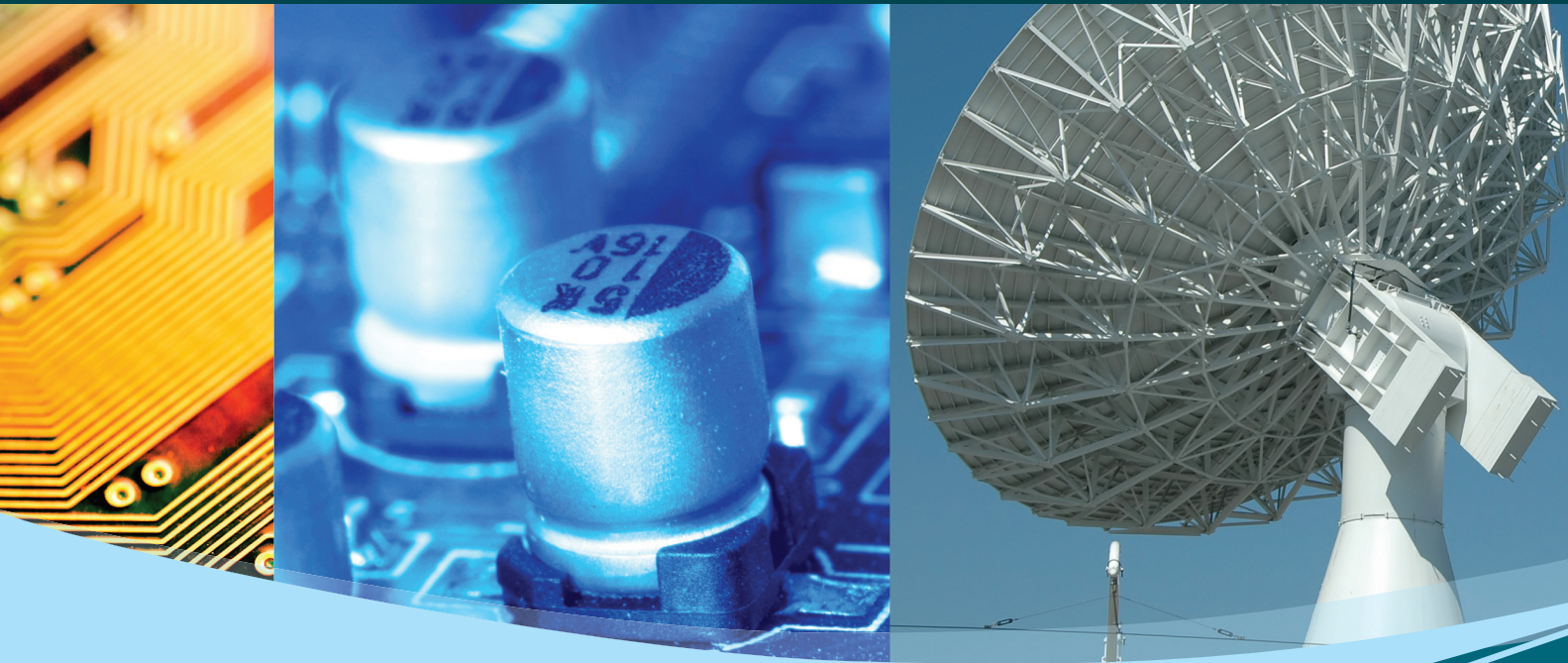


INTERNATIONAL JOURNAL OF  
**MICROWAVE  
AND WIRELESS  
TECHNOLOGIES**

[journals.cambridge.org/mrf](http://journals.cambridge.org/mrf)



**EuMA**

**CAMBRIDGE  
UNIVERSITY PRESS**

# INTERNATIONAL JOURNAL OF MICROWAVE AND WIRELESS TECHNOLOGIES

## EDITOR-IN-CHIEF

**Prof. Almudena Suarez,**  
R&D Laboratories of Telecommunications  
Engineering  
Universidad de Cantabria  
Avenida de los Castros s/n  
39005, Spain.  
almudena.suarez@unican.es

