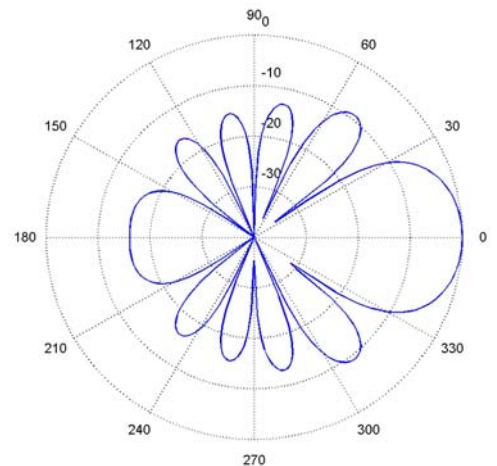
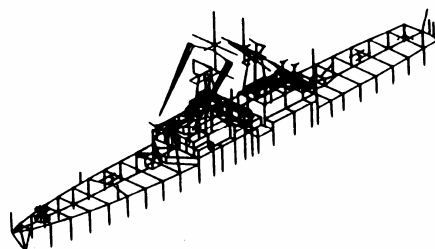
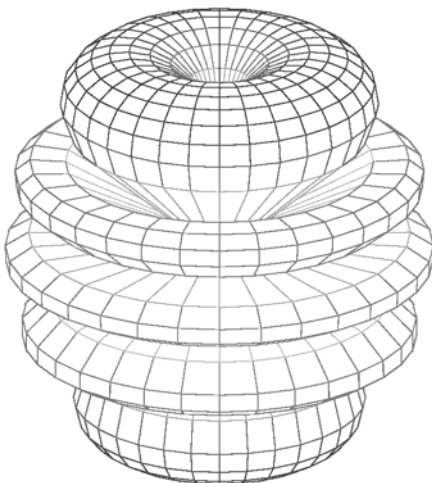
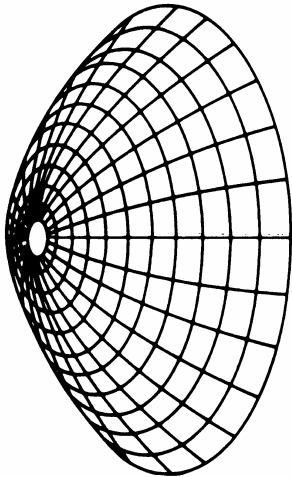
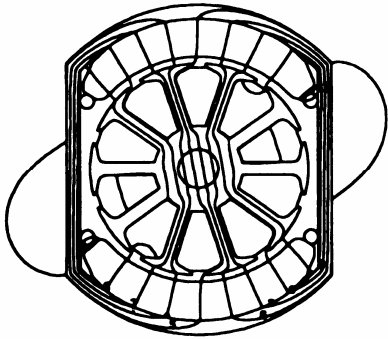
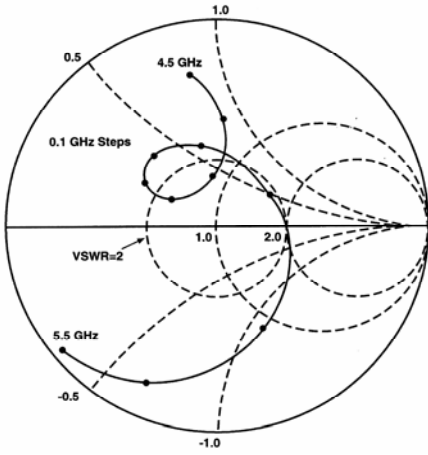


# Applied Computational Electromagnetics Society Journal

Special Issue on  
**ACES 2009 Conference Part I**

Guest Editor  
**Sami Barmada**

December 2009  
Vol. 24 No. 6  
ISSN 1054-4887



**GENERAL PURPOSE AND SCOPE:** The Applied Computational Electromagnetics Society (*ACES*) Journal hereinafter known as the *ACES Journal* is devoted to the exchange of information in computational electromagnetics, to the advancement of the state-of-the art, and the promotion of related technical activities. A primary objective of the information exchange is the elimination of the need to “re-invent the wheel” to solve a previously-solved computational problem in electrical engineering, physics, or related fields of study. The technical activities promoted by this publication include code validation, performance analysis, and input/output standardization; code or technique optimization and error minimization; innovations in solution technique or in data input/output; identification of new applications for electromagnetics modeling codes and techniques; integration of computational electromagnetics techniques with new computer architectures; and correlation of computational parameters with physical mechanisms.

