

# JOURNAL OF SOUND AND VIBRATION

An official medium of publication for the Institute of Acoustics

Founder: E.J. Richards

Editors Emeritus: P.E. Doak  
C.L. Morfey  
M. Petyt  
W. Soedel

## Editorial Board

### Editor-in-Chief:

#### M.P. Cartmell

Department of Mechanical Engineering,  
University of Glasgow, Glasgow G12 8QQ, UK  
E-mail: jsv@isvr.soton.ac.uk

### Receiving Editors:

#### A. Metrikine (Also Deputy Editor-in-Chief)

Faculty of Civil Engineering and Geosciences,  
Delft University of Technology, Stevinweg 1,  
2628 CN Delft, The Netherlands  
E-mail: jsv@isvr.soton.ac.uk

#### L.G. Tham (Also Deputy Editor-in-Chief)

University of Hong Kong, Hong Kong  
E-mail: jsv@isvr.soton.ac.uk

### Subject Editors:

#### R.J. Astley

Institute of Sound and Vibration Research,  
University of Southampton, Southampton, SO17 1BJ, UK  
E-mail: jsv@isvr.soton.ac.uk

#### Y. Aurégan

Laboratoire d'Acoustique de l'Université du Maine,  
LE MANS Cedex 9, France  
E-mail: jsv@isvr.soton.ac.uk

#### G. Degrande

Structural Mechanics, Department of Civil Engineering,  
K.U. Leuven, Kasteelpark Arenberg 40,  
B-3001 Heverlee, Belgium  
E-mail: jsv@isvr.soton.ac.uk

#### L. Huang

Dept. of Mechanical Engineering,  
The University of Hong Kong, Pokfulam Road,  
Hong Kong, China  
E-mail: jsv@isvr.soton.ac.uk

#### S. Ilanko

Department of Engineering, School of Science &  
Engineering, The University of Waikato, New Zealand  
E-mail: jsv@isvr.soton.ac.uk

#### P.F. Joseph

Institute of Sound and Vibration Research,  
University of Southampton, Southampton, SO17 1BJ, UK  
E-mail: jsv@isvr.soton.ac.uk

#### D. Juvé

Centre Acoustique, LMFA, UMR CNRS 5509,  
Ecole Centrale de Lyon, 36 Avenue Guy de Collongue,  
69134 Ecully Cedex, France  
E-mail: jsv@isvr.soton.ac.uk

#### J. Lam

University of Hong Kong, Hong Kong  
E-mail: jsv@isvr.soton.ac.uk

#### J. Macdonald

Department of Civil Engineering, University of Bristol,  
Queen's Building, University Walk Bristol BS8 1TR, UK  
E-mail: jsv@isvr.soton.ac.uk

#### R.E. Musafir

Department of Mechanical Engineering and Department  
of Water Resources and Environmental Engineering,  
Federal University of Rio de Janeiro, Brazil  
E-mail: jsv@isvr.soton.ac.uk

#### H. Ouyang

Department of Engineering, University of Liverpool,  
Liverpool L69 3GH, UK  
E-mail: jsv@isvr.soton.ac.uk

#### K. Shin

Andong National University, South Korea  
E-mail: jsv@isvr.soton.ac.uk

#### I. Trendafilova

Department of Mechanical Engineering,  
Strathclyde University, Glasgow G1 1XJ  
E-mail: jsv@isvr.soton.ac.uk

#### L. Virgin

Department of Civil and Environmental Engineering,  
Duke University, Durham, NC, USA  
E-mail: jsv@isvr.soton.ac.uk

#### D. Wagg

Department of Mechanical Engineering, Queens Building,  
University of Bristol, Bristol BS8 1TR, UK  
E-mail: jsv@isvr.soton.ac.uk

#### K. Worden

Department of Mechanical Engineering, University of  
Sheffield, Mappin St, Sheffield S1 3JD, UK  
E-mail: jsv@isvr.soton.ac.uk

### Assistant Editors:

#### I. Kovacic

Department of Mechanics, Faculty of Technical Sciences,  
University of Novi Sad, Serbia

#### C. Powles

Institute of Sound and Vibration Research,  
University of Southampton, Southampton, SO17 1BJ, UK

#### E. Rustighi

Institute of Sound and Vibration Research,  
University of Southampton, Southampton, SO17 1BJ, UK

### Book Reviews Editor:

#### M.C.M. Wright

Institute of Sound and Vibration Research,  
University of Southampton, Southampton SO17 1BJ, UK  
E-mail: jsv@isvr.soton.ac.uk

### Editorial Advisory Board:

#### S. Adhikari

School of Engineering, University of Wales Swansea,  
Swansea SA2 8PP, UK

#### M. Amabili

Department of Mechanical Engineering,  
McGill University, 817 Serbrooke Street West,  
Montreal, Quebec, Canada, H3A 2K6

#### E.T.K. Au

Department of Civil Engineering,  
The University of Hong Kong, Hong Kong

#### R.J. Banerjee

Mechanical Engineering and Mathematical Sciences,  
City University of London, London EC1V 0HB, UK

#### H. Bodén

MWL, AVE, KTH, SE-10044, Stockholm, Sweden

#### J. Brownjohn

Department of Civil and Structural Engineering,  
University of Sheffield, Mappin Street, Sheffield  
S1 3JD, UK

