

Dan Jiao

Jan/2021

Name: Dan Jiao

Education:

<i>Degree</i>	<i>Date</i>	<i>School</i>
PhD	Oct. 2001	Univ. of Illinois at Urbana-Champaign
PhD Student	1996-1998	University of Science and Technology of China, P. R. China
MSEE	July 1996	Anhui University, P. R. China Graduation with the Highest Honor
BSEE	July 1993	Anhui University, P. R. China Graduation with the Highest Honor Exempted from Graduate Entrance Exam

Professional and Honorary Society Memberships:

Fellow of Institute of Electrical and Electronics Engineering (IEEE)

Member of the following societies:

IEEE Antennas and Propagation (AP) Society
IEEE Microwave Theory and Techniques (MTT) Society
IEEE Council on Electronic Design Automation
IEEE Components, Packaging, and Manufacturing Technology
Society of Industrial and Applied Mathematics (SIAM)
IEEE Women in Engineering

Honors and Awards:

[1] IEEE MTT-Society Distinguished Microwave Lecturer 2020

One of the three selected (<https://mtt.org/distinguished-microwave-lecturers/>), for the term of 2021-2023. The IEEE Microwave Theory and Techniques Society (MTT-S) each year carefully selects a group of Distinguished Microwave Lecturers (DMLs) who are internationally recognized experts and technical leaders in their fields within the Society. The DMLs are available to present talks to local chapters world-wide and serve as ambassadors for the Society.

[2] Best Student Paper Award Finalist, (Student: L. Xue, Advisor: D. Jiao), *2020 IEEE Antennas and Propagation Symposium* (AP-S)
July 2020

This paper is titled “Fast Method for Accelerating Convergence in Iterative Solution of Frequency-Domain Partial Differential Equation Methods.” One of 10 papers selected as finalists, and awarded a stipend of \$1600.

- [3] HONORABLE MENTION AWARD, (Student: C. Yang, Advisor: D. Jiao), *the 2020 IEEE International Symposium on Antennas and Propagation*. July 2020

This paper is titled “Nested Reduction Algorithm for Generating H²-Matrix Representation of Electrically Large Surface Integral Operators from FMM.” A stipend of \$1500.

- [4] Intel’s 2019 Outstanding Researcher Award 2019

Annually, Intel recognizes the exceptional contributions made through Intel university-sponsored research with Outstanding Researcher Awards. These distinguished researchers and technologists have been nominated and selected by Intel's Corporate Research Council (CRC) and the Strategic Research Sector (SRC) committee.

In selecting the award winners, careful consideration is given to the fundamental insights, industrial relevance, technical difficulty, communications and potential student hiring associated with a candidate's research program. Prof. Jiao is one of the 7 recipients.

- [5] Appointed to Chair of WIE (Women in Engineering) of the IEEE AP-S (Antennas and Propagation Society) 2019

- [6] Appointed to Tatsuo Itoh Prize (IEEE MWCL Best Paper) committee 2019, 2020

- [7] Best Student Paper Award Finalist, (Student: L. Xue, Advisor: D. Jiao), *IEEE International Microwave Symposium (IMS)*. June 2019

This paper is titled “Rapid Inverse Modeling of Integrated Circuit Layout in Both Frequency and Time Domain,” *the 2019 IEEE International Microwave Symposium (IMS)* held in Boston, MA.

- [8] Best Student Paper Award Finalist, (Student: S. Sun, Advisor: D. Jiao), *the 2019 IEEE International Symposium on Antennas and Propagation*. July 2019

This paper is titled “Multiphysics Modeling of Crosstalk Effect in Graphene-Encapsulated Cu Nano-Interconnects,” *the 2019 IEEE*

International Symposium on Antennas and Propagation, held in July 2019, Atlanta, GA.

- [9] Selected to IEEE Fellows Committee of the IEEE AP-S (Antennas and Propagation Society) 2018

This Committee selects new IEEE fellows for AP-S society

- [10] Appointed to Chair of the Best Paper Awards Committee of the IEEE AP-S 2018

This Committee selects Best Transactions Papers published in the society.

- [11] Appointed to Chair of WIE (Women in Engineering) of the IEEE AP-S (Antennas and Propagation Society) 2018

- [12] HONORABLE MENTION AWARD, (Student: M. Ma, Advisor: D. Jiao), *the 2018 IEEE International Symposium on Antennas and Propagation*. July 2018

This paper is titled "Accuracy Controlled H2-Matrix-Matrix Product in Linear Complexity and Its Applications," *the 2018 IEEE International Symposium on Antennas and Propagation*, held in July 2018, Boston, MA.

- [13] HONORABLE MENTION AWARD, (Student: M. Ma, Advisor: D. Jiao), *the 2018 IEEE International Symposium on Antennas and Propagation*. July 2018

This paper is titled "Symmetric Positive Semi-Definite FDTD Subgridding Algorithm in Both Space and Time," *the 2018 IEEE International Symposium on Antennas and Propagation*, held in July 2018, Boston, MA.

- [14] Cadence's Women in Technology Scholarship (Student: M. Ma, Advisor: D. Jiao). 2018

Cadence Women in Tech Scholarship winners are selected to receive a \$5,000 scholarship. Winners must demonstrate a strong academic record and exemplify leadership and demonstrate passion in technology.

- [15] IEEE Region 4 Outstanding Student Award (Student: Michael Hayashi, Advisor: D. Jiao) 2018

The "IEEE Region 4 Outstanding Student" Award recognizes one student who has exhibited exceptional performance both as a

student and as a young professional through his or her contributions to the Institute, their university and membership in Region 4.

- [16] Appointed to Chair of WIE (Women in Engineering) of the IEEE AP-S (Antennas and Propagation Society) 2017
- [17] Selected to the IEEE AP-S (Antennas and Propagation Society) Fellows Committee 2016

This Committee selects new IEEE fellows for AP-S society.

- [18] HONORABLE MENTION AWARD, (Student: M. Ma, Advisor: D. Jiao), *the 2016 IEEE International Symposium on Antennas and Propagation*. June 2016

This paper is titled “New HSS-Factorization and Inversion Algorithms with Exact Arithmetic for Efficient Direct Solution of Large-Scale Volume Integral Equations,” *the 2016 IEEE International Symposium on Antennas and Propagation*, held in June 26 to July 1, 2016, Fajardo, Puerto Rico.

- [19] Best Student Paper Award Finalist, (Student: J. Yan, Advisor: D. Jiao), IEEE International Microwave Symposium (IMS) Symposium. May 2016

This paper is titled “Explicit and Unconditionally Stable FDTD Method Without Eigenvalue Solutions,” the 2016 IEEE International Microwave Symposium (IMS) held in San Francisco, CA, May 22-27, 2016.

- [20] Best Student Paper Award, 2nd Place winner, (Student: M. Ma, Advisor: D. Jiao), ACES 2016 conference. Mar. 2016

This paper is titled “HSS-Matrix Based Fast Direct Volume Integral Equation Solver for Electrodynamical Analysis,” the IEEE International Conference on Wireless Information Technology and Systems (ICWITS) and Applied Computational Electromagnetics (ACES), held in Honolulu, Hawaii in March 13-17, 2016.

- [21] Elevated to IEEE Fellow Nov. 2015

For contributions to computational electromagnetics.

- [22] Best Student Paper Award, 2nd Place winner, (Student: B. Zhou, Advisor: D. Jiao), ACES 2015 conference. Mar. 2015

This paper is titled “Direct Finite Element Solver of Linear Complexity for Analyzing Electrically Large Problems,” the 31th International Review of Progress in Applied Computational Electromagnetics (ACES 2015) Conference, held in Williamsburg, VA in March 22-26.

- [23] Best Student Paper Award Finalist, (Student: M. Gaffar, Advisor: D. Jiao), IEEE International Microwave Symposium (IMS) Symposium. May 2015

This paper is titled “An Alternative Method for Making an Explicit FDTD Unconditionally Stable.”

- [24] Two Best Paper Award Finalists, 2015 IEEE Symposium on Electromagnetic Compatibility and Signal Integrity, Mar. 2015

One is titled “Method for Accurate and Efficient Signaling Analysis of Nonlinear Circuits” authored by Prof. Jiao and student Jianfang Zhu; the other is titled “Fast Structure-Aware Direct Time-Domain Finite Element Solver for Large-Scale On-Die Power Grid Simulation” authored by student Woochan Lee and Prof. Jiao.

