

# **REPORT 2013**



INTERNATIONAL UNION OF THEORETICAL AND  
APPLIED MECHANICS

# REPORT 2013



Ecole Normale Supérieure de Cachan, France  
and  
University College Dublin, Ireland

Edited by Frédéric Dias  
Printed in France by Copie Clean (91300 Massy)

ISBN-978-2-909968-99-5

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## Bureau: Officers and Members

The following members of the Bureau of IUTAM have been elected for the period 1 November 2012 to 31 October 2016:

### Officers

Professor V. Tvergaard (Denmark)	President
Professor T.J. Pedley (UK)	Vice-President
Professor P. Eberhard (Germany)	Treasurer
Professor F. Dias (Ireland)	Secretary-General

### Members

Professor N. Aubry (USA)	(elected 2012)
Professor M. Rubin (Israel)	(elected 2012)
Professor B. Schrefler (Italy)	(elected 2012)
Professor W. Yang (China)	(elected 2012)

## Secretariat

IUTAM-Secretariat, Centre de Mathématiques et de Leurs Applications,  
Ecole Normale Supérieure de Cachan, 94235 Cachan, France

Telephone: +33 1 47 40 59 00, Telefax: +33 1 47 40 59 01

E-mail: [frederic.dias@cmla.ens-cachan.fr](mailto:frederic.dias@cmla.ens-cachan.fr); Internet: <http://www.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)
2000	H.K. Moffatt (UK)	W. Schiehlen (Germany)	L.B. Freund (USA)	D.H. van Campen (Netherlands)
2004	L.B. Freund (USA)	H.K. Moffatt (UK)	J. Engelbrecht (Estonia)	D.H. van Campen (Netherlands)
2008	T. Pedley (UK)	L.B. Freund (USA)	N. Olhoff (Denmark)	F. Dias (France)

## 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
21	2004	Warsaw, Poland	W. Gutkowski
22	2008	Adelaide, Australia	E. Tuck
23	2012	Beijing, China	Y. Bai



## Adhering Organizations

### **Australia (1964)**

The Australian National Committee for Mechanical and Engineering Sciences of the Australian Academy of Science  
GPO Box 783, Canberra City, ACT 2601  
President/Chair: Prof. I. (Ivan) Marusic  
Contact: J. (Jeanette) Mill  
Representatives in IUTAM: Prof. I. (Ivan) Marusic, Prof. S. (Scott) Sloan

### **Austria (1951)**

Austrian National Committee for Theoretical and Applied Mechanics of the Austrian Academy of Sciences  
Dr.-Ignaz-Seipel-Platz 2, A-1010 Wien  
President/Chair: Prof. F. (Franz) Rammerstorfer  
Contact: Prof. A. (Alfred) Kluwick  
Representative in IUTAM: Prof. A. (Alfred) Kluwick

### **Belgium (1949)**

The National Committee for Theoretical and Applied Mechanics of the Royal Academies for Science and Arts of Belgium  
Hertogsstraat 1 rue Ducale, B-1000 Brussels  
President/Chair: Prof. J. (Joris) Degrieck  
Contact: Prof. Y. (Yvan) Baudoin  
Representatives in IUTAM: Prof. P. (Philippe) Boulanger, Prof. E. (Erik) Dick, Prof. D. (Dirk) Vandepitte

### **Brazil (1982)**

Associação Brasileira de Engenharia e Ciências Mecânicas – ABCM  
Avenida Rio Branco 124/18º andar, 20040-001 Rio de Janeiro  
President/Chair: Prof. V. (Valder) Steffen Jr.  
Contact: Prof. A. (Atila) Freire  
Representatives in IUTAM: Prof. A. (Atila) Freire, Prof. A. (Alvaro) Prata

### **Bulgaria (1969)**

Bulgarian National Committee on Theoretical and Applied Mechanics of the Bulgarian Academy of Sciences  
1, 15 novembre str., BG-1040 Sofia  
President/Chair: Prof. S. (Stefan) Radev  
Representative in IUTAM: Prof. S. (Stefan) Radev

**Canada (1963)**

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

National Committee for IUTAM

President/Chair: Prof. S.B. (Stuart) Savage

Contact: Prof. J.W. (Jean) Zu

Representatives in IUTAM: Prof. J.M. (Maciej) Floryan, Prof. S.B. (Stuart) Savage,  
Prof. S. (Suresh) Shrivastava, Prof. J.W. (Jean) Zu

**Chile (1996)**

The Chile National Committee on Theoretical and Applied Mechanics Academia Chilena  
de Ciencias

Almirante Montt 454, Santiago, Chile

President/Chair: Dr. J. (Juan) Asenjo

Secretary: Dr. F. (Francisco) Hervé

Contact: Prof. F. (Fernando) Lund

Representatives in IUTAM: Prof. F. (Fernando) Lund

**China (1980)**

The Chinese Society of Theoretical and Applied Mechanics

15 Beisihuanxi Road, Beijing 100190

President/Chair: Prof. H. (Haiyan) Hu

Secretary: Prof. X. (Xiqiao) Feng

Contact: Prof. X. (Xiqiao) Feng

Representatives in IUTAM: Prof. Y. (Yi-long) Bai, Prof. H. (Haiyan) Hu, Prof. J  
(Jiachun) Li, Prof. W. (Wei) Yang

**China-Hong Kong (1996)**

The Hong Kong Society of Theoretical and Applied Mechanics (HKSTAM)

Department of Mechanical Engineering, City University of Hong Kong, 83 Tat Chee av.,  
Kowloon Tong, HK

President/Chair: Dr. J. (Jane) Lu

Secretary: Dr. Jeff Jianfeng Wang

Representative in IUTAM: Prof. A. (Andrew) Leung

**China-Taipei (1980)**

The Society of Theoretical and Applied Mechanics

Institute of Applied Mechanics, National Taiwan University

No. 1, Sec. 4, Roosevelt Road, Taipei, 10617, Taiwan (R.O.C.)

President/Chair: Prof. K.-C. (Kuang-Chong) Wu

Secretary: S.-D. (Sheng-Der) Chao

Contact: Prof. C.-C. (Chien-Cheng) Chang

Representatives in IUTAM: Prof. C.-C. (Chien-Cheng) Chang, Prof. W.-C. (Wei-Chung)  
Wang

**Croatia (1994)**

Croatian Society of Mechanics  
Ivana Lucica 5, HR-10000 Zagreb .  
President/Chair: Prof. I. (Ivica) Kozar  
Contact: Prof. G. (Goran) Turkalj  
Representative in IUTAM: Prof. G. (Goran) Turkalj

**Cyprus (2010) (*Associate Organization*)**

Cyprus Mathematical Society,  
36 Stanisou street, Office 102, Strovolos 2003, Nicosia  
President/Chair: Prof. G. (Gregory) Makrides  
Contact: Prof. Y.-S. (Yorgos-Socrates) Smyrlis

**Czech Republic (1993/1949)**

The National Committee of Theoretical and Applied Mechanics  
Academy of Sciences of the Czech Republic, Institute of Thermomechanics,  
Dolejškova 5, CZ-18200 Prague 8  
President/Chair: Prof. M. (Miloslav) Okrouhlík  
Secretary: Dr. J. (Jiri) Naprstek  
Contact: Prof. M. (Miloslav) Okrouhlík  
Representative in IUTAM: Prof. M. (Miloslav) Okrouhlík

**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/Chair: Prof. T. (Tom) Fenchel  
Secretary: Prof. H. (Henrik) Breuning-Madsen  
Representatives in IUTAM: Dr C. (Christian) Niordson, Prof. J.N. (Jens Nørkær)  
Sørensen

**Egypt (1976)**

Academy of Scientific Research and Technology  
Egyptian Committee of Theoretical and Applied Mechanics, 101 Kasr El Eini Street,  
Cairo, Egypt.  
President/Chair: Prof. M.K. (Mohamed) Ismail  
Secretary General: Prof. Z.Z. Momeh  
Contact: Prof. M.K. (Mohamed) Ismail  
Representative in IUTAM: Prof. M.K. (Mohamed) Ismail

**Estonia (1992)**

Estonian Committee for Mechanics,  
Akadeemia tee 21, EE-12618 Tallinn  
President/Chair: Prof. A. (Andrus) Salupere  
Contact: Prof. A. (Andrus) Salupere  
Representative in IUTAM: Prof. A. (Andrus) Salupere

**Finland (1952)**

The Finnish National Committee on Mechanics  
Aalto University, Attent. Prof. Juha Paavola, P.O.Box 12100, FIN-00076 Aalto, Finland  
President/Chair: Prof. J. (Juha) Paavola  
Secretary: Prof. R. (Reijo) Kouhia  
Contact: Prof. J. (Juha) Paavola  
Representatives in IUTAM: Prof. R. (Reijo) Kouhia, Prof. J. (Juha) Paavola

**France (1949)**

Comité National Français de Mécanique, Académie des Sciences  
23, quai Conti, F-75006 Paris  
President/Chair: Prof. P. (Pierre) Suquet  
Secretary: Prof. J. (Jacques) Magnaudet  
Contact: Prof. J. (Jacques) Magnaudet  
Representatives in IUTAM: Prof. S. (Sébastien) Candel, Prof. F. (François) Charru, Prof.  
D. (Djimedjo) Kondo, Prof. A. (Alain) Molinari

**Georgia (2000)**

National Committee of Theoretical and Applied Mechanics  
I. Vekua Institute of Applied Mathematics of Tbilisi State University, 2 University Str.,  
Tbilisi 0186  
President/Chair: Prof. G. (George) Jaiani  
Secretary-General: Prof. B. (Bakur) Gulua  
Contact: Prof. G. (George) Jaiani  
Representative in IUTAM: Prof. G. (George) Jaiani

**Germany (1950)**

Deutsches Komitee für Mechanik (DEKOMECH)  
Clausthal University of Technology, Institute of Applied Mechanics, Adolph-Roemer-  
Str. 2a, D-38678 Clausthal-Zellerfeld  
President/Chair: Prof. P. (Peter) Eberhard  
Secretary: Prof. S. (Stefan) Hartmann  
Contact: Prof. P. (Peter) Eberhard  
Representatives in IUTAM: Prof. R. (Reinhold) Kienzler, Prof. M. (Martin) Oberlack,  
Prof. R. (Robert) Seifried, Prof. A. (André) Thess

**Greece (1979)**

Hellenic Society for Theoretical and Applied Mechanics  
National Technical University of Athens, Mechanics Division, Zographou, GR-15773  
President/Chair: Prof. J.T. (John) Katsikadelis  
Secretary: Prof. H.G. (Haralambos) Georgiadis  
Representative in IUTAM: Prof. N. (Nicos) Makris

**Hungary (1948)**

Hungarian National Committee for IUTAM  
Department of Structural Mechanics, Budapest University of Technology and  
Economics, Műegyetem rkp. 3, H-1521 Budapest  
President/Chair: Prof. S. (Sandor) Kaliszky  
Secretary: Prof. G. (Gábor) Stépán  
Representative in IUTAM: Prof. G. (Gábor) Stépán

**India (1950)**

National Committee for Theoretical and Applied Mechanics of the Indian National  
Science Academy  
Bahadur Shah Zafar Marg, New Delhi - 110 002  
President/Chair: Prof. V.D. Sharma  
Contact: Prof. S. Gopalakrishnan  
Representatives in IUTAM: Dr G. (Gautam) Biswas, Dr S. (Sanjay) Mittal, Prof. V.D.  
Sharma

**Ireland (1984)**

Irish National Committee for Mathematical Sciences  
Royal Irish Academy, 19 Dawson Street, Dublin 2  
President/Chair: Prof. R. (Richard ) Timoney  
Secretary: Prof. R. (Rachel ) Quinlan  
Contact: Prof. M. (Michael) Gilchrist  
Representative in IUTAM: Prof. M. (Michael) Gilchrist

**Israel (1950)**

The Israel Society for Theoretical and Applied Mechanics (ISTAM)  
Faculty of Mechanical Engineering, Technion-Israel Institute of Technology, Haifa  
32000  
President/Chair: Prof. M.B. (Miles) Rubin  
Secretary: Prof. A. (Amir) Gat  
Contact: Prof. M.B. (Miles) Rubin  
Representatives in IUTAM: Prof. M.B. (Miles) Rubin, Prof. Z. (Zohar) Yosibash

**Italy (1949)**

Associazione Italiana di Meccanica Teorica ed Applicata

Piazza Leonardo da Vinci 32, I-20133 Milano

President/Chair: Prof. P. (Paolo) Luchini

Secretary: Prof. G. (Guido) Borino

Contact: Prof. P. (Paolo) Luchini

Representatives in IUTAM: Prof. D. (Davide) Bigoni, Prof. A. (Alessandro) Bottaro,

Prof. A. (Angelo) Morro, Prof. G. (Giuseppe) Rega

**Japan (1951)**

The National Committee for Theoretical and Applied Mechanics

Science Council of Japan, 7- 22-34 Roppongi, Minato-ku, Tokyo 106-8555

President/Chair: Prof. K. (Kikuo) Kishimoto

Contact: Prof. K. (Kikuo) Kishimoto

Representatives in IUTAM: Prof. K. (Kikuo) Kishimoto, Prof. Y. (Youichirou)

Matsumoto, Prof. N. (Naosi) Nishimura, Prof. O. (Osamu) Sano

**Korea, Republic of (2012/1989)**

Korean Committee for Theoretical and Applied Mechanics

Department of Aerospace Engineering, Seoul National University, Seoul 151-742

President/Chair: Prof. J.Y. (Jung Yul) Yoo

Contact: Prof. S.J. (Sang Joon) Lee

Representative in IUTAM: Prof. H.J. (Hyung Jin) Sung

**Latvia (1992)**

Latvian National Committee for Mechanics

Latvian Academy of Sciences, Akademijas laukums 1, Riga LV-1524

President/Chair: Prof. A. (Andrejs) Krasnikovs

Contact: Prof. A. (Andrejs) Krasnikovs

Representative in IUTAM: Prof. A. (Andrejs) Krasnikovs

**Mexico (2008)**

Mexican Academy of Sciences

Km 23.5 Carretera Federal México-Cuernavaca, "Casa Tlalpan", Av. Cipreses s/n Col.

San Andrés Totoltepec, Tlalpan, 14400 Mexico

Representative in IUTAM: Prof. E. (Eduardo) Ramos

**Netherlands (1952)**

Netherlands Mechanics Committee

c/o Eindhoven University of Technology, Department of Mechanical Engineering,  
P.O. Box 513, NL 5600 MB Eindhoven.

President/Chair: Prof. D.H. (Dick) van Campen

Contact: Prof. D.H. (Dick) van Campen

Representatives in IUTAM: Prof. M. (Marc) Geers, Prof. G. (GertJan) van Heijst

**New Zealand (1979)**

The Royal Society of New Zealand, Committee on Mathematical & Information  
Sciences

P.O. Box 598, Wellington

President: Dr N. (Neville) Jordan

Contact: Dr. P. (Paul) Behrens

Representative in IUTAM: Dr. G. (Graham) Weir

**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/Chair: Prof. J. (John) Grue

Contact: Prof. J. (John) Grue

Representative in IUTAM: Prof. J. (John) Grue

**Poland (1952)**

Committee for Mechanics of the Polish Academy of Sciences

ul. Pawlowskiego 5B, 02-106, Warszawa, Poland

President/Chair: Prof. T. (Tadeusz) Burczynski

Contact: Prof. T. (Tadeusz) Burczynski

Representatives in IUTAM: Prof. T. (Tadeusz) Burczynski, Prof. H. (Henryk) Petryk

**Portugal (1968)**

Portuguese Society of Theoretical, Applied and Computational Mechanics

Laboratorio Nacional de Engenharia Civil, Avenida do Brasil 101, 1700-066 Lisboa

President/Chair: Prof. C.A. (Carlos) Mota Soares

Contact: Prof. C.A.B. (Carlos) Pina, Prof. D.R.Z. (Dinar) Camotim

Representative in IUTAM: Prof. D.R.Z. (Dinar) Camotim

**Romania (1956)**

Romanian Academy, Department of Mathematics, Romanian National Committee of Theoretical and Applied Mechanics  
Calea Victoriei 125, 71102 Bucharest, Romania  
President/Chair: Prof. H. (Horia) Ene  
Secretary: Prof. V. (Vasile) Brinzanescu  
Representative in IUTAM: Prof. H. (Horia) Ene

**Russia (1992/1956)**

Russian National Committee on Theoretical and Applied Mechanics  
Prospekt Vernadskogo 101 : 1 , Moscow 119526  
President/Chair: Prof. I. (Irina) Goryacheva  
Secretary: Prof. V. (Vladimir) Karev  
Contact: Prof. F.L. (Felix) Chernousko, Prof. I. (Irina) Goryacheva, Prof. N.F. (Nikita) Morozov  
Representatives in IUTAM: Prof. F.L. (Felix) Chernousko, Prof. I. (Irina) Goryacheva, Prof. V. (Vladimir) Levin, Prof. N.F. (Nikita) Morozov

**Saudi Arabia (1988)**

King Abdullaziz City for Science and Technology  
Directorate of Technology and International Cooperation, P.O. Box 6086, Riyadh 11442  
President/Chair: Dr. M.I. (Mohammed ibn Ibrahim) Al-Suwaiyel  
Contact: Mr. F.S. (Fahad) Huraib, Dr. M.I. (Mohammed ibn Ibrahim) Al-Suwaiyel  
Representative in IUTAM: Dr. M.I. (Mohammed ibn Ibrahim) Al-Suwaiyel

**Serbia (2006/1952)**

Serbian Society of Mechanics  
Kneza Milosa 9/1, 11000 Belgrade  
President/Chair: Prof. D. (Dragan) Spasic  
Secretary: Prof. M. (Mihailo) Lazarevic  
Representative in IUTAM: Prof. D. (Dragan) Spasic

**Slovakia (1993)**

The Slovak Society for Mechanics  
Council of Scientific Societies, Stefánikova 49, SK-811 04 Bratislava  
President/Chair: Prof. J. (Jan) Sladek  
Contact: Prof. J. (Jan) Sladek  
Representative in IUTAM: Prof. J. (Jan) Sladek



**Slovenia (1994)**

Slovene Mechanics Society, Faculty of Mechanical Engineering  
University of Maribor, Smetanova 17, 2000 Maribor  
President/Chair: Prof. L. (Leopold) Skerget  
Secretary: Prof. J. (Jure) Marn  
Representative in IUTAM: Prof. L. (Leopold) Skerget

**South Africa (1994)**

National Research Foundation (NRF), South African Association for Theoretical and Applied Mechanics (SAAM)  
South African ICSU Secretariat, P.O. Box 2600, Pretoria 0001  
President/Chair: Prof. S. (Schalk) Kok  
Contact: Prof. S. (Schalk) Kok  
Representative in IUTAM: Prof. S. (Schalk) Kok

**Spain (1950)**

Instituto Nacional de Tecnica Aeroespacial  
Carretera de Ajalvir km. 4,00, Torrejón de Ardoz, 28850 Madrid  
Contact: Mr. A. (Angel) Moratilla  
Representative in IUTAM: Mr. A. (Angel) Moratilla

**Sweden (1950)**

Swedish National Committee for Mechanics  
Malmö University , 205 06 Malmö  
President/Chair: Prof. L. (Laszlo) Fuchs  
Secretary: Prof. M. (Mathias) Wallin  
Contact: Prof. D. (Dan) Henningson, Prof. P. (Per) Stahle  
Representatives in IUTAM: Prof. D. (Dan) Henningson, Prof. S. (Staffan) Lundström,  
Prof. P. (Per) Stahle

**Switzerland (1950)**

Board of the Federal Institutes of Technology  
(Rat der Eidgenössischen Technischen Hochschulen)  
ETH-Zentrum, CH-8092 Zürich  
President/Chair: Dr. F. (Fritz) Schiesser  
Contact: Prof. J. (Jürg) Dual, Prof. P.A. (Peter) Monkewitz  
Representatives in IUTAM: Prof. J. (Jürg) Dual, Prof. P.A. (Peter) Monkewitz

**Turkey (1977)**

Turkish National Committee of Theoretical and Applied Mechanics  
Istanbul Teknik Üniversitesi, Fen-Edebiyat Fakültesi, Maslak 80626 Istanbul  
President/Chair: Prof. Y. (Yalcin) Aköz  
Secretary: Prof. M.A. (Mehmet Ali) Tasdemir  
Contact: Prof. E.S. (Erdogan) Suhubi  
Representative in IUTAM: Prof. E.S. (Erdogan) Suhubi

**UK (1948)**

The Royal Society, UK Panel for IUTAM  
6 Carlton House Terrace, London SW1Y 5AG  
President/Chair: Prof. B.L. (Bhushan) Karihaloo  
Secretary: Prof. N. (Nigel) Peake  
Contact: Prof. N.A. (Norman) Fleck  
Representatives in IUTAM: Prof. N.A. (Norman) Fleck, Prof. B.L. (Bhushan) Karihaloo,  
Prof. N. (Nigel) Peake, Prof. T.J. (Timothy) Pedley

**Ukraine (1995)**

National Committee of Ukraine on Theoretical and Applied Mechanics  
S.P.Timoshenko Institute of Mechanics, 3 Nesterov Str., Kyiv 03680  
President/Chair: Prof. A.N. (Alexandr) Guz  
Secretary: Prof. J.J. (Jeremiah) Rushchitsky  
Representative in IUTAM: Prof. A.N. (Alexandr) Guz

**USA (1949)**

The U.S. National Committee on Theoretical and Applied Mechanics  
The National Academies, 500 Fifth Street NW, Washington, DC 20001  
President/Chair: Prof. S. (Stelios) Kyriakides  
Secretary: Prof. L. (Linda) Franzoni  
Contact: Prof. W.K. (Wing Kam) Liu  
Representatives in IUTAM: Prof. N. (Nadine) Aubry, Prof. L. P. (Linda) Franzoni, Prof.  
C.T. (Carl) Herakovich, Prof. S. (Stelios) Kyriakides, Prof. Z. (Zhigang) Suo

**Viet Nam (1990)**

Vietnam Association of Mechanics (VAM)  
264 Doi Can Str., Hanoi  
President/Chair: Prof. N. (Nguyen) Hoa Thinh  
Secretary: Prof. D. (Dinh) Van Phong  
Contact: Prof. N. (Nguyen) Tien Khiem  
Representative in IUTAM: Prof. N. (Nguyen) Tien Khiem

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## Affiliated Organizations

### **CISM (1970)**

International Centre for Mechanical Sciences  
Palazzo del Torso, Piazza Garibaldi, I-33100 Udine, Italy  
Rectors of CISM: Prof. Elisabeth Guazzelli,  
Prof. Friedrich Pfeiffer and Prof. Franz Rammerstorfer  
President/Chair: Mario Pezzetta  
Secretary: Prof. B.A. (Bernhard) Schrefler  
Contact: Prof. B.A. (Bernhard) Schrefler  
Representative of CISM in IUTAM: Prof. B.A. (Bernhard) Schrefler  
Representative of IUTAM in CISM: Prof. F. (Frederic) Dias

### **ICHMT (1972)**

International Centre for Heat and Mass Transfer  
Mechanical Engineering Dept., Middle East Technical University,  
06531 Ankara, Turkey  
President/Chair: G. (Graham) de Vahl Davis  
Secretary: Prof. F. (Faruk) Arinc  
Contact: Prof. F. (Faruk) Arinc  
Representative of ICHMT in IUTAM: Prof. F. (Faruk) Arinc  
Representative of IUTAM in ICHMT: Dr. R. (Rudolf) Dvorač

### **ICR (1974)**

International Committee on Rheology  
President/Chair: Prof. I. (Igor) Emri  
Secretary: Prof. M.H. (Manfred) Wagner  
Representative of ICR in IUTAM: Prof. L.G. (Gary) Leal  
Representative of IUTAM in ICR: *To be nominated*

### **IAVSD (1977)**

International Association for Vehicle System Dynamics  
Prof. Michael Valásek, Department of Mechanics, Faculty of Mechanical Engineering,  
Czech International University in Prague, Kalovo Nanesti 13,  
121 35 Praha 2, Czech Republic  
President/Chair: Prof. H. (Hans) True  
Secretary: Prof. M. (Michael) Valásek  
Contact: Prof. M. (Michael) Valásek  
Representative of IAVSD in IUTAM: Prof. M. (Mats) Berg  
Representative of IUTAM in IAVSD: Prof. W. (Werner) Schiehlen

**EUROMECH (1978)**

European Mechanics Society

University of Padova, Faculty of Engineering, Dipartimento di Costruzioni e Trasporti,  
35131 Padova, Italy

President/Chair: Prof. G. (GertJan) van Heijst

Secretary: Prof. P. (Pierre) Suquet

Contact: Prof. B.A. (Bernhard) Schrefler

Representative of EUROMECH in IUTAM: Prof. P. (Patrick) Huerre

Representative of IUTAM in EUROMECH: Prof. T.J. (Timothy) Pedley

**ISIMM (1978)**

International Society for the Interaction of Mechanics and Mathematics

President/Chair: Prof. A. Visintin

Secretary: Prof. U. Stefanelli

Contact: Prof. L. Truskinovsky

Representative of ISIMM in IUTAM: Prof. M.A. (Michael) Hayes

Representative of IUTAM in ISIMM: Prof. G. (Gérard) Ioss

**ICF (1978)**

International Conference on Fracture

Prof. T. Yokobori, School of Science and Engineering, Teikyo University,  
Toyosatodai 1-1, Utsunomiya, 320, Japan

President/Chair: Prof. A. (Alberto) Carpinteri

Secretary: Prof. T. (Toshimitsu) Yokobori Jr.