**SUBMISSIONS:** The *ACES Journal* welcomes original, previously unpublished papers, relating to applied computational electromagnetics. Typical papers will represent the computational electromagnetics aspects of research in electrical engineering, physics, or related disciplines. However, papers which represent research in applied computational electromagnetics itself are equally acceptable.

Manuscripts are to be submitted through the upload system of *ACES* web site <http://aces.ee.olemiss.edu> See “Information for Authors” on inside of back cover and at *ACES* web site. For additional information contact the Editor-in-Chief:

**Dr. Atef Elsherbeni**

Department of Electrical Engineering  
The University of Mississippi  
University, MS 386377 USA  
Phone: 662-915-5382 Fax: 662-915-7231  
Email: [atef@olemiss.edu](mailto:atef@olemiss.edu)

**SUBSCRIPTIONS:** All members of the Applied Computational Electromagnetics Society who have paid their subscription fees are entitled to receive the *ACES Journal* with a minimum of three issues per calendar year and are entitled to download any published journal article available at <http://aces.ee.olemiss.edu>.

**Back issues**, when available, are \$15 each. Subscriptions to *ACES* is through the web site. Orders for back issues of the *ACES Journal* and changes of addresses should be sent directly to *ACES*:

**Dr. Allen W. Glisson**

302 Anderson Hall  
Dept. of Electrical Engineering  
Fax: 662-915-7231  
Email: [aglisson@olemiss.edu](mailto:aglisson@olemiss.edu)

Allow four week’s advance notice for change of address. Claims for missing issues will not be honored because of insufficient notice or address change or loss in mail unless the Executive Officer is notified within 60 days for USA and Canadian subscribers or 90 days for subscribers in other countries, from the last day of the month of publication. For information regarding reprints of individual papers or other materials, see “Information for Authors”.

**LIABILITY.** Neither *ACES*, nor the *ACES Journal* editors, are responsible for any consequence of misinformation or claims, express or implied, in any published material in an *ACES Journal* issue. This also applies to advertising, for which only camera-ready copies are accepted. Authors are responsible for information contained in their papers. If any material submitted for publication includes material which has already been published elsewhere, it is the author’s responsibility to obtain written permission to reproduce such material.

# **APPLIED COMPUTATIONAL ELECTROMAGNETICS SOCIETY JOURNAL**

Guest Editor  
**Sami Barmada**

December 2009  
Vol. 24 No. 6  
ISSN 1054-4887

**The ACES Journal is abstracted in INSPEC, in Engineering Index, DTIC, Science Citation Index Expanded, the Research Alert, and to Current Contents/Engineering, Computing & Technology.**

The first, fourth, and sixth illustrations on the front cover have been obtained from the Department of Electrical Engineering at the University of Mississippi.

The third and fifth illustrations on the front cover have been obtained from Lawrence Livermore National Laboratory.

The second illustration on the front cover has been obtained from FLUX2D software, CEDRAT S.S. France, MAGSOFT Corporation, New York.