## EDITORIAL BOARD

**Dr. Eduardo Carrasco,** IT'IS, Switzerland  
**Prof. Wenhua Chen,** Tsinghua University,  
Beijing, China

**Prof. Paolo Colantonio,** Università di Tor  
Vergata Roma, Italy

**Prof. Alessandra Costanzo,** University of  
Bologna, Italy

**Prof. Philippe Ferrari,** IMEP Grenoble, France

**Prof. Gaspare Galati,** Università di Tor  
Vergata Roma, Italy

**Prof. Alessandro Galli,** Sapienza  
University of Rome, Italy

**Prof. Antonio Garcia-Pino,** University of  
Vigo, Spain

**Dr. Anthony Ghitto,** IMS Laboratory,  
Talence, France

**Prof. Shiban K Koul,** Indian Institute of  
Technology Delhi, India

**Prof. Krzysztof S Kulpa,** Warsaw  
University of Technology, Poland

**Prof. Asher Madjar,** M2Microwaves LLC,  
Philadelphia, USA and Tel Aviv University,  
Israel

**Prof. Francisco Medina,** University of  
Sevilla, Spain

**Dr. Steve Nightingale,** Cobham, UK

**Prof. Marco Pasian,** Université Pavia, Italy

**Prof. Luca Perregrini,** Université Pavia, Italy

**Dr. Xianming Qing,** Institute for  
Infocomm Research, Singapore

**Dr. Ruediger Quay,** Fraunhofer Institute  
Freiburg, Germany

**Prof. Raymond Quééré,** XLIM-University  
of Limoges, France.

**Dr. Fred Schindler,** RFMD, USA

**Prof. Dominique Schreurs,** KU Leuven,  
Belgium

**Prof. Roberto Sorrentino,** University of  
Perugia, Italy

**Prof. Danielle Vanhoenacker-Janvier,**  
UC Louvain, Belgium

**Prof. Huei Wang,** NTU, Taiwan

**Prof. Robert Weigel,** University of  
Erlangen, Germany

**Dr. Hung-Wei Wu,** Kun Shan University,  
Taiwan

**Prof. Felix Yanovsky,** National Aviation  
University, Ukraine

**Prof. Alex Yarovoy,** TU Delft, The  
Netherlands

oriented, providing a platform for the  
microwave industry. Subjects covered  
include: applied electromagnetic field  
theory, components, analogue and  
mixed-signal circuits, systems,  
optical-microwave interactions,  
electromagnetic compatibility, industrial  
applications, biological effects and medical  
applications.

## Submission of Manuscripts

All manuscripts should be submitted  
online at <http://mc.manuscriptcentral.com/mrf>. Please consult the instructions  
for authors at <http://cambridge.org/mrf>

## Subscriptions

*International Journal of Microwave  
and Wireless Technologies* (ISSN  
1759-0787) is published ten times a year  
in February, March, April, May, June, July,  
September, October, November and  
December. The subscription price (exclud-  
ing VAT) of Volume 9 (2017) (which  
includes postage by air, plus electronic  
access) is £1042 net (US \$1944 in the  
USA, Canada and Mexico) for institutions;  
the electronic only price for institutional  
subscribers is £758 net (US \$1421 in the  
USA, Canada and Mexico). Members of  
the European Microwave Association  
receive free online access to the Journal,  
and may order print subscriptions at a  
reduced rate for their personal use only.  
Single parts are £133 (US \$251 in the  
USA, Canada and Mexico) plus postage.  
Orders, which must be accompanied by  
payment, may be sent to a bookseller,  
subscription agent or direct to the publisher:  
Cambridge University Press, Journals  
Fulfilment Dept, UPH, Shaftesbury Road,  
Cambridge CB2 8BS, UK; or in the USA,  
Canada and Mexico: Cambridge University  
Press, Journals Fulfillment Department,  
1 Liberty Plaza, Floor 20, New York, NY,  
10006, USA. EU subscribers (outside the  
UK) who are not registered for VAT should  
add VAT at their country's rate. VAT regis-  
tered subscribers should provide their VAT  
registration number. Japanese prices for  
institutions are available from Kinokuniya  
Company Ltd, P.O. Box 55, Chitose, Tokyo  
156, Japan. Copies of the journal for  
subscribers in the USA, Canada and  
Mexico are sent by air to New York  
to arrive with minimum delay. Periodicals  
postage paid at New York, NY, and at  
additional mailing offices. POSTMASTER:  
send address changes in the USA,  
Canada and Mexico to: *International  
Journal of Microwave and Wireless  
Technologies*, 1 Liberty Plaza, Floor 20,  
New York, NY, 10006, USA. Claims

for missing issues should be made imme-  
diately on receipt of the subsequent issue.

## Advertising

For all parts of the world except USA,  
Canada and Mexico to Journals  
Advertising: [ad\\_sales@cambridge.org](mailto:ad_sales@cambridge.org)  
Address enquiries in the USA,  
Mexico and Canada only to:  
[journals\\_advertising@cup.org](mailto:journals_advertising@cup.org)

## Copying

This journal is registered with the  
Copyright Clearance Center, 222  
Rosewood Drive, Danvers, MA 01923,  
USA. Organizations in the USA who are  
also registered with C.C.C. may therefore  
copy material (beyond the limits permitted  
by sections 107 and 108 of U.S. Copyright  
law) subject to promotional or commercial  
purposes. Code 0266-4674/2017 \$16.00.  
*ISI Tear Sheet Service*, 3501 Market Street,  
Philadelphia, PA 19104, USA, is authorized  
to supply single copies of separate articles  
for private use only.

Organizations authorized by the Copyright  
Licensing Agency may also copy material  
subject to the usual conditions. For all  
other use, permission should be sought  
from Cambridge or the American Branch  
of Cambridge University Press.

## Internet Access

This journal is included in Cambridge Core  
and can be found at [cambridge.org/mrf](http://cambridge.org/mrf).  
For further information on other Press  
titles access <http://www.cambridge.org>

© Cambridge University Press and the  
European Microwave Association 2017  
Cambridge University Press, UPH,  
Shaftesbury Road, Cambridge CB2 8BS,  
United Kingdom 1 Liberty Plaza, Floor 20,  
New York, NY, 10006, USA USA 477  
Williamstown Road, Port Melbourne,  
VIC 3207, Australia Ruiz de Alarcón 13,  
28014 Madrid, Spain Dock House,  
The Waterfront, Cape Town 8001,  
South Africa

*Printed in the United Kingdom by  
Bell & Bain Ltd, Glasgow.*

This journal issue has been printed on  
FSC™-certified paper and cover board.  
FSC is an independent,  
non-governmental, not-for-profit  
organization established to promote the  
responsible management of the world's  
forests. Please see [www.fsc.org](http://www.fsc.org) for  
information.

## Scope of the journal

*International Journal of Microwave  
and Wireless Technologies* is  
interdisciplinary and application