Representative of ICF in IUTAM: Prof. R.M. (Robert) McMeeking

Representative of IUTAM in ICF: Prof. J.B. (Jean-Baptiste) Leblond

**ICM (1982)**

International Congress on Mechanical Behaviour of Materials,

President/Chair: Prof. O. (Oliver) Kraft

Secretary: Prof. T. (Toshihiko) Hoshide

Contact: Prof. S.W. (Soo Woo) Nam

Representative of ICM in IUTAM: Prof. S.W. (Soo Woo) Nam

Representative of IUTAM in ICM: *To be nominated*

**AFMC (1982)**

Asian Fluid Mechanics Committee

Center for Atmospheric and Oceanic Sciences

Indian Institute of Science, Bangalore, India 560012

President/Chair: Prof. G. S. Bhat

Contact: Prof. G. S. Bhat

Representative of AFMC in IUTAM: Prof. G. S. Bhat

Representative of IUTAM in AFMC: Prof. F. (Frederic) Dias

**IACM (1984)**

International Association for Computational Mechanics  
International Center for Numerical Methods in Engineering,  
Edificio C-1, Gran Capitán s/n, E-08034 Barcelona, Spain  
President/Chair: Prof. G. (Genki) Yagawa  
Secretary: Prof. A. (Antonio) Huerta  
Representative of IACM in IUTAM: Prof. P. (Pierre) Ladeveze  
Representative of IUTAM in IACM: Prof. R. (Eduardo) de Arantes e Oliveira

**CACOFD (1992-2010)**

Caribbean Congress of Fluid Dynamics  
*(the acronym CACOFD has been changed into LACCOTAM in 2010 – see LACCOTAM below)*

**IABEM (1994)**

International Association for Boundary Element Methods  
President/Chair: Prof. M. (Martin) Schanz  
Representative of IABEM in IUTAM: Prof. N. (Naosi) Nishimura  
Representative of IUTAM in IABEM: Prof. N. (Naosi) Nishimura

**ISSMO (1996)**

International Society for Structural and Multidisciplinary Optimization  
President/Chair: Prof. O. (Ole) Sigmund  
Secretary: Prof. H.C. (Helder) Rodrigues  
Contact: Prof. N. (Niels) Olhoff  
Representative of ISSMO in IUTAM: Prof. H.C. (Helder) Rodrigues  
Representative of IUTAM in ISSMO: Prof. N. (Niels) 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/Chair: Prof. R. (René) Moreau  
Secretary: Prof. A. (André) Thess  
Contact: Prof. A. (André) Thess  
Representative of HYDROMAG in IUTAM: Prof. R. (René) Moreau  
Representative of IUTAM in HYDROMAG: Prof. H.K. (Keith) Moffatt

**IIAV (1997)**

International Institute of Acoustics and Vibration

Prof M. J. Crocker. Dept. of Mechanical Engineering, Auburn University,  
201 Ross Hall, Auburn, AL 36849 USA

President/Chair: Prof. M. (Marek) Pawelczyk

Secretary: Prof. S. (Semyung) Wang

Contact: Prof. M.J. (Malcolm) Crocker

Representative of IIAV in IUTAM: Prof. M.J. (Malcolm) Crocker

Representative of IUTAM in IIAV: Prof. J.D. (Jan) Achenbach

**ICA (1998)**

International Commission for Acoustics

President/Chair: Mrs. M. (Marion) Burgess

Secretary: Dr. M. (Michael) Stinson

Contact: Dr. M. (Michael) Stinson

Representative of ICA in IUTAM: Mrs. M. (Marion) Burgess

Representative of IUTAM in ICA: Prof. A. (Andrew) Norris

**ICTS (2002)**

International Congresses on Thermal Stresses

St. Raphael, Apt. 1209, 7117 Pelican Bay Blvd., Naples, FL 34108, USA

President/Chair: Prof. R.B. (Richard) Hetnarski

Secretary: Prof. T.R. (Theodore) Tauchert

Contact: Prof. R.B. (Richard) Hetnarski

Representative of ICTS in IUTAM: Prof. R.B. (Richard) Hetnarski

Representative of IUTAM in ICTS: Prof. M. (Masato) Abe

**BICTAM (2010)**

Beijing International Center for Theoretical and Applied Mechanics

Institute of Mechanics, Chinese Academy of Sciences, 15 Beisihuanxi Road, 100190,  
Beijing, China

President/Chair: Prof. J. (Jiachun) Li

President/Chair: Prof. H. (Haiyan) Hu

Representative of BICTAM in IUTAM: Prof. H. (Haiyan) Hu

Representative of IUTAM in BICTAM: Prof. N. (Narinder) Gupta

**LACCOTAM (2010)**

Latin American and Caribbean Conference on Theoretical and Applied Mechanics

c/o The Department of Math and Computer Science, The University of the West Indies,  
St. Augustine, Trinidad, West Indies

President/Chair: Prof. F. (F.) Malpica

Secretary: Dr. D. M. G. (Donna) Comissiong

Contact: Prof. H. (Harold) Ramkissoon

Representative of LACCOTAM in IUTAM: Prof. H. (Harold) Ramkissoon

Representative of IUTAM in LACCOTAM: *To be nominated*

## Members of the General Assembly

<i>Member</i>	<i>Representative of</i>	<i>Remarks</i>
Prof. J. (Jan) Achenbach		Member-at-Large
Prof. A. (Andreas) Acrivos		Member-at-Large
Dr. M.I. (Mohammed ibn Ibrahim) Al-Suwaiyel	Saudi Arabia	
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Prof. D. (Davide) Bigoni	Italy	
Prof. G. (Gautam) Biswas	India	
Prof. B. (Bruno) Boley		Member-at-Large
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Prof. F. (Francois) Charru	France	
Prof. F.L. (Felix) Chernousko	Russia	
Prof. F. (Frédéric) Dias		Bureau member
Prof. E. (Erik) Dick	Belgium	
Prof. J. (Jürg) Dual	Switzerland	
Prof. P. (Peter) Eberhard		Bureau member
Prof. H. (Horia) Ene	Romania	
Prof. N.A. (Norman) Fleck	UK	Chair SP Solids
Prof. M. (Maciej) Floryan	Canada	
Prof. L. P. (Linda) Franzoni	USA	
Prof. A. (Atila) Freire	Brazil	
Prof. B. (Ben) Freund		Member-at-Large
Prof. M.G.D. (Marc) Geers	Netherlands	
Prof. M. (Michael ) Gilchrist	Ireland	
Prof. I.G. (Irina) Goryacheva	Russia	
Prof. J. (John) Grue	Norway	
Prof. A.N. (Alexandr) Guz	Ukraine	
Prof. G.J.F.(GertJan) van Heijst	Netherlands	
Prof. D. (Dan) Henningson	Sweden	
Prof. C.T. (Carl) Herakovich	USA	

<i>Member</i>	<i>Representative of</i>	<i>Remarks</i>
Prof. H. (Haiyan) Hu	China	Representative of BICTAM
Prof. M.K. (Mohamed) Ismail	Egypt	
Prof. G. (George) Jaiani	Georgia	
Prof. B.L. (Bhushan) Karihaloo	UK	
Prof. R. (Reinhold) Kienzler	Germany	
Prof. K. (Kikuo) Kishimoto	Japan	
Prof. A. (Alfred) Kluwick	Austria	
Prof. S. (Schalk) Kok	South Africa	
Prof. D. (Djimedjo) Kondo	France	
Prof. R. (Reijo) Kouhia	Finland	
Prof. A. (Andrejs) Krasnikovs	Latvia	
Prof. S. (Stelios) Kyriakides	USA	
Prof. A.Y.T. (Andrew) Leung	China-Hong Kong	
Prof. V. (Vladimir) Levin	Russia	
Prof. J. (Jiachun) Li	China	
Prof. F. (Fernando) Lund	Chile	
Prof. S. (Staffan) Lundstrom	Sweden	
Prof. G. (Giulio) Maier		Member-at-Large
Prof. N. (Nicos) Makris	Greece	
Prof. Y. (Yvan) Marusic	Australia	
Prof. Y. (Youichirou) Matsumoto	Japan	
Prof. S. (Sanjay) Mittal	India	
Prof. K. (Keith) Moffatt		Member-at-Large Chair WP-9
Prof. A. (Alain) Molinari	France	
Prof. P.A. (Peter) Monkewitz	Switzerland	
Mr. A. (Angel) Moratilla	Spain	
Prof. N.F. (Nikita) Morozov	Russia	
Prof. A. (Angelo) Morro	Italy	
Prof. R. (Roddam) Narasimha		Member-at-Large
Dr C. (Christian) Niordson	Denmark	
Prof. N. (Naosi) Nishimura	Japan	Representative of IABEM
Prof. M. (Martin ) Oberlack	Germany	
Prof. M. (Miloslav) Okrouhlik	Czech Republic	
Prof. N. (Niels) Olhoff		Member-at-Large
Prof. J. (Juha) Paavola	Finland	
Prof. N. (Nigel) Peake	UK	
Prof. T.J. (Timothy) Pedley	UK	Bureau member
Prof. H. (Henryk) Petryk	Poland	
Prof. A. (Alvaro) Prata	Brazil	
Prof. S. (Stefan) Radev	Bulgaria	
Prof. E. (Eduardo ) Ramos	Mexico	



<b>Member</b>	<b>Representative of</b>	<b>Remarks</b>
Prof. G. (Giuseppe) Rega	Italy	
Prof. M.B. (Miles) Rubin	Israel	Bureau member
Prof. A. (Andrus) Salupere	Estonia	
Prof. O. (Osamu) Sano	Japan	
Prof. S.B. (Stuart) Savage	Canada	
Prof. W. (Werner) Schiehlen		Member-at-Large
Prof. B.A. (Bernhard) Schrefler		Bureau member Representative of CISM
Prof. R. (Robert) Seifried	Germany	
Prof. V.D. Sharma	India	
Prof. S. (Suresh) Shrivastava	Canada	
Prof. L. (Leopold) Skerget	Slovenia	
Prof. J. (Jan) Sladek	Slovakia	
Prof. S. (Scott) Sloan	Australia	
Prof. Y.S. (Yorgos-Socrates) Smyrlis	Cyprus	
Prof. D. (Dragan) Spasic	Serbia	
Prof. P. (Per) Stahle	Sweden	
Prof. G. (Gabor) Stepan	Hungary	
Prof. E.S. (Erdogan) Suhubi	Turkey	
Prof. H.J. (Hyung Jin) Sung	Republic of Korea	
Prof. Z. (Zhigang) Suo	USA	
Prof. J.N. (Jens Nørkær) Sørensen	Denmark	
Prof. T. (Tomomasa) Tatsumi		Member-at-Large
Prof. A. (André) Thess	Germany	
Prof. N. (Nguyen) Tien Khiem	Viet Nam	
Prof. G. (Goran) Turkalj	Croatia	
Prof. V. (Viggo) Tvergaard		Bureau member
Prof. D. (Dirk) Vandepitte	Belgium	
Prof. W.C. (Wei Chung) Wang	China-Taipei	
Prof. G. (Graham) Weir	New Zealand	
Prof. L. (Leen) van Wijngaarden		Member-at-Large
Prof. W. (Wei) Yang	China	Bureau member Chair WP-7
Prof. Z. (Zohar) Yosibash	Israel	
Prof. J.W. (Jean) Zu	Canada	

## Observers to the General Assembly

<i>Name</i>	<i>Country</i>	<i>Representative of</i>
Prof. O. (Olivier) Allix	France	Chair WP-3
Prof. F. (Faruk) Arinc	Turkey	ICHMT
Prof. M. (Mats) Berg	Sweden	IAVSD
Prof. G.S. Bhat	India	AFMC
Prof. M. (Marion) Burgess	Australia	ICA
Prof. M.J. (Malcolm) Crocker	USA	IIAV
Prof. J. (Jacob) Fish	USA	Chair WP-5
Prof. M. (Michael) Hayes	Ireland	ISIMM
Prof. R.B. (Richard) Hetnarski	USA	ICTS
Prof. G. (Gerhard) Holzapfel	Austria	Chair WP-6
Prof. P. (Patrick) Huerre	France	EUROMECH
Prof. P. (Pierre) Ladeveze	France	IACM
Prof. G. (Gary) Leal	USA	ICR Chair WP-1 Chair SP Fluids
Prof. P. (Paul) Linden	UK	Chair WP-8
Prof. F. (Freddy) Malpica	Venezuela	LACCOTAM
Prof. R.M. (Robert) McMeeking	USA	ICF Chair WP-4
Prof. R. (René) Moreau	France	HYDROMAG
Prof. S.W. (Soo Woo) Nam	Korea	ICM
Prof. H. (Helder) Rodrigues	Portugal	ISSMO
Prof. H.Y. (Hiroshi) Yabuno	Japan	Chair WP-2

**Members of the Congress Committee**

\*Year indicates end of term

<b>Member</b>	<b>Country</b>	<b>Year*</b>	<b>Remarks</b>
Prof. L. (Leslie) Banks-Sills	Israel	2016	
Prof. D.H. (Dick) van Campen	Netherlands	2016	Member of XCCC
Prof. R. (Renato) Cotta	Brasil	2014	
Prof. F. (Frédéric) Dias	France	2016	
Prof. P. (Peter) Eberhard	Germany	2014	
Prof. B. (Bruno) Eckhart	Germany	2014	Member of XCCC
Prof. H. (Horacio) Espinosa	USA	2016	
Prof. M. (Maciej) Floryan	Canada	2016	Member of XCCC
Prof H. (Huajian) Gao	USA	2016	
Prof. N.K. (Narinder) Gupta	India	2016	
Prof. G. (Gertjan) van Heijst	Netherlands	2014	
Prof. C.T. (Carl) Herakovich	USA	2014	
Prof. P. (Patrick) Huerre	France	2016	
Prof. Y. (Yukio) Kaneda	Japan	2016	
Prof. A. (Ann) Karajozian	USA	2016	
Prof. D. (Djimedo) Kondo	France	2016	
Prof. J.B. (Jean-Baptiste) Leblond	France	2014	
Prof. T. (Tianjian ) Lu	China	2016	
Prof. J. (Jacques) Magnaudet	France	2016	Member of XCCC
Prof. N. (Nicos) Makris	Greece	2016	
Prof. V. (Valery) Matveenko	Russia	2016	
Prof. R.M. (Robert) McMeeking	USA	2016	Secretary of XCCC
Prof. N.F. (Nikita) Morozov	Russia	2014	
Prof. N. (Nigel) Peake	UK	2014	
Prof. R. (Renzo) Piva	Italy	2016	
Prof. K. Ravi-Chandar	USA	2014	
Prof. E. (Eric) Shaqfeh	USA	2016	
Prof. G. (Gabor) Stépan	Hungary	2014	Member of XCCC
Prof. H. (Howard) Stone	USA	2014	
Prof. K. (Kazuo) Tanishita	Japan	2014	
Prof. V. (Viggo) Tvergaard	Denmark	2016	President of XCCC
Prof. J. (Jens) Walther	Denmark	2016	
Prof. G. (Genki) Yagawa	Japan	2014	

## Members of the Symposia Panels

In 1977 the Bureau of IUTAM 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.

<b>Symposia Panel for Fluid Mechanics:</b>			
<i>Member</i>	<i>Country</i>	<i>Year*</i>	<i>Remarks</i>
Prof. H. (Haecheon) Choi	Korea	2014	
Prof. L.G. (Gary) Leal	USA	2016	Chair
Prof. N. (Nigel) Peake	UK	2016	
Prof. K. R. (Katepalli) Sreenivasan	USA	2014	
Prof. M.A. (Michael) Stiasnie	Israel	2014	
<b>Symposia Panel for Solid Mechanics</b>			
<i>Member</i>	<i>Country</i>	<i>Year*</i>	<i>Remarks</i>
Prof. A. (Alberto) Corigliano	Italy	2016	
Prof. N.A. (Norman) Fleck	UK	2016	Chair
Prof. H. (Huajian) Gao	USA	2016	
Prof. J.-B. (Jean-Baptiste) Leblond	France	2016	
Prof. G. (Gábor) Stépán	Hungary	2014	

\*Year indicates end of term

## Members of the Working Parties

Based on the assessment of IUTAM, the General Assembly agreed in Cambridge, UK (August 2002) to establish nine Working Parties.

A Working Party in a certain subfield of the mechanics is meant to structure the overlapping activities between IUTAM on the one hand and the relevant Affiliated Organizations and sister International Unions on the other. Also, Working Parties should identify important growth areas of the field.

More detailed background information on Working Parties, including their Terms of Reference, is given in the IUTAM Report on Working Parties.

A listing of the Working Parties and their current membership is given below.

**WP-1: Non-Newtonian Fluid Mechanics and Rheology**

Members: Prof. L.G. (Gary) Leal, USA (chair); Prof. A.N. (Antony) Beris;  
Prof. J. R. A. (Anthony) Pearson, UK; Prof. T. (Tam) Sridhar, Australia;  
Prof. D. (Dimitri) Vlassopoulos, Greece; Prof. H. (Hiroshi) Watanabe, Japan

**WP-2: Dynamical Systems and Mechatronics**

Members: Prof. H.Y. (Hiroshi) Yabuno, Japan (chair); Prof. F.L. (Felix) Chernousko,  
Russia; Prof. R.S. (Robin) Sharp, UK; Prof. M. (Masayoshi) Tomizuka, USA

**WP-3: Mechanics of Materials**

Members: Prof. O. (Olivier) Allix, France (chair); Prof. C.T. (Carl) Herakovich, USA;  
Prof. T. (Tatsuo) Inoue, Japan; Prof. S. (Stelios) Kyriakides, USA; Prof. Y. (Yulong) Li,  
China

**WP-4: Materials Processing**

Members: Prof. R.M. (Robert) McMeeking, USA (chair); Prof. S. (Shigeo) Asai, Japan;  
Prof. Y. (Yves) Brechet, France; Prof. R. (René) Moreau, France;  
Prof. A. (André) Thess, Germany; Prof. C.L. (Charles) Tucker III, USA

**WP-5: Computational Fluid and Solid Mechanics**

(this WP acts as link between IUTAM and IACM)

Members: Prof. J. (Jacob) Fish, USA (chair); Prof. E. R. (Eduardo) de Arantes  
e Oliveira, Portugal; Prof. J. T. (Tinsley) Oden, USA, Prof. M.W. (Mingwu) Yuan,  
China

**WP-6: Biomechanics**

Members: Dr. G.A. (Gerhard) Holzapfel, Austria (chair); Prof. D. (Dominique) Barthès-  
Biesel, France; Prof. J.E. (Joan) Bechtold, USA; Prof. R.W. (Ray) Ogden, UK;  
Prof. K. (Kazuo) Tanishita, Japan

**WP-7: Nano- and Micro-Scale Phenomena in Mechanics**

Members: Prof. W. (Wei) Yang, China (chair); Prof. F. (Fernand) Ellyin, Canada;  
Prof. Y. (Yonggang) Huang, USA; Dr. G. (Graham) Weir, New Zealand

**WP-8: Geophysical and Environmental Mechanics**

Members: Prof. P.F. (Paul) Linden, UK (chair); Prof. H. (Hervé) Le Treut, France;  
Prof. J.W. (John) Rudnicki, USA; Prof. J. Srinivasan, India, Dr P. (Luis) Thomas,  
Argentina

**WP-9: Education in Mechanics and Capacity Building**

Members: Prof. H.K. (Keith) Moffatt (chair); Prof. L. (Luiz) Bevilacqua, Brazil; Dr. I.  
(Igle) Gledhill, South Africa; Prof. H. (Haiyan) Hu, China; Prof. K.R. (Katepalli)  
Sreenivasan, USA

## Donations in 2013

Donations given to IUTAM Symposia are recorded under the heading “Financial Support” of the Reports of Symposia and Summer Schools held in 2013.

