

REPORT 2000

INTERNATIONAL UNION OF THEORETICAL AND
APPLIED MECHANICS

REPORT 2000



Eindhoven University of Technology
THE NETHERLANDS

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Contents

Bureau: Officers and Members	7
Secretariat	7
Past Officers	7
Past Congress Presidents	8
Adhering Organisations	9
Affiliated Organizations	18
Members of the General Assembly	21
Members of the Congress Committee	24
Members of the Symposia Panels	25
Donations in 2000	25
Representation in other organizations	25
Reports of IUTAM Symposia held in 2000	26
Report of IUTAM Summer School on Friction and Instabilities	61
ICTAM 2000 Chicago	62
Special Lectures, Mini-Symposia and Pre-nominated Sessions	62
ICTAM 2000 Statistics	67
Minutes of General Assembly Meetings, 2000	69
Minutes of Congress Committee Meetings, 2000	87
2000 Treasurer's Report	93
Reports on	98
AFMC (Asian Fluid Mechanics Committee)	98
CACOFD (Caribbean Congress of Fluid Dynamics)	98
CISM (International Centre for Mechanical Sciences)	98
COSTED (Committee on Science and Technology in Developing Countries)	100
EUROMECH (European Mechanics Society)	100
HYDROMAG (International Association for Hydromagnetic Phenomena and Applications)	101
IACM (International Association for Computational Mechanics)	102
IABEM (International Association for Boundary Element Methods)	103
IAVSD (International Association for Vehicle System Dynamics)	103
ICA (International Commission for Acoustics)	104
ICF (International Congress on Fracture)	105
ICM (International Congress on the Mechanical Behaviour of Materials)	105
IIAV (International Institute of Acoustics and Vibration)	106
ISIMM (International Society for the Interaction of Mechanics and Mathematics)	107
ICHMT (International Centre for Heat and Mass Transfer)	108
ISSMO (International Society of Structural and Multidisciplinary Optimization)	109
SCOR (SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH)	110
Relations with ICSU	111
COSPAR (Committee on Space Research)	112
Agreement by and between IUTAM and Kluwer Academic Publishers B.V.	112
Statutes	116

<u>Statuts de l'Union Internationale de Mécanique Théorique et Appliquée</u>	116
<u>Règles de fonctionnement du Comité des Congrès de l'Union</u>	120
<u>Procédés pour l'élection du Bureau de l'IUTAM</u>	120
<u>Procédure pour l'élection de membres cooptés par l'Assemblée Générale</u>	121
<u>Statutes of the International Union of Theoretical and Applied Mechanics</u>	122
<u>Rules of procedure for the Congress Committee of IUTAM</u>	125
<u>Procedure* for election of the Bureau of IUTAM</u>	126
<u>Procedure* for electing Members-at-Large of the General Assembly</u>	126
<u>List of Publications</u>	127
<u>List of Addresses</u>	141

Bureau: Officers and Members

The following members of the Bureau of IUTAM have been elected for the period 1 November 2000 to 31 October 2004:

Officers:

Professor H.K. Moffatt (UK)	President
Professor W. Schiehlen (Germany)	Vice-President
Professor L.B.Freund (USA)	Treasurer
Professor D.H. van Campen (Netherlands)	Secretary-General

Members:

Professor C. Cercignani (Italy)	elected	(2000)
Professor J. Engelbrecht (Estonia)		(1996)
Professor R. Narasimha (India)		(2000)
Professor J. Salencon (France)		(2000)

Secretariat

IUTAM-Secretariat, Department of Mechanical Engineering,
Eindhoven University of Technology,
5600 MB Eindhoven, The Netherlands
Telephone: +31 40 247 2710, Telefax: +31 40 243 7175
E-mail: sg@iutam.net

Past Officers

Elected President	Vice-President	Treasurer	Secretary
1948 J. Péres (France)	R.V. Southwell (UK)	H.L. Dryden (USA)	J.M. Burgers (Netherlands)
1952 H.L. Dryden (USA)	J. Péres (France)	G. Temple (UK)	F.A. v. d. Dungen (Belgium)
1956 F.K.G. Odqvist (Sweden)	H.L. Dryden (USA)	G. Temple (UK)	M. Roy (France)
1960 G. Temple (UK)	F.K.G. Odqvist (Sweden)	W.T. Koiter (Netherlands)	M. Roy (France)
1964 M. Roy (France)	G. Temple (UK)	W.T. Koiter (Netherlands)	H. Görtler (Germany)
1968 W.T. Koiter (Netherlands)	M. Roy (France)	H. Görtler (Germany)	F.I. Niordson (Denmark)
1972 H. Görtler (Germany)	W.T. Koiter (Netherlands)	D.C. Drucker (USA)	F.I. Niordson (Denmark)

1976	F.I. Niordson (Denmark)	H. Görtler (Germany)	D.C. Drucker (USA)	J. Hult (Sweden)
1980	D.C. Drucker (USA)	F.I. Niordson (Denmark)	E. Becker (Germany)	J. Hult (Sweden)
1984	J. Lighthill (UK)	D.C. Drucker (USA)	L.v. Wijngaarden (Netherlands)	W. Schiehlen (Germany)
1988	P. Germain (France)	J. Lighthill (UK)	L.v. Wijngaarden (Netherlands)	W. Schiehlen (Germany)
1992	L.v. Wijngaarden (Netherlands)	P. Germain (France)	B.A. Boley (USA)	F. Ziegler (Austria)
1996	W. Schiehlen (Germany)	L.v. Wijngaarden (Netherlands)	L.B. Freund (USA)	M.A. Hayes (Ireland)

Past Congress Presidents

Nr.	Year	Place	Congress-President
1	1924	Delft, The Netherlands	C.B. Biezeno
2	1926	Zürich, Switzerland	E. Meissner
3	1930	Stockholm, Sweden	A.F. Enström
4	1934	Cambridge, UK	C.E. Inglis
5	1938	Cambridge, USA	K.T. Compton
6	1946	Paris, France	H. Villat
7	1948	London, UK	R.V. Southwell
8	1952	Istanbul, Turkey	K. Erim
9	1956	Brussels, Belgium	F.H. van den Dungen
10	1960	Stresa, Italy	G. Colonna
11	1964	Munich, Germany	H. Görtler
12	1968	Stanford, USA	N.J. Hoff
13	1972	Moscow, USSR	N.I. Muskhelishvili
14	1976	Delft, The Netherlands	W.T. Koiter
15	1980	Toronto, Canada	F.P.J. Rimrott
16	1984	Lyngby, Denmark	F. Niordson
17	1988	Grenoble, France	P. Germain and M. Piau
18	1992	Haifa, Israel	J. Singer
19	1996	Kyoto, Japan	T. Tatsumi
20	2000	Chicago, USA	H. Aref

Adhering Organisations

Argentina (1959)

Asociacion Argentina de Mecanica Computacional, Güemes 3450,
3000 Santa Fe

Chairman: Dr. S.R. Idelsohn

Representative in IUTAM: Dr. S.R. Idelsohn

Australia (1964)

The Australian National Committee for Theoretical and Applied Mechanics of the
Australian Academy of Sciences, GPO Box 783, Canberra City, ACT 2601

Chairman: Prof. N. Phan-Thien

Representatives in IUTAM: Prof. N. Phan-Thien and Prof. R.I. Tanner

Austria (1951)

Austrian National Committee for Theoretical and Applied Mechanics, Austrian
Academy of Sciences, Dr.-Ignaz-Seipel-Platz 2, A-1010 Wien

Chairman: Prof. H. Troger

Deputy Chairman: Prof. A. Kluwick

Representative in IUTAM: Prof. H. Mang

Belgium (1949)

The National Committee for Theoretical and Applied Mechanics of the Class of Sciences
of the Royal Belgian Academy, Hertogsstraat 1, B-1000 Brussels

President: Prof. Roland Keunings

Vice-President: Prof. Albert Cardon

Secretary: Prof. R. Bourgois

Representatives in IUTAM: Prof. R. Keunings, Prof. A. Cardon, Prof. R. Bourgois

Brazil (1982)

Associação Brasileira de Ciências Mecânicas, Avenida Rio Branco 124/18º andar,
20040-001 Rio de Janeiro

President: Prof. R. Cotta

Representative in IUTAM: Prof. L. Bevilacqua

Bulgaria (1969)

Bulgarian National Committee for Theoretical and Applied Mechanics at the Bulgarian
Academy of Sciences, "Acad. G. Bonchev" str. bl. 4,

1113 Sofia, Bulgaria

President: Prof. A. Baltov

Secretary: Prof. M. Mihovski

Representative in IUTAM: Prof. St. Radev

Canada (1963)

The National Research Council of Canada, Ottawa, Canada K1A 0R6

President: Dr. A. Carty

National Committee for IUTAM, Chairman: Prof. S.B. Savage

Representatives in IUTAM: Prof.D.S. Weaver, Prof. F.P.J. Rimrott,
Prof. S. B. Savage, Prof. J.Hansen.

Chile (1996)

The Chile National Committee on Theoretical and Applied Mechanics, Academia Chilena de Ciencias, Almirante Montt 454, Santiago, Chile

President: Prof. E. Tirapegui

Representative in IUTAM: Prof. F. Lund

China (1980)

The Chinese Society of Theoretical and Applied Mechanics, 15 Zhong Guan Cun Road, Beijing 100080

Chairman: Prof. Yi-Leng Bai

Representatives in IUTAM: Prof. You-Sheng He, Prof. K.C. Hwang,
Prof. Ren Wang, Prof. Z.M. Zheng

China-Hong Kong (1996)

The Hong Kong Society of Theoretical and Applied Mechanics (HKSTAM), Department of Mechanical Engineering

The Hong Kong University of Science and Technology

Clear Water Bay, Kowloon

President: Prof. T. Yu (HKUST)

Vice-President: Prof. T.X. Yu (HKUST)

Secretary: Prof. K.T. Chau (HKPolyU)

Representative in IUTAM: Prof. Pin Tong (HKUST)

The Society of Theoretical and Applied Mechanics, Department of Civil Engineering, National Central University, Chungli 32054, Taiwan

President: Prof. K.-S. Wang

Secretary: Prof. C.-Y. Wang

Representatives in IUTAM: Prof. Wen-Hwa Chen, Prof. C.-S. Yeh

Croatia (1994)

Croatian Society of Mechanics, Ivana Lucića 5, HR-10000 Zagreb, Croatia.

President: Prof. Pavao Marovic.

Representative in IUTAM: Prof. I. Alfircic

Czech Republic (1993), (former Czechoslovakia (1949))

The National Committee of Theoretical and Applied Mechanics,
Academy of Sciences of the Czech Republic,
Institute of Thermomechanics, Dolejskova 5, CZ-18200 Prague 8
President: Dr. R. Dvorák
Secretary: Prof. M. Okrouhlik
Representative in IUTAM: Dr. R. Dvorák

Denmark (1949)

National Committee for Theoretical & Applied Mechanics,
The Royal Danish Academy of Sciences and Letters,
H.C. Andersens Boulevard 35, DK-1553 Copenhagen V.
President: Prof. B. Munk Olsen
Secretary: Prof. T.A. Bak
Representatives in IUTAM: Prof. Per A. Madsen, Prof. N. Olhoff

Egypt (1976)

Academy of Scientific Research and Technology,
Egyptian Committee of Theoretical and Applied Mechanics
101 Kasr El Eini Street, Cairo, Egypt.
ECTAM Chairman: Prof. M.K. Ismail
Secretary General: Prof. Z.Z. Momeh
Representative in IUTAM: Prof. M.K. Ismail

Estonia (1992)

Estonian Committee for Mechanics,
Akadeemia tee 21, EE-12618 Tallinn
Chairman: Prof. J. Engelbrecht
Representative in IUTAM: Prof. J. Engelbrecht

Finland (1952)

The Finnish National Committee on Mechanics,
Helsinki University of Technology,
P.O.Box 4100, FIN- 02015 HUT, Finland
Chairman: Prof. M.J. Mikkola
Secretary: Prof. M. Määttänen
Representatives in IUTAM: Prof. M.J. Mikkola, Prof. M. Määttänen

France (1949)

Comité National Français de Mécanique, Académie des Sciences,
23, quai Conti, F-75006 Paris

President: Prof. Gerard Iooss

Secretary: Prof. Olivier Maisonneuve

Representatives in IUTAM: Prof. D. Barthes-Biesel, Prof. P. Suquet,
Prof. S. Zaleski, Prof. A. Zaoui

Georgia (2000)

National Committee of Theoretical and Applied Mechanics

I. Vekua Institute of Applied Mathematics of Tbilisi State University,
2 University Str., Tbilisi 380043

Co-Chairmen: Prof. G. Jaiani, Prof. D. Danelia

Representatives in IUTAM: Prof. G. Jaiani

Germany (1950)

Deutsches Komitee für Mechanik (DEKOMECH),

Institut für Baumechanik und Numerische Mechanik, Universität Hannover, Appelstraße
9 A, D-30167 Hannover

Chairman: Prof. E. Stein

Secretary: Prof. G. Kuhn

Representatives in IUTAM: Prof. U. Gabbert, Prof. E. Krause,
Prof. G. Kuhn, Prof. S. Wagner

Greece (1979)

Hellenic Society for Theoretical and Applied Mechanics,

National Technical University of Athens, GR-10682 Athens

President: Prof. A.N. Kounadis

Secretary: Prof. D. Beskos

Representative in IUTAM: Prof. A.N. Kounadis

Hungary (1948)

Hungarian National Committee for IUTAM, Department of Structural Mechanics,

Budapest University of Technology and Economics, Műegyetem rkp. 3,
H-1521 Budapest

President: Prof. S. Kaliszky

Secretary: Prof. G. Stepan

Representative in IUTAM: Prof. S. Kaliszky

India (1950)

National Committee for Theoretical and Applied Mechanics of the Indian National Science Academy, Bahadur Shah Zafar Marg, New Delhi - 110 002

Chairman: Dr. M.L. Munjal

Representatives in IUTAM: Prof. N.K. Gupta, Prof. Tarun Kant,
Prof. M.L. Munjal, Dr. T.V.S.R. Appa Rao,
Dr. P.R. Viswanath

Ireland (1984)

Irish National Committee for Theoretical and Applied Mechanics,
Royal Irish Academy, 19 Dawson Street, Dublin 2

Chairman: Prof. P. O'Donoghue

Secretary: Dr. J.J. Grannell

Representative in IUTAM: Prof. P.O'Donoghue

Israel (1950)

The Israel Society of Theoretical and Applied Mechanics, Dept. of Mechanical Engineering, Technion-Israel Institute of Technology, Haifa 32000

President: Prof. S.R. Bodner

Representatives in IUTAM: Prof. S.R. Bodner, Prof. T. Miloh

Italy (1949)

Associazione Italiana di Meccanica Teorica ed Applicata,
Piazza Leonardo da Vinci 32, I-20133 Milano

President: Prof. G. Capriz

Secretary: Prof. A. Morro

Representatives in IUTAM: Prof. G. Maier, Prof. C. Cercignani,
Prof. P. Podio-Guidugli, Prof. F. Vatta

Japan (1951)

The National Committee for Theoretical and Applied Mechanics,
Science Council of Japan,

7- 22-34 Roppongi 7-chome, Minato-ku, Tokyo 106-8555

Chairman: Prof. T.Kambe

Representatives in IUTAM: Prof. T. Kambe, Prof. H. Kitagawa
Prof. T. Kobayashi, Prof. E. Watanabe

Kazakhstan (1996)

The Kazakhstan National Committee on Theoretical and Applied Mechanics, National Academy of Sciences of the Republic of Kazakhstan,

Abai Avenue, 31, 480091 Almaty, Kazakhstan

Chairman: Prof. Zh.S. Erzhanov

Secretary: Dr. A.A. Baimukhametov

Representative in IUTAM: Prof. Zh.S. Erzhanov

Korea (1990)

Korean Society of Theoretical and Applied Mechanics, Department of Aerospace Engineering, Seoul National University, Seoul 151-742

President: Prof. Jung Yul Yoo

Secretary: Prof. Seung Jo Kim

Representative in IUTAM: Prof. Jung Yul Yoo

Latvia (1992)

Latvian National Committee for Mechanics, Latvian Academy of Sciences, Akademijas laukums 1, Riga LV-1524

President: Prof. V. Tamuzs

Vice-President: Prof. O. Lielausis

Representative in IUTAM: Prof. V. Tamuzs

Morocco (1998)

Societe Marocaine des Sciences Mecaniques, Madinat Al Irfane, Rabat Institut, Rabat

President: Prof. J. Khalid Naciri

Representative in IUTAM: Prof. M. Belhaq

Netherlands (1952)

Dept. for Mechanics of the Royal Institution of Engineers in the Netherlands, c/o Philips Research Laboratories, Building WB-1-57, Prof. Holstlaan 4, NL 5656 AA Eindhoven.

President: Dr. J.F. Dijkman

Representatives in IUTAM: Prof. J.A. Battjes, Prof. D.H. van Campen,
Dr. J.F. Dijkman

New Zealand (1979)

The Royal Society of New Zealand, P.O. Box 598, Wellington

President: Sir Gil Simpson

Chief Executive Officer: Dr. S.C. Thompson

Representative in IUTAM: Dr. E.R. Davis

Norway (1949)

National Committee on Theoretical and Applied Mechanics, Norwegian Acad. Sciences and Letters,

Dept. of Maths, University of Oslo, P.O.Box 1053, Blindern, N-0316 Oslo 3

President: Prof. B. Gjevik

Representative in IUTAM: Prof. B. Gjevik

Poland (1952)

Committee for Mechanics of the Polish Academy of Sciences,

ul. Swietokrzyska 21, PL-00 049 Warszawa

Chairman: Prof. G. Szefer

Representatives in IUTAM: Prof. W. Gutkowski, Prof. H. Zorski

Portugal (1968)

Portuguese Society of Theoretical, Applied and Computational Mechanics, Laboratorio

Nacional de Engenharia Civil,

Avenida do Brasil 101, 1700-066 Lisboa

Chairman: Prof. J. Novais Barbosa

Vice-Presidents: Prof. J.A.C. Martins, Prof. C. Mota Soares

Representative in IUTAM: Prof. J.A.C. Martins

Romania

Romanian Academy, Department of Mathematics,

Romanian National Committee of Theoretical and Applied Mechanics

Calea Victoriei 125, 71102 Bucharest, Romania

Head of Department: Dr. G. Marinoschi

Representative in IUTAM: Prof. N.D. Cristescu

Russia (1956) (former USSR (1956–1991))

Russian National Committee on Theoretical and Applied Mechanics,

Prospekt Vernadskogo 101, Moscow 117526

President: Prof. G.G. Chernyi

Secretary: Prof. G.K. Mikhailov

Representatives in IUTAM: Prof. G.G. Chernyi, Prof. K.V. Frolov,

Prof. G.K. Mikhailov, Prof. I.F. Obraztsov

Saudi Arabia (1988)

King Abdulaziz City of Science and Technology,

International Cooperation Department, P.O. Box 6086, Riyadh 11442

President: Dr. S.A. Al-Athel

Director: Mr. Fahad Huraib

Representative in IUTAM: Dr. S.A. Al-Athel

Slovakia (1993) (former Czechoslovakia (1949))

The Slovak Society for Mechanics, Council of Scientific Societies,

Stefánikova 49, SK-811 04 Bratislava

President: Prof. J. Brilla

Representative in IUTAM: Prof. J. Brilla

Slovenia (1994)

Slovene Mechanics Society, Faculty of Mechanical Engineering,
University of Maribor, Smetanova 17, 2000 Maribor

President: Prof. Leopold Skerget

Secretary: Prof. Jure Marn

Representative in IUTAM: Prof. M. Saje

South Africa (1994)

National Research Foundation (NRF), Association for Theoretical and Applied
Mechanics (SAAM),

South African ICSU Secretariat, P.O. Box 2600, Pretoria 0001

President: Dr. I. Gledhill

Representative in IUTAM: Prof. C.G. de K. du Toit

Spain (1950)

Instituto Nacional de Tecnica Aeroespacial, Carretera de Ajalvir km. 4,00,
Torrejón de Ardoz, 28850 Madrid

Representative in IUTAM: Mr. Angel Moratilla

Sweden (1950)

Swedish National Committee for Mechanics, Department of Mechanics
Royal Institute of Technology, S-10044 Stockholm

President: Prof. L. Josefsson

Secretary: Prof. L. Davidson

Representatives in IUTAM: Prof. B. S. Storakers, Prof. A. Boström,
Prof. B. Lundberg

Switzerland (1950)

Board of the Federal Institutes of Technology, (Rat der Eidgenössischen Technischen
Hochschulen), ETH-Zentrum, CH-8092 Zürich

President: Prof. F. Waldvogel

Secretary-General: Dr. J. Fulda

Representatives in IUTAM: Prof. P.A. Monkewitz, Prof. M. Sayir

Turkey (1977)

Turkish National Committee of Theoretical and Applied Mechanics,
Istanbul Teknik Üniversitesi, Fen-Edebiyat Fakültesi, Maslak 80626 Istanbul

President: Prof. Yalçın Aköz

Secretary-General: Prof. Mehmet Ali Tasdemir

Representative in IUTAM: Prof. E. Suhubi

Ukraine (1995)

National Committee of Ukraine on Theoretical and Applied Mechanics
S.P.Timoshenko Institute of Mechanics, Nesterov str. 3, Kyiv 03680
Chairman: Prof. A.N. Guz
Secretary-General: Prof. J.J.Rushchitsky
Representatives in IUTAM: Prof. A.N. Guz

UK (1948)

The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG
Executive Secretary of the Royal Society: Mr. Stephen Cox
Chairman of UK Panel for IUTAM: Prof. P.W. Carpenter
Secretary of UK Panel for IUTAM: Prof. B.L. Karihaloo
Representatives in IUTAM: Prof. C.R. Calladine, Prof. T.J. Pedley,
Prof. P.W. Carpenter, Prof. J.R. Willis

USA (1949)

The U.S. National Committee on Theoretical and Applied Mechanics,
National Academy of Sciences,
2101 Constitution Avenue, N.W., Washington, DC., 20418
Chairman: Prof. Ron Adrian
Secretary: Prof. P.G. Hodge, Jr.
Representatives in IUTAM: Prof. Ron Adrian, Prof. H. Aref, Prof. E. H. Dowell,
Prof. Carl Herakovich, Prof. P.G. Hodge Jr.

Vietnam (1990)

Vietnamese Association of Mechanics (VAM),
Hoi Co Hoc Vietnam, 264 Doi Can, Hanoi
President: Prof. Nguyen Van Dao
Secretary: Prof. Do Sanh
Representative in IUTAM: Prof. Nguyen Van Dao

Yugoslavia (1952)

Yugoslav Society of Mechanics, Fac. of Mechanical Engineering,
University of Belgrade, 27. Marta 80, YU-11120 Beograd
President: Prof. D.D. Ruzic
Secretary: Prof. M. Nedeljkovic
Representative in IUTAM: Prof. D.D. Ruzic

Affiliated Organizations

CISM (1970)

International Centre for Mechanical Sciences, Palazzo del Torso, Piazza Garibaldi, I-33100 Udine, Italy

Director: Prof. G. Bianchi

President: Avv. Vinicio Turello

Secretary-General: Prof. B. Schrefler

Rectors: Prof. S. Kaliszky, Prof. M. Sayir, Prof. W. Schneider

Representative of CISM in IUTAM: Prof. G. Bianchi

Representative of IUTAM in CISM: Prof. L. van Wijngaarden

ICHMT (1972)

International Centre for Heat and Mass Transfer, Mechanical Engineering Dept., Middle East Technical University, 06531 Ankara, Turkey.

President: Prof. R.J. Goldstein

Secretary-General: Prof. F. Arinc

Representative of ICHMT in IUTAM: Prof. F. Arinc

Representative of IUTAM in ICHMT: Dr. R. Dvorak

ICR (1974)

International Committee on Rheology, Prof. D.F. James, Dept. of Mechanical and Industrial Engineering, University of Toronto, Toronto, Ont M5S 3G8, Canada

Chairman: Prof. D. De Kee

Secretary: Prof. D.F. James

Representative of ICR in IUTAM: Dr. J.R.A. Pearson

Representative of IUTAM in ICR: Prof. F.I. Niordson

IAVSD (1977)

International Association for Vehicle System Dynamics, Prof. R.S. Sharp, School of Engineering, Whittle Building, Cranfield University, Wharley End, Bedford MK43 0AL, UK

President: Prof. W. Kortüm

Secretary: Prof. R.S. Sharp

Representative of IAVSD in IUTAM: Prof. R.S. Sharp

Representative of IUTAM in IAVSD: Prof. W. Schiehlen

EUROMECH (1978)

European Mechanics Society

Prof. M. Okrouhlik, Institute of Thermomechanics, Dolejskova 5, Prague 8
Czech Republic

President: Prof. H.H. Fernholz

Secretary General: Prof. M. Okrouhlik
Representative of EUROMECH in IUTAM: Prof. T. Pedley
Representative of IUTAM in EUROMECH: Prof. W.Schiehlen

ISIMM (1978)

International Society for the Interaction of Mechanics and Mathematics, Prof.K. Wilmanski, Weierstrasse Institute, Berlin, Germany
President: Prof. I. Müller
Secretary: Prof. K. Wilmanski
Representative of ISIMM in IUTAM: Prof. M.A. Hayes
Representative of IUTAM in ISIMM: Prof. G. Iooss

ICF (1978)

International Congress on Fracture, Prof. T. Yokobori, School of Science and Engineering, Teikyo University, Toyosatodai 1-1, Utsunomiya, 320, Japan
Founder President: Prof. T. Yokobori
President: Prof. Robert O. Ritchie.
Secretary-General: Dr. M. Kitagawa
Representative of ICF in IUTAM: Prof. Bhushan L. Karihaloo
Representative of IUTAM in ICF: Prof. J.B. Leblond

ICM (1982)

International Congress on Mechanical Behaviour of Materials, Prof. F. Ellyin, Dept. of Mechanical Engineering, University of Alberta, Edmonton, Canada T6G 2G8
President: Prof. F. Ellyin
Secretary: Dr. J.D. Wolodko
Representative of ICM in IUTAM: Prof F. Ellyin
Representative of IUTAM in ICM: Prof. S.R. Bodner

AFMC (1982)

Asian Fluid Mechanics Committee, Prof. R. Narasimha, Centre for Atmospheric Sciences, Indian Institute of Science, Bangalore 560 012, India
Chairman: Prof. R. Narasimha
Representative of AFMC in IUTAM: Prof. R. Narasimha
Representative of IUTAM in AFMC: Prof. I. Imai

IACM (1984)

International Association for Computational Mechanics, Prof. E. Oñate, International Center for Numerical Methods in Engineering, Edificio C-1, Gran Capitán s/n, E-08034 Barcelona, Spain
President: Prof. T.J.R. Hughes

Secretary: Prof. E. Oñate
Representative of IACM in IUTAM: Prof. J.T. Oden
Representative of IUTAM in IACM: Prof. E.R. de Arantes e Oliveira

CACOFD (1992)

Caribbean Congress of Fluid Dynamics, c/o The Department of Math and Computer Science, The University of the West Indies, St. Augustine, Trinidad, West Indies
President: Prof. F. Malpica
Secretary: Dr. W. Mellowes
Representative of CACOFD in IUTAM: Dr. H. Ramkissoon
Representative of IUTAM in CACOFD: Prof. D.D. Joseph

IABEM (1994)

International Association for Boundary Element Methods, Prof. M. Bonnet, CNRS et Ecole Polytechnique, Laboratoire de Mecanique des Solides, Ecole Polytechnique 91128 PALAISEAU cedex, FRANCE
President: Prof. M. Bonnet
Secretary: Prof. R. Callego
Representative of IABEM in IUTAM: Prof. M. Bonnet
Representative of IUTAM in IABEM: Prof. G. Kuhn

ISSMO (1996)

International Society for Structural and Multidisciplinary Optimization, Prof. G. Rozvany, FB 10, University–GH–Essen, D–45117 Essen, Germany
President: Prof. N. Olhoff
Secretary: Prof. V. Toropov
Representative of ISSMO in IUTAM: Prof. G. Rozvany
Representative of IUTAM in ISSMO: Prof. N. Olhoff

HYDROMAG (1996)

International Association for Hydromagnetic Phenomena and Applications, Prof. S. Asai, Dept of Mat. Sciences, University of Nagoya, Furo-cho, Chikusa-ku, Nagoya 464-0, Japan
President: Prof. S. Asai
Secretary General: Prof. A. Thess
Representative of HYDROMAG in IUTAM: Prof. R. Moreau
Representative of IUTAM in HYDROMAG: Prof. H.K. Moffatt

IIAV (1997)

International Institute of Acoustics and Vibration, Prof M. J. Crocker. Dept. of Mechanical Engineering, 201 Ross Hall, Auburn University, Auburn, AL 36849 USA
President: Dr. H. H. Heller

Secretary: Prof. A.F. Seybert
Representative of IIAV in IUTAM: Prof. M. Crocker
Representative of IUTAM in IIAV: Prof. J. D. Achenbach

ICA (1998)

International Commission for Acoustics, Dr. Gilles Daigle, Institute for Microstructural Sciences, National Research Council, Ottawa KIA OR6, Canada.

President: Prof Lawrence R. Crum
Secretary General: Dr. Gilles Daigle
Representative of ICA in IUTAM: Prof Stephen H. Crandall
Representative of IUTAM in ICA: Prof. A Bostrom

Members of the General Assembly

Prof. Ronald Adrian (USA)
Dr. Saleh Al-Athel (Saudi Arabia)
Prof. Ivo Alfirevic (Croatia)
Dr. T.V.S.R. Appa Rao (India)
Prof. Hassan Aref (USA)
Prof. Faruk Arinc (Turkey), representative of ICHMT
Prof. Dominique Barthes-Biesel (France)
Prof. Jurjen Battjes (Netherlands)
Prof. Mohamed Belhaq (Morocco)
Prof. Luiz Bevilacqua (Brazil)
Prof. Giovanni Bianchi (Italy), representative of CISM
Prof. Sol Bodner (Israel), representative in ICM
* Prof. Bruno Boley (USA)
Prof. Marc Bonnet (France), representative of IABEM
Prof. Anders Boström (Sweden), representative in ICA
Prof. Roger Bourgois (Belgium)
Prof. Jozef Brilla (Slovakia)
Prof. Christopher Calladine (UK)
Prof. Dick van Campen (Netherlands), Bureau member
Prof. Albert Cardon (Belgium)
Prof. Peter W. Carpenter (UK)
Prof. Carlo Cercignani (Italy), Bureau member
Prof. Wen-Hwa Chen (Taiwan)
Prof. Gorimir Chernyi (Russia)
Prof. Stephen H. Crandall (USA), representative of ICA
Prof. Nicolaie Cristescu (USA)
Prof. Malcolm Crocker (USA), representative of IIAV
Dr. Eddie Davis (New Zealand)
Dr. Frits Dijkstra (Netherlands)

- Prof. Earl H. Dowell (USA)
- * Prof. Daniel C. Drucker (USA)
- Dr. Rudolf Dvorák (Czech Republic), representative in ICHMT
- Prof. Fernand Ellyin (Canada), representative of ICM
- Prof. Juri Engelbrecht (Estonia), Bureau member
- Prof. Zh. S. Erzhanov (Kazakhstan)
- * Prof. W. Fiszdon (Poland)
- Prof. Ben Freund (USA), Bureau member
- Prof. Konstantin Frolov (Russia)
- Prof. Ulrich Gabbert (Germany)
- ** Prof. Paul Germain (France)
- Prof. Bjorn Gjevik (Norway)
- Prof. Narinder Gupta (India)
- Prof. Witold Gutkowski (Poland)
- Prof. Alexandr Guz (Ukraine)
- Prof. Jorn Hansen (Canada)
- ** Prof. Michael Hayes (Ireland), also representative of ISIMM
- Prof. You-Sheng He (China)
- Prof. Carl T. Herakovich (USA)
- ** Prof. Philip Hodge (USA)
- * Prof. Jan Hult (Sweden)
- Prof. Keh-Chih Hwang (China)
- Dr. Sergio Idelsohn (Argentina)
- * Prof. Alexander Ishlinsky (Russia)
- Prof. Mohamed Ismail (Egypt)
- Prof. George Jaiani (Georgia)
- Prof. Sandor Kaliszky (Hungary)
- Prof. Tsutomu Kambe (Japan)
- Prof. Tarun Kant (India)
- Prof. Bhushan Karihaloo (UK), representative of ICF
- Prof. Roland Keunings (Belgium)
- Prof. Hiroshi Kitagawa (Japan)
- Prof. Alfred Kluwick (Austria)
- Prof. Toshio Kobayashi (Japan)
- Prof. Anthony Kounadis (Greece)
- Prof. Egon Krause (Germany)
- * Prof. Yu Ku (USA)
- Prof. Günther Kuhn (Germany), representative in IABEM
- Prof. Fernando Lund (Chile)
- Prof. Bengt Lundberg (Sweden)
- Prof. Mauri Maattanen (Finland)
- Prof. Per A. Madsen (Denmark)
- Prof. Giulio Maier (Italy)
- Prof. Joao Martins (Portugal)
- Prof. Gleb Mikhailov (Russia)

- Prof. Martti Mikkola (Finland)
 Prof. Touvia Miloh (Israel)
 Prof. Keith Moffatt (UK), Bureau member, representative in HYDROMAG
 Prof. Peter A. Monkewitz (Switzerland)
 Mr. Angel Moratilla (Spain)
 Prof. Rene Moreau (France), representative of HYDROMAG
 Prof. Manohar Munjal (India)
 Prof. Roddam Narasimha (India), Bureau member,
 also representative of AFMC
- * Prof. Frithiof Niordson (Denmark), representative in ICR
 Prof. P. O'Donoghue (Ireland)
 Prof. Ivan Obraztsov (Russia)
 Prof. Tinsley Oden (USA), representative of IACM
 Prof. Niels Olhoff (Denmark), representative in ISSMO
 Prof. J.R. Anthony Pearson (UK), representative of ICR
 Prof. Timothy Pedley (UK), representative of EUROMECH
 Prof. Nhan Phan-Thien (Australia)
 Prof. Paolo Podio-Guidugli (Italy)
 Prof. Stefan Radev (Bulgaria)
 Prof. Harold Ramkissoon (West Indies), representative of CACOFD
 Prof. Friedrich Rimrott (Canada)
 Prof. George Rozvany (Hungary), representative of ISSMO
 Prof. Dobroslav Ruzic (Yugoslavia)
 Prof. M. Saje (Slovenia)
 Prof. Jean Salençon (France), Bureau member
 Prof. Stuart Savage (Canada)
 Prof. Mahir Sayir (Switzerland)
 Prof. Werner Schiehlen (Germany), Bureau member,
 representative in IAVSD and in EUROMECH
- Prof. Robin S. Sharp (UK), representative of IAVSD
 Prof. Bertil Storåkers (Sweden)
 Prof. Erdogan Suhubi (Turkey)
 Prof. Pierre Suquet (France)
 Prof. Vitauts Tamuzs (Latvia)
 Prof. Roger Tanner (Australia)
- ** Prof. Tomomasa Tatsumi (Japan)
 Prof. Charl de K. du Toit (South Africa)
 Prof. Pin Tong (China)
 Prof. Nguyen Van Dao (Viet Nam)
 Prof. Furio Vatta (Italy)
 Dr. Peruvemba Viswanath (India)
 Prof. Siegfried Wagner (Germany)
 Prof. Ren Wang (China)
 Prof. Eiichi Watanabe (Japan)
 Prof. David Weaver (Canada)

- ** Prof. Leen van Wijngaarden (Netherlands), representative in CISM
 Prof. John Willis (UK)
 Prof. Chau-Shiung Yeh (Taiwan)
 Prof. Jung Yul Yoo (Korea)
 Prof. S Zaleski (France)
 Prof. A Zaoui (France)
 Prof. Zhemin Zheng (China)
 Prof. Henryk Zorski (Poland)
- * Members elected by the General Assembly.
- ** Members-at-Large elected by the General Assembly for the period 1996-2000.

Members of the Congress Committee

- * Prof. Hassan Aref (USA) 2004
 Prof. Martin P. Bendsøe (Denmark) 2004, representative of ISSMO
 Prof. David Bogy (USA) 2004
 Prof. Dick van Campen (Netherlands) 2004
 Prof. D. Durban (Israel) 2004
 Prof. Juri Engelbrecht (Estonia) 2004
 Prof. Norman Fleck (UK) 2002
 Prof. Ben Freund (USA) 2004
 Prof. Graham Gladwell (Canada) 2004
 Prof. Peter Gudmundson (Sweden) 2004
 Prof. Michael Hayes (Ireland) 2002, representative of ISIMM
 Prof. Tatsuo Inoue (Japan) 2002, representative of ICM
 Prof. Javier Jiménez (Spain) 2002
 Prof. Tsutomu Kambe (Japan) 2004
 Prof. Bhushan Karihaloo (UK) 2004, representative of ICF
 Prof. Alfred Kluwick (Austria) 2002
 Prof. Anthony Kounadis (Greece) 2002
 Prof. V.V. Kozlov (Russia) 2002
 Prof. Yu Ku (USA)
 Prof. Gary Leal (USA) 2004, representative of ICR
 Prof. Peter Lugner (Austria) 2004, representative of IAVSD
 Prof. Fernando Lund (Chile) 2004
- * Prof. Keith Moffatt (UK) 2004, Chairman
 Prof. Peter A. Monkewitz (Switzerland) 2004
- * Prof. Rene Moreau (France) 2004, representative of HYDROMAG
 Prof. Bahadur Nakra (India) 2002
 Prof. Tinsley Oden (USA) 2002, representative of IACM
- * Prof. Niels Olhoff (Denmark) 2004
- * Prof. Timothy Pedley (UK) 2004, Secretary

- * Prof. Bernhard Schrefler (Italy) 2002
Prof. Kazimierz Sobczyk (Poland) 2002
Prof. Pierre Suquet (France) 2004
Prof. Roger Tanner (Australia) 2002
Prof. Eiichi Watanabe (Japan) 2002
Prof. Feng-Gan Zhuang (China) 2004
- * Members of Executive Committee (2000-2004)

Year, where stated, indicates end of term (applies to members elected after 1972).
List as of 1st November 2000

Members of the Symposia Panels

The Bureau of IUTAM in 1977 set up two panels charged with the duty of scanning proposals made for IUTAM–Symposia in the fields of fluid and solid mechanics. In 1992 that duty was extended to include scanning of proposals for IUTAM–Summer Schools. The following members have been elected in 2000 for the period up to and including the 2004 meeting of the General Assembly

Fluid Mechanics

Prof. Patrick Huerre
Prof. Tsutomu Kambe
Prof. Egon Krause
Prof. Gary Leal
Prof. D. Howell Peregrine

Solid Mechanics

Prof. Jan D. Achenbach
Prof. Felix Chernousko
Prof. Wolfgang Ehlers
Prof. Viggo Tvergaard
Prof. John Willis

Donations in 2000

Donations given to IUTAM Symposia are recorded under the heading “Financial Support” of the Reports of Symposia held in 2000. IUTAM is grateful to UNESCO and ICSU for providing a grant of \$7,000 for the support of the following activities:

IUTAM Symposium on Mechanical Waves for Composite Structures Characterization,
Chania, Greece, June 14-17, 2000;
Fifth IUTAM Symposium on Creep in Structures,
Nagoya Japan, April 2-7, 2000.

Representation in other organizations

COSPAR

Prof. G. Cheryni acts as Representative of IUTAM in the Committee on Space Research.

COSTED

Prof. R. Narasimha acts as Representative of IUTAM in the Committee on Science and Technology in Developing Countries.

SCOPE

Prof. G.M. Lespinard acts as Representative of IUTAM in the Scientific Committee of the Environment.

SCOR

Prof. S.A. Thorpe acts as Representative of IUTAM in the Scientific Committee on Oceanic Research.

