

QING HUO LIU

Department of Electrical & Computer Engineering
Duke University
Durham, NC 27708-0291

Qing.Liu@duke.edu
Phone: (919) 660-5440
Fax: (919) 660-5293
<http://www.ee.duke.edu/~qhliu>

EDUCATION

Jan. 1989	Ph.D. in Electrical Engineering (9/1986–12/1988) Dept. ECE, University of Illinois, Urbana-Champaign, IL
July 1986	M.Sc. in Physics (9/1983–7/1986) Physics Department, Xiamen University, China
July 1983	B.Sc. in Physics (9/1979–7/1983) Physics Department, Xiamen University, China

EXPERIENCE

2004/1–present	Full Professor , Electrical & Computer Engineering, Duke University, Durham, NC 27708
1999–2003	Associate Professor , Electrical & Computer Engineering, Duke University, Durham, NC 27708
1996–1999	Associate Professor , Electrical & Computer Engineering, New Mexico State University, Las Cruces, NM 88003
2/1994–12/1995	Program Leader , Schlumberger-Doll Research, Ridgefield, CT
3/1990–12/1995	Research Scientist , Schlumberger-Doll Research, Ridgefield, CT
12/1988–2/1990	Postdoctoral Research Associate , Dept. of ECE, University of Illinois at Urbana-Champaign, Urbana, IL
9/1986–12/1988	Research Assistant , Dept. of ECE, University of Illinois at Urbana-Champaign, Urbana, IL

AWARDS/HONORS RECEIVED • Presidential Early Career Award for Scientists and Engineers (PECASE), White House Office of Science and Technology, 1996.

- National Science Foundation CAREER Award, 1997.
- U.S. Environmental Protection Agency Early Career Research Award, 1996.
- Fellow of the IEEE, 2005. For contributions to computational electromagnetics and subsurface sensing applications.
- Fellow of the ASA, 2005. For contributions to computational acoustics and elasticity.

HONORARY AND TECHNICAL SOCIETIES

Fellow of IEEE. Member of IEEE APS, MTT, and GRS societies.
Fellow of the Acoustical Society of America
Full Member of USNC/URSI Commissions B & F
Phi Kappa Phi, Tau Beta Pi.
Listed in *American Men and Women of Science*
Listed in *Who's Who Among Asian Americans*
Member of Electromagnetics Academy

PROFESSIONAL ACTIVITIES

- Guest Editor, Special Issue on Computational Wave Issues in Remote Sensing, Imaging and Target Identification, Propagation, and Inverse Scattering, *IEEE Transactions on Geoscience and Remote Sensing*, published in July 2000 (with W. C. Chew).

- Associate Editor, *IEEE Transactions on Geoscience and Remote Sensing*, 1996–present.
- Associate Editor, *Radio Science*, 2003–present.
- Panelist for NSF and NIH proposal review. Reviewer for NSF, NIH, and National Research Council proposals.
- Reviewer for IEEE-AP, IEEE-MTT, IEEE-GRS, IEEE-UFFC, IEEE-CPMT, IEEE-MGWL, IEEE-IP, IEEE-APWL, Radio Science, Intl. J. MIMICAE, Geophysics, JEWA, Log Analyst, JOSA, JASA.

PUBLICATIONS

A. Journal Papers

- [1] W. C. Chew, and Q. Liu, "Resonance frequency of a microstrip patch," *IEEE Trans. Antennas Propagat.*, vol. AP-36, pp.1045–1056, 1988; Correction, vol. AP-36, p. 1827, 1988.
- [2] Q. Liu, and W. C. Chew, "Curve-fitting formulas for fast determination of accurate resonant frequency of circular microstrip patches," *IEE Proc.*, Pt. H, vol. 135, pp.289–292, 1988.
- [3] Q. H. Liu, W. C. Chew, M. R. Taherian, and K. A. Safinya, "A modeling study of electromagnetic propagation tool in complicated borehole environments," *Log Analyst*, vol. 30, pp. 424–436, 1989.
- [4] Q. H. Liu, and W. C. Chew, "Surface integral equation method for the analysis of an obliquely stratified half-space," *IEEE Trans. Antennas Propagat.*, vol. 38, pp. 653–663, 1990.
- [5] Q. H. Liu, and W. C. Chew, "Numerical mode matching method for the multi-region vertically stratified media," *IEEE Trans. Antennas Propagat.*, vol. 38, pp. 498–506, 1990.
- [6] Q. H. Liu, and W. C. Chew, "A hybrid method for the analysis of complex rectangular dielectric waveguides," *J. Electromagnet. Waves Appl.*, vol. 5, pp. 253–266, 1991.
- [7] Q. H. Liu, and W. C. Chew, "Analysis of discontinuities in planar dielectric waveguides: an eigenmode propagation method," *IEEE Trans. Microwave Theory Tech.*, vol. MTT-39, pp. 422–430, 1991.
- [8] W. C. Chew, Z. Nie, Q. H. Liu, and B. Anderson, "An efficient solution of electrical well logging tools in a complex environment," *IEEE Trans. Geosci. Remote Sensing*, vol. 29, pp. 308–313, 1991.
- [9] W. C. Chew, Z. Nie, Q. H. Liu, and Y. T. Lo, "A rigorous analysis of a probe-fed microstrip disk antenna," *IEE Proc.*, Pt. H, vol. 138, pp. 185–191, 1991.
- [10] M. Moghaddam, W. C. Chew, B. Anderson, E. Yannakakis, and Q. H. Liu, "Computation of transient electromagnetic waves in inhomogeneous media," invited paper, *Radio Science*, vol. 26, no. 1, pp. 265–273, 1991.
- [11] W. C. Chew, L. Gurel, Y. M. Wang, G. Otto, R. Wagner, and Q. H. Liu, "A generalized recursive algorithm for wave-scattering solutions in two dimensions," *IEEE Trans. Microwaves Theory Tech.*, vol. 40, no. 4, pp. 716–723, 1992.
- [12] Q. H. Liu, and W. C. Chew, "Diffraction of nonaxisymmetric waves in cylindrically layered media by horizontal discontinuities," *Radio Sci.*, vol. 27, no. 5, pp. 569–581, 1992.
- [13] Z. Nie, W. C. Chew, and Q. H. Liu, "Electromagnetic scattering from two-dimensional layered media with axial symmetry," *Acta Geophysica Sinica*, vol. 35, no. 4, pp. 479–489, 1992.
- [14] Q. H. Liu, "Electromagnetic field generated by an off-axis source in a cylindrically layered medium with an arbitrary number of horizontal discontinuities," *Geophysics*, vol. 58, no. 5, pp. 616–625, 1993.
- [15] Q. H. Liu, and W. C. Chew, "A CG-FFHT method for the scattering solution of axisymmetric inhomogeneous media," *Microwave Opt. Technol. Lett.*, vol. 6, no. 2, pp. 101–104, 1993.
- [16] Q. H. Liu, "Reconstruction of two-dimensional axisymmetric inhomogeneous media," *IEEE Trans. Geosci. Remote Sensing*, vol. 31, no. 3, pp. 587–594, 1993.
- [17] B. Anderson, Q. H. Liu, R. Taherian, J. Singer, W. C. Chew, B. Freeman, and T. Habashy, "Interpreting the response of the Electromagnetic Propagation Tool in complex lithologies," *The Log Analyst*, vol. 35, March–April, pp. 65–83, 1994.
- [18] Q. H. Liu, and W. C. Chew, "Applications of the CG-FFHT method with an improved FHT algorithm," (invited paper), *Radio Sci.*, vol. 29, no. 4, pp. 1009–1022, 1994.
- [19] Q. H. Liu, B. Anderson, and W. C. Chew, "Modeling low-frequency electrode-type resistivity tools in invaded thin beds," *IEEE Trans. Geosci. Remote Sensing*, vol. 32, no. 3, pp. 494–498, 1994.
- [20] Q. H. Liu, "Nonlinear inversion of electrode-type resistivity measurements," *IEEE Trans. Geosci. Remote Sensing*, vol. 32, no. 3, pp. 499–507, 1994.