## IUTAM Representation in ICSU and its Scientific Committees

<i>Acronym</i>	<i>Organization/Scientific Committee</i>	<i>Representative of IUTAM</i>
ICSU	International Council for Science	Prof. V. Tvergaard
COSPAR	Committee on Space Research	<i>To be nominated</i>
SCOR	Scientific Committee on Oceanic Research	<i>To be nominated</i>

## Report of IUTAM Symposia held in 2013

### 13-1 IUTAM Symposium on Vortex Dynamics: Formation, Structure and Function

Fukuoka, Japan, March 10 – March 14, 2013

The IUTAM Symposium on Vortex Dynamics: Formation, Structure and Function was held at the Centennial Hall, Kyushu University School of Medicine, Fukuoka, Japan, during the week of March 10-14, 2013.

#### a) Scientific Committee

Yasuhide Fukumoto (Japan – Chairman), Darren G. Crowdy (UK), Stephane Le Dizès (France), Stefan Llewellyn Smith (USA), Paul K. Newton (USA), Renzo L. Ricca (Italy), GertJan van Heijst (Netherlands, IUTAM representative).

#### b) Short summary of scientific progress achieved

This symposium was a continuation, five years on, of the IUTAM symposium "150 Years of Vortex Dynamics", Lyngby, Denmark, organized by the late Professor Hassan Aref. The symposium started with a recollection of the legacy of the late Professors H. Aref and V. Meleshko, who both passed away in 2010. The continuous development of numerical method and new experimental results has stimulated the development of new mathematical methods and theoretical concepts, bringing in novel techniques in vortex dynamics, in such aspects as vortex equilibria, spectra, instability and nonlinear dynamics of vortices in barotropic and baroclinic fluids, chaos, classical and quantum turbulence, and wall turbulence, flow separation and vortex-body interactions. Topical applications include biological locomotion, environmental problems, and Bose-Einstein condensates in condensed matter theory. The symposium registered the successful progress made over the past five years.

Central issues in theoretical, numerical and experimental aspects of vortex dynamics were covered during the Symposium. Some of the topics followed the themes presented in the IUTAM symposium "Topological Fluid Dynamics", Cambridge, UK, 2012.

- i. The dynamics of point vortices in domains of non-trivial topology, its Hamiltonian formulation and new statistical approaches.
- ii. 3D instability of vortices, with effects of compressibility and stratification.
- iii. Stratified vortices in the atmosphere and oceans and MHD vortices in astrophysics.
- iv. Numerical methods for calculating vortex equilibria.
- v. Numerical methods for calculating separation of vortices and vortex-vortex interactions with their application to fish and insect locomotion and wind turbines.
- vi. Vortex structures and the reconnection of turbulence.

vii. Transition of wall turbulence and bursts in turbulent boundary layer.

The symposium started with a session commemorating the legacy of the work of the late Professors H. Aref and V. Meleshko. Both had a great interest in historical aspects of fluid dynamics. Building on this knowledge, Professor Aref revitalized the study of point vortices, investigating integrable and chaotic motion, chaotic advection and N-vortex equilibria. Professor Meleshko's interests spanned research areas from fluid to solid mechanics. Following Chaplygin's work, he developed a theory of the interaction of vortex dipoles, with numerical simulations and laboratory experiments.

New directions discussed at the Symposium included:

- Vortex methods. Numerical methods discretizing vorticity with Lagrangian particles/panels have been extended to flows with distributed vorticity on rotating spheres, in stratified flows and in the presence of magnetic field.
- Numerical methods for calculating vortex shedding. Methods were presented to calculate vortex shedding from a moving or fixed solid body using a variety of techniques with a goal of investigating the unsteady dynamics of flexible bodies with sharp edges over a wide range of Reynolds number.
- The statistical behavior of systems of point vortices. Onsager's conjecture of self-organization of a large number of point vortices, corresponding to negative temperatures, has been numerically tested with high accuracy. It is claimed that, for point vortices on a sphere, the inverse cascade of the energy is halted, contrary to Onsager's conjecture, possibly because of lack of ergodicity. On the other hand, a solution whose streamfunction blows up at finite points is found to the mean-field equations governing the statistical equilibria of vortices. The implication of the singularity remains to be explored.
- Topological aspects. The Jones polynomial invariant of knot theory was interpreted as a new invariant of ideal vortex dynamics. Vortex motion and streamline topology in multiply connected domains were considered together with their braid word description.
- Superfluid vortex dynamics. Common features of classical and quantum turbulence, such as vortex interaction and reconnection, were clarified. The inertial range, with a power law for the energy spectrum, was identified for a sample of trapped superfluid Rb atoms. A model of rotational internal structure for quantum vortices was proposed.
- Visualization of vortical structure. Advanced experimental techniques for flow visualization have revealed fine structure in the vortex cores of unstable vortex pairs, interacting with a wall, pairing instability of helical vortices, and polygonal patterns of a rotating flow with a free surface. Combined with theory and DNS for the turbulence in a precessing sphere, it was shown that the bright pattern of reflective flakes does not represent the instantaneous flow field.



- Vortex-wave interaction. Mathematical methods, as exemplified by singular perturbation techniques and complex-function theory, have been developed for dealing with the back reaction of sound, (internal) gravity and inertial waves on two- and three-dimensional dynamics of vortices with distributed vorticity. The ubiquity of radiative instability was clarified.
- Vortex tubes in turbulence. A method was proposed for numerically tracking the evolution of Lagrangian-like vortex-tube structures in turbulence, through the formation to reconnection at later times. Stretching mechanism of turbulent vortex rings, going through reconnections, was shown to be tied with the Kolmogorov law of the energy spectrum.
- Homogeneous shear and wall-bounded turbulence. Solutions representing intermittent bursts were numerically obtained both by DNS and as nonlinear unstable equilibrium solutions. Strong bursts play an important role for energy production in shear flows which are not subject to inflectional instabilities.

### c) Countries represented and number of participants

The meeting attracted 133 participants from institutions located in 16 different countries: Algeria, Brazil, Canada, China, France, Germany, India, Italy, Japan, Netherlands, Poland, Russia Federation, Spain, UK, Ukraine and USA. More than 50% of the delegates were from overseas, and 25% of the delegates were postgraduate students or postdoctoral researchers.

### d) Publication of Proceedings

A contract to publish selected papers in a Special Issue of Fluid Dynamics Research has been signed with IOP Publishing. The expected date of publication is June 2014.

### e) Financial support

The following institutions have provided financial support for the Symposium: IUTAM (\$6,000), Expo Commemorative Fund (JPY1,634,000), Ministry of Education, Japan (JPY1,083,000), Japan Sci. Tech. Agency (JPY453,000), Kyushu University (JPY274,000).

### f) Scientific program

**Sunday 10 March 2013** *Main Topic: Legacy of Profs. Aref and Meleshko*

11h00 Paul Newton (USC, USA) – Hassan Aref and the N–vortex problem

11h30 GertJan van Heijst (Eindhoven University of Technology, Netherlands) – Professor Slava Meleshko and his fascination of vortices

14h00 Darren Crowdy (Imperial College, UK) – Hollow vortices: New results for an old model (Invited)

14h40 Yoshifumi Kimura (Nagoya, Japan) – A route through Kelvin–Helmholtz billows in stably stratified turbulence

15h00 Mark Stremler (Virginia Tech, USA) – On point vortex models of bluff body wakes

15h40 Renzo Ricca (Milano–Bicocca, Italy) – The Jones polynomial as a new invariant of topological fluid dynamics

16h00 Stephane Le Dizès (IRPHE, France) – Radiative instability of vortices

16h20 Stefan Llewellyn Smith (UCSD, USA) – Compressible point vortices

17h00 Luca Zannetti (Politecnico di Torino, Italy) – Models for inviscid wakes past bluff bodies

17h20 Vitalii Ostrovskiy (USC, USA) – Stability of icosahedral point vortex configurations on a sphere

17h40 GertJan van Heijst (Eindhoven University of Technology, Netherlands) – Point vortex motion inside a circular domain – short tribute to Slava Meleshko

**Monday 11 March 2013 Main Topic: Vortices in Stratified and Rotating Fluids**

09h00 Paul Billant (LadHyX, France) – Towards a theory for vortex filaments in stratified–rotating fluids (Invited)

09h40 Xavier Carton (UBO, France) – Stability of cyclones and anticyclones in a multi–layer quasi–geostrophic model, with application to mediterranean water eddies

10h00 Yue–Kin Tsang (St Andrews, UK) – Ageostrophic effects on the evolution of ellipsoidal vortices

10h40 Hiroshi Niino (Tokyo, Japan) – An idealized numerical experiment on tropical cyclogenesis due to breakdown of intertropical convergence zone

11h00 David Dritschel (St Andrews, Scotland, UK) – Onsager's conjecture of self–organisation and the inverse cascade of inviscid two–dimensional turbulence on a sphere

11h20 Freddy Bouchet (ENS–Lyon, France) – Stochastic averaging, large deviations, and random transitions for the dynamics of 2D and geostrophic turbulent vortices

11h40 Atsushi Mizuta (Kyoto, Japan) – Transition of universality observed in 2D inverse cascade

**Main Topic: Topological Vorticity Dynamics**

15h20 P. J. Morrison (Texas, USA) – Calculation of vortex states using dissipative structures with Dirac constraint theory (Invited)

16h00 Gregory Baker (Ohio State, USA) – Behavior of the curvature on the boundaries of vortex patches

16h20 Tsutomu Kambe (Tokyo, Japan) – Superfluid flow can be rotational ?

17h00 Tom Ashbee (UCL, UK) – Generalized Hamiltonian point vortex dynamics on arbitrary domains using the method of fundamental solutions

17h20 Takashi Sakajo (Hokkaido, Japan) – Streamline topologies for structurally stable vortex flows in multiply connected domains and their word representations

17h40 Rhodri Nelson (Hokkaido, Japan) – Applications of vortex dynamics in multiply connected domains

**Tuesday 12 March 2013 Main Topic: Stability of Vortices**

09h00 Charles H. K. Williamson (Cornell, USA) – Flow phenomena, vortex dynamics and instabilities of vortex pairs (Invited)

09h40 Thomas Leweke (CNRS, France) – Experiments on the pairing instability in helical vortices

10h00 Philippe Meliga (CNRS, France) – A weakly nonlinear mechanism for mode selection in swirling jets

10h40 David Fabre (Toulouse, France) – Instabilities of a swirling flow with a free surface

11h00 Oleg Kirillov (Helmholtz–Zentrum Dresden–Rossendorf, Germany) – WKB instability thresholds of the magnetized cylindrical Couette–Taylor flow in helical magnetic fields

11h20 Takayuki Gau (Tohoku, Japan) – Modal and non–modal stability of two–dimensional Taylor–Green vortices

11h40 Xavier Riedinger (Exeter, UK) – Shear instability in shallow water with a smoothed broken velocity profile

**Wednesday 13 March 2013 Main Topic: Vorticity in Turbulence**

09h00 D. I. Pullin (Caltech, USA) – Whither vortex tubes? (Invited)

09h40 Robert Kerr (Warwick, UK) – Moment growth and scaling near reconnection

10h00 Bartosz Protas (McMaster, Canada) – Vortices, maximum growth and the problem of finite–time singularity formation

10h40 Atsushi Sekimoto (Universidad Politecnica Madrid, Spain) – Inclined–vortex solutions in homogeneous shear flow

11h00 Javier Jiménez (Universidad Politecnica, Spain) – Bursting in shear flows

11h20 Mikio Hino (Tokyo Institute of Technology, Japan) – The large–scale coherent structure of plant canopy flows

11h40 Saleh Tanveer (Ohio State, USA) – Rigorous analytical approximations for Blasius similarity solution

**Main Topic: Environmental and Biological Vorticity Dynamics**

15h20 Yuji Ohya (Kyushu, Japan) – Bluff body flow and vortex (Invited)

16h00 Dmitry Kolomenskiy (CERFACS, France) – Vortex shedding from rotating wings

16h20 Scott Kelly (North Carolina at Charlotte, USA) – Self–propulsion of free solid bodies via localized singular vortex shedding in two– and three–dimensional ideal fluids

17h00 Chuijie Wu (Dalian University of Technology, China) – Vorticity dynamics and swimming control of 3D bionic fish

17h20 Jiezhi Wu (Peking, China) – Lamb vector's counterpart in viscous compressible aerodynamics

**Thursday 14 March 2013 Main Topic: Creation of Vortices and Vortex Methods**

09h00 Shigeo Kida (Doshisha, Japan) – Bright pattern of reflective flakes in a precessing sphere (Invited)

09h40 Robert Krasny (Michigan, USA) – A particle/panel method for the barotropic vorticity equation on a rotating sphere

10h00 Monika Nitsche (New Mexico, USA) – Viscous starting flow past flat plates

10h40 Carlo Barenghi (Newcastle, UK) – Turbulent vortex filaments

11h00 Vanderlei Bagnato (Sao Paulo, Brazil) – Quantum turbulence in an atomic trapped superfluid: Main characteristics and the observation of power law in the kinetic energy spectrum

11h20 Eva Kanso (USC, USA) – Dipole lattices

11h40 Alexander Kilin (Udmurt State, Russia) – The dynamics of vortex rings: leapfrogging, choreographies and the stability problem

**Main Topic: Equilibria and Statistics of Vortices**

13h40 Paolo Luzzatto-Fegiz (Cambridge, UK) – Bifurcation structure and stability of families of two-dimensional, opposite-signed vortex pairs (Invited)

14h20 Zensho Yoshida (Tokyo, Japan) – Unfreezing Casimir invariants — application to a Hamiltonian description of tearing-mode instability

14h40 Daniel Freilich (UCSD, USA) – Sadovskii-type vortex model

15h20 Gavin Esler (UCL, UK) – Statistical fluctuations of the vorticity distribution of a neutral point vortex gas

15h40 Hiroshi Ohtsuka (Miyazaki, Japan) – On some properties of mean fields of equilibrium vortices described by the Hamiltonian of vortices

16h00 Pierre-Henri Chavanis (Laboratoire de Physique Theorique, France) – Statistical mechanics of geophysical flows in the Gaussian approximation

**Poster data**

A1. Nadezhda Erdakova (Udmurt State, Russia) - On the dynamics of point vortices in an annular region

A2. Marie Farge (ENS, France) - Production of dissipative vortices by solid bodies in incompressible fluid flows: Comparison between Prandtl, Navier-Stokes and Euler solutions

A3. Patrick Folz (UCSD, USA) - Asymmetric vortex interactions in the presence of background shear

A4. Yasuhide Fukumoto (Kyushu, Japan) - Lagrangian approach to weakly nonlinear interaction of Kelvin waves and a symmetry-breaking bifurcation of a rotating flow

- A5. Keita Iga (Tokyo, Japan) - Various phenomena on a water vortex in a cylindrical tank over a rotating bottom
- A6. Tatiana Ivanova (Udmurt State, Russia) - Numerical and analytical researches on the equilibrium of a liquid self-gravitating elliptic cylinder with internal rotation
- A7. Andrzej Kosior (Wrocław University of Technology, Poland) - Influence of the viscosity on vortex tube reconnection using vortex particle method and parallel computations on GPUs
- A8. Tomasz Kozłowski (Wrocław University of Technology, Poland) - Numerical study of vortex wake behind the flapping profile
- A9. Paul Krueger (Southern Methodist, USA) - On the vorticity distribution in thick-core vortex rings formed by transient jet ejection from a tube
- A10. Henryk Kudela (Wrocław University of Technology, Poland) - Self-similar collapse of  $n$ -vortices
- A11. Yuko Matsumoto (Numazu College of Technology, Japan) - A dynamical system of interacting dipoles in two-dimensional flows
- A12. Mikhail Sokolovskiy (Water Problems Institute of RAS, Russia) - Generalized choreographies in vortex problems of geophysical fluid dynamics
- A13. Kazuyuki Ueno (Tohoku, Japan) - A density of impulse for incompressible flow fields
- A14. John Wells (Ritsumeikan, Japan) - Kinematical and dynamical effects of vorticity at a free surface
- A15. Yuichi Yatsuyanagi (Shizuoka, Japan) - Observation of locally different temperature for equilibrium two-dimensional point vortex system
- A16. Junshi Ito (Tokyo, Japan) - Formation mechanism of dust devil-like vortices in atmospheric boundary layers
- A17. Xavier Perrot (St Andrews, UK) - 3D interaction of vortex in a QG model with buoyancy boundary condition
- A18. Francesco Volponi (Tokyo, Japan) - Linear convection and the accretion of nearly Keplerian hydrodynamic discs with full stratification
- A19. Yasunori Maekawa (Kobe, Japan) - On the inviscid limit problem for viscous incompressible flows in the half plane
- A20. Sherwin Maslowe (McGill, Canada) - Inviscid instability of a trailing vortex with Moore-Saffman velocity profiles
- A21. Takahiro Nishiyama (Yamaguchi, Japan) - Algebraic approach to non-integrability of streamlines in a steady Stokes flow
- A22. Ken Sawada (Meteorological Col., Japan) - Mean field equation for vortex filament systems in the continuous path model
- B1. Tadashi Ohtsuka (Kyushu, Japan) - Performance of an anisotropy-resolving subgrid-scale model for complex turbulence with massive flow separation
- B2. Dmytro Cherniy (Kiev Taras Shevchenko, Ukraine) - The vortex model of a viscous wall's layer

- B3. Alexandre Gourjii (National tech. Univ., Ukraine) - Modeling of propagation of a passive impurity on the surface of sea straits
- B4. Makoto Iima (Hiroshima, Japan) - Synchronization of two spring-loaded cylinders in a uniform flow
- B5. Katsuya Ishii (Nagoya, Japan) - Vortical flow structure of the Taconis oscillations in a closed tube
- B6. Taizo Kobayashi (Kyushu, Japan) - Interaction between compressible fluid and sound in a flue instrument.
- B7. Hamid Oualli (Ecole Mili. Polytechnique, Algeria) - Taylor vortices destruction using the inner cylinder cross-section variation in presence of flow free surface
- B8. Evgeny Ryzhov (V.I.I'ichev Pacific Oceanological Institute, Russia) - Self-propagating vortex pair passing over delta-shaped submerged obstacle
- B9. Junya Yoshida (Tokyo Univ. Agri. and Tech., Japan) - Collision of a vortex ring on the granular layer
- B10. Valery Zyryanov (Institute of Waters Problems of RAS, Russia) - Toroidal vortices over submarine obstacles
- B11. Yuji Hattori (Tohoku, Japan) - Evolution of localized disturbances in the elliptical flow
- B12. Tatsuya Yasuda (Osaka, Japan) - Large-eddy simulation of hyperbolic stagnation-point flow
- B13. Yohei Kawazura (Tokyo, Japan) - Structure formation of thermal-driven plasma turbulence
- B14. Konstantin Koshel (V.I. Il'ichev Pacific Oceanological Institute, Russia) - Parametric instability of a point-vortex pair in a flow with shear and rotation
- B15. Takeshi Matsumoto (Kyoto, Japan) - Stretching and compression dynamics in a turbulent viscoelastic fluid flow
- B16. Chihiro Matsuoka (Ehime, Japan) - Nonlinear motion of non-uniform double current-vortex sheets in magnetohydrodynamic flows
- B17. Katsunobu Nishihara (Osaka, Japan) - Magnetic field amplification by the Richtmyer-Meshkov instability and dynamics of nonuniform double-current vortex with density stratification
- B18. Takayoshi Sano (Osaka, Japan) - Magnetic field amplification associated with the nonlinear growth of Richtmyer-Meshkov instability
- B19. Yoichi Sawamura (Nagoya, Japan) - Numerical simulations of vortex generation and evolution around a maple seed using a volume penalization method
- B20. Kai Schneider (Aix-Marseille, France) - Self-organization of three-dimensional magnetohydrodynamic flows in confined toroidal geometries
- B21. S. Sharma (IIT Bombay, India) - Control of Benard-Karman instability by means of streamwise vortices generated by obliquely segmented blunt trailing edge
- B22. Masaki Shimizu (Osaka, Japan) - The splitting of a turbulent puff in pipe flow

**Report composed by Y. Fukumoto**

**13-2 IUTAM Symposium on Nonlinear Interfacial Wave Phenomena from the Micro- to the Macro-scale**

Limassol, Cyprus, April 14 – April 18, 2013

The IUTAM Symposium on Nonlinear Interfacial Wave Phenomena from the micro- to the macro-scale was held at the Mediterranean Beach Hotel, Limassol, Cyprus, during the week of April 14–18, 2013.

**a) Scientific and Organizing Committee**

Onno Bokhove (Netherlands), Thomas Bridges (UK), Paul Christodoulides (Cyprus), Frederic Dias (IUTAM Representative), James Duncan (USA), Mark Groves (Germany), Omar Matar (UK), Touvia Miloh (Israel), Demetrios Papageorgiou (UK – Chair of the Organizing Committee), Yiorgos Smyrlis (Cyprus, Organizing Committee), Jean-Marc Vanden-Broeck (UK, Organizing Committee).

**b) Short summary of scientific progress achieved**

This symposium brought together researchers working on viscous and inviscid interfacial phenomena with an aim to exchange ideas and knowledge of their respective fields. There are several instances where the mathematical approaches share common tools, including the use of asymptotic analysis to develop reduced models, the use of dynamical systems theory to analyze emerging equations, the use of analytic function theory to solve inviscid or highly viscous flows, and the use of boundary integral or boundary element methods to simulate the flows directly. The symposium as expected succeeded to advance the field by nurturing and supporting interdisciplinary research in nonlinear interfacial waves.

The emergence of new technologies and miniaturization has produced many applications, which can benefit significantly from a fundamental understanding of interfacial waves in complex physical systems. Examples include micro-manufacturing, coating technologies and heat or mass transfer enhancement. Such flows are characterized by small Reynolds numbers and are driven by interfacial forces such as capillarity, Marangoni forces and electrostatic stresses, for instance. Even though viscosity is dominant, nonlinear dynamics can emerge which support coherent structures such as solitary waves, with very intricate mathematical properties and behavior. In addition to waves of permanent form and their interactions, the evolution can terminate in finite time singularities that are a precursor of topological transitions or substrate touchdown. Such structures are of fundamental mathematical and physical interest because they are special solutions of the Navier-Stokes equations in multi-fluid flows.

On the macro-scale interfacial wave phenomena are primarily inviscid and are driven by inertial effects induced by gravitational forces. Applications include

oceanography and meteorology. Even though linear phenomena are well understood, their nonlinear counterparts have only recently proven amenable to both rigorous analysis and computation. Many challenging problems exist including the existence and stability of three-dimensional traveling waves in the presence or absence of vorticity.

The Symposium served as a catalyst to bring people working in viscous and inviscid flows to collaborate. Several such synergies were explored and are currently being pursued with examples ranging from inviscid limits of mixed type conservation laws (with applications in multi fluid flows), to viscous effects on the hydrodynamics of pilot wave models.