Reports of IUTAM Symposia held in 2000

00-1 Fifth IUTAM Symposium on Creep in Structures Nagoya, Japan, April 2-7, 2000

Scientific Committee

S. Murakami (Japan, Co-Chair), N. Ohno (Japan, Co-Chair), A. Bertram (Germany), F. Ellyin (Canada), E. van der Giessen (Netherlands), D. R. Hayhurst (UK), F. Leckie (USA), J. Lemaitre (France), B. Storåkers (Sweden), M. Życzkowski (Poland), Ren Wang (China).

Short Summary of Scientific Progress Achieved

The First (1960) and the Second (1970) IUTAM Symposium on Creep in Structures were concerned mainly with the phenomenological law of creep and creep analysis of structural elements, whereas the issues of the Third Symposium (1980) had been shifted toward the problems of creep damage, creep crack growth, practical and effective design methods, etc.

Besides these topics, the new contribution of the Fourth Symposium (1990) was observed in the problems related to the internal structural change of materials. The materials concerned, furthermore, have been extended to single crystals, composite materials, polymeric materials, ceramics, geological materials, etc.

The aims of the Fifth IUTAM Symposium on Creep in Structures were to consolidate the development of creep research since 1990, and to provide a forum to discuss the new horizon of this fundamental field of applied mechanics toward the coming century.

As a result of the invitation to about 80 best and the most active scientists and engineers in the field of creep research in the world, the Symposium finally had 50 innovative presentations related to the problems of energy and environmental engineering, electronic engineering, automotive engineering, aeronautical and aerospace engineering.

The most important development in this symposium in comparison with the Fourth Symposium is the elaboration of creep research, both from physical and computational points of view. Namely, the highlights of the Symposium were

- 1) papers on accurate modeling of the creep and creep fracture phenomena based on metallurgical physics,
- 2) papers on the advanced computational techniques in creep analysis applied to fundamental technology and industry,
- 3) papers on the reliable design codes of high temperature structures.

Countries Represented and Number of Participants

Country	Participants	Spouses	Total
Austria	2	0	2
Belgium	1	0	1
Canada	4	1	5
China	1	1	2
Denmark	1	0	1
France	5	2	7
Germany	1	0	1
The Netherlands	2	1	3
Norway	1	0	1
Poland	3	1	4
Portugal	1	0	1
Russia	1	0	1
UK	12	1	13
USA	2	1	3
Japan	44	2	46
Total	81	10	91

Publication of Proceedings of the Symposium

Camera-ready manuscripts of 48 papers were accepted and subjected to peer review. Maximum assigned pages are 14 and 10 for the general lectures and ordinary lectures, respectively. The final manuscripts of about 520 pages were sent to Kluwer Academic Publishers in the middle of August, 2000.

Financial Support

The Symposium had financial support from the following 13 organizations and foundations (in alphabetical order):

International Union of Theoretical and Applied Mechanics;
 United Nations Educational, Scientific and Cultural Organization;
 Nagoya University Foundation;
 Amada Foundation for Metal Work Technology;
 The Asahi Glass Foundation;
 Casio Science Promotion Foundation;
 Commemorative Association for the Japan World Exposition (1970);
 Daiko Foundation;

The Iwatani Naoji Foundation;
 The Mikiya Science and Technology Foundation;
 Research Foundation for the Electrotechnology of Chubu;
 Suzuki Foundation;
 Yoshida Foundation for Science and Technology.

Scientific Program

April 3 (Mon.)

9:00-9:30 OPENING ADDRESS

S. Murakami
 J. Lemaître
 D. R. Hayhurst

9:30-10:15 GENERAL LECTURE

(Chairpersons: *J. Lemaître and N. Ohno*)
 B. F. Dyson and M. McLean

10:45-12:00 MICROMECHANISMS AND MECHANICAL MODELING 1

(Chairpersons: *J. Lemaître and N. Ohno*)
 W. T. Marketz, A. Chatterjee, F. D. Fischer and H. Clemens
 D. M. Knowles and D. W. MacLachlan
 E. P. Busso, N. P. O'Dowd and R. J. Dennis

14:00-14:45 GENERAL LECTURE

(Chairpersons: *B. F. Dyson and T. Kitamura*)
 P. Onck, B.-N. Nguyen and E. van der Giessen

14:45-15:35 MICROMECHANISMS AND MECHANICAL MODELING 2

(Chairpersons: *B. F. Dyson and T. Kitamura*)
 B.-N. Nguyen, P. Onck and E. van der Giessen
 N. Tada and R. Ohtani

16:05-17:45 MICROMECHANISMS AND MECHANICAL MODELING 3

(Chairpersons: *I. Le May and K. Yagi*)
 T. H. Hyde and W. Sun
 A. D. Bettinson, N. P. O'Dowd, K. Nikbin and G. A. Webster
 T. Kitamura and T. Shibutani
 N. Miyazaki

April 4 (Tue.)

9:00-9:45 GENERAL LECTURE

(Chairpersons: *D. R. Hayhurst and T. Inoue*)
 J. P. Sermage, J. Lemaître and R. Desmorat

9:45-10:35 CONTINUUM DAMAGE MECHANICS 1

(Chairpersons: *D. R. Hayhurst and T. Inoue*)
 Y. Wei, C. L. Chow, M. K. Neilsen and H. E. Fang
 H. Altenbach

11:05-12:20 CONTINUUM DAMAGE MECHANICS 2

(Chairpersons: *C. L. Chow and T. Igari*)
 A. Benallal and L. Siad

S. Murakami, T. Hirano and Y. Liu

T. Inoue

14:00-14:45 GENERAL LECTURE

(Chairpersons: *E. Krempl and H. Ishikawa*)

D. R. Hayhurst

14:45-15:35 CONTINUUM DAMAGE MECHANICS 3

(Chairpersons: *E. Krempl and H. Ishikawa*)

A. Litewka and A.C.B. Mesquita

A. Bodnar and M. Chrzanowski

16:05-17:45 COMPUTATIONAL METHOD IN CREEP AND DAMAGE ANALYSIS

(Chairpersons: *A. Benallal and N. Miyazaki*)

L. Adam and J. P. Ponthot

A. Ganczarski

Ch. Hellmich, M. Lechner, R. Lackner, J. Macht and H.A. Mang

Epishin, E. Kablov, E. Golubovskiy, I. Svetlov, T. Link, U. Brückner and

P. Portella

April 5 (Wed.)

9:00-9:45 GENERAL LECTURE

(Chairpersons: *T. H. Hyde and S. Kubo*)

H. C. Furtado and I. Le May

9:45-10:35 CREEP DAMAGE AND CREEP CRACK GROWTH 1

(Chairpersons: *T. H. Hyde and S. Kubo*)

D. J. Smith, N. S. Walker and S. T. Kimmins

K. Yagi, F. Abe, K. Kimura and H. Kushima

11:05-11:55 CREEP DAMAGE AND CREEP CRACK GROWTH 2

(Chairpersons: *D. J. Smith and A. Litewka*)

S. Kubo, E. Tamura, N. Tagami and K. Ohji

G. Harkegard and H.-J. Huth

12:00-18:00 *Excursion*

19:00-21:30 *Banquet*

April 6 (Thur.)

9:00-9:45 GENERAL LECTURE

(Chairpersons: *Ky Dang Van and M. Sakane*)

J. T. Boyle and R. Seshadri

9:45-10:35 FRACTURE ASSESSMENT AND DESIGN 1

(Chairpersons: *Ky Dang Van and M. Sakane*)

Y. Takahashi

R. A. Ainsworth, D. W. Dean and P. J. Budden

11:05-12:20 FRACTURE ASSESSMENT AND DESIGN 2

(Chairpersons: *R. A. Ainsworth and Y. Takahashi*)

Ky Dang Van

- L. Verger, A. Constantinescu and E. Charkaluk
T. Igari, T. Tokiyoshi and Y. Mizokami
14:00-14:45 GENERAL LECTURE
(Chairpersons: *J. T. Boyle and F. Yoshida*)
E. Krempl and K. Ho
14:45-15:35 MODELING OF CREEP AND RATCHETING 1
(Chairpersons: *J. T. Boyle and F. Yoshida*)
D. R. Hayhurst, J. Lin, Z. L. Kowalewski and B. F. Dyson
H. Ishikawa, K. Sasaki and T. Mayama
16:05-17:45 MODELING OF CREEP AND RATCHETING 2
(Chairpersons: *M. Chrzanowski and M. Kawai*)
Z.L. Kowalewski
M. Sakane and T. Hosokawa
F. Yoshida
Y. Sugita, N. Sinohara and K. Sugiyama

April 7 (Fri.)

- 9:00-9:45 GENERAL LECTURE
(Chairpersons: *H. Altenbach and Z. L. Kowalewski*)
N. Ohno, T. Ando, T. Miyake and S. Biwa
9:45-10:35 Micromechanics AND COMPOSITE MATERIALS
(Chairpersons: *H. Altenbach and Z. L. Kowalewski*)
S. Kruch, J.L. Chaboche and N. Carrere
J. Carmai and F. P. E. Dunne
11:05-12:20 CREEP OF NONMETALLIC MATERIALS
(Chairpersons: *L. P. Mikkelsen and Y. Sugita*)
M. Kawai
P. D. Barrette and I. J. Jordaan
T. Hiroe, H. Matsuo, K. Fujiwara and F. Ohashi
14:00-15:15 CREEP AND CREEP DAMAGE IN SHELLS
(Chairpersons: *E. Busso and S. Biwa*)
L. P. Mikkelsen
O. K. Morachkovsky and K. Naumenko
T.-Q. Yang, X. Zhang, Q. Gang and Q. An
15:15-15:30 CLOSING ADDRESS
N. Ohno

S. Murakami and N. Ohno

**00-2 IUTAM Symposium on Bluff Body Wakes and Vortex-Induced Vibrations
Marseille, France, June 13-16, 2000**

Scientific Committee

P. W. Bearman (UK, Co-Chairman), T. Leweke (France, Co-Chairman),

C.H.K. Williamson (USA, Co-Chairman), M. Gharib (USA), K. Hourigan (Australia), G.E. Karniadakis (USA), M. Kiya (Japan), P.A. Monkewitz (Switzerland), C. Norberg (Sweden), M.P. Païdoussis (Canada), D.O. Rockwell (USA), M.S. Triantafyllou (USA), T. Tatsumi (Japan + IUTAM Representative)

Summary of scientific progress achieved

The Symposium attracted 100 participants from 18 countries and, apart from a few who were unable to be present, gathered together the most active researchers in the field. The scientific programme included 8 invited lectures, 41 oral presentations and 23 poster presentations. People responsible for the posters were given a few minutes each to make a short presentation on their work. A total of 91 abstracts were received and these were reviewed by the Scientific Committee and the Chairmen. It was agreed by all present that the general standard of the presentations and the scientific level achieved were high.

One of the main purposes of the symposium was to bring together people working on the wakes of fixed bluff bodies with those studying vortex-induced vibrations of bluff bodies. Papers on the wake structure of fixed bluff bodies were divided into two main areas: those dealing with two-dimensional shapes, or those with only small amounts of three-dimensionality, and those on spheres. Presentations were almost equally divided between experimental and computational work and several addressed the question of vortex shedding control, both passive and active. There were separate sessions on theoretical aspects with a number of presenters following the interesting non-linear model equation approach showing that they were able to predict many of the physical features.

Vortex-induced vibration (VIV) is a subject that has been around for a long time and key parameters include structural damping and mass ratio, i.e. the mass of the structure to the mass of displaced fluid. The flow can be studied by considering bluff bodies forced to oscillate or bluff bodies free to oscillate and presentations on both approaches were given. Much is known about VIV of structures in air where mass ratios are high. Offshore oil production has stimulated an interest in large amplitude VIV for cylinders with mass ratios near unity. A number of new phenomena have been observed including different modes of shedding and distinct branches to the response curve of amplitude versus reduced velocity. For low mass ratios the added mass component provided by the fluid has a significant effect on oscillation frequency and is found to vary significantly with reduced velocity. These findings provoked extensive discussion on the meaning of added mass and whether it should be considered in its ideal flow sense or whether it should always be found from the component of the total fluid force in phase with acceleration.

A significant outcome of the meeting was the recognition of the advances being made by Computational Fluid Dynamics (CFD). It was demonstrated that considerable insight can be provided by applying CFD to an idealised cylinder experiment with some combination of the mass, damping and stiffness equated to zero. Direct simulations of three-dimensional modes of shedding are now possible and this prompted some discussion as to what role they play in determining the amplitude of VIV. Others argued that VIV

imposes order on the wake and that two-dimensional codes should be adequate for predicting VIV. An intriguing result, which was known before the symposium but reaffirmed at the meeting, is that CFD codes are having great difficulty in predicting the maximum amplitude of oscillation when the combined mass and damping parameter is low. There was much speculation as to why this is. One researcher had found that the maximum response could be predicted if the flow speed in the computation was very slowly raised, as might happen in an experiment. Others who had tried the same approach could not attain large enough amplitudes. As the mass and damping tend to zero the phase angle by which the transverse fluid force leads the displacement becomes extremely small and to predict maximum amplitudes this angle has to be found to a very high degree of accuracy. Predicting maximum amplitude remains one of the challenges facing CFD specialists.

In addition to those mentioned above, important new results were displayed on a number of other topics, including: sphere wakes, wakes of cylinders at or near a free surface, flow around multiple cylinders and the extraction of energy from bluff body wakes. Selected papers from the Symposium are due to appear in a special edition of the Journal of Fluids and Structures.

The symposium was held in a resort hotel complex directly on the coast, which possessed a sufficient level of isolation to ensure that the scientific sessions were always very well attended. The hospitality and meals provided by the hotel were excellent and they played a significant part in bringing the participants together for many interesting discussions. Everybody was able to leave the meeting with some new research ideas to follow up.

Countries/nationalities represented and number of participants

<u>Country</u>	<u>Number of participants</u>	<u>Nationality</u>	<u>Number of participants</u>
Australia	8	American	14
Brazil	3	Australian	9
Canada	2	Brazilian	3
France	33	British	7
Germany	2	Canadian	2
Greece	1	Chinese	3
India	1	French	30
Italy	1	German	3
Japan	6	Greek	3
Korea	3	Indian	2
Norway	2	Iranian	2
Poland	2	Israeli	1
Singapore	2	Italian	3
Sweden	2	Japanese	4
Switzerland	2	Korean	3
Taiwan	1	Luxemburgian	1

United Kingdom	9	Norwegian	1
USA	20	Polish	2
		Singaporean	2
100 participants		Swedish	2
18 countries		Swiss	2
22 nationalities		Taiwanese	1

Publication of Proceedings

The Proceedings of the present IUTAM Symposium will appear in a Special Double Issue of the Journal of Fluids and Structures, published by Academic Press, whose editor is Michael Paidoussis of McGill University in Montreal, Canada. This Special Issue, which will combine Numbers 3 and 4 of Volume 15 of the journal, will come out in April/May 2001.

During the Symposium, the Scientific Committee selected 21 oral presentations, whose authors were asked to contribute to the Proceedings; all accepted. In addition, 5 Invited Speakers accepted to write a paper for this volume. The corresponding manuscripts have all been received by the Organising Committee, and are presently undergoing review.

Financial support

The IUTAM grant of US\$ 5000 was credited to our local account as 33500 French Francs (FF). These funds were used to give financial support for travel and subsistence 15 researchers, who were unable to obtain sufficient funds from other sources.

In addition to the IUTAM grant, substantial financial support was provided by the European Commission (131000 FF), the US Office of Naval Research International Field Office London (33800 FF), the French Ministries of Defence and Research (30000 FF each), the local Regional and Departmental Councils (20000 FF each), the Université de Provence (10000 FF), and the French National Centre for Scientific Research CNRS (10000 FF).

Scientific programme

The scientific programme of the Symposium included 9 Invited Plenary Lectures and 9 topical sessions, several of which were split into two parts. A total of 41 oral presentations (20 minutes including discussion) and 23 poster presentations (3 minutes without discussion) were given. The poster presentations were included in the appropriate sessions, in order to avoid a single large poster session, which from experience is often tiring and unproductive.

The Invited Lectures were:

Fluid mechanics in the coming century (Opening Address)

T. Tatsumi (Int. Inst. for Advanced Studies, Japan)

Flow-induced vibration of a circular cylinder: insights from computational experiments

A. Leonard (California Institute of Technology, USA)

Aspects of the classic VIV problem

A. Roshko (California Institute of Technology, USA)

Interpretation of flow visualization

A. E. Perry & M. S. Chong (University of Melbourne, Australia)

Interaction between vortex rings and a separated shear layer: towards active control of separation zones

M. Kiya, O. Mochizuki & H. Ishikawa (Hokkaido University, Japan)

Time-dependent flow about solid and perforated cylinders

T. Sarpkaya (Naval Postgraduate School Monterey, USA)

Flow-structure interactions in presence of a free surface

D. O. Rockwell (Lehigh University, USA)

Modelling of vortex shedding from cylinders with span-wise non-uniformities

P. A. Monkewitz (EPF Lausanne, Switzerland)

Flow around elongated bodies: flow structure and resonance

K. Hourigan & M. Thompson (Monash University, Australia)

The topical sessions had the following titles:

Vortex-Induced Vibrations (6 talks of 20 minutes, 2 poster presentations)

- Sphere Wakes 1 & 2 (5 talks, 3 posters)
- Wake Control 1 & 2 (5 talks, 3 posters)
- Forced Oscillations (3 talks, 6 posters)
- Flexible Structures (5 talks)
- Three-dimensional Effects (4 talks)
- Fundamentals 1 & 2 (5 talks, 6 posters)
- Wake Manipulation (3 talks, 3 posters)
- Three-dimensional Instability (5 talks)

T.Leweke

00-3 IUTAM Symposium on Mechanical Waves for Composite Structures Characterization, Chania, Greece, 14-17 June 2000

Chair: Dimitrios A. Sotiropoulos (USA)

This report is on the *International Union of Theoretical and Applied Mechanics Symposium* "Mechanical waves for composite structures characterization". The Symposium took place June 14-17, 2000 in Chania, Crete, Greece. The Symposium covered a wide variety of areas and subjects that fall under its title-theme. As the symposium theme is interdisciplinary in nature, participants were invited from diverse fields such as Applied Mathematics, Applied Physics, Biomedical Engineering, Civil Engineering, Electrical Engineering, Fluid and Solid Mechanics, Materials Engineering, Mechanical Engineering, and Seismology. The symposium covered analytical, computational, numerical, theoretical and experimental aspects from state-of-the-art fundamental research to applied research and applications in emerging technologies. The topics include body waves, elastic waves, guided waves, inhomogeneous waves, rays, surface waves, and ultrasound in composite materials which are fiber-reinforced, laminated, or homogeneous containing bonds, coatings, cracks, defects, or thin films. The symposium participants, more than fifty, represented four continents. In addition, they were from across the board in terms of experience in the field: from Ph.D. students to Postdocs to renowned scientists. The papers presented can be placed in five thematic categories: the first category includes papers that deal with waves or rays from localized/plastic sources in layered media. In the second category, papers deal explicitly with discontinuities (e. g. dislocations, cracks). The third category encompasses papers in which experimental investigations are of primary interest. The fourth category includes papers that concentrate on waves in multilayered structures. Finally, papers included in the fifth category deal exclusively with elastic waves and interfaces. The contributing authors and participants are hereby gratefully acknowledged. The Symposium extended beyond its focused theme to an excursion that included the Archeological Museum in Heraklion, the Ancient City of Knossos, and lunch at Matala in the southern coast of Crete. I would also like to take this opportunity to express my sincere gratitude to Professor M. A. Hayes the ex-Secretary General of the International Union of Theoretical and Applied Mechanics and a member of the Symposium's Scientific Committee. His constant encouragement and support made the Symposium not only possible but also successful. To the success also contributed all the members of the Symposium's Scientific Committee which I had the honor to chair. I express my appreciation to each one of them who are: Professor J. D. Achenbach (USA), Professor M. A. Hayes (Ireland), Professor K. J. Langenberg (Germany), Professor A. K. Mal (USA), Professor X. Markenscoff (USA), Professor S. Nair (USA), Professor R. W. Ogden (UK), Professor G. J. Quentin (France), and Professor F. Ziegler (Austria). Finally, the financial support of Unesco, Iutam, and the US Army Research Laboratory-Europe Office is gratefully acknowledged

Dimitrios A. Sotiropoulos

**00-4 IUTAM Symposium on Advances in Mathematical Modelling of
Atmosphere and Ocean Dynamics, Limerick, Ireland, July 2-7, 2000**

Scientific Committee

F. Baer (U.S.A.), J.R. Bates (Denmark), P. Gent (U.S.A.), R. Grimshaw (Australia), P.F. Hodnett (Ireland, Chairman), A. Hollingsworth (U.K.), Y. Kimura (Japan), K. Moffatt (U.K., ex officio), R. Salmon (U.S.A.).

Scientific Progress achieved

The goals of the Symposium were to highlight advances in modelling of atmosphere and ocean dynamics; to provide a forum where atmosphere and ocean scientists could present their latest research results and learn of progress and promising ideas in these allied disciplines; to facilitate interaction between theory and applications in atmosphere/ocean dynamics. These goals were seen to be especially important in view of current efforts to model climate requiring models which include interaction between atmosphere, ocean and land influences.

Participants were delighted with the diversity of the scientific programme; the opportunity to meet fellow scientists from the other discipline (either atmosphere or ocean) with whom they do not normally interact through their own discipline; the opportunity to meet scientists from many countries other than their own; the opportunity to hear significant presentations (50 minutes) from the keynote speakers (who are listed below) on a range of relevant topics. Certainly the goal of creating a forum for exchange between atmosphere and ocean scientists who need to input jointly to create realistic models for climate prediction was achieved by the Symposium and this goal will be further advanced by the publication of the Proceedings by Kluwer Academic Publishers.

Countries represented and number of participants

China 1, Japan 3, U.S.A. 25, Canada 6, Switzerland 1, Australia 4, Denmark 3, France 3, Italy 2, India 1, U.K. 10, Ireland 9, Russia 2, Estonia 2. Total: 72

Proceedings of the Symposium

The proceedings will be published by Kluwer Academic Publishers in 2001 (editor P.F. Hodnett).

Financial Support

Financial support for the Symposium was generously provided by the following: Aer Lingus; College of Informatics and Electronics, University of Limerick; Convention Bureau of Ireland; Department of Mathematics and Statistics, University of Limerick; Enterprise Ireland; International Union of Theoretical and Applied Mechanics; Kluwer Academic Publishers; Marine Institute (Ireland); Met Eireann; Office of Naval Research (London); President, University of Limerick.

Scientific Program

Opening and Welcome

Dr. R. Downer, President, University of Limerick.

Prof. H.K. Moffatt, IUTAM Bureau.

Prof. M. Hayes, Royal Irish Academy.

Keynote Lectures

Keynote 1 (Chair: R. Grimshaw)

J. Pedlosky: Kelvin's theorem and the large scale oceanic circulation in the presence of islands and barriers: steady and unsteady motions

Keynote 2 (Chair: A. Hollingsworth)

P. Gent: Parameterising Eddies in Ocean Climate Models.

Keynote 3 (Chair: R. Bates)

P. Lynch: Numerical Weather Prediction: the origin and development of computer forecasting.

Keynote 4 (Chair: F. Baer)

D. Durran: Open boundary conditions: fact and fiction

Keynote 5 (Chair: P. Lynch)

M. McIntyre: Balance, potential-vorticity inversion, Lighthill radiation and the slow quasi-manifold.

Oral Presentations

Session 1 (Chair: G. Swaters)

G.M. Reznik and R. Grimshaw: Dynamics of an intense localized vortex on a beta-plane

R.M. Samelson: Periodic orbits and disturbance growth for baroclinic waves

David N. Straub: Instability of chaotic 2D flows to 3D perturbations

P. Lionello and J. Pedlosky: On the propagation of a surface density front in the interior of the ventilated thermocline

P.F. Choboter and G.E. Swaters: Modelling the dynamics of abyssal equator-crossing currents

Session 2 (Chair: R. Samelson)

Gordon E. Swaters: Evolution of higher harmonics associated with near-singular modes of the Bickley jet

E.S. Benilov: Planetary and topographic waves over two-dimensional topography

Chris W. Hughes: The role of bottom pressure torques in the ocean circulation

P.F. Hodnett and R. McNamara: Zonal influences in a modified Stommel – Arons model of the abyssal ocean circulation

I.A. Sazonov, S.D. Danilov, Yu L. Chernousko and V.G. Kochina: Oscillatory regimes of forced zonal flow over topography. Numerical and laboratory simulations

Session 3 (Chair: F. Hodnett)

Rui Xin Huang: The available potential energy in a compressible ocean

Georgi G. Sutyryn, Isaac Ginis, Sergey A. Frolov: Nonlinear equilibration of a baroclinically unstable jet over topographic slope

M.K. Reszka and G.E. Swaters: Baroclinic instability of bottom-dwelling currents in a continuously stratified ocean

Session 4 (Chair: P. Lynch)

Shigeo Yoden and Masakazu Taguchi: A numerical experiment on intraseasonal and interannual variations of the troposphere-stratosphere coupled system

G.M. Reznik and G.G. Sutyryn: Baroclinic modons over a sloping bottom

A. Hollingsworth : ECMWF's Earth-system Model and Assimilation Facility

Session 5 (Chair: P. Gent)

John L. McGregor and Martin R. Dix: The CSIRO conformal-cubic atmospheric GCM

Dr. Timothy LaRow: New dynamical climate system model

Gary Shaffer, Steffen Olsen and Jorgen Bendtsen: Small-scale mixing, thermohaline circulation and climate in simple coupled models

A. Gluhovsky and C. Tong: Low-order models of atmospheric dynamics with physically sound behaviour

Blanca Gallego and Paola Cessi: Decadal variability with two oceans and an atmosphere

Session 6 (Chair: M. Mak)

H.C. Davies, D. Luthi, Ch. Frei, and Ch. Schär: Pseudo-predictability of regional climate models

J. Ray Bates: A dynamical stabilizer in the climate system: a mechanism suggested by a simple model and supported by GCM experiments

V.A. Alexeev and J.R. Bates: A study of some parameterisations relating to a climate stabilizing hypothesis using the NCEP/NCAR Reanalysis

Session 7 (Chair: Y. Kimura)

Peter Lynch and Ray McGrath: Boundary filters for initialisation and launching

Stephen D. Burk and Tracy Haack: Coastal orographically forced variability: Atmospheric and ocean impacts

Antonietta Capotondi and Mike Alexander: Wind forced decadal Rossby waves in the tropical North Pacific

Session 8 (Chair: R. Bates)

Remi Tailleux and James C. McWilliams: Linear Resonance, WKB breakdown, and the coupling of Rossby waves over slowly-varying topography

N. Keeley and A.A. White: Quasi-geostrophic potential vorticity for a generalised vertical coordinate formulation and applications

Lucrezia Ricciardulli, Rolando Garcia and Prashant Sardeshmukh: The importance of understanding smaller scale convective variability for improving GCMs Simulations

Rein Röön and Aarne Männink: Acoustic filtration in pressure-coordinate models. Basic concepts and applications in non-hydrostatic modelling

Session 9 (Chair: P. Chu)

Mankin Mak: Non-hydrostatic barotropic instability: essence of non-supercell tornadogenesis

A. Mahalov and B. Nicolaenko: Strongly nonlinear wave-vortex interactions and shear-stratified pancake dynamics

I.A. Sazonov, S.D. Danilov, Yu L. Chernousko and V.G. Kochina: Oscillatory regimes of forced zonal flow over topography. Numerical and laboratory simulations

Feng-Ying Wei, Hong-Xing Cao and Guo-Lin Feng: Time multi-level difference scheme in atmospheric dynamical model

M. Yaremchuk: A dynamically constrained synthesis of climatological data for the North Pacific Ocean

Session 10 (Chair: J. O'Brien)

Weiming Sha and Toshiaki Iwasaki : An advanced numerical method for solving three-dimensional time-dependent Navier-Stokes equations in spherical polar coordinates

Peter Bartello: Applying recent progress in rotating stratified turbulence to numerical methods in GFD

John Thuburn and Tom Haine: Nonoscillatory advection schemes with well-behaved adjoints

Session 11 (Chair: D. Durran)

J. Vanneste, J.R. Alisse and P.H. Haynes: Modelling small-scale stratospheric mixing

D.M. Sonechkin: Synchronicity of the low-frequency planetary wave dynamics and its use to create a model for the numerical monthly weather forecasting

Michael S. Fox-Rabinovitz: Regional climate simulation and data assimilation with a variable resolution

Klara Finkle and Peter Lynch: Development and Simulation of Atlantic storms during FASTEX

Session 12 (Chair: Y. Kimura)

Peter C. Chu: Toward accurate coastal ocean modelling

S. Nazarenko, N.K.R. Kevlahan and B. Dubrulle: Nonlinear RDT theory of near-wall turbulence

G. Haller: An analytic criterion for coherent structures on two-dimensional geophysical turbulence

Jacques Vanneste: The impact of small-scale topography on large-scale Rossby-wave propagation

Session 13 (Chair: M. McIntyre)

P.C. Chu and Shihua Lu: A coastal atmosphere-ocean coupled system (CAOCS) for data assimilation and prediction

William I. Gustafson and Bryan C. Weare: Regional scale investigations of the initiation of the Madden-Julian oscillation

Bruce Turkington: A statistical equilibrium model of zonal shears and embedded vortices in a Jovian atmosphere

Session 14 (Chair: F. Hodnett)

F. Baer, M. Taylor and J.J. Tribbia: Global and regional atmospheric modelling using spectral elements

J.M. Baey and X. Carton: Instability of circular eddies and multipole formation: a model comparison

Roger Grimshaw: Models for instability in geophysical flows

Session 15 (Chair: E. Benilov)

Huijun Yang: Planetary wave packet regimes and complex climate variability in oceans

G. Reznik, V. Zeitlin and M. Ben Jelloul: Nonlinear theory of the geostrophic adjustment of localized disturbances in rotating shallow water

Poster Presentations

M. Benjelloun, X. Carton, V. Zeitlin: Asymptotic models of mesoscale ocean dynamics and their application to nonlinear vortex evolution

Hong-Xing Cao: Nonlinear feature of self-memorization equation of the atmosphere

Francesco Mainardi, Alberto Maurizi and Paolo Paradisi: Non local and memory models for turbulent flows based on fractional calculus

A.S. Vasudeva Murthy: Effect of surface emissivity and a spectral window on radiative equilibrium temperature profiles

Nikolaj Nawri: On the formulation of helical vortex flow

P.F. Hodnett

00-5 IUTAM Symposium on Free Surface Flows Birmingham, United Kingdom, 10-14 July, 2000

Scientific Committee

J. R. Blake (UK), J. B. Keller (USA), A. C. King (UK, Chairman), W. Lauterborn (Germany), D. H. Peregrine (UK), A. Prosperetti (USA), E. O. Tuck (Australia), L. van Wijngaarden (Netherlands).

Short summary of scientific progress achieved:

This symposium was convened to bring together those working in the area of free surface flows. It attracted a wide and high quality set of participants from around the world who were generally working on problems concerned with Bubble dynamics, Dynamic wetting, Moving contact lines, Axisymmetric flows and non-linear waves. There were five days of invited presentations on these topics with excellent interaction between the

participants in the allotted discussion time and also in the refreshment or lunch breaks. In the area of Bubble dynamics there were theoretical and experimental papers on laser induced and acoustic bubbles and their applications e.g. sonoluminescence and sonochemistry. Work was also presented, and discussed, on toroidal bubbles, underwater explosions and Lagrange's equations for describing bubble dynamics. The appearance of a stress singularity at the moving contact line of a wetting fluid, or when a axisymmetric thread of fluid snaps, brought about a great deal of discussion on how to modify the Navier-Stokes equations and boundary conditions in order to resolve this non-physical effect. The use of lubrication theory and its regularisation gave some insight into this and there was substantial interaction between participants on the question of whether contact line effects were global or local in various different flows. The extreme features of Non-Linear waves were described and discussed using both numerical methods and analytic techniques. Some non-classical flows with non-linear waves such as muddy bed topographies, free surface shear layers and hydraulic jumps of mixed type illustrated the scope of modern applied mechanics and indicated areas in which further work need to be carried out. The general view of the participants was that there were strong overlaps in the apparently different areas of the symposiums' scope which made interaction between the delegates very fruitful. It would be reasonable to view this symposium as having contributed towards new research collaborations in a very positive way.

Countries represented and Number of Participants:

Australia 3, China 1, France 6, Germany 4, Ireland 1, Italy 1, Japan 2, Netherlands 2, New Zealand 1, Norway 1, Romania 1, Russia 1, Singapore 1, South Africa 1, United Kingdom 48, United States 16.

Total 89

Proceedings of the Symposium

The Proceedings comprising reviewed Symposium papers will be published by Kluwer Academic Publishers by the end of 2001 (Editors: A. C. King and Y. Shikhmurzaev)

Financial Support

Financial support for the Symposium was generously provided by the following organisations: IUTAM, Schlumberger Cambridge Research and The University of Birmingham.

Scientific Program

Session 1: Bubbles and Acoustic fields Chair: J. R. Blake

A. Prosperetti, *vapour bubbles in flow and acoustic fields*

D. Lohse, *How snapping shrimp snap: through cavitating bubbles*

T. Matula, M. R. Bailey, P. R. Hilmo, D. L. Sokolov and L. A. Crum, *Simultaneous detection of acoustic and light emissions from cavitation bubbles in shock-wave lithotripsy.*

Session 2: Spiral flows Chair: J. Billingham

Y. M. Stokes, *Flow in spiral channels.*

I. Wallwork, S. P. Decent and A. C. King, *The stability and trajectory of a spiraling liquid jet.*

Session 3: Vortices and free surfaces Chair: M. J. Cooker

R. M. Moreira and D. H. Peregrine, *Interaction of water waves and vortices.*

M. Sterling and D. W. Knight, *Boundary shear stress and velocity distributions in open channel flow.*

J. M. Vanden-Broeck, *Large gravity-capillary waves with constant vorticity.*

Session 4: Discontinuities in wave motion Chair: E. O. Tuck

M. J. Cooker, *Violently erupting jets from sea wave impacts.*

M. S. Longuet-Higgins, *Vertical jets from standing waves: the bazooka effect.*

D. P. Lathrop, *Surface singularities and jet eruption.*

Session 5: Unsteady liquid-solid interactions Chair: D. J. Needham

J. R. A. Pearson, *The approach of liquid-liquid interfaces to smooth probes: some thought on rupture by asperities and edges.*

D. H. Peregrine and M. Brocchini, *An instantaneous measure of the strength of a spilling breaker?*

J. Billingham and E. O. Tuck, *Zero gravity sloshing.*

Session 6: Laser-generated bubbles Chair: T. Matula

W. Lauterborn, T. Kurz, O. Schenke, O. Lindau and B. Wolfrum, *Laser-induced bubbles in cavitation research.*

A. Vogel, E. Brujan, P. Schmidt and K. Nahen, *Interaction of laser-produced cavitation bubbles with elastic boundaries.*

J. R. Blake, *Single cavitation bubble luminescence.*

Session 7: Nonlinear water waves Chair: A. D. D. Craik

D. Astruc and S. Fauve, *Parametrically amplified 2-dimensional solitary waves.*

H. -C. Chang and E. A. Demekhin, *Wave texture coarsening and selection on a falling film.*

I. Barashenkov, *Travelling solutions, solitonic complexes and the effect of impurity in Faraday resonance.*

G. A. El and R. H. J. Grimshaw, *An integrable model for undular bores in shallow water.*

Session 8: Before and after breakup of liquid volumes Chair: J. R. A. Pearson

P. L. Marston, M. J. Marr-Lyon and D. B. Thiessen, *New methods for controlling the capillary instability of liquid bridges.*

S. P. Decent and A. C. King, *Surface tension driven flow in a slender cone.*

L. de Luca, *Mechanisms of break-up of plane vertical jets.*

Session 9: Coalescence and breakup Chair: A. C. King

J. Eggers, *Coalescence of liquid drops.*

J. R. Lister, D. Vaynblat and T. R. Witelski, *Singularity, similarity and symmetry in pinchoff and rupture.*

Y. D. Shikhmurzaev, *Coalescence and breakup: solutions without singularities.*

S. T. Thoroddsen, *The cascade of coalescing drop.*

Session 10: Waves caused by moving bodies Chair: J. M. Vanden-Broeck

E. O. Truck, D. C. Scullen and L. Lazauskas, *Ship-wave patterns in the spirit of Michell*

L. LI, D. T. Papadopoulos, F. T. Smith and G. X. Wu, *Water flow from rapid partially submerged body movement.*

E. Parau and F. Dias, *Ice waves generated by a moving load.*

Session 11: Bubbly liquids Chair: W. Lauterborn

G. Tryggvason and B. Bunner, *Direct numerical simulations of bubbly flows.*

K. Sugiyama, S. Takagi and Y. Matsumoto, *Pseudo turbulence modelling in dispersed flow.*

Session 12: Wetting, coating, cusping Chair: J. R. Lister

S. Garoff and E. Ramé, *Experimental studies of the hydrodynamics near moving contact lines.*

S. B. G. O'Brien, M. Hayes and J. H. Lammers *Coating of substrates with small imperfections.*

D. Jacqmin, *Flow of air into a free surface cusp or 180° moving contact line.*

M. Siegel *Cusp formation and tipstreaming instabilities for time-evolving interfaces in Stokes flow.*

Session 13: Modelling moving contact lines Chair: Y. D. Shikhmurzaev

L. M. Hocking, *Contact angles and van der Waals forces*

C. Duquennoy, O. Lebaigue and J. Magnaudet, *A Numerical model of a gas-liquid-solid contact line*

M. C. T. Wilson, J. L. Summers, P. H. Gaskell and Y. D. Shikhmurzaev, *Numerical modelling of the moving contact-line problem.*

E. Ramé, *Modelling dynamic wetting in the presence of surfactants.*

Session 14: Thin films and flows over curved surfaces Chair: L. M. Hocking

J. R. King, *Degenerate fourth order parabolic equations and thin film flows*

J. Rosenzweig and O. E. Jensen, *Long-time draining of thin films in nonuniform geometrics.*

M. Heil, *Finite Reynolds number effects in Bretherton-type flow in channels with rigid and elastic walls.*

S. K. Wilson and B. R. Duffy, *Thin-film flows on large horizontal cylinders.*

Session 15: Modelling of bubbles Chair: G. Tryggvason

J. R. Ockendon and S. Howison, *Free surfaces in negative squeeze films.*

J. F. Harper, *Lagrange's equations for rising bubbles.*

H. Wong, *The motion of an expanding or contracting bubble pinned at a submerged tube tip: theory and experiment.*

R. Palaparthi, C. Mandarelli and D. T. Papageorgiou, *Controlling the mobility of bubbles using surfactants – an experimental and theoretical study.*

Session 16: Free surfaces in natural processes Chair: D. H. Peregrine

J. E. Zhang and T. Y. Wu, *Run-up of ocean waves on beaches.*

D. J. Needham, *Alluvial dynamics: ripples, dunes and roll waves.*

N. J. Balmforth, A. S. Burbridge and R. V. Craster, *Radial extrusion of isothermal, viscoplastic materials – evolving lava domes.*

Session 17: Instability Chair: S. P. Decent

A. D. D. Craik, *Instability of two-dimensional standing Faraday waves.*

L. Kondic and J. Diez, *Instabilities in the flow of thin liquid films.*

L. Cummings and M. Benamar, *Fingering instabilities in thin films of nematic liquid crystals.*

Session 18: Bubbles near walls Chair: J. Harper

Y. L. Zhang, K. S. Yeo, B. C. Khoo and W. K. Chong, *3D toroidal bubbles near a rigid wall.*

A. Verma, P. J. Harris and R. Chakrabarti, *Dynamics of an explosion bubble close to a deformable structure.*

S. Popinet, *Bubble collapse near a solid boundary: A numerical study of the influence of viscosity.*

A.C. King

00-6 IUTAM Symposium on Diffraction and Scattering in Fluid Mechanics and Elasticity, Manchester, UK, July 16-20, 2000

Scientific Committee

I D Abrahams (UK, Chairman), M A Hayes (Ireland), V M Babich (Russia), A Bostrom (Sweden), D V Evans (UK), R H J Grimshaw (UK), E J Kerschen (USA), A N Norris (USA)

Scientific Progress

Objectives of the Symposium

Diffraction and scattering phenomena occur in a multitude of areas of physics and engineering, and consequently the understanding and estimation of such wave behaviour is key in many industrial settings. Typical applications, where specialist knowledge is required, include the ultrasonic nondestructive evaluation of components, medical scanning, wave forces on offshore ocean structures (oil-rigs etc.), detection of underwater vehicles or fish shoals. This area has been the focus for a great deal of

attention by the theoretical mechanics community for the best part of a century; the fact that it continues to this day to demand such study is due to the combination of a continuance of new and pressing applications, and the development of improved analytical and numerical tools.

