



# ACES

The Applied Computational Electromagnetics Society

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## NEWSLETTER

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### Editor's note:



Hello again. I hope 2011 is going well so far for everyone.

This month's Newsletter is dedicated to two things: the Board of Directors elections and a brief update on ACES 2011.

If you haven't voted yet in the election, please go to [aces.ee.olemiss.edu](http://aces.ee.olemiss.edu), log in and click on 'elections'. The last day is the 15<sup>th</sup> February! I have repeated the candidates' statements in the Newsletter.

Plans for the conference are progressing well. Why not have a look at the other attractions round and about. It is such an historic city and it looks really well set up for visitors.

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Wishing you all well

Alistair Duffy [apd@dmu.ac.uk](mailto:apd@dmu.ac.uk)

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## Board elections

The information below is a copy of the information on the ACES web site about the candidates standing for election this year. Remember to go to <http://aces.ee.olemiss.edu> and cast your votes

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### Dr. Steven Weiss

### General Background



Dr. Steven Weiss is the team leader for the Antenna Team at the Army Research Lab and has worked with the Army since 1989. In this capacity, he has been instrumental in the development of numerous specialized antennas for military applications. The work has ranged from antennas for communications in the VHF band, radar antennas, antennas for Satellite on the Move (SOTM,) as well as antennas for collision avoidance. He has an active interest in beamformers and beamforming networks and has integrated a number of these into phased array architectures. He has been instrumental in defining external research through BAA and SBIR solicitations. Dr. Weiss also teaches graduate courses on Antenna theory, Electromagnetics, and engineering mathematics. Dr. Weiss' current research efforts include development of metamaterials for RF antenna applications as well as in-situ modeling of antennas. Dr. Weiss has been an active member of ACES for the last 5 years regularly submitting papers, attending conferences, and reviewing

papers.

Member: Applied Computational Electromagnetics Society (ACES)

Fellow of the Washington Academy of Science

Senior Member: IEEE Antennas and Propagation Society

Member USNC-URSI Commission A and B.

Member-at-Large, USNC-URSI, 2009-2011.

### Candidate's Platform

As a board member of ACES I will seek to encourage papers that model electromagnetic structures (e.g., antennas) taking into account the effects of the platform. These in-situ simulations are very important to practical applications from a

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system perspective. Another important area to encourage pertains to publishing papers on multi-scale modeling of electromagnetic structures. An example would be fully simulating a metamaterial ground plane *with an accompanying antenna*, to have simulations to compare to measurements. The need to publish accurate computational algorithms and simulations is of great importance to the military and commercial sectors. ACES is particularly well suited to vet such work with special issues.

**Ahmed A. Kishk** received the BS degree in Electronic and Communication Engineering from Cairo University, Cairo, Egypt, in 1977, and in Applied Mathematics from Ain-Shams University, Cairo, Egypt, in 1980. In 1981, he joined the Department of Electrical Engineering, University of Manitoba, Winnipeg, Canada, where he obtained his M.Eng and PhD degrees in 1983 and 1986, respectively.



From 1977 to 1981, he was a research assistant and an instructor at the Faculty of Engineering, Cairo University. From 1981 to 1985, he was a research assistant at the Department of Electrical Engineering, University of Manitoba. From December 1985 to August 1986, he was a research associate fellow at the same department. In 1986, he joined the Department of Electrical Engineering, University of Mississippi, as an Assistant Professor.

He was on sabbatical leave at Chalmers University of Technology, Sweden during the 1994-1995 academic years. He is now a Professor at the University of Mississippi (since 1995). He was an Associate Editor of *Antennas & Propagation Magazine* from 1990 to 1993. He is now an Editor of *Antennas & Propagation Magazine*. He was a Co-editor of the special issue, "Advances in the Application of the Method of Moments to Electromagnetic Scattering Problems," in the *ACES Journal*. He was also an editor of the *ACES Journal* during 1997. He was an Editor-in-Chief of the *ACES Journal* from 1998 to 2001. He was the chair of Physics and Engineering division of the *Mississippi Academy of Science* (2001-2002). He was a guest Editor of the special issue on artificial magnetic conductors, soft/hard surfaces, and other complex surfaces, on the *IEEE Transactions on Antennas and Propagation*, January 2005. He was a technical program committee member in several international conferences.

His research interest includes the areas of design of millimeter frequency antennas, feeds for parabolic reflectors, dielectric resonator antennas, microstrip antennas, EBG, artificial magnetic conductors, soft and hard surfaces, phased array antennas, and computer aided design for antennas.