- [25] BEST PAPER IN SESSION AWARD, (Student: B. Zhou, Advisor: D. Jiao), TECHCON 2014 conference. Sept. 2014

This best paper of chip-package co-design session is entitled “Linear (Optimal) Complexity Direct Full-Wave Solution of Full-Package Problems Involving over 10 Million Unknowns on a Single Computer.” TECHCON is the annual research conference held by SRC (Semiconductor Research Corporation). The technical papers selected represent a summary of the best research in SRC’s portfolio across all SRC’s research programs. Best Paper in Session awards are selected based on technical content, perceived value, technology transfer, and presentation.

- [26] BEST STUDENT PAPER AWARD Finalist, (Student: S. Omar, Advisor: D. Jiao), the 2014 IEEE International Symposium on Antennas and Propagation (AP-S), the premium conference in Electromagnetics July 2014

S. Omar and D. Jiao, “An $O(N)$ Direct Volume IE Solver with a Rank-Minimized H^2 -Representation for Large-Scale 3-D Circuit Extraction in Inhomogeneous Materials.” Ranked the highest among all student papers in Computational electromagnetics.

- [27] ELATE Fellow May 2014

Prof. Jiao was among the 21 women faculty selected across the country as the 2014-2015 Fellow of ELATE (Executive Leadership in Academic Technology and Engineering) at Drexel, a national leadership program for women in the academic STEM fields.

- [28] BEST STUDENT PAPER AWARD Finalist, (Student: S. Omar, Advisor: D. Jiao), IEEE International Microwave Symposium (IMS), the premium conference in Microwave June 2014

S. Omar and D. Jiao, "A Linear Complexity H^2 -matrix Based Direct Volume Integral Solver for Broadband 3-D Circuit Extraction in Inhomogeneous Materials."

- [29] Sergei A. Schelkunoff Best Paper Award of the IEEE Antennas and Propagation Society 2013

The Sergei A. Schelkunoff Prize Paper Award is presented to the author of the BEST PAPER published in the *IEEE Transactions on Antennas and Propagation* during the previous year. This paper is titled "Explicit Time-Domain Finite-Element Method Stabilized for an Arbitrarily Large Time Step," published in the *IEEE Transactions on Antennas and Propagation*, vol. 60, no. 11, pp. 5240-5250, Nov. 2012, authored by Qing He, Houle Gan, and Prof. Dan Jiao. Qing He and Houle Gan are Prof. Jiao's Ph.D. students.

- [30] University Faculty Scholar 2013

University Faculty Scholars at Purdue are select associate and full professors who have been in that rank for no more than five years and are on an accelerated path toward academic distinction. University Faculty Scholars receive additional funding to support their research.

- [31] BEST STUDENT PAPER AWARD Finalist, (Student: B. Zhou, Advisor: D. Jiao), *the 2013 IEEE International Symposium on Antennas and Propagation*, 2013

B. Zhou and D. Jiao, "A Linear Complexity Direct Finite Element Solver for Large-Scale 3-D Electromagnetic Analysis."

- [32] BEST STUDENT PAPER AWARD Finalist, (Student: M. Gaffar, Advisor: D. Jiao), *the 2013 IEEE International Microwave Symposium (IMS)*, 2013

M. Gaffar and D. Jiao, "An Explicit and Unconditionally Stable FDTD Method for 3-D Electromagnetic Analysis."

- [33] BEST STUDENT PAPER AWARD (Student: Q. He, Advisor: D. Jiao), *the 2012 International Workshop on Finite Elements for Microwave Engineering (FEM2012)*, 2012

This paper was titled “An Explicit and Unconditionally Stable Time-Domain Finite-Element Method of Linear Complexity.”

- [34] BEST STUDENT PAPER AWARD Finalist (Student: W. Chai, Advisor: D. Jiao), *the 2012 International Annual Review of Progress in Applied Computational Electromagnetics (ACES)*, the premium conference in Computational Electromagnetics 2012

The paper was titled “A Theoretical Study on the Rank of the Integral Operators for Large-Scale Electrodynamical Analysis.”

- [35] THREE HONORABLE MENTION AWARDS, (Students: B. Zhou, F. Sheng, and W. Chai, Advisor: D. Jiao), *the 2012 IEEE International Symposium on Antennas and Propagation*, 2012

B. Zhou and D. Jiao, “A Fast Direct Finite Element Solver for Large-Scale 3-D Electromagnetic Analysis.”

F. Sheng and D. Jiao, “A Minimal Order Model from Zero to High Frequencies and Its Fast Generation for Finite-Element Based 3-D Electromagnetic Analysis.”

W. Chai and D. Jiao, “A Fast H^2 -Based Integral Equation Solver with an Optimized H^2 -Partition and Minimized Rank for Large-Scale Electromagnetic Analysis.”

- [36] Chosen for National Academy of Engineering’s 2011 US Frontiers of Engineering symposium 2011

Prof. Jiao was among the 85 of the nation’s brightest young engineers selected to take part in the National Academy of Engineering’s (NAE) 17th annual US Frontiers of Engineering symposium. The participants — engineers ages 30 to 45 who are performing exceptional engineering research and technical work in industry, academia, and government — were nominated by fellow engineers or organizations and chosen from approximately 315 applicants.

- [37] IEEE Transactions on Advanced Packaging 2010 BEST PAPER AWARD Finalist 2010

Prof. Jiao’s paper was one of the three finalists. The paper was titled “A Theoretically Rigorous Full-Wave Finite-Element-Based Solution of Maxwell’s Equations from DC to High Frequencies,”

published in *the IEEE Trans. Advanced Packaging*, vol. 33, no. 4, pp. 1043-1050, 2010. It was nominated for fundamentally resolving the low-frequency breakdown problem in 3-D full-wave solvers.

- [38] BEST STUDENT PAPER AWARD Finalist (Student: Q. He, Advisor: D. Jiao), *the 2011 IEEE International Symposium on Antennas and Propagation*, the premium conference in Electromagnetics 2011

The paper was titled “An Explicit Time-Domain Finite-Element Method that is Unconditionally Stable.” It was ranked the 4th in the final competition, the highest rank among papers in Computational Electromagnetics.

- [19] BEST STUDENT PAPER AWARD (Student: H. Liu, Advisor: D. Jiao), 2nd Place winner, *the 2011 International Annual Review of Progress in Applied Computational Electromagnetics (ACES)*, 2011

The paper was titled “Layered H-Matrix Based LU factorization of Significantly Reduced Complexity for Direct Finite-Element-Based Computation of Large-Scale Electromagnetic Problems.”

- [20] HONORABLE MENTION AWARD (Student: W. Chai, Advisor: D. Jiao), *the 2011 IEEE International Symposium on Antennas and Propagation* 2011

The paper was titled “An H^2 -Based Direct Integral Equation Solver of Linear Complexity for Full-Wave Extraction of 3-D Structures in Multiple Dielectrics.”

- [21] IEEE Antennas and Propagation Society Doctoral Research Award (Student: W. Chai, Advisor: D. Jiao) 2010

For work titled “Beyond $O(M \log M)$ —An H^2 -Matrix Framework for Reducing the Complexity of Computational Electromagnetic Methods.”

- [22] BEST STUDENT PAPER AWARD Finalist (Student: J. Zhu, Advisor: D. Jiao), *the 2010 IEEE International Symposium on Antennas and Propagation* 2010

The paper was titled “A Theoretically Rigorous Solution for Fundamentally Eliminating the Low-Frequency Breakdown Problem in Finite-Element-Based Full-Wave Analysis.”

- [23] HONORABLE MENTION AWARD (Student: W. Chai, Advisor: D. Jiao), *the 2010 IEEE International Symposium on Antennas and Propagation* 2010

The paper was titled “A Complexity-Reduced H-Matrix Based Direct Integral Equation Solver with Prescribed Accuracy for Large-Scale Electrodynamics Analysis.