It is clear on examining previous IUTAM symposia lists that it has been some time since there has been one concerned with an examination of scattering and diffraction effects in both solids and fluids. In contrast, there has been a very healthy number of small meetings or workshops encompassing specific areas within the proposed theme, for example special sessions at recent Acoustical Society of America and Society for Industrial and Applied Mathematics meetings; the annual International Day on Diffraction meetings (St. Petersburg, Russia); and the annual International Water Wave Workshops. The profusion and variety of smaller workshops concerned with scattering and diffraction indicates that it is timely to bring together workers from different subject disciplines and industrial focuses, to examine the ways that the various subjects have developed and to stimulate cross-fertilisation of ideas and methods.

To keep within reasonable bounds of size and interests the IUTAM Symposium specialised on the following areas concerned with diffraction and scattering, each of which has a large and identifiable research community:

- diffraction and propagation of water and other free surface waves;
- elasticity;
- aeroacoustics;
- acoustic phenomena in stationary fluids.

Mathematical techniques, including analytical (exact and asymptotic), numerical and hybrid, and their developments were of primary concern at the Symposium, as was the understanding of phenomenological aspects of new models. Emphasis was placed on theoretical analysis of the mechanics, and so straightforward evaluation of specific problems or the presentation of routine numerical results without global conclusions to the subject was discouraged.

The Conference

IUTAM Symposium 2000/10 on Diffraction and Scattering in Fluid Mechanics and Elasticity was held in Manchester, England on July 16-20 2000. It was organised jointly by the Departments of Mathematics at the University of Manchester and Keele University. Accommodation, lecture and dining room facilities were provided within the Chancellors Conference Centre, a purpose built facility run by the University of Manchester. The week was memorable both for the content of the Meeting as well as the exceptional weather: clear blue skies and perfect temperatures around 78° F (26° C). This informal meeting was organised to discuss recent mathematical advances in the field of diffraction, both from the theoretical and more applied points of view. In particular, its primary goal was to bring together groups of researchers working in disparate application areas, but who nevertheless share common models, phenomenological features arising in such problems, and common mathematical tools. To this end, we were delighted to have

four Plenary Speakers, Professors Allan Pierce, Ed Kerschen, Roger Grimshaw and John Willis FRS, who are undisputed leaders in the four thematic areas of our meeting (respectively acoustics, aeroacoustics, water or other free surface waves, elasticity). The forthcoming Proceedings should offer an excellent vehicle for continuing the dialogue between these groups of researchers.

The participants were invited because of their expertise and recent contributions to this field. Collectively, there were around 90 contributors to the Symposium, including 46 speakers, 30 non-attending co-authors and 12 other delegates.

Space limitation here prohibits a full discussion of the academic content of the Symposium or a report on current progress in the area. What clearly emerged from the Meeting was the increasing diversity of application areas of the classical field of diffraction and its related topics, and therefore its continued relevance to the applied mathematics, engineering and scientific communities. Topics such as fracture mechanics, whilst on the surface quite divorced from diffraction theory can be shown to be intimately related to it; in geophysics, oceanographic Rossby waves have recently been found, through satellite altimetry data, to be scattered strongly by ocean ridges and coastlines features; diffraction effects are now known to play a profound role in noise radiation from aerojet engines. In all these examples progress can be made on understanding the physics only through a detailed analysis of the underlying mathematics models. It may be envisaged that the commonality of mathematical systems arising from such diverse physical examples would therefore allow the development of appropriate analytical tools for their solution. To some extent this is true; however, such mathematical systems are often extremely difficult to crack, and despite the fact that the subject has been studied intensively for over a century, it is only very recently that significant progress has been made on obtaining analytical results on a number of key models. Several talks at the Symposium reported progress in this direction.

Countries Represented and Number of Participants

Australia 1, France 1, Germany 1, India 1, Japan 1, Latvia 1, Mexico 1, Portugal 1, Russia 8, Spain 1, UK 34, USA 7. Total number of attending delegates 58.

Symposium Proceedings

A booklet of refereed two-page abstracts was distributed at the Symposium. The Proceedings, containing refereed articles summarising the papers presented at the Symposium, will be published in summer/autumn 2001 by Kluwer as part of its Fluid Mechanics and Its Applications series. The editors of this volume are I.D.Abrahams, P.A.Martin and M.J.Simon.

Financial Support

The organisers extend their thanks to the following for sponsorship of IUTAM 2000/10:

- The International Union of Theoretical and Applied Mechanics
- Keele University
- Kluwer Academic Publishers

- The Leverhulme Trust
- The London Mathematical Society
- The Royal Society of London
- The University of Manchester

Scientific Programme

The sessions were organised into themes, obvious by the titles of the talks. Speakers' forenames are given in full below, but co-authors' initials only are written.

Session 1. Chair: Andrew J Willmott

I David Abrahams: Opening address and aims of the Symposium

Nick R T Biggs, D Porter & D Stirling: Wave diffraction through a perforated barrier of non-zero width

Mridula Kanoria & B N Mandal: Reflection by slotted thick barriers under oblique wave attack -- a numerical study

Plenary Lecturer Roger H J Grimshaw: Nonlinear effects in wave scattering and generation due to flow interaction with topography

Session 2. Chair: Chris M Linton

Alexander Shermenev & M Shermeneva: Long periodic waves on a beach

Jean-Marc Vanden-Broeck: Time dependent gravity-capillary flows past an obstacle

Philip McIver: Approximations to embedded trapped modes in wave guides

Session 3. Chair: Maureen McIver

C G Poulton, Alexander B Movchan, R C McPhedran, N A Nicorovici & Y A Antipov:

Propagation of elastic waves in doubly periodic structures and phononic gaps

Alexander Sergeev & D Sergeev: Wave passage through a string having multielement inclusions with partial interior dynamics

Andrei K Abramian & E Shelepova: Formation of an unknown discrete spectrum in a general spectrum for structures interacting with a fluid

Daniel Bosquetti, J Sanchez-Dehesa, D Caballero, E Marega & G E Marques: An improved time-domain method to study the sound scattering in inhomogeneous systems

Session 4. Chair: Philip McIver

Richard Porter & D V Evans: Trapped modes about tube bundles in waveguides

Nobumasa Sugimoto & K Tsujimoto: Effects of temperature gradient on the propagation of an acoustic solitary wave in an air-filled tube

Richard H Tew: Scattering by blunt and sharp convex objects in two dimensions

Yuri A Antipov: Diffraction by an impedance circular cone and a slice of a hard or soft cone

Valery P Smyshlyaev & V M Babich: Diffraction of creeping waves by conical singularities

Session 5. Chair: Valery P Smyshlyaev

John G Harris: Elastic surface waves in curved structures

Paul A Martin & J R Berger: Waves in wood: elastic waves in cylindrically orthotropic materials

Plenary Lecturer John R Willis & A B Movchan: Theory of crack front waves

Session 6. Chair: John G Harris

Fiona H Kerr & A M Baird: Acoustic modelling of signature reduction materials for underwater applications

Peter R Brazier-Smith: A unified model for the properties of composite materials

S B Khelil, Alain Merlen, V Preobrazhensky & P Pernod: Numerical simulation of acoustic wave phase conjugation in active media

Session 7. Chair: Roger H J Grimshaw

Chris M Linton: The finite dock problem

I D Abrahams, C W Hughes, Gareth W Owen, A J Willmott: Scattering of Rossby waves by ocean ridges

Maureen McIver: Localised oscillations near submerged obstacles

Anton Duchkov & S V Goldin: Seismic wave dynamics in regular and singular points of the ray

Session 8. Chair: C John Chapman

Alexander Kaptsov & S Kuznetov: Spectral properties of the Christoffel equation for Rayleigh waves

Vladimir A Borovikov: Singularities of the Green function for non-strictly hyperbolic operators

M Bochniak & Fioralba Cakoni: Domain sensitivity analysis of the elastic far-field pattern

V A Borovikov & Dmitri Gridin: Kiss singularities of Green's functions for non-strictly hyperbolic equations

Session 9. Chair: Nigel Peake

Luis M B C Campos & M H Kobayashi: On the scattering of sound by a thick shear layer

A J Cooper & Nigel Peake: Acoustic resonance in aeroengine intake ducts

Plenary Lecturer Ed J Kerschen: Effects of airfoil shape and angle of attack on sound generated by interaction with high-frequency gusts

Session 10. Chair: Nobumasa Sugimoto

C John Chapman: The wavenumber surface in blade-vortex interaction

Nigel Peake & S V Sorokin: Waves in fluid-structure interaction problems with mean flow: sandwich panels and nonlinear aspects

Yibin B Fu: Propagation of steady nonlinear waves in a pre-stressed coated elastic half-space

Session 11. Chair: Paul A Martin

Patricia A Lewis: Numerical calculation of diffraction coefficients in anisotropic materials

V M Babich, V A Borovikov, Larissa Ju Fradkin, D Gridin, V Kamotski & V P Smyshlyaev: Diffraction coefficients for tilted surface-breaking cracks

Anthony M J Davis & I D Abrahams: Matrix Wiener-Hopf factorization for a partially clamped plate

Andrew T Peplow, M Stojek & I Karasalo: Boundary integral methods for elastic layered media

Session 12. Chair: Andrew N Norris

Sergei V Sorokin: On the nonlinear formulation of the dynamics of elastic thin-walled structures in heavy fluid loading conditions

Philip L Marston, F J Blonigen, K Gipson, B T Hefner & S F Morse: Ultrasonic backscattering enhancements for truncated objects in water: quantitative models and tests and special cases

Plenary Lecturer Allan D Pierce: Variational methods in diffraction

Session 13. Chair: R Douglas Gregory

Sergey Kadyrov: A two-dimensional model of the interaction between a pressure wave and a submerged sandwich panel

Andrew N Norris: Acoustic scattering from inhomogeneous wave bearing structures

Ivan V Andronov: A new class of point models in diffraction by thin elastic plates

Jane B Lawrie & I D Abrahams: On the propagation and scattering of fluid-structural waves in a three-dimensional cavity bounded by thin elastic walls

I David Abrahams

00-7 IUTAM Symposium on Field Analyses for Determination of Material Parameters Experimental and Numerical Aspects, Abisko National Park, Kiruna, Sweden, July 31st - August 4th, 2000

Scientific Committee

P. Stahle (Sweden, Chair), S. Aoki (Japan), H. D. Bui (France) M. Ortiz (USA), K.-S. Kim (USA),

J. F. Kalthoff (Germany), N. Morozov (Russia), J. Field (UK), J. Engelbrecht (Estonia)

Short summary of scientific progress achieved

The aim of the symposium was to bring together researchers from the analytical, computational and experimental fields who have as a common interest testing for identification of advanced constitutive models of solids. Indeed we managed to attract a few of very interesting key persons representing first class researchers with outstanding knowledge regarding modern optical and other experimental field methods. In addition also researchers with broad knowledge in analytical and numerical analyses participated. The chairman's impression was that many rewarding meetings took place, which hopefully will lead to future cooperation. The oral presentations were aiming at 30 minutes but spontaneous discussions were encouraged and occurred during almost every session. It pleased the chairman to note that these discussions very often involved several participants and did on a few occasions not always involve the speaker. This is to say that the sessions very vivid and interesting for everyone. A few presentations were of a review character, which described the state of the art. A few such reviewing latest developments of experimental methods were highly appreciated. Also a few excellent presentations of achievements in numerical analyses stood out among the overall very good presentations.

Countries represented and Number of Participants

Japan 5, Sweden 13, Belgium 1, Spain 1, Greece 1, Iran 1, Germany 2, Russia 2, England 1, Holland 2, Poland 1, Total : 30

Proceedings of the Symposium

The Proceedings comprising reviewed Symposium papers will be published by Kluwer Academic Publishers by the end of the summer of 2001 (editors: P. Stahle and K. G. Sundin)

Financial Support

Financial support for the Symposium was generously provided by the following organisations:

The Malmö University, Lulea University of Technology and Volvo Aero Corporation.

Scientific Program

Session 1: Experimental Methods I

Chair: *K. G. Sundin and H. T. Goldrein*

Opening of the Symposium by *Professor P. Stahle, chairman of the scientific committee*

Whole-Field Displacement Measurement with Moiré Interferometry as a Basis for a Microstructural FE Model of a Polymer Bonded Explosive, *H.T. Goldrein, P.J. Rae, S.J.P. Palmer, A.L. Lewis, G. Miles and N. Zahlan*

Measurement of Microscopic Residual Stress Based on the Evolution of Surface Roughness During Shallow Chemical Etching, *Kyung-Suk Kim*

The Incubation Time - Theory and Experiment, *N. F. Morozov and Y. V. Petrov*

Affordable TMF Testing Supported by FE Simulation, *Magnus Hasselqvist*

A Study on Design Method of Cone Coupling for Power Transmitting System in Medium Sized Marine Diesel Engine, *Umerjan Abla, Tashpulat Rozi and Hiroshi Maki*

Session 2: Experimental Methods II

Chair: *N. F. Morozov*

Identification of Dynamic Properties of Railway Track, *A.P. de Man and V.L. Markine*
Optical Method to Study Material Behaviour at High Strain Rates, *J. Kajberg and M. Sjödahl*

Determination of Cylindrical Elastic Orthotropy in Wood by Use of Digital Speckle Photography, *L.O. Jernkvist and F. Thuvander*

Session 3: Optimization Techniques and Simulation Methods I

Chair: *V.L. Markine*

Identification of Elastic/Visco-Plastic Material Constants under Impact Loading, *S. Aoki, K. Amaya, T. Noguchi, K-G. Sundin and P. Stähle*

Parameter Identification For Inverse Problems in Metal Forming Simulations, *J.P. Ponthot, J.P. Kleinermann, L. Stainier and M. Hogge*

One Step Prediction Error Approach to the Identification Problem of Creep and Viscoplastic Material Models, *O. Wall and J. Holst*

Session 4: Optimization Techniques and Simulation Methods II

Chair: *Shigeru Aoki*

Extraction of Elasticity Properties from Dynamic Field Information, *Hugo Sol*
A Numerical Tool for the Development of Material Models, *Ralf Mohrmann*

Session 5: Optimisation Techniques and Simulation Methods III

Chair: *Hugo Sol*

Inversion Method Using Spectral Decomposition of Green's Functions, *Muneo Hori*

Determination of Ballast Parameters of Railway Track Using an Optimisation Technique, *V.L. Markine and C. Esveld*

Estimation of Material Parameters at Elevated Temperatures by Inverse Modelling of a Gleeble Experiment, *M. Eriksson, B. Wikman and G. Bergman*

Session 6: Material Modelling I

Chair: *Mueno Hori*

Hydride-Induced Embrittlement in Metals-Stress and Temperature Effects, *A.G. Varias and A.R. Massih*

A Non-Isothermal Model for the Phase Transformations and the Mechanical Behaviour of a 12% Chromium Steel, *C. Gantert and R. Mohrmann*

Session 7: Material Modelling II

Chair: *A. G. Varias*

Size Effect on Stress-Intensity Factors of CNS Specimen with an Interface Crack Subjected to Mixed-Mode Loading, *Kenji Machida*

On Penny Shaped Equilibrium Cracks in Materials Reinforced by Fibers, *M.A. Grekov, N.F. Morozov and N.V. Ponikarov*

Session 8: Material Modelling III

Chair: *M. A. Grekov*

Identification of Stress from Strain for Body with Not Fully Identified Constitutive Relations, *M. Hori and T. Kameda*

The Experimental-Numerical Investigation of the Power Flows In a Specimens with a Crack by Pulse Loading, *Y. Kostandov, A. Ryzhakov and I. Shipovsky*

Evaluation Method of Interface Strength Between Thin Films in LSI, *Takayuki Kitamura*

After Word and Concluding Remarks by *Academician Professor N. F. Morozov*

P. Stahle

00-8 IUTAM Symposium on Smart Structures and Structronic Systems Magdeburg, Germany, September 26 – 29, 2000

International Scientific Committee

U. Gabbert (Germany, Chairman), I. Hagiwara (Japan), D.J. Inman (USA), H. Irschik (Austria),

R.S.W Lee. (Hong Kong), W. Schiehlen (Germany) (IUTAM Bureau), Y.P. Shen (China),

B.F. Spencer (USA), J. Tani (Japan), G.R. Tomlinson (UK), H.S. Tzou (USA) (Co-Chairman),

V.V. Varadan (USA), D. Wang (China)

Short summary of the scientific progress achieved

Synergistic integration of smart materials, structures, sensors, actuators and control electronics has redefined the concept of “structures” from a conventional passive elastic system to an active controllable structronic (structure + electronic) system with inherent self-sensing, diagnosis, and control capabilities. Such structronic systems can be used as components of high performance systems or be an integrated structure itself performing designated functions and tasks.

It was the objective of Symposium, the first IUTAM Symposium in this emerging area, to reflect the rapid development in smart structures and structronic systems and to provide a forum to discuss recent research advances and future directions or trends in this field.

The Symposium has focused on the fundamental mechanics and electromechanics of structures and structronic systems, consisting of smart materials, sensors, actuators, and control electronics. Multi-field, such as elastic, electric, temperature, light, phenomena related to the structronic systems, as well as control effectiveness and other related topics were also discussed at the meeting.

It was the intention of the Scientific Committee to invite leading scientists and researchers with different expertise to present their research findings at the Symposium. Five major topics have been discussed during 12 Sessions. These topics were:

- Novel Smart Structures Technologies (Sessions 1,2,3)

- Smart Materials and Structures (Sessions 4,5,6)
- Distributed Structural Systems (Sessions 7,8)
- Damage, Model Updating and Optimization (Session 9,10)
- Intelligent Control Systems (Session 11, 12)

The open and friendly environment during the Symposium provided an excellent opportunity for intensive discussions and exchanging of ideas among all participants. Each of the 45 presentations was limited to 30 minutes in total including 10 minutes for discussions. Nearly all presentations ignited very interesting, intensive and exciting discussions which in most cases have been continued during the breaks. Assembling presented papers from distinguished invited speakers and reporting to the technical community was an important mission of the Symposium. It is hardly possible to summarize the main research progress here, but, the proceedings consisting of 43 papers will represent the symposium highlights, and the editors sincerely hope that these proceedings would serve as a milestone of this new emerging field and further promote the technology in both scientific research and practical applications of structronic systems.

At the end of the Symposium a very challenging and exciting panel on "Prospects of Smart Structures and Structronic Systems" chaired by H.S. Tzou (University of Kentucky) took place. Distinguished scientists (U. Gabbert, University of Magdeburg; E. Garcia, DARPA; I. Hagiwara, Tokyo Institute of Technology; D.J. Inman, Virginia Tech; H. Irschik, University of Linz; Y.P. Shen, Xian Jiaotong University; J. Tani, Tohoku University; V.V. Varadan, Penn State University) first reported their research activities, visions, etc. to the symposium. Open challenging research issues, current needs, unsolved problems, and future directions were also discussed. They can be briefly summarized as follows: i) Nonlinear modeling, simulation and design tools, control-structure interactions, design criteria; ii) Material processing, materials with enhanced properties and temperature stability, material library, new materials to MEMS; iii) Material-structure integration, material incompatibilities; iv) Micro-mechanics (bonding, fracture, fatigue, etc.); v) Health monitoring and diagnosis, systems identification; vi) Distributed control (PDE) via structronics technology; vii) Biological inspired structures, self-growth/repair; viii) Education, web information, benchmark problems. For details see also the Proceedings published by KLUWER Academic Publishers in 2001.

The Symposium was attended by 79 scientists from 16 countries including a local group of about 10 young researchers. Especially for these young researchers and other interested participants a Tutorial on Smart Structures and Structronic Systems was organized by the Scientific Committee one day before the Symposium. In four lectures of 1.5h each an introduction in the topics of the Symposium had been given by H.S. Tzou (University of Kentucky), V.V. Varadan (Penn State University), U. Gabbert (Magdeburg University) and T. Bein (Magdeburg University), where also laboratories of the Institute of Mechanics of the Magdeburg University could be visited. The Tutorial was attended by 19 participants.

Countries represented and number of participants

Australia	1	P. R. China	6
Austria	1	Poland	2
Brazil	1	Russia	3
Bulgaria	2	Singapore	2
France	2	Sweden	3
Germany	38*	UK	1
Israel	1	Ukraine	1
Japan	4	USA	12
		Total	78

* Including a local group of young scientists.

Publications of the Proceedings of the symposium

An extended abstract booklet was distributed at the Symposium. The papers presented at the symposium will be published by Kluwer Academic Publishers in 2001. These proceedings will be edited by U. Gabbert and H.S. Tzou.

Financial report

A financial support was provided by the International Union of Theoretical and Applied Mechanics (IUTAM), the German Research Society (DFG) and Kluwer Academic Publishers. The means of IUTAM have been used to support eight participants from Asia and America. The DFG covered the expenses of seven participants from East European countries to enable their participation. The financial support is gratefully acknowledged.

Scientific program**Opening Session**

U. Gabbert: Opening and Welcome Address of the Chairman of the Symposium

W. Schiehlen: Welcome Address by the President of IUTAM

H.S. Tzou: Introduction by the Co-Chairman of the Symposium

Session 1

Chairman: H.S. Tzou

D.J. Inman, M. Ahmadian, R.O. Claus: Simultaneous Active Damping and Health Monitoring of Aircraft Panels

B.A. Grohmann, P. Konstanzer, B. Kröplin : Decentralized Vibration Control and Coupled Aeroservoelastic Simulation of Helicopter Rotor Blades with Adaptive Airfoils

M.J. Atalla, M.L. Fripp, J.H. Yung, H.W. Hagoood: Design of Reduced-Order Controllers on a Representative Aircraft Fuselage

R. Lerch, H. Landes, R. Simkovics, M. Kaltenbacher: Numerical Analysis of Nonlinear and Controlled Electromechanical Transducers

Session 2

Chair: D.J. Inman

F. Dignath, M. Hermle, W. Schiehlen: Smart Structures in Robotics

K.D. Hristov, F. Ionescu, K.G. Kostadinov: An Approach for Conceptual Design of Piezoactuated Micromanipulators
L.R.F. Rose, C.H. Wang: Modelling and Optimisation of Passive Damping for Bonded Repair to Acoustic Fatigue Cracking
S. Keye, M. Rose, D. Sachau: A Localization Concept for Delamination Damages in CFRP

Session 3

Chair: R. Lammering

J. Holnicki-Szulc, T. Bielecki: Structures with Highest Ability of Adaptation to Overloading
B.L. Zhou, G.H. He, J.D. Guo: Bio-Inspired Study on the Structure and Process of Smart Materials and Structures
S.N. Isakov, T.V. Isakova, E.S. Kirillov: MAO Technology of New Active Elements Reception
T. Hauke, A.Z. Kouvátov, R. Steinhausen, W. Seifert, H.T. Langhammer, H. Beige: Modeling of Bending Actuators Based on Functionally Gradient Materials

Session 4

Chair: V.V. Varadan

A. Rosinus, S. Kaesche, A. Zimmermann, W. Sigmund, G. Thurn, F. Aldinger: Processing and Characterization of PZT and PZST Ceramics
H. Asanuma : Fabrication of Smart Actuators Based on Composite Materials
M. Sester, Ch. Poizat: On the Analytical and Numerical Modelling of Piezoelectric Fibre Composites
Q.-P. Sun, Z.Q. Li, K.K. Tse: On Superelastic Deformation of NiTi Memory Alloy Micro-Tube and Wires - Band Nucleation and Propagation

Session 5

Chair: J. Holnicki-Szulc

R. Lammering, I. Schmidt: The Damping Capacity of Shape Memory Alloys and its Use in the Development of Smart Structures
J. Wang, Y.P. Shen: Prediction of Effective Stress-Strain Behavior of SM Composites with Aligned SMA Short-Fibers
X. Gao, W. Huang, J. Zhu: Modeling and Numerical Simulation of Shape Memory Alloy Devices Using a Real Multi-Dimensional Model
O. Heintze, O. Kastner, H.-S.Sahota, S. Seelecke: The Role of Thermomechanical Coupling in the Dynamic Behavior of Shape Memory Alloys

Session 6

Chair: I. Hagiwara

X.M.Yang, Y.P. Shen, X.G. Tian: Dynamic Instability of Laminated Piezoelectric Shells
Q. Wang, S.T. Quek: Flexural Analysis of Piezoelectric Coupled Structures

Session 7

Chair: H. Irschik

S.V. Gopinathan, V.V. Varadan, V.K. Varadan: Active Noise Control Studies Using the Rayleigh-Ritz Method

Y.-H. Zhou, J. Wang, X.J. Zheng: A Wavelet-Based Approach for Dynamic Control of Intelligent Piezoelectric Plate Structures with Linear and Nonlinear Deformation

M. Kader, M. Lenczner, Z. Mearica: Distributed Control Based on Distributed Electronic Circuits. Application to Vibration Control

H. Berger, H. Köppe, U. Gabbert, F. Seeger: On Finite Element Analysis of Piezoelectric Controlled Smart Structures

Session 8

Chair: J. Tani

A. Tylikowski: A Study on Segmentation of Distributed Piezoelectric Sectorial Actuators in Annular Plates

N.N. Rogacheva: Thin-Walled Smart Laminated Structures: Theory and Some Applications

S.-S. Lih, G. Hickey, D.W. Wang, H.S. Tzou: Precision Actuation of Micro-Space Structures

H. Abramovich, H.-R. Meyer-Piening: Experimental Studies on Soft Core Sandwich Plates with a Built-in Adaptive Layer

Session 9

Chair: V.S. Rao

V.D. Koshur: Simulation of Smart Composite Materials of the Type of MEM by Using Neural Network Control

V. Lopes, Jr., H.H. Müller-Slany, F. Brunzel, D.J. Inman: Damage Detection in Structures by Electrical Impedance and Optimization Technique

I. Hagiwara, Q.Z. Shi, D.W. Wang, Z.S. Rao: Optimal Placement of Piezoelectric Actuators to Interior Noise Control

G. Locatelli, H. Langer, M. Müller, H. Baier: Simultaneous Optimization of Actuator Placement and Structural Parameters by Mathematical and Genetic Optimization Algorithms

Session 10

Chair: Y.P. Shen

M.W. Zehn, O. Martin: Suitable Algorithms for Model Updating and their Deployment for Smart Structures

M.H. Zhao, C.F. Qian, S.W.R. Lee, P. Tong, T.-Y. Zhang: Bending Analysis of Piezoelectric Laminates

Y. Urushiyama, D. Lewinnek, J. Qiu, J. Tani: Buckling of Curved Column and Twinning Deformation Effect

Session 11

Chair: P. Kiriazov

H.S. Tzou, J. H. Ding: Electronic Circuit Modeling and Analysis of Distributed Structronic Systems

K. Kuhnen, H. Janocha: An Operator-Based Controller Concept for Smart Piezoelectric Stack Actuators

N.D. Sims, R. Stanway, A.R. Johnson: Experiments with Feedback Control of an ER Vibration Damper

H. Irschik, M. Krommer, U. Pichler: Collocative Control of Beam Vibrations with Piezoelectric Self-Sensing Layers

Session 12

Chair: R. Stanway

P. Kiriazov: Efficient Approach for Dynamic Parameter Identification and Control Design of Structronic Systems

J.M. Sloss, J.C. Bruch, Jr., S. Adali, I.S. Sadek: An Integral Equation Approach for Velocity Feedback Control Using Piezoelectric Patches

M. Enzmann, C. Döschner: Decentralised Multivariable Vibration Control of Smart Structures Using QFT

S. Sana, V.S. Rao: Integrated Controller Design for Smart Structures Using Linear Matrix Inequalities

Panel Session: Future Prospects of Smart Structures and Structronic Systems

Chair: H.S. Tzou

Panelists: U. Gabbert, E. Garcia, I. Hagiwara, D.J. Inman, H. Irschik, Y.P. Shen, J. Tani, V. V. Varadan

U. Gabbert

**00-9 IUTAM International Symposium on Designing for Quietness
Bangalore, India, 12-14 December, 2000**

Members of the Scientific Committee:

M.L. Munjal (India, Chairman), Malcolm J. Crocker (USA), Frank J. Fahy (UK), T.L.

Geers (USA), Colin H. Hansen (Australia), Tor Kihlman (Sweden),

Gary Koopman (USA), Michael Moser (Germany),

W. Schiehlen (Germany, IUTAM Representative).

Short summary of the scientific progress achieved:

There were twenty-one participants, all invited speakers, from several countries including India covering different aspects of noise control at the source and designing for quietness. Titles of the lectures are listed in the scientific programme. Thirty one other delegates from Industry and national laboratories of India attended the symposium.

The symposium was inaugurated by Prof. G. Mehta, Director of the Indian Institute of Science. Prof. Roddam Narasimha, FRS, Director of the National Institute of Advanced Studies and the Member of the IUTAM Bureau was the Chief Guest at the Inaugural function. Prof. Malcolm J. Crocker, Member of the Scientific Committee and Executive Director of the International Institute of Acoustics and Vibration gave an overview of the status of technical acoustics in the world. Prof. Munjal, Chairman of the Scientific Committee gave an idea of different technologies and practices that can be adopted while designing a system for quietness; namely,

- a. Manufacturing to closer tolerances
- b. Reducing tip speeds and flow speeds
- c. Increasing the number of blades, cylinders and the number of teeth
- d. Increasing the contact area for bearings and gears
- e. Decreasing the pressure ratios for valves
- f. Impedance mismatching
- g. Developing and adopting low-speed stationary gensets and compressors

The 3-day symposium ended with a valedictory function where stock was taken of the scientific progress achieved in the symposium. This function was presided over jointly by Prof. Albrecht Eiber, who represented Prof. Schiehlen, and Prof. Munjal, Chairman, Scientific Committee. The opinions expressed during the session were as follows:

1. In designing of quieter structures it would be better to build in more sinks (damping), rather than stiffness.
2. We should adopt a system approach to design for quietness, isolated components or sub-assemblies should not be modelled in isolation.
3. Cost-effectiveness and designing for quietness should go hand in hand.
4. There is a need for developing an undergraduate level book on designing for quietness, at a level that could be useful for all engineers, not just mechanical engineers.
5. It was also felt that we should try to design for better sound quality, not necessarily for quietness.
6. In the Indian context, there is a strong case for running campaigns through media for adopting quieter socio-religious habits side by side with developing quieter machines.
7. Finally, it was felt that this was the first time that an International Symposium was conducted on Designing for Quietness. We should try to repeat such symposia elsewhere and eventually make them periodic.

Countries represented and number of participants:

Australia 1, Japan 2, Russia 4, Germany 3, Denmark 1, USA 3, UK 1, India 36

Publication of the Proceedings of the Symposium:

Manuscripts were obtained well in advance from all the twentyone invited speakers. These were xeroxed, spiral-bound and distributed to all the participants along with the bags and other conference material. At the end of the symposium, during the valedictory function, some of the speakers were asked to submit revised or better quality manuscripts for review process. The manuscripts will be sent out for review during January, and the reviewer suggestions for further improvement of the manuscripts will be communicated to all the authors, who will then be asked to prepare a camera-ready typescript as per the format of the Kluwer Academic Publishers. In this connection all the speakers have been given a copy of:

- a. Preparation of camera-ready typescript - A guide for authors
- b. Consent to publish and transfer of copyright
- c. Submission checklist for contributors

On receipt of camera-ready typescripts, Prof. Munjal will edit the same and communicate the entire proceedings to Prof. Gladwell, Series Editor of the Solid Mechanics Series of IUTAM Symposium proceedings.

Financial support:

Rs.10,000/- from Indian Institute of Science

US\$ 5000 from IUTAM

Dfl. 1000 from Kluwer Academic Publishers

Registration fee from 51 delegates

Scientific Programme

Session 1: Chairman: Professor M.J. Crocker

Dhanesh N. Manik and Parag H. Mathuria "Application of SEA for Diesel Engine Noise Reduction through Transfer Path Analysis".

S.N. Baranov and L.S. Kuravsky "Optimal Suppression of Acoustic Vibrations for Thin-Walled Aircraft Structures".

Session 2: Chairman: Professor M.G. Prasad

Ashish P. Diwanji "Absorptive Muffler Systems".

Steffen Marburg and Hans-Jurgen Hardtke "An Optimization technique in structural-acoustic design of sedan body panels".

Session 3: Chairman: Dr. Z Maekawa

Gunnar Rasmussen "Acoustical Measurements for Noise Control"

Amiya R. Mohanty "Acoustical Materials for Automotive NVH Reduction".

Session 4: Chairman: Dr. R.J. Hooker

C.S. Jog: “Reducing Radiated Sound Power by Minimizing the Dynamic Compliance”.
M.J. Crocker and Avinash R. Patil “Theoretical and Experimental Studies of the Acoustical Design of Vehicle Cabs – A Review of Truck Noise Source and Cab Design Using Statistical Energy Analysis”.

Session 5: Chairman: Dr. S.N. Baranov

Deepak Prasher “How noise control improves health”
Albrecht Eiber and Werner Schiehlen “Dynamics of Hearing – Sensitivity to Noise”.

Session 6: Chairman: Professor Steffen Marburg

M.L. Munjal and B. Venkatesham “Analysis and Design of An Annular Airgap Lined Duct for Hot Exhaust Systems”.
R.J. Hooker “Transmission and Absorption-Predictions and Performance”.

Session 7: Chairman: Professor Deepak Prasher

S. Narayanan and Chandramouli Padmanabhan “Active Noise Control in Acoustic Cavities with Flexible Walls”.
V. Bhujanga Rao “In Pursuit of Quieter Ship Design.....”

Session 8: Chairman: Dr. Albrecht Eiber

M.G. Prasad “Acoustic Characterization of One-Port Sources and Its Application to Duct Noise Control System Design”.
S. Manivasagam and J. Senthilnathan “Compressed Related Noise Control in Air-conditioners and Refrigerators”.

Session 9: Chairman: Dr. Hans-Joachim Beer

Z. Maekawa and K. Konishi “An Experimental Impact Assessment of a Projected Airport Noise”.
S. Gopalakrishnan and D. Roy Mahapatra “ Active Control of Structure-Borne Noise in Helicopter Cabin Transmitted through Gearbox Support Strut”.

Session 10: Chairman: Professor. Dhanesh N. Manik

Rudra Pratap and Yash K. Dungerpuria “Design of a MEMS Pressure Sensor for Acoustic Applications”.
Hans-Joachim Beer, Joachim Gier, Hans-Jurgen Hardtke, Steffen Marburg, Florence Perret, Roland Rennert “ Experimental Verification of Structural-acoustic modeling and Design Optimization”.
V.I. Bujakas “Vibration damping in a class of large space structures”.

L. Munjal

Report of IUTAM Summer School on Friction and Instabilities CISM, Udine Italy, July 3-7, 2000

Lecturers: J. Barber (USA), A. Klarbring (Sweden), J.A.C. Martins (Portugal),
Z. Mroz (Poland), Q.S. Nguyen (France), M. Raous (France).

The course had the objective of surveying recent theoretical developments on stability and bifurcation in frictional contact problems, as well as the corresponding computational algorithms. With the purpose of presenting an up-to-date view of the theoretical and computational advances in the field, the course put together concepts and approaches originating from a variety of areas, namely: contact and impact mechanics, nonlinear dynamics, mathematical theory of variational and quasi-variational inequalities, bifurcation theory, thermoelastic couplings (non-smooth) computational mechanics, and finite element methods. The theoretical concepts and the computational algorithms have been applied to a variety of problems involving continuum or discrete systems. Particular emphasis in the presentation of these examples has been put on the capability for analysing and modelling instability phenomena such as squeal of a disk brake, squeal of the waist seal of a glass window in a car, hot spots in brakes and clutches.

The various topics (fundamental, mechanical, numerical aspects and applications to real industrial problems) have gathered 30 participants coming both from the academic and industrial communities. Car and tyre industries were significantly represented. The international character has been strongly emphasized with 15 countries represented.

A few participants shortly presented their own works and had a chance to discuss them openly with the lecturers and other participants.

The lecture notes will be published by Springer-Verlag Wien, New York in 2001. The high level of the lectures, the interest of the subject as well as the active participation of the attendees made the school a real success.

Giovanni Bianchi

ICTAM 2000 Chicago

Special Lectures, Mini-Symposia and Pre-nominated Sessions

General Lectures:

Opening Lecture:

J.R. Rice (Harvard University, USA): New perspectives on crack and fault dynamics

Closing Lecture:

H.K. Moffatt (University of Cambridge, UK): Local and global perspectives in fluid dynamics

Sectional Lectures:

H. BenHadid (France): MHD damped buoyancy-driven flows (Associated with Mini-symposium MF3)

S.J. Cowley (UK): Laminar boundary-layer theory: a 20th century paradox?