**THE APPLIED COMPUTATIONAL ELECTROMAGNETICS SOCIETY**

<http://aces.ee.olemiss.edu>

**ACES JOURNAL EDITOR-IN-CHIEF**

**Atef Elsherbeni**

University of Mississippi, EE Dept.  
University, MS 38677, USA

**ACES JOURNAL ASSOCIATE EDITORS-IN-CHIEF**

**Sami Barmada**

University of Pisa, EE Dept.  
Pisa, Italy, 56126

**Erdem Topsakal**

Mississippi State University, EE Dept.  
Mississippi State, MS 39762, USA

**Fan Yang**

University of Mississippi, EE Dept.  
University, MS 38677, USA

**ACES JOURNAL EDITORIAL ASSISTANTS**

**Matthew J. Inman**

University of Mississippi, EE Dept.  
University, MS 38677, USA

**Mohamed Al Sharkawy**

Arab Academy for Science and Technology  
ECE Dept.  
Alexandria, Egypt

**ACES JOURNAL EMERITUS EDITORS-IN-CHIEF**

**Duncan C. Baker**

EE Dept. U. of Pretoria  
0002 Pretoria, South Africa

**Allen Glisson**

University of Mississippi, EE Dept.  
University, MS 38677, USA

**David E. Stein**

USAF Scientific Advisory Board  
Washington, DC 20330, USA

**Robert M. Bevensee**

Box 812  
Alamo, CA 94507-0516, USA

**Ahmed Kishk**

University of Mississippi, EE Dept.  
University, MS 38677, USA

**ACES JOURNAL EMERITUS ASSOCIATE EDITORS-IN-CHIEF**

**Alexander Yakovlev**

University of Mississippi, EE Dept.  
University, MS 38677, USA

**DECEMBER 2009 REVIEWERS**

**Mohamed Bakr**

**Sami Barmada**

**Maurizio Bozzi**

**Felipe Catedra**

**Alistar Duffy**

**Said El-Khamy**

**Magda Elshenawee**

**Christophe Fumeaux**

**Susan Hagness**

**Naftali Herscovici**

**Antonino Musolino**

**Natalia Nikolova**

**C. J. Reddy**

**Alain Reineix**

**Fan Yang**

**Q. Zhang**

**THE APPLIED COMPUTATIONAL ELECTROMAGNETICS SOCIETY**  
**JOURNAL**

Vol. 24 No. 6

December 2009

**TABLE OF CONTENTS**

“Computational Electromagnetics and Model-Based Inversion: A Modern Paradigm for Eddy-Current Nondestructive Evaluation” H. A. Sabbagh, R. K. Murphy, E. H. Sabbagh, J. C. Aldrin, J. Knopp, and M. Blodgett.....	533
“Adaptive Arrays” R. Haupt.....	541
“Study of Exact and High-Frequency Code Solvers for Applications to a Conformal Dipole Array” S. D. Walker and D. Chatterjee.....	550
“Design and Fabrication of an Axial Mode Helical Antenna” W. Coburn, C. Ly, T. Burcham, R. Harris, and A. Bamba.....	559
“Rotman Lens Amplitude, Phase, and Pattern Evaluations by Measurements and Full Wave Simulations” J. Dong, A. I. Zaghloul, R. Sun, C. J. Reddy, and S. J. Weiss.....	567
“FEKO Simulation of a Wedge Mounted Four Element Array Antenna” S. Weiss, W. Coburn, O. Kilic.....	577
“Infinite Periodic Boundary Conditions in FEKO” J. van Tonder and U. Jakobus.....	584
“A Mode Selecting Eigensolver for 2D FIT Models of Waveguides” B. Bandlow and R. Schuhmann.....	592
“Multi-Fidelity Optimization of Microwave Structures Using Response Surface Approximation and Space Mapping” S. Koziel.....	600
“Modeling of UIC Cables in Railway Systems for Their Use as Power Line Communication Channels” S. Barmada, A. Gaggelli, P. Masini, A. Musolino, R. Rizzo, and M. Tucci.....	609

“Enhancing Microwave Breast Tomography with Microwave-Induced Thermoacoustic Imaging” G. Zhu and M. Popović.....	618
“Electrodynamics of Dipolar Beads in an Electrophoretic Spherical Cavity” M. H. Lean and A. R. Völkel.....	628