He has published over 220-refereed Journal articles and 380 conference

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papers. He is a coauthor of four books and several book chapters. He offered several short courses in international conferences.

Dr. Kishk and his students are the recipient of many awards. Dr. Kishk received the [1995 and 2006 outstanding paper awards](#) for papers published in the *Applied Computational Electromagnetic Society Journal*. He received the [1997 Outstanding Engineering Educator Award](#) from Memphis section of the IEEE. He received the [Outstanding Engineering Faculty Member of the Year on 1998 and 2009, Faculty research award for outstanding performance in research on 2001 and 2005](#). He received the [Award of Distinguished Technical Communication](#) for the entry of IEEE Antennas and Propagation Magazine, 2001. He also received [The Valued Contribution Award](#) for outstanding Invited Presentation, “EM Modeling of Surfaces with STOP or GO Characteristics – Artificial Magnetic Conductors and Soft and Hard Surfaces” from the Applied Computational Electromagnetic Society. He received the [Microwave Theory and Techniques Society Microwave Prize 2004](#). Dr. Kishk is a [Fellow](#) member of IEEE since 1998 and Fellow of Electromagnetic Academy. He is a member of Antennas and Propagation Society, Microwave Theory and Techniques, Sigma Xi society, U.S. National Committee of International Union of Radio Science (URSI) Commission B, Phi Kappa Phi Society, Electromagnetic Compatibility, and Applied Computational Electromagnetics Society.

### **Past Service to ACES**

Dr. Kishk was a Co-Editor of ACES Journal for the special issue of the Advances in the Application of the Method of Moments to Electromagnetic Scattering Problems (1995). It is considered one of the successful special issues as it was distributed widely to the ACES and non ACES members for several years after 1995. From 1997-1999, Dr. Kishk was Editor of the ACES Journal (1997-1999) and he was Editor-in-Chief for ACES Journal (1998-2001). During his term, the Journal took the professional form of uniform format of the two columns form. He has many quality ACES Journal publications that two of them received the outstanding paper award in 1995 and 2006. He also received [The Valued Contribution Award](#) for outstanding Invited Presentation, “EM Modeling of Surfaces with STOP or GO Characteristics – Artificial Magnetic Conductors and Soft and Hard Surfaces” ACES, March 2003. He received the [2002 Exemplary Service Award](#) for continuous service as ACES Journal Editor-in-Chief 1998-2001. He offered three short courses during ACES conferences. He organized sessions and he is an active participant in ACES since 1989.

### **Candidate's Platform**

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As a long participant and member of ACES and involved in the editorialship for several

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years for ACES Journal, I have observed the progress of ACES over the years. The society provides excellent services to the members and the scientific community in general. The services are following the latest technology by providing all its service online to ease access to all the members to their conveniences. However, the society in terms of active members is not growing as a natural trend. This should be of concern to all of us as the continuity and survivability relatively depends on that growth. We have to attract not only new members, but also to encourage inactive members to come back and be involved. I think we should widen the base of our society involvement. One of the possible regions that the society could grow is Asia and South America. We should try to attract new member from these regions. One of the possibilities is increasing the visibility of ACES in these regions by holding ACES conference in these regions as it was very successful in Italy. The society should give an active rule to the members in these regions. As a BoD, I will be active in promoting ACES. I will encourage young and new blood to be involved to bring new ideas.

**Dr. J. Alan Roden Background.** Alan Roden is a *Senior Project Leader* with *The*



*Aerospace Corporation* in Chantilly, Va where his responsibilities include electromagnetic analysis and design for satellite and air-breathing vehicles in support of a variety of government and civilian agencies. He is a Senior Member of IEEE

Dr. Roden received his Ph.D. in Electrical Engineering from the University of Kentucky, Lexington, KY in 1997, his master's degree in electrical engineering from North Carolina State University in 1989, and his B.S. from the University of Tennessee at Chattanooga in 1984.

He began his career as a electronics design and test engineer with the IBM Corporation in Research Triangle Park, NC. Early successes in communications adapter design often led to long nights in the EMC chamber trying to understand the 'Black Magic' of unintentional radiated emissions. As a result, Dr. Roden applied for and was awarded the prestigious *IBM Resident Study Fellowship* which supported three years of resident study at a selected university in order to pursue a Ph.D. with an emphasis in computational electromagnetics. Subsequent work at IBM was focused on enhancing IBM's capability of solving EMC and electrical packaging problems analytically and computationally.