G. Dagan (Israel): Effective, equivalent and apparent properties of heterogeneous media

P.E. Dimotakis (USA): Recent advances in turbulent mixing (Associated with Mini-symposium MF1)

E. van der Giessen (The Netherlands): Plasticity in the 21st century

I. Goldhirsch (Israel): Kinetic and continuum descriptions of granular flows (Associated with Mini-symposium MF2)

T.J. Gordon (UK): Adaptive, nonlinear and learning techniques for the control of vehicle ride dynamics (Associated with Mini-symposium MS3)

R.N. Iyengar (India): Probabilistic methods in earthquake engineering

S. Kida (Japan): Vortical structure in turbulence

A. Liñán (Spain): Diffusion controlled combustion

P.A. Monkewitz (Switzerland): Flow instabilities and transition in spatially inhomogeneous systems

V.A. Palmov (Russia): Stationary waves in elasto-plastic and visco-plastic bodies

C.S. Peskin (USA): Muscle and blood: fluid dynamics of the heart and its valves

P. Ponte Castañeda (USA): Nonlinearity and microstructure evolution in composite materials (Joint paper with P. Suquet. Associated with Mini-symposium MS1)

O. Sigmund (Denmark): Optimum design of MicroElectroMechanical Systems (MEMS)

E. Stein (Germany): Error controlled adaptivity for hierarchical models and finite-element approximations in structural mechanics

S. Suresh (USA): Deformation and properties of homogeneous and graded surfaces, thin films and small-volume structures

D.L. Weaire (Ireland): Hard problems with soft materials: the mechanics of foams (Associated with Mini-symposium MS2)

Mini-Symposia:*MF1. Turbulent mixing*Chair: *E.J. Hopfinger* (France); Co-chair: *P.E. Dimotakis* (USA)

Initial lectures:

J.M. Ottino (USA): The kinematics of mixing flows*C.I. Wunsch* (USA): Overview of oceanic mixing problems from the microscale to the general circulation*E. Villermaux* (France): Mixing: kinetics and geometry*MF2. Granular flows*Chair: *S.B. Savage* (Canada); Co-chair: *R.P. Behringer* (USA)

Initial Lectures:

S. Roux (France): Statistical approach to the mechanical behavior of granular media (joint paper with F. Radjai)*S. Nagel* (USA) and *H.M. Jaeger* (USA): Signatures of microstructure in granular shear flows: The use of non-invasive probes*M. Louge* (USA): Particle segregation in collisional shearing flows (Joint paper with J.T. Jenkins)*MF3. Electromagnetic processing of materials* (jointly with HYDROMAG)Chair: *R. Moreau* (France); Co-chair: *N. El-Kaddah* (USA)

Initial lectures:

P.A. Davidson (UK): Electromagnetic phenomena in aluminium reduction cells*E. Takeuchi* (Japan): Electromagnetic phenomena in steel continuous casting*J.S. Walker* (USA): Electromagnetic phenomena in crystal growth*MS1. Damage and failure of composites*Chair: *Z. Hashin* (Israel); Co-chair: *G.J. Dvorak* (USA)

Initial lectures:

R.M. Christensen (USA): A survey of and evaluation methodology for fiber composite material failure theories*J.L. Chaboche* (France): On constitutive and damage modelling in metal matrix composites*G.J. Dvorak* (USA): Damage analysis and prevention in composite materials*MS2. Mechanics of foams and cellular materials*Chair: *A.M. Kraynik* (USA); Co-chair: *N.A. Fleck* (UK)

Initial lectures:

L.J. Gibson (USA): Metallic foams: structure, properties and applications*M. Loewenberg* (USA): Numerical simulation of dense emulsion flows*S. Kyriakides* (USA): In-plane crushing of honeycomb

MS3. Vehicle systems dynamics (jointly with IAVSD)

Chair: *P. Lugner* (Austria); Co-chair: *J.K. Hedrick* (USA)

Initial lectures:

W. Kortüm (Germany) and *W. Schiehlen* (Germany): Software tools: from multibody system analysis to vehicle system dynamics

J.A. Elkins (USA): Rail dynamics for the 21st century (Joint paper with R.J. Anderson and B.V. Brickle)

R. Sharp (UK): fundamentals of the lateral dynamics of road vehicles

M. Abe (Japan) and *K. Hedrick* (USA): A mechatronics approach to advanced vehicle control system design

Pre-nominated Sessions:

Fluid Mechanics:

1. *Biological fluid dynamics*

Chair: *K. Tanishita* (Japan); Co-chair: *T.J. Pedley* (UK)

2. *Boundary layers*

Chair: *H.H. Fernholz* (Germany); Co-chair: *A.I. Ruban* (UK/Russia)

3. *Combustion and flames*

Chair: *J. Buckmaster* (USA); Co-chair: *M. Matalon* (USA)

4. *Complex and smart fluids*

Chair: *E. Shaqfeh* (USA); Co-chair: *R.I. Tanner* (Australia)

5. *Compressible flow*

Chair: *J.-P. Bonnet* (France); Co-chair: *A.J. Smits* (USA)

6. *Computational fluid dynamics (jointly with IACM)*

Chair: *J. Kim* (USA); Co-chair: *A.J. Baker* (USA)

7. *Convective phenomena*

Chair: *F.H. Busse* (Germany); Co-chair: *N.O. Weiss* (UK)

8. *Drops and bubbles*

Chair: *J.R. Blake* (UK); Co-chair: *A. Prosperetti* (USA)

9. *Environmental fluid mechanics*

Chair: *P.F. Linden* (USA); Co-chair: *J.C.R. Hunt* (UK)

10. *Experimental methods in fluid mechanics*

Chair: *H. Alfredsson* (Sweden); Co-chair: *H. Eckelmann* (Germany)

11. *Flow control*

Chair: *M. Gad-el-Hak* (USA); Co-chair: *R. Narasimha* (India)

12. *Flow in porous media*

Chair: *G.M. Homsy* (USA); Co-chair: *J. Koplik* (USA)

13. *Flow instability and transition*

Chair: *S. Leibovich* (USA); Co-chair: *M. Nishioka* (Japan)

14. *Flows in thin films*

Chair: *Y. Couder* (France); Co-chair: *L.W. Schwartz* (USA)

15. *Fluid mechanics of materials processing*
Chairs: W. Schneider (Austria) and J.I.D. Alexander (USA)
16. *Geophysical fluid dynamics*
Chair: K. Hutter (Germany); Co-chair: P. Lynch (Ireland)
17. *Low Reynolds number flow*
Chair: H.A. Stone (USA); Co-chair: A. Delgado (Germany)
18. *Microfluid dynamics*
Chair: J.F. Brady (USA); Co-chair: L. van Wijngaarden (The Netherlands)
19. *Multi-phase flows*
Chair: G. Tryggvason (USA); Co-chair: L.g. Leal (USA)
20. *Topological fluid mechanics*
Chair: A.B. Tsinober (Israel); Co-chair: R.B. Pelz (USA)
21. *Turbulence*
Chair: O. Métais (France); Co-chair: K.R. Sreenivasan (USA)
22. *Vortex dynamics*
Chair: D.I. Pullin (USA); Co-chair: V.V. Meleshko (Ukraine)
23. *Waves*
Chair: R. Grimshaw (Australia); Co-chair: C.C. Mei (USA)

Solid Mechanics:

24. *Biological solid mechanics*
Chair: S.C. Cowin (USA); Co-chair: I. Knets (Latvia)
25. *Computational solid mechanics (jointly with IACM)*
Chairs: P. Ladevèze (France) and W. Wunderlich (Germany)
26. *Computational strategies for multiscale phenomena in mechanics (jointly with IACM)*
Chair: J.T. Oden (USA); Co-chair: E. Stein (Germany)
27. *Contact and friction problems (jointly with IAVSD)*
Chairs: A. Klarbring (Sweden) and J.R. Barber (USA)
28. *Control of structures*
Chair: D.H. van Campen (The Netherlands); Co-chair: F.L. Chernousko (Russia)
29. *Damage mechanics*
Chair: D. Krajcinovic (USA); Co-chair: J. Lemaitre (France)
30. *Dynamic plasticity of structures*
Chair: S.R. Reid (UK); Co-chair: V.W.P. Shim (Singapore)
31. *Elasticity*
Chair: R. Ogden (UK); Co-chair: J.K. Knowles (USA)
32. *Experimental methods in solid mechanics*
Chair: I.M. Daniel (USA); Co-chair: J.F. Kalthoff (Germany)
33. *Fatigue*
Chair: R.O. Ritchie (USA); Co-chair: K. Tanaka (Japan)
34. *Fracture and crack mechanics (jointly with ICF)*
Chairs: B.L. Karihaloo (UK) and J.-B. Leblond (France)

35. *Functionally graded materials*
Chair: M.-J. Pindera (USA); Co-chair: G.H. Paulino (USA)
36. *Impact and wave propagation*
Chair: R.J. Clifton (USA); Co-chair: A. Boström (Sweden)
37. *Material instabilities*
Chairs: V. Tvergaard (Denmark) and A. Needleman (USA)
38. *Mechanics of phase transformations (jointly with IACM)*
Chair: A. Molinari (France); Co-chair: F.-J. Ulm (USA)
39. *Mechanics of porous materials*
Chair: A. Carpinteri (Italy); Co-chair: W. Ehlers (Germany)
40. *Mechanics of thin films and nanostructures*
Chair: L.B. Freund (USA); Co-chair: J. Dual (Switzerland)
41. *Multibody dynamics*
Chair: W. Schiehlen (Germany); Co-chair: J.J. McPhee (Canada)
42. *Plasticity and viscoplasticity*
Chairs: Z. Mroz (Poland) and B. Storåkers (Sweden)
43. *Plates and shells (Jointly with IACM)*
Chair: H. Mang (Austria); Co-chair: A.W. Leissa (USA)
44. *Rock mechanics and geomechanics*
Chair: B. Schrefler (Italy); Co-chair: I. Vardoulakis (Greece)
45. *Smart materials and structures*
Chair: R.D. James (USA); Co-chair: Y. Matsuzaki (Japan)
46. *Solid mechanics in manufacturing*
Chair: F. Pfeiffer (Germany); Co-chairs: D.B. Bogy (USA) and T. Inoue (Japan)
47. *Stability of structures*
Chair: A.N. Kounadis (Greece); Co-chair: G.J. Simitzes (USA)
48. *Structural optimization (jointly with ISSMO)*
Chair: M.P. Bendsøe (Denmark); Co-chair: R.T. Haftka (USA)
49. *Structural vibrations*
Chair: P. Hagedorn (Germany); Co-chair: J.F. Doyle (USA)
50. *Viscoelasticity and creep*
Chair: J.L. Bassani (USA); Co-chair: N. Ohno (Japan)

Topics Involving Both Fluid and Solid Mechanics:

51. *Acoustics*
Chair: A.P. Dowling (UK); Co-chairs: A. Pierce (USA) and L. Bjørnø (Denmark)
52. *Cellular and molecular mechanics*
Chair: C.R. Calladine (UK); Co-chair: S. Weinbaum (USA)
53. *Chaos in fluid and solid mechanics*
Chair: T. Mullin (UK); Co-chair: F.C. Moon (USA)
54. *Continuum mechanics*
Chair: G.A. Maugin (France); Co-chair: J. Casey (USA)

55. *Fluid-structure interaction*

Chairs: M.P. Paidoussis (Canada) and P. Terndrup Pedersen (Denmark); Co-chair: J. Grue (Norway)

56. *Microgravity mechanics*

Chair: S. Ostrach (USA); Co-chairs: H. Rath (Germany) and V.I. Polezhaev (Russia)

ICTAM 2000 Statistics*Registrations*

Totals

1,430	registered participants
97	registered accompanying persons
51	countries represented

Papers

Submissions: 1953

	Invited	Lectures	Seminars
After IPC meeting	39	738	513
On Final Program	39	717	404
Presented at ICTAM 2000	39	708	379

Papers Statistics and Registered Participants

Country	Submitted	L Acc'd	S Acc'd	L Prsntd	S Prsntd	Invited	Regist'd
USA	619	300	184	298	132	15	587
Russia	142	30	28	23	19	1	48
Germany	128	50	43	46	36	2	101
France	123	61	37	58	31	4	116
Japan	113	45	34	45	31	3	94
China (PRC)	100	13	16	12	11		29
United Kingdom	90	53	26	51	18	5	83
Italy	62	24	13	21	5		36
Ukraine	41	5	8	3	3		5
Poland	40	12	9	12	8		25
Israel	36	18	11	17	10	2	33
India	34	5	2	4	2	1	8
Denmark	29	16	8	16	7	1	28
The Netherlands	29	16	10	16	5	1	28
Canada	26	7	8	7	6	1	23
Austria	25	17	3	17	3		23
Sweden	21	9	5	9	4		23
Brazil	20	2	6	2	4		6
Taiwan	19	1	4	1	2		6

REPORT 2000

Switzerland	18	14	3	15	3	1	24
Romania	17		5		3		2
Hong Kong	16	2	5	2	4		6
Czech Republic	15	1	3	1	2		4
Armenia	14						3
Bulgaria	12	2	3	2	1		3
Korea	12		4		4		9
Belarus	10		1				0
South Africa	10	3	2	2	2		7
Spain	10	3	4	3	1	1	5
Singapore	9	2	2	2	2		8
Belgium	8	3	2	3	2		6
Greece	8	3	2	3	1		5
Hungary	8	2	1	2	1		3
Egypt	7		1				0
Portugal	7	2	1	2			3
Australia	6	3	3	3	2		9
Ireland	6	1	2	1	2	1	5
Latvia	5	3		2			2
Norway	5	2	1	2	1		3
Finland	4	2	2	1	2		4
Uzbekistan	4						0
Yugoslavia	4		1		1		1
Mexico	3	1	1	1			1
Slovakia	3						2
Thailand	3		1				0
Turkey	3		1		1		1
Vietnam	3	1					0
Croatia	2						0
Estonia	2	1	1	1	1		2
Georgia	2		1		1		1
Guadeloupe FWI	2		1		1		1
Kyrgyzstan	2						0
Nigeria	2	1					0
Saudi Arabia	2		1		1		2
Slovenia	2		2		2		2
Argentina	1						0
Chile	1	1		1			1
Cuba	1		1		1		1
Iran	1						0
Jordan	1						0
Kazakhstan	1						0
Nepal	1	1		1			1
Papua New Guinea	1						0
Trinidad	1						0

Zimbabwe	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0
New Zealand	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
TOTAL	1953	738	513	708	379	39	1430

Minutes of General Assembly Meetings, 2000 in Chicago on 29 and 30 August 2000

The President, Prof. Werner Schiehlen, opened the meeting and welcomed the delegates and observers. The following agenda was agreed.

AGENDA

August 29, 2000

1. Adoption of the minutes of the General Assembly Meeting 1998 (Report 1998, pp. 69-85).
2. Report of the Secretary General.
3. Report of the Treasurer on financial matters.
4. Preliminary discussion on annual dues.
5. Report on relations with ICSU.
6. Report of the Secretary of the Congress Committee.
7. Adhering Organizations
 - 7.1 Application from Ukraine.
 - 7.2 Application from Georgia
8. Affiliated Organizations.
9. Inter-Union Committees and Commissions.
10. Matters concerning non-ICSU organizations.
11. Report of Electoral Committee.
12. Proposals for election of Members at Large.
13. Preliminary discussion on future IUTAM Symposia. Reports from Symposia panels.
14. Preliminary discussion on future International Summer School on Mechanics.
15. Report on Assessment of IUTAM and preliminary discussion of actions.
16. Reports on Working Parties.

August 30, 2000

17. Continued discussion and final decision regarding future IUTAM Symposia.
18. Continued discussion and final decision regarding future International Summer Schools on Mechanics.
19. Continued discussion and final decision regarding annual dues.
20. Election of members of the Bureau.
21. Election of Members at Large.
22. Election of members of the Congress Committee of IUTAM.
23. Action on Assessment of IUTAM.
24. Report on Web page.
25. Appointment of Symposia Panels.

26. Appointment of Working Parties.
27. Date and venue of the next General Assembly.
28. Any other business.

Attendance: See Appendix A

1. Adoption of the minutes of the General Assembly Meeting 1998.

The Minutes were adopted.

Arising from the Minutes (9.1), Prof. Narasimha pointed out that a meeting on storm surges and numerical modelling had been organized in Dhaka, Bangladesh, and three Indian scientists had attended the meeting as speakers. The Indian participation was supported by the Government of India and the Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore.

2. Report of the Secretary General.

Mr. President, Colleagues,

It is two years since our General Assembly in Stuttgart. During that time I have had the sad duty of recording the deaths of six of our colleagues and friends who have served our Union. May I please ask you to stand while I read their names.

Professor Behrouz Tabbarok died on April 20, 1999 aged 60, following heart surgery. He was Professor of Mechanical Engineering at the University of Victoria, Canada. He made basic contributions to stress and vibration analysis. He served on the General Assembly and on the Congress Committee from 1980. He was Vice-President of XV ICTAM, 1980, in Toronto.

Professor Leonid I. Sedov died on 5 September, 1999, aged 92. He made fundamental contributions to many areas of mechanics especially hydrodynamics. He was Head of the Department of Hydromechanics of Moscow University, member of the Russian Academy of Sciences, foreign member of the French Academy of Sciences. He was an elected member of the General Assembly having been a member continuously since 1954, and a member of the Bureau from 1964 to 1980. He presented a General Lecture at ICTAM XI in Munich, 1964.

Professor Pericles S. Theocaris died on 14 September, 1999 aged 78. He was Professor of Theoretical and Applied Mechanics at the University of Athens, and a past President of the Academy of Athens. He made basic contributions in mechanics and in particular to photoelasticity. He was a member of the General Assembly, 1980 to 1986.

Professor John Martin died on 7 October 1999 aged 62. He had been Dean of Engineering and Director of the Center for Research in Computational and Applied Mechanics at the University of Cape Town. He made basic contributions in computational plasticity. He represented South Africa in the General Assembly, first as an observer in 1992 and then from 1994 to 1996.

Professor George Batchelor died on 30 March 2000 aged 80. He had been Professor of Applied Mathematics at Cambridge University. He made fundamental contributions to micro fluid mechanics and to the theory of turbulence. He was an elected member of the General Assembly having been continuously a member since 1958. He was also a member of the Congress Committee. He was the Chairman of Euromech from 1966 to 1992. He gave General Lectures at VII ICTAM, 1948, in London and XIV ICTAM, 1976, in Delft.

Professor David Crighton died on 12 April, 2000, aged 57. He was Professor of Applied Mathematics at Cambridge. He made fundamental contributions in aeroacoustics and the theory of nonlinear waves. He was President of the European Society for Mechanics. Our sympathy and grateful thoughts for what they did for our Union go to their families and their nations.

Adhering Organizations

There are now 49 adhering organizations. At the Bureau meeting in 1999 the Treasurer reported that Ukraine has never paid dues. Correspondence between the Secretary-General and Professors Paton and Guz' was considered. Following discussion it was unanimously agreed to expel Ukraine from IUTAM.

It was agreed that the letters of Professors Paton and Guz' could be considered as an application from the Ukraine for Category 1 membership. Subject to their approval, the Bureau would propose to the General Assembly, the application of Ukraine for Category 1 membership, at the General Assembly meeting in Chicago, 2000. Prof. Guz' would be invited to attend as an observer. Later on the Agenda here are the reapplication of Ukraine and an application from Georgia.

Affiliated Organizations

All affiliated organizations have presented reports in the past two years. These reports are in the Report 1998 and Report 1999. All the affiliated organizations appear to be in a healthy state.

The application for affiliation by the International Congresses on Thermal Stresses (ICTS) has been considered by the Bureau. However, because to date the statutes and rules of ICTS have not been received, there is no recommendation on its affiliation. Following the approval by the General Assembly in 1998 of ICA as an affiliated organisation, the late Prof. D. Crighton agreed to act as the IUTAM representative in ICA.

Assessment of IUTAM

During the past year, 1999-2000, the Assessment of IUTAM was undertaken by a committee chaired by Professor Karl Pister. Their report has been circulated to you and will be discussed later on the Agenda. The Officers and Bureau are very grateful to all those who participated in the Assessment.

IUTAM web site

The IUTAM web site is maintained by Prof. Jim Phillips of the University of Illinois, Champaign. It is very professional and is brought up to date on a daily basis, indeed some days on an hourly basis! On your behalf I should like to express our grateful thanks to him and his team for their splendid work. Also, this year, the Calendar of Events was introduced. It is going from strength to strength. It is also maintained by Prof. Phillips and his team

Symposia and Summer Schools

All eighteen symposia approved in Stuttgart are going ahead as scheduled. There were nine IUTAM symposia in 1999, with average attendance 55. There was one summer school, in CISM, Udine, with 47 participants. Reports on these may be found in Report 1999.

Having received the views of the Bureau, one Summer School in 2000 on "Friction and Instabilities" was allocated to CISM, Udine, and one, "Hierarchical Structures in Turbulence", to Beijing

Professor Fang Jing) in 2001.

(It was agreed in Stuttgart that the Secretary General would initiate a call for proposals, by 1 March 1999, for summer schools in 2000 & 2001. The General Assembly (See Item 18 of the Minutes of the General Assembly of August 1998) had given the Bureau authority to take decisions on these proposals.)

Publications

To date Kluwer has published 41 volumes of symposia proceedings. There are four further volumes "in press".

Sponsorship

It was agreed to sponsor without financial support the International Conference on Advanced Problems in Vibration 2000 in Xi'an in June 2000. Prof. Dick van Campen agreed to act on the Scientific Committee. It was also agreed to sponsor with financial support (\$1,000) the Conference "Control of Oscillations and Chaos" (COC'2000) Saint-Petersburg, July 5-7, 2000.

Working Parties

Prof. A. Pearson has agreed to act as chairman of WP1 Mechanics of Non - Newtonian Fluids. Prof. Gary Leal has agreed to join WP1.

Matters concerning ICSU

The Bureau reaffirmed its view that the International Association for Hydraulic Research should be an International Scientific Associate of ICSU. The Bureau agreed to support the application of the International Union for Physical and Engineering Sciences in Medicine (IUPESM) for Scientific Union Membership of ICSU.

Matters concerning non-ICSU Organizations

The President reported that Prof. D. Barthes-Biesel had accepted his invitation to attend meetings of World Council for Bio-Mechanics on a trial basis. (This relationship is not reciprocal. It was agreed to send a member on a trial basis--the matter to be reconsidered in a few years.)

IUTAM and the year 2000

The Bureau approved the proposal that a booklet, edited by the President and Vice-President, would be produced in time for ICTAM 2000 in Chicago.

Thanks

I take this opportunity of placing on record my thanks to all who have helped me over the past four years. Working as Secretary General has been a unique, valuable and unforgettable experience.

I hope IUTAM will grow and continue to make worthwhile contributions to mechanics. Floreat.

Michael Hayes

The President thanked Prof. M. A. Hayes for his report.

3. Report of the Treasurer on financial matters.

Mr. President and General Assembly Colleagues,

It is my pleasure to report to you on the financial accounts of IUTAM. With reference to the 1999 Treasurer's Report:

The total assets of the Union as of 31 December 1999 stood at the level \$272,492. This reflects a budget surplus of approximately \$21,000 for the year. There are several reasons for this surplus: reduced level of support for symposia following a decision taken in 1997, relatively low administrative costs, and an unusually successful year in dues receipts from adhering organizations.

The main source of revenues for the Union is subscription dues. Adhering organizations which are represented in the General Assembly continue to pay dues on a more or less regular schedule. More than 80 percent of these organizations are fully paid through 1999, and more than half have paid dues for 2000. Regrettably, there are currently three adhering organizations which are seriously in arrears in their dues. It was agreed in 1974 that the level of dues would be adjusted at each meeting of the General Assembly by an amount consistent with the rate of price inflation as reported by the Organization for Economic Cooperation and Development. Accordingly, the level of dues for 2002 and 2003 will be decided later in this meeting.

The cash reserves of the Union earned interest as reflected in the report. This amount is derived from savings accounts in banks in the Netherlands and in the United States.

Through ICSU, IUTAM is eligible for UNESCO support for symposia which meet certain criteria. The level of support from UNESCO for IUTAM symposia has been decreasing in recent years. The level of support for 1999 was \$7000, compared to \$10,000 for 1998 and \$12,000 for 1997.

By far the largest expense is the support of IUTAM sponsored symposia and summer schools. The level of support has been \$5000 per symposium or summer school since the beginning of 1998.

The cost of travel for members of the Bureau, the Executive Committee of the Congress Committee, the Electoral Committee and others on IUTAM business totaled approximately \$18,000 for the year.

IUTAM pays annual dues to ICSU as a scientific member of that umbrella organization. These dues have been increasing at the rate of about 4 percent to 5 percent per year in recent years.

The cost of administration is principally the cost of operating the office of the Secretary General. The principal items under administrative costs are postage and a bit of secretarial assistance. The cost of printing the annual report itself is listed separately.

IUTAM financial records are subject to an audit by an independent international accounting firm each year. This firm must submit a formal report to ICSU on its findings by March 15th of each year. In recent years, this audit has been conducted by the firm UWP UNITREU GMBH in Eschborn, Germany.

Finally, the amount shown as bank fees represents additional per transaction costs which must be borne for receiving dues payments, arranging symposium awards, and conducting other IUTAM business through commercial banks.

Invoices for dues for 2000 totaling \$91,507 were sent to adhering organizations or their sponsors. Of this amount, only \$38,619 remains outstanding as of August 4, 2000. In addition, there is an amount of \$15,659 outstanding on dues for years prior to this year.

The only unusual expense for the past year has been the cost of undertaking the assessment of the organization itself. Up to the present time, the total cost of the assessment project amounts to \$7,637.

In summary, the financial state of the Union has remained stable over the past couple of years. By exercising a modest degree of prudence, it is likely that this situation can continue for the foreseeable future. Any additional commitments which might be considered will necessarily require identification of corresponding new revenue sources.

In closing, it is a pleasure to acknowledge the help and advice provided by the assistant treasurers Professor Bruno Boley and Professor Dick van Campen.

Respectfully submitted,
L. B. Freund, Treasurer.

The President thanked Prof. L. B. Freund for his report which was adopted. In reply to a question on the tax status of the IUTAM savings accounts, the Treasurer replied that incomes derived from those accounts are exempt from income taxes according to current tax law in both the U.S. and in the Netherlands.

4. Preliminary discussion on annual dues.

On the question of the dues, Prof. Salençon said that European countries, particularly in the Euro zone have been very badly hit by exchange rate fluctuations and requested that consideration be given to the dues being denominated in Euros as well as in US dollars. Professor Germain remarked that he feared in coming years some countries will not be able to pay their dues. He was of the view that at the next General Assembly there would be a serious problem. He suggested that the increase in dues be the minimum possible. He also suggested that the Bureau should revisit its decision of 1974 to link increases with the prevailing OECD inflation increases.

Professor Aref said his Committee of ICTAM 2000 would make a contribution to the IUTAM general operating fund in an amount approximately equal to one percent of net annual dues in order to minimize the increase in dues for 2002 and 2003. The proposal was welcomed by the delegates.

5. Report on relations with ICSU

Dear Colleagues,

The last issue of the ICSU newsletter Science International was published in December 1999. The message of the new president, Prof. Hiroyuki Yoshikawa, Japan, was entitled as

ICSU opening the door to the new millennium.

Prof. Herman Th. Verstappen, The Netherlands, reported in this issue on the results of the International Decade of Natural Disaster Reduction (IDNDR) in which IUTAM was also strongly involved. The mandate of the Special Committee for IDNDR lapsed with the end of 1999. However, ICSU formed a new Special Committee for Disaster Reduction.

In May 2000 ICSU circulated a brief note on the newly established Inter-Academy Council (IAC) indicating ICSU's readiness for a pro-active and collaborative association with IAC.

The Inter-Academy Council is an initiative by a number of major national academies of science to establish a new and additional mechanism to provide scientific advice to international organizations and decision-makers. Its development has been closely linked to the InterAcademy Panel on International Issues (IAP), an informal mechanism that brings together over 70 national academies.

In June 2000 ICSU informed the Unions on the project of *Nature*, the international weekly journal of science, to publish a Science & Technology Yearbook. Part 2 of this Yearbook includes science news of international organizations.

ICSU and its Committee on Capacity Building in Science (ICSU/CCBS) are organizing a Conference in China.

Early in 1996 UNESCO and the International Council for Science (ICSU) Press convened a major international conference on

Electronic Publishing in Science

to study these issues from the perspective of practicing scientists world-wide. There have been major developments in the field of science publishing since then. ICSU proposes to convene a second Conference, at UNESCO Headquarters on 20-23 February 2001. This Conference will provide the same effective blend of lectures by international experts and interactive break-out sessions.

Werner Schiehlen

The President added that the question would have to be faced as to whether it is worthwhile for IUTAM to be a member of ICSU.

6. Report of the Secretary of the Congress Committee.

- 6.1 Prof. N. Olhoff said that arrangements for ICTAM 2000 are exceptional, and noted that there is an extremely satisfactory number of participants in the Congress, 1,520 registered active participants and 100 accompanying persons from 54 different countries.
- 6.2 On behalf of the Congress Committee and of the participants, Prof. Olhoff thanked President H. Aref and Secretary-General J.W. Phillips of ICTAM 2000 for their immense and devoted work towards making the Congress a resounding success. Prof. Olhoff mentioned Prof. Aref's exceptional organizational skills and Prof. Phillips' most useful work of both constructing and maintaining the ICTAM 2000 and the IUTAM websites.
- 6.3 Prof. Olhoff also thanked the members of the International Papers Committee (IPC), Profs. L. Gary Leal, T.J. Pedley, S. Bodner, D. van Campen and A. Needleman, for their work in evaluating and selecting papers for presentation at the Congress. This task involved considerable work during February and March this year, and particularly during the 4-day meeting of the IPC in Urbana-

Champaign at the end of March. In addition to recommendations given by the chairs of the Mini-Symposia and the Pre-nominated Sessions, the IPC also was assisted in its work by the paper pre selection procedures of the nine major countries of the Union, namely Canada, France, Germany, Japan, P.R. China, Poland, Russia, UK and USA. On behalf of the Congress Committee, Prof. Olhoff thanked the chairs of the Mini-Symposia and the Pre-nominated Sessions as well as the members of the paper preselection committees of the aforementioned countries, for their valuable cooperation.

- 6.4 The total number of papers submitted to ICTAM 2000 was no less than 1,953 papers, which is substantially higher than the submissions to the last several Congresses, e.g., Kyoto 1,642, Haifa 1,183, and Grenoble 1,262. Out of the 1,953 papers submitted to ICTAM 2000, 1,251 papers were accepted by the IPC (738 for lecture and 513 for seminar presentation), and 702 papers (or 36%) were rejected. The number of contributed papers on the final program of 22 August is 1,121 in total (717 lecture and 404 seminar presentations), and adding the total number of 39 invited papers, brings up the number of papers presented at ICTAM 2000 to a grand total of 1,160 papers.
- 6.5 The Congress Committee received in May very strong final invitations/proposals from Brussels, Dresden, Manchester and Warsaw to host the 21st Congress in year 2004. The proposals were presented by the potential hosts and were compared and discussed in great detail at the meeting of the Congress Committee held Sunday evening (27 August). The proposals will be finally discussed at the meeting of the Congress Committee to be held Thursday afternoon (31 August), where the final decision regarding the venue of the 21st Congress will be made.
- 6.7 Prof. Olhoff finally addressed the question of new membership of the Congress Committee. He said that the procedure for appointment of new members is described on pp. 91-92 of the IUTAM 1995 Report, and that the current membership is set out on pp. 20-21 of the 1999 Report. The Congress Committee had made the following recommendations to the General Assembly:
- that Profs. H. Aref (USA), J. Engelbrecht (Estonia), H.K. Moffatt (UK), N. Olhoff (Denmark) and T.J. Pedley (UK) be reappointed for a further 4-year term due to their membership of the Executive Committee or of the Bureau, and that Profs. D. Bogy (USA), L.B. Freund (USA), G.M.L. Gladwell (Canada), P. Lugner (IAVSD, Austria), R. Moreau (HYDROMAG, France), P. Suquet (France) and Feng-gan Zhuang (China) be reappointed for their second term.
 - that Profs. S. Bodner (Israel), B. Lundberg (EUROMECH, Sweden), G.E.A. Meier (Germany), R.I. Nigmatulin (Russia), M. Sayir (Switzerland), T. Tatsumi (Japan) and L. van Wijngaarden (Netherlands) should retire since they have completed their second term of service and are neither officers of the Bureau nor members of the Executive Committee. In addition, Profs. A.

Acrivos (USA), J.R.A. Pearson (ICR, UK) and W. Schiehlen (Germany) had desired to retire, so all in all there were 10 vacancies.

- that a slate of 13 candidates be considered for the 10 vacancies in the Congress Committee. The 13 candidates were: Profs. M.P. Bendsøe (ISSMO, Denmark), D. van Campen (Netherlands), D. Durban (Israel), L. Gaul (Germany), P. Gudmundson (Sweden), E. van der Giessen (Netherlands) T. Kambe (Japan), B.L. Karihaloo (ICF, UK), V.V. Kozlov (Russia), G. Leal (ICR, USA), F. Lund (Chile), P. Monkewitz (Switzerland) and S. Wagner (Germany).

7. Adhering Organizations

7.1 Ukraine. It was agreed that the Ukraine be admitted as a Category 1 member.

7.2 Georgia. Professor Jiani spoke of the activities in mechanics in Georgia and of its many contributions over the years. Its application for Category 1 membership was supported by the Bureau. It was agreed that Georgia be accepted as a Category 1 member.

8. Affiliated Organizations Nothing to report.

9. Inter-Union Committees and Commissions Nothing to report.

10. Matters concerning non-ICSU organizations Nothing to report.

11. Report of Electoral Committee

In May 1999 the Electoral Committee invited the members of the General Assembly to submit suggestions for candidates for the Bureau election by November 30, 1999.

The call for suggestions was very successful, by the end of 1999, the Electoral Committee received 78 replies from the 119 members of the General Assembly. After careful evaluation of the suggestions the Electoral Committee met on Saturday, March 4 this year in Stuttgart. First of all, the Committee prepared a shortlist of nominees, then the geographical and scientific representation, and the continuity as well as the renewal within the Bureau were considered. After some discussion a list of candidates with three names for the offices and eight names for the four member positions was compiled.

On request of the Electoral Committee seven candidates indicated their willingness to accept an election. To guarantee the continuity, the Electoral Committee decided not to add another candidate to the list.

On April 18, 2000 the final nominations were presented to the Secretary-General Professor Michael Hayes who conveyed these nominations to the members of General Assembly well in time.

With these nominations the Electoral Committee achieved the following goals:

1. American, Asian and European countries are represented in the new Bureau.
2. Fluid and solid mechanics are properly represented.
3. Continuity and renewal are achieved, half of the Bureau is replaced.
4. The General Assembly has a good choice between excellent candidates.
5. The order of the candidates on the list is not alphabetical, the order represents the number of suggestions received.

Let me finish my report with sincere thanks to the members of the Electoral Committee namely Professors Bruno Boley, Gorimir Chernyi, Paul Germain and Tsutomu Kambe. The members of the Committee and myself would be pleased to answer any questions you may have.

I thank you.

Werner Schiehlen

It was agreed that voting on the membership of the Bureau would take place in the Session of August 30.

12. Proposals for election of Members-at-Large

The President reported that the Bureau had considered the nominations proposed by members of the General Assembly. The Bureau recommended to the General Assembly the reelection of Professors Boley, Drucker, Fiszdon, Hult, Ishlinsky, Ku, Niordson, and the election of Professors Paul Germain (France), Michael A. Hayes (Ireland), Philip G. Hodge (USA), Tomomasa Tatsumi (Japan), Leen van Wijngaarden (The Netherlands).

13. Preliminary discussion on future IUTAM Symposia. Reports from Symposia Panels.

The following is the list of symposia proposals.

1. **Singularities, Asymptotics and Homogenization in Problems of Mechanics**, Liverpool, UK 2002
2. **Mechanics of Structural Rearrangements: Thermomechanical Theories and Experiments**, Besancon, France 2002
3. **Dynamics of Advanced Materials and Smart Structures**, Yamagata, Japan 2002
4. **Mesoscopic Dynamics of Fracture Process and Materials Strength**, Osaka, Japan 2003
5. **Hysteresis in Engineering Fields; Characteristics Studies, Modeling, Understanding and Application of the Phenomenon**, Raleigh, North Carolina, USA 2002
6. **Quasi-Brittle Fibre Reinforced Composites: From Micromechanics to Structural Response**, Warwick, UK 2002
7. **Foundations of the Theories of Plates and Shells**, Bremen, Germany 2002

8. **Multi-Scale Modeling and Characterization of Elastic-Inelastic Behavior of Engineering Materials**, Marrakesh, Morocco 2002
9. **Nonlinear Stochastic Dynamics**, Urbana- Champaign, Illinois, USA 2002
10. **Mechanics of Physicochemical and Electromechanical Interactions in Porous Media**, Eindhoven, The Netherlands 2002
11. **Advances in Multibody System Dynamics**, Nanjing, China 2002
12. **Dynamic Problems in Industrial Hazards**, Ningbo, China 2003
13. **Complementary-duality Variational Principles in Nonlinear Mechanics**, Dalian, China 2002
14. **Integrated Modeling of Fully Coupled Fluid-Structure Interactions**, Rutgers, N.J.,USA 2003
15. **Evolutionary Methods in Mechanics**, Cracow, Poland 2002
16. **Chaotic Dynamics and Control of Systems and Processes in Mechanics**, Rome, Italy 2002
17. **Reynolds Number Scaling in Turbulent Flow**, Princeton, N.J., USA 2002 / 2003
18. **Advances in Acoustic Cavitation**, Boston, MA, USA 2002
19. **Symposium Transsonicum IV**, Goettingen, Germany 2002
20. **Water Waves and Optics – Common Nonlinear Features**, Lyngby, Denmark 2003
21. **Unsteady Separated Flows**, Toulouse, France 2002
22. **Mechanics and Rheology of Aqueous Foam**, Boston, MA, USA 2002 / 2003

The reports of the Symposia Panels had been circulated. The Panels had met and their recommendations were presented. After preliminary discussion those numbered 3, 4, 9, 10, 13, 15, 16, 17, 18, 20, 21, were ranked "alpha", those numbered 1, 2, 5, 6, 7, 8, 11, 14, 19, 22, were ranked "beta" whilst number 12 was ranked "gamma". It was agreed that those ranked "alpha" would be accepted, that ranked "gamma" would be rejected and the remainder considered at the second session.

14. Preliminary discussion on future International Summer School on Mechanics

There were two proposals:

SS1. Mechanics of Heterogeneous Materials, Beijing, China 2002

SS2. Environmental Fluid Dynamics, St.Augustine, Trinidad 2002

The summer school SS1 was ranked "alpha " and accepted, and after some discussion, SS2 was ranked "beta".

15. Report on Assessment of IUTAM and Preliminary Discussion of Actions.

The General Assembly had before it the document "Assessment Actions" received from the Bureau.

Assessment Actions

As a first follow-up to the Assessment Report, the Bureau of IUTAM asks the General Assembly of IUTAM to approve the following actions:

1. The Bureau of IUTAM is asked to prepare the establishment of Standing Scientific Committees to be approved at the forthcoming General Assembly in 2002.
2. The Secretary-General of IUTAM is responsible for the Internet activities of the Union.
3. The Congress Committee of IUTAM is asked to encourage the chairmen of pre-nominated sessions at the ICTAM to submit survey notes on their subjects. These surveys will be published on the Internet and help improve the visibility of IUTAM.

Further the Bureau suggests to the General Assembly the following items for discussion

4. Affiliated Organizations may have an optional voting right subject to the payment of a category 1 annual subscription.
5. The General Assembly may appoint a Statutes Committee with the following terms of reference: "to keep the Statutes of IUTAM under review in the light of discussions of the General Assembly, and to bring proposals for change of Statutes to the General Assembly as and when required."

There were many contributions to the discussion which followed.

It became clear that there was little support for Action 4 on voting rights for affiliated organizations being subject to an annual subscription.

A strong role for the Congress Committee was urged. Also, the view was expressed that the chairs of working parties should be free to take initiatives.

16. Reports on Working Parties.

The Secretary General pointed out that written reports on Working Parties, WP1, WP3, WP4, WP6 had been circulated in June. The reports on WP2 and WP5 are in Appendix 2.

Oral reports were presented on WP1-"Mechanics of Non-Newtonian Fluids" by Prof. G. Leal, on WP5 "Electromagnetic Processing of Materials" by Prof. R. Moreau, and on WP6 "Computational Mechanics" by Prof. E. R. Arantes e Oliveira.

17. Continued discussion and final decision regarding future IUTAM Symposia.

A vote was taken regarding those symposia proposals numbered 1, 2, 5, 6, 7, 8, 11, 14, 19, 22 and SS2. As a result the following further symposia proposals were accepted: those numbered 1, 6, 8, 14, 19, 22. Thus, those numbered (see item 13)

1, 3, 4, 6, 8, 9, 10, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 are accepted

18. Continued discussion and final decision regarding future International Summer Schools on Mechanics.

Only SS1 was accepted.

19. Continued discussion and final decision regarding annual dues

Following general discussion, the General Assembly agreed to accept Professor Aref's proposal and to set the membership dues for IUTAM adhering organizations at the level of 642 USD per membership unit for 2002 and 656 USD per membership unit for 2003. Those adhering organizations which pay dues in equal installments over the two-year period (payment schedule B) will be invoiced for 649 USD per membership unit in each of the two years.

20. Election of members of the Bureau

The result of the election is as follows.

Prof. H. K. Moffatt, President
 Prof. W. Schiehlen, Vice-President
 Prof. L. B. Freund, Treasurer
 Prof. D. H. van Campen, Secretary-General
 Prof. C. Cercignani
 Prof. J Engelbrecht
 Prof. R. Narasimha
 Prof. J. Salençon

21. Election of Members-at-Large.

Professors Boley, Drucker, Fiszdon, Hult, Ishlinsky, Ku, Niordson were reelected. Professors Paul Germain (France), Michael A. Hayes (Ireland), Philip G. Hodge (USA), Tomomasa Tatsumi (Japan), Leen van Wijngaarden (The Netherlands) were elected Members-at-Large.