## 2009 INSTITUTIONAL MEMBERS

AUSTRALIAN DEFENCE LIBRARY  
Northcott Drive  
Canberra, A.C.T. 2600 Australia

BAE SYSTEMS  
W423A Warton Aerodome  
Preston, Lancashire  
United Kingdom PR4 1AX

DARTMOUTH COLLEGE  
6193 Murdough Center  
Hanover, NH 03755-3560

DSTO-DSTORL EDINBURGH  
Jets AU/33851-99, PO Box 562  
Milsons Point, NSW  
Australia 1565

DTIC-OCP/LIBRARY  
8725 John J. Kingman Rd. Ste 0944  
Ft. Belvoir, VA 22060-6218

ELLEDIEMME  
Libri Dal Mondo  
PO Box 69/Poste S. Silvestro  
Rome, Italy 00187

ELSEVIER  
Bibliographic Databases  
PO Box 2227  
Amsterdam, Netherlands 1000 CE

ENGINEERING INFORMATION, INC  
PO Box 543  
Amsterdam, Netherlands 1000 Am

ETSE TELECOMUNICACION  
Biblioteca, Campus Lagoas  
Vigo, 36200 Spain

FGAN-FHR  
Neuenahrerstrasse 20  
Wachtberg, Germany 53343

FLORIDA INTERNATIONAL UNIV  
10555 W. Flagler Street  
Miami, FL 33174

GEORGIA TECH LIBRARY  
225 North Avenue, NW  
Atlanta, GA 30332-0001

HANYANG UNIVERSITY  
Paiknam Academic Info. Ctr Library  
17 Haengdang-Dong  
Seongdong-Ku  
Seoul, South Korea 133-791

HRL LABS, RESEARCH LIBRARY  
3011 Malibu Canyon  
Malibu, CA 90265

IEE INSPEC/Acquisitions Section  
Michael Faraday House  
6 Hills Way  
Stevenage, Herts UK SG1 2AY

IND CANTABRIA  
PO Box 830470  
Birmingham, AL 35283

INSTITUTE FOR SCIENTIFIC INFO.  
Publication Processing Dept.  
3501 Market St.  
Philadelphia, PA 19104-3302

L-3 IS  
1133 Wood Valley Drive  
Woodway, TX 76712

LIBRARY – DRDC OTTAWA  
3701 Carling Avenue  
Ottawa, Ontario, Canada K1A OZ4

LIBRARY of CONGRESS  
Reg. Of Copyrights  
Attn: 40T Deposits  
Washington DC, 20559

LINDA HALL LIBRARY  
5109 Cherry Street  
Kansas City, MO 64110-2498

LULEA UNIV. OF TECHNOLOGY  
Porson  
Lulea, Sweden 97187

MISSISSIPPI STATE UNIV LIBRARY  
PO Box 9570  
Mississippi State, MS 39762

MISSOURI S&T  
400 W 14<sup>th</sup> Street  
Rolla, MO 56409

MIT LINCOLN LABORATORY  
Periodicals Library  
244 Wood Street  
Lexington, MA 02420

NATIONAL DEFENSE ACADEMY  
1-10-20 Hashirimizu  
Yokosuka, Kanagawa  
239-8686 Japan

NAVAL POSTGRADUATE SCHOOL  
Attn: J. Rozdal/411 Dyer Rd./ Rm 111  
Monterey, CA 93943-5101

NDL KAGAKU  
C/O KWE-ACCESS  
PO Box 300613 (JFK A/P)  
Jamaica, NY 11430-0613

OHIO STATE UNIVERSITY  
1320 Kinnear Road  
Columbus, OH 43212

OVIEDO LIBRARY  
PO BOX 830679  
Birmingham, AL 35283

PENN STATE UNIVERSITY  
126 Paterno Library  
University Park, PA 16802-1808

DAVID J. PINION  
1122 E PIKE STREET #1217  
SEATTLE, WA 98122

SOUTHWEST RESEARCH  
INSTITUTE  
6220 Culebra Road  
San Antonio, TX 78238

SWETS INFORMATION SERVICES  
160 Ninth Avenue, Suite A  
Runnemede, NJ 08078

TELSTRA  
13/242 Exhibition Street  
Melbourne, Victoria  
3000 Australia

TIB & UNIV. BIB. HANNOVER  
DE/5100/G1/0001  
Welfengarten 1B  
Hannover, Germany 30167