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In recent years, Dr. Roden has focused on advancing the field of computational electromagnetics in support of a wide range of complex radiation and scattering problems in service to his Nation's defense and other government entities. While the majority of this work cannot be published due to program sensitivities, he has been able to publish upwards of 30 peer reviewed or conference articles focusing on fundamental technology and co-authored one book chapter. Some of these are seminal advances in the field of time-domain computational electromagnetics.

For example, Dr. Roden's formulation of the 'Split-Field Update Method' for periodic FDTD at oblique incidence was reported originally in his dissertation and later in periodicals as well as texts. This method is the de-facto standard for time-domain periodic analysis and has greatly advanced the field of periodic FDTD.

Furthermore, his invention of the Convolutional PML (CPML) has proven to be the most effective implementation of PML available and its application has been reported widely. This advance, which allows the annihilation of both evanescent and propagation waves, completely segregates the complexities of the PML from the materials present in the problem formulation and allow a problem independent implementation of the perfectly matched layer PML.

He has led two multi-year IRAD programs (in partnership with the University of Kentucky) which have focused on the development of a high order explicit time-domain solver. This work has been published widely as the Discontinuous Galerkin Finite Element Time Domain Method (DGFETD). The algorithms developed by this research have now been successfully implemented with the commercially available ANSOFT product.

### **Professional Service**

Dr. Roden served at the Features Editor for the ACES newsletter between the years (approx) 2000 and 2005. He served as Secretary (2007-2008), Vice-Chair (2009-2010), and now serves as Chair of the IEEE EMC TC-9 Sub-Committee on Computational Electromagnetics.

He is a regular for the EMC society, the Antennas and Propagation Society, and the Microwave Theory and Techniques society.

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## **My Goals as a Board of Directors Member for ACES**

As a member of the Board of Directors, I would strive to bring a voice from industry, seasoned by research, into the shaping the future of the ACES. I come with a good practical experience in modern-day electromagnetic problems as well as an appreciation and understanding of the mathematics behind our many computational methods that serve as a toolbox for our members.

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I believe that ACES serves its community best by providing a venue for the sharing of ideas directed at solving of important problems which its members face on a daily basis. This venue must be composed of the time-proven methods of information sharing such as conferences and journals, but it must also expand into the domain of the younger engineers of today if it is to be relevant.

For example, I would investigate usage of newly available social networking capabilities such as 'twitter' or better known avenues such as blogs to allow focused conversations on various problems or solvers. The goal would be to provide a timely information service to its members. This would be a timely source of information and conversation for the regularly occurring problems that we all have faced.

So far as the content in ACES, it is my view that the focus of the conferences and journals must be CEM technologies and the application of these to problems of interest in the electromagnetic community at large. It should not become too focused on products themselves allowing papers simply becoming sells pitches.

Another fundamental focus of the Society should be a validation clearing house for the variety of tools which are on the market. Engineers who use these tools often are not experienced in electromagnetic. Their only validation is often simply claims in the products documentation. The ACES site can serve as a database of problem validation data to allow the engineer to prove the commercial code in a relevant environment.

It would be an honor to serve on the Board of Directors for ACES. I believe ACES must expand its offerings in order to grow and succeed in the future. I believe I can help make that happen.

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**Levent Gürel (IEEE Fellow)** received the B.Sc. degree from the Middle East Technical University (METU), Ankara, Turkey, in 1986, and the M.S. and Ph.D. degrees from the University of Illinois at Urbana-Champaign (UIUC) in 1988 and 1991, respectively, all in electrical engineering.

He joined the Thomas J. Watson Research Center of the International Business Machines Corporation, Yorktown Heights, New York, in 1991, where he worked as a Research Staff Member on the electromagnetic compatibility (EMC) problems related to electronic packaging, on the use of microwave processes in the manufacturing and testing of electronic circuits, and on the development of fast solvers for interconnect modeling. Since 1994, he has been a faculty member in the Department of Electrical and Electronics Engineering of the Bilkent University, Ankara, where he is currently a Professor. He was a Visiting Associate Professor at the Center for Computational Electromagnetics (CCEM) of the UIUC for one semester in 1997. He returned to the UIUC as a Visiting Professor in 2003-2005, and as an Adjunct Professor after 2005. He founded the Computational Electromagnetics Research Center (BiLCEM) at Bilkent University in 2005, where he is serving as the Director.

