

Photonics Seminar



Dr. Mark Haynes

Radar Science and Engineering
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Waveport Scattering Library

Tuesday, October 26, 2021

EEB 132

1:30 PM – 2:30 PM

Zoom Link:

<https://usc.zoom.us/j/91808071892?pwd=VUwyK3NSNW5rSzVLQzFKSGdPc05yUT09>

Abstract: The Waveport Scattering Library – Version 1 is a 260-page collection of notes and Matlab codes on electromagnetic scattering created by Mark Haynes. The primary application of the library is radar scattering and analysis. The code and documentation have been publicly released as open-source on the NASA-JPL GitHub site under the Apache 2.0 open-source license. The library contains custom implementations for computations and algorithms on several scattering topics including: Green's functions, spherical wave functions, spherical wave function rotation and translation, S-matrix and T-matrix conversion, Kirchhoff facets, Fast Multipole Method operators, and generation of rough surfaces and random objects. The public code and document repository is: <https://github.com/nasa-jpl/Waveport>. The documentation is written in the style of Numerical Recipes and was designed to be part quick reference, code explanation, and teaching guide. The goal is to continue to grow the library and receive feedback and contributions from members of the community while working toward a second future release. This talk will cover in more depth the purpose, background, and content of the library.

Biography: Mark Haynes received B.S.E.-E.E. and B.M.A. (cello), M.S.E- E.E., and Ph.D. degrees in applied physics from the University of Michigan, Ann Arbor, in 2006, 2011, and 2012, respectively. From 2012 to 2013 he was a post-doctoral research associate with the Department of Electrical Engineering, University of Southern California. Since 2013 he has been with the Radar Science and Engineering Section at the NASA-Jet Propulsion Laboratory. He has worked on SWOT, AirSWOT, and REASON instruments and missions and is involved with technology development and future mission concepts in ground penetrating radar, distributed radar sounders and asteroid tomography. His research areas and interests are synthetic aperture radar, low-frequency radar sounding, tomography and interferometry, inverse scattering, electromagnetic simulation, and scientific computing all with applications to earth science, planetary exploration and medical imaging. He was a recipient of the Pre-Doctoral Traineeship Fellowship at the Department of Defense, Breast Cancer Research Program, in 2008, and the NASA Honor Award Early Career Public Achievement Medal in 2018.

Hosts: Faculty-Wade Hsu, Mercedeh Khajavikhan, Michelle Povinelli, Constantine Sideris, and Wei Wu
Students-Max Lien and Raymond Yu
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