22. Election of members of the Congress Committee of IUTAM.

- 22.1 The General Assembly accepted the recommendations by the Congress Committee (see minute 6.7), and by secret ballot elected the following 10 new members of the Congress Committee: Profs. M.P. Bendsøe (ISSMO, Denmark), D. van Campen (Netherlands), D. Durban (Israel), P. Gudmundson (Sweden), T. Kambe (Japan), B.L. Karihaloo (ICF, UK), V.V. Kozlov (Russia), G. Leal (ICR, USA), F. Lund (Chile), and P. Monkewitz (Switzerland).
- 22.2 The Secretary recorded warm thanks to the following for their devoted service to the Congress Committee: Profs. A. Acrivos (USA), S. Bodner (Israel), B. Lundberg (EUROMECH, Sweden), G.E.A. Meier (Germany), R.I. Nigmatulin (Russia), J.R.A. Pearson (ICR, UK), M. Sayir (Switzerland), W. Schiehlen (Germany), T. Tatsumi (Japan) and L. van Wijngaarden (Netherlands).
- 22.3 The new membership of the Congress Committee and its Executive Committee is recorded in the table below. Prof. N. Olhoff had served as Secretary for 8 years, and this task will be taken over by Prof. T.J. Pedley.

Members of the Congress Committee

- * Prof. H. Aref (USA) 2004
- Prof. M.P. Bendsøe (Denmark) 2004, Rep. of ISSMO
- Prof. D. Bogy (USA) 2004
- Prof. D. van Campen (Netherlands) 2004
- Prof. D. Durban (Israel) 2004
- Prof. J. Engelbrecht (Estonia) 2004
- Prof. N. A. Fleck (UK) 2002
- Prof. L.B. Freund (USA) 2004
- Prof. G.M.L. Gladwell (Canada) 2004
- Prof. P. Gudmundson (Sweden) 2004
- Prof. M. A. Hayes (Ireland) 2002, Rep. of ISIMM
- Prof. T. Inoue (Japan) 2002, Rep. of ICM
- Prof. J. Jimenez (Spain) 2002
- Prof. A. Kluwick (Austria) 2002
- Prof. T. Kambe (Japan) 2004
- Prof. B.L. Karihaloo (UK) 2004, Rep. of ICF
- Prof. A.N. Kounadis (Greece) 2002
- Prof. V.V. Kozlov (Russia) 2004
- Prof. Y.H. Ku (USA)
- Prof. G. Leal (USA) 2004, Rep. of ICR
- Prof. F. Lund (Chile) 2004
- Prof. P. Lugner (Austria) 2004, Rep. of IAVSD
- * Prof. H.K. Moffatt (UK) 2004, Chairman
- Prof. P. Monkewitz (Switzerland) 2004
- * Prof. R. Moreau (France) 2004, Rep. of HYDROMAG
- Prof. B. C. Nakra (India) 2002
- Prof. J. T. Oden (IACM, USA) 2002
- * Prof. N. Olhoff (Denmark) 2004
- * Prof. T.J. Pedley (UK) 2004, Secretary
- * Prof. B. A. Schrefler (Italy) 2002
- Prof. K. Sobczyk (Poland) 2002
- Prof. P. Suquet (France) 2004
- Prof. R.I. Tanner (Australia) 2002
- Prof. E. Watanabe (Japan) 2002
- Prof. Feng-gan Zhuang (China) 2004

* Members of Executive Committee (2000-2004).

Year, where stated, indicates end of term (applies to members elected after 1972).

List as of 1st November 2000.

23. Action on Assessment of IUTAM

The General Assembly approved the actions 1 to 3 (see item 15) recommended by the Bureau of IUTAM. The General Assembly expects a report on assessment actions in 2002.

24. Report on Web page

The President thanked Professor Phillips for his splendid work on the IUTAM web pages over the past four years. His work was invaluable. He had created a resource and a web page of which the IUTAM General Assembly could be proud.

25. Appointment of Symposia Panels

The Secretary-General Prof. Hayes reported to the General Assembly the following proposal of the Bureau for the appointment of Symposia Panels.

Symposia Panel (Solids)

Professors Achenbach (chair), Chernousko, Ehlers, Tvergaard, Willis;

Symposia Panel (Fluids)

Professors Huerre (chair), Kambe, Krause, Leal, Peregrine.

The General Assembly approved this proposal.

26. Appointment of Working Parties

The Secretary-General reported that the Bureau was of the view that some of the Working Parties were sufficiently active and viable to be Standing Scientific Committees. However, he said that decisions on this would have to await the establishment of Standing Scientific Committees at the next General Assembly. Prof. Hayes also said that at least one of the Working Parties needed a transfusion of new blood.

27. Date and venue of the next General Assembly

At the invitation of Professor Moffatt the next General Assembly meeting will be held in Cambridge, 16-18 August, 2002.

28. Any other business

Professor Schiehlen expressed his thanks to all those who had helped him in his time as President. He was very honoured to have been able to serve IUTAM and said his successor, Professor Moffatt, had his best wishes for a fruitful term as President. He thanked Professor Aref and his team for the splendid work they had done in making ICTAM 2000 such a success. In particular he wished to thank the local organizers for their wonderful hospitality.

He wished those present a safe journey home.

Appendix A**Attendance at Meeting of August 29**

R.Adrian (USA), H. Aref (USA), T. Astley (New Zealand), D. Barthes-Biesel (France), (Morocco), S.R. Bodner (Israel), B. A. Boley (USA), A. Boström (Sweden), C.R. Calladine (UK), D.H. van Campen (The Netherlands), A. Cardon (Belgium), P.W. Carpenter (UK), C. Cercignani (Italy), S. Crandall (USA), N.D. Cristescu (Romania), M. Crocker (USA), E.H. Dowell (USA), J. Engelbrecht (Estonia), L.B. Freund (USA), U. Gabbert (Germany), P. Germain (France), J. Grue (Norway), W. Gutkowski (Poland), M. A. Hayes (Ireland), J. Hansen (Canada), You-Sheng He (China), C. T. Herakovich (USA), P.F. Hodnett (Ireland), K. C. Hwang (China), R. N. Iyengar (India), S. Kaliszky (Hungary), T Kambe (Japan), B.L. Karihaloo (U. K.), A. Kluwick (Austria), A.N. Kounadis (Greece), E. Krause (Germany), G. Kuhn (Germany), G. Leal (USA), F. Lund (Chile), M. Määttänen (Finland), G.K. Mikhailov (Russia), M.J. Mikkola (Finland), H.K. Moffatt (UK), P.A. Monkewitz (Switzerland), R. Moreau (France), R. Narasimha (India), F.I. Niordson (Denmark), J. T. Oden (USA), N. Olhoff (Denmark), E.R. de Arantes e Oliveira (Portugal), T.J. Pedley (UK), N. Phan-Thien (Australia), P. Podio-Guidugli (Italy), G. Rozvany (Hungary), D. Ruzic (Yugoslavia), J. Salençon (France), S. B. Savage (Canada), W. Schiehlen (Germany), R. S. Sharp (UK), B. Storakers(Sweden), P. Suquet (France), R.I. Tanner (Australia), T. Tatsumi (Japan), C.G. du Toit (South Africa), F. Vatta (Italy), P. R. Viswanath (India), S. Wagner (Germany), Ren Wang (China), D. S. Weaver (Canada), H. I. Weber (Brazil), L. van Wijngaarden (The Netherlands), J. R. Willis (UK), T. X. Yu (Hong Kong), Z.M. Zheng (China), H. Zorski (Poland).

Attendance at Meeting of August 30

R.Adrian (USA), H. Aref (USA), T. Astley (New Zealand), D. Barthes-Biesel (France), S.R. Bodner (Israel), B. A. Boley (USA), A. Boström (Sweden), C.R. Calladine (UK), D. H. van Campen (The Netherlands), A. Cardon (Belgium), P.W. Carpenter (UK), C. Cercignani (Italy), S. Crandall (USA), N.D. Cristescu (Romania), E.H. Dowell (USA), J. Engelbrecht (Estonia), L.B. Freund (USA), U. Gabbert (Germany), P. Germain (France), W. Gutkowski (Poland), M. A. Hayes (Ireland), J. Hansen (Canada), You-Sheng He (China), C. T. Herakovich (USA), P.G. Hodge, Jr. (USA), P.F. Hodnett (Ireland), K. C. Hwang (China), T. Inoue (Japan), R. N. Iyengar (India), S. Kaliszky (Hungary), T Kambe (Japan), B.L. Karihaloo (U. K.), A. Kluwick (Austria), A.N. Kounadis (Greece), E. Krause (Germany), G. Kuhn (Germany), F. Lund (Chile), M. Määttänen (Finland), J. Martins (Portugal), G.K. Mikhailov (Russia), M.J. Mikkola (Finland), H.K. Moffatt (UK), P.A. Monkewitz (Switzerland), R. Moreau (France), R. Narasimha (India), F.I. Niordson (Denmark), N. Olhoff (Denmark), T.J. Pedley (UK), N. Phan-Thien (Australia), P. Podio-Guidugli (Italy), G. Rozvany (Hungary), D. Ruzic (Yugoslavia), J. Salençon (France), S. B. Savage (Canada), W. Schiehlen (Germany), R. S. Sharp (UK), B. Storakers(Sweden), P. Suquet (France), T. Tatsumi (Japan), C.G. du Toit (South Africa), F. Vatta (Italy), S. Wagner (Germany), Ren Wang (China), D. S. Weaver (Canada), H. I. Weber (Brazil), L. van Wijngaarden (The Netherlands), J. R. Willis (UK), Z.M. Zheng (China), H. Zorski (Poland).

Observers:

Professor C.L. Chow (U.S.A), Professor A. N. Guz (Ukraine), Professor G. Jiaini (Georgia), Professor G.E.A. Meier (Germany), Professor J.W. Phillips (USA).

Proxy votes:

Professor Kambe held the proxies of Professors H. Ohashi, G. Yagawa and M. Ito. Professor Olhoff held the proxy of Professor Per Madsen, Professor Weaver held the proxy of Professor Rimrott, Professor B. Boley held the proxy of Professor Drucker, Professor van Campen the proxy of Professor Dijksman, Professor Tatsumi the proxy of Professor Imai, Professor Mikkola the proxy of Professor Määttänen, Professor Storakers the proxy of Professor Hult, Professor Boström the proxy of Professor Lundberg and Professor Mikhailov the proxy of Professor Chernyi.

Appendix B

Reports on Working Parties WP2 and WP5

Report to General Assembly on WP2.

The Working Party WP2 - Dynamic Systems featuring the cooperation between the International Association of Vehicle System Dynamics (IAVSD) and IUTAM met twice on the occasion of the 15th and 16th Symposium on the Dynamics of Vehicles on Roads and on Tracks.

At the first meeting 1997 in Budapest, Hungary the proposal for a minisymposium at ICTAM 2000 was discussed and approved. Later at the second meeting 1999 in Pretoria, South Africa the lecturers of the minisymposium entitled "Vehicle system dynamics" were appointed and the co-authors were approved. Further, the preparations for the pre-nominated sessions on contact and friction problems were started.

The Working Party WP2 - Dynamic Systems is proud of the high recognition of vehicle system dynamics during the ICTAM 2000 which takes place in the close neighborhood of the world's largest car manufacturers. Thus, mechanics and mechatronics contribute to the rapid development of road and rail transportation.

The forthcoming 17th IAVSD Symposium will be held in Lyngby, Denmark and offers another excellent opportunity to bring together scientists from the mechanics community, and road and rail vehicle engineering.

Werner Schiehlen

Report to General Assembly on WP5 "Electromagnetic Processing of Materials"

A significant number of scientific meetings have been organized by HYDROMAG members during the years 1999 and 2000. They include both small workshops (7) and large conferences. The most important events were:

- The Summer School on MHD organized jointly by IUTAM and HYDROMAG in CISM (Udine, Italy, June 1999, 48 students)
- The EPM-2000 conference held in Nagoya, Japan, under the chairmanship of Professor Asai (April 2000, more than 150 attendees)
- The mini-symposium on Electromagnetic Processing of Materials, organized within the ICTAM-2000 in Chicago, USA, in August 2000, co-chaired by Professors Moreau and El-Kaddah
- The PAMIR conference on MHD and related fields to be held in Giens, France (September 2000).

For the next years a rather active program has already been discussed, including a conference on Magnetic Fluids (Bremen, Germany, 2001) and a new conference on Electromagnetic Processing of Materials (Paris, France, 2003). The quarterly HYDROMAG letter is efficiently used to announce these meetings and to guarantee the participation of the leading groups from both universities and industrial research centers.

René Moreau

Minutes of Congress Committee Meetings, 2000 held in Chicago on 27 and 31 August 2000

Present:

A. Acrivos*, H. Aref (President, ICTAM 2000), S. Bodner*, J. Engelbrecht, N.A. Fleck, L.B. Freund, G.M.L. Gladwell, M.A. Hayes, T. Inoue (only 31 Aug.), J. Jimenez (only 31 Aug.), A. Kluwick, A.N. Kounadis, P. Lugner, G.E.A. Meier, H.K. Moffatt, R. Moreau*, J.T. Oden (only 27 Aug.), N. Olhoff* (Secretary), T.J. Pedley*, W. Schiehlen* (President), B.A. Schrefler, K. Sobczyk, P. Suquet, R.I. Tanner, T. Tatsumi, E. Watanabe, L. van Wijngaarden, and Fenggan Zhuang.

(* = Members of Executive Committee).

Present by invitation: J.W. Phillips (Secretary-General, ICTAM 2000); A. Cardon (for presentation of case for Brussels for ICTAM 2004); F. Pfeiffer and P. Ruge (for presentation of case for Dresden for ICTAM 2004); P.W. Duck and I.D. Abrahams and on 31 Aug. J.R. Willis (for presentation of case for Manchester for ICTAM 2004); and W. Gutkowski and T. Kowalewski (for presentation of case for Warsaw for ICTAM 2004).

Apologies:

D. Bogy, Y.H. Ku, B. Lundberg, B.C. Nakra, R.I. Nigmatulin, J.R.A. Pearson, and M. Sayir.

A. Meeting on 27 August 2000

Item 1: Minutes of meeting of Congress Committee (CC) held in Stuttgart, Germany, August 1998 (Previously circulated)

These minutes were approved.

Item 2: Minutes of meeting of Executive Committee (XC) of CC held in Aalborg, Denmark, August 1999 (Previously circulated)

These minutes were approved.

Item 3: Report on meeting of the International Papers Committee (IPC) held in Urbana-Champaign, USA, 26-29 March 2000 (Previously circulated)

This report was also approved. The total number of papers submitted to ICTAM 2000 in Chicago was 1,953, i.e., substantially more than the submissions to the last several Congresses. Out of the 1,953 papers submitted to ICTAM 2000, 1,251 papers were accepted by the IPC (738 for lecture and 513 for seminar presentation), and 702 papers (or 36%) were rejected. It was agreed to thank the members of the IPC, Professors L. Gary Leal, T.J. Pedley, S. Bodner, D. van Campen and A. Needleman, for their immense work of evaluating and selecting papers for presentation at the Congress.

In addition to the recommendations received by the IPC from the Chairpersons of the Mini-Symposia and Prenominated Sessions, the IPC also was greatly assisted in its work by the paper preselection procedures of the nine major countries of the Union, Canada, France, Germany, Japan, P.R. China, Poland, Russia, UK and USA. It was agreed to thank the chairpersons of the Mini-Symposia and Prenominated Sessions as well as the National Adhering Organizations of the aforementioned countries for their valuable cooperation.

Item 4: Report by the Local Executive Committee of ICTAM 2000

Prof. Aref briefly reported on some statistics and very recent preparations for the Congress. He expected that the Congress would be attended by about 1,400 registered participants and 100 registered accompanying persons. Prof. Aref informed that the number of contributed papers that had been included in the final program made on 22 August was 1,121 in total (717 lecture and 404 seminar presentations), and that adding of the total number of 39 invited papers, brought up the number of papers included in the printed program of ICTAM 2000 to a grand total of 1,160 papers.

Prof. Aref said that a type of problem which he had quite frequently been confronted with during the past few months was conflict between the invitations of papers by Pre-nominated Session or Mini-symposia Chairs and the decisions made by the IPC regarding some of the papers. In all cases, the Local Executive Committee had adhered strictly to the decisions by the IPC.

The following ICTAM publications contained in the Congress bags were briefly presented: Final Program, Abstract Book, List of Participants, and a Booklet

entitled "Overviews of Mechanics" containing descriptions of topics in mechanics contributed by chairs and co-chairs of the technical sessions at ICTAM 2000. Prof. Aref informed that the Congress budget showed balance between income and expenditure at a level of USD 670,000. A total amount of USD 125,000 had been used for support of 110 Congress participants. About half of this amount had been allocated to Russian scientists and had helped to secure a reasonable participation in ICTAM 2000 from Russia.

The plan and time table for the Opening and the Closing Ceremonies were presented and approved. The plans for the Science Teachers Day and for the Congress Banquet were also presented.

Item 5: New members of the Congress Committee (CC)

The procedure to be followed for appointment of new members of the CC is described pp. 91-92 of the IUTAM 1995 Report. The current membership is set out pp. 20-21 of the 1999 Report.

The Committee firstly agreed to recommend to the General Assembly that the following 7 members of the Congress Committee were reappointed for a second term, 2000-2004:

Prof. D. Bogy (USA), L.B. Freund (USA), G.M.L. Gladwell (Canada), P. Lugner (Austria) representing IAVSD, R. Moreau (France) representing HYDROMAG, P. Suquet (France) and Fenggan Zhuang (China).

The terms of the following 12 members of the CC expire in 2000: Prof. H. Aref (USA), S. Bodner (Israel), J. Engelbrecht (Estonia), B. Lundberg (Sweden) representing EUROMECH, G.E.A. Meier (Germany), H.K. Moffatt (UK), R.I. Nigmatulin (Russia), N. Olhoff (Denmark), T.J. Pedley (UK), M. Sayir (Switzerland), T. Tatsumi (Japan) and L. van Wijngaarden (Netherlands). In addition, Prof. A. Acrivos (USA), J.R.A. Pearson (UK) representing ICR, and W. Schiehlen (Germany) desired to retire from the CC, so all in all there were 15 vacancies. The Committee agreed to recommend to the General Assembly that decisions on these 15 potential vacancies were made as follows:

- reappointment (before ballot) of the following 5 persons due to their membership of the Bureau or of the EC:
Prof. H. Aref (USA), J. Engelbrecht (Estonia), H.K. Moffatt (UK), N. Olhoff (Denmark) and T.J. Pedley (UK).
- appointment of the remaining 10 members from the following slate of 13 candidates:
Prof. M.P. Bendsøe (Denmark) representing ISSMO, D. van Campen (Netherlands), D. Durban (Israel), L. Gaul (Germany), P. Gudmundson (Sweden), E. van der Giessen (Netherlands), T. Kambe (Japan), B.L. Karihaloo (UK) representing ICF, V.V. Kozlov (Russia), G. Leal (USA) representing ICR, F. Lund (Chile), P. Monkewitz (Switzerland) and S. Wagner (Germany).

Item 6: Discussion regarding membership of the Executive Committee

It was decided to postpone this discussion until the General Assembly had appointed the new members of the Congress Committee.

Item 7: Venue for 21st Congress in year 2004

The four proposals to host the 21st Congress in August, 2004 were presented as follows:

Brussels proposal by Prof. A. Cardon

Dresden proposal by Profs. F. Pfeiffer and P. Ruge

Manchester proposal by Profs. P.W. Duck and I.D. Abrahams

Warsaw proposal by Profs. W. Gutkowski and T. Kowalewski.

After the presentations the proposals were discussed in great detail, with particular attention paid to, *a.o.*, the proposed budgets, possibilities of external financial support, hotel versus university environment, and the general strength of the local community in theoretical and applied mechanics.

Item 8: Any other business

The President informed the CC on the report and the recommendations just made by the Panel on Assessment of IUTAM. Upon request, the CC granted the President permission to approach a number of Chairs of Pre-nominated Sessions for short descriptions of their fields with a view to publish these descriptions on the Internet and thereby improve the visibility of IUTAM.

B. Meeting on 31 August 2000

Item 9: Venue for 21st Congress in year 2004 (contd.)

The presenters of the cases for Brussels, Dresden, Manchester and Warsaw for ICTAM 2004 (see Item 7 above), were first invited to answer further questions from the members of the CC pertaining to their proposals to host ICTAM 2004. The presenters then left the CC meeting, and the proposals were discussed in great detail by the members of the CC.

The CC agreed to adopt the sequential voting procedure normally used when more than two options exist, and decided that an extra vote should be given to the oldest member of the CC, Prof. T. Tatsumi, in case of a tie between two proposals. Three CC members who were unable to attend the meeting, had sent letters to the President and the Secretary and requested to be represented by proxies, but the CC decided against the constitution of proxies.

The four proposals to host the 21st Congress were now put to a secret ballot which gave the following result: Brussels 0 vote, Dresden 10 votes, Manchester 5 votes, and Warsaw 12 votes.

The venue for the Congress was now to be decided in a vote between Dresden and Warsaw, and the result was the following:

Dresden 13 votes, Warsaw 14 votes.

The 21st Congress will thus be held in Warsaw in August, 2004.

Later, in consultation with the Local Organizers,

the precise dates for the 21st Congress have been fixed as August 15-21, 2004.

Item 10: Appointment of new CC members by the General Assembly

The Secretary reported that the General Assembly, at its meeting on 30 August, had followed the recommendation made by the Congress Committee (see Item 5).

Hence, for membership of the Congress Committee during the period 2000-2004, the General Assembly

- reappointed:
 Profs. D. Bogy (USA), L.B. Freund (USA), G.M.L. Gladwell (Canada), P. Lugner (Austria) representing IAVSD, R. Moreau (France) representing HYDROMAG, P. Suquet (France) and Fenggan Zhuang (China)
- appointed (before ballot):
 Profs. H. Aref (USA), J. Engelbrecht (Estonia), H.K. Moffatt (UK), N. Olhoff (Denmark) and T.J. Pedley (UK)
- appointed (by secret ballot) from the slate of 13 candidates (see Item 5) the following 10 members:
 Profs. M.P. Bendsøe (Denmark) representing ISSMO, D. van Campen (Netherlands), D. Durban (Israel), P. Gudmundson (Sweden), T. Kambe (Japan), B.L. Karihaloo (UK) representing ICF, V.V. Kozlov (Russia), G. Leal (USA) representing ICR, F. Lund (Chile), and P. Monkewitz (Switzerland).

The appointments take effect by 1st November 2000.

On behalf of IUTAM, the Secretary recorded warm thanks to the following for their devoted service to the Congress Committee: Profs. A. Acrivos (USA), S. Bodner (Israel), B. Lundberg (EUROMECH, Sweden), G.E.A. Meier (Germany), R.I. Nigmatulin (Russia), J.R.A. Pearson (ICR, UK), M. Sayir (Switzerland), W. Schiehlen (Germany), T. Tatsumi (Japan) and L. van Wijngaarden (Netherlands). The new membership of the Committee is set out in Appendix 1.

Item 11: Executive Committee

Following a recommendation from the Executive Committee, the Congress Committee approved that the new Executive Committee be appointed as follows:

H.K. Moffatt (President-elect)
 T.J. Pedley (Secretary-elect)
 H. Aref
 W. Gutkowski (co-opted, President of 21st ICTAM)
 R. Moreau
 N. Olhoff
 B.A. Schrefler

Prof. Olhoff had desired to retire as a Secretary of the CC and XC after eight years of service, and Prof. Pedley was appointed as his successor. The new appointments take effect from 1st November 2000.

On behalf of IUTAM, Prof. Olhoff expressed warm thanks to Profs. S. Bodner and W. Schiehlen for their devoted service to the Executive Committee.

Item 12: Date and venue of the next meeting of the Congress Committee
By invitation by Professor H.K. Moffatt, President-elect of IUTAM,

the next meeting of the Congress Committee
will be held in Cambridge, UK, 16-18 August, 2002

in conjunction with meetings of the General Assembly and the Bureau of IUTAM.

APPENDIX 1: Members of the Congress Committee of IUTAM

- * Prof. H. Aref (USA) 2004
- Prof. M.P. Bendsøe (Denmark) 2004, Rep. ISSMO
- Prof. D. Bogy (USA) 2004
- Prof. D. van Campen (Netherlands) 2004
- Prof. D. Durban (Israel) 2004
- Prof. J. Engelbrecht (Estonia) 2004
- Prof. N.A. Fleck (UK) 2002
- Prof. L.B. Freund (USA) 2004
- Prof. G.M.L. Gladwell (Canada) 2004
- Prof. P. Gudmundson (Sweden) 2004
- Prof. M.A. Hayes (Ireland) 2002, Rep. ISIMM
- Prof. T. Inoue (Japan) 2002, Rep. ICM
- Prof. J. Jimenez (Spain) 2002
- Prof. A. Kluwick (Austria) 2002
- Prof. T. Kambe (Japan) 2004
- Prof. B.L. Karihaloo (UK) 2004, Rep. ICF
- Prof. A.N. Kounadis (Greece) 2002
- Prof. V.V. Kozlov (Russia) 2004
- Prof. Y.H. Ku (USA)
- Prof. G. Leal (USA) 2004, Rep. ICR
- Prof. F. Lund (Chile) 2004
- Prof. P. Lugner (Austria) 2004, Rep. IAVS
- * Prof. H.K. Moffatt (UK) 2004, Chairman
- Prof. P. Monkewitz (Switzerland) 2004
- * Prof. R. Moreau (France) 2004, Rep. of HYDROMAG
- Prof. B.C. Nakra (India) 2002
- Prof. J.T. Oden (USA) 2002, Rep. IACM
- * Prof. N. Olhoff (Denmark) 2004
- * Prof. T.J. Pedley (UK) 2004, Secretary
- * Prof. B.A. Schrefler (Italy) 2002
- Prof. K. Sobczyk (Poland) 2002
- Prof. P. Suquet (France) 2004
- Prof. R.I. Tanner (Australia) 2002

Prof. E. Watanabe (Japan) 2002
 Prof. Fenggan Zhuang (China) 2004

* Members of Executive Committee

Year, where stated, indicates end of term (applies to members elected after 1972).
 List as of 1st November 2000.

2000 Treasurer's Report

US Dollars

Balance, 31 December 1999	272,491.62
Net revenues minus expenses for 2000	2,802.46
Balance, 31 December 2000	275,294.08
Revenues collected during 2000:	
Subscription dues	90,268.00
Interest income	6,101.67
ICSU allocations	7,000.00
Repayment Symposia	0.00
Total	103,369.67
Expenses paid during 2000:	
Symposia	40,000.00
IUTAM summer course	5,000.00
Other meetings	1,000.00
Travel, Bureau	9,910.72
Travel, Congress Committee Executive Committee	4,721.45
Travel, Other	16,579.66
Bureau Prizes, ICTAM2000	1,500.00
Contribution to ICSU	0.00
Administration	3,749.54
Auditor's fee	1,958.06
Printing costs	6,089.23
Bank fees	608.24
Total	91,116.90
Revenues minus expenses for 2000	12,252.77
Gain (loss) from exchange of currency	(9,450.31)
Net revenues minus expenses for 2000	2,802.46

Statement of IUTAM Bank Accounts

1 January through 31 December 2000

**Checking
Accounts**

Bank	Balance 31-Dec-99	Withdrawals 2000	Deposits 2000	Balance 31-Dec-00	Currency
Citizens Bank Providence 1009-367-2	61,412.16	(57,689.31)	69,642.15	73,365.00	US\$
ABN- AMRO Bank Eindhoven 41.41.42.551	28,042.76	(34,340.54)	28,250.34	21,952.56	US\$
ABN- AMRO Bank Eindhoven 41.41.28.311	2,421.81	(455.38)	12.70	1,979.13	NLG
Bank of Ireland Belfield UCD Dublin 12526624	2,139.83	(7,637.25)	8,988.00	3,490.58	IRL

**Savings
Accounts**

Bank	Balance 31-Dec-99	Withdrawals 2000	Deposits 2000	Balance 31-Dec-00	Currency
Busey Bank Urbana	21,417.24	0.00	0.00	21,417.24	US\$
Citizens Bank Providence	92,839.06	0.00	3,615.33	96,454.39	US\$
ABN-	142,199.29	0.00	4,418.50	146,617.79	NLG

AMRO Bank
Eindhoven

IUTAM Bank Account Information

Treasurer:

Professor L. B. Freund, Division of Engineering, Brown University, Providence, RI
02912-9104, USA

Assistant Treasurers:

Professor D. H. van Campen, Faculty of Mechanical Engineering, Eindhoven University
of Technology,

Postbus 513, NL-5600 MB Eindhoven, The Netherlands

Professor Bruno A. Boley, Department of Civil Engineering & Engineering Mechanics,
Columbia

University, New York, NY 10027

Bank Accounts:

ABN-AMRO Bank, Postbus 515, 5600 AM Eindhoven, The Netherlands, Account
41.41.28.311 (NLG), 41.41.42.551 (USD)

Citizens Bank, One Citizens Drive, Riverside, RI 02915-3000, Account 1009-367-2
USD)

Bank of Ireland, University Branch Montrose, Dublin, Ireland, Account 12526624
(IRL)

Subscription Dues Paid in Membership Units

1 January through 31 December 2000

Adhering Organization	1994	1995	1996	1997	1998	1999	2000
Argentina	1	1	1	1	1	1	1
Australia	1	1	1	3	3	3	3
Austria	1	1	1	1	1	1	1
Belgium	5	5	5	5	5	5	5
Brazil	1	1	1	1	1	1	1
Bulgaria	1	1	1	1	1	1	1

REPORT 2000

Canada	8	8	8	8	8	8	8
Chile				--	--	--	--
China / Beijing	8	8	8	8	8	8	--
China / Hong Kong				1	1	1	1
China / Taipei	3	3	3	3	3	3	3
Croatia		1	1	1	1	1	--
Czech Republic	1	1	1	1	1	1	1
Denmark	3	3	3	3	3	3	--
Egypt	1	1	1	1	1	1	1
Estonia	1	1	1	1	1	1	1
Finland	3	3	3	3	3	3	3
France	8	8	8	8	8	8	8
Georgia							
Germany	8	8	8	8	8	8	8
Greece	1	1	1	1	1	--	--
Hungary	1	1	1	1	1	1	--
India	5	5	5	5	5	5	5
Ireland	1	1	1	1	1	1	1
Israel	3	3	3	3	3	3	3
Italy	8	8	8	8	8	8	8
Japan	8	8	8	8	8	8	8
Kazakhstan				--	--	--	--
Korea	3	3	3	--	--	--	--
Latvia	1	1	1	1	1	1	1

Morocco						--	--
Netherlands	5	5	5	5	5	5	5
New Zealand	1	1	1	1	1	1	1
Norway	1	1	1	1	1	--	--
Poland	3	3	3	3	3	3	3
Portugal	1	1	1	1	1	1	1
Romania	1	1	1	1	1	1	1
Russia	8	8	8	8	8	8	8
Saudi Arabia	1	1	1	1	1	1	1
Slovakia	1	1	1	1	1	1	1
Slovenia		1	1	1	1	1	1
South Africa		1	1	1	1	1	1
Spain	1	1	1	1	1	--	1
Sweden	5	5	5	5	5	5	5
Switzerland	3	3	3	3	3	3	3
Turkey	1	1	1	1	--	--	--
Ukraine				--	--	--	
United Kingdom	8	8	8	8	8	8	8
United States	12	12	12	12	12	12	12
Vietnam	1	1	1	1	1	--	1
Yugoslavia	1	1	1	1	1	--	--

Note: For any particular year, a dash (--) indicates that dues had not been paid as of 31 December 2000 and a blank space indicates no adhering organization. Dues are expressed in membership units of 1, 3, 5, 8 or 12, corresponding to category of membership from I through V, respectively

Reports on

AFMC (Asian Fluid Mechanics Committee)

Preparations for the Ninth Asian Congress of Fluid Mechanics are in progress. The Congress will be held during 27-31 May 2001 in Isfahan, Iran. Chairman of the Organizing Committee: Prof E Shirani, Department of Mechanical Engineering, Isfahan University of Technology, Isfahan 84154, Iran. Deadlines: Pre-registration form: 1 May 2001, Submission of papers: 1 September 2001, Notice of acceptance: 1 December 2001, Advance registration and accommodation reservation: 1 March 2002. More information available at www.iut.ac.ir/conf.htm or www.ecerc.org/acfm9.

R. Narasimha

CACOFD (Caribbean Congress of Fluid Dynamics)

The Caribbean Congress of Fluid Dynamics is preparing for its fifth Latin American and Caribbean Congress of Fluid Mechanics which takes place at Universidad Simon Bolivar, Caracas, Venezuela, from May 14-17, 2001. Among the invited speakers are Prof. C. Amon (Carnegie Mellon University, U.S.A.), H. Brenner (M.I.T., U.S.A.), D. Liepsch (Fachhochschule, Munchen, Germany) and B.Mena (UNAM, Mexico).

The Organizing Committee is headed by the President of CACOFD, Prof. F. Malpica, who is also the Rector of Universidad Simon Bolivar. During this Conference, a CACOFD Business Meeting will be held to plan activities for the next three years.

CACOFD's programme to build expertise in Environmental Fluid Mechanics in the Caribbean suffered a major set back when its application for a IUTAM grant was turned down. Funding will now have to be sought from other sources.

H. Ramkissoon

CISM (International Centre for Mechanical Sciences)

1. Courses and Seminars

The regular programme of courses and seminars, planned for the Centre for the year 2000 by the Scientific Council, took place in two Scientific Sessions, the Oswatitsch Session (June-July 2000) and the Panagiotopoulos Session (September-October 2000). The topics, always at an advanced level, included different fields of mechanics and related computer sciences, both at a basic and applied level. Two courses were sponsored by the EC, three by UNESCO and a few by CNR (National Research Council of Italy). One course was organized with IUTAM.

The Oswatitsch Session

- Emerging Methods for Treating Multidisciplinary Optimization Problems
- Topics in Finite Elasticity
- Smart Structures: Theory and Applications
- Advanced Numerical Applications and Plasticity in Geomechanics
- Interfacial Phenomena, the Marangoni Effect, Instability, Waves and Convective Flows
- Drop-Surface Interactions

The Panagiotopoulos Session

- Crashworthiness: Energy Management and Occupant Protection
- Configurational Mechanics of Materials
- Mechanics of Random and Multiscale Microstructures
- Inelastic Behaviour of Structures under Variable Repeated Loads

11th IUTAM Intl. Summer School on Friction and Instabilities

(see separate report)

Advanced Professional Training (APT)

- Refurbishment of Buildings and Bridges

2. Various International Events

Besides the above courses, the following other international meetings were organized or hosted by CISM in 2000

- CEPET Workshop (Central European Program in Economic Theory), May 31 - June 2
- Ro.Man.Sy. 2000, 13th Symposium on Theory and Practice of Robots and Manipulators, Zakopane, Poland, July 3-6
- ISSEK 2000 Workshop (International School for the Synthesis of Expert Knowledge "Fusion and Perception", October 5 - 7

3. Editorial Activities

The lectures of several courses held at CISM are published in book form and distributed by Springer Verlag Vienna-New York.

The following books were published in 2000

- A. Wirgin "Wavefield Inversion"
- R. Peyret - E. Krause "Advanced Turbulent Flow Computations"
- K.H. Laermann "Modern Optical Methods in Experimental Solid Mechanics"
- G. Della Riccia "Computational Intelligence on Data Mining"
- D. Krajcinovic - J. Van Mier "Damage and Fracture of Disordered Materials"
- H. Petryk "Material Instabilities in Elastic and Plastic Materials"
- F. Mazzolani - V. Gioncu "Seismic Resistant Structures"
- F. Pfeiffer - C. Glocker "Multibody Dynamics with Unilateral Contacts"
- M. Ivanyi - C. Baniotopoulos "Semirigidity in Connections of Structures Steelworks"
- J. Kalker - B. Jacobson "Rolling Contact Phenomena"

The international Journal for rapid publication "Mechanics Research Communications" (bimonthly) created by CISM and Pergamon Press, Oxford-New York in 1973, published

in 2000 its twentyseventh volume n. 6. It contains short communications on research related to a wide domain of both theoretical and applied mechanics.

4. Scholarships

A number of scholarships, including free lodging and board or exemption from registration fee, was offered during the courses to participants who were not supported by their home institutions, priority being given to young researchers coming from countries that contribute to CISM's operating resources.

Travel expenses as well as board and lodging of participants from mediterranean and Central-European countries have been covered by a UNESCO contribution.

5. International Participation

73 lecturers from 17 countries delivered lectures in the Oswatitsch and Panagiotopoulos Sessions and the IUTAM School. The courses were attended by 391 participants coming from 47 countries.

Giovanni Bianchi

COSTED (Committee on Science and Technology in Developing Countries)

Direct interactions between activities of IUTAM and the programmes of COSTED continue to be weak. COSTED has organized meetings on Coastal Land Use/Land Cover Changes, Remote Sensing Applications and on International Mobility of S&T Professionals. All of these are of general interest to scientists in many different disciplines, but a concerted effort of IUTAM is required if its interaction with COSTED has to be stronger.

R. Narasimha

EUROMECH (European Mechanics Society)

EUROMECH - European Mechanics Society is an international non-governmental non-profit scientific organization.

The objective of the Society is to engage in all activities intended to promote in Europe the development of mechanics as a branch of science and engineering.

The society is governed by the Council whose members are being elected according to rules set in Statutes.

EUROMECH MEETINGS

The EUROMECH Council has overall responsibility for EUROMECH Colloquia and EUROMECH Conferences.

EUROMECH Colloquia are informal meetings on specialized research topics.

Participation is restricted to a small number of research workers actively engaged in the

field of each Colloquium. The organization of each Colloquium, including the selection of participants for invitation, is entrusted to a Chairman. Proceedings are not normally published. Those who are interested in taking part in a Colloquium should write to the appropriate Chairman. Number, Title, Chairperson or Co-chairperson.

EUROMECH Conferences are broad in scientific scope. They comprise the EUROMECH Solid Mechanics Conference, the EUROMECH Fluid Mechanics Conference, the EUROMECH Turbulence Conference, the EUROMECH Nonlinear Dynamics Conference and the EUROMECH Mechanics of Materials Conference. They are open to all those interested and are expected to have a number of participants between 150 and 600. The general purpose is to provide opportunities for scientists and engineers to meet and discuss current research. The responsibility for each series of Conferences is delegated to a Standing Conference Committee. The organizational work is carried out by Local Organizing Committees (LOC). Those who are interested in taking part in one of the Conference should write to the Chairman or Secretary of the appropriate LOC.

In 2000 EUROMECH Society organized the 8th European Turbulence Conference in Barcelona, the 4th EUROMECH Solid Mechanics Conference in Metz, the 4th Euromech Fluid Mechanics Conference in Eindhoven and 13 Colloquia.

For more details see www.euromech.cz, where the list of Colloquia and Conferences in the past, as well as in the future is presented,

M. Okhouhlik

HYDROMAG (International Association for Hydromagnetic Phenomena and Applications)

HYDROMAG is an international association of scientists and engineers active in those fields of research which involve the flow of fluids in the presence of a magnetic fields, namely magnetohydrodynamics (MHD), electromagnetic processing of materials (EPM) and dynamics of magnetic fluids (MF). HYDROMAG promotes growth and visibility of the field of hydromagnetics and stimulates exchanges between its members throughout the world via conferences, workshops, summer schools and publications. Detailed information on HYDROMAG can be accessed under:

<http://www.maschinenbau.tu-ilmenau.de/mb/wwwtd/hydromag/home.html>

This WWW-site contains information on membership, forthcoming conferences, the electronic HYDROMAG newsletter and a link to the German Ferrofluid Information Server, maintained by Dr. S. Odenbach (University of Bremen).

During the year 2000 several workshops and scientific meetings have been conducted involving the active participation of HYDROMAG and its members.

The 3rd International Conference on Electromagnetic Processing of Materials was held in Nagoya (Japan) from 3rd to 6th April, 2000 . The Conference was attended by more than 200 participants from all over the world representing a blend of academia and industry and was widely considered a success.