- [24] Ruth and Joel Spira Outstanding Teaching Award 2010

Bestowed by School of Electrical and Computer Engineering at Purdue University

- [25] IEEE Antennas and Propagation Society Doctoral Research Award (Student: H. Gan, Advisor: D. Jiao) 2009

One of the three recipients selected throughout the world for 2008-2009.

- [26] BEST STUDENT PAPER AWARD NOMINATION (Student: W. Chai, Advisor: D. Jiao), *the 2009 International Annual Review of Progress in Applied Computational Electromagnetics (ACES)* 2009

- [27] NSF CAREER Award 2008

The proposal was titled “From $O(N)$ to $O(M)$: Scalable Algorithms for Large Scale Electromagnetics-Based Analysis and Design of Next Generation VLSI Circuits.”

- [28] Honorable Mention Paper and Travel Support Award, (Student: J. Lee, Advisor: D. Jiao), *the 2008 IEEE International Symposium on Antennas and Propagation* 2008

- [29] DARPA Young Faculty Award Finalist 2007

One of the 50 young faculty members selected throughout the United States. This is the second time Prof. Jiao was selected.

The proposal was titled “Breaking the $O(N)$ Barrier: Scalable Algorithms for Large-Scale Electromagnetics-Based Analysis and Design of Next Generation Military Microsystems.”

- [30] One of the two Purdue Nominees for the Packard Fellowship for Science and Engineering, 2007

Every year, the Packard Foundation invites the presidents of 50 universities to nominate two young professors each from their institutions.

- [31] ONR Award through Young Investigator Program 2006
 Ranked top 20 nationally. The proposal was titled “A fast and high-capacity electromagnetic solution for high-frequency mixed-signal IC design.”
- [32] DARPA Young Faculty Award Finalist 2006
 One of the 50 young faculty members selected throughout the United States. The competition was carried out in three rounds. There were 50 members who were selected into the final round
 The proposal was titled “Co-Design Technologies for Ultra Large Scale Integration (CODE-for-ULSI).”
- [33] Jack and Cathie Kozik Faculty Start-up Award, 2006
 Recognize one outstanding new faculty at Purdue ECE.
- [34] BEST PAPER AWARD, DTTC 2004
 D. Jiao, J. Kim, and C. Dai, “BroadSpice: Generic Broadband SPICE Model of High-Speed Circuits,” *2004 Intel Design and Test Technology Conference (DTTC)* (This is the premium conference at Intel, which is held once a year).
- [35] Intel Technology Computer Aided Design (TCAD) Divisional Achievement Award 2004
 For the development of interconnect modeling application platform
- [36] Intel Logic Technology Development (LTD) Divisional Achievement Recognition Award 2003
 In recognition of her excellent work on the industry-leading BroadSpice modeling/simulation capability
- [37] Intel TCAD Divisional Achievement Award 2003
 For the development of innovative full-wave solvers for high frequency IC design
- [38] Paper Ranked No. 1, SISPAD 2003

D. Jiao, M. Mazumder, S. Chakravarty, C. Dai, M. J Kobrinsky, M. C Harmes, and S. List, "A Novel Technique for Full-wave Modeling of Large-Scale Three-Dimensional High-Speed On/Off-chip Interconnect Structures." This paper was ranked No. 1 among all the papers submitted to *2003 International Conference on Simulation of Semiconductor Processes and Devices*. In this conference, a score was given by the review panel to every paper submitted to this conference.

- [39] Intel LTD Team Quality Award 2002
 For her outstanding contribution to the development of the measurement capability and simulation tools for high frequency on-chip cross-talk
- [40] Intel Hero Award (the tenth recipient Intel-wide) 2002
 For the timely and accurate two- and three-dimensional full-wave simulations, bestowed by Intel's Components Research
- [41] Raj Mittra Outstanding Research Award, UIUC 2000
 Recognize the best graduate student researcher in Electromagnetics area, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign
- [42] Research Achievement Award, Anhui Province, P. R. China 1998
- [43] Graduation with the Highest Honor, Anhui University, 1996
- [44] Excellent Graduate Student Award, Anhui University
 1995-1996, 1994-1995
- [45] Exempted from the Graduate Entrance Examination, Anhui University 1993
 Only 1 student was selected out of each department.
- [46] Graduation with the Highest Honor, Anhui University 1993
- [47] Highest Undergraduate Scholarship, ranked No. 1 in Dept. of Electronic Engineering each semester during undergraduate years, Anhui University 1989-1993

Professional Experiences:

Oct. 2001 - Dec. 2003	Sr. CAD Engineer (Grade 7), Intel Corporation, Santa Clara, CA
Jan. 2004 - Dec. 2004	Staff Engineer (Grade 8), Intel Corporation, Santa Clara, CA, (Very Early Promotion)
Jan. 2005 - Sept. 2005	Sr. Staff Engineer (Grade 9), Intel Corporation, Santa Clara, CA, (Very Early Promotion)
Jan. 2004 - Sept. 2005	Corporate-Wide Consultant on Electromagnetics and High-frequency Computer Aided Design, Intel Corporation, Santa Clara, CA
Sept. 2005 – Aug. 2009	Assistant Professor, School of Electrical and Computer Engineering, Purdue University
Aug. 2009 – Aug. 2013	Associate Professor with tenure, School of Electrical and Computer Engineering, Purdue University
Aug. 2013 –	Full Professor, School of Electrical and Computer Engineering, Purdue University
Jan. 2018 – July 2020	Director of Graduate Admissions, School of Electrical and Computer Engineering, Purdue University
July 2020 –	Associate Head for Resource Planning and Management, School of Electrical and Computer Engineering, Purdue University

Professional Society Activities:

Session Organizer and Chair, “New Challenges and Opportunities in Computational Electromagnetics,” *Progress in Electromagnetics Research Symposium*, 2007.

Session Chair, “Finite Element Method and Applications,” *2007 IEEE International Symposium on Antennas and Propagation*.

Technical Program Committee Member, *IEEE International Symposium on Antennas and Propagation* (the premium conference in Electromagnetics), 2008.

Session Organizer and Chair, “On-Chip Electromagnetics,” *2008 IEEE International Symposium on Antennas and Propagation*.

Session Chair, “Materials and Periodic Structures,” *The 9th Int. Workshop on Finite Elements for Microwave Engineering*, Bonn, Germany, May 2008.

Invited NSF Review Panelist, 2008

Invited NSF Career Review Panelist, 2009

Session Organizer and Chair, "Computational Electromagnetic Methods of Significantly Reduced Complexity for High-Speed IC Design," *the 25th International Annual Review of Progress in Applied Computational Electromagnetics* (ACES 2009)

Invited Single Guest Editor for the special issue of *the IEEE Transactions on Advanced Packaging* titled "Recent Progress in Electrical Modeling and Simulation of High-Speed Integrated Circuits and Packages," no. 4, 2010.

Associate Editor of the *IEEE Transactions on Advanced Packaging*, 2009-2011
Session Chair, "Finite Element Techniques and Domain Decomposition," 2009 *IEEE International Symposium on Antennas and Propagation*.

Session Chair, "Preconditioning and Fast Methods II," 2009 *IEEE International Symposium on Antennas and Propagation*.

Session Organizer and Chair, "Advanced Finite Element Methods for Circuit Modeling," *the 10th Int. Workshop on Finite Elements for Microwave Engineering*, Oct 12th-13th, 2010, Meredith, NH, USA.

Invited NSF Review Panelist, 2010

Session Chair, "Fast Integral Equation Solution Schemes," 2010 *IEEE International Symposium on Antennas and Propagation*.

Session Chair, "Modeling and Simulation," *the IEEE 19th Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS)*, 2010

External thesis evaluator, University of Hong Kong, 2008

External thesis evaluator, National University of Singapore, 2010

External proposal evaluator, Portugal Electrical Engineering Evaluation, 2010

Technical Program Committee Member, *the IEEE Electrical Design of Advanced Packaging & Systems Symposium (EDAPS)*, 2011

Workshop organizer, "H²-matrix based linear-complexity integral-equation solvers for large-scale electromagnetic analysis," 2011 *International Annual Review of Progress in Applied Computational Electromagnetics*

Session Organizer and Chair, "Electrical Analysis of Electronic Packages," *the ASME 2011 Pacific Rim Technical Conference and Exhibition on Packaging and Integration of Electron and Photonic Systems, MEMS and NEMS.*

Invited NSF Review Panelist, 2011

Session Chair, "Time-Domain Finite Element Method," *the 2011 IEEE International Symposium on Antennas and Propagation*, July, 2011

Session Chair, "Model reduction and accelerated extraction," *the 48th ACM/EDAC/IEEE Design Automation Conference (DAC)*, June, 2011

Session Chair, "Jitter Modeling and Analysis," *the IEEE 20th Conference on Electrical Performance of Electronic Packaging and Systems*, Oct. 2011.