TU DARMSTADT  
Schlossgartenstrasse 8  
Darmstadt, Hessen  
Germany D-64289

UNIV OF CENTRAL FLORIDA LIB.  
4000 Central Florida Boulevard  
Orlando, FL 32816-8005

UNIVERSITY OF KANSAS –  
WATSON  
1425 Jayhawk Blvd 210S  
Lawrence, KS 66045-7594

UNIVERSITY OF MISSISSIPPI  
JD Williams Library  
University, MS 38677-1848

UNIVERSITY OF PALERMO  
PO Box 69- Poste S. Silvestr  
Rome, 00187, Italy

VIRTUAL EM INC.  
2019 Georgetown Blvd.  
Ann Arbor, MI 48105



# ACES COPYRIGHT FORM

This form is intended for original, previously unpublished manuscripts submitted to ACES periodicals and conference publications. The signed form, appropriately completed, MUST ACCOMPANY any paper in order to be published by ACES. PLEASE READ REVERSE SIDE OF THIS FORM FOR FURTHER DETAILS.

TITLE OF PAPER:

RETURN FORM TO:

Dr. Atef Z. Elsherbeni  
University of Mississippi  
Dept. of Electrical Engineering  
Anderson Hall Box 13  
University, MS 38677 USA

AUTHORS(S)

PUBLICATION TITLE/DATE:

---

## PART A - COPYRIGHT TRANSFER FORM

(NOTE: Company or other forms may not be substituted for this form. U.S. Government employees whose work is not subject to copyright may so certify by signing Part B below. Authors whose work is subject to Crown Copyright may sign Part C overleaf).

The undersigned, desiring to publish the above paper in a publication of ACES, hereby transfer their copyrights in the above paper to The Applied Computational Electromagnetics Society (ACES). The undersigned hereby represents and warrants that the paper is original and that he/she is the author of the paper or otherwise has the power and authority to make and execute this assignment.

**Returned Rights:** In return for these rights, ACES hereby grants to the above authors, and the employers for whom the work was performed, royalty-free permission to:

1. Retain all proprietary rights other than copyright, such as patent rights.
2. Reuse all or portions of the above paper in other works.

3. Reproduce, or have reproduced, the above paper for the author's personal use or for internal company use provided that (a) the source and ACES copyright are indicated, (b) the copies are not used in a way that implies ACES endorsement of a product or service of an employer, and (c) the copies per se are not offered for sale.

4. Make limited distribution of all or portions of the above paper prior to publication.

5. In the case of work performed under U.S. Government contract, ACES grants the U.S. Government royalty-free permission to reproduce all or portions of the above paper, and to authorize others to do so, for U.S. Government purposes only.

**ACES Obligations:** In exercising its rights under copyright, ACES will make all reasonable efforts to act in the interests of the authors and employers as well as in its own interest. In particular, ACES REQUIRES that:

1. The consent of the first-named author be sought as a condition in granting re-publication permission to others.
2. The consent of the undersigned employer be obtained as a condition in granting permission to others to reuse all or portions of the paper for promotion or marketing purposes.

In the event the above paper is not accepted and published by ACES or is withdrawn by the author(s) before acceptance by ACES, this agreement becomes null and void.

---

AUTHORIZED SIGNATURE

TITLE (IF NOT AUTHOR)

---

EMPLOYER FOR WHOM WORK WAS PERFORMED

DATE FORM SIGNED

## Part B - U.S. GOVERNMENT EMPLOYEE CERTIFICATION

(NOTE: if your work was performed under Government contract but you are not a Government employee, sign transfer form above and see item 5 under Returned Rights).

This certifies that all authors of the above paper are employees of the U.S. Government and performed this work as part of their employment and that the paper is therefor not subject to U.S. copyright protection.

