

Editor: Ahmad Ibrahim

Volume 28 Number 3

**Contributions in: Outreach, First-Year Programs,
Creativity, Project Work, Design Methodologies,
University–Industry Cooperation, Professional Skills,
Competencies, Lifelong Learning, Women in Engineering,
Architectural Engineering, Failure Analysis, Digital Signal
Processing, Part Visualization, Biomedical Engineering,
Civil Engineering, Online Learning, Wikis, Virtual
Laboratories and Instrumentation, Simulations,
Neural Networks and Data Mining**

The International Journal of ENGINEERING EDUCATION

FOUNDER AND FIRST EDITOR-IN-CHIEF

MICHAEL S. WALD

(1932–2008)

EDITOR

Ahmad Ibrahim, PhD, PEng
Toronto, Ontario, Canada
E-mail: ijee.editor@gmail.com

ASSOCIATE EDITORS

Thomas R. Kurfess, Ph.D., P.E. Professor and BMW Chair of Manufacturing, Dept. of Mech. Engineering; Director, Carroll A. Campbell Jr. Graduate Engineering Center, International Center for Automotive Research, Clemson University, Clemson SC 29634-0921, USA. E-mail: kurfess@clemson.edu

Milos Manic, MHRG Director, University of Idaho Idaho Falls, Idaho Falls, ID 83402, USA. E-mail: misko@uidaho.edu

D. McCarthy, Tempus Publications, Rathfarnham, Dublin 14, Ireland. E-mail: donal McCarthy@eircom.net

J. Turner, Dublin Institute of Technology, Bolton Street, Dublin 1, Ireland. E-mail: jturner@dit.ie

BOARD OF EDITORS

Augusto Beléndez, Dept. Física, Ingeniería de Sistemas y Teoría de la Señal, Universidad de Alicante, Apartado 99, E-03080 Alicante, Spain.

Ahmed Hussein, Physics Department, University of Northern British Columbia, Prince George, B.C., Canada.

C. Y. Lam, School of Mechanical and Aerospace Engineering, Nanyang Technological, Singapore 639798.

C. S. Slater, Rowan University, Department of Chemical Engineering, Glassboro, NJ, USA.

EDITORIAL ADVISORY BOARD

Alice Agogino, Mechanical Engineering, University of California, Berkeley, 94720-1740, USA.

Stuart Burgess, Department of Mechanical Engineering, University of Bristol, UK.

Clive Dym, Fletcher Jones Chair of Engineering Design, Harvey-Mudd College, Claremont CA 91711, USA.

Nesimi Ertugrul, Department of Electrical and Electronic Engineering, University of Adelaide, Adelaide 5005, Australia.

R. Felder, North Carolina State University, Raleigh NC 27695, USA.

Lawrence Genalo, Department of Materials Science and Engineering, Iowa State University, Ames IA 50011, USA.

Denis Gillet, EPFL, Swiss Federal Institute of Technology, CH-1015, Switzerland.

Wilmar Hernandez, Department of Circuits and Systems, EUIT de Telecomunicacion, Universidad Politecnica de Madrid, Ctra. Valencia km 7, 28031 Madrid, Spain.

Dogan Ibrahim, Department of Biomedical Engineering, Near East University, Nicosia, Cyprus.

J. Jawitz, Centre for Higher Education Development, University of Cape Town, South Africa.

Russel C. Jones, Managing Partner, World Expertise LLC, Falls Church VA, USA.

Kok Kiong Tan, Department of Electrical and Computer Engineering, National University of Singapore, Singapore.

Paul King, Department of Biomedical Engineering, Vanderbilt University, Nashville TN 37253, USA.

Anette Kolmos, UCPBL, Aalborg University, Fibigerstraede 13, DK-9220 Aalborg, Denmark.

Susan Lord, Department of Engineering, University of San Diego, CA 92110, USA.

J. F. Marchman, Virginia Polytechnic Institute and State University, Blacksburg VA 24061, USA.

Tom Owens, Department of Electrical Engineering & Electronics, Brunel University, Uxbridge, UK.

Shirley Pomeranz, Department of Mathematical and Computer Sciences, The University of Tulsa, Tulsa, OK 74104-3189, USA.

Z. J. Pudlowski, Faculty of Engineering, Monash University, Clayton, Melbourne, Vic 3168, Australia.

Nicholas Salamon, Engineering Science & Mechanics, Penn State University, University Park, PA 16802, USA.

D. Schaefer, Georgia Institute of Technology, Savannah, GA 31407, USA.

Thomas C. Sheahan, College of Engineering, Northeastern University, Boston, MA 02115, USA.

Sheri D. Sheppard, Department of Mechanical Engineering, Stanford University, Stanford, CA 94305, USA.

P. Shiue, Christian Brothers University, Memphis TN 38104, USA.

I. Verner, Department of Education in Technology & Science, Israel Institute of Technology, Haifa 32000, Israel.

B. Wagner, Center for Didactics of Technology, University of Hannover, Germany.

Levent Yilmaz, Computer Science and Software Engineering, Auburn University, Auburn AL 36849, USA

Subscription Rates

For complete information, please contact:

International Journal of Engineering Education — ijee@eircom.net

Copyright © 2012 TEMPUS Publications

Published 6 per annum

It is a condition of publication that manuscripts submitted to this journal have not been published and will not to be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the publisher, if and when the article is accepted for publication. However, assignment of copying is not required from authors who work for organizations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and transactions. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.