Session Chair, "Signal Integrity," *the IEEE Electrical Design of Advanced Packaging & Systems Symposium (EDAPS)*, Dec. 2011.

Technical Program Committee Member, *the 49th ACM/EDAC/IEEE Design Automation Conference (DAC)*, 2012, the premium conference in electronic design automation

Technical Program Committee Member, *the IEEE International Microwave Symposium (IMS)*, 2012, the premium conference in microwave

Associate Editor, *IEEE Trans. on Components, Packaging, and Manufacturing Technology*, 2011-

Invited NSF workshop participant, NSF Workshop on Micro, Nano, Bio Systems, March 2012

Session Chair, "Direct Matrix Solvers in CEM: PDEs and IEs," *the 2012 International Annual Review of Progress in Applied Computational Electromagnetics (ACES)*, April 2012.

Session Organizer and Chair, "FEM methods for the analysis and design of integrated circuits," *the 11th International Workshop on Finite Elements for Microwave Engineering*, June 2012.

Session Chair, "Integral Equation Solvers for Large and Multi-Scale Problems," *the 2012 IEEE International Symposium on Antennas and Propagation*, July 2012.

Session Chair, "Fast Methods," *the 2012 IEEE International Symposium on Antennas and Propagation*, July 2012.

Student Paper Competition Judge, *the 2012 IEEE International Microwave Symposium (IMS)*, June 2012.

Technical Program Committee Member, *the 50th ACM/EDAC/IEEE Design Automation Conference (DAC)*, 2013, the premium conference in electronic design automation

Technical Program Committee Member, *the IEEE International Microwave Symposium (IMS)*, 2013, the premium conference in microwave

Technical Program Committee Member, *IEEE International Symposium on Antennas and Propagation*, 2013, the premium conference in Electromagnetics

Technical Program Committee Member, *IEEE MTT International Microwave & RF Conference (IMaRC)*, 2013, premier annual international meeting in India for microwave theory and practice

Session Chair, "Well-Conditioned Integral Equation Formulations," *the IEEE International Symposium on Antennas and Propagation*, July 2013.

Session Chair, "Advanced Frequency- and Time-Domain Finite Element Methods," *the IEEE International Symposium on Antennas and Propagation*, July 2013.

Session Chair, "Electromagnetics," *the IEEE 22th Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS)*, 2013.

Steering Committee Member, *the first IEEE International Conference on Signal and Power Integrity (SIPI)*, 2014.

Technical Program Committee, Vice-Chair for the Frequency- and Time-Domain Methods subcommittee, *the IEEE International Microwave Symposium (IMS)*, 2014, the premium conference in microwave

Technical Program Committee, *IEEE International Conference on Numerical Electromagnetic Modeling and Optimization (NEMO)*, 2014.

Technical Program Committee Member, *the 51th ACM/EDAC/IEEE Design Automation Conference (DAC)*, 2014, the premium conference in electronic design automation

Technical Program Committee Member, *IEEE International Symposium on Antennas and Propagation*, 2014.

NSF Review Panelist, 2014

- Technical Program Committee Member, the *12th Int. Workshop on Finite Elements for Microwave Engineering*, 2014.
- Session Chair, Algebraic and Kernel-Dependent Solvers for Integral Equations, *IEEE International Symposium on Antennas and Propagation*, 2014
- Session Chair, Fast Integral Equation Solvers, *IEEE International Symposium on Antennas and Propagation*, 2014.
- Session Chair, Time-Domain Finite Element and Discontinuous Galerkin Methods, *IEEE International Symposium on Antennas and Propagation*, 2014.
- Session Chair, Advanced Methods for the Analysis and Design of High-Speed Interconnect, Packaging, and Printed Circuit Board Structures, *IEEE International Microwave Symposium (IMS)*, 2014.
- Session Chair and Organizer, Fast Direct Solvers, the *12th Int. Workshop on Finite Elements for Microwave Engineering*, 2014.
- Technical Program Committee, Vice Chair, Subcommittee of Time- and Frequency-domain EM analysis techniques, *IEEE International Microwave Symposium (IMS)*, 2015.
- Technical Program Committee Member, *IEEE International Symposium on Antennas and Propagation*, 2015.
- Chair, Subcommittee of Numerical Modeling and Simulation Techniques, Technical Program Committee, *IEEE International Conference on Electromagnetic Compatibility and Signal Integrity*, 2015.
- Technical Program Committee, Member, *IEEE International Conference on Numerical Electromagnetic Modeling and Optimization (NEMO)*, 2015.
- Technical Program Committee, Member, *Computational Electromagnetics International Workshop (CEM'15)*, 2015.
- Session Chair, *Computational Electromagnetics International Workshop (CEM'15)*, July 2015.
- Session Chair, Novel Finite Element and Domain Decomposition Methods, *IEEE International Symposium on Antennas and Propagation*, July 2015.
- Session Chair, FDTD Methods, *IEEE International Symposium on Antennas and Propagation*, July 2015.

Session Chair, Integral Equations for Anisotropic and Inhomogeneous Objects in Frequency and Time Domain, *IEEE International Symposium on Antennas and Propagation*, July 2015.

Session Chair, Advanced Finite Element Methods, *IEEE International Symposium on Antennas and Propagation*, July 2015.

Session Chair and Organizer, Emerging Fast Time-Domain Methods, *IEEE MTT-S International Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization (NEMO)*, Aug. 2015.

Session Chair, Recent Advances in Computational Electromagnetics and Its Application, *International Conference on Electromagnetics in Advanced Applications (ICEAA)*, Sept. 2015.

NSF Review Panelist, 2016

Technical Program Committee, Chair, Subcommittee of Time- and Frequency Domain EM Analysis Techniques, *IEEE International Microwave Symposium (IMS)*, 2016.

Technical Program Committee Member, *IEEE International Symposium on Antennas and Propagation*, 2016.

Session Chair, Advances in Finite Element-Based Methods, *IEEE International Symposium on Antennas and Propagation*, June 2016.

Session Chair, Fast and Stable Integral Equation Solvers, *IEEE International Symposium on Antennas and Propagation*, June 2016.

Scientific Committee Member, *13th International Workshop on Finite Elements for Microwave Engineering*, 2016.

Chair, Subcommittee of Numerical Modeling and Simulation Techniques, Technical Program Committee, *IEEE International Conference on Electromagnetic Compatibility and Signal Integrity*, 2016.

Technical Program Committee Member, *IEEE International Conference on Computational Electromagnetics (ICCEM)*, 2016.

Technical Program Committee, Co-Chair, SC-1 Computational Electromagnetics, *Progress in Electromagnetics Research Symposium (PIERS)*, 2016.

Best Paper Award Judge, *Progress in Electromagnetics Research Symposium (PIERS)*, 2016.

Invited Tutorial, “Low-Complexity Direct Solvers,” *IEEE International Conference on Wireless Information Technology and Systems (ICWITS) and Applied Computational Electromagnetics (ACES)*, 2016.

Keynote Speaker, “Recent Progress on Optimal-Complexity Direct Solvers,” *IEEE International Conference on Computational Electromagnetics (ICCEM)*, 2017.

Three NSF Panels, 2017

Technical Program Committee, Chair, Subcommittee of Time- and Frequency Domain EM Analysis Techniques, *IEEE International Microwave Symposium (IMS)*, 2017.

Technical Program Committee Member, *IEEE International Symposium on Antennas and Propagation*, 2017.

Session Chair, Advances in Finite Element-Based Methods, *IEEE International Symposium on Antennas and Propagation*, July 2017.

Session Chair, FDTD Advances, *IEEE International Symposium on Antennas and Propagation*, July 2017.