Prof. Gürel's research interests include the development of fast algorithms for computational electromagnetics (CEM) and the application thereof to scattering and radiation problems involving large and complicated scatterers, antennas and radars, frequency-selective surfaces, high-speed electronic circuits, optical and imaging systems, nanostructures, and metamaterials. He is also interested in the theoretical and computational aspects of electromagnetic compatibility and interference analyses. Ground penetrating radars and other subsurface scattering applications are also among his research interests. Since 2006, his research group has been breaking several world records by solving extremely large integral-equation problems, most recently the largest involving as many as 550 million unknowns.

Among the recognitions of Prof. Gürel's accomplishments, the two prestigious awards from the Turkish Academy of Sciences (TUBA) in 2002 and the Scientific and Technical Research Council of Turkey (TUBITAK) in 2003 are the most notable.

He is a member of the USNC of the International Union of Radio Science (URSI) and the Chairman of Commission E (Electromagnetic Noise and Interference) of URSI Turkey National Committee. He served as a member of the General Assembly of the European Microwave Association (EuMA) during 2006-2008.

He is currently serving as an associate editor for *Radio Science*, *IEEE Antennas and*



Prof. Gürel served as the Chairman of the AP/MTT/ED/EMC Chapter of the IEEE Turkey Section in 2000-2003. He founded the IEEE EMC Chapter in Turkey in 2000. He served as the Cochairman of the 2003 IEEE International Symposium on Electromagnetic Compatibility. He is the organizer and General Chair of the CEM'07 and CEM'09 Computational Electromagnetics International Workshops held in 2007 and 2009.

**ACES Activities:** Prof. Levent Gürel has been member of ACES since 1992. During this time, he has been serving ACES both as a reviewer and as a contributor. His first contribution to ACES appeared in the 1991 conference proceedings, even before he became a member:

W. C. Chew, Y. M. Wang, L. Gürel, and J. H. Lin, "Recursive algorithms to reduce the computational complexity of scattering problems," *The 7th Annual Review of Progress in Applied Computational Electromagnetics, Conference Proceedings*, Monterey, CA, pp. 278-291, Mar. 1991.

Some of his other contributions are as follows:

Ö. Ergül and L. Gürel, "Combined-field solution of composite geometries involving open and closed conducting surfaces," *2005 IEEE/ACES International Conference on Wireless Communications and Applied Computational Electromagnetics*, Hawaii, USA, April 2005.

L. Gürel, Ö. Ergül, and A. Ünal, "Investigation of transmission properties of multilayer metamaterial structures with MLFMA," *The 23<sup>rd</sup> International Review of Progress in Applied Computational Electromagnetics (ACES 2007)*, Verona, Italy, March 2007.

L. Gürel, Ö. Ergül, and T. Malas, "Solutions of large integral-equation problems with parallel preconditioned MLFMA," *The 23<sup>rd</sup> International Review of Progress in Applied Computational Electromagnetics (ACES 2007)*, Verona, Italy, March 2007.

A complete list of Prof. Gürel's publications can be seen on his web page: [www.cem.bilkent.edu.tr](http://www.cem.bilkent.edu.tr)

In addition, Prof. Gürel has been organizing special sessions in ACES conferences.

## **ACES VISION**

We should strive to extend the membership base of ACES. We can do this by first enhancing the value of the ACES offerings, and then communicating those offerings to a wider base. Both academia and industry need to be targeted for this purpose. The expertise and capabilities created by academic research can be ultimately useful in industrial applications. ACES can take on a more active role to foster this symbiotic relationship.

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**Extra information:**

**Candidate's Primary Affiliation:** Bilkent University Computational Electromagnetics Research Center (BiLCEM) and Dept. of EEE

**Candidate's Position:** Professor and Director of BiLCEM

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**Candidate's Address:** Bilkent University, Dept. of EEE, TR-06800, Ankara, Turkey

**Prof. Levent Gürel** has been making remarkable contributions to the area of computational electromagnetics (CEM). Solution of the world's largest integral-equation problems since 2006 has crowned more than 20 years of his focused hard work.