---

AUTHORIZED SIGNATURE

TITLE (IF NOT AUTHOR)

---

NAME OF GOVERNMENT ORGANIZATION

DATE FORM SIGNED

---

## PART C - CROWN COPYRIGHT

(NOTE: ACES recognizes and will honor Crown Copyright as it does U.S. Copyright. It is understood that, in asserting Crown Copyright, ACES in no way diminishes its rights as publisher. Sign only if *ALL* authors are subject to Crown Copyright).

This certifies that all authors of the above Paper are subject to Crown Copyright. (Appropriate documentation and instructions regarding form of Crown Copyright notice may be attached).

---

AUTHORIZED SIGNATURE

TITLE OF SIGNEE

---

NAME OF GOVERNMENT BRANCH

DATE FORM SIGNED

### Information to Authors

#### ACES POLICY

ACES distributes its technical publications throughout the world, and it may be necessary to translate and abstract its publications, and articles contained therein, for inclusion in various compendiums and similar publications, etc. When an article is submitted for publication by ACES, acceptance of the article implies that ACES has the rights to do all of the things it normally does with such an article.

In connection with its publishing activities, it is the policy of ACES to own the copyrights in its technical publications, and to the contributions contained therein, in order to protect the interests of ACES, its authors and their employers, and at the same time to facilitate the appropriate re-use of this material by others.

The new United States copyright law requires that the transfer of copyrights in each contribution from the author to ACES be confirmed in writing. It is therefore necessary that you execute either Part A-Copyright Transfer Form or Part B-U.S. Government Employee Certification or Part C-Crown Copyright on this sheet and return it to the Managing Editor (or person who supplied this sheet) as promptly as possible.

#### CLEARANCE OF PAPERS

ACES must of necessity assume that materials presented at its meetings or submitted to its publications is properly available for general dissemination to the audiences these activities are organized to serve. It is the responsibility of the authors, not ACES, to determine whether disclosure of their material requires the prior consent of other parties and if so, to obtain it. Furthermore, ACES must assume that, if an author uses within his/her article previously published and/or copyrighted material that permission has been obtained for such use and that any required credit lines, copyright notices, etc. are duly noted.

#### AUTHOR/COMPANY RIGHTS

If you are employed and you prepared your paper as a part of your job, the rights to your paper initially rest with your employer. In that case, when you sign the copyright form, we assume you are authorized to do so by your employer and that your employer has consented to all of the terms and conditions of this form. If not, it should be signed by someone so authorized.

**NOTE RE RETURNED RIGHTS:** Just as ACES now requires a signed copyright transfer form in order to do "business as usual", it is the intent of this form to return rights to the author and employer so that they too may do "business as usual". If further clarification is required, please contact: The Managing Editor, R. W. Adler, Naval Postgraduate School, Code EC/AB, Monterey, CA, 93943, USA (408)656-2352.

Please note that, although authors are permitted to re-use all or portions of their ACES copyrighted material in other works, this does not include granting third party requests for reprinting, republishing, or other types of re-use.

#### JOINT AUTHORSHIP

For jointly authored papers, only one signature is required, but we assume all authors have been advised and have consented to the terms of this form.

#### U.S. GOVERNMENT EMPLOYEES

Authors who are U.S. Government employees are not required to sign the Copyright Transfer Form (Part A), but any co-authors outside the Government are.

Part B of the form is to be used instead of Part A only if all authors are U.S. Government employees and prepared the paper as part of their job.

**NOTE RE GOVERNMENT CONTRACT WORK:** Authors whose work was performed under a U.S. Government contract but who are not Government employees are required so sign Part A-Copyright Transfer Form. However, item 5 of the form returns reproduction rights to the U. S. Government when required, even though ACES copyright policy is in effect with respect to the reuse of material by the general public.