- [21] W. C. Chew, and Q. H. Liu, "Inversion of induction tool measurements using the distorted Born iterative method and CG-FFHT," *IEEE Trans. Geosci. Remote Sensing*, vol. 32, no. 4, pp. 878–884, 1994.
- [22] L. Knizhnerman, V. Druskin, Q. H. Liu, and F. J. Kuchuk, "Spectral Lanczos decomposition method for solving single phase fluid flow in porous media," *Numerical Methods for Partial Differential Equations*, vol. 10, pp. 569–580, 1994.
- [23] Q. H. Liu, "Transient electromagnetic modeling with the generalized k -space (GkS) method," *Microwave Opt. Technol. Lett.*, vol. 7, no. 18, pp. 842–848, 1994.
- [24] Q. H. Liu, "Generalization of the k -space formulation to elastodynamic scattering problems," *J. Acoust. Soc. Am.*, vol. 97, no. 3, pp. 1373–1379, 1995.
- [25] C.-C. Lu, and Q. H. Liu, "A three-dimensional dyadic Green's function for elastic waves in multilayer cylindrical structures," *J. Acoust. Soc. Am.*, vol. 98, no. 5, pp. 2825–2835, 1995.
- [26] Q. H. Liu, and C. Chang, "Compressional head waves in attenuative formations: forward modeling and inversion," *Geophysics*, vol. 61, no. 6, pp. 1908–1920, 1996.
- [27] Q. H. Liu, F. Daube, C. Randall, E. Schoen, H. Liu, and P. Lee, "A 3D finite difference simulation of sonic logging," *J. Acoust. Soc. Am.*, vol. 100, no. 1, pp. 72–79, 1996.
- [28] W. C. Chew, and Q. H. Liu, "Perfectly matched layers for elastodynamics: A new absorbing boundary condition," *J. Computational Acoust.*, vol. 4, no. 4, pp. 341–259, 1996.
- [29] B. K. Sinha, Q. H. Liu, and S. Kostek, "Acoustic waves in pressurized borehole: A finite-difference formulation," *J. Geophys. Res.*, vol. 101, no. B11, pp. 25173–25180, 1996.
- [30] Q. H. Liu, "An FDTD algorithm with perfectly matched layers for conductive media," *Microwave Opt. Technol. Lett.*, vol. 14, no. 2, pp. 134–137, 1997.
- [31] Q. H. Liu, "The PSTD algorithm: a time-domain method requiring only two cells per wavelength," *Microwave Opt. Technol. Lett.*, vol. 15, no. 3, pp. 158–165, 1997.
- [32] Q. H. Liu, and J. Tao, "The perfectly matched layer (PML) for acoustic waves in absorptive media," *J. Acoust. Soc. Am.*, vol. 102, no. 4, pp. 2072–2082, 1997.
- [33] Y. H. Chen, W. C. Chew, and Q. H. Liu, "A three-dimensional finite difference code for the modeling of sonic logging tools," *J. Acoust. Soc. Am.*, vol. 103, no. 2, pp. 702–712, 1998.
- [34] Q. H. Liu, and N. Nguyen, "An accurate algorithm for nonuniform fast Fourier transforms (NUFFT)," *IEEE Microwave Guided Wave Lett.*, vol. 8, no. 1, pp. 18–20, 1998.
- [35] C. Chang, and Q. H. Liu, "Inversion of source time function using borehole array sonic waveforms," *J. Acoust. Soc. Am.*, vol. 103, no. 6, pp. 3163–3168, 1998.
- [36] Q. H. Liu, "The PSTD algorithm for acoustic waves in inhomogeneous, absorptive media," *IEEE Trans. Ultrason., Ferroelect., Freq. Contr.*, vol. 45, no. 4, pp. 1044–1055, 1998.
- [37] Q. H. Liu, and J. Q. He, "Quasi-PML for waves in cylindrical coordinates," *Microwave Opt. Technol. Lett.*, vol. 19, no. 2, pp. 107–111, 1998.
- [38] G.-X. Fan, and Q. H. Liu, "A PML-FDTD algorithm for simulating plasma-covered cavity-backed slot antennas," *Microwave Opt. Technol. Lett.*, vol. 19, no. 4, pp. 258–262, 1998.
- [39] Q. H. Liu, and X. Y. Tang, "An iterative algorithm for nonuniform inverse fast Fourier transform (NU-IFFT)," *Electronics Letters*, vol. 34, no. 20, pp. 1913–1914, 1998.
- [40] N. Nguyen, and Q. H. Liu, "The regular Fourier matrices and nonuniform fast Fourier transforms," *SIAM J. Sci. Compt.*, vol. 21, no. 1, pp. 283–293, 1999.
- [41] Q. H. Liu, "Large-scale simulations of electromagnetic and acoustic measurements using the pseudospectral time-domain (PSTD) algorithm," *IEEE Trans. Geosci. Remote Sensing*, vol. 37, no. 2, pp. 917–926, 1999.
- [42] J. He, and Q. H. Liu, "A nonuniform cylindrical FDTD algorithm with improved PML and quasi-PML absorbing boundary conditions," *IEEE Trans. Geosci. Remote Sensing*, vol. 37, no. 2, pp. 1066–1072, 1999.
- [43] Q. H. Liu, "PML and PSTD algorithm for arbitrary lossy anisotropic media," *IEEE Microwave Guided Wave Lett.*, vol. 9, no. 2, pp. 48–50, 1999.

- [44] Q. H. Liu, and G.-X. Fan, "A frequency-dependent PSTD algorithm for general dispersive media," *IEEE Microwave Guided Wave Lett.*, vol. 9, no. 2, pp. 51–53, 1999.
- [45] Q. H. Liu, "Perfectly matched layers for elastic waves in cylindrical and spherical coordinates," *J. Acoust. Soc. Am.*, vol. 105, no. 4, pp. 2075–2084, 1999.
- [46] Q. H. Liu, and G.-X. Fan, "Simulations of GPR in dispersive media using the PSTD algorithm," *IEEE Trans. Geosci. Remote Sensing*, vol. 37, no. 5, pp. 2317–2324, 1999.
- [47] Q. H. Liu, and Z. Q. Zhang, "A nonuniform fast Hankel transform (NUFHT) algorithm," *Applied Optics*, vol. 38, no. 32, pp. 6705–6708, 1999.
- [48] Q. H. Liu, and B. K. Sinha, "Simulations of multipole sources in biaxially stressed boreholes: A 2.5-dimensional finite-difference method," *Geophysics*, vol. 65, no. 1, pp. 190–201, 2000.
- [49] X. M. Xu, and Q. H. Liu, "The conjugate-gradient nonuniform fast Fourier transform (CG-NUFFT) method for one- and two-dimensional media," *Microwave Opt. Technol. Lett.*, vol. 24, no. 6, pp. 385–389, 2000.
- [50] B. Tian, and Q. H. Liu, "Nonuniform fast cosine transform and Chebyshev PSTD algorithm," *Progress in Electromagnetics Research*, PIER 28, pp. 259–279, 2000. Abstract in *J. Electromagnet. Waves Appl.*, vol. 14, no. 6, 797–798, 2000.
- [51] G.-X. Fan, and Q. H. Liu, "An FDTD algorithm with PML for dispersive, conductive media," *IEEE Trans. Antennas Propagat.*, vol. 48, no. 5, pp. 637–646, 2000.
- [52] Z. Q. Zhang, and Q. H. Liu, "Reconstruction of axisymmetric media with an FFHT enhanced extended Born approximation," *Inverse Problems*, invited paper, vol. 16, no. 5, pp. 1281–1296, 2000.
- [53] G.-X. Fan, Q. H. Liu, and S. P. Blanchard, "3-D numerical mode-matching (NMM) method for resistivity well logging tools," *IEEE Trans. Antennas Propagat.*, vol. 48, no. 10, pp. 1544–1552, 2000.
- [54] Q. H. Liu, X. M. Xu, B. Tian, and Z. Q. Zhang, "Applications of nonuniform fast transform algorithms in numerical solutions of differential and integral equations," *IEEE Trans. Geosci. Remote Sensing*, vol. 38, pp. 1551–1560, 2000.
- [55] Q. H. Liu, Z. Q. Zhang, and X. M. Xu, "The hybrid extended Born approximation and CG-FFT method for electromagnetic induction problems," *IEEE Trans. Geosci. Remote Sensing*, vol. 39, no. 2, pp. 347–355, Feb. 2001.
- [56] X. M. Xu, and Q. H. Liu, "Fast spectral-domain method for acoustic scattering problems," *IEEE Trans. Ultrason., Ferroelect., Freq. Contr.*, vol. 48, no. 2, pp. 522–529, March 2001.
- [57] G.-X. Fan, and Q. H. Liu, S. A. Hutchinson, "FDTD and PSTD Simulations for plasma applications," *IEEE Trans. Plasma Sci.*, vol. 29, no. 2, pp. 341–348, 2001.
- [58] G.-X. Fan, and Q. H. Liu, "Pseudospectral time-domain algorithm applied to electromagnetic scattering from electrically large objects", *Microwave Opt. Technol. Lett.*, vol. 29, no. 2, pp. 123–125, 2001.
- [59] Y. Q. Zeng, J. He, and Q. H. Liu, "The application of the perfectly matched layer in numerical modeling of wave propagation in poroelastic media," *Geophysics*, vol. 66, no. 4, pp. 1258–1266, 2001.
- [60] Z. Q. Zhang, and Q. H. Liu, "Simulation of induction logging response using conjugate gradient method with nonuniform fast Fourier and fast Hankel transforms," *Radio Sci.*, vol. 36, no. 4, pp. 599–608, 2001.
- [61] Z. Q. Zhang, and Q. H. Liu, "The hybrid extended Born approximation and CG-FFHT method for axisymmetric media," *IEEE Trans. Geosci. Remote Sensing*, vol. 39, no. 4, pp. 710–717, April 2001.
- [62] G.-X. Fan, and Q. H. Liu, "The CGFFT method with a discontinuous FFT algorithm," *Microwave Opt. Technol. Lett.*, vol. 29, no. 1, pp. 47–49, 2001.
- [63] Z. Q. Zhang, and Q. H. Liu, "Three-dimensional weak-form conjugate- and biconjugate-gradient FFT methods for volume integral equations," *Microwave Opt. Technol. Lett.*, vol. 29, no. 5, pp. 350–356, 2001.