Most recently, his research center (BiLCEM: Bilkent University Computational Electromagnetics Research Center) broke another world record by solving electromagnetics problems involving more than 500 million unknowns. Such an achievement requires the solution of  $550,000,000 \times 550,000,000$  dense (not sparse) matrix equations. The significance of this development is not only in the hugeness of the matrix equations, but also in the ability to solve some important physical problems that could not be solved earlier in the literature. It is also important to emphasize that the solution of such incredibly large problems cannot be achieved with conventional methods on any supercomputer, but instead, the solution relies on a multi-disciplinary effort bringing together electromagnetic theory, integral equations, iterative solvers, fast algorithms, parallel programming, and even computer architecture. By successfully directing this multi-disciplinary CEM effort, Prof. Gürel has been serving to the advancement of knowledge in areas that are most relevant to ACES.

Prof. Gürel has been contributing to the fast multipole method (FMM) and the multilevel fast multipole algorithm (MLFMA), which have been two of the most useful computational tools of recent times. Prof. Gürel extended the applicability of the FMM from homogeneous-medium problems to layered-media problems. He also applied the FMM to the solution of real-life stealth problems. He introduced several original contributions that improved both accuracy and the efficiency of MLFMA. He devised original schemes for the parallelization of MLFMA, which is not a trivial task. It is due to these contributions that he has been able to solve the world's largest integral-equation problems.

Prof. Gürel also made other important contributions to integral equations employed in computational electromagnetics in terms of both accuracy and efficiency. He clearly demonstrated an accuracy problem inherent to the magnetic-field integral equation (MFIE) and devised remedies for it. He also designed novel preconditioners to accelerate the iterative solutions of integral equations. Expanding the applicability of the combined-field integral equation (CFIE) to problems containing both closed and open geometries is another important contribution of Prof. Gürel.

Advancing his research in both breadth and depth, Prof. Gürel made important contributions to the areas of subsurface scattering and modeling of ground-penetrating radars (GPRs). He also published notable papers prescribing the means to reduce the numerical errors in the FDTD method. He significantly contributed to the

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development of the recursive T-matrix algorithms (RTMAs) while he was still a Ph.D. student at the University of Illinois. Furthermore, he also produced other important results for the recursive solution of method-of-moments (MOM) problems.

Prof. Levent Gürel is a dedicated researcher. The quality of his research program is of remarkably high caliber, which is also evident from the excellence of his publications. He aspires to push the boundaries of existing knowledge. With a wholehearted intent to share his research results with the scientific community, Prof. Gürel publishes in prestigious journals and with a textbook-style clear articulation.

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In addition to his virtues as a research scientist, Prof. Gürel is also an outstanding teacher. He has been teaching both undergraduate and graduate electrical-engineering courses at Bilkent University for 15 years. Several of his students, who have been personally taught, advised, and/or mentored by Prof. Gürel, have been accepted to MS/PhD programs of various U.S. universities and have proven the quality of education they received.

## **Dr Alistair Duffy**

### ***General Background***



Dr Alistair Duffy is Reader in Electromagnetics at De Montfort University (DMU), Leicester, UK and Associate Head of the Department of Engineering in the Faculty of Technology, De Montfort University, UK. He received his BEng(Hons) and MEng degrees in 1988 and 1989 respectively from University College, Cardiff, University of Wales. He read for his PhD with professors Christopoulos and Benson at Nottingham University, graduating in 1993. He also holds an MBA from the Open University, UK, graduating in 2004. He is a Fellow of the Institution of Engineering and Technology (IET, formerly the IEE) and a Senior Member of the IEEE. He is widely published, mostly on his research interests of validation of computational electromagnetics; physical layer components, particularly communications cabling, and

electromagnetic compatibility testing. These are the three areas on which he lectured as an IEEE EMC Society Distinguished Lecturer for 2008 and 2009, having the privilege to talk to colleagues in Poland, Turkey, Croatia, Romania, Italy, Spain and, of course, the UK. He is currently a member of the IEEE EMC Society's Respected Speakers Bureau.

Alistair's professional service has seen him contribute to many successful conferences through refereeing functions or organising committee responsibilities. He currently serves on the Board of Directors of the International Wire and Cable Symposium, which attracts approximately 1000 delegates annually. Publication commitments also see him as an Associate Editor for the IEEE Transactions on EMC and as Editor-in-Chief of the Transactions of the IWCS, as well as Editor-in-Chief of the ACES Newsletter. Other professional activities include standards body work in the UK (British Standards Institute) and in the IEEE. He is also currently a Board member of

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the IEEE EMC Society.

Alistair was Series Editor for a series of undergraduate textbooks published by Butterworth-Heinemann (now part of Elsevier).