### **c) Countries represented and number of participants**

The number of registered participants reached 45, 14 of which were graduate students or postdoctoral researchers, from 10 countries, namely Brazil, Cyprus, France, Ireland, Israel, the Netherlands, Republic of Korea, Russian Federation, United Kingdom and United States of America.

### **d) Publication of Proceedings**

A contract to publish Proceedings in the online Procedia IUTAM series was signed with Elsevier, with the actual date of publication being February 2014.

### **e) Financial and other support**

The following institutions have provided financial and other support for the Symposium: IUTAM (€150), Cyprus University of Technology (€2000), University of Cyprus (€2000), Cyprus Mathematical Society (equipment and stationery), Cyprus Tourism Organization (information material).

### **f) Scientific program**

#### ***Monday, 15 April 2013***

09h00 Paul Milewski (University of Bath, UK), Nonlinear three dimensional capillary gravity waves: focussing and breathers

09h30 Andre Nachbin (Instituto Nacional de Matemática Pura e Aplicada, Brazil), A hydrodynamic pilot wave model: generation and propagation

10h00 Wooyoung Choi (Korea Advanced Institute of Technology, Republic of Korea), A theoretical and experimental study of the generation of internal solitary waves in a two-layer system

11h00 Michael Siegel (New Jersey Institute of Technology, USA), A numerical method for induced-charge electro-kinetic flow with deformable interfaces

11h30 Ehud Yariv (Technion–Israel Institute of Technology, Israel), Electrophoresis of bubbles



- 12h00 Ory Schnitzer (Technion–Israel Institute of Technology, Israel), Taylor-Melcher electrohydrodynamics: a coarse-grained electrokinetic model?
- 12h30 Soteris Kalogirou (Cyprus University of Technology, Cyprus), The effect of air flow on building an integrated photovoltaic (BIPV)
- 14h30 James Duncan (University of Maryland, USA), The non-linear response of a water free surface to a pressure distribution moving at constant speed
- 15h00 Alexander Dyachenko (Novosibirsk State University, Russia), Compact dynamical equation for 2-D water waves
- 15h30 Ricardo Barros (Instituto Nacional de Matemática Pura e Aplicada, Brazil), Elementary stratified flows with stability at low Richardson number
- 16h30 Dmitri Tseluiko (Loughborough University, UK), Instabilities in non-local active-dissipative equations arising in the modeling of thin liquid films.
- 17h00 Yiorgos Smyrlis (University of Cyprus, Cyprus), On the analyticity of certain dissipative-dispersive dynamical systems

### ***Tuesday, 16 April 2013***

- 09h00 Anne Juel (University of Manchester, UK), Oscillatory bubbles induced by geometric constraint
- 09h30 Nikos Savva (Cardiff University, UK), Contact line dynamics on heterogeneous substrates
- 10h00 Sergey Shklyaev (Institute of Continuous Media Mechanics–UB RAS, Russia), Marangoni convection in a binary liquid: Modulational instability of perfectly periodic wavy patterns
- 11h00 David Ambrose (Drexel University, USA), Traveling waves with multi-valued height
- 11h30 Yehuda Agnon (Technion–Israel Institute of Technology, Israel), Linear and nonlinear complementary mild slope equations (CMSE) for surface waves and interfacial waves
- 12h00 Zhan Wang (University College London, UK), Flexural-gravity solitary waves in deep water
- 12h30 Emilian Parau (University of East Anglia, UK), Fully nonlinear hydroelastic solitary waves on deep and shallow water
- 14h30 Jean-Marc Vanden-Broeck (University College London, London, UK), Non-periodic gravity waves in water of infinite depth
- 15h00 Frederic Dias (University College Dublin, Ireland & ENS Cachan, France), An analytical model for wave energy converters
- 15h30 Demetrios Papageorgiou (Imperial College London, UK), Nonlinear interfacial dynamics in stratified multilayer channel flows
- 16h30 Cleopatra Christoforou (University of Cyprus, Cyprus), Isometric Immersions via Fluid Dynamics
- 17h00 Paul Christodoulides (Cyprus University of Technology, Cyprus), Microfluidics in microstructure optical fibers: flows and heat flux

***Wednesday, 17 April 2013***

09h00 Karima Khusnutdinova (Loughborough University, UK), On Kadomtsev-Petviashvili equation in various geometries

09h30 George Kaoullas (University of Cyprus, Cyprus), Trapped continental shelf waves

10h00 Brenny van Groesen, Reconstruction and forecast of ocean and sea waves from radar images

11h00 Claudio Viotti (University College Dublin, Ireland), Emergence of coherent structures in deep-water random seas

11h30 Denys Dutykh (Universite de Savoie, France), Extreme wave run-up on a vertical cliff

12h00 Andreas Anayiotos (Cyprus University of Technology, Cyprus), Head rotation causes geometric changes, reduced flow and altered hemodynamics in the carotid bifurcation

12h30 Katerina Kaouri (Intercollege, Cyprus) Accelerating through the sound speed and other wave problems related to sonic boom research

**Report composed by P. Christodoulides and D.T. Papageorgiou**

**13-3 IUTAM Symposium on Recent Development of Experimental Techniques Under Impact Loading**

NWPU, Xi'an, China, May 6 – May 10, 2013

The IUTAM Symposium on Recent Development of Experimental Techniques Under Impact Loading was held at Northwestern Polytechnical University, Xi'an, Shaanxi, P.R. China on May 6-10, 2013.

**a) Scientific Committee**

Y.L. Li (China–Chair), H. Zhao (France–Co-Chair), M. Langseth (Norway), K.T. Ramesh (USA), D. Rittel (Israel), N. Petrinic (U.K), T. Yokoyama (Japan), B. Freund (IUTAM representative, USA)

**b) Short summary of scientific progress achieved**

The behavior under impact loading of materials has been a constant research interest in the past decades and the finding in this domain is mainly driven by the development of the experimental techniques. Recently, many new experimental techniques in this domain have been developed to enrich the available experimental data. For example, with the high speed camera, optical or infrared image analysis has been used under impact loading for strain or temperature field measurement. Meanwhile, numerical simulation becomes also a common tool for experimental workers to design and better understand testing results. Therefore, with the aim of bringing together experimental scientists working in the domain of impact loading to exchange their recent innovations, the IUTAM Symposium on Recent Development of Experimental Techniques Under Impact Loading was held at Xi'an, China on May 6-10, 2013.

33 presentations addressed the following topics:

- on the new development of dynamic SHPB technique
- new loading frame and multiaxial loading
- new development on measurement
- Extremely loading environment
- Characterization of new material /structures under impact loading

The details are given in the following:

1) The new development of dynamic SHPB technique is one of the interesting topic on the Symposium, such as presentations “On the use of hopkinson pressure bar devices for analyzing the behavior of concrete at high strain-rates”, “The dynamic tensile behavior of 2D-C-SiC composite under high strain rates at elevated temperatures”, “Experimental and computational study on effects of specimen slenderness ratio and ratio between specimen and pressure bars in the SHPB tests”, “Parametric identification for material of viscoelastic SHPB from wave propagation incorporating geometrical effects”, “Experimental and Numerical investigation of impact behavior of steel sheets depending on the projectile shapes”, “Influence

analysis of specimen's properties on friction effect at specimen ends in SHPB tests", "Dynamic tensile failure of MEMS single crystal silicon components", "Dynamic fragmentation tests of metallic materials using a SHPB based expanding ring technique".

2) On new loading frame and multiaxial loading, the presentations are: "High strain rate biaxial testing of sheet materials", "Effect of stress triaxiality on polymer failure under dynamic loading", "Dynamic behavior of aluminum honeycombs under mixed compression/shear loadings and effects of cells in-plane orientation", "Impact testing of cellular material under combined hearing-compressive loading".

3) On the new development on measurement, the related presentations are: "Development of techniques to measure the transient behaviour of plates subjected to close proximity blast loading", "Recent development of some inverse analyses for experimental investigation on dynamic response of materials under impact loading", "Impact compressive deformation of synthetic quartz accompanied by electromagnetic waves", "Dynamic measurements during shock wave loading: synchrotron X-ray diagnostics and high temperature calibration standard".

4) Extremely loading environment

"Ultrasonic impact loading with an intermediate striker", "Investigation on constitutive models characterizing fcc and bcc metals over wide temperature and strain rate ranges", "Transient response of square plates subjected to blast loads: experiments investigating different degrees of confinement", "CQ-4 pulsed power generator for ramp-wave loading".

5) Characterization of new material /structures under impact loading

"Response of a cellular rod with varying cross-section under impact", "Spallation behavior of bulk metallic glasses", "Microscopic observation of damage accumulation in brittle solids subjected to dynamic compressive loading", "On the dynamically stored energy of cold work in pure single and polycrystalline copper", "Investigation on hypervelocity impact of 2D plain-woven C/SiC composite", "On the composite laminates instability under high speed impact", "Dynamic behavior of poly (lactic acid)/poly (butylene adipate-co-terephthalate) polymer alloys", "Modelling of damage and permeability of concrete subjected to dynamic loads", "Collision and rebounding of circular rings on rigid target", "Long rod penetration of tungsten-fiber/metallic-glass matrix composite material into steel target", "Nonlinear waves in rubber: strain-rate and hysteretic effects".

### e) Countries represented and number of participants

The meeting attracted 45 participants, who came from institutions located in 9 different countries: China, France (five participants), Japan (three participants), Singapore (three participants), Israel (one participant), South Africa (two participants), Canada (one participant), UK (one participant) and USA (two participants).

**d) Publication of Proceedings**

A contract to publish Proceedings in the online Procedia IUTAM series has been signed with Elsevier. Submissions to the International Journal of Impact Engineering were due on December 15, 2013.

**e) Financial Support**

The following institutions have provided financial support for the Symposium: IUTAM (USD 2000), 111 project of China (B07050) (RMB 11700), National Natural Science Foundation of China (NSFC) (10932008) (RMB 30000), NWPU (RMB 80000).

**f) Scientific Program**

<b>Monday, May 6</b>	
Session Chairman: Prof. Yulong Li	
8:30-9:00	Welcome address from the President of NPU
9:00-9:40	Prof. Wei Yang, director of the National Natural Science Foundation of China (NSFC)
9:40-10:20	Prof. Lili Wang, Ningbo University: Recent development of some inverse analyses for experimental investigation on dynamic response of materials under impact loading
Session Chairman: Prof. G.N. Nurick	
10:40-11:20	Dr. Bin Wang, U. K.: Experimental and Numerical investigation of impact behavior of steel sheets depending on the projectile shapes
11:20-12:00	Prof. G.S. Langdon, University of Cape Town, South Africa Development of techniques to measure the transient behaviour of plates subjected to close proximity blast loading
Session Chairman: Prof. Eric Markiewicz	
2:00-2:40	Prof. Fangyun Lu, National University of Defense Technology, P.R.China: Influence analysis of specimen's properties on friction effect at specimen ends in SHPB tests
2:40-3:20	Prof. P. Forquin, Lorraine University, France : On the use of hopkinson pressure bar devices for analyzing the behavior of concrete at high strain-rates
Session Chairman: Prof. Fangyun Lu	
3:40-4:20	Prof. V. Grolleau, Universite de Bretagne Sud, France High strain rate biaxial testing of sheet materials
4:20-5:00	Prof. X.W. Chen, China Academy of Engineering Physics, China Long rod penetration of tungsten-fiber/metallic-glass matrix composite material into steel target
<b>Tuesday, May 7</b>	
Session Chairman: Prof. K. Ravi-Chandar	
9:00-9:40	Prof. H. Zhao, Université Pierre & Marie Curie, France

	Impact testing of cellular material under combined hearing-compressive loading
9:40-10:20	Prof. M. Ganiev, Kazan Federal University, Russia Ultrasonic impact loading with an intermediate striker
Session Chairman: Prof. G.X. Lu	
10:40-11:20	Prof. V.P.W. Shim, National University of Singapore Effect of stress triaxiality on polymer failure under dynamic loading
11:20-12:00	Prof. T.X. Yu, Hong Kong University of Science and Technology, P.R.China Collision and rebounding of circular rings on rigid target
Session Chairman: Prof. T. Yokoyama	
2:00-2:40	Prof. Fenglei Huang, Beijing Institute of Technology Investigation on constitutive models characterizing fcc and bcc metals over wide temperature and strain rate ranges
2:40-3:20	Prof. Weinong Chen, College of Engineering, Purdue University, U.S. Dynamic tensile failure of MEMS single crystal silicon components
Session Chairman: Prof. Victor P.W. Shim	
3:40-4:20	Prof. E. Markiewicz, University of Valenciennes, France Dynamic behavior of aluminum honeycombs under mixed compression/shear loadings and effects of cells in-plane orientation
4:20-5:00	Prof. G.X. Lu, Nanyang Technological University, Singapore Response of a cellular rod with varying cross-section under impact
5:00-6:30	Lab visit
<b>Wednesday, May 8</b>	
Session Chairman: Prof. D. Rittel	
09:00-9:40	Prof. GN Nurick, University of Cape Town, South Africa Transient response of square plates subjected to blast loads: experiments investigating different degrees of confinement
9:40-10:20	Prof. H. Kobayashi, Osaka University, Japan, Impact compressive deformation of synthetic quartz accompanied by electromagnetic waves
Session Chairman: Prof. H. Zhao	
10:40-11:20	Prof. L.H. Dai, Chinese Academy of Sciences, Spallation behavior of bulk metallic glasses
11:20-12:00	Prof. Jianheng Zhao, Institute of Fluid Physics, P.R.China CQ-4 pulsed power generator for ramp-wave loading
Session Chairman: Prof. V. Grolleau	
2:00-2:40	Prof. K. Ravi-Chandar, The University of Texas at Austin, U.S. Nonlinear waves in rubber: strain-rate and hysteretic effects
2:40-3:20	Prof. Zhou Fenghua, Ningbo University, China, Dynamic fragmentation tests of metallic materials using a SHPB based expanding ring technique
Session Chairman: Prof. Tongxi Yu	

3:40-4:20	Prof. Kaiwen Xia, University of Toronto, Canada Microscopic observation of damage accumulation in brittle solids subjected to dynamic compressive loading
4:20-5:00	Prof. Pu Xue, Northwestern Polytechnical University Parametric identification for material of viscoelastic SHPB from wave propagation incorporating geometrical effects
<b>Thursday, May 9</b>	
Session Chairman: Prof. Lanhong Dai	
09:00-9:40	Prof. D. Rittel, Israel Institute of Technology, Israel On the dynamically stored energy of cold work in pure single and polycrystalline copper
9:40-10:20	Dr. Takeshi Iwamoto, Hiroshima University, Japan Experimental and computational study on effects of specimen slenderness ratio and ratio between specimen and pressure bars in the SHPB tests
10:20-10:40	Break
Session Chairman: Prof. GS Langdon	
10:40-11:20	Prof. Yulong Li, Northwestern Polytechnical University, China The dynamic tensile behavior of 2D-C-SiC composite under high strain rates at elevated temperatures
11:20-12:00	Prof. Fei Xu, Northwestern Polytechnical University, China Investigation on hypervelocity impact of 2D plain-woven C/SiC composite
Session Chairman: Prof. P. Forquin	
2:00-2:40	Prof. Shengnian Luo, Sichuan University, China, Dynamic measurements during shock wave loading: synchrotron X-ray diagnostics and high temperature calibration standard
2:40-3:20	Prof. Weiguo Guo, Northwestern Polytechnical University On the composite laminates unstability under high speed impact
Session Chairman: Prof. Lili Wang	
3:40-4:20	Dr. Masahiro Nishida, Nagoya Institute of Technology, Japan Dynamic behavior of poly (lactic acid)/poly (butylene adipate-co-terephthalate) polymer alloys
4:20-5:00	Dr. Wen Chen, Université de Lorraine, France, Modelling of damage and permeability of concrete subjected to dynamic loads

**Report composed by Yulong Li**

## **13-4 IUTAM Symposium on Materials and Interfaces under High Strain Rate and Large Deformation**

Metz, France, June 17 – June 21, 2013

### **a) Scientific committee**

Co chairs : S. Mercier, University of Lorraine, Metz, France and J.F. Molinari, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland

Members :Prof. G. Kanel, Institute for High temperatures of Russian Academy of Sciences, Moscow, Russia, Prof. M. Ortiz, California Institute of Technology, Pasadena, USA, Prof. K. T. Ramesh, Johns Hopkins University, Baltimore, USA Prof. G. Ravichandran, California Institute of Technology, Pasadena, USA, Prof. D. Rittel, Technion Israel Institute of Technology, Haifa, Israel

IUTAM representatives: Prof. N.K. Gupta, Indian Institute of Technology, Delhi, New Delhi, India, Prof. O. Allix, LMT Cachan, ENS Cachan, Cachan, France

### **b) Short summary of scientific progress achieved**

The scope of symposium was to present the actual state of the art in terms of response of materials and interfaces under dynamic conditions and large deformation. Materials and interfaces are subject to extreme conditions in numerous applications such as impacts, explosions, high-speed processes and forming. In many of these problems the mechanical response of the bulk materials is intimately related to the behaviour of material interfaces. Physical mechanisms, which govern the response, span length scales that range from the nano-scale to the level of structures. These have been addressed by different means, with a balance between theoretical developments, experimental investigations and numerical simulations.

45 talks were given during the symposium and were organized in five sessions

- Interfaces
- Fracture
- Material Instabilities, Strain Localization
- Material Response
- Waves, Impacts, Shocks

A wide range of novel theories, models, experiments and simulations have been proposed to understand the response of materials and interfaces at high strain rate and large deformation. The talks were of very high quality. The discussions have been very lively which demonstrated that the symposium had reached its goal, i.e. promoting exchanges between the the communities involved in the dynamic behavior of materials and the interface response community. Excellent feedback has



been gathered from the participants who also considered that the Symposium had achieved a good balance between generations of scientists.

### c) Countries represented and number of participants

63 registered delegates from 13 countries : USA(14), Israel(3), Germany(1), Spain(6), Italy(3), UK(1), the Netherlands(3), France(24), Romania(1), Switzerland(4), Japan(1), Russia (1), Turkey (1). In addition to the 63 registered delegates, Ph.D. students and staff members of the LEM3 have attended the conference.

### d) Publication of Proceedings of the Symposium

After the conference, a special issue of the Journal “Mechanics of Materials” is planned for 2014. Note that the submission of papers is due to end of October 2013. This special issue will be published by the two chairmen of the symposium together with Prof. Daniel Rittel. More than 25 participants have already expressed their intention to contribute to this special issue.

### e) Financial support

IUTAM, LSMS laboratory (EPFL), LEM3 laboratory (University of Lorraine), Dymat, Région Lorraine, Metz Metropole, CNRS, University of Lorraine, Fédération GI2M provided financial support (total amount of 16500 euros). These grants have been used partially to provide financial support (full or partial) to participants. Full expenses have been supported by the conference for 3 participants. In addition, 22 participants received some grants to support registration fees.

### f) Scientific program

45 presentations were given during the five days of the conference.

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Monday, June 17

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9:00 – 10:30      Session Interfaces

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Why do the surfaces of rapidly growing cracks in brittle materials roughen? L. B. Freund  
 Molecular tailoring of interfaces using self-assembled monolayers, P.H. Geubelle  
 Shock propagation in aluminum open-cell foam under impact, S. Gaitanaros

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11:00 AM-12:30 PM      Session Waves, Impacts, Shocks

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Shock response of homogeneous solids: metal single crystals, sapphire and silicate glasses, G.I. Kanel  
 Interaction of strongly non linear waves with interfaces, V. Vitelli  
 Dynamic behaviour of finite thickness cohesive interfaces, M. Corrado

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**14:15 PM- 15:45 PM      Session Waves, Impacts, Shocks**


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Frequency and dispersion of flexural waves in fluid-filled tubes subject to axial impact, K. Inaba  
 Shock-induced phase transitions in thermoelastic bars: riemann problems and applications, C. Făciu  
 Pulse splitting, bending, and combining in 2d and 3d granular networks, A. Leonard

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**16:15 PM – 17:15      Session Material Response**


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Understanding the ignition of energetic materials under dynamic loading: a multiscale thermomechanical challenge, H. Trumel  
 Dynamic perforation of thermoviscoplastic plates by rigid projectiles and shape effects, A. Rusinek

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 Tuesday, June 18
 

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**9:00 AM-10:30 AM      Session Material Response**


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The secret lives of twins, K.T. Ramesh  
 Rate sensitivity according to discrete dislocation plasticity, P.K. Agnihotri  
 Dislocations in prestressed ductile materials, D. Bigoni

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**11:00 AM-12:30 PM      Session Fracture**


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Deformation and failure of metals subjected to laser shock loading, M. A. Meyers  
 Constitutive behavior of porous ductile materials accounting for micro-inertia and void shape, S. Mercier  
 Evidences of material strengthening at very high strain rates – plastic deformation of explosively formed projectiles – charpy energy at high impact velocities, H. Couque

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**14:15 PM- 15:45 PM      Session Material Response**


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High strain rate response of an elastomer at high pressure, R. Clifton  
 The dynamic performance of ultra high molecular weight polyethylene fibre composites, V.S. Deshpande  
 Dynamic behavior of polymers and polymer nanocomposites: modeling and simulations, S. Ahzi

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**16:15 PM – 17:15      Material Instabilities, Strain Localization**


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Dynamic stability of transient states in structures subjected to high strain rate,

N. Triantafyllidis

Analysis of adiabatic shear banding in machining, X. Soldani

Instabilities in dynamic fracture, E. Bouchbinder

Wednesday, June 19

9:30 AM-10:30 AM

Session Material Response

Atomistic mechanisms of dynamic strain aging and their impact on ductility in al-mg, W. A. Curtin

High-pressure Hugoniot measurements using Mach reflections, G. Ravichandran

11:00 AM-12:30 PM

Session Fracture

Numerical implementation and application of a model for plastic porous materials incorporating void shape effects, J.B. Leblond

New analytic criterion describing the combined effect of pressure and third invariant on yielding of porous aggregates, O. Cazacu

On characteristic parameters involved in dynamic fragmentation processes, F. Hild

Thursday, June 20

9:00 AM-10:30 AM

Session Fracture

Effect of rate on the statistics of ductile fracture surface roughness, A. Needleman

Microstructural effects on ductile damage of polycrystalline materials, R.A. Lebensohn

Some aspects of inertia in porous ductile solids subjected to dynamic loading, N. Jacques

11:00 AM-12:30 PM

Session Interfaces

Slip precursors at frictional interfaces, J.F. Molinari

Effect of deformation of deformation-induced surface roughening on metal-polymer interface integrity, J. van Beeck

Dynamic crack growth along curved interfaces in composite and bonded polymer materials, D. Coker

14:15 PM- 15:45 PM

Material Instabilities, Strain Localization

On the onset of adiabatic shear failure, D. Rittel

On the complete extinction of selected imperfection wavelengths in dynamically expanded ductile rings, J. A. Rodríguez-Martínez

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Energy-based variational modelling for adiabatic shear band structure, L. Stainier

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16:15 PM – 17:45                      Session Fracture

Dynamic fragmentation in ductile materials via optimal transportation meshfree method, A. Pandolfi  
Gradient damage models coupled with plasticity, J.J. Marigo  
Dynamic vs quasi-static shear failure of high strength metallic alloys: experiment and modeling, P. Longère

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Friday, June 21

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9:00 AM-10:30 AM                      Session Fracture

On bounded rate constitutive model : application to objective failure prediction, O. Allix  
Effect of strain rate, stress triaxiality and lode parameter on ductile fracture, D. Mohr  
Cohesive zone modelling of dynamic failure in brittle materials, S. Hiermaier

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11:00 AM-12:00 PM                      Session Interfaces

Study of friction and wear mechanisms at high sliding speed, G. List  
Crack propagation through glass-adhesive interface driven by dynamic loading, W. Chen

**Report composed by S. Mercier**

**13-5 IUTAM Symposium on Multiscale Modeling and Uncertainty  
Quantification of Materials and Structures**

Santorini Island, Greece, September 9 – September 11, 2013

**a) Scientific Committee**

- M. Papadarakakis, National Technical University of Athens, Greece (Chairman)
- O. Allix, Ecole Normale Supérieure de Cachan, France (Representative of IUTAM)
- S. Mariani, Politecnico di Milano, Italy
- P.M. Mariano, University of Florence, Italy
- G. Stefanou, National Technical University of Athens, Aristotle University of Thessaloniki, Greece
- Weinan E, Princeton University, USA
- X.F. Xu, Beijing Jiaotong University, China

**b) Short summary of scientific progress achieved**

Over the last few years, the intense research activity at microscale and nanoscale reflected the need to account for disparate levels of uncertainty from various sources and across scales. As even over-refined deterministic approaches are not able to account for this issue, an efficient blending of stochastic and multiscale methodologies is required to provide a rational framework for the analysis and design of materials and structures. The purpose of the Symposium was to promote achievements in uncertainty quantification combined with multiscale modeling and to encourage research and development in this growing field with the aim of improving the safety and reliability of engineered materials and structures.