- [64] Y. Q. Zeng, and Q. H. Liu, "Acoustic detection of buried objects in 3-D fluid saturated porous media: numerical modeling," *IEEE Trans. Geosci. Remote Sensing*, vol. 39, no. 6, pp. 1165–1173, June 2001.
- [65] Q. H. Liu, and J. Q. He, "An efficient PSTD algorithm for cylindrical coordinates," *IEEE Trans. Antennas Propagat.*, vol. 49, no. 9, pp. 1349–1351, Sept. 2001.
- [66] Y. Q. Zeng, and Q. H. Liu, "A staggered-grid finite-difference method with perfectly matched layers for poroelastic wave equations," *J. Acoust. Soc. Am.*, vol. 109, no. 6, pp. 2571–2580, 2001.
- [67] Z. Q. Zhang, and Q. H. Liu, "Two nonlinear inverse methods for electromagnetic induction measurements," *IEEE Trans. Geosci. Remote Sensing*, vol. 39, no. 6, pp. 1331–1339, June 2001.
- [68] Q. H. Liu, Z. Q. Zhang, T. Wang, G. Ybarra, L. W. Nolte, J. A. Bryan, W. T. Joines, "Active microwave imaging I: 2-D forward and inverse scattering methods," *IEEE Trans. Microwave Theory Tech.*, vol. 50, no. 1, pp. 123–133, Jan. 2002.
- [69] X. M. Xu, Q. H. Liu, and Z. Q. Zhang, "The stabilized biconjugate gradient fast Fourier transform method for electromagnetic scattering," *J. Appl. Computat. Electromag. Soc.*, vol. 17, no. 1, pp. 97–103, March 2002.
- [70] G.-X. Fan, and Q. H. Liu, "Dyadic Green's functions for curved waveguides and cavities and their reformulation," *Radio Sci.*, vol. 37, no. 5, 1078, doi:10.1029/2001RS002476, 2002.
- [71] G.-X. Fan, Q. H. Liu, and J. S. Hesthaven, "Multidomain pseudospectral time-domain method for simulation of scattering from objects buried in lossy media," *IEEE Trans. Geosci. Remote Sensing*, vol. 40, no. 6, pp. 1366–1373, June 2002.
- [72] X. M. Xu, and Q. H. Liu, "The BCGS-FFT method for electromagnetic scattering from inhomogeneous objects in a planarly layered medium," *IEEE Antennas Wireless Propagat. Lett.*, vol. 1, pp. 77–80, 2002.
- [73] Z. Q. Zhang, and Q. H. Liu, "A volume adaptive integral method (VAIM) for 3D inhomogeneous objects," *IEEE Antennas Wireless Propagat. Lett.*, vol. 1, no. 6, pp. 102–105, 2002.
- [74] Q. H. Liu, "A pseudospectral frequency-domain (PSFD) method for computational electromagnetics," *IEEE Antennas Wireless Propagat. Lett.*, vol. 1, no. 6, pp. 131–134, 2002.
- [75] Z. Q. Zhang, Q. H. Liu, and X. M. Xu, "RCS computation of large inhomogeneous objects using a fast integral equation solver," *IEEE Trans. Antennas Propagat.*, vol. 51, no. 3, pp. 613–618, March 2003.
- [76] G. Zhao, and Q. H. Liu, "The 2.5-D multidomain pseudospectral time-domain algorithm," *IEEE Trans. Antennas Propagat.*, vol. 51, no. 3, pp. 619–627, March 2003.
- [77] Z. Q. Zhang, and Q. H. Liu, "Applications of the BCGS-FFT method to 3-D induction well logging problems," *IEEE Trans. Geosci. Remote Sensing*, vol. 41, no. 5, pp. 998–1004, 2003.
- [78] Q. H. Liu, and B. K. Sinha, "A 3-D cylindrical PML/FDTD method for elastic waves in fluid-filled pressurized boreholes in triaxially stressed formations," *Geophysics*, vol. 68, no. 5, pp. 1731–1743, 2003.
- [79] X. Millard, and Q. H. Liu, "A fast volume integral equation solver for electromagnetic scattering from large inhomogeneous objects in planarly layered media," *IEEE Trans. Antennas Propagat.*, vol. 51, no. 9, pp. 2393–2401, 2003.
- [80] G. Zhao, Y. Q. Zeng, and Q. H. Liu, "The 3-D multidomain pseudospectral time-domain method for wideband simulation," *IEEE Microwave Wireless Compon. Lett.*, vol. 13, no. 5, pp. 184–186, May 2003.
- [81] T. Xiao, and Q. H. Liu, "Finite difference computation of head-related transfer function for human hearing," *J. Acous. Soc. Am.*, vol. 113, no. 5, pp. 2434–2441, 2003.
- [82] I. N. Deshmukh, and Q. H. Liu, "Pseudospectral beam propagation method for optical waveguides," *IEEE Photon. Technol. Lett.*, vol. 15, no. 1, pp. 60–62, Jan. 2003.
- [83] Z. B. Tang, and Q. H. Liu, "The 2.5-D FDTD and Fourier PSTD methods and applications," *Microwave Opt. Technol. Lett.*, vol. 36, no. 6, pp. 430–436, 2003.
- [84] Z. Q. Zhang, and Q. H. Liu, C. Xiao, E. Ward, G. Ybarra, and W. T. Joines, "Microwave breast imaging: 3-D forward scattering simulation," *IEEE Trans. Biomed. Eng.*, vol. 50, no. 10,

- pp. 1180–1189, Oct. 2003.
- [85] G.-X. Fan, and Q. H. Liu, “A strongly well-posed PML in lossy media,” *IEEE Antennas Wireless Propagat. Lett.*, vol. 2, no. 7, pp. 97–100, 2003.
 - [86] G. Zhao, and Q. H. Liu, “The unconditionally stable multidomain pseudospectral time-domain method,” *IEEE Microwave Wireless Compon. Lett.*, vol. 13, no. 11, pp. 475–477, 2003.
 - [87] Z. Q. Zhang, and Q. H. Liu, “3-D nonlinear image reconstruction for microwave biomedical imaging,” *IEEE Trans. Biomed. Eng.*, vol. 51, no. 3, pp. 544–548, 2004.
 - [88] G.-X. Fan, and Q. H. Liu, “Fast Fourier transform for discontinuous functions,” *IEEE Trans. Antennas Propagat.*, vol. 52, no. 2, pp. 461–465, Feb. 2004.
 - [89] X. Millard, and Q. H. Liu, “Simulations of near-surface detection of objects in layered media by the BCGS-FFT method,” *IEEE Trans. Geosci. Remote Sensing*, vol. 42, no. 2, pp. 327–334, 2004.
 - [90] T. Xiao, and Q. H. Liu, “A staggered upwind embedded boundary method to eliminate the FDTD staircasing error,” *IEEE Trans. Antennas Propagat.*, vol. 52, no. 3, pp. 730–741, March 2004.
 - [91] G. Zhao, and Q. H. Liu, “The 3-D multidomain pseudospectral time-domain method for inhomogeneous conductive media,” *IEEE Trans. Antennas Propagat.*, vol. 52, no. 3, pp. 742–749, March 2004.
 - [92] Y. Q. Zeng, Q. H. Liu, and G. Zhao, “Multidomain pseudospectral time-domain (PSTD) method for acoustic waves in lossy media,” *J. Computational Acoust.*, vol. 12, no. 3, pp. 277–299, Sept. 2004.
 - [93] S. A. Wartenberg, and Q. H. Liu, “A coaxial-to-microstrip transition for multi-layer substrates,” *IEEE Trans. Microwave Theory Tech.*, vol. 52, no. 2, pp. 584–588, Feb. 2004.
 - [94] Q. H. Liu, and G. Zhao, “Review of PSTD Methods for transient electromagnetics,” *Intl. J. Numer. Modelling: Electronic Networks, Devices and Fields*, vol. 22, no. 17, pp. 299–323, 2004.
 - [95] F. Li, Q. H. Liu, and L.-P. Song, “Three-dimensional reconstruction of objects buried in layered media using Born and distorted Born iterative methods,” *IEEE Geosci. Remote Sensing Lett.*, vol. 1, no. 2, pp. 107–111, 2004.
 - [96] Y. Q. Zeng, and Q. H. Liu, “A multidomain PSTD method for 3D elastic wave equations,” *Bulletin Seis. Soc. Am.*, vol. 94, no. 3, pp. 1002–1015, 2004.
 - [97] J. Liu, and Q. H. Liu, “A spectral integral method (SIM) for periodic and nonperiodic structures,” *IEEE Microwave Wireless Compon. Lett.*, vol. 14, no. 3, pp. 97–99, March 2004.
 - [98] T. Xiao, and Q. H. Liu, “Enlarged cells for the conformal FDTD method to avoid the time step reduction,” *IEEE Microwave Wireless Compon. Lett.*, vol. 14, pp. 551–553, 2004.
 - [99] Q. H. Liu, C. Cheng, and H. Z. Massoud, “The spectral grid method: A novel fast Schrödinger-equation solver for semiconductor nanodevice simulation,” *IEEE Trans. Computer Aided Design Integrated Circ. Systems*, vol. 23, no. 8, pp. 1200–1208, Aug. 2004.
 - [100] L.-P. Song, and Q. H. Liu, “Fast three-dimensional electromagnetic nonlinear inversion in layered media with a novel scattering approximation,” *Inverse Problems*, vol. 20, no. 6, pp. S171–194, Dec. 2004.
 - [101] L.-P. Song, and Q. H. Liu, “GPR landmine imaging: 2D seismic migration and 3D inverse scattering in layered media,” *Radio Science*, vol. 40, RS1S90, doi:10.1029/2004RS003087, 2004.
 - [102] C. Cheng, Q. H. Liu, J. H. Lee, and H. Z. Massoud, “Spectral element method for the Schrödinger-Poisson System,” *J. Computat. Electronics*, vol. 3, pp. 417–421, 2004.
 - [103] L.-P. Song, Q. H. Liu, F. Li, and Z. Q. Zhang, “Reconstruction of three-dimensional objects in layered media: Theory and numerical experiments,” *IEEE Trans. Antennas Propagat.*, vol. 53, no. 4, pp. 1556–1561, April 2005.
 - [104] L.-P. Song, and Q. H. Liu, “A new approximation to three-dimensional electromagnetic scattering,” *IEEE Geosci. Remote Sensing Lett.*, vol. 2, no. 2, pp. 238–242, April 2005.
 - [105] Y. Chen, W. T. Joines, M. Chai, Q. H. Liu, and L. Carin, “Design and construction of a broadband balun for coaxial-to-planar transmission lines,” *Microwave Opt. Technol. Lett.*, vol. 44, no. 6, pp. 501–504, 2005.