He has served in many committee roles in the IET (formally IEE) including Council, International Board and Chair of the Electromagnetics Professional Network.

### ***Past Service to ACES***

Alistair is completing his first term as a member of the Board of Directors of ACES, where he has taken a particular interest in the way the Society publications help foster the sense of community within ACES. As both a Board member and as the ACES Newsletter Editor, he has looked to develop an approach for the Newsletter that will help serve the ACES Community as a complementary communications medium to the Journal and the Conference. This is still a work in progress but 2011 will see these ideas come together.

### ***Candidate's Platform***

I still see my main mission, if re-elected as a member of the ACES BoD, to develop and improve the sense of 'community' within ACES. This must be through strengthening the membership and expanding the ways that members interact. Strengthening membership must be based on the value brought to members by membership of ACES: particularly in a professional environment where there are also other excellent professional societies. Interaction between members can be virtual or physical, and physical interaction may be at international events or more locally. Hence, I see my main role on the Board being to contribute to understanding and developing the value of ACES membership equally to members in academia and industry.

### **GENERAL BACKGROUND**



**Jin-Fa Lee** received the B.S. degree from National Taiwan University, in 1982 and the M.S. and Ph.D. degrees from Carnegie-Mellon University in 1986 and 1989, respectively, all in electrical engineering. From 1988 to 1990, he was with ANSOFT Corp., where he developed several CAD/CAE finite element programs for modeling three-dimensional microwave and millimeter-wave circuits. From 1990 to 1991, he was a postdoctoral fellow at the University of Illinois at Urbana-Champaign. From 1991 to 2000, he was with Department of Electrical and Computer Engineering, Worcester Polytechnic Institute. Currently, he is a Professor at ElectroScience Lab., Dept. of Electrical and Computer Engineering, The Ohio State University. Prof. Lee becomes an IEEE Fellow on year 2005

and serves as an associate editor since 2007 for IEEE Transaction on Antenna

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Propagation.

Professor Lee's research interests mainly focus on numerical methods and their applications to computational electromagnetics. Current research projects include: analyses of numerical methods, fast finite element methods, fast integral equation methods, three-dimensional mesh generation, domain decomposition methods, hybrid numerical methods and high frequency techniques based on domain decompositions approach, LCD modeling, large antenna arrays and co-design for signal integrity and packaging.

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### **PAST SERVICES TO ACES**

- **Co-Chair** for ACES meeting, Monterey, 1996.
- **Plenary Speaker, Tampere, Finland, ACES2010**, *Domain Decomposition Methods for Solving Multi-Scale and Electrically Large Electromagnetic Wave Radiation and Scattering Problems*.
- **ACES 2009 Best Paper Award** for *Analyzing PEC Scattering Structure Using an IE-FFT Algorithm*, ACES Journal, vol. 24, no. 2, 2009, by S.

M. Seo, C. Wang, and J. F. Lee.

### **CANDIDATE'S PLATFORM**

I have been working on computational electromagnetic (CEM) for more than 25 years, and have the fortune to be involved intimately with commercial software vendors through the years. It is my passion as well as my ambition to transform the elegant and beautiful mathematics into computer codes that are pivotal in solving complex real-life electromagnetic problems. Therefore, if elected into the ACES board of directors, my mandates will encompass the following three major initiatives.

#### **CEM For Practical Real-Life Engineering Applications**

CEM today, somewhat ironic, is both mature and not-yet adequate. For the last couple of decades, we have witnessed the development of some truly amazing CEM algorithms such as fast integral equation methods, Domain Decomposition Methods, and various hybridizations that completely changed the viewpoints of CEM in engineering community both academically and commercially. Currently, CEM codes (in-house and/or commercial software) play critical roles and are routinely employed in wide ranges of engineering applications, from antenna designs for wireless communications, placements of multiple antenna systems on a mission critical platform, military stealth technologies, bio-medical engineering devices, ultrafast and very large integrated circuits, EMC/EMI effects of electronics, to name just a few.

However, it is also through these multi-scale/complex engineering applications that we realize that the current state-of-art CEM algorithms are still fall far short in many accounts. Accuracy of the numerical solutions, the robustness of the solution process

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(matrix convergences etc.), the efficiency and scalability of the numerical algorithms with respect to the operating frequency are calling into questions. In many situations, the complexities of the problems prevent even the model preparations, let alone solving for the numerical solutions. By directly confronting the real-life engineering applications, we are humbled and admit that CEMs today are not-yet adequate. Nonetheless the deficiencies of CEM algorithms, however, will not be evident by solving only the canonical problems that are typical in academic exercises.