Special emphasis was placed on multiscale material modeling and simulation as well as on the multiscale analysis and uncertainty quantification of fracture mechanics of heterogeneous media. The homogenization of two-phase random media was also thoroughly examined in several presentations. Various problems of multiscale stochastic mechanics, such as identification of material models, scale coupling, modeling of random microstructures, analysis of CNT-reinforced composites and stochastic finite elements, have been analyzed and discussed. A large number of papers were finally devoted to innovative methods in stochastic structural dynamics.

**c) Countries represented and number of lecturers**

39 participants from 12 countries: Austria (1), Belgium (2), China (4), Czech Republic (4), Denmark (1), France (4), Germany (6), Greece (9), Italy (3), Japan (1), UK (1), USA (3).

**d) Publication of Proceedings of the Symposium**

The Proceedings of the Symposium will be published by Springer within 2014.

### e) Financial support

The Scientific Committee is indebted to IUTAM for the financial support to some of the participants. Additional sponsorship provided by the Operational Program “Education and Lifelong Learning”, co-financed by the European Social Fund (ESF) and the Greek State, is gratefully acknowledged.

### f) Scientific Program

The full scientific program is as follows:

#### Monday, 9 September

#### 08:45 - 10:45 MULTISCALE MODELING AND SIMULATION

##### Chair: D. Vandepitte

On Multiscale Simulation for Solving Industrial Problems: The Non-Intrusive Paradigm

*Olivier Allix*

Multiscale Modeling of Anisotropic Inelastic Effects in Filled Rubbers

*Mikhail Itskov, Roozbeh Dargazany, Khiêm Ngoc Vu*

Viscoplastic Multiscale Modeling of Carbon Nanotube Reinforced Composites

*Vissarion Papadopoulos, Dimitrios Savvas*

Multiscale Modeling Of Magnetorheological Elastomers Under Large Deformation

*Paul Steinmann, George Chatzigeorgiou, Ali Javili*

#### 11:00 - 13:00 DAMAGE AND FRACTURE

##### Chair: O. Allix

A Framework for the Multiscale Analysis and Uncertainty Quantification of Fracture Mechanics of Heterogeneous Media

*Leon Dimas, Tristan Giesa, Markus Buehler*

Fracture Simulations of Concrete Using Discrete Meso-Level Model with Random Fluctuations of Material Parameters

*Jan Eliáš, Miroslav Vořechovský*

Fracture In Quasicrystals: Vistas

*Paolo Maria Mariano, Enrico Radi*

Sequentially Linear Analysis of Structures with Stochastic Material Properties

*George Stefanou, Manolis Georgioudakis, Manolis Papadrakakis*

#### 14:15 – 15:15 INVERSE PROBLEMS - IDENTIFICATION

##### Chair: X.F. Xu

Identification of a Mesoscale Model with Multiscale Experimental Observations

*Manh Tu Nguyen, Christophe Desceliers, Christian Soize*

Using Experimentally Determined Resonant Behaviour to Estimate the Design Parameter Variability of Thermoplastic Honeycomb Sandwich Structures

*Stijn Debruyne, Dirk Vandepitte, Korneel Van Massenhove*

**15:30 - 18:00 HOMOGENIZATION****Chair: P. Steinmann**

DLO Prediction of Strength Properties of Matrix-Inclusion Materials Using Random Variables

*Sebastian Bauer, Roman Lackner*

Homogenization of Crack Toughness as a Depinning Transition

*Stéphane Roux, Sylvain Patinet, Damien Vandembroucq*

An Adaptive Strategy for the Stochastic Homogenization and the Multiscale Stochastic Stress Analysis

*Sei-ichiro Sakata*

Homogenization of Random Heterogeneous Media with Inclusions of Arbitrary Shape

*George Stefanou, Dimitrios Savvas, Manolis Papadarakakis, George Deodatis*

FFT-Based Method for Homogenization of Periodic Media: Finite Element Formulation and Reliable Error Bounds on Homogenized Coefficients

*Jaroslav Vondřejc, Jan Zeman, Jan Novák, Ivo Marek***Tuesday, 10 September****09:00 - 10:30 MULTISCALE STOCHASTIC MECHANICS - I****Chair: G. Stefanou**

A Coupling Method for Stochastic Continuum Models at Different Scales

*Régis Cottreau, Yves Le Guennec, Didier Clouteau, Christian Soize*

Stochastic Multiscale Coupling

*Hermann Matthies*

A Note on Scale-Coupling Mechanics

*Xi Frank Xu***10:45 - 12:45 MULTISCALE STOCHASTIC MECHANICS - II****Chair: H. Matthies**

Effective Second Gradient Elastic (Mindlin) Materials

*Francesco Dal Corso, Mattia Bacca, Davide Bigoni, Daniele Veber*

Stochastic Strain Softening And Localization of a Brittle Bar

*Xiaodan Ren, Jie Li*

Wang Tiles for Materials Microstructures

*Martin Doškár, Jan Novák, Anna Kučerová, Jan Zeman*

Statistical Volume Elements for Metal Foams

*Maximilian Geißendörfer, Carsten Propp***14:00 - 16:00 MULTISCALE STOCHASTIC MECHANICS - III****Chair: V. Papadopoulos**

Using Multi-Resolution Monte Carlo and Non-Parametric Bayesian Regression for Efficient Uncertainty Quantification in Patient Specific Models Of Abdominal Aortic Aneurysms

*Jonas Biehler, Michael Gee, Wolfgang Wall*

A Variability Response Functions-Based Adaptive Spectral Stochastic Finite Element Method

*Dimitrios Giovanis, Vissarion Papadopoulos*

Quantification of Uncertainty Using Fuzzy Approaches in Multiscale Modeling and Analysis of Structures

*Sambasiva Singiresu*

Monte Carlo Simulation vs. Polynomial Chaos in Structural Analysis: A Numerical Performance Study

*George Stavroulakis, Dimitrios Giovanis, Manolis Papadrakakis, Vissarion Papadopoulos*

### **16:15 - 17:45 MULTISCALE STOCHASTIC MECHANICS - IV**

**Chair: S. Adhikari**

Stochastic Multi-Scale Modeling of Multiple Unit Cell Structures Using Experimental Data of Random Geometry

*A. Vanaerschoot, B.N. Cox, S.V. Lomov, D. Vandepitte*

Effects of Pod-Based Components of Turbulent Wind on The Aeroelastic Stability of Long Span Bridges

*Vincenzo Sepe, Marcello Vasta*

Multiscale Material Non-Linear Analysis of Carbon Nanotube Reinforced Composites in The Framework of a  $Fe^2$  Approach

*Maria Tavlaki, Vissarion Papadopoulos*

**Report prepared by M. Papadrakakis and G. Stefanou**



**13-6 IUTAM Symposium on the Dynamics of Extreme Events Influenced by Climate Change**

Lanzhou, China, September 23 – September 25, 2013

The IUTAM Symposium on the Dynamics of Extreme Events Influenced by Climate Change was held at Lanzhou University, China, during September 23-25, 2013.

**a) Scientific Committee**

Professor Xiaojing Zheng, Lanzhou University, China (Chair)

Professor Paul Linden, University of Cambridge, UK (Co-Chair)

Professor Jiachun Li, Institute of Mechanics, Chinese Academy of Sciences, China

Professor Harindra Fernando, University of Notre, USA

Professor Charles Kennel, University of California, San Diego, USA

Professor Kerry Emanuel, MIT, USA

Professor Syed Hasnain, The Energy and Resources Institute, India

Professor Keith Moffatt, University of Cambridge, UK (IUTAM Representative)

**b) Short Summary of Scientific Progress Achieved**

The symposium was an overwhelming success. This symposium brought together the world's principal active research groups working on issues concerning the Dynamics of Extreme Events Influenced by Climate Change. New and important results and recent advances were displayed on a number of topics, including: 'Extreme events and its predictability', 'Climate change and its impacts', 'Atmospheric turbulence, heat waves, pollutions and Tropical cyclone', 'Atmospheric layer, soil erosion and sand storms', etc. 21 participants from 10 countries gave wonderful presentations, and almost every speech triggered heat discussions. For example, Professor Xiaojing Zheng's work on cross-scales quantitative simulation of sand dune formation and its evolution process, as well as the field observation and analysis of high Reynolds number turbulence properties in dust storm in Lanzhou University attracted high interest and attention. In summary, this conference allowed the researchers interact with each other effectively and promoted to some common understandings. All conventioners reached the conclusion of the need for the further studies on high precision field observation and theoretical simulation to develop high-resolution regional models of extreme events such as, hurricanes and tropical cyclones, dust storms, inundation, and flooding. In addition, Near 30 young scientists and graduate students from Lanzhou University, China Institute of Water Resources and Hydropower, Institute of Atmospheric Physics of Chinese Academy of Science, etc. also attended this symposium. It was a precise opportunity for young researchers to approach and closely communicate with the well-established scientists.

**c) Countries represented and number of participants**

21 registered participants with 30 researchers and graduate students attended the symposium. The following 10 countries were represented: France (2), Germany (1), Ireland (1), Russia (1), Japan (1), Botswana (1), Sri Lanka (1), Singapore (1), China (11), Hong Kong China (1).

**d) Publication of Proceedings**

A contract to publish Proceedings of the IUTAM symposium on the Dynamics of Extreme Events Influenced by Climate Change was signed with Procedia IUTAM. Fifteen of the speakers have submitted their manuscripts to be published in the proceedings with some other speakers still to submit their full-length papers. The review process is being organized, and the processing of the manuscript is expected to be completed before April, 2014.

**e) Financial Support**

The symposium organizers received a generous IUTAM sponsorship of \$6000 to support external speakers, who could not secure their own funds. National Natural Science Foundation (China) provided \$4960 to support the symposium, and the Lanzhou University provided \$16530. These supports permitted the organizer to pay for all the facilities, providing a reception, lunches, dinners, the banquet and a one-day excursion for the participants, and paying for the bound volume of the Proceedings.

**f) Scientific Program****Monday, September 23, 2013**

08:30 – 08:50: Opening Ceremony: Chair Professor Xiaojing Zheng, Lanzhou University, China; Professor Frederic Dias, University College Dublin, Ireland.

***Session 1, Extreme events and its predictability***

08:50 – 10:10: Session Chair: Zhixian Cao, Wuhan University, China

Hydro-meteorological disasters: Causes, effects and mitigation measures, A. W. Jayawardena, University of Hong Kong, Sri Lanka.

Field observations on the turbulent features of the near-surface flow fields and dust transport during dust storms, Xiaojing Zheng, Lanzhou University, China.

10:20 – 12:20: Session Chair: Frederic Dias, University College Dublin, Ireland.

Extreme floods and sediment transport dynamics shift in disaster research, Zhixian Cao, Wuhan University, China.

Wind gust and dust entrainment in the atmospheric surface layer, Fei Hu, Chinese Academy of Sciences, China.

Effects of Water Seepage on the Stability of Soil-Slopes, Qingquan Liu, Chinese Academy of Sciences, China.

**Session 2, Climate change and its impacts**

14:30 – 15:50: Session Chair: Koh Tieh-Yong, Nanyang Technological University, Singapore.

The future wave climate of Ireland: from averages to extremes, Frederic Dias, University College Dublin, Ireland.

Global Change: What does glacier tell us on the Tibetan Plateau? Shichang Kang, Chinese Academy of Sciences, China.

16:10 – 18:10: Session Chair: Fei Hu, Chinese Academy of Sciences, China.

High-impact weathers in a changing climate over arid Eurasia and proactive disaster management, Masato Shinoda, Tottori University, Japan.

Dust transportation and climate impact, Huang Jian ping, Lanzhou University, China.

Statistical Distributions and Climate Change, Koh Tieh-Yong, Nanyang Technological University, Singapore.

**Tuesday, September 24, 2013****Session 3, Atmospheric turbulence, heat waves, pollutions, and Tropical cyclone**

08:30 – 09:50: Session Chair: Sylvain Dupont, INRA, France

How Tabletop Turbulence Experiments Can Help Understand Large-scale Fluid Phenomena in Nature? Keqing Xia, Chinese University of Hong Kong, Hong Kong.

When will cyclogenesis commence given a favorable tropical environment? G.V. Levina, Russian Academy of Sciences, Russia.

10:00 – 12:00: Session Chair: Keqing Xia, Chinese University of Hong Kong, Hong Kong.

Prediction skill of heat waves over Mainland China in the NCEP Climate Forecast System version 2, Lin zhao hui, CAS, China.

Southern Africa's 2012-13 Violent Storms: The Role of Climate Chang, Elisha N Moyo, SADC-Climate Services Centre, Botswana.

Modeling and Optimal Control of Atmospheric Pollution Hazard in Nuclear and Chemical Disasters, Shun-xiang Huang, Institute of chemical defense, China.

**Session 4, Atmospheric Layer, soil erosion and sand storms**

14:00 – 16:00: Session Chair: G.V. Levina, Russian Academy of Sciences, Russia.

Modelling aeolian erosion in presence of vegetation, Sylvain Dupont, University of Bordeaux I, France.

Effects of Roughness Elements on Boundary Layer Flow, Jinjun Wang, BUAA, China.

Influence of Gaussian hill on concentration of solid particles in suspension inside Turbulent Boudary Layer, Serge Simoens, LMFA, France.

16:10 – 18:10: Session Chair: Lin Zhao hui, Chinese Academy of Sciences, China  
Discussions of some issues for wind-blown sand flow simulation, Gu zhao lin, Xi'an Jiaotong University, China.

Micromechanical DEM model for wet granular materials, Christian Jakob,  
Technische Universität Bergakademie Freiberg, German.

Wind-tunnel Experiment on Dust Atmosphere-surface exchange: Emission and  
Deposition, Ning Huang, Lanzhou University, China.

**Report prepared by Ning Huang**

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## Report of the IUTAM Summer School held in 2013

### IUTAM-CISM Summer School on Variational Approaches to Damage in Continua and Interfaces

The Summer School took place at CISM, Udine, Italy, from 10 to 14 June 2013. The coordinators were Jean-Jacques Marigo and Claudia Comi.

#### 1. Summary

The goal of this course was to give a modern presentation of the mathematical theory of damage completed by various applications. Specifically, the course was divided into three main parts:

*Part I: General framework for developing damage models.* This part began by a presentation of the physical aspects of damage in order to establish the basic ingredients required to model them at a macroscopic level. We did not intend to develop a full micromechanical approach. However, the main microstructural mechanisms of damage were highlighted and a multi-scale approach was used to make a link between damage and fracture. Then different types of models were elaborated, each one being related to a particular class of materials or mechanisms: interfacial and cohesive zone models, local versus non local models, discrete versus continuous damage models, concrete and geomaterial damage models with chemo-mechanical coupling, isotropic versus anisotropic damage models, modelling of the asymmetric behaviour in tension and compression, modelling of Mullins effect in elastomers, damage models in biological systems...)

*Part II: Qualitative analysis of the evolution problem of damage.* This part was devoted to the mathematical study of the governing equations for the evolution of damage. In particular, we emphasized the theoretical merits of the variational approach which allows to introduce in a natural and rational way the fundamental concepts of bifurcation and stability. We showed in particular that, in presence of softening, the classical approaches based on the equilibrium equations and the constitutive evolution laws are not sufficient to lead to well-posed problems while the introduction of stability conditions allows to rule out unphysical solutions. These concepts and their consequences were illustrated by means of key examples.

*Part III: Numerical implementation and various applications.* In this last part various numerical methods have been presented and compared. Moreover, we focused on the link between damage models and fracture mechanics. We showed how damage evolution can be used as a pre-cursor to crack propagation. Various numerical tests illustrated the power of such an approach.

## 2. The audience

The course was addressed to a broad public: graduate students, doctoral students, young researchers and practicing engineers. It was eventually followed by 40 people coming from different countries of the European Community : Poland (11), Italy (9), Germany (6), Netherlands (4), France (2), Belgium (2), Sweden (2),...). The major parts of them were doctoral students or young researchers, but there were some few practicing engineers. The evaluation enquiries are very positive, many people have particularly appreciated the content and the pedagogical methods of the course.

## 3. The lectures

**Jean-Jacques Marigo** (Ecole Polytechnique, France)

7 lectures on

*The variational approach to damage modeling*

(the basic concepts of damage mechanics; the standard local damage models for brittle materials; the evolution problem of damage in a structure; the variational approach to gradient damage models; stability and bifurcations issues)

**Claudia Comi** (Politecnico di Milano, Italy)

6 lectures on

*Damage models for concrete like materials*

(inelastic behaviour of concrete and rocks; isotropic damage models; anisotropic damage models; fracture energy based pseudo-regularization and non-local formulation; multiphase modelling of chemo-mechanical degradation)

**Marc Geers** (Eindhoven University of Technology, The Netherlands)

6 lectures on

*Interface damage mechanics & multi-scale approaches*

(interface mechanics; cohesive zones: basics, large deformations, multi-scale aspects; ductile damage and nonlocal large deformation approaches; multi-scale damage-to-fracture transition: from homogenization to localization)

**Blaise Bourdin** (Louisiana State University, USA)

6 lectures on

*Numerical implementations of gradient damage models*

(panorama of numerical models; limit models: gradient damage models seen as approximation of sharp interface fracture and damage models; Gamma convergence, Ambrosio-Tortorelli vs. Modica Mortolla; numerical implementation of Ambrosio-Tortorelli and examples; improving the implementations: effective toughness, backtracking, dynamic)

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**Corrado Maurini** (Université Paris 6, France)

6 lectures on

*The application of gradient damage models to fracture*

(gradient damage models to approach brittle fracture; homogeneous solutions, loss of stability and limit stress; localized solutions, their energy and toughness; examples of damage models converging to fracture; unilateral effects; fracture and damage under thermal loads)

**Antonio De Simone** (SISSA, Italy)

4 lectures on

*Damage of elastomers and application to biomechanics*

(Polymers and Elastomers; large deformation hyperelastic models for rubber elasticity; Mullins effect in rubbers; outlook of applications of damage mechanics in biological systems)

**Report prepared by Jean-Jacques Marigo and Claudia Comi**

## **Reports of the IUTAM Working Parties**

### **WP-2 – Dynamical Systems and Mechatronics**

The Working party WP-2 covers a variety of fields to dynamical systems and mechatronics, which overlap with the territories of other societies as IFAC, ASME and so on. Individual members have taken various initiatives in international conferences on dynamics and control together with their applications and played important roles as Associate Editor in related journals as follows: Advisory Board of Multibody System Dynamics; Editorial Board of Vehicle System Dynamics; Associate Editor of Trans. of ASME, Journal of Computational and Nonlinear Mechanics; Associate Editor of Journal of Vibration and Control; Associate Editor of International Journal of Dynamics and Control. The development of theoretical and experimental methods makes it possible to clarify the complex dynamics in the essential elements composing mechanical systems as tyre. Such topics will continue to be important and to be included in the field of WP-2. Also, as new or emerging topics, we may list

- Mechatronics involving human
- Medical mechatronics: there are fundamental modeling issues of medical devices
- Dynamic analysis and control arising from mechatronics systems involving communications: handling latency (delay), data(packet)loss, and so on

In this regard, fundamental studies on the dynamical systems and mechatronics become much more important and the role of WP-2 will increase more than ever. On the other hand, a particular difficulty for WP-2 is the competition in relation to the above newer aspects of mechanics from IFAC, ASME etc. It is fact that the territory is rather fully occupied. WP-2 should be continued, but it is essential to establish strong collaborations with related societies much more actively. Then, we have to make an effort to highlight WP-2 own uniqueness in the above new and emerging topics from the viewpoints of theoretical and applied mechanics.

**Report composed by Hiroshi Yabuno, Chairman of WP-2**



**WP-6 – Biomechanics**

Biomechanics is an interdisciplinary area with the goal to combine mechanics with biology, physics, mathematics and chemistry in order to gain a better knowledge of phenomena in engineering and (clinical) medicine. It is a vibrant area which attracts many young students with the objective to analyze and tabulate, to search for causal connections and to make predictions on the basis of abstraction and general principles. Challenging new topics in, for example, the mechanics of biological tissues come up on a daily basis driven by new developments in microscopy and computer science.

In addition to several books in biomechanics published by leading companies in 2013 a new (open access) Journal was also launched with the title “International Biomechanics”, edited by Professor Anthony MJ Bull from Imperial College London, UK. The intent of this Journal is to foster innovation, debate and collaboration across the field whilst maintaining a defined and relevant audience for the topics and findings reported. Strong activities in from of international conferences of Computational and Mathematical Biomechanics, Biomedical Engineering and Bioengineering, and on Biomaterials were pursued in Asia (e.g., Hong Kong, Singapore), Canada (e.g., Montreal), then Europe (e.g., Austria, Belgium, France, Greece, Sardinia, Spain, UK) and in the US.