- [106] S. A. Wartenberg, G. Zhao, and Q. H. Liu, "Electro-Thermal Coupling of Interconnects on GaAs," *J. Electronic Materials*, vol.34, no. 3, pp. 294–298, 2005.
- [107] J.-H. Lee, and Q. H. Liu, "An efficient 3-D spectral element method for Schrödinger equation in nanodevice simulation," *IEEE Trans. Computer Aided Design Integrated Circ. Systems*, vol. 24, no. 12, pp. 1848-1858, Dec. 2005.
- [108] D. Liu, G. Kang, L. Li, Y. Chen, S. Vasudevan, W. Joines, Q. H. Liu, J. Krolik, and L. Carin, "Electromagnetic time-reversal imaging of a target in a cluttered environment," *IEEE Trans. Antennas Propagat.*, vol. 53, no. 9, pp. 3058–3066, 2005.
- [109] T. Xiao, and Q. H. Liu, "Three-dimensional unstructured-grid discontinuous Galerkin method for Maxwell's equations with well-posed perfectly matched layer," *Microwave Opt. Technol. Lett.*, vol. 46, no. 5, pp. 459–463, 2005.
- [110] L.-P. Song, C. Yu, and Q. H. Liu, "Through-wall imaging (TWI) by radar: 2D tomographic results and analyses," *IEEE Trans. Geosci. Remote Sensing*, vol. 43, no.12, pp. 2793-2798, 2005.
- [111] C. Yu, L.-P. Song, and Q. H. Liu, "Inversion of multi-frequency experimental data for imaging complex objects by a hybrid DTA-CSI method," *Inverse Prob.*, Invited Paper, vol. 21, no. 6, S165-S178, Dec. 2005.
- [112] L. P. Song, E. Simsek, and Q. H. Liu, "A fast 2-D volume integral equation solver for scattering from inhomogeneous objects in layered media," *Microwave Opt. Technol. Lett.*, vol. 47, no. 2, pp. 128-134, 2005.
- [113] E. Simsek, Q. H. Liu, and B. Wei, "Singularity subtraction for evaluation of Green's functions for multilayer media," *IEEE Trans. Microwave Theory Tech.*, vol. 54, no. 1, pp. 216-225, Jan. 2006.
- [114] J.-H. Lee, T. Xiao, and Q.H. Liu, "A 3-D spectral element method using mixed-order curl conforming vector basis functions for electromagnetic fields," *IEEE Trans. Microwave Theory Tech.*, vol. 54, no. 1, pp. 437-444, Jan. 2006.
- [115] J. Song, Q. H. Liu, K. Kim, and W. R. Scott, Jr., "High-resolution 3-D radar imaging through nonuniform fast Fourier transform (NUFFT)," *Comm. Computat. Phys.*, vol. 1, no. 1, pp. 176-191, 2006.
- [116] M. Chai, T. Xiao, and Q. H. Liu, "A conformal method to eliminate the ADI-FDTD staircasing errors," *IEEE Trans. Electromag. Compatibility*, vol. 48, no. 2, pp. 273-281, 2006.
- [117] Y. Liu, J.-H. Lee, T. Xiao, and Q. H. Liu, "A spectral element time-domain solution of Maxwell's equations," *Microwave Opt. Technol. Lett.*, vol. 48, no. 4, pp. 673-680, 2006.
- [118] E. Simsek, J. Liu, and Q. H. Liu, "A spectral integral method (SIM) for layered media," *IEEE Trans. Antennas Propagat.*, vol. 54, no. 6, pp. 1742-1749, June 2006.
- [119] J. Song, Q. H. Liu, P. Torriane, and L. Collins, "2-D and 3-D NUFFT migration method for landmine detection using ground-penetrating radar," *IEEE Trans. Geosci. Remote Sensing*, vol. 44, no. 6, pp. 1462-1469, June 2006.
- [120] K. H. Lim, J.-H. Lee, G. Ye, and Q. H. Liu, "An efficient forward solver in electrical impedance tomography by spectral element method," *IEEE Trans. Med. Imaging*, vol. 25, no. 8, pp. 1044-1051, August 2006.
- [121] Y. Chen, Z. Xie, W. T. Joines, Q. H. Liu, and L. Carin, "Double-sided Exponentially Tapered GPR Antenna and Its Transmission Line Feed Structure," *IEEE Trans. Antennas Propagat.*, vol. 54, no. 9, pp. 2615-2623, Sept. 2006.
- [122] B. K. Sinha, E. Simsek, Q. H. Liu, "Elastic-wave propagation in deviated wells in anisotropic formations," *Geophysics*, vol. 71, no. 6, pp. D191-202, 2006.
- [123] E. Simsek, J. Liu, and Q. H. Liu, "A spectral integral method and hybrid SIM/FEM for layered media," *IEEE Trans. Microwave Theory Tech.*, vol. 54, no. 11, pp. 3878-3884, Nov. 2006.
- [124] J. Song, and Q. H. Liu, "Improving non-Cartesian MRI reconstruction through discontinuity subtraction," *Intl. J. Biomed. Imaging*, vol. 2006, Article ID 87092, 9 pages, 2006. doi:10.1155/IJBI/2006/87092
- [125] B. Wei, E. Simsek, and Q. H. Liu, "Improved diagonal tensor approximation (DTA) and hybrid DTA/BCGS-FFT method for accurate simulation of 3-D inhomogeneous objects in layered media," *Waves in Random and Complex Media*, vol. 17, no. 1, pp. 55-66, Feb. 2007.

- [126] B. Wei, E. Simsek, C. Yu, and Q. H. Liu, “Fast three-dimensional electromagnetic nonlinear inversion in layered media by a hybrid diagonal tensor approximation stabilized biconjugate gradient fast Fourier transform method,” *Waves in Random and Complex Media*, vol. 17, no. 2, pp. 129-147, May 2007.
- [127] M. Chai, T. Xiao, G. Zhao, and Q. H. Liu, “A Hybrid PSTD/ADI-CFDTD Method for Mixed-Scale Electromagnetic Problems,” *IEEE Trans. Antennas Propagat.*, vol. 55, no. 5, pp. 1398-1406, May 2007.
- [128] J.-H. Lee, and Q. H. Liu, “A 3-D spectral element time-domain method for electromagnetic simulation,” *IEEE Trans. Microwave Theory Tech.*, vol. 55, no. 5, pp. 983-991, May 2007.
- [129] J. Liu, and Q. H. Liu, “A novel radiation boundary condition for finite-element method,” *Microwave Opt. Technol. Lett.*, vol. 49, no. 8, pp. 1995-2002, 2007.
- [130] C. Cheng, J.-H. Lee, K. H. Lim, H. Z. Massoud, and Q. H. Liu, “3-D Quantum Transport Solver Based on the Perfectly Matched Layer and Spectral Element Methods for the Simulation of Semiconductor Nanodevices,” **J. Computat. Phys.**, doi: 10.1016/j.jcp.2007.07.028.
- [131] T. Xiao, and Q. H. Liu, “A 3-D Enlarged Cell Technique (ECT) for the Conformal FDTD Method,” *IEEE Trans. Antennas Propagat.*, in press.
- [132] G. Zhao, and Q. H. Liu, “3-D multidomain discontinuous Galerkin pseudospectral time-domain algorithm for electromagnetic applications,” *IEEE Trans. Antennas Propagat.*, submitted.
- [133] J. Song, Q. H. Liu, S. L. Gewalt, G. Cofer, and G. A. Johnson, “General Least Square NUFFT Methods Applied to 2D and 3D Radially Encoded MR Image Reconstruction,” submitted.
- [134] G. Ye, K. H. Lim, R. George, Jr., G. Ybarra, W. T. Joines, and Q. H. Liu, “3-D EIT for breast cancer imaging: System design and measurements,” submitted.
- [135] K. H. Lim, J.-H. Lee, and Q. H. Liu, “Thermoacoustic Tomography Forward Modeling with the Spectral Element Method, *Physics in Medicine*, in press.
- [136] K. H. Lim, and Q. H. Liu, “Inhomogeneous Back-Projection with a Novel Scattering Approximation in Thermoacoustic Tomography,” submitted.

B. Book Chapters

- [137] Q. H. Liu, “Some current trends in numerical methods for transient acoustic and elastic waves in multidimensional inhomogeneous media,” in *Current Topics in Acoustical Research*, Research Trends, vol. 2, pp. 31-42, 1998.
- [138] Q. H. Liu, and Z. Q. Zhang, “FFT-Accelerated Fast Forward and Inverse Scattering Methods for Microwave Imaging,” *Microwave Nondestructive Evaluation and Imaging*, Research Signpost. Editor: M. Pastorino, 2002.
- [139] Q. H. Liu, G.-X. Fan, G. Zhao, and Y. Zeng, “The PSTD methods for computational electromagnetics,” Recent Research Developments in Microwave Theory and Techniques, Transworld Research Network. Editors: B. Baker, and Y. Chen, 2002.
- [140] Q. H. Liu, “Fast Fourier Transforms and NUFFT,” *Encyclopedia of RF and Microwave Engineering*, pp. 1401-1418, Wiley-Interscience. Editor: K. Chang, Jan. 2005.
- [141] Q. H. Liu, and G. Zhao, “Advances in PSTD Techniques.” Chapter 17, *Computational Electromagnetics: The Finite-Difference Time-Domain Method*, A. Taflove, and S. Hagness, Ed., Artech House, Inc., 2005.
- [142] W. T. Joines, Q. H. Liu, and G. Ybarra, “Electromagnetic Imaging of Biological Systems,” in *CRC Handbook on Biological Effects of Electromagnetic Fields*, eds. B. Greenebaum and F. Barnes. 2006.
- [143] G. A. Ybarra, Q. H. Liu, J. Stang, W. T. Joines, “Microwave Breast Imaging,” in *Emerging Biomedical Imaging Technologies*, ed.: J. Suri, American Scientific Publishers, in press.
- [144] G. A. Ybarra, Q. H. Liu, G. Ye, K. H. Lim, R. George, W. T. Joines, Breast Imaging using Electrical Impedance Tomography (EIT),” in *Emerging Biomedical Imaging Technologies*, ed.: J. Suri, American Scientific Publishers, in press.

C. Refereed Conference Proceedings

- [145] W. C. Chew, and Q. Liu, "Resonance frequency of a microstrip patch," Proc. 1987 Antennas Applications Symposium, University of Illinois, 1987.
- [146] Q. Liu, and W. C. Chew, "Simple formulas for the resonant frequencies of microstrip patches," Intl. IEEE/AP-S Symposium, Syracuse, NY, 1988.
- [147] W. C. Chew, B. Anderson, E. Yannakakis, M. Moghaddam, and Q. H. Liu, "Computation of transient electromagnetic waves in inhomogeneous media," Proceedings of the 1989 URSI International Symposium on Electromagnetic Theory, pp. 310–312, Stockholm, Sweden, August 1989.
- [148] W. C. Chew, Z. Nie, Q. H. Liu, and Y. T. Lo, "Some methods of analysis of a probe-fed microstrip disk antenna," 1990 Intl. IEEE/AP-S Symposium, Dallas, TX, pp. 346–349, May 1990.
- [149] W. C. Chew, Z. Nie, Q. H. Liu, and B. Anderson, "A full wave analysis of wave propagation in multiregion, cylindrically stratified media," 1990 Intl. IEEE/AP-S Symposium, Dallas, TX, pp. 602–605, May 1990.
- [150] W. C. Chew, Z. Nie, Q. H. Liu, and B. Anderson, "Modeling of well logging tools in a multi-bed environment with invasions," 10th Intl. Geoscience & Remote Sensing Symposium, Washington, D. C., May, 1990.
- [151] Q. H. Liu, B. Anderson, and T. Barber, "Interpretation of multiarray logs in complex formations," SPWLA, Oklahoma City, OK, June 1992.
- [152] Q. H. Liu, B. Anderson, and M. G. Luling, "Supporting interpretation of invaded thin beds with forward modeling of induction and 2-MHz resistivity tools in 2-D axisymmetric formations," 1992 Intl. Geoscience & Remote Sensing Symposium (IGARSS'92), Houston, TX, May 1992.
- [153] Q. H. Liu, "Modeling of a $2\frac{1}{2}$ -dimensional problem in electromagnetic well logging," 1992 Intl. Geoscience & Remote Sensing Symposium (IGARSS'92), Houston, TX, May 1992.
- [154] Q. H. Liu, "Radiation of an off-axis point source in a cylindrical medium with an arbitrary number of layers in radial and axial directions," 1992 Intl. IEEE/AP-S Symposium, Chicago, IL, July 1992.
- [155] Q. H. Liu, and W. C. Chew, "A CG-FFHT method for the solution of EM field in axisymmetric inhomogeneous media," Proceedings of the 9th Annual Review of Progress in Applied Computational Electromagnetics, pp. 672–677, Monterey, CA, March 1993.
- [156] D. F. Allen, B. I. Anderson, T. Barber, Q. H. Liu, and M. G. Luling, "Supporting interpretation of complex, axisymmetric invasion by modeling wireline induction and 2-MHz LWD resistivity tools," SPWLA Annual Symposium, Calgary, Alberta, Canada, June 1993.
- [157] Q. H. Liu, "DBIM for the inversion of two-dimensional axisymmetric inhomogeneous media," 1993 Intl. IEEE/AP-S Symposium, Ann Arbor, MI, June 1993.
- [158] Q. H. Liu, B. Anderson, and W. C. Chew, "Modeling low-frequency electrode-type resistivity tools in 2-D formations," 1993 Intl. Geoscience & Remote Sensing Symposium (IGARSS'93), Tokyo, Japan, August 1993.
- [159] Q. H. Liu, and C. Chang, "Compressional head waves in attenuative formations," SEG Intl. Exposition & 64th Annual Meeting, Extended Abstract, pp. 12–15, Oct. 1994.
- [160] B. K. Sinha, and Q. H. Liu, "Flexural waves in pressurized boreholes: A finite-difference approach," 65th Ann. Internat. Mtg., Soc. Expl. Geophys., Expanded Abstract, pp. 26–29, Oct. 1995.
- [161] W. C. Chew, and Q. H. Liu, "Using perfectly matched layers for elastodynamics," 1996 Intl. IEEE/AP-S Symposium Digest, Baltimore, MD, July 1996.
- [162] Q. H. Liu, "The pseudospectral time-domain (PSTD) method: A new algorithm for solutions of Maxwell's equations," Intl. IEEE/AP-S Symposium Digest, pp. 122–125, Montreal, Canada, July 1997.
- [163] Q. H. Liu, "Finite-difference and pseudospectral time-domain methods for subsurface radar applications," Intl. IEEE/AP-S Symposium Digest, pp. 990–993, Montreal, Canada, July 1997.