January 2002

## INFORMATION FOR AUTHORS

### PUBLICATION CRITERIA

Each paper is required to manifest some relation to applied computational electromagnetics. **Papers may address general issues in applied computational electromagnetics, or they may focus on specific applications, techniques, codes, or computational issues.** While the following list is not exhaustive, each paper will generally relate to at least one of these areas:

1. **Code validation.** This is done using internal checks or experimental, analytical or other computational data. Measured data of potential utility to code validation efforts will also be considered for publication.
2. **Code performance analysis.** This usually involves identification of numerical accuracy or other limitations, solution convergence, numerical and physical modeling error, and parameter tradeoffs. However, it is also permissible to address issues such as ease-of-use, set-up time, run time, special outputs, or other special features.
3. **Computational studies of basic physics.** This involves using a code, algorithm, or computational technique to simulate reality in such a way that better, or new physical insight or understanding, is achieved.
4. **New computational techniques** or new applications for existing computational techniques or codes.
5. **“Tricks of the trade”** in selecting and applying codes and techniques.
6. **New codes, algorithms, code enhancement, and code fixes.** This category is self-explanatory, but includes significant changes to existing codes, such as applicability extensions, algorithm optimization, problem correction, limitation removal, or other performance improvement. **Note: Code (or algorithm) capability descriptions are not acceptable, unless they contain sufficient technical material to justify consideration.**
7. **Code input/output issues.** This normally involves innovations in input (such as input geometry standardization, automatic mesh generation, or computer-aided design) or in output (whether it be tabular, graphical, statistical, Fourier-transformed, or otherwise signal-processed). Material dealing with input/output database management, output interpretation, or other input/output issues will also be considered for publication.
8. **Computer hardware issues.** This is the category for analysis of hardware capabilities and limitations of various types of electromagnetics computational requirements. Vector and parallel computational techniques and implementation are of particular interest.

Applications of interest include, but are not limited to, antennas (and their electromagnetic environments), networks, static fields, radar cross section, inverse scattering, shielding, radiation hazards, biological effects, biomedical applications, electromagnetic pulse (EMP), electromagnetic interference (EMI), electromagnetic compatibility (EMC), power transmission, charge transport, dielectric, magnetic and nonlinear materials, microwave components, MEMS, RFID, and MMIC technologies, remote sensing and geometrical and physical optics, radar and communications systems, sensors, fiber optics, plasmas, particle accelerators, generators and motors, electromagnetic wave propagation, non-destructive evaluation, eddy currents, and inverse scattering.

Techniques of interest include but not limited to frequency-domain and time-domain techniques, integral equation and differential equation techniques, diffraction theories, physical and geometrical optics, method of moments, finite differences and finite element techniques, transmission line method, modal expansions, perturbation methods, and hybrid methods.

Where possible and appropriate, authors are required to provide statements of quantitative accuracy for measured and/or computed data. This issue is discussed in “Accuracy & Publication: Requiring, quantitative accuracy statements to accompany data,” by E. K. Miller, *ACES Newsletter*, Vol. 9, No. 3, pp. 23-29, 1994, ISBN 1056-9170.

### SUBMITTAL PROCEDURE

All submissions should be uploaded to ACES server through ACES web site (<http://aces.ee.olemiss.edu>) by using the upload button, journal section. Only pdf files are accepted for submission. The file size should not be larger than 5MB, otherwise permission from the Editor-in-Chief should be obtained first. Automated acknowledgment of the electronic submission, after the upload process is successfully completed, will be sent to the corresponding author only. It is the responsibility of the corresponding author to keep the remaining authors, if applicable, informed. Email submission is not accepted and will not be processed.

### PAPER FORMAT (INITIAL SUBMISSION)

The preferred format for initial submission manuscripts is 12 point Times Roman font, single line spacing and single column format, with 1 inch for top, bottom, left, and right margins. Manuscripts should be prepared for standard 8.5x11 inch paper.

### EDITORIAL REVIEW

**In order to ensure an appropriate level of quality control,** papers are peer reviewed. They are reviewed both for

technical correctness and for adherence to the listed guidelines regarding information content and format.