The International PAMIR Conference took place from 18th to 22nd September, 2000 in Giens (France). The participants, mostly from Europe, discussed a wide range of MHD-topics ranging from fundamental topics like the origin of Earth's magnetic field to industrial applications like electromagnetic flow control in metallurgy and electrochemistry.

A group of European Scientists successfully established a network on MHD in frame of the COST-programme of the European Commission called "COST action P6 Magnetofluidynamics". The programme supports mutual visits of scientists. Detailed information can be obtained from:

http://www.maschinenbau.tu-ilmeneau.de/mb/wwwtd/COST/COST_Page01.html

André Thess

IACM (International Association for Computational Mechanics)

The following IACM supported events took place in 2000:

- FEF'2000 - Finite Elements in Flow Problems, April 30 - May 4, 2000, University of Texas at Austin. Organised by Profs. Graham F. Carey and J. Tinsley Oden.
- IACM - IASS 2000, 4th International Colloquium on Computation of Shell and Spatial Structures, 5 - 7 June 2000, Chania, Crete, Greece. Organised by Prof. M. Papadrakakis.
- COMPLAS 2000 - IV International Conference on Computational Plasticity, Barcelona, September 11 - 14, 2000. Organised by the Spanish Association for Numerical Methods in Engineering within the European Congress on Computational Methods in Engineering and Applied Sciences (ECCOMAS 2000).
- III European Congress on Computational Methods in Applied Sciences in Engineering (ECCOMAS 2000). Barcelona, 11-14 September 2000. The congress chairman was Prof. E. Oñate

Future IACM activities:

V IACM World Congress on Computational Mechanics (WCCM). The V WCCM will take place on 7-12 July 2002 in Vienna. The congress chairmen will be Profs. H. Mang and F.G. Rammerstorfer from Technical University of Vienna.

Details on above events can be obtained from the IACM Secretariat at iacm@cimne.upc.es

Further information on IACM activities can be found in the web page www.cimne.upc.es/iacm

E. Onate

IABEM (International Association for Boundary Element Methods)

IABEM held its full symposium on July 4-7, 2000, at Brescia, Italy. The symposium organization was supervised by Prof. Angelo Carini of Brescia university. There were 68 participants from 17 countries (including host country), and 54 papers were presented. A selection of papers will appear shortly as a special issue of Computational Mechanics guest-edited by A. Carini.

IABEM also participated in setting a series of special sessions on BEMs (about 30 papers) at the ICES 2000 Symposium organized by Prof. S. N. Atluri and held at Los Angeles, USA.

Preparations are under way concerning the next IABEM symposium in 2002.

Marc Bonnet.

IAVSD (International Association for Vehicle System Dynamics)

The main thrust of the Association is to serve the interests of vehicle dynamicists, mainly concerned with rail or road vehicles, in which the interactions between the wheel and the track are essential parts of the problems encountered. Its main activities are biennial Symposia and occasional workshops.

IAVSD made the following contributions to ICTAM, Chicago, August-September 2000: Mini-Symposium on Vehicle Dynamics, with co-chairmen P. Lugner and J. K. Hedrick. Lectures "Software tools: From multibody system analysis to vehicle system dynamics" by W. Kortuem and W. Schiehlen; "Rail dynamics for the 21st century" by J. A. Elkins, R. J. Anderson and B. V. Brickle; "Fundamentals of lateral dynamics of road vehicles" by R. S. Sharp and "A mechatronics approach to advanced vehicle control system design" by M Abe and J. K. Hedrick were given. T. J. Gordon gave a sectional lecture on "Adaptive, non-linear and learning techniques for the control of vehicle ride dynamics". Paper versions of these lectures are in the late stages of publication by Kluwer Academic Publishers.

The 17th Symposium will take place in Lyngby, Copenhagen, Denmark, August 20-24, 2001, hosted by the Technical University of Denmark Centre for Modelling, Non-linear dynamics and Irreversible Thermodynamics, with Chairman, Professor Hans True.

Members of the Scientific Committee are:

R J ANDERSON, Canada	C MacADAM, USA
H. Chollet, France	G MASTINU, Italy
J A ELKINS, USA	M NAGAI, Japan
R D FRÖHLING, South Africa	L PALKOVICS, Hungary

R M GOODALL, UK	W SCHIEHLEN, Germany
J K HEDRICK, USA	R S SHARP, UK
K KNOTHE, Germany	H TRUE, Denmark, CHAIRMAN
W KORTÜM, Germany	M VALASEK, Czech Republic
P LUGNER, Austria	W. M. ZHAI, China

Up to date information can be found at: <http://www.midit.dtu.dk> at line 17th IAVSD Symposium.

R. S. Sharp

ICA (International Commission for Acoustics)

The ICA Board held its annual meeting in Nice, France on 2000 August 31. In particular plans for the 17th International Congress on Acoustics to be held in Rome, Italy and for the 18th Congress to be held in Kyoto, Japan were reviewed.

The next triennial Congress, the 17th, will be held in Rome, 2-7 September, 2001. This Congress promises to gather many of the world's leading acousticians, with technical sessions covering all major topics in acoustics, exhibits by a number of companies, and an impressive array of Plenary Lectures that will discuss recent developments in acoustics research. Information concerning the Congress can be found at the 17th ICA Website (<http://www.ica2001.it>). At the Rome Congress, we will be having the 2nd General Assembly of members of the Commission. Member Societies are asked to send delegates to this General Assembly which will undertake a variety of tasks, including the election of members of the Board of the Commission. Copies of the Nomination Form can be obtained from the ICA web site.

The Board of the Commission has been active on new initiatives that are expected to be of interest to the ICA Member Societies and their individual members. Funds are available to support the travel of Early Career researchers to the 17th Congress, especially those acousticians from developing countries. Details to apply for these grants can be found on the ICA Website under the Young Scientist Conference Attendance Grants.

The ICA has also established a Small Grants Program for the support of Specialty Conferences on Acoustics. These awards, typically on the order of US\$2000, are intended to assist in the organization of small specialized symposia of less than 100 participants. Eligibility is limited to ICA Member Society. A brief description of recent awards are also available on the ICA Website.

The address of the ICA Website is (<http://www.icacommission.org>).

Gilles Daigle

ICF (International Congress on Fracture)

The International Congress on Fracture (ICF) is today the premier body for the promotion of worldwide cooperation among scientists and engineers concerned with the mechanics and mechanisms of fracture, fatigue and the strength of solids. Founded by Professor Takeo Yokobori in 1965, the Congress was formally started in April 1978 with a registered office in Japan.

Among the aims of the Congress are to promote the integration of multidisciplinary studies on fracture and to provide the means whereby the results of such efforts may be publicly communicated. To this end, the Congress, both solely and in cooperation with other bodies, hosts the International Conference on Fracture every four years, and additionally sanctions smaller international meetings on fracture in the interim years. Preparations for the next major ICF conference, the 10th International Conference on Fracture (ICF-10), are progressing well under the chairmanship of Professor Teruo Kishi of the University of Tokyo (e-mail: kishi@hpm.rcast.utokyo.ac.jp), with Profs. K. Ravi-Chandar (University of Houston), R. O. Ritchie (University of California, Berkeley), and A. T. Yokobori, Jr. (Tohoku University) as vice-chairs. The Conference is set for December 3-7, 2001, in the Hilton Hawaiian Village in Honolulu, Hawaii. The ICF-10 Proceedings will be published under the editorship of Profs. Kishi, Yokobori, Taplin, Ravi-Chandar and Ritchie, in similar format to previous conferences (ICF4-10) by Elsevier.

R. O. Ritchie

ICM (International Congress on the Mechanical Behaviour of Materials)

The Eighth International Conference on the Mechanical Behaviour of Materials (under the auspices of the International Congress of Mechanical Behaviour of Materials, ICM) was held in Victoria, Canada from May 16-21, 1999. More than 300 delegates participated in this very successful conference, which was co-organized by the University of Alberta (Edmonton, Canada) and University of Victoria (Victoria, Canada). In the conference, 210 papers were presented by authors from twenty six nations on a variety of traditional and new topics of interest, including fatigue, fracture, novel experimental methods, thin film and surface properties, advanced materials and modeling of mechanical behaviour. The ICM executive meeting was held during the conference, chaired by Vice-President Prof. T. Inoue, in place of the President, Prof. A. Bakker. A new executive committee consisting of 13 members, headed by Prof. Fernand Ellyin (President), was nominated for the next four-year term (1999 to 2003). During the meeting of the Board of Governors, bids were presented from three countries (Korea, Ukraine and Israel) to host the next international conference. Based on a vote from the international delegates, the bid from Haifa, Israel (chaired by Prof. S.R. Bodner) was chosen to host the Ninth International Conference in 2003.

A new website for the ICM has recently been constructed, and can be found at: "acme.mece.ualberta.ca/icm". The purpose of the website is to outline the scope, charter and history of the congress, as well as to provide minutes from the previous meetings and a link to the web-page for the upcoming Ninth International Conference to be held in Haifa, Israel.

F. Ellyin

IIAV (International Institute of Acoustics and Vibration)

The International Institute of Acoustics and Vibration IIAV continues to grow. At present it has over 500 individual members in 54 countries and in addition 32 scientific societies or similar organizations are affiliated to IIAV as cooperating societies. In the third annual election held last year Professor Colin Hansen of the University of Adelaide in Australia was elected as President of IIAV to succeed Dr. Hanno Heller of DLR, Braunschweig, Germany whose term was up. Also a ballot was held in which all members voted on candidates for five new directors. This year in the fourth annual IIAV election a ballot of all IIAV members will be held again for five new directors.

A very successful conference was held at Garmisch Partenkirchen near Munich, Germany from July 4-7, 2001. About 550 delegates attended this, the Seventh International Congress on Sound and Vibration. The technical programme included 440 lectures arranged in 69 technical sessions, many of which had been organized by members of the Scientific Committee. The technical proceedings was available to delegates at the Congress both in CD-ROM and in hard copy format as a set of six volumes totalling 3534 pages in length. There were altogether eight plenary keynote papers (by *Geoffrey Lilley (UK)* University of Southampton, UK, *Leo Beranek (USA)*, *Vladimir V. Bolotin (Russia)*, *Luis Bento Coelho (Portugal)*, *David J. Ewins (UK)*, *Christopher L. Morfey (UK)*, *Goran Pavic (France)*, and *Siegfried Wagner (Germany)*) and 15 specialist keynote lectures presented at the Seventh Congress. In addition, four well-attended tutorial sessions were given on specialized topics on the first day. A dinner gathering of all the session chairs -- some 80 of them -- was held the first evening. During the Congress banquet, Dr. Leo L. Beranek was awarded the third Honorary Fellow membership of the IIAV (the first was awarded to Professor David Crighton at the Fifth Congress in Adelaide, Australia in 1997 and the second was awarded to Dr. Per V. Bruel at the Sixth Congress in Copenhagen in 1999.). In addition, nine IIAV members were elevated to fellow grade in IIAV.

The Eighth International Congress on Sound and Vibration will be held July 2-6, 2001 in Hong Kong at the Polytechnic University of Hong Kong. A total of 662 abstracts from authors from over 50 countries have been received for the Eighth Congress. All of the papers will be published and be available on CD-ROM format for participants at the Congress. In addition the programme which will be available at the Congress in hard

paper form, for all participants, will include all of the abstracts. An Exhibition will also be held at the Eighth Congress.

The date and venue of the Ninth International Congress on Sound and Vibration has already been decided. It will be held in Orlando, Florida, July 8-11, 2002 and will be hosted by the Department of Mechanical Engineering of the University of Central Florida (UCF). It will be sponsored by NASA/Kennedy, IIAV and UCF. Several other societies and organizations are cooperating with its hosting including the American Society of Mechanical Engineering, the Society for Experimental Stress Analysis (SEM) and the American Society of Civil Engineers (ASCE-Aerospace Division.) The Congress will be opened with a welcoming address by Roy Bridges, the Technical Director of NASA-Kennedy and himself a former astronaut.

In addition, the IIAV was one of the sponsoring organizations of the IUTAM International Symposium on Designing for Quietness held at the Indian Institute for Science, Bangalore, India on December 12-14, 2000. Twenty-one invited papers were presented at the Symposium. A photocopy of all of the 21 papers presented was available at the Symposium as a proceedings document. After review, it is planned that all the papers will published in the Kluwer book series "Solid Mechanics and its Applications." Professor Malcolm J. Crocker, Executive Director of IIAV served on the Scientific Committee and attended the Symposium as the representative of IIAV. Dr. Crocker gave a special survey of the "Current State of Progress in Acoustics at the End of the Twentieth Century" at the Symposium Opening Ceremony.

Publication of the International Journal of Acoustics and Vibration IJAV, the refereed quarterly journal of IIAV continues. It is receiving a steadily increasing flow of good papers. It is sent to all IIAV members and to a number of libraries.

Malcolm J. Crocker

ISIMM (International Society for the Interaction of Mechanics and Mathematics)

As result of the elections which have taken place in 1999 the Society has the following officers since the beginning of the year 2000:

President: Prof. I. Müller, Germany, im@thermo08.pi.tu-berlin.de

Vice President: Prof. G. Capriz, Italy, capriz@dm.unipi.it

Secretary/Treasurer: Prof. K. Wilmanski, Germany, wilmansk@wias-berlin.de

Executive Committee:

Prof. N. Bellomo, Italy, bellomo@polito.it

Prof. P.G. Ciarlet, France, pgc@ann.jussieu.fr

Prof. S. Cowin, USA, cowin@banet.net

Prof. J. Engelbrecht, Estonia, je@ioc.ee

Prof. M. Epstein, Canada, epstein@enme.ucalgary.ca
Prof. K. Hutter, Germany, hutter@mechanik.th-darmstadt.de
Prof. R. Knops, UK, R.J.Knops@hw.ac.uk
Prof. J. Kratochvil, Czech Republic, kratochvil@fsv.cvu.cz
Prof. G. A. Maugin, France, gam@ccr.jussieu.fr
Prof. M. Renardy, USA, renardym@math.vt.edu

Due to these changes the webpage of the Society in the Internet has been renewed, and it can be found under the following address:

<http://www.thermodynamik.tu-berlin.de/isimm/index.html>

STAMM 2000. The biannual meeting of the Society, the Symposium on Trends in Applications of Mathematics to Mechanics (STAMM XII) was held in Galway, Ireland, on July 9th-14th, 2000, organised by Prof. J. Flavin and Prof. P. O'Donoghue (National University of Ireland, Galway). Scientific Committee: P. O'Donoghue (Ireland, Chairman), Ph. Boulanger (Belgium), B. Broberg (Sweden), M. Hayes (Ireland), R. Knops (UK), G. Iooss (France), L. Truskinowski (USA). The Proceedings have appeared in the "Data Science Library" published by Elsevier.

The Conference of Continuum Mechanics and Thermodynamics, affiliated to ISIMM, and organised by prof. I. Mueller, and prof. K. Wilmanski (Germany) will be held in Potsdam (Germany), July 30th - August 3rd, 2001. Scientific Committee: G. Capriz (Pisa), C. Cercignani (Milano), K. Hutter (Darmstadt), K. Kirchgaessner (Stuttgart), R. Knops (Edinburgh), J. Rodrigues (Lisboa), T. Ruggeri (Bologna), W. Schneider (Wien), J. Sprekels (Berlin), W. Wendland (Stuttgart), H. Zorski (Warszawa).

The next STAMM XIII will be held near Naples in 2002. Prof. G. Romano and Prof. S. Rionero organize the Symposium.

K. Wilmanski

ICHMT (International Centre for Heat and Mass Transfer)

ICHMT organized two international symposia in 2000 :

- "Heat Transfer in Gas Turbine Systems", August 13-18, 2000, in Golden Dolphin Holiday Village, Çeşme, İzmir, Turkey. The symposium was chaired by Professor Richard J. Goldstein, University of Minnesota, USA. The Proceedings will be published in the Annals of NYAS (New York Academy of Sciences).

- "Multiphase Flow and Transport Phenomena", November 5-10, 2000, in Corinthia Club Hotel, Antalya, Turkey. The symposium was chaired by Professor David Moalem Maron, Holon Institute of Technology, Israel. The Proceedings will be published by Begell House, Inc.

Details of these meetings including abstracts of all presentations can be found on the web page at

<http://ichmt.me.metu.edu.tr/abstracts/Meetings.html>

The organization of several future meetings have continued. These are :

- “Advances in Computational Heat Transfer II”, May 20-25, 2001, in Palm Cove Beach, Queens Land, Australia. Detailed information can be found on the symposium Web site: <http://cht01.mech.unsw.edu.au>.

- “The Third International Symposium on Radiative Transfer”, June 17-22, 2001, in Merit Limra Hotel, Kemer, Antalya, Turkey. Detailed information can be found on the symposium Web site:

<http://ichmt.me.metu.edu.tr/upcoming-meetings/Rad-01/announce.html>.

- “Imaging and Visualization in Transport Phenomena”, October 14-19, 2001, in Adora Golf Resort Hotel, Belek, Antalya, Turkey. Detailed information can be found on the symposium Web site:

<http://ichmt.me.metu.edu.tr/upcoming-meetings/Vim-01/announce.html>.

- “The Second Mediterranean Combustion Symposium”, January 6-11, 2002, in Sharm El-Sheikh, Egypt. The first announcement can be found on the symposium Web site:

<http://ichmt.me.metu.edu.tr/upcoming-meetings/Mcs-02/announce.html>.

- “Industrial Applications of Micro/nanoscale Thermophysical Engineering”, Spring, 2002, in Turkey. Preliminary announcement can be found on the symposium Web site:

<http://ichmt.me.metu.edu.tr/upcoming-meetings/Mect-02/announce.html>

- “Biothermal and Biomass Transport in Engineering and Medicine: Analysis, Experimentation and Design”, Spring, 2002, Jerusalem, Israel.

- “Heat and Mass Transfer in Spray Systems”, June, 2003, in Turkey.

The Executive Committee of ICHMT met twice in 2000; one in London, UK, and the second one in Heidelberg, Germany. The Agendas of these meetings are on the web page at

<http://ichmt.me.metu.edu.tr/agenda>

We are looking forward to another busy year in 2001.

Faruk ARINÇ

ISSMO (International Society of Structural and Multidisciplinary Optimization)

ISSMO co-organized with IUTAM the Pre-Nominated Session devoted to Structural Optimization at the 20th International Congress of Theoretical and Applied Mechanics (ICTAM 2000) held in Chicago 27 August - 2 September 2000. This Pre-Nominated Session was one of the largest of the Congress and comprised presentations of 18 contributed lectures and 16 seminar presentations.

ISSMO co-sponsored the 8th AIAA/USAF/NASA/ISSMO Symposium on Multidisciplinary Analysis and Optimization, held 6-8 Sept. 2000 in Long Beach, California, USA. About 250 full papers were presented and published in the proceedings (CD-ROM).

The Society co-sponsored the Second ASMO UK / ISSMO Conference on Engineering Design Optimization held at the University of Wales Swansea, 10-11 July 2000.

ISSMO co-sponsored the NATO Advanced Research Workshop on Topology Optimization of Structures and Composite Continua, held 8-12 May 2000 in Budapest, Hungary. The proceedings are published by Kluwer Academic Publishers.

A Multidisciplinary Design Optimization Workshop held in Pretoria, South Africa, 8-10 August 2000, was also co-sponsored by ISSMO.

The next ISSMO World Congress to be held in Dalian, China 4-8 June 2001, is being organized. About 250 papers are anticipated.

See <http://www.aero.ufl.edu/~issmo> for more details on ISSMO.

Niels Olhoff

SCOR (SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH)

1. SCOR held its 25th General Meeting at the US National Academy of Sciences in Washington, DC, 10-13 October, 2000 chaired by the President, Professor John Field. Dr Ed Urban has replaced Mrs Elizabeth Gross as Executive Director of SCOR.

2. Active SCOR Working Groups which may be of interest to IUTAM:

WG 108 *Double diffusion*

Members of the group are working on several articles to be published in the journal *Progress in Oceanography*. A final meeting will be held in Miami, Florida, in 2001.

WG 111 *Coupling winds, waves and currents in coastal models*.

This WG will meet in Miami, Florida, in 2001. A book is planned.

WG 114 *Transport and reaction in permeable marine sediments*

This held its first meeting in September 1999. Its next meeting is in January 2001, and it has submitted an article to *EOS*.

3. SCOR continues to be involved in large-scale several international scientific programs, including:

i) Joint Global Ocean Flux Study (JGOFS)

ii) Global Ocean Ecosystems Dynamics (GLOBEC)

iii) Global Ecology and Oceanography of Harmful Algal Blooms (GEOHAB)

Scientific Programmes under development include

i) SCOR/IGBP/WCRP Surface Ocean Lower Atmosphere Study (SOLAS)

ii) SCOR/IGPB Initiative on Future Directions in Ocean Biogeochemistry

4. The 35th SCOR Executive Committee Meeting will take place in Mar del Plata, Argentina on October 29-30, 2001, in connection with the joint assemblies of IAPSO and IABO.

5. Further information can be found in the SCOR Annual Report for 2000 available from Dr Ed Urban, Executive Director, SCOR, Department of Earth and Planetary Sciences, The Johns Hopkins University, Baltimore, MD 21218, USA; e-mail scor@jhu.edu, or in pdf format at <http://www.jhu.edu/~scor>

S.A.Thorpe

Relations with ICSU

In May 2000 the International Council for Science (ICSU) indicated the readiness for an active collaboration with the newly established Inter-Academy Council (IAC). The Inter-Academy Council is an initiative by a number of major national academies of science to establish a new and additional mechanism to provide scientific advice to international organizations and decision-makers. Its development has been closely linked to the Inter Academy Panel on International Issues (IAP), an informal mechanism that brings together over 70 national academies.

ICSU accepted an invitation, in collaboration with the IUCN - The World Conservation Union, to present a paper on energy and transport on behalf of the world scientific community to the ninth session of the United Nations Commission on Sustainable Development (CSD-9), to be held in New York in April 2001.

ICSU, and in particular ICSU's Committee on Disaster Reduction (CDR), consulted various ICSU family members including IUTAM, to seek their advice on a topic related to disaster reduction.

ICSU is one of the partners of an international forum created in 1998 called "IGOS", or Integrated Global Observing Strategy. IGOS has been discussing the possibility of an international collaborative effort (called "theme" in IGOS vocabulary) on disaster reduction. The goal of this effort would be to have all parties design together a common strategy for observational needs, ground and satellite, for operational and research activities linked to disaster reduction. The space agencies and observing systems are very keen in improving the utilization of existing and planned Earth observation data, and in getting input on future new observations.

A triple issue of the ICSU newsletter Science International was published in December 2000. The Executive Director of ICSU, Larry R. Kohler, presented ICSU's new vision for the future summarizing his experiences with the ICSU family, its many programmes and committees achieved during his first year with ICSU. The new vision is to strengthen

ICSU's links to its Scientific Unions and National Scientific Members instead of supporting, mainly interdisciplinary committees and programmes.

Werner Schiehlen

COSPAR (Committee on Space Research)

The main COSPAR event – the biannual Scientific Assembly – was held 16-23 July 2000 in Warsaw, Poland and with more than 2000 presented papers should be considered as the most successful. The COSPAR Journal “Advances in Space Research” has published papers presented at the Assembly.

In 2000 COSPAR continued to publish its quarterly Information Bulletin. Four issues appeared containing scientific mission news, the important news from space organizations as well as the list of satellite and space probe launches.

Three COSPAR Colloquia took place in 2000 and three new are planned for 2001: “Acceleration and Heating in the Magnetosphere” (6-10 February in Warsaw, Poland), “Space Debris” (19-21 March in Darmstadt, Germany) and “Solar-Terrestrial Magnetic Activity and the Space Environment” (10-12 September in Beijing, China).

The attention of COSPAR is increasingly focused on the World Space Congress II (October 2002 in Houston, USA), organized jointly by COSPAR, IAF, IAA and IISL.

G. Chernyi

Agreement by and between IUTAM and Kluwer Academic Publishers B.V.

(hereinafter referred to as the "Publisher")

WHEREAS IUTAM and the Publisher agree that, as of January 1, 1999, Kluwer Academic Publishers is the official designated publisher of the proceedings of IUTAM Symposia (hereinafter referred to as "Symposia". The organizer or organizers of an IUTAM Symposium, being the chairmen of the Scientific Committee of the Symposium, are hereinafter referred to as the "Organizers");

WHEREAS IUTAM and the Publisher agree that each IUTAM proceedings volume published by the Publisher (hereinafter referred to as "Volume"), providing it is appropriate vis-a-vis subject matter, will be published in the "Solid Mechanics and Its Applications" book series, or the "Fluid Mechanics and Its Applications" book series (hereinafter referred to as the "Series");

WHEREBY, in consideration of the mutual covenants and obligations herein contained, the parties hereto have agreed and do agree as follows:

1. Publication

1. Kluwer Academic Publishers shall be the preferred publisher of the proceedings of all IUTAM Symposia. Each proceedings accepted for publication shall appear as a Volume in the Series. In those cases where it is not appropriate, the Volume will be published out-of-series in the same style and format. Each Volume will appear in a hard bound version.

2. IUTAM will inform the Organizers of IUTAM Symposia of the possibility of publishing a proceedings with the Publisher, and encourage them to contact the Publisher. Further contact between the Organizers and the Publisher will be bilateral. In addition, IUTAM will notify the Publisher sufficiently ahead of time which Symposia are to be organized and shall give the Publisher the names and addresses of the Organizers.

3. The Organizers of each individual Symposium, in accord with the IUTAM Scientific Committee, will remain free to propose to publish the proceedings in a suitable journal. In such case, the Organizers and the Publisher shall first jointly make an effort to investigate the availability of a suitable journal of Kluwer Academic Publications.

4. If the Organizers decide to publish a proceedings with the Publisher, as recommended by IUTAM, a separate contract will be concluded between the Organizers and the Publisher in which all details regarding publication will be settled. The terms and conditions relating to the publication of a given Volume will be a matter of negotiation between the Organizers and the Publisher, where the basic conditions are based on this present Agreement.

5. The Organizers act as the Editors of the Volume.

6. Typescripts for Volumes in the Series shall yield maximally about 450 printed pages. Exemption from this restriction can be agreed on by the Organizers and the Publisher. Further, the typescripts will not contain colour pictures or colour photographs, unless the Organizers and the Publisher agree otherwise.

7. The papers submitted for publication will be preferably in LaTeX format using the Kluwer style file. The style file will be made available by the Publisher, and the Publisher will assist in any questions regarding its use. The papers will be submitted in camera-ready, laser printed, form (with the original figures pasted in the typescript) according to the guidelines given by the Publisher.

8. The proceedings of IUTAM Symposia will be published as Volumes in the Series, having a uniform design and recognisable cover design, including the IUTAM logo (see article 1.2). Proceedings that will be or have been published with other publishers do not form part of the Series.

9. Both the Publisher and the Organizers will do their very best in bringing the Volume out no later than one year after the Symposium has taken place. This requires that the Volume Editors who are responsible of assembling the final typescript should deliver it on time, in consultation with the Publisher.

10. IUTAM grants the Publisher the non-exclusive rights of the use of the IUTAM logo.

11. IUTAM grants the Publisher the use of the brand name "IUTAM Symposium on". This brand name is solely reserved for proceedings Volumes based on

the Symposia which have been decided upon by the IUTAM General Assembly and entrusted to the Scientific Committee of the Symposium.

12. The brand name "IUTAM Symposium on" will be an integral part of the title page and the front and back cover of each Volume, and will feature in relevant promotional material.

13. The right to publish the IUTAM Symposium proceedings is not transferable by Kluwer Academic Publishers to any other publisher.

14. The Volumes will be published entirely for the account and risk of the Publisher, who shall be the proprietor of the goodwill and copyrights to each individual Volume.

15. In consideration of the Publisher's obligations hereinafter mentioned, IUTAM grants to the Publisher all of its rights, title, and interest in and to the publication rights to the Volumes in any language throughout the world, including but not limited to the following: the exclusive right to print, publish and sell the Volumes in whole or in part, in book form and in any other form including, without limitation, mechanical, electronic and visual reproduction, electronic storage and retrieval systems, and all other forms of electronic publication not known or hereinafter invented. The Publisher also shall have the the exclusive authorization to license the right to translate, print, publish, or sell any no-English language edition of the Volumes, all during the unrestricted period of copyright.

16. IUTAM hereby agrees that the Publisher shall be the copyright holder of each Volume in the Series, and the Publisher shall be responsible for affixing the proper notice of copyright in each copy of each Volume.

2. Responsibilities

1. The Organizers, will in their role of the Editors of the Volume be responsible for ensuring that each Volume satisfies the standards of high scientific quality. This requires that a reviewing procedure should be carried out of each submission to the Volume. This reviewing procedure will in general be performed by the Scientific Committee of each Symposium.

2. The Publisher will provide either directly, either through the Volume Editors, guidelines and instructions to contributing authors so as to ensure that each contribution appearing in the Volume is prepared to a consistent style and format. The Editors of each Volume shall endeavour that the typescripts are prepared in accordance with the Publisher's instructions.

3. All decisions regarding publication, promotion, prices and the sale of Volumes in the Series shall be made by the Publisher. However, at the Publisher's request, IUTAM or the Volume Editors will advise the Publisher on matters pertaining to promotion and advertisement. IUTAM will allow the Publisher the right to use its name in connection with such advertising and promotion of the Series and Volumes in the Series.

4. The Publisher will be responsible for ensuring that the Volumes are produced to a high quality in a consistent style and format.

5. IUTAM and Volume Editors warrant to ensure to the best of their ability that no material in the Series contains anything that is obscene, objectionable, indecent, or of libellous or scandalous character.

3. Payments/Complimentary Copies

1. Royalties shall not be paid.

2. In lieu of royalties, the Organizers will get a minimum of 2 copies of each Volume free of charge.

3. The Publisher will provide the IUTAM Bureau with 9 free copies of each Volume.

4. Participants to the Symposium will be given the opportunity to order the Volume at a special prepublication price. The special Volume price will be included in the Symposium registration fee, so that each registered Participant will automatically receive a copy of the Volume upon publication. The special price includes tax (if applicable) and postage. The special price will depend on the number of participants and the size of the Volume and will be subject to negotiation between the Publisher and the Organizers of the Symposium concerned. In any event, if the page limit mentioned under 1.6 is adhered to, the special price to participants will not exceed Dfl 140 (one hundred & forty Dutch guilders, currently approximately US\$93). Should inflation or costs increase appreciably this maximum will be subject to appraisal.

5. It will be the sole responsibility of the Organizers of a given Symposium to forward the appropriate, one-time payment to the Publisher. The Organizers will also supply the Publisher with adhesive labels with the names and addresses of the relevant participants.

4. Special Conditions

1. Should Kluwer decide to send a representative to a given Symposium, the Organizers will agree to provide display space free of charge for the display of relevant publications and, possibly, the dissemination of relevant promotion material to participants in the conference portfolios.

2. Kluwer will provide the Organizers with a subsidy of Dfl 1000 (one thousand Dutch guilders) towards the costs of organizing the Symposium. This subsidy will be paid upon receipt of the contracts signed by the Organizers.

5. Termination

The Agreement between IUTAM and Kluwer Academic Publishers will remain in force for an initial period of 3 (three) years, starting January 1, 1999. The Agreement will be renewed for additional periods of 3 (three) years subject to confirmation of extension by both parties 12 months before the end of the initial 3-year period or subsequent 3-year periods. Either party may terminate the Agreement with or without cause upon 12 months written notice to the other.

6. Arbitration

Any disputes that may arise in connection with this present Agreement or the breach thereof shall be settled before a competent court of law at the site of the IUTAM Secretary General.

Statutes

Statuts de l'Union Internationale de Mécanique Théorique et Appliquée

ART. I

«L'Union Internationale de Mécanique Théorique et Appliquée» ci-après dénommée «l'Union» est une organisation scientifique à la fois internationale et non-gouvernementale.

ART. II

Les Principaux objectifs de l'Union sont

- a) de constituer un lien entre personnes et organisations engagées dans le travail scientifique (théorique ou expérimental) concernant la mécanique ou les sciences associées;
- b) d'organiser les congrès internationaux de mécanique théorique et appliquée par l'intermédiaire de son Comité permanent des Congrès (cf. Art. XII ci-après), et d'organiser d'autres réunions internationales sur des sujets relevant de la mécanique théorique et appliquée;
- c) de s'engager en d'autres activités visant à promouvoir le développement de la mécanique, aussi bien théorique qu'appliquée, en tant que branche de la science.

ART. III

L'autorité suprême de l'Union est son Assemblée Générale.

Cette Assemblée détient le pouvoir de décider sur toute question affectant l'Union, notamment sur toute modification de ses Statuts. Sur des questions spécifiées, elle peut déléguer tout ou partie de ses pouvoirs à un ou à des organismes appropriés.

La composition de l'Assemblée Générale est régie par l'article VI ci-après. Les réunions de l'Assemblée Générale doivent se tenir aux dates fixées par le Bureau de l'Union (cf. Art. XI ci-après) ou sur la demande de 10 Membres au moins de cette Assemblée.

ART. IV

Dans toutes ses décisions, l'Assemblée Générale doit être guidée par la tradition de libre coopération scientifique internationale développée par les Congrès Internationaux de Mécanique Théorique et Appliquée. En poursuivant ses objectifs, l'Union respectera le principe général de non-discrimination et reconnaîtra le droit pour tout homme de science dans le monde d'adhérer ou de s'associer à une activité scientifique internationale sans rencontrer d'opposition pour motif de race, de religion, de philosophie politique, d'origine ethnique, de citoyenneté, de langage ou de sexe.

ART. V

Dans les votes de l'Assemblée Générale, chaque membre ne dispose que d'une voix.

Pour une modification des Statuts, la majorité requise est de deux tiers des votes exprimés.

Pour toute autre décision la majorité simple des votes exprimés est requise. Tout membre se trouvant dans l'impossibilité d'être présent à une réunion peut désigner, à l'avance et par lettre adressée au Secrétaire Général, un autre membre qu'il charge de voter en son nom.

Dans l'intervalle entre réunions de l'Assemblée Générale, un vote peut être émis par correspondance sur proposition formulée par le Bureau (cf. Art. XI ci-après). En pareil cas, le résultat du vote n'est valablement obtenu que si le nombre des participants effectifs n'est pas inférieur aux deux tiers du nombre total des membres de l'Assemblée Générale.

ART. VI*

L'Assemblée Générale se compose:

- a) des représentants des «organisations adhérentes» (cf. art. VIII);
- b) des membres du Bureau (cf. art. XI);
- c) des membres par l'Assemblée Générale de l'Union cooptés;
- d) s'il y a lieu, et sur décision de l'Assemblée Générale, des représentants de comités ou groupes d'hommes de science.

La durée de fonction de tout membre élu doit être précisée, lors de son élection, par l'Assemblée Générale. La durée de fonction des membres du Bureau doit coïncider avec celle de leur fonction au Bureau.

*) Adoptés par l'Assemblée Générale de l'Union le 2 September 1990 à Vienne (l'Autriche)

ART. VII

L'Assemblée Générale doit tendre à une représentation adéquate de tout groupe d'hommes de science poursuivant des recherches en mécanique théorique ou appliquée et non représentés par une organisation adhérente.

ART. VIII

Les organisations d'hommes de science en mécanique théorique ou appliquée (ou les unions de telles organisations) qui représentent effectivement une activité scientifique indépendante dans un pays ou dans un territoire bien défini peuvent être admises dans l'Union par l'Assemblée Générale comme «organisations adhérentes» pourvu que leur dénomination exclut tout malentendu quant à la qualification du pays ou du territoire en cause.

En principe, une seule organisation pourra être admise pour chaque pays ou chaque territoire.

ART. IX

Chaque «organisation adhérente» dispose d'un certain nombre de représentants dans l'Assemblée Générale et doit acquitter une cotisation annuelle à l'Union (cf. Art. XIV ci-après).

ART. X

Des organisations internationales dont les domaines principaux d'activité sont en étroite relation avec ceux de l'Union peuvent être admises par l'Assemblée Générale en qualité «d'organisations affiliées» à l'Union.

Chaque organisation affiliée a la faculté de désigner un observateur qui est invité à participer, sans droit de vote, à l'Assemblée Générale de l'Union. Le Bureau de l'Union (Article XI) a réciproquement la faculté de désigner un observateur, sans droit de vote, au Conseil Scientifique ou à l'organe équivalent de l'organisation affiliée.

L'organisation affiliée et l'Union sont tenues de s'informer mutuellement de toutes leurs activités importantes et des mesures affectant leur fonctionnement. En préparant les rencontres scientifiques internationales qu'elles organisent, l'Union et chaque organisation affiliée sont tenues de prendre soigneusement en considération toutes les décisions déjà prises par l'Union et les organisations affiliées de manière à assurer la bonne coordination de toutes ces activités scientifiques.

Les organisations affiliées n'ont à payer aucune cotisation annuelle à l'Union.

ART. XI**

Pour exécuter les décisions de l'Assemblée Générale et pour assurer entre ses sessions le travail de l'Union, l'Assemblée Générale élit les membres d'un Bureau pour une durée de quatre ans au plus. Le Bureau est composé d'un Comité Directeur (un Président, le précédent Président qui remplit la fonction de Vice-Président, un Secrétaire Général et un Trésorier) et de quatre autres personnes qui ont été membres de l'Assemblée Générale à un moment de la période précédant de quatre ans le moment de l'élection du Bureau.

Les membres, qui ne sont pas au Comité Directeur, ne peuvent être recevoir plus de deux mandats consécutif. Les membres du Bureau nouvellement élus entrent en fonction au 1er novembre qui suit l'Assemblée Générale qui a procédé à leur élection.

Le Bureau doit se réunir au moins une fois par an. Tout membre du Bureau empêché de prendre part à une réunion de celui-ci peut désigner par lettre adressée au Secrétaire Général un autre membre de l'Assemblée Générale pour le remplacer à cette session.

Le Secrétaire Général centralise toutes les questions concernant le fonctionnement de l'Union y compris ses relations avec les organisations adhérentes, affiliées ou autres.

Le domicile légal de l'Union se situe au domicile du Secrétaire Général. Le Bureau a le droit de désigner un trésorier-assistant en tout pays où l'Union est titulaire d'un compte bancaire. Les trésoriers-assistants peuvent être désignés en dehors des membres du Bureau mais parmi les membres de l'Assemblée Générale.

Le Bureau doit dresser un budget prévisionnel pour l'année à venir, administrer les finances de l'Union et soumettre à l'Assemblée Générale un rapport financier annuel. Le Vice-Président remplit les fonctions du Président pendant toute période où celui-ci se trouve empêché de les exercer.

Entre les réunions de l'Assemblée Générale, il incombe au Bureau de désigner un remplaçant temporaire pour remplir les fonctions du Vice-Président, du Secrétaire Général ou du Trésorier si cela s'avère nécessaire.

** Adoptés par l'Assemblée Générale de l'Union le 2 Septembre 1990 à Vienne (l'Autriche).

ART. XII

L'Assemblée Générale désigne un Comité permanent des Congrès chargé de l'organisation à intervalles réguliers des Congrès Internationaux de Mécanique Théorique et Appliquée.

- a) Le Président de l'Union préside aussi ce Comité des Congrès.
- b) Les Membres de ce Comité sont élus par l'Assemblée Générale; ce sont des hommes de science actifs dans le domaine de la mécanique théorique ou appliquée, n'appartenant pas nécessairement à l'Assemblée Générale.
- c) Le Comité des Congrès élit ou réélit, pour une durée qu'il juge convenable, son Secrétaire Général.
- d) Les règles du fonctionnement du Comité des Congrès sont soumises à l'approbation de l'Assemblée Générale.

ART. XIII

Les ressources financières de l'Union sont constituées par:

- a) les cotisations annuelles des «organisations adhérentes»;
- b) les dons et subventions que l'Union peut recevoir.

L'Union doit tenir une liste de ses bienfaiteurs où doivent être mentionnés pour chaque année les noms des personnes ou institutions qui ont fait bénéficier l'Union de donations, legs ou subventions.