- [164] Q. H. Liu, "A new numerical method for large-scale complex media: The PSTD algorithm," Proc. 17th Intl. Geoscience & Remote Sensing Symposium (IGARSS'97), Singapore, August 1997.
- [165] Q. H. Liu, "Using GPR and seismic reflection measurements to characterize buried objects: Large-scale simulations," Proc. 17th Intl. Geoscience & Remote Sensing Symposium (IGARSS'97), Singapore, August 1997.
- [166] Q. H. Liu, Y.-L. Li, and J. C. Liao, "The PSTD algorithm: a fast and accurate method for electronic package characterization," Electrical Performance of Electronic Packaging Conference, San Jose, CA, October 1997.
- [167] Y. H. Chen, W. C. Chew, and Q. H. Liu, "A three-dimensional finite difference code for the modeling of sonic logging tools," 67th Ann. Internat. Mtg., Soc. Expl. Geophys., Expanded Abstract, October 1997.
- [168] Q. H. Liu, and J. Q. He, "A PSTD algorithm in cylindrical coordinates," in *Proc. 14th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 1998.
- [169] G.-X. Fan, and Q. H. Liu, "A PML-FDTD algorithm for general dispersive media," in *Proc. 14th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 1998.
- [170] Q. H. Liu, "On the PSTD method for large-scale problems," media," in *Proc. 14th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 1998.
- [171] Q. H. Liu, and N. Nguyen, "An accurate algorithm for nonuniform fast Fourier transforms (NUFFT's) and its applications," in *Proc. 14th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 1998.
- [172] J.-Q. He, and Q. H. Liu, "A systematic study of three PML absorbing boundary conditions through a unified formulation in cylindrical coordinates," in *Proc. 14th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 1998.
- [173] Q. H. Liu, "A new algorithm for simulations of GPR and acoustic reflection measurements," 7th Intl. Conf. Ground Penetrating Radar, Lawrence, KS, May 1998.
- [174] J.-Q. He, and Q. H. Liu, "Borehole radar modeling with a nonuniform cylindrical FDTD algorithm," 7th Intl. Conf. Ground Penetrating Radar, Lawrence, KS, May 1998.
- [175] G.-X. Fan, and Q. H. Liu, "A 3D PML-FDTD algorithm for simulating ground-penetrating radar on dispersive earth media," 7th Intl. Conf. Ground Penetrating Radar, Lawrence, KS, May 1998.
- [176] G.-X. Fan, and Q. H. Liu, "A PML-FDTD algorithm for general dispersive media in GPR and plasma applications," Intl. IEEE/AP-S Symposium Digest, Atlanta, GA, June 1998.
- [177] Q. H. Liu, N. Nguyen, "Nonuniform fast Fourier transform (NUFFT) algorithm and its applications," Intl. IEEE/AP-S Symposium Digest, Atlanta, GA, June 1998.
- [178] X. Y. Tang, and Q. H. Liu, "CG-FFT for Nonuniform Inverse Fast Fourier Transforms (NUIFFT's)," Intl. IEEE/AP-S Symposium Digest, Atlanta, GA, June 1998.
- [179] Z. B. Tang, and Q. H. Liu, "The 2.5D pseudospectral time-domain (PSTD) algorithm with PML absorbing boundary condition," Intl. IEEE/AP-S Symposium Digest, Atlanta, GA, June 1998.
- [180] G.-X. Fan, and Q. H. Liu, "Dyadic Green's functions for curved waveguides and cavities and their reformulation," Intl. IEEE/AP-S Symposium Digest, Atlanta, GA, June 1998.
- [181] Q. H. Liu, and J.-Q. He, "An efficient PSTD algorithm in cylindrical coordinates," Intl. IEEE/AP-S Symposium Digest, Atlanta, GA, June 1998.
- [182] J.-Q. He, and Q. H. Liu, "A nonuniform cylindrical FDTD algorithm using new split PML formulations," Intl. IEEE/AP-S Symposium Digest, Atlanta, GA, June 1998.
- [183] Q. H. Liu, N. Nguyen, and X. Y. Tang, "Accurate algorithms for nonuniform fast forward and inverse Fourier transforms and their applications," Intl. Geoscience Remote Sensing Symposium (IGARSS'98), Seattle, WA, July 1998.
- [184] J.-Q. He, and Q. H. Liu, "A nonuniform cylindrical FDTD algorithm with PML for borehole radar modeling," Intl. Geoscience Remote Sensing Symposium (IGARSS'98), Seattle, WA, July 1998.

- [185] Q. H. Liu, and G.-X. Fan, "A PSTD algorithm for general dispersive media and its applications to GPR simulations," Intl. Geoscience Remote Sensing Symposium (IGARSS'98), Seattle, WA, July 1998.
- [186] X. Xu, and Q. H. Liu, "The conjugate-gradient nonuniform fast Fourier transform (CG-NUFFT) method and its applications in subsurface sensing," Intl. Geoscience Remote Sensing Symposium (IGARSS'99), Hamburg, Germany, 1999.
- [187] H. Jiang, and Q. H. Liu, "2.5-D cylindrical PSTD and nonuniform FDTD methods," Intl. Geoscience Remote Sensing Symposium (IGARSS'99), Hamburg, Germany, 1999.
- [188] Q. H. Liu, "Multidimensional nonuniform fast forward and inverse Fourier transforms," Intl. Geoscience Remote Sensing Symposium (IGARSS'99), Hamburg, Germany, 1999.
- [189] Q. H. Liu, "PML and PSTD algorithm for arbitrary lossy bianisotropic media," Intl. IEEE/AP-S Symposium Digest, Orlando, FL, July 1999.
- [190] H. Jiang, and Q. H. Liu, "A 2.5-D PSTD algorithm in cylindrical coordinates," Intl. IEEE/AP-S Symposium Digest, Orlando, FL, July 1999.
- [191] Q. H. Liu, G.-X. Fan, "Frequency-dependent PSTD method and its applications to GPR modeling," Intl. IEEE/AP-S Symposium Digest, Orlando, FL, July 1999.
- [192] Q. H. Liu, "PML-FDTD method for elastic waves in cylindrical and spherical coordinates," Intl. IEEE/AP-S Symposium Digest, Orlando, FL, July 1999.
- [193] B. Tian, and Q. H. Liu, "Nonuniform fast cosine transform and the Chebyshev PSTD algorithm," Intl. IEEE/AP-S Symposium Digest, Orlando, FL, July 1999.
- [194] S. P. Blanchard, G.-X. Fan, and Q. H. Liu, "3-D numerical mode-matching (NMM) method for inhomogeneous media," Intl. IEEE/AP-S Symposium Digest, Orlando, FL, July 1999.
- [195] G.-X. Fan, and Q. H. Liu, "Pseudospectral time-domain algorithm applied to electromagnetic scattering from electrically large objects," Intl. IEEE/AP-S Symposium Digest, Orlando, FL, July 1999.
- [196] B. K. Sinha, Q. H. Liu, T. J. Plona, and K. W. Winkler, "A finite-difference formulation of borehole wave propagation in prestressed formations," 69th Annual Meeting of Society of Exploration Geophysicists, Houston, TX, *Expanded Abstracts*, vol. 1, pp. 49–52, 1999.
- [197] G.-X. Fan, and Q. H. Liu, "Fast Fourier transform of functions with jump discontinuities," in *Proc. 16th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 2000.
- [198] Q. H. Liu, X. M. Xu, and Z. Q. Zhang, "Applications of nonuniform fast transform algorithms in numerical solutions of integral equations," in *Proc. 16th Annual Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 2000.
- [199] Q. H. Liu, X. M. Xu, and Z. Q. Zhang, "Applications of nonuniform fast Fourier transform (NUFFT) algorithms in subsurface sensing," *AP2000 Millennium Conference on Antennas and Propagation*, Davos, Switzerland, April 2000.
- [200] Y. Q. Zeng, and Q. H. Liu, "A poroelastic model for acoustic landmine detection," in *Proc. SPIE*, Orlando, FL, April 2000.
- [201] X. M. Xu, and Q. H. Liu, "The conjugate-gradient nonuniform fast Fourier transform (CG-NUFFT) method for one and two-dimensional media," Intl. IEEE/AP-S Symposium Digest, Salt Lake City, UT, July 2000.
- [202] G.-X. Fan, Q. H. Liu, "Fast Fourier transform of functions with jump discontinuities," Intl. IEEE/AP-S Symposium Digest, Salt Lake City, UT, July 2000.
- [203] Q. H. Liu and Z. Q. Zhang, and X. M. Xu, "A spectral hybrid EBA method for integral equations," Intl. IEEE/AP-S Symposium Digest, Salt Lake City, UT, July 2000.
- [204] Z. Q. Zhang, and Q. H. Liu, "The hybrid extended Born approximation and CG-FFHT method for axisymmetric media," Intl. IEEE/AP-S Symposium Digest, Salt Lake City, UT, July 2000.