Consequently, if elected, as a board member for ACES, I will advocate strongly that any new CEM algorithms need to firmly emphasize on solving real-life engineering problems. I will also facilitate the trends to go back to the drawing board and embrace true out-of-box CEM innovations that impact significantly on solving problems that cannot be solved yet.

### **Multi-Physics, Co-Design Computer Modeling**

One of my agenda, if elected, as a member on the ACES board is to encourage ACES to fully embrace the emerging trend of multi-physics, codesign computer modeling. Specifically, I would launch two activities:

- Organize a workshop at the annual ACES symposium on multi-physics, co-design computer modeling. The workshop should consist of design engineers representing the end-users' perspectives, commercial software vendors, and the algorithm developers. Furthermore, the scope of the workshop includes detailing the multi-physics nature of the related engineering products; outlining the pressing mathematical/physical issues that desperately need answers; and, presenting possible solutions and/or valuable insights;
- Establish a multi-physics, co-design working group within ACES community. The group will serve as a focal point to set up sample examples for benchmarking; write tutorial articles periodically on ACES journal; and organize short courses on multi-physics modeling at ACES symposium.

### **EM Education Through Scientific Visualization of CEM Results**

As many of us know, the electromagnetic field theory is abstract and very difficult to teach and for engineers to comprehend. However, with CEM tools maturing together with powerful scientific visualization technologies, we have been presented a golden opportunity: The ability to "see" electromagnetic fields inside sophisticated engineering products. Albeit in the rush to get solutions/answers of ever so pressing engineering designs, I am afraid that we rarely take the time to enjoy the valuable insights and be educated using full wave electromagnetic field solutions. As a board member of ACES, if elected, I shall propose setting up an engineering user group focus specifically on electromagnetic education using CEM tools: How wireless products work and/or fail to work from electromagnetic fields perspectives, troubleshooting failed engineering designs etc.

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## Conference

### *The 27th International Review of Progress in Applied Computational Electromagnetics.*

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Early indications are that this is going to be a great conference. The number of exhibitors and sponsors is the highest we have probably had for an ACES conference. Some of the highlights are:

- 27 March: short courses and reception
- 28 March: Keynote by L.B. Roe and Plenary by S.M. Rao. Sessions on unstructured meshes, S-o-P wireless components, optimization techniques, 30 years of RWG basis functions, student paper competition, EM simulation of large problems, EM simulation using FEKO.
- 29 March: Plenary talks by L. Gurel and L. Kempel. Sessions on EM simulation using Sonnet, dielectric resonator antennas, metamaterials, EM techniques and measurements, modeling of RFID systems, optimization.
- 30 March: Plenary talks by O. Mohamed and J. Volakis. Sessions on FE methods and applications, reflectarray analysis and design, EM simulation using Wipl-D, antenna design, CEM modeling and demonstrations, space applications.
- 31 March: Acceleration for CEM, topics in radar scattering, numerical techniques for EMC, advances in FDTD and applications.

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## Message from **C.J. Reddy – conference co-chair**



Invitation to Attend ACES 2011 Conference in Williamsburg VA, USA March 27-31, 2011

We proudly invite you to the 27th International Review of Progress in Applied Computational Electromagnetics (ACES) which will be held in Williamsburg, Virginia, March 27-31, 2011. The ACES Conference serves as a forum for developers, analysts, and users of computational techniques applied to electromagnetic field problems at all frequency ranges. The symposium includes technical presentations, software demonstrations, vendor booths, short courses, and hands-on workshops. This year's conference sponsors and exhibitors include:

1. FEKO – EM Software & Systems (Platinum Sponsor)
  2. Applied EM Inc. (Gold Sponsor)
  3. Andro Computational Solutions (Gold Sponsor)
  4. REMCOM (Gold Sponsor)
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5. WIPL-D O.O
  6. CST
  7. 2COMU (GEMS)
  8. SCITECH Publishing Inc.
  9. EFIELD AB
  10. ANSYS
  11. Tech-X Corporation
  12. Sonnet Software