ART. XIV

Le nombre des représentants d'une «organisation adhérente» et le montant de la cotisation annuelle qu'elle doit acquitter sont déterminés, selon le tableau suivant, par la catégorie à laquelle désire appartenir l'organisation, après accord de l'Assemblée Générale.

Catégorie	Nombre de représentants	Nombre d'unités de la cotisation annuelle
I	1	1
II	2	3
III	3	5
IV	4	8
V	5	12

Le montant de l'unité de cotisation annuelle est fixé par l'Assemblée Générale, au moins une année avant celle à laquelle cette cotisation devient exigible.

Règles de fonctionnement du Comité des Congrès de l'Union

1. Le Comité des Congrès se réunit au moins une fois lors de chaque Congrès.
2. Le Comité des Congrès peut instituer un Comité Exécutif chargé de prendre en son nom toutes les décisions nécessaires pendant la période qui s'écoule entre deux Congrès successifs, et de lui en faire rapport à sa prochaine réunion. Le Comité Exécutif comprend le président et le secrétaire du Comité des Congrès et un ou plusieurs membres désignés par le comité des Congrès.
3. L'organisation effective d'un Congrès est confiée à un Comité local d'Organisation, élu par le pays ou l'organisation qui invite, et ce Comité est également responsable de la publication des Comptes rendus du Congrès. Le Comité d'Organisation fera son rapport au Comité des Congrès soit au cours du Congrès qu'il organise, soit avant, s'il le juge préférable.
4. Le Comité d'Organisation devra obtenir l'approbation du Comité des Congrès (normalement par l'intermédiaire du Comité Exécutif) pour toutes les questions relevant de la politique générale du Comité des Congrès, en particulier pour celles qui concernent:
 - 4.1 le but du Congrès;
 - 4.2 la sélection des communications pour le Congrès;
 - 4.3 le choix des conférences générales pour le Congrès;
 - 4.4 la désignation des présidents de sessions du Congrès;
 - 4.5 les principes généraux régissant les arrangements financiers du Congrès.
5. Le comité d'Organisation percevra, de tous les membres du Congrès, une contribution (dont le montant sera proposé par le Comité du Congrès et approuvé par le Bureau) afin de couvrir les dépenses administratives du Comité du Congrès. Ces contributions seront reversées à l'IUTAM immédiatement après le Congrès.

Procédés pour l'élection du Bureau de l'IUTAM

1. Lors de l'Assemblée générale (GA) précédant celle au cours de laquelle le nouveau Bureau doit être élu, un Comité électoral (EC) doit être élu comprenant le Président de IUTAM (Qui assure la présidence de ce Comité) et deux à quatre membres de l'Assemblée GA, non membres du Bureau en exercice.
2. A la suite de cette élection, le Comité EC doit inviter les membres de la GA à faire connaître à son Président, dans des délais fixés, leurs suggestions de candidatures pour le Bureau, c'est-à-dire pour les charges de Président (P) de Secrétaire général (S),

de Trésorier (T) et pour quatre autres postes. Toutes ces suggestions doivent être traitées confidentiellement par le Comité BC.

3. Prenant en compte toutes les suggestions reçues, le Comité BC doit soumettre au Secrétaire général les noms proposés comme candidats au Bureau: un seul nom pour les charges P,S,T et un ou plusieurs noms pour chacun des quatre autres postes (W,X,Y,Z). Le Comité EC doit s'assurer que tous les candidats ainsi proposés sont prêts à accepter leur élection. Toutes ces propositions sont portées par le Secrétaire général à la connaissance des membres de l'Assemblée GA avant la première session de l'Assemblée générale au cours de laquelle le nouveau Bureau doit être élu.

4. Lors de cette première session d'autres propositions de candidatures peuvent être proposées pour chacun des postes,P,S,T,W,X,Y,Z. Aucun candidat ne peut être proposé pour plus d'un seul poste.

5. Avant la seconde session de l'Assemblée GA au cours de laquelle le nouveau Bureau doit être élu, chaque proposition envisagée au point 4 ci dessus pour pouvoir être acceptée doit recevoir l'appui d'au moins dix membres de l'Assemblée GA ayant le droit de vote au moyen d'une déclaration écrite et signée et faire l'objet d'un engagement écrit de la personne proposée indiquant qu'elle est prête à accepter son élection. Toute proposition ne remplissant pas ces conditions sera retirée.

6. Pour chacun des postes P,S,T,W,X,Y,S, l'Assemblée générale est appelée à désigner le titulaire par un vote mettant en compétition les candidats restants. S'il y a plusieurs candidats pour un poste, le vote doit avoir lieu au scrutin secret.

Procédure pour l'élection de membres cooptés par l'Assemblée Générale

1. La procédure s'applique à l'élection et à la réélection des membres cooptés par l'Assemblée Générale mentionnés à l'article VI c) des Statuts.

2. Les propositions émanant des membres de l'Assemblée Générale ayant le droit de vote en vue de l'élection des membres cooptés, doivent parvenir au Bureau au moins trois mois avant l'Assemblée Générale au cours de laquelle ces propositions sont prises par elle en considération, en règle générale celle qui se tient pendant le Congrès International de Mécanique Théorique et Appliquée (ICTAM). Toutes ces propositions doivent être traitées confidentiellement par le Bureau.

3. Après avoir pris en compte toutes les propositions ainsi reçues le Bureau présente à l'Assemblée Générale une liste de celles qui sont jugées pouvoir recevoir de la part de l'Assemblée Générale un soutien raisonnable, pourvu cependant que le nombre total des membres cooptés n'excède pas 1/8 environ du nombre total ayant le droit de vote. La liste de ces propositions est communiquée à tous les membres de l'Assemblée

Générale pendant la première session de la réunion de l'Assemblée au cours de laquelle doit avoir lieu le vote.

4. Une liste de propositions différente de celle présentée par le Bureau n'est recevable que si elle a recueilli le soutien d'au moins dix membres de l'Assemblée Générale avant la seconde session.

5. L'Assemblée Générale vote sur les listes de candidats qui font l'objet des paragraphes 3 et 4.

Statutes of the International Union of Theoretical and Applied Mechanics

I "The International Union of Theoretical and Applied Mechanics" hereinafter called "the Union" is an international non-governmental scientific organization.

II The principal objectives of the Union are

a) to form a link between persons and organizations engaged in scientific work (theoretical or experimental) in mechanics or in related sciences;

b) to organize international congresses of theoretical and applied mechanics through a standing Congress Committee (Article XII), and to organize other international meetings for subjects falling within the field of theoretical and applied mechanics;

c) to engage in other activities meant to promote development of mechanics, both theoretical and applied, as a branch of science.

III The highest authority of the Union is its General Assembly.

The General Assembly has the power to decide all questions affecting the Union, including alterations of the Statutes. On specified questions it may delegate its power to appropriate bodies. The composition of the General Assembly is regulated in Article VI.

Meeting of the General Assembly will take place at times decided by the Bureau (Article XI) or on the request of at least 10 members of the General Assembly.

IV In all its decisions the General Assembly shall be guided by the tradition of free international scientific cooperation, developed in the International Congresses for Theoretical and Applied Mechanics.

In pursuing its objectives the Union shall observe the basic policy of non-discrimination and affirm the rights of scientists throughout the world to adhere to or to associate with international scientific activity without regard to race, religion, political philosophy, ethnic origin, citizenship, language or sex.

V In voting every member of the General Assembly shall dispose of one vote. For an alteration of the Statutes the majority required is 2/3 of the votes brought forward. For all other decisions a simple majority of the votes brought forward is required.

Any member who is unable to attend a meeting may by a letter to the Secretary General constitute another member of the General Assembly as proxy.

Between meetings of the General Assembly voting may be carried out by correspondence upon proposals made by the Bureau (Article XI); in this case decisions

will be valid only provided the number of persons taking part in the vote is not less than 2/3 of the total membership of the General Assembly.

VI*) The General Assembly is composed of

- a) representatives of the adhering organizations (Article VIII);
- b) members of the Bureau (Article XI);
- c) members-at-large;
- d) representatives of committees and groups of scientists, if so decided by the General Assembly.

The term of an elected member shall be determined by the General Assembly at the time of the election. The term of members of the Bureau shall coincide with their term of service on the Bureau.

*) Adopted by the General Assembly on September 2, 1990 in Vienna (Austria)

VII The General Assembly shall provide for an adequate representation of any group of scientists carrying out research in theoretical or applied mechanics and not represented by an adhering organization.

VIII Organizations of scientists in theoretical or applied mechanics (or unions of such organizations) which effectively represent independent scientific activity in a country or in a definite territory can be admitted by the General Assembly as adhering organizations of the Union provided they can be listed under a name that will avoid any misunderstanding about the country or territory represented.

In general only one organization from each country or territory will be admitted.

IX Each adhering organization shall have representatives in the General Assembly of the Union, and pay an annual subscription to the Union in accordance with Article XIV.

X International organizations mainly occupied in fields closely related to that of the Union can be admitted by the General Assembly as affiliated organizations of the Union.

Each affiliated organization has the right to appoint an observer, who is invited to take part in the General Assembly without voting rights. The Bureau of the Union (Article XI) has the reciprocal right to appoint a nonvoting observer to the corresponding council or other executive body of the affiliated organization.

The affiliated organization and the Union are mutually obliged to keep each other informed about all important activities and of organizational measures taken.

In organizing international scientific meetings the Union and each of the affiliated organizations are obliged to consider carefully all measures already taken by the Union and its affiliated organizations in order to coordinate such international scientific activities.

Affiliated organizations pay no annual dues to the Union.

XI*) To execute the decisions of the General Assembly and to carry out work between meetings, the General Assembly elects members of a Bureau for a period of at most four years. The Bureau consists of the officers (President, the retiring President who serves as Vice-President, Secretary-General, and Treasurer) and four other persons who shall have been members of the General Assembly at some time within the four years preceding the

time of election to the Bureau. The maximum continuous period of service as a member of the Bureau, other than an officer, is limited to eight years. Newly elected members of the Bureau enter into office on the date of November 1, following the General Assembly at which they were elected. The Bureau will meet at least every year. A member of the Bureau who is prevented from attending a meeting may by letter to the Secretary-General designate another member of the General Assembly as a replacement.

The Secretary-General will act as a permanent center for all matters affecting the Union, including relations with adhering, affiliated and other organizations.

The legal domicile of the Union shall be the place where the Secretary-General lives. The Bureau is authorized to appoint Assistant-Treasurers in those countries where the Union has a bank account.

The Assistant-Treasurers must be members of the General Assembly but need not to be members of the Bureau.

*) Adopted by the General Assembly on September 2, 1990 in Vienna (Austria)
The Bureau shall draft a budget for each coming year, and shall administer the finances. The Bureau shall submit an annual financial report to the General Assembly.

The Vice-President shall normally fulfill the duties of the President should the President become unable to discharge them.

Between meetings of the General Assembly the Bureau shall decide who shall undertake the duties of the Vice President, Secretary-General, or Treasurer should a temporary replacement be necessary.

XII The General Assembly establishes a standing Congress Committee which is responsible for the organization of International Congresses of Theoretical and Applied Mechanics at regular intervals.

a) The President of the Union shall also serve as President of the Congress Committee.

b) The members of the Congress Committee are appointed by the General Assembly as scientists active in theoretical or applied mechanics and need not be members of the General Assembly.

c) The Congress Committee appoints a Secretary, without stated terms of office.

d) The rules of procedure of the Congress Committee shall be approved by the General Assembly.

XIII The financial means of the Union are formed by:

a) the annual subscriptions of the adhering organizations;

b) gifts and grants.

The Union shall maintain a roll of benefactors on which shall be inscribed annually the names of those persons or institutions which have accorded gifts, legacies or other subventions to the Union.

XIV The number of representatives of an adhering organization and the amount of the annual subscription to be paid by that organization will be regulated according to one of the following categories, as proposed by the adhering organization and after approval of the General Assembly of the Union:

	Category Number of	Units of annual
	representatives	subscription
I	1	1

II	2	3
III	3	5
IV	4	8
V	5	12

Changes in the amount of the unit annual subscription will be decided by the General Assembly not less than one year in advance.

XV*) Any proposal for alteration of the Statutes either prepared by the Bureau or supported by statements to the General-Secretary signed by at least ten voting members of the General Assembly with voting rights, shall be sent to members of the General Assembly with the Agenda for a meeting of the General Assembly. Such proposals shall be discussed during the first session of that meeting and voted upon during the second session (Article V).

*)Article XV adopted by the General Assembly on August 28, 1994 in Amsterdam.

Rules of procedure for the Congress Committee of IUTAM

1. The Congress Committee meets at least once at every Congress.
2. The Congress Committee may appoint an Executive Committee to take all necessary actions on its behalf in the period between two successive Congresses, and to report to it at its next meeting. The Executive Committee will consist of the president, the secretary and one or more members appointed by the Congress Committee.
3. The actual organization of a Congress is delegated to a local Organizing Committee, elected by the host-country or host-organization, which is also responsible for publication of its Proceedings. The Organizing Committee will report to the Congress Committee either during or, if it sees fit, before the Congress which it organizes.
4. The Organizing Committee will obtain the approval of the Congress Committee (normally through the Executive Committee) with regard to all matters affecting the general policy of the Congress Committee, in particular with regard to:
 - 4.1 the scope of the Congress;
 - 4.2 the screening of papers of the Congress;
 - 4.3 the selection of general lectures for the Congress;
 - 4.4 the appointment of chairmen of sessions of the Congress;
 - 4.5 the broad principles regarding financial arrangements for the Congress.
5. The Organizing Committee will levy a fee (the level to be recommended by the Congress Committee and approved by the Bureau) for administrative expenses of the Congress Committee, from all Congress members. This fee will be paid over to IUTAM after the Congress.

Procedure* for election of the Bureau of IUTAM

1. At the General Assembly (GA) preceding the one at which the new Bureau is to be elected, an Electoral Committee (EC) shall be elected, consisting of the President of IUTAM (who shall act as Chairman of the EC) and two to four members of the GA who are not members of the current Bureau.
2. Following its election, the EC shall invite from members of the GA, within a specified time-limit, suggestions for candidates for the Bureau, viz., for the Offices of President (P), Secretary-General (S) and Treasurer (T), and for the four non-Officer positions. All suggestions shall be treated confidentially by the EC.
3. Taking account of all suggestions received, the EC shall submit to the Secretary-General nominations for candidates for election to the Bureau: one name for each of the Officer positions (P, S, T) and one or more names for each of the non-Officer positions (W, X, Y, Z). The EC will make sure that the candidates thus nominated are willing to accept an election. These nominations shall be conveyed by the Secretary-General to the GA in advance of the first session of the meeting of the GA at which the new Bureau is to be elected.
*) Procedure adopted by the General Assembly on August 28, 1994 in Amsterdam.
4. At this first session, additional candidates may be proposed by members of the GA for each and any of the positions P, S, T, W, X, Y, Z. No candidate may be proposed for more than one position.
5. Before the second session of the GA at which the new Bureau is to be elected, the proposals under clause 4 above shall be accepted if supported by statements to the Secretary-General each signed by at least ten (voting) members of the GA and by written confirmation that each nominee is willing to accept election; otherwise they shall be considered withdrawn.
6. The GA shall vote separately on the surviving nominations for each of the positions P, S, T, W, X, Y, Z. In any case in which there is more than one candidate for a position, the vote shall be by secret ballot.

Procedure* for electing Members-at-Large of the General Assembly

1. This procedure shall apply for the election and re-election of the Members-at-Large of the General Assembly provided for in Article VI(c) of the Statutes.
2. Proposals, by members of the General Assembly with voting rights, for Members-at-Large must be received by the Bureau at least three months before the meeting of the General Assembly at which proposals are to be considered, normally

during the International Congresses of Theoretical and Applied Mechanics (ICTAM). All proposals will be treated confidentially by the Bureau.

3. Taking into account all material received, the Bureau will present to the General Assembly such proposals as it deems will have at least a reasonable support by the General Assembly, provided however that the total number of Members-at-Large is not to exceed approximately one eighth (1/8) of the total General Assembly membership with voting rights. Such proposals will be circulated to all members of the General Assembly during the first session of meeting of the Assembly at which the proposals are to be voted on.
 4. Proposals not identical with those presented by the Bureau are considered to be withdrawn, unless they are sustained and supported by at least ten members of the General Assembly before its second session.
 5. The General Assembly will vote on those candidates mentioned in the proposals of paragraphs 3 and 4.
- *) Procedure adopted by the General Assembly on 26 August 1992 in Haifa, Israel

List of Publications

Four categories of IUTAM publications can be distinguished:

- a) **Annual Reports**
Since 1948, the Union has published a Report every year with detailed information on its activities. These Annual Reports are preserved at the IUTAM Archive at CISM, Udine, Italy.
The IUTAM Annual Reports over the last five years are available upon request from the IUTAM Secretariat.
- b) **Proceedings of IUTAM Symposia**
These are only available by ordering directly from the publisher.
- c) **Proceedings of the International Congresses on Theoretical and Applied Mechanics (ICTAM)**
These are only available by direct ordering from the publisher.
- d) **Publications on the history of IUTAM**

Proceedings of IUTAM Symposia

The Proceedings of IUTAM Symposia published since 1990 are listed below. The names of the editors and of the publisher are given in every case. A complete list of all published Proceedings can be found at the IUTAM website <http://www.iutam.net> .

1990

- 90-1 *IUTAM Symposium on Mechanical Modeling of New Electromagnetic Materials* (Stockholm, Sweden, 2-6 April 1990).
The Proceedings of the Symposium, edited by R.K.T. Hsieh, have been published by Elsevier, Amsterdam, 1990. ISBN 0-444-88518-8.
- 90-2 *IUTAM Symposium on Dynamical Problems of Rigid-Elastic Systems and Structures* (Moscow, USSR, 23-27 May 1990).
The Proceedings of the Symposium, edited by N.V. Banichuk, D.M. Klimov and W. Schiehlen, have been published by Springer-Verlag, Berlin, 1991. ISBN 3-540-53788-0.
- 90-3 *IUTAM Symposium on Inelastic Deformation of Composite Materials* (Troy, New York, USA, 29 May-1 June 1990).
The Proceedings of the Symposium, edited by G.J. Dvorák, have been published by Springer-Verlag, New York, 1991. ISBN 0-387-97458-X.
- 90-4 *IUTAM Symposium on Dynamics of Marine Vehicles and Structures in Waves* (Uxbridge, UK, 24-17 June 1990).
The Proceedings of the Symposium, edited by W.G. Price, P. Temarel and A.J. Keane, have been published by Elsevier, Amsterdam, 1991.
ISBN 0-444-89020-3.
- 90-5 *IUTAM Symposium on Separated Flows and Jets* (Novosibirsk, USSR, 9-13 July 1990).
The Proceedings of the Symposium, edited by V.V. Kozlov and A.V. Dovgal, have been published by Springer-Verlag, Berlin, 1991. ISBN 3-540-53762-7.
- 90-6 *IUTAM Symposium on Fluid Mechanics of Stirring and Mixing* (La Jolla, California, USA, 20-24 August 1990).
The Proceedings of the Symposium, edited by A. Acrivos, have been published in the journal "Physics of Fluids A", ISSN 0899-8213, Vol. 3 (1991), pp. 1009-1469.
- 90-7 *IUTAM Symposium on Nonlinear Hydrodynamic Stability and Transition* (Sophia-Antipolis, Nice, France, 3-7 September 1990).
The Proceedings of the Symposium, edited by G. Iooss, have been published in the journal "European Journal of Mechanics B/ Fluids", ISSN 0997-7546, Vol. 10 (1991), No. 2-Suppl., 3-334.
- 90-8 *IUTAM Symposium on Contact Load and Local Effects in Thin-Walled Plates and Shell Structures* (Prague, CSFR, 4-7 September 1990).
The Proceedings of the Symposium, edited by V. Krupka and M. Drdácky, have been published by Springer-Verlag, Berlin, 1992. ISBN 3-540-53551-9.
- 90-9 *IUTAM Symposium on Creep in Structures* (Cracow, Poland, 10-14 September 1990).
The Proceedings of the Symposium, edited by M. Zyczkowski, have been published by Springer-Verlag, Berlin, 1992. ISBN 3-540-53786-4.

1991

- 91-1 *IUTAM Symposium on Aerothermodynamics in Combustors* (Taipei, Taiwan, 3-5 June 1991).
The Proceedings of the Symposium, edited by R.S.L. Lee, J.H. Whitelaw and T.S. Wung, have been published by Springer-Verlag, Berlin, 1992. ISBN 3-540-55404-1.
- 91-2 *IUTAM Symposium on Mechanical Effects of Welding* (Lulea, Sweden, 10-14 June 1991).
The Proceedings of the Symposium, edited by L. Karlsson, L.E. Lindgren and M. Jonsson, have been published by Springer-Verlag, Berlin, 1992. ISBN 3-540-55240-5.
- 91-3 *IUTAM Symposium on Nonlinear Stochastic Mechanics* (Torino, Italy, 1-5 July 1991).
The Proceedings of the Symposium, edited by N. Bellomo and F. Casciati, have been published by Springer-Verlag, Berlin, 1992. ISBN 3-540-55545-5.
- 91-4 *IUTAM Symposium on Mechanics of Fluidized Beds* (Stanford, California, 1-4 July 1991).
No Proceedings of the Symposium have been published. The "Report of a Symposium on Mechanics of Fluidized Beds" by G.M. Homsy, R. Jackson and J.R. Grace has been published in the "Journal of Fluid Mechanics" (1992), Vol. 236, 477-495.
- 91-5 *IUTAM Symposium on Breaking Waves* (Sydney, Australia, 15-19 July 1991).
The Proceedings of the Symposium, edited by M.L. Banner and R. Grimshaw, have been published by Springer-Verlag, Berlin, 1992. ISBN 3-540-55944-2.
- 91-6 *IUTAM Symposium on Constitutive Relations for Finite Deformations of Polycrystalline Metals* (Beijing, China, 22-25 July 1991).
The Proceedings of the Symposium, edited by Ren Wang and D.C. Drucker, have been published by Springer-Verlag, Berlin, 1992. ISBN 3-540-55128-X.
- 91-7 *IUTAM Symposium on Finite Inelastic Deformations - Theory and Application* (Hannover, Germany, 19-23 August 1991).
The Proceedings of the Symposium, edited by D. Besdo and E. Stein, have been published by Springer-Verlag, Berlin, 1992. ISBN 3-540-55849-7.
- 91-8 *IUTAM Symposium on Interpretation of Time Series from Mechanical Systems* (Warwick, UK, 26-30 August 1991).
The Proceedings of the Symposium, edited by P.G. Drazin and G.P. King, have been published by North Holland, Elsevier Science Publ, Amsterdam, Physica D Nonlinear Phenomena, Vol. 58, 1992. ISSN 0167-2789.
- 91-9 *IUTAM Symposium on Microgravity Fluid Mechanics* (Bremen, Germany, 2-6 September 1991).
The Proceedings of the Symposium, edited by H.J. Rath, have been published by Springer-Verlag, Berlin, 1992. ISBN 3-540-55122-0.
- 91-10 *IUTAM Symposium on Local Mechanics Concepts for Composite Material Systems* (Blacksburg, Virginia, 27-31 October 1991).

The Proceedings of the Symposium, edited by J.N. Reddy and K.L. Reifsnider, have been published by Springer-Verlag, Berlin, 1992. ISBN 3-540-55547-1.

1992

- 92-1 *IUTAM Symposium on Optimal Control of Mechanical Systems* (Moscow, Russia, 19-25 April 1992).
The Proceedings of the Symposium, co-edited by F.L. Chernousko, have been published in Russian in the form of a (special) issue of the journal "Izvestiya of the Russian Academy of Sciences, Tekhnicheskaya Kibernetika, No. 1, Jan.-Febr. 1993", ISSN 0002-3388; and in the English translation of this journal published by Scripta Technica Inc., A. Wiley Company, New York.
- 92-2 *IUTAM Symposium on Inverse Problems in Engineering Mechanics* (Tokyo, Japan, 11-15 May 1992).
The Proceedings of the Symposium, edited by M. Tanaka and H.D. Bui, have been published by Springer-Verlag, Berlin, 1993. ISBN 3-540-56345-8.
- 92-3 *IUTAM Symposium on Optimal Design with Advanced Materials*.
The Frithiof I. Niordson Volume (Lyngby, Denmark, 18-20 August 1992).
The Proceedings of the Symposium, edited by P. Pedersen, have been published by Elsevier Science Publishers, Amsterdam, 1993. ISBN 0444-89869-7.
- 92-4 *IUTAM Symposium on Aerothermochemistry of Spacecraft and Associated Hypersonic Flows* (Marseille, France, 1-4 September 1992).
The Proceedings of the Symposium, edited by R. Brun and A.A. Chikhaoui, have been published by Jouve, 18, rue Saint-Denis, F-75001 Paris. Dépôt légal: Janvier, 1994. No. 215515N.
- 92-5 *IUTAM Symposium on Bluff-Body Wakes, Dynamics and Instabilities* (Göttingen, Germany, 7-11 September 1992).
The Proceedings of the Symposium, edited by H. Eckelmann, J.M.R. Graham, P. Huerre and P.A. Monkewitz, have been published by Springer-Verlag, Berlin, 1993. ISBN 3-540-56594-9.
- 92-6 *IUTAM Symposium on Fluid Dynamics of High Angle of Attack* (Tokyo, Japan, 13-17 September 1992).
The Proceedings of the Symposium, edited by R. Kawamura and Y. Aihara, have been published by Springer-Verlag, Berlin, 1993. ISBN 3-540-56593-0.
- 92-7 *IUTAM Symposium on Eddy Structure Identification in Free Turbulent Shear Flow* (Poitiers, France, 12-14 October 1992).
The Proceedings of the Symposium, edited by J.P. Bonnet and M.N. Glauser, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1993. ISBN 0-7923-2449-8.

1993

- 93-1 *IUTAM Symposium on Probabilistic Structural Mechanics: Advances in Structural Reliability Methods* (San Antonio, Texas, USA, 7-10 June 1993).

- The Proceedings of the Symposium, edited by P.D. Spanos and Y.-T. Wu. have been published by Springer-Verlag, Berlin, 1994. ISBN 3-540-57709-2.
- 93-2 *IUTAM Symposium on Computational Mechanics and Materials* (Providence, RI, USA, 15-18 June 1993).
The Proceedings of the Symposium have been published as a special issue in a journal "Modelling and Simulation in Materials Science and Engineering", edited by M. Ortiz and C.F. Shih, Vol 2 No 3A 421-782 May 1994, ISSN: 0965-0393.
- 93-3 *IUTAM Symposium on Nonlinearity and Chaos in Engineering Dynamics* (University College, London, 19-23 July 1993).
The Proceedings of the Symposium, edited by J.M.T. Thompson and S.R. Bishop, have been published by John Wiley & Sons, Chichester, UK, 1994. ISBN 0-471-94458-0.
- 93-4 *IUTAM Symposium on Nonlinear Instability of Nonparallel Flows* (Potsdam, NY, USA, 26-31 July 1993).
The Proceedings of the Symposium, edited by S.P. Lin, W.R.C. Phillips, D.T. Valentine, have been published by Springer-Verlag, Berlin, 1994. ISBN 3-540-57679-7.
- 93-5 *IUTAM Symposium on Nonlinear Waves in Solids* (Victoria, British Columbia, Canada, 15-20 August 1993).
The Proceedings of the Symposium, edited by Joanne L. Wegner and Frederick R. Norwood, have been published by The American Society of Mechanical Engineers, New York, 1995. ISBN 0-7918-0645-6.
- 93-6 *IUTAM Symposium on Identification of Mechanical Systems* (Wuppertal, Germany, 23-27 August 1993).
The Proceedings of the Symposium, edited by P.C. Müller, have been published by Springer-Verlag, Berlin, 1995.
- 93-7 *IUTAM Symposium on Discrete Structural Optimization* (Zakopane, Poland, 31 August-3 September 1993).
The Proceedings of the Symposium, edited by W. Gutkowski, have been published by Springer-Verlag, Berlin, 1994. ISBN 3-540-57679-X.
- 93-8 *IUTAM Symposium on Bubble Dynamics and Interface Phenomena* (Birmingham, UK, 6-9 September 1993).
The Proceedings of the Symposium, edited by J.R. Blake, J.M. Boulton-Stone and N.H. Thomas, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1994. ISBN 0-7923-3008-0.
- 93-9 *IUTAM Symposium on Fracture of Brittle, Disordered Materials: Concrete, Rock and Ceramics* (Brisbane, Australia, 20-24 September 1993).
The Proceedings of the Symposium, edited by G. Baker and B.L. Karihaloo, have been published by E & FN Spon, London, UK, 1995. ISBN 0-419-19050-3.
- 93-10 *IUTAM Symposium on Impact Dynamics* (Beijing, China, 11-15 October 1993).

The Proceedings of the Symposium, edited by Zheng Zhemin (Che-Min Cheng) and Tan Qingming, have been published by Peking University Press, Beijing, China, 1994.

ISBN 7-301-02489-4/0 338.

- 93-11 *IUTAM Symposium on Numerical Simulation of Non-Isothermal Flow of Viscoelastic Liquids* (Kerkrade, The Netherlands, 1-3 November 1993). The Proceedings of the Symposium, edited by J.F. Dijkstra and G.D.C. Kuiken have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1995.
ISBN 0-7923-3262-8.
- 1994**
- 94-1 *IUTAM Symposium on Liquid-Particle Interactions in Suspension Flow* (Grenoble, France, 18-22 April 1994).
The chairman G. Cognet has not edited the Proceedings (Oct. 1996).
- 94-2 *IUTAM Symposium on Waves in Liquid / Gas and Liquid / Vapor Two-Phase Systems* (Kyoto, Japan, 9-13 May 1994).
The Proceedings of the Symposium, edited by Shigeki Morioka and L. van Wijngaarden, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1995. ISBN 0-7923-3424-8.
- 94-3 *IUTAM / ISIMM Symposium on Structure and Dynamics of Nonlinear Waves in Fluids* (Hannover, Germany, 17-20 August 1994).
The Proceedings of the Symposium, edited by A. Mielke and K. Kirchgässner, have been published as Volume 7 of the Advanced Series in Nonlinear Dynamics, by World Scientific Publishing, Singapore, 1995.
ISBN 981-02-2124-X.
- 94-4 *IUTAM Symposium on Microstructure-Property Interactions in Composite Materials* (Aalborg, Denmark, 23-25 August 1994).
The Proceedings of the Symposium, edited by R. Pyrz, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1995.
ISBN 0-7923-3427-2.
- 94-5 *IUTAM / ISIMM Symposium on Anisotropy, Inhomogeneity and Nonlinearity in Solid Mechanics* (Nottingham, UK, 30 August-3 September 1994).
The Proceedings of the Symposium, edited by D.F. Parker and A.H. England, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1995. ISBN 0-7923-3594-5.
- 94-6 *IUTAM Symposium on Laminar-Turbulent Transition* (Sendai, Japan, 5-9 September 1994).
The Proceedings of the Symposium, edited by R. Kobayashi, have been published by Springer Verlag, Berlin, 1995. ISBN 3-540-59297-0.
- 94-7 *IUTAM Symposium on Mechanical Problems in Geodynamics* (Beijing, China, 5-9 September 1994).
The Proceedings of the Symposium, edited by R. Wang and K. Aki, have been published in the journal "PAGEOPH (Pure and Applied Geophysics)", Part I in Vol.145, No.3/4, Dec.1995 (ISSN 0033-4553), and Part II in Vol.146, No.3/4,

- Feb.1996 (ISBN 3-7643-5412-7). A bound volume has been announced to be published in 1996.
- 94-8 *IUTAM Symposium on The Active Control of Vibrations* (Bath, UK, 5-8 September 1994).
The Proceedings of the Symposium, edited by C.R. Burrows and P.S. Keogh have been published by Mechanical Engineering Publications Limited, London, 1994. ISBN 0-85298-916-4.
- 94-9 *IUTAM Symposium on Size-Scale Effects in the Failure Mechanisms of Materials and Structures* (Turin, Italy, 3-7 October 1994).
The Proceedings of the Symposium, edited by A. Carpinteri, have been published by E & FN Spon, London, UK, 1995. ISBN 0-419-20520-9.
- 94-10 *IUTAM Symposium on Mechanics and Combustion of Droplets and Sprays* (Taipei, Taiwan, 6-10 December 1994).
The Proceedings of the Symposium, edited by H.H. Chiu, have been published by Begell House, Inc. New York, USA, 1995, pp. 396. ISBN 1-56700-051-7.
Selected papers under the title Mechanics and Combustion of Droplets and Sprays have been published by Begell House Publishers at 79 Madison Avenue, New York, NY 10016, Fax (+1) 212-213-8368, edited by N.A. Chigier.
- 1995**
- 95-1 *IUTAM Symposium on Optimization of Mechanical Systems* (Stuttgart, Germany, 26-31 March 1995).
The Proceedings of the Symposium, edited by D. Bestle and W. Schiehlen, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1996. ISBN 0-7923-3830-8.
- 95-2 *IUTAM Symposium on Asymptotic Methods for Turbulent Shear Flows at High Reynolds Numbers* (Bochum, Germany, 28-30 June 1995).
The Proceedings of the Symposium, edited by K. Gersten, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1996. ISBN 0-7923-4138-4.
- 95-3 *IUTAM Symposium on Advances in Nonlinear Stochastic Mechanics* (Trondheim, Norway, 3-7 July 1995).
The Proceedings of the Symposium, edited by A. Naess and S. Krenk, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1996. ISBN 0-7923-4193-7.
- 95-4 *IUTAM Symposium on Nonlinear Instability and Transition in Three-Dimensional Boundary Layers* (Manchester, UK, 17-20 July 1995).
The Proceedings of the Symposium, edited by P.W. Duck and P. Hall, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1996. ISBN 0-7923-4079-5.
- 95-6 *IUTAM Symposium on Micromechanics of Plasticity and Damage of Multiphase Materials* (Paris, France, 29 August-1 September 1995).
The Proceedings of the Symposium, edited by A.Pineau and A.Zaoui, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1996. ISBN 0-7923-41388-0.

- 95-7 *IUTAM Symposium on Nonlinear Analysis of Fracture* (Cambridge, UK, 3-7 September 1995).
The Proceedings of the Symposium, edited by J. Willis, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1997. ISBN 0-7923-4378-6.
- 95-9 *IUTAM Symposium on Combustion in Supersonic Flows* (Poitiers, France, 2-6 October 1995).
The Proceedings of the Symposium, edited by M. Champion & B. Deshaies, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1997. ISBN 0-7923-4313-1.
- 1996**
- 96-1 *IUTAM Symposium on Interaction between Dynamics and Control in Advanced Mechanical Systems* (Eindhoven, The Netherlands, 21-26 April 1996).
The Proceedings of the Symposium, edited by D.H. van Campen have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1997. ISBN 0-7923-4429-4.
- 96-2 *IUTAM Symposium on Innovative Computational Methods for Fracture and Damage* (Dublin, Ireland, 30 June-5 July 1996).
The Proceedings of the Symposium, edited by P. E. O' Donoghue, M. D. Gilchrist, and K. B. Broberg, have been published in the "Computational Mechanics Journal", 19, 447- 552; 20, 3-198, 1997.
- 96-3 *IUTAM Symposium on Variable Density Low Speed Turbulent Flows* (Marseille, France, 7-10 July 1996). Co-sponsored by ICSU.
The Proceedings of the Symposium, edited by Louis Fulachier, John L. Lumley and Fabien Anselmet, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1997. ISBN 0-7923-4602-5.
- 96-4 *IUTAM Symposium on Mechanics of Granular and Porous Materials* (Cambridge, UK, 15-17 July 1996).
The Proceedings of the Symposium, edited by N.A. Fleck and A.C.F. Cocks, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1997. ISBN 0-7923-4553-3.
- 1997**
- 97-1 *IUTAM Symposium on Lubricated Transport of Viscous Materials* (Tobago, 7-10 January 1997).
The Proceedings of the Symposium, edited by Harold Ramkissoon, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1997. ISBN 0-7923-4897-4.
- 97-2 *IUTAM Symposium on Transformation Problems in Composite and Active Materials* (Cairo, Egypt, 9-12 March 1997).
The Proceedings of the Symposium, edited by Y.A. Bahei-El-Din and G.J. Dvorak, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1998. ISBN 0-7923-5122-3.

- 97-3 *IUTAM Symposium on Non-Linear Singularities in Deformation and Flow* (Haifa, Israel, 17-21 March 1997).
The Proceedings of the Symposium, edited by D. Durban and J.R.A. Pearson, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1998. ISBN 0-7923-5349-8.
- 97-4 *IUTAM Symposium on Variations of Domains and Free-Boundary Problems in Solid Mechanics* (Paris, France, 22-25 April 1997).
The Proceedings of the Symposium, edited by P. Argoul, M. Frémond and Q.S.Nguyen, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1998.
ISBN 0-7923-5450-8.
- 97-5 *IUTAM Symposium on Simulation and Identification of Organized Structures in Flows* (Lyngby, Denmark, 25-29 May 1997).
The Proceedings of the Symposium, edited by J.N. Sørensen, E.J. Hopfinger, and N. Aubry, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1999.
ISBN 0-7923-5603-9.
- 97-6 *IUTAM Symposium on Discretization Methods in Structural Mechanics* (Vienna, Austria, 1-6 June 1997).
The Proceedings of the Symposium, edited by H.A. Mang and F.G. Rammerstorfer, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands 1999.
ISBN 0-7923-5591-1.
- 97-7 *IUTAM Symposium on Material Instabilities in Solids* (Delft, The Netherlands, 9-13 June 1997).
The Proceedings of the Symposium, edited by R. de Borst and E. van der Giessen, have been published by John Wiley & Sons, Chichester, UK, 1998. ISBN 0 471 97460 9.
- 97-8 *IUTAM Symposium on Statistical Energy Analysis* (Southampton, UK. 8-11 July 1997).
The Proceedings of the Symposium, edited by F.J. Fahy and W.G Price, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1998, ISBN 0-7923-5457-5.
- 97-9 *IUTAM Symposium on Rheology and Computation* (Sydney, Australia, 20-25 July 1997).
No Proceedings of the Symposium have been published. Selected papers have been published in several 1999-volumes of the “Journal of Non-Newtonian Fluid Mechanics”, with a footnote attached to each of those papers.
- 97-10 *IUTAM Symposium on New Applications of Nonlinear and Chaotic Dynamics in Mechanics* (Ithaca, NY, USA, 27 July-1 August 1997).

The Proceedings of the Symposium, edited by Francis C. Moon, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1998. ISBN 0-7923-5276-9.

- 97-11 *IUTAM Symposium on Computational Methods for Unbounded Domains* (Boulder, USA, 3-7 August 1997).

The Proceedings of the Symposium, edited by Thomas L. Geers, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1998. ISBN 0-7923-5266-1.

- 97-12 *IUTAM Symposium on Micro- and Macrostructural Aspects of Thermoplasticity* (Bochum, Germany, 25-29 August 1997).

The Proceedings of the Symposium, edited by O.T. Bruhns and E. Stein, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1998. ISBN 0-7923-5265-3.

- 97-13 *IUTAM Symposium on Dynamics of Slender Vortices* (Aachen, Germany, 31 August - 3 September 1997).

The Proceedings of the Symposium, edited by E. Krause and K. Gersten, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1998. ISBN 0-7923-5041-3.

- 97-14 *IUTAM Symposium on Rheology of Bodies with Defects* (Beijing, China, 2-6 September 1997).

The Proceedings of the Symposium, edited by Ren Wang, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1998. ISBN 0-7923-5297-1.

1998

- 98-1 *IUTAM Symposium on Three-Dimensional Aspects of Air-Sea Interaction* (Nice, France, 17-21 May 1998)

The Proceedings of the Symposium, edited by F. Dias and C. Khariff, have been published as a special issue of the "European Journal of Mechanics B / Fluids", Vol. 18, No. 3 (1999)

- 98-2 *IUTAM Symposium on Synthesis in Bio Solid Mechanics* (Lyngby, Denmark, 24-27 May 1998).