- [205] Z. Q. Zhang, and Q. H. Liu, "Simulation of borehole induction using the hybrid extended Born approximation and CG-FFHT method," in *Proc. SPIE*, San Diego, CA, July 2000.
- [206] Q. H. Liu and Z. Q. Zhang, "A novel inverse algorithm for borehole induction measurements Using a spectral hybrid EBA forward method," in *Proc. SPIE*, San Diego, CA, July 2000.
- [207] Y. Zeng, and Q. H. Liu, "Acoustic landmine detection: A 3D poroelastic model," *Proc. SPIE*, Orlando, FL, April 2001.
- [208] Z. Q. Zhang, and Q. H. Liu, "Microwave imaging for breast tumor: 2D forward and inverse methods," Intl. IEEE/AP-S Symposium Digest, Boston, MA, July 2001.
- [209] Z. Q. Zhang, and Q. H. Liu, "Simulation of 3D EM fields by a weak-Form biconjugate gradient FFT method," Intl. IEEE/AP-S Symposium Digest, Boston, MA, July 2001.
- [210] Z. Q. Zhang, and Q. H. Liu, "Two nonlinear inverse methods for electromagnetic induction measurements," Intl. IEEE/AP-S Symposium Digest, Boston, MA, July 2001.
- [211] G.-X. Fan, and Q. H. Liu, "A well-posed PML ABC for lossy media," *IEEE Antennas and Propagat. Soc. Intl. Symp.*, vol. 3, pp. 2–5, July 2001.
- [212] Q. H. Liu, and Z. Q. Zhang, "RCS calculation for large inhomogeneous penetrable objects," Intl. IEEE/AP-S Symposium Digest, Boston, MA, July 2001.
- [213] G.-X. Fan, and Q. H. Liu, "Multi-domain pseudospectral time-domain method for lossy media," Intl. IEEE/AP-S Symposium Digest, Boston, MA, July 2001.
- [214] Z. Q. Zhang, and Q. H. Liu, "Applications of Microwave Imaging to three-dimensional biological tissues," Intl. IEEE/AP-S Symposium Digest, San Antonio, TX, June 2002.
- [215] X. M. Xu, Q. H. Liu, and Z. Q. Zhang, "The stabilized biconjugate gradient fast Fourier transform method for electromagnetic scattering," Intl. IEEE/AP-S Symposium Digest, San Antonio, TX, June 2002.
- [216] G. Zhao, and Q. H. Liu, "Applications of the 2.5-D multidomain pseudospectral time-domain algorithm," Intl. IEEE/AP-S Symposium Digest, San Antonio, TX, June 2002.
- [217] L. Sha, L. Nolte, Z. Q. Zhang, and Q. H. Liu, "Performance analysis for Bayesian microwave imaging in decision aided breast tumor diagnosis," *ISBI 2002 Proc.*, Washington, D.C., July 2002.
- [218] B. K. Sinha, and Q. H. Liu, "Acoustic waves in pressurized boreholes in formations with triaxial stresses," *IEEE Ultrasonics Symposium, 2002. Proceedings*, vol. 1, pp. 505–510, Oct. 8-11, 2002.
- [219] Q. H. Liu, and G. Zhao, "Review of PSTD Methods for Transient Electromagnetics," 5th International Workshop on Computat. Electromagnetics in Time Domain-TLM, FDTD and Other Techniques (CEM-2003), Halifax, Nova Scotia, Canada, June 2003.
- [220] T. Xiao, and Q. H. Liu, "Unstructured-grid spectral method for 3D Maxwell's equations with well-posed PML," Intl. IEEE/AP-S Symposium Digest, Columbus, OH, June 2003.
- [221] T. Xiao, and Q. H. Liu, "A staggered time integration technique for spectral methods," Intl. IEEE/AP-S Symposium Digest, vol. 1, pp. 694–697, Columbus, OH, June 2003.
- [222] G. Zhao, and Q. H. Liu, "Unconditionally stable multidomain pseudospectral time-domain (PSTD) method," Intl. IEEE/AP-S Symposium Digest, vol. 1, pp. 336–339, Columbus, OH, June 2003.
- [223] G. Zhao, and Q. H. Liu, "The 3-D multidomain pseudospectral time-domain algorithm for inhomogeneous conductive media," Intl. IEEE/AP-S Symposium Digest, vol. 3, pp. 559–562, Columbus, OH, June 2003.
- [224] L.-P. Song, Q. H. Liu, F. Li, and Z. Q. Zhang, "GPR landmine imaging: 2D migration and 3D inverse scattering in layered media," 2004 URSI EMTS Intl. Symposium on Electromagnetic Theory, vol. 1, pp. 391–393, May 2004.
- [225] F. Li, Q. H. Liu, and L.-P. Song, "Reconstruction of 3-D objects buried in layered media using Born and distorted Born iterative methods," 2004 URSI EMTS Intl. Symposium on Electromagnetic Theory, vol. 1, pp. 1095–1097, May 2004.

- [226] F. Li, L.-P. Song, and Q. H. Liu, "Three-Dimensional Reconstruction of Objects Buried in Layered Media," Intl. IEEE/AP-S Symposium Digest, Monterey, CA, June 2004.
- [227] J. Liu, and Q. H. Liu, "An Embedded Boundary Method to Eliminate the ADI-FDTD Staircasing Error," Intl. IEEE/AP-S Symposium Digest, Monterey, CA, June 2004.
- [228] L.P. Song, Q. H. Liu, and F. Li, "3D Nonlinear Electromagnetic Inversion for Buried Objects in Layered Media," Intl. IEEE/AP-S Symposium Digest, Monterey, CA, June 2004.
- [229] L.P. Song, C. Yu, and Q. H. Liu, "2-D Nonlinear Image Reconstruction for Buried Objects in Layered Media," Intl. IEEE/AP-S Symposium Digest, Washington, DC, July 2005.
- [230] L.P. Song, C. Yu, and Q. H. Liu, "Image Reconstruction from Measured Scattering Data," Intl. IEEE/AP-S Symposium Digest, Washington, DC, July 2005.
- [231] G. Ye, K. H. Lim, R. George, G. Ybarra, W. T. Joines, and Q. H. Liu, "A 3D EIT System for Breast Cancer Imaging," 2006 IEEE International Symposium on Biomedical Imaging Proc., pp. 1092-1093, Washington D.C., 2006.
- [232] J. Song, and Q. H. Liu, "A Novel MR Image Reconstruction for Arbitrary K-space Trajectory without Density Compensation," IEEE 2006 Intl. Conf. Eng. Med. Biol. Soc., New York, NY, Sept. 2006.
- [233] M. Chai, and Q. H. Liu, "A Hybrid PSTD-FDTD Method for Indoor Wireless Communication Systems," Intl. IEEE/AP-S Symposium Digest, Honolulu, HI, June 2007.
- [234] J. H. Lee, and Q. H. Liu, "Nanophotonic Applications of the Discontinuous Spectral Element Time-Domain (DG-SETD) Method," Intl. IEEE/AP-S Symposium Digest, Honolulu, HI, June 2007.
- [235] Q. H. Liu, C. Yu, J. Stang, M. Yuan, E. Bresslour, R. T. George, G. A. Ybarra, W. T. Joines, "Experimental and Numerical Investigations of a High-Resolution 3D Microwave Imaging System for Breast Cancer Detection," Intl. IEEE/AP-S Symposium Digest, Honolulu, HI, June 2007.
- [236] J. Liu, Y. Lin, J. H. Lee, E. Simsek, and Q. H. Liu, "Application of the Hybrid Spectral Integral Method with Spectral Element Method," Intl. IEEE/AP-S Symposium Digest, Honolulu, HI, June 2007.

D. Conference Abstracts

- [237] Q. H. Liu, and W. C. Chew, "An efficient numerical method for the multi-region vertically stratified media," National Radio Science Meeting, Boulder, Colorado, Jan. 1989.
- [238] Q. H. Liu, and W. C. Chew, "A numerical method for the obliquely stratified half-space," National Radio Science Meeting, Boulder, Colorado, Jan. 1989.
- [239] W. C. Chew, and Q. H. Liu, "A numerical method for the obliquely stratified inhomogeneous half space: basic studies in microwave remote sensing of earth surface," Progress in Electromagnetics Research Symposium, Boston, Massachusetts, July 1989.
- [240] Q. H. Liu, and W. C. Chew, "Analysis of multi-rectangular dielectric waveguides by numerical mode matching method," National Radio Science Meeting, Boulder, Colorado, Jan. 1990.
- [241] Q. H. Liu, and W. C. Chew, "Analysis of discontinuities in planar dielectric waveguides: a recursive numerical mode matching method," National Radio Science Meeting, Boulder, Colorado, Jan. 1990.
- [242] W. C. Chew, Y. M. Wang, L. Gurel, J. H. Lin, Q. H. Liu, "Fast algorithms for calculating scattering by inhomogeneous and impenetrable objects," Progress in Electromagnetics Research Symposium, Boston, Massachusetts, July 1991.
- [243] Q. H. Liu, and W. C. Chew, "Non-axisymmetric wave propagation in cylindrical structures with horizontal junction discontinuities," Progress in Electromagnetics Research Symposium, Boston, Massachusetts, July 1991.
- [244] Q. H. Liu, and W. C. Chew, "CG-FHT-FFT method for the analysis of radiation from a loop antenna in an inhomogeneous medium with rotational symmetry," 1992 URSI Meeting, Chicago,