### **PAPER FORMAT (FINAL SUBMISSION)**

Only camera-ready electronic files are accepted for publication. The term “**camera-ready**” means that the material is neat, legible, reproducible, and in accordance with the final version format listed below.

The following requirements are in effect for the final version of an ACES Journal paper:

1. The paper title should not be placed on a separate page. The title, author(s), abstract, and (space permitting) beginning of the paper itself should all be on the first page. The title, author(s), and author affiliations should be centered (center-justified) on the first page. The title should be of font size 16 and bolded, the author names should be of font size 12 and bolded, and the author affiliation should be of font size 12 (regular font, neither italic nor bolded).
2. An abstract is required. The abstract should be a brief summary of the work described in the paper. It should state the computer codes, computational techniques, and applications discussed in the paper (as applicable) and should otherwise be usable by technical abstracting and indexing services. The word “Abstract” has to be placed at the left margin of the paper, and should be bolded and italic. It also should be followed by a hyphen (–) with the main text of the abstract starting on the same line.
3. All section titles have to be centered and all the title letters should be written in caps. The section titles need to be numbered using roman numbering (I. II. ....)
4. Either British English or American English spellings may be used, provided that each word is spelled consistently throughout the paper.
5. Internal consistency of references format should be maintained. As a guideline for authors, we recommend that references be given using numerical numbering in the body of the paper (with numerical listing of all references at the end of the paper). The first letter of the authors’ first name should be listed followed by a period, which in turn, followed by the authors’ complete last name. Use a coma (,) to separate between the authors’ names. Titles of papers or articles should be in quotation marks (“ ”), followed by the title of journal, which should be in italic font. The journal volume (vol.), issue number (no.), page numbering (pp.), month and year of publication should come after the journal title in the sequence listed here.
6. Internal consistency shall also be maintained for other elements of style, such as equation numbering. As a guideline for authors who have no other preference, we suggest that equation numbers be placed in parentheses at the right column margin.

7. The intent and meaning of all text must be clear. For authors who are not masters of the English language, the ACES Editorial Staff will provide assistance with grammar (subject to clarity of intent and meaning). However, this may delay the scheduled publication date.
8. Unused space should be minimized. Sections and subsections should not normally begin on a new page.

ACES reserves the right to edit any uploaded material, however, this is not generally done. It is the author(s) responsibility to provide acceptable camera-ready pdf files. Incompatible or incomplete pdf files will not be processed for publication, and authors will be requested to re-upload a revised acceptable version.

### **COPYRIGHTS AND RELEASES**

Each primary author must sign a copyright form and obtain a release from his/her organization vesting the copyright with ACES. Copyright forms are available at ACES, web site (<http://aces.ee.olemiss.edu>). To shorten the review process time, the executed copyright form should be forwarded to the Editor-in-Chief immediately after the completion of the upload (electronic submission) process. Both the author and his/her organization are allowed to use the copyrighted material freely for their own private purposes.

Permission is granted to quote short passages and reproduce figures and tables from an ACES Journal issue provided the source is cited. Copies of ACES Journal articles may be made in accordance with usage permitted by Sections 107 or 108 of the U.S. Copyright Law. This consent does not extend to other kinds of copying, such as for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. The reproduction of multiple copies and the use of articles or extracts for commercial purposes require the consent of the author and specific permission from ACES. Institutional members are allowed to copy any ACES Journal issue for their internal distribution only.

### **PUBLICATION CHARGES**

All authors are allowed for 8 printed pages per paper without charge. Mandatory page charges of \$75 a page apply to all pages in excess of 8 printed pages. Authors are entitled to one, free of charge, copy of the journal issue in which their paper was published. Additional reprints are available for a nominal fee by submitting a request to the managing editor or ACES Secretary.

Authors are subject to fill out a one page over-page charge form and submit it online along with the copyright form before publication of their manuscript.

**ACES Journal is abstracted in INSPEC, in Engineering Index, DTIC, Science Citation Index Expanded, the Research Alert, and to Current Contents/Engineering, Computing & Technology.**