Session Chair, Advances in Numerical Techniques for Microwave Engineering, *IEEE International Microwave (IMS)*, June 2017.

Technical Program Committee, Member, *Computational Electromagnetics International Workshop (CEM'17)*, 2017.

Technical Program Committee, Co-Chair, SC-1 Computational Electromagnetics, *Progress in Electromagnetics Research Symposium (PIERS)*, 2017.

Technical Program Committee Subcommittee Chair on CAD for RF/analog, 2017 IEEE/ACM International Conference on Computer-Aided Design (ICCAD), 2017.

Session Chair, Novel EM Theory and Numerical Methods, *International Applied Computational Electromagnetics Society (ACES) Symposium*, Aug. 2017.

Student Paper Competition Judge, *International Applied Computational Electromagnetics Society (ACES) Symposium*, Aug. 2017.

One of the five judges, ICEAA -IEEE AWPL Young Scientist Best Paper AWARD, Sept. 2017.

Technical Program Committee, Co-Chair, Subcommittee of Time- and Frequency Domain EM Analysis Techniques, *IEEE International Microwave Symposium (IMS)*, 2018

NSF Panelist, 2018

Technical Program Committee, Track Chair, CAD for Analog/Mixed-Signal/RF and Multi-Domain Modeling, *2018 IEEE/ACM International Conference on Computer-Aided Design (ICCAD)*, 2018.

Technical Program Committee Member, *IEEE International Symposium on Antennas and Propagation*, 2018.

Session Chair, “Fast Integral Equation Solvers,” *IEEE International Symposium on Antennas and Propagation*, July 2018.

Session Chair, “Hybrid Methods,” *IEEE International Symposium on Antennas and Propagation*, July 2018.

Session Chair, “Recent Advances in the Finite Element Method,” *IEEE International Symposium on Antennas and Propagation*, July 2018.

Student Paper Competition Chair, *International Applied Computational Electromagnetics Society (ACES) Symposium*, Aug. 2018, China.

Member of IEEE Fellows Committee of the IEEE AP-S (Antennas and Propagation Society), 2017-2018

Chair of the Best Paper Awards Committee of the IEEE AP-S, 2018-2019

Chair of WIE (Women in Engineering) of the IEEE AP-S, 2018-2020

Member, 2019 Tatsuo Itoh Prize (IEEE MWCL Best Paper) committee

Conference General Chair, *IEEE MTT-S International Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization (NEMO)*, Boston, USA, May 2019.

Keynote Speaker, “Accuracy Controlled H²-Arithmetic for the Development of Next Generation Fast Electromagnetic Solvers”, *International Applied Computational Electromagnetics Society Symposium (ACES 2019)*, Nanjing, China.

Session Chair, “Integral Equation Methods II,” *IEEE International Symposium on Antennas and Propagation*, July 2019.

Session Chair, "Finite Element Methods," *IEEE International Symposium on Antennas and Propagation*, July 2019.

Session Chair, "Computational Electromagnetics II," *IEEE International Symposium on Antennas and Propagation*, July 2019.

Session Chair, "Modeling Techniques for Electromagnetics," IEEE Conf. CEM, Feb. 2019.

Session Chair, "Fast and Efficient Methods in Computational Electromagnetics," IEEE Conf. CEM, Feb. 2019.

Technical Program Committee, Subcommittee of Time- and Frequency Domain EM Analysis Techniques, *IEEE International Microwave Symposium (IMS)*, 2019

MTT-1: Field Theory and Computational EM, Committee Member, 2019-

Technical Program Committee, Chair of SC-1, Subcommittee of Field Analysis and Guided Wave, *IEEE International Microwave Symposium (IMS)*, 2020

Technical Program Committee, Chair, Track of Computational & Numerical Techniques, *IEEE International Symposium on Antennas and Propagation*, 2020

Member, 2020 Tatsuo Itoh Prize (IEEE MWCL Best Paper) committee

Session Chair, "Fast Methods," *IEEE International Symposium on Antennas and Propagation*, July 2020.

Session Chair, "Finite Element Methods," *IEEE International Symposium on Antennas and Propagation*, July 2020.

Session Chair, "Novel Components, Waveguides, and Methods for Radiating Structures," *IEEE International Microwave Symposium (IMS)*, 2020

Invited Tutorial, "Accuracy Controlled H^2 -Arithmetic for the Development of Next Generation Fast Electromagnetic Solvers," *the 36th International Review of Progress in Applied Computational Electromagnetics Conference (ACES 2020)*.

Invited Speaker, "Fast Solvers for Electromagnetics-Based Analysis and Design of Integrated Circuits and Systems," *IEEE AP/MTTS Chicago Chapter*, 2020.

Master's Thesis Supervision Completed:

Jongwon Lee Dec. 2007, "A Linear-Time Eigenvalue Solver for Solving Large-Scale Wave Propagation Problems in Inhomogeneously Filled Waveguides."

Ph.D. Thesis Supervision Completed:

- Houle Gan May 2010, "Time-Domain Finite-Element Reduction-Recovery Methods for Large-Scale Electromagnetics-Based Analysis and Design of Next Generation Integrated Circuits."
- Jongwon Lee November 2010, "Linear-Complexity Complex-Valued Eigenvalue Solvers for Electromagnetics-Based Analysis and Design of High-Speed Integrated Circuits."
- Jianfang Zhu July 2011, "On the Elimination of Low-Frequency Breakdown Problem and the Development of Fast Solvers for Finite-Element-Based Analysis of High-Speed ICs."
- Haixin Liu Jan. 2012, "H-Matrix Based Fast Direct Finite-Element Methods for Large-Scale Electromagnetic Analysis."
- Wenwen Chai Feb. 2012, "Linear-Complexity Integral-Equation Based Methods for Large-Scale Electromagnetic Analysis."
- Feng Sheng Feb. 2012, "Fast Algorithms for Frequency-Domain Finite Element Based Analysis of Integrated Circuits and Packages."
- Duo Chen June 2012, "Time-Domain Orthogonal Finite-Element Reduction-Recovery (OrFE-RR) Method for Electromagnetics-Based Analysis of Very Large Scale Integrated Circuit and Package Problems."
- Qing He Nov. 2012, "An Electromagnetics-Based Circuit Simulator of Linear Complexity, Linear Speedup, and Unconditional Stability."
- Saad Omar April 2014, "Fast Direct Volume Integral Equation Solvers for Large-Scale General Electromagnetic Analysis."
- Bangda Zhou Aug. 2015, "Linear Complexity Direct Finite Element Solvers for General Electromagnetic Forward Analysis and Inverse Design."

Md Gaffar	Feb. 2016, “Explicit and Unconditionally Stable Finite Difference Time Domain Methods for General Electromagnetic Analysis.”
Woochan Lee	Sept. 2016, “Fast Time- and Frequency-Domain Finite-Element Methods for Electromagnetic Analysis.”
Jin Yan	Dec. 2016, “Matrix-Free Time-Domain Methods for General Electromagnetic Analysis.”
Kaiyuan Zeng	May 2019, “Accurate and Efficient Methods for Multiscale and Multiphysics Analysis.”
Miaomiao Ma	Aug. 2019, “Accuracy Explicitly Controlled H^2 -Matrix Arithmetic in Linear Complexity and Fast Direct Solutions for Large-Scale Electromagnetic Analysis.”
Li Xue	Sept. 2020, “Rapid Modeling and Simulation Methods for Large-Scale and Circuit-Intuitive Electromagnetic Analysis of Integrated Circuits and Systems.”