- IL, July 1992.
- [245] Q. H. Liu, "Imaging a 2-D axisymmetric inhomogeneous medium using low-frequency TM measurements," 1993 URSI Meeting, Ann Arbor, MI, June 1993.
 - [246] Q. H. Liu, "Reconstruction of two-dimensional axisymmetric inhomogeneous media using induction measurements," Progress in Electromagnetics Research Symposium, Pasadena, CA, July 1993.
 - [247] Q. H. Liu, and W. C. Chew, "An efficient CG-FFHT method for the solution of EM field," Progress in Electromagnetics Research Symposium, Pasadena, CA, July 1993.
 - [248] Q. H. Liu, "Imaging a two-dimensional axisymmetric inhomogeneous medium using a TM resistivity tool," Progress in Electromagnetics Research Symposium, Pasadena, CA, July 1993.
 - [249] W. C. Chew, and Q. H. Liu, "Using CG-FFHT method to solve the borehole inverse problem at induction frequencies," Progress in Electromagnetics Research Symposium, Pasadena, CA, July 1993.
 - [250] W. C. Chew, and Q. H. Liu, "Using CG-FFHT method to solve the borehole inverse problem at induction frequencies," URSI General Assembly, Kyoto, Japan, August 1993.
 - [251] Q. H. Liu, "K-Space Formulation for electromagnetic scattering problems in time domain," 1994 URSI Meeting, Seattle, WA, June 1994.
 - [252] Q. H. Liu, "A new generalized k -space (GkS) method for transient elastodynamic scattering problems," 128th Meeting of the Acoustical Society of America, Austin, TX, November 1994.
 - [253] Q. H. Liu, E. Schoen, F. Daube, C. Randall, H.-L. Liu, and P. Lee, "Large-scale 3D finite-difference simulation of elastic wave propagation in borehole environments," 128th Meeting of the Acoustical Society of America, Austin, TX, November 1994.
 - [254] C.-C. Lu, and Q. H. Liu, "Three-dimensional dyadic Green's function for elastic waves in multilayer cylindrical structures," 128th Meeting of the Acoustical Society of America, Austin, TX, November 1994.
 - [255] Q. H. Liu, "An Efficient Generalized k -Space (GkS) Method for Transient EM Subsurface Probing," (invited paper), Progress in Electromagnetics Research Symposium, Seattle, WA, July 1995.
 - [256] Q. H. Liu, "A Fundamental Forward and Inverse Problem in Borehole Elastic Wave Propagation," (invited paper), Progress in Electromagnetics Research Symposium, Seattle, WA, July 1995.
 - [257] Q. H. Liu, "A revisit to the k -space method for acoustic scattering problems," 2nd International Conference on Theoretical and Computational Acoustics, Honolulu, Hawaii, August 21-25, 1995.
 - [258] Q. H. Liu, "A spectral-domain method with perfectly matched layers for time-domain solutions of Maxwell's equations," 1996 URSI Meeting, Baltimore, MD, July 1996.
 - [259] Q. H. Liu, and J. Tao, "Perfectly matched layers for acoustic waves in viscous media: Applications to underwater acoustics," *J. Acous. Soc. Am.*, vol. 101, no. 5, Pt. 2, p. 3182, May 1997 (133rd Acoustical Society of America Meeting).
 - [260] Q. H. Liu, "The PSTD algorithm: A time-domain method combining the pseudospectral technique and perfectly matched layers," *J. Acous. Soc. Am.*, vol. 101, no. 5, Pt. 2, p. 3182, May 1997 (133rd Acoustical Society of America Meeting).
 - [261] W. C. Chew, and Q. H. Liu, "Perfectly matched layers for elastodynamics," PIERS'97, Boston, MA, July 1997.
 - [262] J. He, and Q. H. Liu, "An FDTD method with nonuniform cylindrical grids for inhomogeneous conductive media," 1997 URSI Meeting Abstract, p. 133, Montreal, Canada, July 1997.
 - [263] Q. H. Liu, "A New PML formulation for anisotropic media and PSTD algorithm," 1998 URSI Meeting Abstract, Atlanta, GA, June 1998.
 - [264] Q. H. Liu, and G.-X. Fan, "A frequency-dependent PSTD algorithm for general dispersive media," 1998 URSI Meeting Abstract, Atlanta, GA, June 1998.
 - [265] N. T. Nguyen, and Q. H. Liu, "The method of scaling factors for nonuniform fast Fourier transforms," 1999 Joint Mathematics Meetings, San Antonio, Tx, January 1999.
 - [266] X. Xu, and Q. H. Liu, "The CG-NUFFT method for inhomogeneous media," 1999 URSI Meeting Abstract, Orlando, FL, July 1999.

- [267] Q. H. Liu, and Z. Q. Zhang, "The nonuniform fast Hankel transform and its applications for integral equations," 1999 URSI Meeting Abstract, Orlando, FL, July 1999.
- [268] Q. H. Liu, "Pseudospectral time-domain method with a nonuniform fast Fourier transform algorithm," 1999 URSI Meeting Abstract, Orlando, FL, July 1999.
- [269] Y. Q. Zeng, J. Q. He, Q. H. Liu, "The Perfectly Matched Layer (PML) for Elastic Waves in Poroelastic Media," *J. Acous. Soc. Am.*, vol. 106, no. 4, Pt. 2, p. 2131, Nov. 1999 (138th Acoustical Society of America Meeting).
- [270] Q. H. Liu, B. Tian, X. Xu, Z. Q. Zhang, "Recent progress on nonuniform fast Fourier transform algorithms and their applications," *Invited Talk, J. Acous. Soc. Am.*, vol. 106, no. 4, Pt. 2, p. 2135, Nov. 1999 (138th Acoustical Society of America Meeting).
- [271] Q. H. Liu, "Theory of perfectly matched layer for elastic waves and their applications in cylindrical and spherical coordinates," *J. Acous. Soc. Am.*, vol. 106, no. 4, Pt. 2, p. 2288, Nov. 1999 (138th Acoustical Society of America Meeting).
- [272] Y. Q. Zeng, Q. H. Liu, "Detection of land mines in fluid-saturated unconsolidated soil: numerical modeling," *J. Acous. Soc. Am.*, vol. 107, no. 5, Pt. 2, p. 2897, May 2000 (139th Acoustical Society of America Meeting).
- [273] X. M. Xu and Q. H. Liu, "The CG-NUFFT method for the solution of integral equations," Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [274] Q. H. Liu and G.-X. Fan, "Simulation of GPR measurements in dispersive media with the PSTD algorithm," Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [275] Z. Q. Zhang and Q. H. Liu, "Hybridization of the extended Born approximation and CG-FFHT method," Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [276] G.-X. Fan and Q. H. Liu, "A fast Fourier transform algorithm for functions with jump discontinuities," Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [277] Q. H. Liu and Z. Q. Zhang, "A novel nonlinear inversion of borehole induction measurements," Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [278] Q. H. Liu and G.-X. Fan, "Recent advances in the PSTD algorithm for large-scale problems," Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [279] Y. Zeng and Q. H. Liu, "Poroelastic wave propagation for acoustic landmine detection," Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [280] B. K. Sinha, Q. H. Liu, T. J. Plona, and K. W. Winkler, "A finite-difference formulation of borehole wave propagation in prestressed formation," Progress in Electromagnetics Research Symposium, Boston, MA, July 2000.
- [281] Z. Q. Zhang, and Q. H. Liu, "Nonlinear inversion of borehole induction measurements using a new fast forward algorithm," 2000 URSI Meeting Abstract, Salt Lake City, UT, July 2000.
- [282] G.-X. Fan, Q. H. Liu, "An improved pseudospectral time-domain method for perfect conductors," 2000 URSI Meeting Abstract, Salt Lake City, UT, July 2000.
- [283] B. Tian, and Q. H. Liu, "Comparison of two Chebyshev PSTD algorithms for inhomogeneous media," 2000 URSI Meeting Abstract, Salt Lake City, UT, July 2000.
- [284] G.-X. Fan, Q. H. Liu, and X. M. Xu, "Reduction of sampling density in CGFFT method: Application of FFT algorithm for discontinuous functions," 2000 URSI Meeting Abstract, Salt Lake City, UT, July 2000.
- [285] R. Duraiswami, L. Davis, S. A. Shamma, H. C. Elman, R. O. Duda, V. R. Algazi, Q. H. Liu, S. T. Raveendra, "Individualized HRTFs using computer vision and computational acoustics," *J. Acous. Soc. Am.*, vol. 108, no. 5, pt. 2, p. 2597, Nov. 2000 (140th Acoustical Society of America Meeting, Newport Beach, CA).
- [286] Q. H. Liu, and G.-X. Fan, "A systematic method for unsplit PML and applications in FDTD and PSTD methods," *Invited Talk, 2001 URSI Intl. Symp. Electromag. Theory, Victoria, Canada, May 2001.*

- [287] T. Xiao, and Q. H. Liu, "Finite-difference computation of head-related transfer functions for human hearing," 141th Acoustical Society of America Meeting, Chicago, IL, June 2001.
- [288] Y. Q. Zeng, and Q. H. Liu, "3D multidomain PSTD for elasticity," 141th Acoustical Society of America Meeting, Chicago, IL, June 2001.
- [289] Y. Q. Zeng, and Q. H. Liu, "Acoustic landmine detection: Poroelastic model and elastic wave models," 141th Acoustical Society of America Meeting, Chicago, IL, June 2001.
- [290] Y. Q. Zeng, Z. Q. Zhang, and Q. H. Liu, "Active ultrasound imaging of breast tumors: Forward and inverse scattering methods," 141th Acoustical Society of America Meeting, Chicago, IL, June 2001.
- [291] Q. H. Liu, X. Xu, Z. Q. Zhang, G. Zhao, "Strategy for modeling objects obstructed by foliage above a penetrable ground: spectral and higher-order methods," 2001 URSI Meeting Abstract, Boston, MA, June 2001.
- [292] Q. H. Liu, and Z. Q. Zhang, "3-D microwave imaging for biomedical applications: numerical simulations," 2001 URSI Meeting Abstract, Boston, MA, June 2001.
- [293] Q. H. Liu, and G. Zhao, "Multidomain pseudospectral time-domain method for 2.5-D problems," 2001 URSI Meeting Abstract, Boston, MA, June 2001.
- [294] Z. Q. Zhang, and Q. H. Liu, "Reconstruction of 3D lossy media by using microwave measurements," 2001 URSI Meeting Abstract, Boston, MA, June 2001.
- [295] X. M. Xu, and Q. H. Liu, "A fast numerical method for electromagnetic scattering from inhomogeneous objects in layered medium," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [296] Q. H. Liu, "A pseudospectral frequency-domain algorithm for computational electromagnetics," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [297] G. Zhao, and Q. H. Liu, "A 3-D multidomain pseudospectral time-domain algorithm," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [298] T. Xiao, and Q. H. Liu, "An embedded technique for a highly accurate FDTD method," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [299] Z. Q. Zhang, and Q. H. Liu, "Fast AIM computation of EM fields from 3D inhomogeneous objects," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [300] I. Deshmukh, and Q. H. Liu, "Pseudospectral-beam propagation method (PS-BPM) for optical waveguides," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [301] Z. Q. Zhang, and Q. H. Liu, "3D EM induction imaging for buried object detection and identification," 2002 URSI Meeting Abstract, San Antonio, TX, June 2002.
- [302] Z. Q. Zhang, and Q. H. Liu, "3-D fast forward and inverse methods for subsurface electromagnetic induction sensing," Progress in Electromagnetics Research Symposium, Boston, MA, July 2002.
- [303] Z. Q. Zhang, and Q. H. Liu, "FFT-accelerated fast forward and inverse scattering methods for microwave imaging of breast cancer," Progress in Electromagnetics Research Symposium, Boston, MA, July 2002.
- [304] Q. H. Liu, and L. Carin, "A GPR subsystem suitable for integration with EMI/NQR sensors," UXO/Countermines Forum, Orlando, FL, Sept. 2002.
- [305] Z. Q. Zhang, and Q. H. Liu, "A new method for target detection and discrimination: 3-D inverse scattering," UXO/Countermines Forum, Orlando, FL, Sept. 2002.
- [306] Z. Q. Zhang, and Q. H. Liu, "Target detection and discrimination using 3-D inverse scattering methods," *Proc. SPIE*, Orlando, FL, April 2003.
- [307] M. Chai, and Q. H. Liu, "Efficient 3-D ground penetrating radar simulation with spiral antennas and buried objects," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [308] J. Liu, and Q. H. Liu, "A fast simulation method for 3D photonic crystals," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [309] I. Deshmukh, and Q. H. Liu, "Pseudospectral beam propagation method and finite element method: A hybrid technique in computational photonics," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.