In the following, selected events on biomechanics and biomechanically-related topics in 2013 are listed, including those where IUTAM members have been strongly involved. One category lists events devoted to Biomechanics, while another lists conferences and meetings which were not specifically devoted to biomechanics, but included plenary presentations, Minisymposia and special sessions on Biomechanics.

***Conferences, meetings and workshops devoted to Biomechanics (selected):***

- 3rd International Conference on Computational & Mathematical Biomedical Engineering, Hong Kong, 16-18 December 2013.
- The 15th International Conference on Biomedical Engineering (ICBME 2013), Singapore, December 4-7, 2013.
- Biomaterial Modeling Workshop, University of Oxford, UK, November 22, 2013.
- BMES 2013 Annual Meeting, Seattle, Washington, USA, September 25-28, 2013.
- BMT-2013 – 3-Länder-Tagung der Deutschen, Schweizerischen und Österreichischen Gesellschaft für Biomedizinische Technik, Graz, Austria, September 19-21, 2013.

- 19th Congress of the European Society of Biomechanics, Patras, Greece, August 25-28, 2013.
- ASME 2013 Summer Bioengineering Conference, Sunriver, Oregon, USA, June 26-29, 2013.
- MPF2013 – V International Symposium on Modeling of Physiological Flows, Chia Laguna, Sardinia, June 11-14, 2013.
- 8th European Symposium of Vascular Biomaterials (ESVB 2013), Strasbourg, France, May, 10-11, 2013.
- 11th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE 2013), Salt Lake City, Utah, USA, April 3-7, 2013.

***Conferences, meetings and summer schools which were not specifically devoted to biomechanics, but which included plenary or keynote lectures and MiniSymposia and sessions on Biomechanics (selected):***

- 12th International Conference on Computational Plasticity. Fundamentals and Applications (COMPLAS XII), Barcelona, Spain, September 3-5, 2013. (invited sessions on “Computational Modeling in Biomechanics: from Micro-Structure to Macroscopic Response” and “Multiscale Poro-Micro Mechanics of Bio- and Geomaterials”)
- Euromech Colloquium 551 on "Fibre-reinforced Materials: Theory and Applications", Nottingham, UK, September 2-5, 2013. (several presentations devoted to biomechanics)
- 4th Canadian Conference on Nonlinear Solid Mechanics (CanCNSM2013), Montréal, Québec, Canada, July 23-26, 2013. Plenary Speaker: G.A. Holzapfel (Austria), Structurally-based Modeling of Nonlinear Solids with Applications to Cardiovascular Tissues
- 12th U.S. National Congress on Computational Mechanics (USNCCM12), Raleigh, North Carolina, July 22-25, 2013. Semi-Plenary Speaker: M.J. Böhler (US), Computational Biomaterials Science; 7 Mini-Symposia on “Biological Systems”
- The International Summer School-Conference “Advanced Problems in Mechanics”, St. Petersburg, Russia, July 1-6, 2013.
- International Workshop on New Trends in Solid Mechanics: Coupled Fields and Multi-Scale Modelling, Castro Urdiales, Spain, June 24-28, 2013. (several presentations devoted to biomechanics)
- 84th Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM), Novi Sad, Serbia, March 18-22, 2013. (own section on Biomechanics with 19 papers)

**Report composed by Gerhard A. Holzapfel, Chairman of WP-6**

**2013 Treasurer's Report**

<b>Statement of Change in Fund Balance</b>	<b>USD</b>
<b>Balance, 31 December 2012</b>	372,354
Net revenues minus expenses for 2013	100,137
<b>Balance, 31 December 2013</b>	<b>472,491</b>

**Statement of Cash Revenues Collected over Expenses Paid**

<b>Revenues collected during 2013:</b>	
Subscription dues	120,117
ICTAM (levy + seed money from Beijing)	53,897
Interest income	2,466
<b>Total</b>	<b>176,480</b>

<b>Expenses paid during 2013:</b>	
Symposia	31,180
Summer school	0
Contribution to ICSU	4,472
Workshop Mexico	2,338
Travel, Bureau	8,390
Travel, Congress Committee and Executive Committee	10,159
Travel, others	593
Website	0
Administration & Printing	21,144
Auditor's fee	3,104
Bank fees	364
<b>Total</b>	<b>81,744</b>

<b>Revenues minus expenses for 2013</b>	<b>94,736</b>
Gain (loss) from exchange of currency	5,401
<b>Net revenues minus expenses for 2013</b>	<b>100,137</b>

**Statement of IUTAM Bank Accounts  
(1 January 2013 through 31 December 2013)**

Bank (Running Accounts)	Balance 31 Dec 12	Withdrawals 2013	Deposits 2013	Balance 31 Dec 13	Currency
Spar Nord Bank Aalborg 9236 457 73 07097	158,450.48	85,378.84	175,772.95	248,844.59	USD
Spar Nord Bank 9236 457 73 07089	257.40	2.68	3,088.00	3,342.72	EUR
Spar Nord Bank 9236 457 22 92520	754.86	0.00	0.94	755.80	DKK
Nordea Bank Horsholm 6887 390 760	0.00	0.00	0.00	0.00	DKK
Nordea Bank 0745 417 701	0.00	0.00	872.02	872.02	DKK

Bank (Savings Accounts)	Balance 31 Dec 12	Withdrawals 2013	Deposits 2013	Balance 31 Dec 13	Currency
Spar Nord Bank Aalborg	80,000.00	0.00	0.00	80,000.00	USD
Nordea Bank Horsholm	750,000.00	0.00	0.00	750,000.00	DKK

**Treasurer:**

Prof. P. Eberhard, Institute of Engineering and Computational Mechanics,  
University of Stuttgart, Pfaffenwaldring 9, 70569 Stuttgart, Germany

**Assistant Treasurer:**

Professor N. Olhoff, Department of Mechanical and Manufacturing Engineering, Aalborg  
University, Fibigerstraede 16, DK-9220 Aalborg East, Denmark

**Subscription Dues Paid in Membership Units**

<i>Adhering Organization</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>
Australia	3	3	3	3	3	3
Austria	1	1	1	1	1	1
Belgium	5	5	5	5	5	5
Brazil	3	3	3	3	3	3
Bulgaria*				1	1	1
Canada	8	8	8	8	8	8
Chile	1	1	1	1	1	1
China/Beijing	8	8	8	8	8	8
China/Hong Kong	1	1	1	1	1	1
China/Taipei	3	3	3	3	3	3
Croatia	1	1	1	1	1	1
Cyprus**						
Czech Republic	1	1	1	1	1	1
Denmark	3	3	3	3	3	3
Egypt	1	1	1	1	–	1
Estonia	1	1	1	1	1	1
Finland	3	3	3	3	3	3
France*****	8	8	8	8	8	(8)
Georgia	1	1	1	1	1	1
Germany	8	8	8	8	8	8
Greece	1	1	1	1	1	1
Hungary	1	1	1	1	1	1
India	5	5	5	5	5	5

Ireland	1	1	1	1	1	1
Israel	3	3	3	3	3	3
Italy	8	8	8	8	8	8
Japan	8	8	8	8	8	8
Korea***				1	1	1
Latvia	1	1	–	–	–	–
Mexico****				–	–	–
Netherlands	5	5	5	5	5	5
New Zealand	1	1	1	1	1	1
Norway	1	1	1	1	1	1
Poland	3	3	3	3	3	3
Portugal*****	1	1	1	1	1	(1)
Romania	1	1	1	1	1	1
Russia	8	8	8	8	8	8
Saudi Arabia	1	1	–	1	1	1
Serbia*****	1	1	1	1	1	(1)
Slovakia	1	–	–	–	–	–
Slovenia	1	1	1	1	1	1
South Africa	1	1	1	1	1	1
Spain	–	1	–	1	–	–
Sweden	5	5	5	5	5	5
Switzerland	3	3	3	3	3	3
Turkey	1	1	1	1	–	–
Ukraine	1	1	1	1	1	1
United Kingdom	8	8	8	8	8	8
United States	12	12	12	12	12	12
Vietnam	1	1	1	1	1	1

Note: For any particular year, a dash (–) indicates that dues had not been paid as of 31 December 2013. Dues are expressed in membership units of 1, 3, 5, 8 or 12, corresponding to category of membership from I through V, respectively.

\* According to the agreement with IUTAM, Bulgaria has resumed payment of dues from 2011 after accumulation of debt in preceding years. The annual payment is set as one unit due plus a percentage of the debt.

\*\* Cyprus' Mathematical Society entered IUTAM as an Associate Adhering Organization in 2011.

\*\*\* Korea's Adhering Organization in IUTAM shifted to be the newly formed Korean Committee on Theoretical and Applied Mechanics (KCTAM), and dues payment resumed in 2011.

\*\*\*\* Mexico has entered IUTAM as an Adhering Organization, and the first dues payment was invoiced in 2011 but not paid.

\*\*\*\*\* France, Portugal and Serbia paid their 2013 dues in 2014.

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## **Reports on Affiliated Organizations**

### **AFMC (Asian Fluid Mechanics Committee)**

The main AFMC activity in the year 2013 was the 14th Asian Congress of Fluid Mechanics in Hanoi, Vietnam during 15-19 October, 2013 under the slogan “Future Earth, Future Asia – Research for Global Sustainability”. More than 200 delegates from Australia, Bangladesh, China, Germany, Hong Kong, France, India, Iran, Japan, Korea, Norway, Pakistan, Russia, Singapore, Sri Lanka, Thailand, USA and Vietnam participated. The Congress technical program consisted of 8 plenary talks, 4 keynote talks and 226 contributed papers. Three mini-symposia on new energy sources, water resource management and severe event forecast were held. The presentations ranged from fundamental aspects of fluid mechanics to its practical applications covering a variety of fields. The 14th ACFM was well organized with excellent cooperation between AFMC and the local organizing committee led by Prof. Duong Ngoc Hai, Vice-President of Vietnam Academy of Science and Technology. AFMC met twice during this period that took stock of the preparations for the 14th ACFM, listened to the report by AFMC Chairman Prof. Jiachun Li, decided the venue of the 15th ACFM and organizational structure of AFMC. After comprehensive considerations, it was decided that the next ACFM will be held in Kuching, Sarawak in Malaysia in November 2016 under the leadership of Prof. C.S. Ow. Professor Li stepped down as AFMC Chairman and next chairman is Prof. G.S. Bhat from India, with Prof. S. Fu from China and Prof. O. Mochizuki from Japan as vice-chairmen.

### **Report composed by G. S. Bhat**

### **BICTAM (Beijing International Center for Theoretical and Applied Mechanics)**

As one of the affiliated organizations of IUTAM, the Beijing International Center for Theoretical and Applied Mechanics (BICTAM) is an international non-governmental scientific organization. The main objectives of the Center are to improve the advancement of education, research and applications of mechanics and to establish of a platform of relevant scientists and graduate students, especially in the areas of Asia and the Pacific, through the organizations of conferences, symposia, workshops and summer schools for subjects falling within the field of theoretical and applied mechanics and interdisciplinary branches. Detailed information on BICTAM can be accessed under the BICTAM homepage: <http://www.bictam.org.cn/>



***First BICTAM Symposium for Asia-Pacific Young Scholar***

The first BICTAM symposium for Asia-Pacific Young Scholars on Mechanics was successfully held in Singapore during December 11 – 14, 2013. Jointly organized by BICTAM and CSTAM, the symposium aims at promoting academic exchange and cooperation among young scholars from different countries. The main topic of this symposium was computational mechanics of biological materials and cells. A total of over 40 participants from Australia, China, Hong Kong of China and Korea exchanged their newest research works in the field of computational biomechanics during the meeting.

***26th International Tsunami Symposium***

The 26th International Tsunami Symposium (ITS) of IUGG Tsunami Commission was held in Fethiye-Göcek, Turkey and Rhodes Island, Greece during September 25 – 28, 2013. This symposium provided a favorable venue for scientists, practitioners and decision makers, as witnessed by the wide distribution of countries and institutions and highest number of contributions in any ITS. 182 abstracts from 28 countries were submitted and reviewed. 130 abstracts were selected for oral and 18 for poster presentations. Following the success of the 1st Workshop on Natural Hazards-Tsunami in Beijing in 2012, as one of the sponsors of ITS2013, BICTAM provided funding support to assist eight scholars from Asia and Pacific region to attend this symposium.

***Short Course on Micromechanics and Damage – Healing Mechanisms for Heterogeneous and Composite Materials***

Invited by the Scientific Committee of the Center, Prof. J. Woody Ju from the University of California visited the Center and gave a series of talks entitled with “Micromechanics and Damage – Healing Mechanisms for Heterogeneous and Composite Materials” in two half-days in August of 2013. In this short course, recent advances in three innovative areas within the scope of micromechanics and damage-healing mechanics were reviewed. A total of over 200 senior students from China participated in this course.

***International Visiting Scholars Program***

During the year 2013, six scientists from the US, the UK, France, and Australia visited the Center as guest scholars. They worked at the Center for a period and closely contacted relevant scientists in China with common research interests and efficiently exchanged their most recent research achievements.

***Other Events***

During the year 2013 BICTAM took an active part in the scientific activities in the Asia and Pacific region:

- Supported the 14th Asian Congress of Fluid Mechanics as one of the Silver Sponsors.
- Sponsored the 13th International Conference on Fracture (ICF13), which was held during June 16 – 21, 2013 in Beijing.
- Co-hosted IUTAM Symposia in 2013 in China (Recent Development of Experimental Techniques under Impact Loading, Xi' An, May; Dynamics of Extreme Events influenced by Climate Change, Lanzhou, September).
- Appointed the Journal of Theoretical and Applied Mechanics to be the official publication of the Center from January of 2013.

## **Report composed by Jie Chen**

### **CISM (International Centre for Mechanical Sciences)**

#### *1. Courses and Seminars*

The regular programme of courses and seminars, planned for the Centre for 2013 by the Scientific Council, took place in two Scientific Sessions, the van Dike Session (May-August 2013) and the Troger Session (September-October 2013). The topics, always at an advanced level, included different fields of mechanics and related sciences, both at a basic and applied level.

#### *The van Dike Session*

- Iso-Geometric Methods for Numerical Simulation
- Active and Passive Vibration Control of Structures
- Identification Methods for Structural Health Monitoring and Residual Lifecycle Assessment
- 19th CISM IUTAM Int. Summer School on “Variational Approaches of Damage in Continua and Interfaces”
- Non-Spherical Particles and Aggregates in Fluid Flows
- Bone Cell and Tissue Mechanics
- Nonlinear Mechanics of Soft Fibrous Materials
- Separated Representations & PGD Based Model Reduction: Fundamentals and Applications
- The Fluid Dynamics of Climate

#### *The Troger Session*

- Fractal Flow Design: How to Design Bespoke Turbulence and Why
- Differential-Geometric Methods in Computational Multibody System Dynamics
- Failure and Damage Analysis of Advanced Materials

- Structure-Preserving Integrators in Nonlinear Structural Dynamics and Flexible Multibody Dynamics

## 2. Other Events

Besides the above courses, the following other meetings were organized or hosted by CISM in 2013

- EduServ 11” workshop organized by EuroSDR (European Spatial Data Research network)
- “Play Energy 2013” – meeting organized by the Municipal Council of Udine
- Seminars organized by the DFM of CISM on: “Computational Turbulence”, “LIGGGTHS:LAMMPS improved for General Granular and Granular Heat Transfer Simulations”; “Large-eddy Simulation of Particles-laden Flow–recovering Small Scales”

## 3. National APT Courses

A series of courses on Advanced Professional Training (APT) in the fields of structural and geotechnical engineering, environmental, surveying, industrial engineering and bioengineering were given in Italian.

## 4. 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 2013:

R.V. Craster – J. Kaplunov: “Dynamic Localization Phenomena in Elasticity, Acoustics and Electromagnetism”

M.J. Buehler – R. Ballarini: “Materiomics: Multiscale Mechanics of Biological Materials and Structures”

R. Camussi: “Noise Sources in Turbulent Shear Flows: Fundamentals and Applications”

V. Padois – P. Bidaud – O. Khatib: “Romansy 19 Robot Design, Dynamics and Control: Proceedings of the Nineteenth CISM-IFTToMM Symposium”

A. Di Nardo – M. Di Natale – A. Di Mauro: “Water Supply Network District Mating Theory and case Study”

W. Ostachowicz – J. A. Güemes: “New Trends in Structural Health Monitoring”

H. Altenbach – VA. Eremeyev: “Generalized Continua from the Theory to Engineering Application”.

The international journal for rapid communication “Mechanics Research Communications” created by CISM and Pergamon Press, Oxford-New York in 1973, has issued 8 volumes in 2013 (the last one is number fifty four). It contains

short communications on research related to a wide domain of both theoretical and applied mechanics.

### **5. Scholarships**

A number of scholarships, including free lodging and board or exemption from registration fee, were 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.

### **6. International Participation**

In 2013, 79 lecturers from 22 countries delivered lectures in the van Dike and Troger Sessions. The courses were attended by 454 participants coming from 37 countries.

## **Report composed by Bernhard Schrefler**

### **EUROMECH (European Mechanics Society)**

The 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 the 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 Chairperson. Proceedings are not normally published. Those who are interested in taking part in a Colloquium should contact the appropriate Chairperson.

EUROMECH Conferences are broad in scientific scope. They comprise

- ❖ the European Solid Mechanics Conference,
- ❖ the European Fluid Mechanics Conference,
- ❖ the European Turbulence Conference,
- ❖ the European Non-linear Dynamics Conference, and
- ❖ the European Mechanics of Materials Conference.

They are open to all those interested and generally have a number of participants between 150 and 600, although in some cases the latter number has been exceeded substantially. 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 Conferences should register through the conference website or contact the Chairman or Secretary of the appropriate LOC.

EUROMECH also promotes Specialized Workshops, aiming at training of PhD students and postdocs in rather specialized topical areas; these workshops have a limited size (approx. 20 participants). Additional support to activities for junior scientists is given to the annual Postgraduate Fluid Dynamics Conference, which is organised by and for postgraduates.

### ***Prizes and Fellowships***

The EUROMECH Fluid Mechanics Prize and the EUROMECH Solid Mechanics Prize are awarded on the occasions of the Fluid and Solid Mechanics conferences for outstanding and fundamental accomplishments in mechanics. At those conferences Fellowships are awarded to members who have contributed significantly to the advancement of mechanics and related fields. Also, Young Scientist Prizes are awarded at these conferences to the best oral presentations.

### ***EUROMECH Colloquia in 2013***

- 533.** *Biomechanics of the eye.* 22-24 July 2013, Genoa, Italy.
- 541.** *New advances in the nonlinear dynamics and control of composites for smart engineering design.* 3-6 June 2013, Senigallia, Italy.
- 543.** *Quantification of uncertainties in modeling and predictive simulation of fluids.* 10-11 October 2013, Munich, Germany.
- 544.** *Dense flows of soft objects– Bringing together the cases of bubbles, droplets and cells.* 13-15 May 2013. Grenoble, France.
- 545.** *Frontiers in finite-deformation electromechanics.* 22-24 May 2013, Dortmund, Germany.
- 547.** *Trends in open shear flow instability.* 1-3 July 2013, Palaiseau, France.
- 548.** *Direct and variational methods for nonsmooth problems in mechanics.* 24-26 June 2013, Amboise, France.
- 549.** *Immersed boundary methods: current status and future research directions.* 17-19 June 2013, Leiden, The Netherlands.
- 550.** *Multiphysics of solid polymers: experiments and modeling.* 1-5 July 2013, Poitiers, France.
- 551.** *Mechanics of fibre-reinforced materials: Theory and applications.* 2-5 September 2013, University of Nottingham, UK.

**552.** *Modelling atmospheric and oceanic flows: Insights from laboratory experiments and numerical simulations.* 26-28 September 2013, Berlin, Germany.

**555.** *Small scale numerical methods for multi-phase flows.* 28-30 August 2013, Pessac, France.

### ***EUROMECH Conferences in 2013***

13<sup>th</sup> *European Mechanics of Materials Conference* (jointly with ICMM), 9-11 September 2013, Warsaw, Poland.

13<sup>th</sup> *European Turbulence Conference*, 1-4 September 2013, Lyon, France.

### ***EUROMECH Specialized Workshop in 2013***

*Similarity, Symmetry and Group Theoretical Methods in Mechanics*, 7-12 June 2013, Varna, Bulgaria.

For more details see [www.euromech.org](http://www.euromech.org)

**Report composed by Pierre Suquet**

### **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 field, 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.hydromag.eu/wp/>

This WWW-site contains information on membership, forthcoming conferences and the electronic HYDROMAG newsletter. During the year 2013 several workshops and scientific meetings have been conducted involving the active participation of HYDROMAG and its members.

**Report composed by Andre Thess**

**IABEM (International Association for Boundary Element Methods)**

The International Association for Boundary Element Methods (IABEM) is an open community, where everybody working on boundary element methods or boundary integral equations is welcome independent of her/his scientific field. Consequently, there is no official membership or any fees. Details on IABEM can be found on <http://www.iabem.org>.

The scientific activities of IABEM are shown in organising minisymposia on related conferences or holding workshops in the field of BEM. In 2013 this was:

- IABEM Symposium in Santiago, Chile
- Minisymposium at USNCCM 12 "Advances in BEM for Advanced Materials"
- Söllerhaus workshop on "Fast Boundary Element Methods in Industrial Applications"

The organisation has decided to hold the IABEM symposia in a bianual fashion. In January 2013 the symposium has been held in Santiago, Chile at the Pontificia Universidad Catholica de Chile (PUC). Approximately 100 researchers from applied mathematics and engineering have attended this well organized symposium. To give an outlook on 2014, the next symposium will be held in Zhengzhou, China from 13<sup>th</sup> - 15<sup>th</sup> August, 2014. Please, have a look on the web-page <http://www4.zzu.edu.cn/iabem2014/> for details.

**Report composed by Martin Schanz****IACM (International Association for Computational Mechanics)**

No report was submitted by IACM.

**IAVSD (International Association for Vehicle Systems Dynamics)**

The 23<sup>rd</sup> IAVSD Symposium was held at Qingdao, China from 19<sup>th</sup> to 23<sup>rd</sup> August 2013, co-hosted by State Key Laboratory of Traction Power, Southwest Jiaotong University, and CSR Qingdao Sifang Co. ltd, China.

A total of 285 abstracts were submitted of which 110 were road related and 175 were rail related.

108 papers (38%) were accepted for oral presentation including 48 Road papers and 60 Rail papers and a further 84 papers (29%) were accepted for poster presentation including 42 Road papers and 42 Rail papers.

Additionally there were 5 invited state-of-the-art papers which were published in a special issue of Vehicle System Dynamics issued to all delegates.