The Proceedings of the Symposium, edited by Pauli Pedersen and Martin P. Bendsøe, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1999.

ISBN 0-7923-5615-2.

- 98-3 *IUTAM/IUGG Symposium on Developments in Geophysical Turbulence* (Boulder, USA, 16-19 June 1998).

The Proceedings of the Symposium, edited by R.M. Kerr and Y. Kimura, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2000 ISBN 0-7923-6673-5.

- 98-4 *IUTAM Symposium on Viscoelastic Fluid Mechanics* (Stanford, USA, 21-25 June 1998).

- A Report on this Symposium by E.S.G. Shaqfeh and a collection of selected papers have been published in the “Journal of Non-Newtonian Fluid Mechanics”, Vol. 82 (1999), pp. 127-457.
- 98-5 *IUTAM Symposium on Unilateral Multibody Contacts* (Munich, Germany, 3-7 August 1998).
The Proceedings of the Symposium, edited by F. Pfeiffer and Ch. Glocker, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1999. ISBN 0-7923-6030-3.
- 98-6 *IUTAM/IFTToMM Symposium on Synthesis of Nonlinear Dynamical Systems* (Riga, Latvia, 24-28 August 1998).
The Proceedings of the Symposium, edited by E. Lavendelis and M. Zakrzhevsky, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1999. ISBN 0-7923-6106-7.
- 98-7 *IUTAM Symposium on Advanced Optical Methods and Applications in Solid Mechanics* (Poitiers, France, 31 August-4 September 1998).
The Proceedings of the Symposium, edited by A. Lagarde, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2000. ISBN 0-7923-6604-2.
- 98-8 *IUTAM/IASS Symposium on Deployable Structures: Theory and Applications* (Cambridge, UK, 6-9 September 1998)
The Proceedings of the Symposium, edited by S. Pellegrino and S.D. Guest, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2000. ISBN 0-7923-6516-X.
- 98-9 *IUTAM Symposium on Mechanics of Passive and Active Flow Control* (Göttingen, Germany, 7-11 September 1998).
The Proceedings of the Symposium, edited by G.E.A. Meier and P.R. Viswanath, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 1999. ISBN 0-7923-5928-3.
- 1999**
- 99-1 *IUTAM Symposium on Nonlinearity and Stochastic Structural Dynamics* (Madras, India, 4-8 January 1999).
The Proceedings of the Symposium, edited by S. Narayanan and R.N. Iyengar, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2000. ISBN 0-7923-6733-2.
- 99-3 *IUTAM Symposium on Recent Developments in Nonlinear Oscillations of Mechanical Systems* (Hanoi, Vietnam, 2-5 March 1999).
The Proceedings of the Symposium, edited by N. Van Dao and E.J. Kreuzer, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2000. ISBN 0-7923-6470-8.

- 99-5 *IUTAM Symposium on Segregation in Granular Flows* (Cape May, New Jersey, USA, 5-10 June 1999).
The Proceedings of the Symposium, edited by A.D. Rosato and D.L. Blackmore, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2000. ISBN 0-7923-6547-X.
- 99-6 *IUTAM Symposium on Nonlinear Wave Behaviour in Multi Phase Flow* (Notre Dame, Indiana, USA, 7-9 July 1999)
The Proceedings of the Symposium, edited by H.C. Chang, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2000. ISBN 0-7923-6454-6.
- 99-7 *IUTAM Symposium on Theoretical and Numerical Methods in Continuum Mechanics of Porous Materials* (Stuttgart, Germany, 5-10 September 1999).
The Proceeding of the Symposium, edited by W. Ehlers, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2001. ISBN 0-7923-6766-9.
- 99-9 *IUTAM Symposium on Geometry and Statistics of Turbulence* (Hayama, Japan, 1-5 November 1999).
The Proceedings of the Symposium, edited by T. Kambe, T. Nakano and T. Miyauchi, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2001. ISBN 0-7923-6711-1

2000

- 00-1 *IUTAM Symposium on Creep in Structures* (Nagoa, Japan, 3-7 April 2000).
The Proceedings of the Symposium, edited by S. Murakami and N. Ohno, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2001. ISBN 0-7923-6737-5.

Proceedings of the International Congresses on Theoretical and Applied Mechanics (ICTAM)

Until September 4, 1964 the organization of the International Congresses for Applied Mechanics was supervised by the "International Committee for the Congresses of Applied Mechanics" and for each Congress the organization was separately entrusted to a local Organizing Committee who also undertook the publication of the Proceedings. Consequently, there is no central point from which Proceedings may be ordered, and for each volume, application must be made to the publishers who took care of that particular volume.

Since September 4, 1964 the same task will be fulfilled by the Standing Congress Committee of IUTAM, and local Organizing Committees to be established.

The titles of the volumes and the names of the publishing firms are given below.

1st Congress, Delft (Netherlands), 22–26 April 1924.

- Proceedings of the First International Congress for Applied Mechanics, Delft 1924, edited by C.B. Biezeno and J.M. Burgers (one vol.). Technische Boekhandel en Drukkerij J.Waltman Jr., Delft, 1925. No more copies are available for sale at Delft.
- 2nd Congress*, Zürich (Switzerland), 12–17 September 1926.
Verhandlungen - Comptes rendus - Proceedings of the 2nd International Congress for Applied Mechanics, Zürich, 12–17 September 1926, herausgegeben von E. Meissner (one vol.). Orell Füssli Verlag, Zürich und Leipzig, 1927.
- 3rd Congress*, Stockholm (Sweden), 24–29 August 1930.
Verhandlungen - Comptes rendus - Proceedings of the 3rd International Congress for Applied Mechanics, herausgegeben von A.C.W. Oseen und W. Weibull (3 vol.). AB. Sveriges Litografiska Tryckerier, Stockholm, 1931.
- 4th Congress*, Cambridge (UK), 3–9 July 1934.
Proceedings of the Fourth International Congress for Applied Mechanics, Cambridge, UK, 3–9 July, 1934 (one vol.). University Press, Cambridge (UK), 1935.
- 5th Congress*, Cambridge (Massachusetts, USA), 12–16 September 1938.
Proceedings of the Fifth International Congress for Applied Mechanics, held at Harvard University and the Massachusetts Institute of Technology, Cambridge, Massachusetts, September 12–16, 1938, edited by J.P. den Hartog and H. Peters (one vol.), John Wiley and Sons, Inc., New York (USA), and Chapman and Hall Ltd., London (UK), 1939.
- 6th Congress*, Paris (France), 22–29 September 1946.
Proceedings not published (was given in the hands of Gauthier-Villars, Paris).
- 7th Congress*, London (UK), 5–11 September 1948.
Proceedings of the Seventh International Congress for Applied Mechanics, 1948, published by the Organizing Committee (Introduction, Vol. I, Vol. II - Parts 1 and 2, Vol. III, Vol. IV).
- 8th Congress*, Istanbul (Turkey), 20–28 August 1952.
Proceedings published by the Organizing Committee (Vol. I, Vol. II). Faculty of Sciences, University of Istanbul, P.O. Box 245, Istanbul (Turkey), 1953.
- 9th Congress*, Brussels (Belgium), 5–13 September 1956.
Proceedings published by the Organizing Committee (Vol. I to Vol. VIII). Free University of Brussels, 50, avenue Franklin-Roosevelt, Brussels (Belgium), 1957.
- 10th Congress*, Stresa (Italy), 31 August–7 September 1960.
Proceedings published by the Consiglio Nazionale delle Ricerche, Piazzelle delle Scienze 7, Roma (Italia), printed by Elsevier Publishing Company, Amsterdam–New York, 1962.
- 11th International Congress on Theoretical and Applied Mechanics (ICTAM)*, Munich (Germany), 30 August–5 September 1964.
The Proceedings, edited by H. Görtler, have been published by Springer–Verlag, Heidelberger Platz 3, Berlin (Germany), 1966.

12th International Congress on Theoretical and Applied Mechanics (ICTAM),
Stanford, Cal. (USA), 26–31 August 1968.

The Proceedings, edited by M. Hetényi and W.G. Vincenti, have been published by Springer–Verlag, Berlin (Germany), 1969.

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Publications on the history of IUTAM

IUTAM – A Short History, edited by S. Juhasz, has been published by Springer-Verlag, Berlin, Germany, 1988. ISBN 3–540–50043–X.

The short history is dedicated to the memory of Professor Theodore von Karman who had an essential role in the formation of IUTAM. Contributions by S. Juhasz, Sir James Lighthill, G. Battimelli, J. Hult, N.J. Hoff, D.C. Drucker and F.I. Niordson are included in the book.

Mechanics at the Turn of the Century, edited by W. Schiehlen and L. van Wijngaarden, has been published by Shaker Verlag, Aachen, Germany, 2000. ISBN 3-8265-7714-0.

This Report is the result of an initiative of the Bureau of IUTAM to provide some landmarks on the developments in Mechanics during the 20th Century, to report on the 50 years of impulse to Mechanics by the International Union of Theoretical and Applied Mechanics (IUTAM), to visualize by a poster Meters of Motion on the occasion of the 20th International Congress of Theoretical and Applied Mechanics (ICTAM), to look ahead on a very personal basis and to show the broad international involvement of scientists in IUTAM in recent years.

The booklet “Mechanics at the Turn of the Century” is accessible free of charge on the website of Shaker Verlag. The internet address is www.shaker.de and search for Schiehlen as the author. Moreover, this booklet is available upon request at the IUTAM Secretariat

Please note again: The publications listed above, with the exception of the Annual Reports over the last five years and the booklet “Mechanics at the Turn of the Century”, are *not* available at the IUTAM Secretariat. Please order directly from the publisher. Details of all IUTAM publications may be found at

<http://www.iutam.net>

List of Addresses

Abrahams, Prof. I.D., Department of Mathematics, University of Manchester, Oxford Road, M13 9PL Manchester, United Kingdom

Achenbach, Prof. J. D., Center for Quality Engineering and Failure Prevention, Northwestern University, 2137 Sheridan Road, IL 60208-3 Evanston, United States of America

Acrivos, Prof. A., The Benjamin Levich Institute, City College of the City University of New York, T-1M, City College, NY 10031 New York, United States of America

Adrian, Prof. R. J., Department of Theoretical and Applied Mechanics,

University of Illinois at Urbana-Champaign, 216 Talbot Laboratory 104 South Wright Street, IL 61801 Urbana, United States of America

Ahzi, S., University Louis Pasteur, 67100 Strasbourg, France

Al-Athel, Dr. Saleh A., King Abdulaziz City for Science and Technology, P.O. Box 6086, 11442 Riyadh, Saudi Arabia

Alfirevic, Prof. I., Faculty of Mechanical Engineering and Naval Architecture, Institute of Applied Mechanics, University of Zagreb, Ivana Lucica 5, HR-10000 Zagreb, Croatia

Andreasen, Prof. J., Aalborg University, Pontoppidanstraede 101 , DK-9220 Aalborg, Denmark

Appa Rao, Dr. T.V.S.R., Structural Eng. Res. Centre, CSIR Campus, Taramani , 600 113 Chennai, India

Arantes e Oliveira, Prof. E. R. de, Department of Civil Engineering, Instituto Superior Técnico, Technical University of Lisbon Av. Rovisco Pais, 1049-001 Lisboa, Portugal

Aref, Prof. H., Department of Theoretical and Applied Mechanics, University of Illinois at Urbana-Champaign, 216 Talbot Laboratory 104 South Wright Street, IL 61801 Urbana, United States of America

Arinc, Prof. F., Department of Mechanical Engineering, Middle East Technical University, E 104, 06531 Ankara, Turkey

Ashida, Prof. F., Department of Electronic and Control Systems Engineering, Shimane University, 1060 Nishikawatsu-cho, Matsue, Shimane 690-8504, Japan

Bajer, Dr. K., Institute of Geophysics, Warsaw University, ul. Pasteura 7, 02-093 Warszawa, Poland

Baltov, Prof. A., Institute of Mechanics, Bulgarian Academy of Sciences, Acad. G.Bonchev str., bl. 4, 1113 Sofia, Bulgaria

Barthes-Biesel, Prof. D., Génie Biologique, Université de Technologie de Compiègne, BP 20529, F-60 205 Compiègne Cedex, France

Battjes, Prof. J. A., Department of Civil Engineering, Delft University of Technology, Stevinweg 1, NL-2628 CN Delft, Netherlands

Belhaq, Prof. M., Département de Physique, Faculté des Sciences Aïn Chock,

Maârif, BP 5366 Casablanca, Morocco

Bendsøe, Prof. M.P, Department of Mathematics, Technical University of Denmark, Building 303,, DK-2800 LYNGBY, Denmark

Berger, Prof., Laboratoire de Mecanique des Solides, Ecole Polytechnique, 91128 Palaiseau, cedex, France

Beskos, Prof. D.E., Department of Civil Engineering, Structural Engineering Division, University of Patras,, GR- 26500 Patras, Greece

Bevilacqua, Prof. L., Department of Mechanics, National Laboratory for Scientific Computing (LNCC), Av. Getúlio Vargas, 333 Quitandinha, Petropolis, 25651-070 Rio de Janeiro, Brazil

Bianchi, Prof. G., Dipartimento di Meccanica, Politecnico di Milano, Piazza Leonardo da Vinci 32, 20133 Milano, Italy

Bodner, Prof. S. R., Faculty of Mechanical Engineering, Technion - Israel Institute of Technology, Technion City, 32000 Haifa, Israel

Bogy, Prof. D. B., Department of Mechanical Engineering, University of California Berkeley, 6195 Etcheverry Hall, CA 94720-1 Berkeley, United States of America

Boley, Prof. B., Department of Civil Engineering and Engineering Mechanics. School of Engineering and Applied Science, Columbia University, 610 S.W. Mudd Building, New York, NY 10027, United States of America

Bonnet, Prof. M., Laboratoire de Mecanique des Solides, CNRS et Ecole Polytechnique, 91128 Palaiseau cedex, France

Boström, Prof. A., Division of Mechanics, Chalmers University of Technology, S- 412 96 Göteborg, Sweden

Bourgeois, Prof. R., Department of Civil Engineering, Royal Military Academy, Avenue Renaissance 30, B-1040 Brussels, Belgium

Brilla, Prof. J., Slovak Academy of Engineering Sciences, Radlinskeho 11 , SK 813 68 Bratislava, Slovakia

Calladine, Prof. C.R., Department of Engineering, University of Cambridge, Trumpington Street, CB2 1PZ Cambridge, United Kingdom

Campen, Prof. D.H. van, Department of Mechanical Engineering, Eindhoven

University of Technology, Der Dolech 2 PO Box 513, 5600 MB Eindhoven,
Netherlands

Capriz, Prof. G., Dipartimento di Matematica "L. Tonelli", Universita', Via
F. Buonarroti 2, 56127 Pisa, Italy

Cardon, Prof. A.H., Dept. Mechanics of Materials and Constructions (MEMC),
Free University of Brussels (V.U.B.), V.U.B. -TW(KB) - MEMC Pleinlaan 2,
B-1050 Brussels, Belgium

Carpenter, Prof. P.W., School of Engineering, University of Warwick,
Coventry, CV4 7AL Coventry, United Kingdom

Cercignani, Prof. C., Dipartimento di Matematica, Politecnico di Milano,
Piazza Leonardo da Vinci, 32, I-20133 Milano, Italy

Chen, Prof. W.H., Department of Power Mechanical Engineering, National
Tsing Hua University, Hsinchu, Taiwan

Chernousko, Prof. L., Institute for Problems in Mechanics, Russian Academy
of Sciences, pr. Vernadskogo 101-1, 117526 Moscow, Russia

Chernyi, Prof. G. G., Institute of Mechanics, Moscow State University, 1,
Michurinski Prospect, 117192 Moscow, Russia

Crandall, Prof. S., Department of Mechanical Engineering, Massachusetts
Institute of Technology, 3-360 MIT, MA 02139 Cambridge, United States of
America

Cristescu, Prof. N.D., Dept. of Aerospace Eng., Mechanics and Eng. Science,
University of Florida, 231 Aerospace Building P.O. Box 116250,
Gainesville, Fl. 32611-6250, United States of America

Crocker, Prof. M. J., Department of Mechanical Engineering, Auburn
University, 201 Ross Hall, AL 36849 Auburn, United States of America

Daigle, Dr. G. A., Institute for Microstructural Sciences, National
Research Council, 1191 Montreal Road, K1A 0R6 Ottawa, Canada

Davidson, Prof. L., Termo- och Fluidodynamik, Chalmers Tekniska Högskola,
412 96 Göteborg, Sweden

Davis, Dr. E.R., The Royal Society of New Zealand, 4 Halswell Street,
Thorndon, P.O. Box 598, Wellington, New Zealand

De Kee, Prof. D., Dept Genie Chimique, Universite de Sherbrooke, Sherbrooke Quebec J1K 2R1, Canada

Dijksman, Dr. J. F., Group Mechanics, Heat & Particle Optics, Philips Research Laboratories, Prof. Holstlaan 4 (WB-1-57), NL-5656 AA Eindhoven, Netherlands

Dorado, Prof. R., Instituto Nacional de Tecnica Aeroespacial, Carretera de Ajalvir km, 4,00, 28850 Torrejón de Ardoz, Spain

Dowell, Prof. E. H., Department of Mechanical Engineering and Materials Science, Duke University, 185 Hudson Hall, NC 27708 Durham, United States of America

Drucker, Prof. D.C., Department of Aerospace Engineering, Mechanics and Engineering Science, College of Engineering University of Florida, University of Florida, 231 Aerospace Engineering Building P.O. Box 116250, FL 32611 Gainesville, United States of America

Durban, Prof. D., Faculty of Aerospace Engineering, Technion-Israel Institute of Technology, Technion City, Haifa 32000, Israel

Dvorák, Dr. R., Fluid Dynamics Division, Institute of Thermomechanics, Academy of Sciences of the Czech Republic, Dolejskova 5, CZ-18200 Praha, Czech Republic

Ehlers, Prof. W., Institute of Applied Mechanics, University of Stuttgart, Pfaffenwaldring 7, D-70569 Stuttgart, Germany

Ellyin, Prof. F., Department of Mechanical Engineering, Advanced Composite Materials Engineering Group, The University of Alberta, Rm. 4-9 Mechanical Engineering Bldg., T6G 2G8 Edmonton, Alberta, Canada

Engelbrecht, Prof. J., Department of Mechanics and Applied Mathematics, Institute of Cybernetics, Akadeemia 21, EE-12618 Tallinn, Estonia

Erzhanov, Prof. Zh.S., National Academy of Sciences of the Republic of Kazakhstan, Abai Avenue, 31, 480091 Almaty, Kazakhstan

Fiszdon, Prof. W., Institute of Fundamental Technological Research, Polish Academy of Science, ul. Swietokrzyska 21, PL-00 049 Warsaw, Poland

Fleck, Prof. N. A., Department of Engineering, Cambridge University, Trumpington St., CB2 1PZ Cambridge, United Kingdom

Freund, Prof. L. B., Division of Engineering, Brown University, 182 Hope Street, RI 2912 Providence, United States of America

Frolov, Prof. K. V., Mechanical Engineering Research Institute, Russian Academy of Science, M. Kharitonievsky, 4, 101830 Moscow, Russia

Gabbert, Prof. U., Fakultat für Machinebau, Institut für Mechanik, Otto von Guericke University of Magdeburg, Germany, Universitätsplatz 2, D-39106 Magdeburg, Germany

Germain, Prof. P., Academie des Sciences, 23 Quai de Conti, 75006 Paris, France

Gjevik, Prof. B.N., Department of Mathematics, University of Oslo, Box 1053 Blindern, N 0316 Oslo, Norway

Gladwell, Prof. G.M.L., Department of Civil Engineering, University of Waterloo, N2L 3G1 Waterloo, Canada

Gledhill, Dr. I., South African ICSU Secretariat, P.O. Box 2600, 0001 Pretoria, South Africa

Gudmundson, Prof. P., Royal Institute of Technology (KTH), Department of Solid Mechanics, S 10044 Stockholm, Sweden

Gupta, Prof. N.K., Dept. of Applied Mechanics, Indian Institute of Technology, IIT Delhi, Hauz Khas, 110 016 New Delhi, India

Gutkowski, Prof. W., Center of Mechanics, Institute of Fundamental Technological Research, Swietokrzyska 21, 00-049 Warsaw, Poland

Guz, Prof. A.N., Timoshenko Institute of Mechanics, The National Academy of Sciences of Ukraine, 3 Nesterov Street, 252680 Kyiv, Ukraine

Hansen, Prof. J., Institute for Aerospace Studies, University of Toronto, 4925 Dufferin Street, M3H 5T6 Toronto, Canada

Hashin, Prof. Z., School of Engineering, Dept. of Solid Mechanics, Materials & Structures, Tel Aviv University, Tel Aviv 69978, Israel

Hayes, Prof. M., Department of Mathematical Physics, University College - Dublin, F-202 Arts Building 4 Belfield, 4 Dublin, Ireland

He, Prof. Y.S., Department of Engineering Mechanics, School of Civil Engineering and Mechanics, Shanghai Jiao Tong University, 1954 Hua Shan Road, 200030 Shanghai, China

Herakovich, Prof. C.T., Applied Mechanics Program, University of Virginia, B122 Thornton Hall, Charlottesville, Va 22903-2442, United States of America

Hodge, Prof. P., Dept. of Applied Mechanics, School of Engineering, Stanford University, 262 Durand Bldg., CA 94305-4 Stanford, United States of America

Hodnett, Prof. P.F., Department of Mathematics and Statistics, University of Limerick, Limerick, Ireland

Huerre, Prof. P., Laboratoire d' Hydrodynamique , CNRS-Ecole Polytechnique, F-9 1128, Palaiseau Cedex, France

Hult, Prof. J., Department of History of Technology & Industry, Chalmers University of Technology,, S-41296 Gothenburg, Sweden

Hutchinson, Prof. J.W., Division of Applied Mechanics, 315 Pierce Hall, 29 Oxford Street, Cambridge, MA 02138, United States of America

Hwang, Prof. K.C., Department of Engineering Mechanics, Tsinghua University, 100084 Beijing, China

Idelsohn, Dr. S. R., Instituto de Desarrollo Tecnológico para la Industria Química (INTEC), Guemes 3450, 3000 Santa Fe, Argentina

Imai, Prof. I., Professor Emeritus, University of Tokyo, 1-11-5 Suido, Bunkyo-ku, 112-0005 Tokyo, Japan

Inoue, Prof. T., Department of Energy Conversion Science, Faculty of Energy Science, Kyoto University, Yoshida-Honmachi, Sakyo-ku, 606-8501 Kyoto, Japan

Iooss, Prof. G., INLN UMR CNRS-UNSA No 6618, Institut Universitaire de France, 1361 route des Lucioles, F-06560 Valbonne, France

Ishlinsky, Prof. A. Yu., Institute for problems in Mechanics, Russian Academy of Sciences, pr. Vernadskogo 101-1, 117526 Moscow, Russia

Ismail, Prof. M. K., Egyptian Committee of Theoretical and Applied Mechanics, Academy of Scientific Research and Technology, 5 Dessouk Street , Heliopolis, Cairo, Egypt

Ito, Prof. M., Faculty of Engineering, Takushoku University, 5-45-2 Sendagi Bunkyo-ku, 113 Tokyo, Japan

Jaiani, Prof. G., Tbilisi State University, I. Vekua Institute of Applied Mathematics 2 University Str., 380043 Tbilisi, Georgia

James, Prof. D.F., Department of Mechanical and Industrial Engineering, University of Toronto,, M5S 3G8 Toronto, Ontario, Canada

Jiménez, Prof. J., Motopropulsion y Termofluidodinamica E.T.S.I. Aeronauticos, Universidad Politecnica de Madrid, Plaza Cardenal Cisneros 3 , E 28040 Madrid, Spain

Josefsson, Prof. L., Hållfasthetslära, Chalmers Tekniska Högskola, 412 96 Göteborg, Sweden

Kaliszky, Prof. S., Department of Structural Mechanics, Budapest University of Technology and Economics, Muegyetem rpt. 3, 1521 Budapest, Hungary

Kambe, Prof. T., National Committee for Theoretical and Applied Mechanics, Science Council of Japan, Roppongi 7-22-34, Minato-ku, 106-8555 Tokyo, Japan

Kant, Prof. T., Department of Civil Engineering, Indian Institute of Technology Bombay, Powai, 400 076 Mumbai, India

Karihaloo, Prof. B.L., Division of Civil Engineering, School of Engineering, Cradiff University, Queen's Buildings P.O.Box 686, CF2 3TB Cardiff, United Kingdom

Keunings, Prof. R., Center for Systems Engineering and Applied Mechanics (CESAME), Division of Applied Mechanics, Universite Catholique de Louvain, Av. George Lemaître 4, B-1348 Louvain-La-Neuve, Belgium

Kitagawa, Prof. H., Department of Adoptive Machine Systems, Osaka University, Graduate School of Engineering, 2-1 Yamada- Oka Suita, 565-0871 Osaka, Japan

Kluwick, Prof. A., Institut für Stromungslehre und Wärmeübertragung, Technische Universität Wien, Wiedner Hauptstrasse 7/322, A-1040 Wien, Austria

Kobayashi, Prof. T., Department of Mechanical Engineering and Naval Architecture, University of Tokyo, Institute of Industrial Science, 4-6-1-, Komaba, Meguro, 153-8505 Tokyo, Japan

Kortum, Prof. W., Institute of Aeroelasticity DLR-Oberpfaffenhofen, P.O. Box 1116, D-82230 Wessling, Germany

Kounadis, Prof. A.N., Department of Civil Engineering, National Technical University of Athens, Patission Street 42, GR-147 Athens, Greece

Kozlov, Prof. V.V., Sub-faculty of Mathematical Statistics, Dept. of Mathematics and Mechanics, Moscow Lomonosov State University, 119899 Vorob'evy gory, Moscow, Russia

Krause, Prof. E., Rheinisch- Westfälische Technische Hochschule (RWTH) Aachen, Aerodynamisches Institut, Wullnerstrasse 5-7, D-52062 Aachen, Germany

Ku, Prof. Y.H., Department of Electrical Engineering, University of Pennsylvania, 200 South 33-rd Street, PA 19104 Philadelphia, United States of America

Kuhn, Prof. G.C., Lehrstuhl für Technische Mechanik, Universität Erlangen-Nürnberg, Egerlandstr.5, D 91058 Erlangen, Germany

Leal, Prof. L.G., Department of Chemical Engineering, University of California at Santa Barbara, Santa Barbara, CA 93106-5080, United States of America

Leblond, Prof. J.B., Universite Pierre et Marie Curie, Modelisation en Mecanique, Tour 66-Case 162, 4 place Jussieu, F-75252 Paris Cedex 05, France,

Lespinard, Prof. G.M., Institut National Polytechnique de Grenoble, 46 Avenue Felix- Viallet, F 38031 Grenoble Cedex, France

Lugner, Prof. P., Institut für Mechanik E 325, Technische Universität Wien, Wiedner Hauptstr. 8-10, A 1040 Wien, Austria

Lund, Prof. F., Departamento de Física, Facultad de Ciencias Físicas y Matemáticas, Universidad de Chile, Casilla 487-3, Santiago, Chile

Lundberg, Prof. B., Materials Science, Angstrom Laboratory, Uppsala University, Box 534, S-751 21 Uppsala, Sweden

Maattanen, Prof. M., Department of Mechanical Engineering, Helsinki

University of Technology, P.O.Box 4100, FIN-02015 Hut, Finland

Madsen, Prof. P. A., Department of Mathematical Modelling, Section for Numerical Analysis, Computational Hydrodynamics Group, Technical University of Denmark, Building 321, DK-2800 Lyngby, Denmark

Maier, Prof. G., Dipartimento di Ingegneria Strutturale, Politecnico di Milano, Piazza Leonardo da Vinci 32, I 20133 Milano, Italy

Mang, Prof. H.A., Institute for Strength of Materials, Vienna University of Technology, Karlsplatz 13, A-1040 Vienna, Austria

Marn, Prof. J., Faculty of Mechanical Engineering, University of Maribor, Smetonova 17, 2000 Maribor, Slovenia

Martins, Prof. J.A.C., Instituto Superior Technico, Departamento de Engenharia Civil e Arquitectura, Avenida Rovisco Pais, 1049-001 Lisboa, Portugal

Mikhailov, Prof. G., Lomonosovsky Pr. 14, Apt 97, 117296 Moscow, Russia

Mikkola, Prof. M.J., Department of Engineering Physics and Mathematics, Laboratory of Theoretical and Applied Mechanics, Helsinki University of Technology, P.O. Box 1100, FIN-02015 Hut, Finland

Miloh, Prof. T., Department of Fluid Mechanics and Heat Transfer. Faculty of Engineering, Tel Aviv University, Tel Aviv 69978, Israel

Moffatt, Prof. H.K., Department of Applied Mathematics and Theoretical Physics, University of Cambridge, Silver Street, Cambridge CB3 9EW, United Kingdom

Monkewitz, Prof. P. A., Laboratory of Fluid Mechanics (LMF), Department of Mechanical Engineering, Swiss Federal Institute of Technology Lausanne (EPFL), CH-1015 Lausanne, Switzerland

Moratilla, Mr. A., Instituto Nacional de Tecnica Aeroespacial, Carretera de Ajalvir km. 4,00, Torrejon de Ardoz, 28850 Madrid, Spain

Moreau, Prof. R., ENSHM de Grenoble, B.P. 95, Institut National Polytechnique de Grenoble (INPG), F-38402 Saint Martin d'Heres, Cedex, France

Morro, Prof. A., University, DIBE, Via Opera Pia 11a, 16145 Genova, Italy

Munjal, Prof. M. L., Dept. of Mechanical Engineering, Faculty for Research

in Technical Acoustics (FRITA), Department of mechanical Engineering, Indian Institute of Science, 560 012 Bangalore, India

Nakra, Prof. B.C., Department of Mechanical Engineering, Indian Institute of Technology, Hauz Khas, 110 016 New Delhi, India

Narasimha, Prof. R., National Institute of Advanced Studies, Jawaharlal Nehru Centre for Advanced Scientific Research, 560 012 Bangalore, India

Niordson, Prof. F., Department of Solid Mechanics, Technical University of Denmark, Building 404, DK-2800 Lyngby, Denmark

Obraztsov, Prof. I. F., Institute of Applied Mechanics, Russian Academy of Sciences, 32A Leninsky Prospekt, 117334 Moscow, Russia

Oden, Prof. J. T., Department of Aerospace Engineering and Engineering Mechanics, University of Texas at Austin, 2400 Taylor Hall, TX 78712 Austin, United States of America

Ohashi, Prof. H., Kogakuin University, 1-24-2 Nishi-Shinjuku Shinjuku-ku, 163-8677 Tokyo, Japan

Okrouhlik, Prof. M., Mechanics and Solids Department, Institute of Thermomechanics, Academy of Sciences of the Czech Republic, Dolejskova 5 , 182 00 Prague 8, Czech Republic

Olhoff, Prof. N., Institute of Mechanical Engineering, University of Aalborg, Pontoppidanstraede 101, Dk-9220 Aalborg, Denmark

Oñate, Prof. E., Edificio C-1, International Center for Numerical Methods in Engineering (CIMNE), Campus Norte UPC Gran Capitan s/n, 08034 Barcelona, Spain

Pearson, Prof. J. R. A., 25 Chaucer Road , CB2 2EB Cambridge, United Kingdom

Pedley, Prof. T.J., Department of Applied Mathematics and Theoretical Physics, University of Cambridge, Silver Street, CB3 9EW Cambridge, United Kingdom

Peregrine, Prof. D.H., School of Mathematics, University of Bristol, University Walk, BS8 1TW Bristol, United Kingdom

Phan-Thien, Prof. N., Department of Mechanical and Mechatronic Engineering, University of Sydney, 2006 New South Wales, Australia

Phillips, Prof. J.W., Department of Theoretical and Applied Mechanics,
University of Illinois at Urbana-Champaign, 216 Talbot Laboratory 104 South
Wright Street, 61801-2983 Urbana, IL, United States of America

Podio-Guidugli, Prof. P., Dipartimento di Ingegneria Civile, Università di
Roma "Tor Vergata", Via di Tor Vergata 110, I 110-0013 Rome, Italy

Radev, Prof. S.P., Institute of Mechanics, Bulgarian Academy of Sciences,
Acad. G. Bonchev Str., Bl. 4, 1113 Sofia, Bulgaria

Ramkissoon, Prof. H., Department of Mathematics and Computer Science,
University of the West Indies, St. Augustine, Trinidad, West Indies

Rimrott, Prof. F.P.J., Department of Mechanical Engineering, University of
Toronto, Ont. M5S 1 Toronto, Canada

Ritchie, Prof. R.O., Department of Materials Science and Mineral
Engineering, University of California at Berkeley, 463 Evans, CA 94708-1
Berkeley, United States of America

Rozvany, Prof. G., Faculty of Civil Engineering, Department of Structural
Mechanics, Budapest University of Technology and Economics, Muegyetem rkp. 3
Kmf 35, H-1521 Budapest, Hungary

Ruzic, Prof. D.D., Faculty of Mechanical Engineering, Applied Mechanics and
Theory of Structures, University of Belgrade, 27 marta no. 80, 11120
Belgrade, Yugoslavia

Saje, Prof. M., Faculty of Civil and Geodetic Engineering (FGG), University
of Ljubljana, Jamova 2, SLO-61000 Ljubljana, Slovenia

Salençon, Prof. J., Laboratoire des Mécanique des Solides, Ecole
Polytechnique, F-91128 Palaiseau Cedex, France

Savage, Prof. S.B., Department of Civil Engineering and Applied Mechanics,
McGill University, 817 Sherbrooke Street West, H3A 2K6 Montreal, Quebec,
Canada

Sayir, Prof. M.B., Department of Mechanical and Process Engineering, Swiss
Federal Institute of Technology (ETH), ETH-Zentrum, 8092 Zurich,
Switzerland

Schiehlen, Prof. W., Institute B of Mechanics, University of Stuttgart,
Pfaffenwaldring 9, 70550 Stuttgart, Germany

Schrefler, Prof. B.A., Department of Structural and Transportation Engineering, University of Padova, Via F.Marzolo 9, 35131 Padova, Italy

Sharp, Prof. R. S., School of Mechanical Engineering, Cranfield University, Wharley End, MK43 0AL Bedford, United Kingdom

Sobczyk, Prof. K., Center of Mechanics, Institute of Fundamental Technological Research (IPPT), Swietokrzyska 21, 00-049 Warsaw, Poland

Sotiropoulos, Prof. D.A., Southern Polytechnic State University, 1100 S. Marietta Parkway, GA 30060 2 Marietta, United States of America

Stein, Prof. E., Institut für Baumechanik und Numerische Mechanik (IBNM), University of Hannover, Appelstraße 9A, D-30167 Hannover, Germany

Storåkers, Prof. B., Department of Solid Mechanics, Royal Institute of Technology (KTH), Osquars Backe 1, S-10044 Stockholm, Sweden

Stähle, Prof. P., Material Mechanics, Malmo University, SE 205 06 Malmo, Sweden

Suhubi, Prof. E.S., Department of Engineering Sciences, Istanbul Technical University, Maslak 80626, Istanbul, Turkey

Suquet, Prof. P., Laboratoire de Mecanique et d'Acoustique, Centre National de Recherche Scientifique (CNRS), 31 Chemin Joseph Aiguier, 13402 Marseille Cedex 20, France

Szefer, Prof. G., Krakow University of Technology, Institute of Structural Mechanics, ul. Armii Krajowej 57m.3, 31-045 Krakow, Poland

Tamuzs, Prof. V., Institute of Polymer Mechanics, University of Latvia, Aizkraukles iela 23, Lv-1006 Riga, Latvia

Tanner, Prof. R., Department of Mechanical and Mechatronic Engineering, University of Sydney, 2006 NSW Sydney, Australia

Tasdemir, Prof. M.A., Fen-Edebiyat Facultesi, Istanbul Teknik Universitesi, 80626, Maslak, Istanbul, Turkey

Tatsumi, Prof. T., Research Institute, International Institute for Advanced Studies, 9-3 Kizugawadai, Kizu-do, Japan

Thess, Prof. A., Department of Mechanical Engineering, Ilmenau University

of Technology, P.O. Box 100565, D 98684 Ilmenau, Germany

Thorpe, Prof. S.A., Southampton Oceanography Centre, School of Ocean and Earth Science, University of Southampton, Waterfront Campus European Way, SO14 3ZH Southampton, United Kingdom

Toit, Prof. C.G. de K. du, School for Mechanical and Materials Engineering, Unit for Computational Mechanics, Potchefstroom University for Christian Higher Education (CHE), Private Bag X6001, Potchefstroom 2520, South Africa

Tong, Prof. P., Department of Mechanical Engineering, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong, China

Tvergaard, Prof. V., Department of Mechanical Engineering, Solid Mechanics, Technical University of Denmark, Nils Koppels Alle, Building 404, DK-2800 Lyngby, Denmark

Van Dao, Prof. N., Vietnam National University, Hanoi, 144, Xuan Thuy Street, Cau Giay, Hanoi, Viet Nam

Vatta, Prof. F., Dipartimento di Meccanica, Politecnico di Torino, Corso Duca degli Abruzzi 24, 10129 Torino, Italy

Viswanath, Dr. P., Experimental Aerodynamics Division, National Aerospace Laboratory, P.O. Box No. 1779, 560 017 Bangalore, India

Wagner, Prof. S., Department of Aerospace Engineering, University of Stuttgart, Pfaffenwaldring 21, D-70550 Stuttgart, Germany

Wang, Prof. R., Department of Mechanics, Peking University, 100871 Beijing, China

Wang, Prof. C.Y., Department of Civil Engineering, National Central University, 32054 Chungli, Taiwan

Watanabe, Prof. E., Department of Civil Engineering, Kyoto University, Yoshida-Honmachi, Sakyo-ku, 606-8501 Kyoto, Japan

Weaver, Prof. D., Department of Mechanical Engineering, McMaster University, 1280 Main Street West, Ont. L8S 4 Hamilton, Canada

Wijngaarden, Prof. L. van, Department of Mechanical Engineering, University of Twente, Gebouw WB P.O. Box 217, 7500 AE Enschede, Netherlands

Willis, Prof. J., Department of Mathematical Sciences, University of Bath,

BA2 7AY Bath, United Kingdom

Wilmanski, Prof. K., Weierstrass Institute for Applied Analysis and Stochastics, Mohrenstr. 39, 10117 Berlin, Germany

Wolodko, Dr. J.D., Department of Mechanical Engineering, Advanced Composite Materials Engineering Group, University of Alberta, Rm. 4-9 Mechanical Engineering Bldg., T6G 2G8 Edmonton, Alberta, Canada

Yagawa, Prof. G., Department of Quantum Engineering and Systems, University of Tokyo, School of Engineering, 7-3-1 Hongo, Bunkyo-ku, 113- 8656 Tokyo, Japan

Yeh, Prof. C.-S., Institute of Applied Mechanics, National Taiwan University, No. 1 Sec. 4 Roosevelt Road, Taipei, Taiwan

Yokobori, Prof. T., School of Science and Engineering, Teikyo University, Toyosatodai 1-1, Utsunomiya-shi, 320-2555, Japan

Yoo, Prof. J.Y., Seoul National University, 151-742 Seoul, Korea

Yu, Prof. T., Department of Mechanical Engineering, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong

Zheng, Prof. Z., Institute of Mechanics, Chinese Academy of Sciences, 15 Zhong Guan Cun Road, 100080 Beijing, China

Zhuang, Prof. F.-G. Science and Technology Council, China Aerospace Corporation, P.O. BOX 849, 100830 Beijing, China

Ziegler, Prof. F., Institut für Allgemeine Mechanik, Technische Universität Wien, Wiedner Hauptstrasse 8-10/201, A-1040 Wien, Austria

Zorski, Prof. H., Department of Fluid Mechanics, Center for Mechanics and Information Technology, Polish Academy of Sciences, ul. Swietokrzyska 21, 00-049 Warsaw, Poland

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