Photocopying Information for Users in the U.S.A.

The Item-free Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided by the stated fee for copying beyond that permitted by Section 107 or 108 of the United States Copyright Law, is paid. The appropriate remittance of \$3.00 per copy per article is paid directly to the *Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970*.

Permission for Other Use

The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for such copying.

The Item-free Code for this publication is: 0949-149X/92 \$3.00 + 0.00

The International Journal of ENGINEERING EDUCATION

www.ijee.ie

The International Journal of Engineering Education (IJEE) is an independent, peer-reviewed journal. It has been serving as an international archival forum of scholarly research related to engineering education. The Journal publishes six issues per year.

The Journal has published papers in numerous areas of engineering education, including:

Electrical/Electronics Engineering, Mechanical Engineering, Civil Engineering, Chemical Engineering, Computer Engineering, Agricultural Engineering, Aerospace Engineering, Mathematics, Statistics, STEM Learning, Thermodynamics, Structural Engineering, Control Engineering, Robotics, Mechatronics, Fluid Mechanics, Nanotechnology, Simulators, Web-Based Learning, Remote Laboratories, Engineering Design, Engineering Education Research, Assessment, Problem-Based Learning, Sustainability, Creativity, Cooperative Learning, Active Learning, Motivation, Outreach, Women in Engineering, Needs of Industry, and International Cooperation.

Submission of Manuscripts

Manuscripts are to be submitted to the Editor, Dr. Ahmad Ibrahim by e-mail at: ijee.editor@gmail.com

Manuscripts should be submitted in English as MSWord documents (.doc). Authors submitting a revised manuscript need to outline separately the response to the reviewers' comments and the changes introduced to the manuscript.

Manuscripts will be reviewed; all accepted revised manuscripts should be submitted following the style of the Journal (a short guide is available online and at the end of the print issues). They will be copy-edited and typeset. The proofs in PDF format will be sent to the authors before publication.

Copyright

By submitting a manuscript the author(s) declares that the manuscript was not published before, that it is not being considered for publication elsewhere, and that if accepted for publication in the IJEE, will not be published anywhere else. If accepted for publication in the IJEE, the authors agree to transfer the copyright to the Journal and to honour the page charges.

Page Charge

Authors of accepted manuscripts are asked to pay a page charge; the total charge is calculated based on the number of pages of the proofs. Details are provided on the web page of the IJEE.

Review Criteria

Manuscripts that appear to be within the scope of the Journal will be peer-reviewed. Reviewers are asked to consider several aspects of the manuscript, including:

Content: clarity of objective, technical correctness, scope covered, conclusions drawn as supported by the data presented, proper literature survey, impact on teaching and learning, contribution to engineering education, etc.

Originality: presence of new ideas or innovative contribution.

Structure: logical layout, proper use and adequate number of figures, diagrams, tables, etc.

Quality of text: being concise, correct grammar and spelling, clarity of expression, consistency, readability, citation of appropriate references, etc.

A selection of papers accepted for publication

Yuen *et al.*—Affective Factors that Influence Students to Major in Engineering

Galand *et al.*—Effectiveness of Problem-based Learning in Engineering Education: A Comparative Study on Three Levels of Knowledge Structure

Al-Marzouqi and El-Naas—The Role of Environmental Design Competitions in Engineering Education

Sell and Seiler—Improvements of Multi-disciplinary Engineering Study by Exploiting Design-centric Approach, Supported by Remote and Virtual Labs

Ponsa *et al.*—Human-Centred Design in Engineering Curricula

Purta and Kiong—An Alternative Perspective in Engineering Education: A Parallel to Disruptive Technology

Svihla *et al.*—Learning to Design: Authenticity, Negotiation, and Innovation

Bernstein *et al.*—Teaching Design for Environment through Critique within a Project-Based Product Design Course

Ko *et al.*—A Design-Centric Approach for Augmented Reality Collaboration

Han *et al.*—The Educational Effects of an Introductory Design Engineering Course Based on Creative Projects

Zhou *et al.*—Practice-Oriented Intuitive Approach for Engineering Undergraduates: A Case Study

Lu *et al.*—Towards Design-Centric Engineering Education: Capstone Course Reform in a Chinese University

Lončar-Vicković *et al.*—Student Workshops in Engineering Education: Case Studies at the Faculty of Civil Engineering in Osijek, Croatia

Catalano *et al.*—What is Missing from Traditional Design-Centric Engineering Education to Better Prepare Newly Graduated Engineers for the Global Era?

Aquere *et al.*—Coordination of Student Teams Focused on Project Management Processes

Panchal *et al.*—Designing Undergraduate Design Experiences—A Framework Based on the Expectancy-Value Theory

Villalobos and González—A Curricula Model for Supporting a Design-Centric Computing Engineering Education

Wojcik *et al.*—The Value of Impromptu Design Exercises as an Approach in Design-Centric Engineering Education

Kim *et al.*—A Radically Assembled Design-Engineering Education Program with a Selection and Combination of Multiple Disciplines

Volpentesta *et al.*—Collaborative Design Learning and Thinking Style Awareness

Soltani *et al.*—Industry Input into the Education of Undergraduate Engineering Students through Sponsorship

Poop *et al.*—Rationalizing Relationships between the Various Sets of Learning Outcomes as a Data Driven Mapping Strategy