Delegates attended the symposium from 26 Countries with the following countries sending ten or more delegates: Japan 19, Sweden 18, UK 16, Germany 13, Austria 11, Italy 11 and China 96.

Two technical visits were arranged as follows

Visit 1: CSR Qingdao Sifang Co. Ltd, China (CSR Sifang)

Visit 2: Intelligent Charging and Storage Station for Electric Vehicle in Xuejiadao Island, Qingdao

### **Report composed by Hans True**

### **ICA (International Commission for Acoustics)**

The purpose of the ICA is to promote international development and collaboration in all fields of acoustics including research, development, education, and standardisation.

<http://www.icacommission.org/>

The highlight for the ICA in the year of 2013 was the 21st ICA congress in Montreal, Canada. This meeting was jointly organized by the Canadian Acoustical Association and the Acoustical Society of America and there was a record attendance during the 5 day congress with 2300 registrants and over 1600 technical papers presented and 49 Exposition booths. Sincere thanks are due to the excellent planning and organization by the local team around Mike Stinson, Gilles Daigle and Luc Mongeau.

The General Assembly for the ICA was held during this conference. The proposed changes in governance were all accepted and the new board elected under the new rules. The benefit of the new governance was immediately obvious from the number of nominees for the positions on the board. Following the election the Board now comprises Júlio A. Cordioli (Brazil), Dorte Hammershøi (Denmark), Bertrand Dubus (France), Roberto Pompoli (Italy), Kohei Yamamoto (Japan), Jeong-Guon Ih (Korea), Grazyna Grelowska (Poland), Monika Rychtarikova (Slovakia), Yiu Lam (UK) and Mark Hamilton (USA). The executive are Marion Burgess as President, Michael Vorlander as Past President, Jing Tian as Vice President, Mike Stinson as



Secretary General and Antonio Perez-Lopez as Treasurer. Those board members retiring at the time of the General Assembly included some who had served many terms in various positions and were all warmly thanked for their contributions to the board and the ICA.

The ICA is continuing to grow with the new members, Israel and Nigeria welcomed at the General Assembly. This took our membership to 47 member organizations and 8 International Affiliates.

Increasing the awareness around the world of the science and technology of sound is an important task for the ICA. The ICA is an Affiliate Member of the global organization for science, the International Council for Science, ICSU as well as Associate Member of International Union for Pure and Applied Physics (IUPAP) and the International Union of Theoretical and Applied Mechanics (IUTAM).

To further increase awareness internationally the ICA is actively working towards an International Year of Sound in 2019. We are pleased to report that Manell Zakharia has accepted to lead a task group to work on achieving this aim. To have an “International Year” status is a very great challenge and the ICA will be seeking the support from all the member societies and international affiliates as the project continues.

A task group, under the leadership of Vice President Jing Tian, has been set up to investigate the fee structure and the communication with members. At the 2013 board meeting there was agreement that information on each of the member societies would be a valuable addition to the ICA web page. The board also agreed to cover the costs of scanning all the old ICA proceedings and make these freely available from the website. As the ICA congress covers all areas of acoustics this will be a valuable record showing the development of acoustics over the decades. We are grateful for the assistance from Jing Tian for organizing this scanning. As soon as this has been completed and the access arrangements finalized we will advise of the link and make it freely available from the ICA webpage.

The ICA encourages acoustic endeavors by providing financial support for international symposia. In 2014 the support will be provided to:

- 6th Congress of the Alps Adria Acoustics Association, Graz, Austria
- XXV Encontro da Sociedade Brasileira de Acustica (SOBRAC), Campinas, Brazil
- Intl. Symposium on Musical Acoustics 2014, Le Mans, France
- 11th Intl. Congress on Noise as a Public Health Problem (ICBEN 2014), Nara, Japan
- 2nd Intl. Conference of the Acoustical Society of Nigeria (ASON 2014), Nsukka, Nigeria

- XXXI Symposium on Hydroacoustics, Swinoujscie, Poland
- European Symposium on Smart Cities and Environmental Acoustics, Murcia, Spain

And in conjunction with the Acoustical Society of America will be supporting

- 12th School on Acousto-Optics and Applications, Druskininkai, Lithuania

### **Report composed by Marion Burgess**

#### **ICF (International Conference on Fracture)**

The 13<sup>th</sup> International Conference on Fracture (ICF13) was held from June 16 to June 21 in Beijing. Details can be found on the website, <http://www.icf13.org>.

### **Report composed by Frederic Dias**

#### **ICHMT (International Centre for Heat and Mass Transfer)**

ICHMT organized three international symposium and sponsored four in 2013. Details of these meetings can be found on the website, <http://www.ichmt.org>.

#### ***Meetings Organized by ICHMT:***

- “Mediterranean Combustion Symposium,, MCS-13”, 8-13 September 2013, in Cesme, Turkey. The Symposium Co-Chairmen were Professor Nevin Selcuk, Middle East Technical University, Turkey; Dr. Federico Beretta, Istituto di Ricerche sulla Combustione Consiglio Nazionale delle Ricerche, Italy; Professor Mohy S. Mansour, Cairo University, Egypt and Professor Andrea d’Anna, University Federico II, Italy .
- “International Solar Engineering Program – 2013, ISEP 2013”, June 20 to August 8, 2013, in METU, Ankara, Turkey. Instructor of this program was Dr. Derek Baker.
- “Radiative Transfer, RAD-13”, 2-8 June 2013, in Kusadasi, Turkey. The Symposium Co-Chairmen were Professor Brent W. Webb, Brigham Young University, USA and Dr. Denis Lemonnier, LET-ENSMA, France.

#### ***Meetings Co-Sponsored by ICHMT:***

- “Tenth International Conference on Flow Dynamics, ICFD-2013”, 25-27 November 2013, at Sendai International Center, Sendai, Japan. The symposium was Chaired by Professor Shigenao Maruyama, Tohoku University, Japan.

- “International Workshop on Heat Transfer Advances for Energy Conservation and Pollution Control, IWHT-2013”, 18-21 October 2013, Xi'an, China. The workshop was Chaired by Professor Q.W. Wang, China.
- “13th UK Heat Transfer Conference (UKHTC 2013)”, 02-03 September 2013, in London, UK. Conference Co-Chairmen were Dr. Andy Heyes and Dr. Christos Markides, Imperial College London, UK.
- “8th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics, ExHFT-8”, 17-20 June 2013, in Congress Centre of Instituto Superior Técnico (IST) in Lisbon, Portugal. Conference Co-Chairmen were Professor Pedro Coelho and Mário Costa, Instituto Superior Técnico, Lisboa, Portugal.

The organization of several future meetings have continued. These are:

- “Convective Heat and Mass Transfer, CONV-14”, 08-14 June, 2014, in Kuşadası, Turkey. The symposium Chairman is Dr. Mourad Rebay, University of Reims Champagne-Ardenne, France. Detailed information can be found on the Web site: <http://www.ichmt.org/conv-14/>.
- “Advances in Computational Heat Transfer, CHT-15”, 31 May-05 June, 2015, Rutgers University, New Jersey, USA. The symposium Chairman is Professor Yogesh Jaluria, Rutgers University, New Jersey, USA. Detailed information can be found on the Web site: <http://www.ichmt.org/cht-15/>.
- “BIOTRANSPORT’15: Heat and Mass Transfer in Biological and Medical Engineering”, 5-10 July 2015, at Boyalik Beach Hotel, at Cesme, Izmir, Turkey. The symposium Chairman is Associate Professor Rafael Davalos. Webpage is under construction.
- “Thermal and Materials Nanoscience and Nanotechnology, TMNN-2015”, 16-22 August 2015, in Rio de Janeiro, Brazil. Webpage is under construction.
- “5th International Conference on Heat Transfer and Fluid Flow in Microscale, HTFFM-V”, 22-26 April, 2014, Marseille, France. The symposium Chairman is Lounes Tadrist, Aix Marseille University, IUSTI Laboratory, France. Detailed information can be found on the symposium Web site: <http://www.htffm-v.fr/>.
- “10th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, HEFAT-2014”, 06-09 July, 2014, Orlando, Florida, USA. The symposium Chairman is Prof. J.P. Meyer, University of Pretoria, South Africa. Detailed information can be found on the symposium Web site: <http://edas.info/web/hefat2014/home.html>.
- “15th International Heat Transfer Conference, IHTC-15”, 10-16 August 2014, in Kyoto, Japan. The symposium Chairman is Prof. Nobuhide Kasagi, Japan Sci. & Tech. Agency, Japan. Detailed information can be found on the symposium Web site: <http://www.ihtc-15.org/>.

- “ASME-ATI-UIT-2015 Thermal Energy Systems: Production, Storage, Utilization and the Environment”, 17-20 May, 2015, Naples, Italy. Detailed information can be found on the symposium Web site: <http://www.ichmt.org/asme-ati-uit-15/>.
- “20th School-Seminar of Young Scientists and Specialists “Problems of Gas Dynamics and Heat and Mass Transfer in Power Engineering”, 24-29 May, 2015, Zvenigorod, Moscow region, Russia. Webpage is under construction.

### **Report composed by Tugba Gun**

### **ICM (International Congress on the Mechanical Behaviour of Materials)**

The 12th International Conference on Mechanical Behavior of Materials (ICM11) will be held at Karlsruhe, Germany from May 10 to May 14, 2015 (<http://icm12.com/home/>). ICM’s objectives are to foster research on the mechanical behavior of materials, to promote related international cooperation among scientists and engineers and to provide means for the public dissemination of the results from these efforts. Held every four years, these conferences are intended to cover progress on all aspects of the mechanical behavior of materials from both the macroscopic and microscopic viewpoints. The scope of materials of interest includes commercial materials, including metals, polymers, ceramics, composites, as well as advanced materials under development for the use in particular applications. The conference chairs are Prof. Martin Heilmaier, Prof. Oliver Kraft, Prof. Detlef Löhle from the Karlsruhe Institute of Technology, and Prof. Dietmar Eifler from the University of Kaiserslautern.

### **Report composed by Oliver Kraft**

### **ICR (International Committee on Rheology)**

No report was submitted by ICR.

### **ICTS (International Congresses on Thermal Stresses)**

The 10th International Congress on Thermal Stresses, TS 2013, was held from May 31 to June 4, 2013 at the Nanjing University of Aeronautics and Astronautics, in Nanjing, China.

As a jubilee Congress, it was prepared and organized in grand style and run with great energy and efficiency by its General Chair, Cun-Fa Gao, State Key Laboratory of Mechanics and Control of Mechanical Structures, at College of Aerospace Engineering of NUAA. Co-Chairs of the Congress were: Richard B Hetnarski, Rochester Institute of Technology, USA, and Naotake Noda, Shizuoka University, Japan. The scientific part of the Congress consisted of 5 plenary lectures and 17 regular sessions as follows:

#### *PLENARY LECTURES*

1. Lars-Erik Lindgren, A Lundbäck, M Fisk, Thermo-mechanics and Microstructure Evolution in Manufacturing Simulations.
2. Tong-Yi Zhang, Grain Boundary Segregation and Stress-Induced Solubility in Nanograined Materials.
3. Michele Ciarletta, Stan Chirita, Some Non-standard Problems Related with the Mathematical Model of Thermoelasticity with Microtemperatures.
4. Erasmo Carrera, M. Cinefra, Fiorenzo Adolfo Fazzolari. Some Results on Thermal Stress of Layered Plates and Shells by Using Unified Formulation.
5. Weiqiu Chen, General Solution for Magneto-electro-thermoelasticity and Its Applications.

#### *REGULAR SESSIONS*

- S1: Thermo-elasticity and Viscoelasticity (I)
- S2: Thermal Stresses and Deformations (I)
- S3: Thermal Induced Fracture of Materials and Structures (I)
- S4: Experimental Studies on Thermo-mechanics Problems
- S5: Thermal Stresses in Smart Materials and Structures (I)
- S6: Analysis of Stresses in Thermal Structures (I)
- S7: Thermal Vibration and Shock
- S8: Optimization of Thermal Structures
- S9: Launching Ceremony of Books
- S10: Computational Methods in Thermo-mechanics
- S11: Thermal Instability and Localization
- S12: Thermal Stresses and Deformations (II)
- S13: Thermal Induced Fracture of Materials and Structures (II)
- S14: Thermo-elasticity and Viscoelasticity (II)
- S15: Analysis of Stresses in Thermal Structures (II)
- S16: Thermal Stresses in Smart Materials and Structures (II)
- S17: Thermal Stresses in Plate Structures

During the Congress, there was held a joint meeting of the Executive Committee and the International Committee of the ICTS, as well a meeting of the Editorial Board of the Journal of Thermal Stresses.

On June 2, there was an official launching ceremony by Springer Publisher and the NUAA of the 11-volume Encyclopedia of Thermal Stresses, edited by Richard B. Hetnarski and published by Springer, and of a new book, Theory of Elasticity and Thermal Stresses – Explanations, Problems and Solutions, by M. R. Eslami, R. B. Hetnarski, J. Ignaczak, N. Noda, N. Sumi, and Y. Tanigawa, published also by Springer.

The program comprised a rich social program, with numerous excursions.

The information on the next Congress, the 10th International Congress on Thermal Stresses, TS 2015, was announced. The Congress will be held at the University of New Brunswick, Fredericton, NB, Canada, May 31-June 4, 2015.

**Report composed by Richard B. Hetnarski**

### **IIAV (International Institute of Acoustics and Vibration)**

The seventeenth IIAV annual election was held in 2013 in which all members voted on candidates for five new director positions and one president-elect position. The elected directors replaced the directors whose four-year terms had expired. The president-elect position is for a two-year term. The five directors elected were: Hans Boden, Sweden; Sergey Sorokin, Denmark; Jiri Tuma, Czech Republic; Xiaojun Qiu, China; and Michel Rosmolen, Thailand. Jorge P. Arenas, Chile was elected as President-Elect. The IIAV Honorary Fellow award was made in 2013 to Chong-Won Lee, Taejon, South Korea to recognize his scientific contributions in vibration.

IIAV cooperates with scientific and engineering societies and institutes around the world and lists 45 such affiliated organisations on its website at [www.iiav.org](http://www.iiav.org). Recently, five new formal agreements of cooperation were signed between IIAV and the Acoustical Society of America; the Acoustical Society of Croatia, the Acoustical Society of Ecuador, the Acoustical Society of Korea and the Acoustical Society of Sweden.

The Twentieth International Congress on Sound and Vibration (ICSV20), sponsored by the International Institute of Acoustics and Vibration (IIAV) took place in Bangkok, Thailand, 07-11 July, 2013. ICSV20 was held in cooperation with the Faculty of Science, Chulalongkorn University; the Acoustical Society of Thailand; the Science Society of Thailand; the Australian Acoustical Society; the Acoustical Society of China; the Chinese Society of Vibration Engineering; The Hong Kong Institute of Acoustics; the Acoustical Society of India; the Acoustical Society of

Korea; the Korean Society for Noise and Vibration Engineering; the Acoustical Society of Singapore; the School of Science, Walailak University; and the Pollution Control Department of Thailand. Over 650 abstracts from 50 different countries on all areas of acoustics, noise and vibration were received.

ICSV20 was the first one of the ICSV series to be held in Southeast Asia. Despite the continuing economic problems around the globe and consequent reductions in travel funding, over 500 participants and accompanying persons attended ICSV20. About one third of the participants were postgraduate students. The ICSV20 Organising Committee, helped by the International Scientific Committee, arranged for 25 special structured sessions in addition to the 30 regular sessions. The sessions were allotted 15 parallel rooms in the Imperial Queen's Park Hotel, the congress venue. This hotel is a five-star hotel with excellent conference facilities located in the centre of Bangkok. This hotel is the largest convention hotel in Bangkok with 1,200 rooms. A very much reduced room rate was offered at this hotel for the students. The reception, sponsored by the Thai Convention Bureau, was held at the Imperial Queen's Park Hotel with special Thai dance groups performing different styles of Thai dancing. On Tuesday evening all participants were treated to a Boat trip on the Chao Phraya River. The ICSV20 banquet, attended by all the congress participants, was held at Siam Niramit. After the banquet all participants also attended a special Thai dance show held at the same location.

One Honorary Fellow lecture and six distinguished plenary lectures were presented during ICSV20 by engineers and scientists from around the globe. This year the Honorary Fellow lecture was given by Chong-Won Lee from Korea Advanced Institute of Science and Technology (KAIST.) His lecture topic was "Saving Campbell Diagram for Dynamic Analysis of Complex Rotor Systems."

The six keynote lectures were as follows: "Hearing Loss Prevention and Auditory Awareness in the Noisy Workplace" Christian Giguère, Ottawa, Ontario, Canada; "Numerical Prediction of the Signature of Maritime Platforms" Nicole Kessissoglou, Sydney, Australia; "Urban Noise Management and its Practical Implementation" Sergio Luzzi, Florence, Italy; "Statistical Energy Analysis (SEA) Applications in Vibration and Noise" Dhanesh N. Manik, Powai, Mumbai, India; "Applications of The Acoustical Boundary Element Method (BEM) and Related Green's Functions" Martin Ochmann, Berlin, Germany; "Bionic Design of Acoustic Localization System Based on Auditory Orientation Mechanisms" Zhushi Rao, Shanghai, China.

The ICSV20 technical proceedings were made available to delegates at the congress itself on CD-ROM. The ICSV20 CD includes all abstracts and the full texts of all the accepted papers and is now available to all IIAV members on the IIAV website.

The International Journal of Acoustics and Vibration (IJAV), the refereed quarterly journal of IIAV, continues to receive a steady flow of good papers and to be published on schedule. The full papers of current and all back issues of IJAV are displayed on the IIAV website. In addition, hard copies of IJAV are airmailed to all IIAV members and to subscribing libraries all over the world.

**Report composed by Malcolm J. Crocker (Executive Director IIAV)**

### **ISIMM (International Society for the Interaction of Mechanics and Mathematics)**

The International Society for the Interaction of Mechanics and Mathematics is active in fostering the interaction of mathematics and mechanics. The history of both mechanics and mathematics shows much evidence of the beneficial influence of each of these disciplines on the other. Mechanics is understood here in the broad sense of the word, including relevant physical phenomena such as electromagnetic and thermal fields. A major activity of the society concerns the organization of international meetings for the presentation and discussion of research at the interface of the two disciplines.

The 2013 activity of the ISIMM has been focused on the planning of the XIX International Symposium on Trends in Applications of Mathematics to Mechanics. This will take place in Poitiers, France, on September 8-11, 2014. The meeting is chaired by Alain Miranville, and organized by Augusto Visintin, Ulisse Stefanelli, and Lev Truskinovsky (scientific) and Laurence Cherfils, Julien Dambine, Nicolas James, Madalina Petcu, Morgan Pierre, Philippe Rogeon, Germain Rousseaux (local). The confirmed speakers include H.-D. Alber, G. Allaire, G. Bertotti, D. Bigoni, Y. Brenier, M. Cicalese, C. Dafermos, G. Dal Maso, E. Feireisl, M. Fremond, G. Goldstein, M. Grasselli, D. Knees, P. Krejci, E. Lamballai, G. Lazzaroni, I. Mayergoyz, B. Miara, A. Mielke, R. Monneau, S. Neukamm, B. Niethammer, M. Ostoja-Starzewski, M. Peletier, N. Pugno, F. Rindler, E. Rocca, T. Roubicek, G. Saccomandi, A. Schloerker, B. Straughan, M. Sugiyama, L. Truskinovsky.

Additional information can be found at the STAMM 2014 website: <http://www-math.sp2mi.univ-poitiers.fr/STAMM2014/>

The STAMM 2014 will be the occasion to celebrate also the new ISIMM Prize and ISIMM Junior Prize laureates. The ISIMM Prize 2014 will be presented to Prof. Dr. Constantine M. Dafermos (Brown University). The ISIMM Junior Prize 2014 has been co-awarded to Prof. Dr. Elisabetta Rocca and Dr. Stefan Neukamm both currently at the Weierstrass Institute for applied analysis and stochastics (WIAS) in



Berlin. These prizes will be awarded in a special session chaired by professor Ingo Müller, who is the recipient of the ISIMM Prize 2012.

During 2013 the ISIMM internet forum (<http://www.isimmforum.tu-darmstadt.de>) was launched. This forum will host scientific contributions of the members of ISIMM and of invited authors, and also various scientific announcements. This activity is presently coordinated by Hans-Dieter Alber.

**Report composed by Ulisse Stefanelli**

## **ISSMO (International Society for Structural and Multidisciplinary Optimization)**

*1. ISSMO Biennial World Congress on Structural and Multidisciplinary Optimization (WCSMO):*

- WCSMO-10: In 2013 the 10<sup>th</sup> ISSMO World Congress on Structural and Multidisciplinary Optimization (WCSMO-10) was held in Orlando Florida, USA, May 19-24. 429 researchers participated from 28 countries presenting a total of 391 research works (352 oral presentations and 39 poster presentations). ISSMO congratulates and thanks the local organizers (Professors Raphael Haftka and Nam Ho) for this excellent scientific congress.
- WCSMO-11: following approval by the ISSMO Executive Committee, the next World Congress WCSMO-11 will take place in Sydney, Australia. The anticipated dates are in June 2015. Professor Qing Li will coordinate the local organizing committee.

*2. ISSMO endorsed the following international scientific meetings in 2013:*

- International Conference on Design, Fabrication and Economy of Metal Structures, DFE2013, 24-26 April 2013, University of Miskolc, Hungary.
- 39th ASME Design Automation Conference (DAC), August 4-7, 2013 Portland, USA.

*3. ISSMO will endorse the following international scientific meetings during 2014:*

- 8th China---Japan---Korea Joint Symposium on Optimization of Structural and Mechanical System (CJK-OSM8) Gyeongju, Republic of Korea, May 25-29, 2014
- Conference on Engineering and Applied Sciences Optimization (OPT-i), Kos Island, June 2014.
- CISM Advanced School 'Topology optimization of structures and continua-computational aspects and background', Udine, June 9-13, 2014.
- 10<sup>th</sup> ASMO UK/ISSMO conference on Engineering Design Optimization, Delft University of Technology, The Netherlands, June 30-July 1, 2014.
- 4<sup>th</sup> International Conference on Engineering Optimization (EngOpt2014), Lisbon, Portugal, 8-11 September 2014.
- Workshop on Shape and Topology Optimization with PDE Constraints. August 11-15, 2014, LNCC/MCT, Petrópolis - Rio de Janeiro, Brazil.
- MM&FGM 2014, October 19-22, 2014; Taua Resort, SP, Brazil

Please consult the website <http://www.issmo.net> for more information about ISSMO.

**Report composed by H.-C. Rodrigues**

**LACCOTAM (Latin American & Caribbean Congress of Theoretical and Applied Mechanics)**

No report was submitted by LACCOTAM.