- [310] X. Millard, and Q. H. Liu, "The BCGS-FFT method for 3-D objects in subsurface layered media," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [311] Z. Q. Zhang, and Q. H. Liu, "A fast 3-D inverse scattering method for objects in layered media," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [312] T. Xiao, and Q. H. Liu, "Staggered upwind embedded boundary method for 3D Maxwell's equations," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [313] T. Xiao, and Q. H. Liu, "Spectral methods in general curvilinear simplex grids," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [314] G. Zhao, and Q. H. Liu, "A penalty method for multidomain pseudospectral time-domain (PSTD) algorithm," 2003 URSI Meeting Abstract, Columbus, OH, June 2003.
- [315] M. Chai, and Q. H. Liu, "An Embedded Boundary Method to Eliminate the ADI-FDTD Staircasing Error," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [316] Q. H. Liu, F. Li, and L.-P. Song, "Joint Electromagnetic/Acoustic Reconstruction of Underground Structures," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [317] J. Liu, and Q. H. Liu, "A High-Order Integral Equation Method for Non-Smooth Objects," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [318] J. Song, and Q. H. Liu, "2D Nonuniform Fast Fourier Transform (NUFFT) Method for Synthetic Aperture Radar and Ground Penetrating Radar Signal Processing," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [319] J.-H. Lee, and Q. H. Liu, "Analysis of 3D Eigenvalue Problems Based on a Spectral Element Method," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [320] L.-P. Song, Q. H. Liu, and F. Li, "Hybrid Extended Born Approximation and Contrast Source Inversion for 3-D Inversion in Layered Media," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [321] G. Shi, K. H. Lim, J. Di Sarro, J. Hu, R. T. George, G. Ybarra, W. T. Joines, and Q. H. Liu "A 2-D Electrical Impedance Tomography System and Image Reconstruction," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [322] E. Simsek, Q. H. Liu, and J. Liu, "Fast Computation of Green's Functions for Layered Media and Its Application in Interconnect Simulations," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [323] T. Xiao, and Q. H. Liu, "An Efficient and Flexible Pseudospectral Time-Domain (PSTD) Method for Maxwell's Equations," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [324] T. Xiao, and Q. H. Liu, "A 3D Spectral Discontinuous Galerkin Method with Hybrid Elements," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [325] G. Zhao, and Q. H. Liu, "A New Pseudospectral Time-Domain (PSTD) Algorithm Based on Discontinuous Galerkin Method (DGM) and Hexahedral Elements," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [326] G. Zhao, and Q. H. Liu, and S. A. Wartenberg, "Application of the 2.5-D Pseudospectral Time-Domain (PSTD) Algorithm to Eccentric Waveguide Analysis," 2004 URSI Meeting Abstract, Monterey, CA, June 2004.
- [327] Q. H. Liu, F. Li, and L.-P. Song, "Multimodality Inversion for Image Reconstruction of Objects Buried in Multilayered Media with Radar and Seismic Measurements," Progress in Electromagnetics Research Symposium, Nanjing, China, Aug. 2004.
- [328] Q. H. Liu, L.-P. Song, X. Millard, and F. Li, "Fast Forward and Inverse Scattering Methods for 3D Objects Buried in Multilayered Media," Progress in Electromagnetics Research Symposium, Nanjing, China, Aug. 2004.
- [329] Q. H. Liu, and J. Liu, "A Spectral Integral Method (SIM) for the Scattering of Periodic and Nonperiodic Structures," Progress in Electromagnetics Research Symposium, Nanjing, China, Aug. 2004.
- [330] Q. H. Liu, T. Xiao, and G. Zhao, "Spectral and High-Order Time-Domain Methods for Transient Electromagnetics," Progress in Electromagnetics Research Symposium, Nanjing, China, Aug.

- 2004.
- [331] C. Cheng, Q. H. Liu, J. H. Lee, and H. Z. Massoud, "Spectral element method for the Schrödinger-Poisson system," International Workshop on Computational Electronics 10, Oct. 24–27, 2004, Purdue University, West Lafayette, Indiana, USA.
 - [332] B. J. Wei, and Q. H. Liu, "Reconstruction of 3-D objects in layered media with arbitrary source and receiver locations," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [333] G. Ye, Q. H. Liu, K. H. Lim, K. McCarter, R. George, G. Ybarra, W. T. Joines, "A 3-D EIT System for Breast Cancer Detection," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [334] J.-H. Lee, and Q. H. Liu, "A Spectral Element Method with High-Order Geometrical Modeling for 3-D Electromagnetic Fields," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [335] J.-H. Lee, and Q. H. Liu, "A Mesh Generator for the SEM and PSTD Methods," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [336] J. Liu, and Q. H. Liu, "A Hybrid FEM/SIM Method for Electromagnetic Scattering from Objects with an Exact Radiation Boundary Condition," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [337] J. Liu, E. Simsek, and Q. H. Liu, "Fast Simulation of Periodic Structures in a Layered Medium," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [338] J. Song, and Q. H. Liu, "3D Non-Uniform Fast Fourier Transform (NUFFT) Based Migration for Subsurface Object Imaging," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [339] J. Song, and Q. H. Liu, "A Novel Medical Ultrasound Image Reconstruction Method Through Migration," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [340] M. Chai, G. Zhao, and Q. H. Liu, "A Hybrid Technique Combining PSTD, ADI, and FDTD Methods for Mixed Scale Problems," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [341] D. Liu, G. Kang, J. Krolik, Q. H. Liu, L. Carin, "Electromagnetic Time Reversal Imaging and Communications," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [342] T. Xiao, and Q. H. Liu, "Time-Domain Simulation of Negative Refractive Index Materials," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [343] T. Xiao, and Q. H. Liu, "An Enlarged Cell Technique for the Conformal FDTD Method to Model Perfectly Conducting Objects," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [344] J. Liu, and Q. H. Liu, "A Hybrid FEM/SIM Method for Electromagnetic Scattering from Objects with an Exact Radiation Boundary Condition," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [345] E. Simsek, J. Liu, and Q. H. Liu, "A Spectral Integral Method for Layered Media," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [346] T. Xiao, Q. H. Liu, Y. Chen, W. T. Joines, S. A. Wartenberg, and L. Carin, "Design of a Resistively-Loaded Printed Vee Antenna for Ground Penetrating Radars Using ECT-CFDTD Method," 2005 URSI Meeting Abstract, Washington, DC, July 2005.
 - [347] T. Xiao, M. Chai, and Q. H. Liu, "A Hybrid Time-Domain Method for Electromagnetic Problems in Microelectronic Packaging," PIERS'97, Boston, MA, March 2006.
 - [348] J. Liu, J. -H. Lee, E. Simsek, and Q. H. Liu, "A Hybrid Spectral Integral Method/spectral Element Method for Electromagnetic Wave Scattering," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
 - [349] T. Xiao, and Q. H. Liu, "A Flexible Multiscale Technique for Electromagnetic Simulation," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
 - [350] K. H. Lim, and Q. H. Liu, "Thermoacoustic tomography modeling with spectral element method," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
 - [351] C. Yu, E. Simsek, and Q. H. Liu, "Accurate Simulation of Electromagnetic Waves Scattered by 3D Objects in a Multilayered Medium by a Surface Integral Equation Method," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
 - [352] J. Liu, E. Simsek, and Q. H. Liu, "A 3-D Spectral Integral Method for Acoustic and Electromagnetic Wave Scattering," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.

- [353] K. H. Lim, G. Ye, and Q. H. Liu, "3D EIT Forward and Inverse Modeling," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [354] C. Yu, B. Wei, and Q. H. Liu, "Tunnel Detection and Imaging: 2D and 3D Forward and Inverse Solvers," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [355] E. Simsek, J. Liu, and Q. H. Liu, "A 2D Hybrid Spectral-Integral/Finite-Element Method for Layered Media," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [356] J. -H. Lee, T. Xiao, and Q. H. Liu, "A Discontinuous Spectral Element Time-Domain Method for Electromagnetic Devices," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [357] T. Xiao, J. Guo, and Q. H. Liu, "Nanophotonics Application of 3D Spectral Discontinuous Galerkin Method and Enlarged Cell Technique," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [358] J. -H. Lee, and Q. H. Liu, "A 3-D Spectral Element Time-Domain (SETD) Method for Electromagnetic Wave Problems," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [359] M. Chai, T. Xiao, G. Zhao, and Q. H. Liu, "A Hybrid PSTD/FDTD Method for Multiscale Problems," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [360] M. Chai, T. Xiao, and Q. H. Liu, "Large EMI/EMC Simulations with the Hybrid PSTD/FDTD Method," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.
- [361] E. Simsek, J. Liu, and Q. H. Liu, "A 3D Spectral Integral Method for Layered Media," 2006 URSI Meeting Abstract, Albuquerque, NM, July 2006.