PhD Thesis Students Currently Being Supervised:

Chang Yang	PhD (Qualify Exam/Aug. 2017)
Shuzhan Sun	PhD (New Hire/2017)
Yifan Wang	PhD (New Hire/2018)
Michael Hayashi	PhD (Qualify Exam/Aug. 2018)
Zhangchao Wei	PhD (New Hire/2018)
Vinicius Nascimento	PhD (New Hire/2020)

Master Thesis Student Supervised:

Skanda Kotethota	Master (2018)
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PostDocs Supervised:

Yanpu Zhao	Dec. 2014 – Dec. 2015
Ping Li	Dec. 2015 – Dec. 2016
Yuhang Dou	Feb. 2020 –

Visiting Scholars and PhD Students Supervised:

Yu Zhao PhD Student (2017 – 2018)

Xunwang Dang PhD Student (2017 – 2018)

Yi Wang Visiting Faculty (2018 – 2019)

Ning Xu PhD Student (2018 – 2020)

School Committee Activities:

Committee: Graduate Committee
Activity: Chair, 2015 – 2017

Committee: Graduate Admission Committee
Activity: Member, 2005 –
Activity: Director, 2017 –

Committee: Curriculum Committee
Activity: Member, 2007 – 2010

Committee: ECE Head Search Committee
Activity: Member, 2009 – 2010

Committee: ECE Ph.D. Qualify Exam Committee
Activity: Member, 2011 – 2014

Area: FO Area
Role: Chair, 2011 – 2014

Office: ECE Graduate Admissions
Role: Director, Jan. 2018 – July 2020
Leading and coordinating ECE graduate admissions of 2000+
on-campus and on-line students

Committee: ECE Power Area Faculty Search
Activity: Member, 2020

Committee: ECE Computational EM Faculty Search
Activity: Member, 2020

Engineering-Wide Committee Activities:

Committee: College of Engineering Strategic Plan, Professional
Development Team

Activity: Member: Aug. 2009 – Oct. 2009

Community: Engineering-wide New Faculty Community

Role: Co-Chair, 2011 – 2014

Research Book Contributions and Books Published:

- [1] J. Zhu and D. Jiao, "Solution to the low-frequency breakdown problem in computational electromagnetics," Chapter 8 in the *Computational Electromagnetics: Recent Advances and Engineering Applications* edited by Raj Mittra. Springer, 2013, pp. 259-316.
- [2] D. Jiao and J. M. Jin, "Asymptotic waveform evaluation for broadband calculations," Chapter 15 in the *Fast and Efficient Algorithms in Computational Electromagnetics* edited by W. C. Chew, J. M. Jin, E. Michielssen, and J. M. Song. Norwood, MA: Artech House, 2001, pp. 699-727.
- [3] D. Jiao and J. M. Jin, "Finite element analysis in time domain," Chapter 12 in *The Finite Element Method in Electromagnetics*, New York: John Wiley & Sons, 2nd edition, 2002, pp. 529-584.

Serial Journal Articles:

Published Journal Articles

- [1] D. Jiao, W. L. Zhi, and X. L. Wu, "Study on the Traditional and Modified Prony Method for Extracting Poles from Electromagnetic Transient Responses," *Journal of Anhui University*, no. 4, pp. 27-34, Dec. 1993.
- [2] X. L. Wu, D. Jiao, W. L. Zhi, and Z. Q. Peng, "A Method for Singularity Extraction from Targets' Transient Responses via Spline Functions and Rational Approximation," *Journal of China University of Science and Technology*, vol. 26, no. 4, pp. 528-533, Dec. 1996. (First Tier in China)
- [3] X. L. Wu, D. Jiao, and S. J. Xu, "Application of Wavelet Transform for Removing High-Frequency Noise from Targets' Late-Time Transient Responses," *Chinese Journal of Electronics (English version of Acta Electronic Sinica)*, vol. 6, no. 3, pp. 82-86, July 1997. (First Tier in China)
- [4] X. L. Wu, D. Jiao, and F. Biao, "New Algorithm for Calculating Poles of a Thin Wire Scatterer by FFT Method," *Journal of Southeast University*, vol. 27, no. 5, pp. 109-113, Sept. 1997.

- [5] X. L. Wu, D. Jiao, W. L. Zhi, and P. Z. Qiu, "A New Algorithm for Calculating Natural Frequencies of Scattering Objects," *Chinese Journal of Electronics (English version of Acta Electronic Sinica)*, vol. 7, no. 2, pp. 205-209, April 1998. (First Tier in China)
- [6] D. Jiao, S. J. Xu, X. L. Wu, S. X. Li, "Recovery of Signal from Transient Responses Contaminated by Gaussian White Noise Based on Orthogonal Bases of Compactly Supported Wavelets in Frequency Domain," *Chinese Journal of Electronics (Acta Electronic Sinica)*, vol. 27, no. 6, pp. 120-122, June 1999. (First Tier in China)
- [7] D. Jiao, S. J. Xu, and X. L. Wu, "New Algorithm for Natural Frequency Extraction," *Progress in Natural Science*, China, vol. 9, no. 7, pp. 545-552, July 1999. (First Tier in China)
- [8] D. Jiao, X. Y. Zhu, and J. M. Jin, "Fast and Accurate Frequency-Sweep Calculations Using Asymptotic Waveform Evaluation and Combined-Field Integral Equation," *Radio Science*, vol. 34, no. 5, pp. 1055-1063, Sept.-Oct. 1999.
- [9] F. Ling, D. Jiao, and J. M. Jin, "Efficient Electromagnetic Modeling of Microstrip Structures in Multilayer Media," *IEEE Trans. Microwave Theory Tech.*, vol. 47, no. 9, pp. 1810-1818, Sept. 1999.
- [10] D. Jiao and J. M. Jin, "Fast Frequency-Sweep Analysis of RF Coils for MRI," *IEEE Trans. Biomed. Eng.*, vol. 46, no. 11, pp. 1387-1390, Nov. 1999.
- [11] D. Jiao and J. M. Jin, "Fast Frequency-Sweep Analysis of Cavity-Backed Microstrip Patch Antennas," *Microwave Opt. Tech. Lett.*, vol. 22, no. 6, pp. 389-393, Sept. 1999.
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- [55] D. Chen and D. Jiao, "A Direct Domain-Decomposition Based Time-Domain Finite-Element Method of Linear Complexity for Simulating Multiscaled Structures in Integrated Circuit Systems," *IEEE Trans. Antennas Propagat.*, vol. 60, no. 11, pp. 5228 - 5239, Nov. 2012.
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- [213] C. Yang and D. Jiao, "Fast Algorithms for Converting an FMM-Based Representation of Electrically Large Integral Operators to a Minimal-Rank H^2 -Matrix," *IEEE International Symposium on Antennas and Propagation (AP-S)*, July 2019.
- [214] S. Sun and D. Jiao, "Multiphysics Modeling of Crosstalk Effect in Graphene-Encapsulated Cu Nano-Interconnects," *IEEE International Symposium on Antennas and Propagation (AP-S)*, July 2019. (**Best Student Paper Award Finalist**)

- [215] K. Zeng and D. Jiao, "Explicit Unconditionally Stable Symmetric Positive Semi-Definite FDTD Subgridding Algorithm with Analytical Removal of Unstable Modes," *IEEE International Symposium on Antennas and Propagation (AP-S)*, July 2019.
- [216] D. Wei and D. Jiao, "Truncating Matrix-free Time-Domain Method with PML for Solving 3-D Open Region Problems," *IEEE International Symposium on Antennas and Propagation (AP-S)*, July 2019.
- [217] C. Yang and D. Jiao, Nested Reduction Algorithm for Generating \mathcal{H}^2 -Matrix Representation of Electrically Large Surface Integral Operators from FMM," *IEEE International Symposium on Antennas and Propagation (AP-S)*, July 2020. **(HONORABLE MENTION AWARD, \$1500 STIPEND)**
- [218] D. Wei and D. Jiao, "Accurate and Stable Method for Solving Maxwell's Equations in Non-Conformal Mixed Tetrahedron and Brick Meshes," *IEEE International Symposium on Antennas and Propagation (AP-S)*, July 2020.
- [219] Li Xue and D. Jiao, "Fast Method for Accelerating Convergence in Iterative Solution of Frequency-Domain Partial Differential Equation Methods," *IEEE International Symposium on Antennas and Propagation (AP-S)*, July 2020. **(Best Student Paper Award Finalist, \$1600 Stipend)**
- [220] Y. Wang and D. Jiao, "Fast $O(N \log N)$ Algorithm for Generating \mathcal{H}^2 -Representation of Electrically Large Volume Integral Equations," *IEEE International Symposium on Antennas and Propagation (AP-S)*, July 2020.
- [221] Y. Dou and D. Jiao, "Fast Method for Large-Scale Signaling Analysis of Nonlinear Circuits Including Worst-Case Eye and Bit Error Rate Analysis," *IEEE International Microwave Symposium (IMS)*, 2021.