We are pleased to let you know that this year ACES 2011 conference will have exciting technical program with Key Note speech by Lesa Roe, Director of NASA Langley Research Center along with Plenary Talks by leaders in Computational Electromagnetics; Prof. John Volakis, Prof. Osama Mohamed, Prof. Leo Kempel, Prof. Levent Gürel and Dr. S. M. Rao. The technical Program for ACES 2011 is now shaping to include comprehensive sessions on computation techniques in electromagnetic ranging from low frequency to very high frequency ranges. New sessions for this year include GPU computing techniques along with latest developments in all full wave and asymptotic techniques. Sessions on application include exciting technologies in metamaterials, RFIDs etc. And also major software vendors will be holding special sessions. It is also significant to note that this year will mark 30 years of RWG basis functions. At ACES 2011, there will a special session to celebrate 30 years of RWG basis functions and their contributions to computational electromagnetics.

This year ACES 2011 is held in the historic city of Williamsburg, Virginia during spring time, March 27-31, 2011. Williamsburg was the thriving colonial capital of Virginia. From 1699 to 1780, Williamsburg was the political, cultural, and educational center of what was then the largest, most populous, and most influential of the American colonies. Williamsburg is a popular vacation destination for visitors from the US and from countries all over the world, offering history, entertainment and relaxing atmosphere. Conference Hotel, Williamsburg Lodge is right in the middle of Colonial Williamsburg and is short distance away from major attractions. Capital of United States, Washington DC is only two hour's drive from Williamsburg. So plan to bring your family and have a good time. Further information and conference registration can be reached at:

<http://aces.ee.olemiss.edu/index.php?pid=150>.

On behalf of the organizing committee, we hope to see you ACES 2011 conference. You will learn about latest developments and applications in computational electromagnetics, you will be able to network with your colleagues and leaders in the field as well you will be able to have a relaxing and enjoyable time in early spring of 2011. Welcome to Williamsburg!!

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## Notices

<b>Committee information</b>	If you are interested in the work of any of these committees, please contact the committee Chairs directly.	
<b>COMMITTEE</b>	<b>CHAIRMAN</b>	<b>EMAIL ADDRESS</b>
<i>Finance</i>	Andy Peterson	<a href="mailto:Peterson@ece.gatech.edu">Peterson@ece.gatech.edu</a>
<i>Publications</i>	Atef Elsherbeni	<a href="mailto:atef@olemiss.edu">atef@olemiss.edu</a>
<i>Ethics and Publication Conduct</i>	Amir Zaghloul	<a href="mailto:amirz@vt.edu">amirz@vt.edu</a>
<i>Conference</i>	Osama Mohammed	<a href="mailto:mohammed@fiu.edu">mohammed@fiu.edu</a>
<i>Industry Relations</i>	Andy Drozd	<a href="mailto:andro1@aol.com">andro1@aol.com</a>
<i>Constitution and Bylaws</i>	Natalia K. Nikolova	<a href="mailto:talia@mcmaster.ca">talia@mcmaster.ca</a>
<i>Membership and Communications</i>	Vincente Rodriguez	<a href="mailto:rodriguez@ieee.org">rodriguez@ieee.org</a>
<i>BoD Nominations and Elections</i>	Amir Zaghloul	<a href="mailto:amirz@vt.edu">amirz@vt.edu</a>
<i>Awards and Membership Grades</i>	Allen Glisson	<a href="mailto:aglisson@olemiss.edu">aglisson@olemiss.edu</a>
<i>ACES Fellows Committee</i>	Andy Peterson	<a href="mailto:Peterson@ece.gatech.edu">Peterson@ece.gatech.edu</a>

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ACES Newsletter points of contact	
<b>Editor-in-Chief</b>	Alistair Duffy <a href="mailto:apd@dmu.ac.uk">apd@dmu.ac.uk</a>
<b>Tutorial</b>	Giulio Antonini <a href="mailto:giulio.antonini@univaq.it">giulio.antonini@univaq.it</a>
<b>Technical Feature</b>	Andy Drozd <a href="mailto:andro1@aol.com">andro1@aol.com</a>

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## Newsletter information

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The ACES Newsletter is always looking for articles, letters and short communications of interest to ACES members. All individuals are encouraged to write, suggest or solicit articles either on a one-time or continuing basis. Please contact a Newsletter Editor.

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The cost is \$50 per entry (approximately ¼ printed page)

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### The last word

**There are  $10^{11}$  stars in the galaxy. That used to be a huge number. But it's only a hundred billion. It's less than the national deficit! We used to call them astronomical numbers. Now we should call them economical numbers.**

Richard Feynman

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