#### C.J. Chapman

Department of Mathematics, University of Keele,  
Keele, Staffordshire ST5 5BG, UK

#### A. Cummings

Trenwith, Ludlow Road, Little Stretton,  
Church Stretton, Salop, SY6 6RB, UK

#### P. Cupial

Institute of Mechanics and Machine Design,  
Cracow University of Technology, A Jana Pawla II 37,  
Krakow PL-31-854, Poland

#### E. Dokumaci

Dokuz Eylul University, Bornova 35100, Izmir, Turkey

#### J.F. Dunne

University of Sussex, Falmer, Brighton,  
E Sussex, BN1 9QT, UK

#### I. Elishakoff

Florida Atlantic University,  
Boca Raton, FL 33431-0991, USA

#### S.J. Elliott

Institute of Sound and Vibration Research,  
University of Southampton, Southampton SO17 1BJ, UK

#### F. Farassat

NASA Langley Research Center, M/S 460,  
Hampton, VA 23681-2199, USA

#### J.M. Fields

10407 Royal Road, Silver Spring, MD 20903, USA

#### G.M.L. Gladwell

Department of Civil Engineering, University of Waterloo,  
Ontario, Canada, N2L 3G1

#### S.A.L. Glegg

Florida Atlantic University, Boca Raton, FL 33431-0991, USA

#### D.J. Gorman

770 King Edward Ave., University of Ottawa,  
P.O. Box 450, Stn. A., Ottawa K1N 6N5, Canada

#### M. Griffin

Human Factors Research Unit, Inst. of Sound and  
Vibration Research, University of Southampton,  
Highfield, Southampton SO17 1BJ, UK

#### J.-L. Guyader

INSA-Lyon, F-69621 Villeurbanne Cedex, France

#### P. Hagedorn

Department of Applied Mechanics, Darmstadt University  
of Technology, Darmstadt D-64289, Germany

#### M. Harrison

The Royal Academy of Engineering,  
London SW1P 3LW, UK

#### M. Heckl

Department of Mathematics, Keele University,  
Keele, Staffordshire ST5 5BG, UK

#### J. Horner

Department of Aeronautical & Automotive Engineering,  
Loughborough University, Loughborough LE11 3TD, UK

#### H.Y. Hu

Institute of Vibration Engineering Research,  
Nanjing University of Aeronautics and Astronautics,  
29 Yudao Street, Jiangsu 210016, China

#### A. Kahraman

Department of Mechanical Engineering,  
Ohio State University, 201 West 19th Ave,  
Columbus, OH, 43210, USA

#### D. Kennedy

Cardiff School of Engineering (ENGIN6),  
University of Wales Cardiff, PO Box 925  
The Parade, Cardiff CF24 0YF, UK

#### Y.-H. Kim

Department of Mechanical Engineering,  
KAIST, Taejon 305-701, Korea

#### V.V. Krylov

Department of Aeronautical and Automotive Engineering,  
Loughborough University, Loughborough LE11 3TU, UK

#### R.S. Langley

Department of Engineering, University of Cambridge,  
Trumpington St., Cambridge CB2 1PZ, UK

#### A. Lees

Department of Mechanical Engineering,  
University of Wales Swansea, Singleton Park,  
Swansea SA2 8PP, UK

#### A.W. Leissa

Department of Mechanical Engineering,  
Colorado State University, Fort Collins,  
CO 80523-1374, USA

#### R. Lewandowski

Institute of Structural Engineering,  
Poznan University of Technology,  
Piotrowo Street 5, Poznan 60-965, Poland

#### S. Liguore

Boeing Company, St. Louis, MO 63166-0516, USA

#### K. Nagai

Department of Mechanical System Engineering,  
Gunma University, Kiryu, Gunma 376-8515, Japan

#### N. Noiray

Turbomachines Group, Alstom (schweiz)  
AG - Power Systems, Baden Switzerland

#### M. Paidoussis

Department of Mechanical Engineering,  
McGill University, Montreal H3A 2K6, Canada

#### K.S. Peat

Department of Mathematical Sciences, Loughborough  
University, Loughborough LE11 3TU, UK

#### B.A.T. Petersson

Institute of Fluid Dynamics and Technical Acoustics,  
Technical University of Berlin, D-10587 Berlin, Germany

#### S.W. Rienstra

Department of Mathematics and Computer Science,  
Eindhoven University of Technology, The Netherlands

#### A.A. Shabana

Department of Mechanical Engineering,  
University of Illinois at Chicago, 842 W. Taylor Street,  
Chicago, IL 60607-7022, USA

#### R. Singh

Dept. of Mechanical Engineering, The Ohio State University,  
201 West 19th Ave, Columbus, OH 43210 USA

#### S. Sorokin

Department of Mechanical Engineering,  
Aalborg University, Pontoppidanstraede  
101, Aalborg DK-9220, Denmark

#### J.Q. Sun

School of Engineering, University of California Merced,  
CA 95344, USA

#### Q. Wang

Department of Mechanical and Manufacturing  
Engineering, University of Manitoba, Winnipeg, Canada

#### J. Woodhouse

Department of Engineering, University of Cambridge,  
Trumpington St., Cambridge CB2 1PZ, UK

#### Y.B. Yang

Department of Civil Engineering, National Taiwan University,  
No 1 Sec 4 Roosevelt Road, Taipei 10617, Taiwan