Invited Talks:

- [1] "Computational Electromagnetics for Fast Full-wave Design and Analysis of Next Generation Circuits," *California Institute of Technology*, Mar. 2003.
- [2] "Computational Electromagnetics for Fast Full-wave Design and Analysis of Next Generation Circuits," *Massachusetts Institute of Technology*, Mar. 2003.
- [3] "Computational Electromagnetics for High-Frequency IC Design," *IEEE International Symposium on Antennas and Propagation*, 2004.

- [4] “Computer-Aided Next Generation Microsystem Design with Electromagnetic Accuracy,” *The Johns Hopkins University*, Feb. 2004.
- [5] “Computer-Aided Design of Next Generation Circuits with Electromagnetic Accuracy,” *Duke University*, April, 2004.
- [6] “Surface-based finite element method for large-scale 3D Circuit Modeling,” *IEEE 14th Topical Meeting on Electrical Performance of Electronic Packaging*, 2005.
- [7] “Toward Accurate and Fast Broadband Modeling of the Die-Package Interaction,” *Intel Corporation*, Hillsboro, OR, Aug. 2006.
- [8] “High-Capacity Electromagnetic Solutions for High-Speed Full-Chip Design,” *University of Illinois at Urbana-Champaign*, Oct. 2006.
- [9] “High-Capacity Electromagnetic Solutions for High-Speed Full-Chip Design,” *University of Michigan*, Nov. 2006.
- [10] “A Time-Domain Layered Finite-element Reduction Recovery Method for Next Generation IC Design,” *DARPA Young Faculty Award Workshop*, Arlington, Nov. 2006.
- [11] “Breaking the $O(M)$ Barrier: Scalable Algorithms for Large Scale Electromagnetics-Based Analysis and Design of Next Generation VLSI Circuits,” *Intel Corporation*, Santa Clara, CA, Oct. 2007.
- [12] “Breaking the $O(M)$ Barrier: Scalable Algorithms for Large Scale Electromagnetics-Based Analysis and Design of Next Generation Military Microsystems,” *DARPA Young Faculty Award Workshop*, Arlington, Nov. 2007.
- [13] “An H^2 -Matrix-Based Integral-Equation Solver of Linear-Complexity for Large-Scale Full-Wave Modeling of 3D Circuits,” *Intel Corporation*, Santa Clara, CA, Oct. 2008.
- [14] “Time-Domain Orthogonal Finite-Element Reduction-Recovery (OrFE-RR) Method for Fast and Accurate Broadband Simulation of Die-Package Interaction,” *Intel Corporation*, Santa Clara, CA, Oct. 2008.
- [15] “Linear-Complexity Integral-Equation-Based Solvers for Solving Large-Scale Electrodynamical, Electrostatic, and Magnetostatic Problems,” *Synopsys Inc.*, Mountain View, CA, Oct. 2008.

- [16] "A Parallel Transient Simulator of Linear Speedup and Electromagnetic Accuracy for the Simulation of Die-Package Interaction," *Intel Corporation*, Hillsboro, OR, Oct. 2009.
- [17] "An Unconditionally Stable Time-Domain Finite Element Method of Significantly Reduced Computational Complexity for Large-Scale Simulation of IC and Package Problems," *Intel Corporation*, Hillsboro, OR, Oct. 2009.
- [18] "H²-Matrix-Based Fast Direct and Iterative Integral-Equation Solvers for Large-Scale Electromagnetic Analysis," *University of Illinois at Urbana-Champaign*, Mar. 2009.
- [19] "Fast Algorithms for Electromagnetics-Based Modeling and Simulation of High-Speed Integrated Circuits and Packages," *Massachusetts Institute of Technology*, June, 2009.
- [20] "Linear-Complexity Computational Electromagnetic Methods for the Analysis and Design of VLSI Circuits," *Shanghai Jiaotong University*, China, May 2010.
- [21] "Linear-Complexity Computational Electromagnetic Methods for the Analysis and Design of VLSI Circuits," *Zhejiang University*, China, May 2010.
- [22] "Linear-Complexity Computational Electromagnetic Methods for the Analysis and Design of Very Large Scale Integrated Circuits," *University of Science and Technology of China*, May 2010.
- [23] "Linear-Complexity Computational Electromagnetic Methods for the Analysis and Design of Very Large Scale Integrated Circuits," *Anhui University*, China, May 2010.
- [24] "Linear-Complexity Computational Electromagnetic Methods for Large-Scale Circuit Analysis," *Purdue University, Math Department*, April 2010.
- [25] "An H-matrix based framework for reducing the complexity of computational electromagnetic methods," *IEEE APS and MTT Chicago Chapter*, Nov. 2010.
- [26] "A Rigorous Method for Fundamentally Eliminating the Low-Frequency Breakdown Problem in Full-Wave Electromagnetics-Based Analysis," *University of Illinois at Urbana-Champaign*, April 2011.

- [27] “Recent Progress at Purdue in Integrated Circuit Modeling and Simulation Guided by Electromagnetics-Based First Principles,” *Sandia National Lab*, Albuquerque, NM, July 2011.
- [28] “An Extraction-Free Circuit Simulator of Linear Complexity and Its Linear Speedup,” *Intel Corporation*, Santa Clara, CA, Oct. 2011.
- [29] “Direct Matrix Solutions of Linear Complexity for the Modeling and Simulation of Next-Generation Integrated Circuits and Systems,” *NSF Workshop on Micro, Nano, Bio Systems*, Mar. 2012.
- [30] “Direct Matrix Solutions of Linear Complexity for Rapid Modeling and Design of High Bandwidth Package Interconnects,” *SRC IPS Back End Processes and Packaging Meeting*, Stanford University, CA, June 2012.
- [31] “Solution to Two Open Problems in Electromagnetics,” *Penn State University*, State College, PA, September, 2012.
- [32] “Explicit Time-Domain Methods that are Unconditionally Stable,” *IEEE International Symposium on EMC*, Aug. 2013.
- [33] “Direct Electromagnetic Solvers of Linear Complexity for Large-Scale Integrated Circuit Design,” *Georgia Institute of Technology*, EMAG Distinguished Lecturer Program, March, 2014.
- [34] “Explicit Time-Domain Methods that are Unconditionally Stable,” *Anhui University*, China, Oct. 2014.
- [35] “Direct Solvers of Linear Complexity for Large-Scale Electromagnetic Analysis,” *Beijing Institute of Technology*, China, Oct. 2014.
- [36] “Direct Solvers of Linear Complexity for Large-Scale Electromagnetic Analysis,” *Tsinghua University*, China, Oct. 2014.
- [37] “Low-Complexity Direct Solvers,” *the IEEE International Conference on Wireless Information Technology and Systems (ICWITS) and Applied Computational Electromagnetics (ACES)*, Honolulu, Hawaii in March 13-17, 2016.
- [38] “Explicit Time Domain Methods that Are Unconditionally Stable,” *University of Electronic Science and Technology of China*, Aug. 2016.
- [39] “Recent Progress on Optimal-Complexity Direct Solvers,” *IEEE International Conference on Computational Electromagnetics (ICCEM)*, Mar. 2017. (Keynote)

