Selected Papers on Microwave Lunar Exploration in Chinese Chang'E-1 Program* (Science Press, 2010)]. His main research interests include scattering and radiative transfer in complex natural media, microwave remote sensing, as well as theoretical modeling, information retrieval and applications in atmosphere, ocean, and Earth surfaces, and computational electromagnetics.

Dr. Jin is an Associate Editor of IEEE Transactions on Geoscience and Remote Sensing (GRS) and the member of IEEE GRSS AdCom. He is the Founder and Chairman of IEEE GRSS Beijing Chapter (1998-2003).

He received the IEEE GRSS Education Award (2010), the China National Science Prize (1993), the first-grade MoE Science Prizes (1992, 1996 and 2009), and the first-grade Guang-Hua Science Prize (1993) among many other prizes.

TITLE

Talk Abstract (1) Modeling, simulation, inversion and Chang'E data validation for microwave observation in China's lunar project

ABSTRACT

In China's first lunar exploration project, Chang-E 1 (CE-1), a multi-channel microwave radiometer in passive microwave remote sensing, was first aboard the satellite, with the purpose of measuring microwave brightness temperature from lunar surface and surveying the global distribution of lunar regolith layer thickness.

In this lecture, the multi-layered model of lunar surface media is presented, and numerical simulations of multi-channel brightness temperature (Tb) from global lunar surface are obtained. It is applied to study of retrieving the regolith layer thickness and evaluation of global distribution of ^{3}He content in regolith media.

Multi-channel Tb measurements by CE-1 microwave radiometers are displayed, and applied to inversion of the reggolith layer thickness, which are verified and validated by the Apollo *in situ* measurements. It is the first time to retrieve the regolith thickness using microwave remote sensing technology.

In active microwave remote sensing, based on the statistics of the lunar cratered terrain, e.g. population, dimension and shape of craters, the terrain feature of cratered lunar surface is numerically generated. Electromagnetic scattering is simulated, and SAR (synthetic aperture radar) image is then numerically generated, e.g. making use of the digital elevation and Clementine UVVIS data at Apollo 15 landing site as the ground truth, an SAR image at Apollo 15 landing site is simulated.

Utilizing the nadir echoes time delay and intensity difference from the surface and subsurface, high frequency (HF) radar sounder is an effective tool for investigation of lunar subsurface structure in lunar exploration. Making use of rough surface scattering and ray tracing of geometric optics, a numerical simulation of radar echoes from lunar layering structures with surface feature, the topography of mare and highland surfaces is developed. Radar echoes and its range images are numerically simulated, and their dependence on the parameters of lunar layering interfaces are described.

CONTACT INFORMATION

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