- [40] “Matrix-free Time-Domain Methods for Solving PDEs in Multiphysics,” *International workshop on high-performance computing for electromagnetics and multiphysics modeling*, Hangzhou, China, May 2017.
- [41] “Reducing Computational Complexity: A Need Never Out of Date,” EM/Multiphysics based Microwave Modeling and Design Workshop, *IEEE MTT-S International Microwave Symposium*, June 4-9, 2017.
- [42] “Accuracy Directly Controlled Fast Direct Solution of General H²-Matrices and Resulting Fast Direct Volume Integral Equation Solvers,” *International Applied Computational Electromagnetics Society Symposium (ACES)*, Aug. 2017, China.
- [43] “Accurate and Efficient Signaling Analysis of Nonlinear Circuits,” Intel Corporation, Hillsboro, OR, June 2018.
- [44] “Fast Direct Solvers of Controlled Accuracy for Large-Scale Electromagnetic Analysis,” 2018 *International Applied Computational Electromagnetics Society Symposium (ACES)*, Aug. 2018, China.
- [45] “Accuracy Directly Controlled Fast Direct Solutions of General H²-Matrices,” *Conference on Fast Direct Solvers*, Dept. of Mathematics, Purdue University, Nov. 2018.
- [46] “Rapid Modeling and Analysis Framework for Full-Chip/Package/Board Layout Automation,” *DARPA ERI Program Kickoff*, June 2018.
- [47] “Next-generation fast algorithms for electromagnetics-based design and analysis of high-performance integrated circuits, packages, and boards,” *IEEE Wireless and Microwave Technology Conference (Wamicon)*, April 2019. (Invited Speech)
- [48] “Accuracy Controlled H²-Arithmetic for the Development of Next Generation Fast Electromagnetic Solvers,” *Int. Applied Computational Electromagnetics Society Symposium (ACES 2019)*, Aug. 2019. (Keynote Speech)
- [49] “Compact Inverse Model of Large-Scale Integrated Circuit Layout,” 9th International Congress on Industrial and Applied Mathematics (ICIAM 2019), Valencia, Spain, Sept. 2019.
- [50] “Fast Solvers for Electromagnetics-Based Analysis and Design of Integrated Circuits and Systems,” *IEEE AP/MTTS Chicago Chapter*, Dec. 2020.

- [51] “Fast Solvers for Electromagnetics-Based Analysis and Design of Integrated Circuits and Systems,” *IEEE RWW2021 and MTT-S Winter Technical Meeting*, Jan. 2021
- [52] “Fast Solvers for Electromagnetics-Based Analysis and Design of Integrated Circuits and Systems,” *IEEE MTT-S Guadalajara Chapter*, Mexico, March 2021.
- [53] “Fast Solvers for Electromagnetics-Based Analysis and Design of Integrated Circuits and Systems,” *IEEE Benelux AP/MTT Chapter*, Benelux, March 2021.
- [54] “Fast Solvers for Electromagnetics-Based Analysis and Design of Integrated Circuits and Systems,” *IEEE North Jersey MTT*, March 2021.
- [55] “Fast Solvers for Electromagnetics-Based Analysis and Design of Integrated Circuits and Systems,” *the IEEE MTT-S student branch chapter at the Advanced Radar Research Center (ARRC) at the University of Oklahoma*, April 2021.
- [56] “Fast Solvers for Electromagnetics-Based Analysis and Design of Integrated Circuits and Systems,” *IEEE MTTS SBC JADAVPUR UNIVERSITY*, India, April 2021.

Technical Reports:

The following 9 reports can be freely downloaded on line from Purdue e-Pub. Purdue e_Pub reports **total readership 7386** based on full-text downloads.

- [1] H. Liu and D. Jiao, “H-Matrix-Based Fast Direct Finite Element Solver for Large-Scale Electromagnetic Analysis,” ECE TR-396, School of Electrical Engineering, Purdue University, Feb. 2010, 34 pages.
- [2] J. Zhu and D. Jiao, “A Theoretically Rigorous Full-Wave Finite-Element-Based Solution of Maxwell’s Equations from DC to High Frequencies,” ECE TR-395, School of Electrical Engineering, Purdue University, Feb. 2010, 8 pages.
- [3] W. Chai and D. Jiao, “Dense Matrix Inversion of Linear Complexity for Integral-Equation Based Large-Scale 3-D Capacitance Extraction,” TR-ECE-11-05, School of Electrical Engineering, Purdue University, Feb. 2011, 18 pages.

- [4] W. Chai and D. Jiao, "A Complexity-Reduced H-Matrix Based Direct Integral Equation Solver with Prescribed Accuracy for Large-Scale Electrodynamical Analysis," TR-ECE-11-04, School of Electrical Engineering, Purdue University, Feb. 2011, 20 pages.
- [5] J. Zhu and D. Jiao, "A Fast Full-Wave Solution that Eliminates the Low-Frequency Breakdown Problem in a Reduced System of Order One," TR-ECE-11-14, School of Electrical Engineering, Purdue University, Aug. 2011, 11 pages.
- [6] Q. He, H. Gan, and D. Jiao, "An Explicit Time-Domain Finite-Element Method That Is Unconditionally Stable," TR-ECE-11-15, School of Electrical Engineering, Purdue University, Aug. 2011, 12 pages.
- [7] H. Liu and D. Jiao, "A Theoretical Study on the Rank's Dependence with Electric Size of the Inverse Finite Element Matrix for Large-Scale Electrodynamical Analysis," TR-ECE-11-20, School of Electrical Engineering, Purdue University, Nov. 2011, 3 pages.
- [8] W. Chai and D. Jiao, "A Theoretical Study on the Rank of the Integral Operators for Large-Scale Electrodynamical Analysis," TR-ECE-11-19, School of Electrical Engineering, Purdue University, Nov. 2011, 6 pages.
- [9] J. Zhu, S. Omar, and D. Jiao, "Solution to the Electric Field Integral Equation at Arbitrarily Low Frequencies," TR-ECE-12-05, School of Electrical Engineering, Purdue University, May 2012, 11 pages.
- [10] S. Omar and D. Jiao, " $O(N)$ Iterative and $O(N \log N)$ Fast Direct Volume Integral Equation Solvers with a Minimal-Rank H^2 -Representation for Large-Scale 3-D Electrodynamical Analysis," TR ECE17-01, School of Electrical Engineering, Purdue University, Mar. 2017, 13 pages.

Patents:

- 1. D. Jiao, M. Mazumder, and C. Dai, "Analyzing interconnect structures," US patent No. 7,289,945, awarded October 30, 2007.
- 2. D. Jiao and C. Dai, "Electromagnetic solutions for full-chip Analysis," US patent No. 7,509,247, awarded Mar. 24, 2009.

Major Software Released at Intel:

- 1. FastGrid: Industry-first full-wave full-chip power grid simulator, 2005.

2. BroadSpice: Intel's BKM (Best Known Method) tool for high-frequency circuit synthesis, the only tool that generates passive, accurate, and stable broadband models, outperforming vendor tools, 2004.
3. FDEV: Intel's BKM (Best Known Method) tool for high-frequency 3D interconnect modeling, the unique tool that successfully fulfilled on-chip high-frequency validation, 2002.
4. PowerCap: Intel's BKM (Best Known Method) tool for package decap design. It outperforms vendor tools by >100X in CPU/memory, the only design software that can handle realistic decaps in Intel's products, 2003.

Activities as a Referee:

1998 – present	IEEE Transactions on Antennas and Propagation
1999 – present	IEEE Transactions on Microwave Theory and Tech.
2002 – present	IEEE Transactions on Advanced Packaging
2011 – present	IEEE Trans. on EMC
2011 – present	IEEE Trans. on Components, Packaging, and Manufacturing Technology
2013 – present	IEEE Trans. on Computer Aided Design of Integrated Circuits and Systems
2011 – present	Proceedings of the IEEE
2000 – present	IEEE Antennas and Wireless Propagation Letters
2005 – present	IEEE Microwave and wireless components letters
2000 – present	Microwave and Optical Technology Letters
2002 – present	Radio Science
2002 – 2005	IEEE International Conference on Computer Aided Design (ICCAD)
2002 – present	IEEE International Symposium on Antennas and Propagation (AP-S)
2008 – present	Journal of Computational Physics
2010 – present	ACM/EDAC/IEEE Design Automation Conference (DAC)
2010 – present	IEEE International Microwave Symposium (IMS)

Editorial Positions:

- [1] Associate Editor, the *IEEE Transactions on Advanced Packaging*, 2009-2011
- [2] Guest Editor, Special Issue on “Recent Progress in Electrical Modeling and Simulation of High-Speed Integrated Circuits and Packages,” the *IEEE Transactions on Advanced Packaging*, No. 4, 2010.
- [3] Associate Editor, *IEEE Trans. on Components, Packaging, and Manufacturing Technology*, 2011-

- [4] Board Member, *IET Circuits, Devices & Systems*, 2015 –
- [5] Associate Editor, *IEEE Journal on Multiscale and Multiphysics Computational Techniques*, 2018 –
- [6] Guest Editor, Special Issue on IEEE MTT-S NEMO 2019, *IEEE Trans. MTT*.