## **Reports on ICSU and its Scientific Committees**

### **ICSU (International Council for Science)**

#### *Meeting of the International Scientific Unions of ICSU – 29-30 April 2013*

The Meeting of the International Scientific Unions of ICSU 2013 took place in Paris, France, and was attended by 27 of ICSU's 30 scientific unions.

The overall purpose of the meeting was to discuss opportunities for enhanced interdisciplinary collaboration between Unions, and between Unions and ICSU, particularly around newly developing areas of work for the ICSU family.

IUTAM also took part in a meeting of the Physical, Chemical and Mathematical Science Cluster on April 28, 2013.

The meeting opened and closed with general plenary discussions on ICSU's relationship with its Unions. Specific topics were discussed during a series of break-out groups to give Union Members the opportunity for an open exchange of ideas and knowledge. These were then reported back to the plenary.

These topics were:

- Future Earth
- Science education
- Communication between ICSU and Unions
- IRDR (Integrated Research on Disaster Risk)
- Urban Health
- New interdisciplinary horizons
- Open access to data and information

The report below addresses each of these in turn, and then discusses the general conclusions from the meeting reached in plenary about ICSU's strategy and new opportunities to strengthen engagement with the Unions.

Prior to the meeting, Unions were asked to submit background information on the structure of their Union, their recent activities and their future priorities.

### **Opening Plenary**

The Unions were asked to discuss their wishes for the meeting, and for their activities with ICSU. They raised the following issues:

- The need to discuss mechanisms for working together on issues identified at the Unions Meeting.

- The need to improve ICSU's visibility and credibility with the public and scientists, particularly young scientists. This could be achieved by involving high-level scientists in ICSU activities and organizing prestigious conferences or young scientist conferences.
- The need for discussion on ICSU's added value to Unions.
- The need for dialogue between Unions and National Members as to what National Members want from the Unions.

### **Future Earth (Break-out group)**

There was enthusiasm from the Unions to contribute to this important programme. However, it was noted that it is a broad framework that needs to be further defined.

The Unions noted the following points:

- The need for a strong communication plan (work on the uptake of scientific knowledge).
- The need for success indicators (e.g. on food security).
- A stronger focus on the human being and inclusion of human health could be beneficial.
- Implementation plan with concrete activities / targets / deliverables is urgently needed.
- Relationships between the partners of the Alliance (UNESCO, etc.) need to be clarified.
- Areas that should be highlighted include raw materials (to produce food, energy, water, etc.) and risk assessment.
- Need greater emphasis on the uptake of science by policy-makers.
- Boundaries should be clarified, as the umbrella of Future Earth is all-encompassing.
- A change in science culture is needed towards more transdisciplinary (= work across boundaries and new questions) and solutions-oriented approaches.
- Need to define the funding opportunities provided within Future Earth.
- Define the management and integration of massive amount of data and links with current data partners (coordinated set of databases).
- Define and explore the relationship of the Unions with Future Earth and ICSU, and the role of the union clusters.
- Define relationship with urban health and IRDR programmes (differences and synergies) to ensure complementarity.

### *Recommendations*

1. Organise a meeting between Unions and Future Earth team.
2. Identify success stories on large scale behavioural change for use in communication to stakeholders.

3. Develop mechanism to attract scientists not affiliated with Unions and ICSU.
4. Define specific themes / priorities / targets under Future Earth to help individual scientists and Unions get involved.
5. Map out and communicate on what the Unions are doing in relation to Future Earth to identify opportunities for cross-cutting collaborations.
6. Dedicate some funding (ICSU grants, etc.) for meeting of Unions clusters and coordinated activities on Future Earth across Unions.
7. Organise symposia with ICSU and ISSC Unions to define clearer research objects that should be pursued or not under Future Earth.
8. Include sessions on Future Earth in Unions' congresses.
9. Define clear mechanisms for scientists to start activities (give signals that the programme has started).
10. Provide feedback to the Future Earth SC on missing areas (e.g. challenge of feeding a growing population).
11. Translate the materials into other languages.

### **Science Education (Break-out group)**

The main comments raised were:

- Almost all Unions have education programs.
- Only a few are directly involved at the schools and teacher level. These programs concentrate mainly on developing countries.
- There's very little cooperation between Unions.
- International Years have been effective in promoting science education.
- The ICSU Review on Science Education (2011) has had no influence on the specific science education programs of Unions.
- Unions see little need for an inter-disciplinary or multi-disciplinary approach in their own educational programmes.
- ICSU could help gather & share information on best practices.
- Regional offices are an important resource for both existing programs that Unions have, and the development of new programs. So far, this resource has not been effectively exploited.
- All major inter-disciplinary programs should plan, from day one, an explicit science education component, ranging from school-level to professional development.
- ICSU could carry out a wide electronic consultation on online education delivery.

### **Communication between ICSU and Unions (Break-out group)**

It was recognized that communication is a 2-way process, and some noted that there have been improvements in the last decade. The main points raised were:

- Communications from ICSU are not always timely, nor are they flagged in such a way to get the respondent's attention.

- Some expressed frustration at not receiving replies to their requests or inputs to the secretariat.
- ICSU is a weak brand and it was asked whether we should rely more on the full name, rather than the acronym.
- Interdisciplinary bodies and programmes, once established, are removed from their union heritage.
- Request for feedback on contributions eg to surveys, reviews and nominations. More transparency in such processes would be beneficial.
- Regional offices would like to get information about Union contacts at regional and local levels.
- Clusters have a purpose in relation to communications. Some Unions requested information packages about clusters. Development of clusters is uneven, but there was an overall consensus that they provide a model for communications.
- The role of the ICSU Secretariat in relation to support for union clusters needs to be defined.
- Support was expressed for an ICSU corporate video.
- An information package could be developed on ICSU procedures for distribution to newly arriving Union officers.
- ICSU should send representatives to each of the General Assemblies/Conferences of every Union. This has been done in the past and is important that an invitation is received at the ICSU secretariat.
- Need to identify a focal point at each Union to be a liaison with ICSU Secretariat, a role that exists within every National Member organisation.
- Some participants endorsed the usefulness of social media for ICSU although there was a lack of awareness about this by some.
- ICSU should communicate regularly on benefits of membership.

### **IRDR: Integrated Research on Disaster Risk (Break-out group)**

The following issues were discussed in the session:

Is IRDR promoting its messages adequately?

- IRDR is actively developing its communication tools and building networks between organizations and research entities in policy and practice.
- IRDR National Committees are very important.

How can the IRDR and the ICSU Unions work more closely together?

- Provision of FORIN (forensic investigations) methodology for Unions and encouragement of its use.
- Outcomes of DATA (disaster loss data) project to be consulted upon, shared and promoted.

- Information sharing on upcoming RIA (risk interpretation and action) events.
- Unions to share information with IRDR on their activities and together seek grants for joint activities.

#### Academic and government input

- An appropriately balanced involvement of academic and government scientists is being sought by IRDR.
- Research outputs, e.g. publications, vs real impact of work, were discussed.

#### Developing effective mechanisms for best use of scientific advice in decision making

- Production of best practice guidelines.
- Important role of IRDR National Committees in awareness raising.

#### Observation satellites and geo-information technologies

- Importance recognized for disaster risk reduction and management.
- ICSU to represent the interests of IRDR at the relevant governing bodies of the observing systems and GEO/GEOSS.

#### **Urban Health (Break-out group)**

The main points raised in this session included:

- The importance of the programme: it looks at multiple issues that the world will face in the future, many of which we did not face in the past.
- Involvement of multiple stakeholders in project planning is critical.

Research issues were suggested:

- effective policy interventions related to urban health
- cities design to ensure wellbeing
- nutrition: disease prevention and health promotion
- incentives to slow down agglomeration
- healthy lifestyles (linking to WHO's programme Self-Care)

Other issues raised included:

- There are several Unions working on urban health-related issues (e.g. IGU, ISPRS, IUBS, IUNS). There is a need to further discuss how they can be involved in the programme.
- Mathematical, biological, economic and, physical unions can contribute to systems analysis approach (SYKE, Helsinki).
- There is a need to engage the social science cluster.

- ICSU should collect information on Unions activities related to Urban Health as well as contacts. This information should be shared with all Unions.
- A virtual platform where Unions can demonstrate their activities related to urban health should be established.
- The International conference on Urban Health in Paris, 11-13 Sep 2013, was noted.
- Unions can help strengthen connection with WHO, and its involvement in the programme is critical.

### **New interdisciplinary horizons (Break-out group)**

The following points were raised in this discussion:

#### *Support for Future Earth*

- Top priority for ICSU over next 10 years
- Workshop on Future Earth with all Unions to take results into action
- Meeting between Future Earth science committee and the Unions to talk about the programme
- Education and communication are critical – to politicians, lobbyists, journalists, scientists, non-specialists, young people and the general public
- Suggestion: ICSU-produced magazine or newsletter as a lobbying tool

#### *Program on worldwide pollution*

- Part of Future Earth & Urban Health
- From detection to measurement, reduction and public education
- Example: heavy metal pollution

#### *Crowd-sourcing & crowd-ignorance*

- ICSU should take advantage of the development of crowd-sourcing in its programmes
- Relevant to health, pollution, energy, atmospheric control, animal behaviour, etc.
- Crowd-ignorance – links back to public education

#### *Unions meetings*

- ICSU should encourage and support cluster meetings.
- ICSU should also initiate meetings populated randomly from Unions, to develop novel, inter-disciplinary activities.

### **Open access to data and information (Break-out group)**

Main points raised:



- ICSU should push unions to clarify their positions on these important issues.
- ICSU should shine a light on areas of concern that need to be addressed.
- Concerns about archiving data, preserving old research, maintaining accessibility.
- What is the future of conferences, societies, libraries? Big picture discussion needed.
- Fear of over-abundance of publications and data.
- Open access has different implications for different countries, including developing and developed countries.
- Current publishing model is Western-centric and self-propagating.
- Anyone who wants to publish in a language other than English is at a serious disadvantage.
- Funding should include allotment for open access publication costs.
- Need to examine and potentially improve peer-review process, consider alternatives.
- There is value in publishing negative data (i.e. to avoid duplication of inconclusive efforts) but it is hardly done.
- Major concern at the growing number of on-line ‘junk’ publications trawling for authors.

### **New opportunities and ways forward (Closing plenary)**

The following points were raised by the Unions:

- The need to look more closely into how business and science can collaborate.
- Options for improving ICSU’s visibility (Giving recognition to high level scientists involved in ICSU activities; Sponsoring scientific sessions at conferences, with ICSU’s name clearly highlighted; Introducing an ICSU award that will give ICSU visibility, for people who have promoted science internationally; or for young scientists; or by sponsoring Olympiad processes; There are opportunities for ICSU to tack itself more closely to very successful Union awards, rather than inventing something new; Attention to branding, noting that scientists are not normally good at this; Attention is needed to ICSU’s acronym: why maintain the ‘U’? ‘Global Science Council’ as a potential alternative?; ICSU needs to be more proactive in pushing itself forward and making itself visible; The development of a communication plan is needed; Note that ICSU’s visibility is partly a responsibility of the Unions). Unions can help by including ICSU’s logo on their conference materials, or by distributing the ICSU annual report or putting the annual report on Union websites.

- How to set ICSU apart from IAP and IAC: it is the Unions that make ICSU distinctive.
- The need for more frequent meetings and discussions between National and Union Members. Many Unions already have close connections with bodies in different countries. But this could be improved.
- The need to expand ICSU's range of disciplines, perhaps by doing a gap analysis and inviting Unions who are not members to join ICSU (rather than waiting for applications).
- The need for consolidation of ICSU's actions into concrete activities. Being effective is better than just being big.
- Mining and human health as a potential inter-union activity: can be discussed with governments and industry.
- Climate change: urgency from science in the face of skepticism from parts of the public. Could ICSU promote or encourage a series of round-table conferences on immediate issues e.g. mining for fuels (fracking) or education, with the aim of bringing together a small number of individuals to discuss a specific issue? This would show responsiveness.

***Workshop on Mathematics of Climate Change, Related Natural Hazards and Risks – July 29 – August 2, 2013***

By agreement of the Bureau, IUTAM supported the workshop on Mathematics of Climate Change, Related Natural Hazards and Risks that took place in Guanajuato, Mexico during July 29 – August 2, 2013.

The workshop was organized as part of the global program Mathematics of Planet Earth 2013 and was a satellite activity of the 2013 Mathematical Congress of the Americas.

The workshop was sponsored by ICSU, IMU, IUTAM, IUGG, ICIAM and CIMAT, and supported by ICSU, US-NAS and AMC. It was organized by José Antonio de la Peña (CIMAT), Christiane Rosseau (IMU) and by the Scientific Committee integrated by Susan Friedlander (IMU), **Paul F. Linden (IUTAM)** and Ilya Zaliapin (IUGG).

There were 8 invited lecturers at the Workshop, coming from US, France, Argentina and Mexico, who presented a total of 24 lectures. The invited speakers and the topics they presented were as follows:

Prof. Graciela Canziani (Univ. Nac. Centro, Pcia. Bs. As. Argentina): *Climate and disease dynamics, Analysis of wetland dynamics, and Trophic state of shallow lakes.*

Prof. Michael Ghil (École Normale Supérieure, Paris): *Data assimilation, Mathematical theory of climate sensitivity, and Coupling climate and economics.*

Prof. Eugenia Kalnay (Univ. Maryland USA): *Population and climate change, Improving forecasts, and Data assimilation.*

Prof. Roberto Mechoso (UCLA, USA): *Numerical methods for global climate models, Interpretation of Global Climate Models, and An approach for understand the behavior of traces in the atmosphere* (online conferences).

Prof. Bala Rajaratnam (Stanford Univ. USA): *Theory and statistical methods for reconstructing the Paleoclimate.*

Prof. Oscar Velasco Fuentes (CICESE, Mexico): *Transport in geophysical flows, motion in three-dimensional vortices, and tornado climatology in Mexico.*

Prof. George Philander (Princeton Univ. USA): *A tropical perspective on ice Ages, How observations of Ice Ages can improve Climate Models, and A perspective on why Global Warming is polarizing.*

Prof. Eli Tziperman (Harvard Univ. USA): *Warm climates: the pliocene, permanent el Niño and atmospheric superrotation. Even warmer: Equable climate (Eocene) and convective cloud arctic feedback. Very cold climate: Ocean dynamics in a snowball earth.*

The talks were well presented and had high scientific content. The topics were well aligned with the workshop. There were about 30 participants attending the workshop, mainly young scientists, coming from Mexico (12), United States of America (7), South America (6), Israel (2) and Germany (1). There was a round table, discussing the importance of distinguishing the scientific approach for Climate Change from the propaganda. Also, there was a poster session with 7 poster presentations.

The Workshop was complemented with a welcome cocktail, a social event (a callejoneada in Guanajuato downtown), some dinners and tourism activities around the city.

**Report composed by Frederic Dias, Secretary General of IUTAM**

### **COSPAR (Committee on Space Research)**

No report has been submitted by COSPAR.

### **SCOR (Scientific Committee on Oceanic Research)**

No report has been submitted by SCOR.

## Statutes

### Statuts de l'Union Internationale de Mécanique Théorique et Appliquée

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.

II\* Les principaux objectifs de l'Union sont

- a) de constituer un lien entre les personnes et les organisations engagées dans le travail scientifique dans toutes les branches de la mécanique théorique et appliquée, par des recherches analytiques, numériques et expérimentales;
- 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.

\*) *Article II adopté par l'Assemblée Générale de l'Union, le 18 août 2004 à Varsovie, Pologne*

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.

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 scientifique, partout 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.

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.

VI\*\* L'Assemblée Générale se compose des membres suivants avec droit de vote:

- a) des représentants des «organisations adhérentes» (cf. art. VIII);
- b) des membres du Bureau (cf. art. XI);
- c) des membres cooptés par l'Assemblée Générale de l'Union;

La durée de mandat d'un membre coopté est précisée, lors de son élection, par l'Assemblée Générale. La durée de mandat des membres du Bureau coïncide avec celle de leur appartenance au Bureau.

Les catégories suivantes d'observateurs sont invitées à participer, sans droit de vote, à l'Assemblée Générale de l'Union:

- i) des représentants des «organisations affiliées» (cf. art. X);
- ii) le Secrétaire du Comité de Congrès (cf. art. XII);
- iii) les présidents des «Symposia Panels»;
- iv) les présidents des «Working Parties»;
- v) des représentants des « organisations associées adhérentes » (cf. art. IX)
- vi) des représentants des pays candidats à l'adhésion;
- vii) s'il y a lieu, et sur décision de l'Assemblée Générale, des représentants de comités ou groupes de scientifiques.

\*\*\*) *Article VI adopté par l'Assemblée Générale de l'Union, le 27 août 2008 à Adélaïde, Australie*

VII L'Assemblée Générale doit veiller à une représentation adéquate de tout groupe de scientifiques poursuivant des recherches en mécanique théorique ou appliquée et non représenté par une organisation adhérente.

VIII Les organisations de scientifiques 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 exclue 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.

IX\*\*\* Des organisations de scientifiques en mécanique théorique ou appliquée qui représentent une activité scientifique indépendante dans un pays ou dans un territoire du monde en voie de développement et qui ne sont pas déjà représentées par des « organisations adhérentes » de l'Union peuvent, avec le soutien écrit d'une « organisation adhérente », être admises en tant qu' « organisations associées adhérentes » de l'Union. La dénomination de l'organisation adhérente proposée doit être sans ambiguïté et politiquement neutre afin d'exclure tout malentendu quant à la qualification du pays ou du territoire qui est représenté.

\*\*\*) *Article IX adopté par l'Assemblée Générale de l'Union, le 27 août 2008 à Adélaïde, Australie*

X\*\*\*\* 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. XV ci-après). Chaque « organisation associée adhérente » dispose d'un représentant dans l'Assemblée Générale de l'Union sous la forme d'un observateur sans droit de vote, et doit acquitter une seule cotisation tous les quatre ans (cf. Art. XVI ci-après).

\*\*\*\*) *Article X adopté par l'Assemblée Générale de l'Union, le 27 août 2008 à Adélaïde, Australie*

XI 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, à l'organe ayant une responsabilité équivalente dans 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.

XII\*\*\*\*\* 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 recevoir plus de deux mandats consécutifs. Les membres du Bureau nouvellement élus entrent en fonction au premier 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.

C'est au Secrétaire Général que doivent être adressées 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 doivent être choisis parmi les membres de l'Assemblée Générale, mais non nécessairement parmi les membres du Bureau.

Le Bureau doit établir un budget prévisionnel pour l'année à venir, administrer les finances de l'Union et soumettre, chaque année, à l'Assemblée Générale un rapport financier.

Le Vice-Président doit normalement remplir 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.

\*\*\*\*\*) *Article XII adopté par l'Assemblée Générale de l'Union, le 2 Septembre 1990 à Vienne, Autriche*

XIII L'Assemblée Générale désigne un Comité permanent des Congrès chargé d'organiser à intervalles réguliers les Congrès Internationaux de Mécanique Théorique et Appliquée (ICTAM).

- a) Le Président de l'Union préside aussi ce Comité des Congrès.
- b) Les Membres de ce Comité sont nommés par l'Assemblée Générale; ce sont des scientifiques actifs en mécanique théorique ou appliquée, n'appartenant pas nécessairement à l'Assemblée Générale.
- c) Le Comité des Congrès nomme un Secrétaire, sans précision de durée.
- d) Les règles de fonctionnement du Comité des Congrès sont soumises à l'approbation de l'Assemblée Générale.

XIV\*\*\*\*\* Les ressources financières de l'Union sont constituées par:

- a) les cotisations annuelles des «organisations adhérentes»;
- b) les cotisations des « organisations associées adhérentes » ;
- c) 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 accordé à l'Union des dons, des legs ou des subventions.

\*\*\*\*\*) *Article XIV adopté par l'Assemblée Générale de l'Union, le 27 août 2008 à Adélaïde, Australie*

XV Le nombre des représentants d'une «organisation adhérente» et le montant de la cotisation annuelle qu'elle doit acquitter sont définis dans le tableau suivant, par la catégorie à laquelle elle désire appartenir, et avec l'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 précédente celle à laquelle cette cotisation devient exigible.



XVI\*\*\*\*\* La cotisation d'une « organisation associée adhérente » est établie pour couvrir une période de quatre ans, et le montant de ce paiement unique est égal à la cotisation annuelle de l'année en cours d'une « organisation adhérente » de catégorie I. L'admission en tant qu'« organisation associée adhérente » devient effective dès réception de cette cotisation par le Trésorier. Le statut de chaque « organisation associée adhérente » est réexaminé après les quatre premières années, ainsi qu'après les quatre années suivantes. La catégorie de Membre Associé est normalement limitée à un maximum de huit ans. La possibilité de demander l'admission en tant que Membre de la Catégorie I est offerte à tout moment à un Membre Associé.

\*\*\*\*\*) *Article XVI adopté par l'Assemblée Générale de l'Union, le 27 Août 2008 à Adélaïde, Australie.*

XVII\*\*\*\*\* Toute proposition de modification des Statuts, présentée ou par le Bureau ou par le Secrétaire Général, et ayant reçu l'appui d'au moins dix membres de l'Assemblée Générale ayant le droit de vote, devra être envoyée aux membres de l'Assemblée Générale avec l'ordre du jour de la réunion de l'Assemblée Générale. Le débat sur de telles propositions devra s'effectuer au cours de la première session et le vote au cours de la seconde (Article V).

\*\*\*\*\*) *Article XVII adopté par l'Assemblée Générale de l'Union, le 28 Août 1994 à Amsterdam, Pays-Bas.*

### **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 doit nommer un Comité Exécutif chargé de prendre en son nom toutes les décisions nécessaires pendant la période qui s'écoule entre deux réunions successives, et de lui en faire rapport à sa prochaine réunion. Le Comité Exécutif comprend le président, 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.

### **Règles pour l'élection du Bureau de l'IUTAM \***

1. Lors de l'Assemblée Générale (AG) précédant celle au cours de laquelle le nouveau Bureau doit être élu, un Comité Electoral (CE) doit être élu comprenant le Président de IUTAM (qui assure la présidence de ce Comité) et deux à quatre membres de l'AG, non-membres du Bureau en exercice.
2. A la suite de cette élection, le CE invite les membres avec droit de vote et observateurs de l'AG, spécifiés dans l'Article VI des Statuts sous les rubriques a), b), c), i) et ii), 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 CE.
3. Prenant en compte toutes les suggestions reçues, le CE 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 CE 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'AG avant la première session de l'AG 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'AG 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'AG 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'AG est appelé 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 adoptée par l'Assemblée Générale de l'Union, le 18 Août 2004 à Varsovie, Pologne*

### **Règles 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. 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 des membres 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.

*\*) Procédure adoptée par l'Assemblée Générale de l'Union, le 26 Août 1992 à Haïfa, Israël*

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## 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 in all branches of theoretical and applied mechanics and related sciences, including analytical, computational and experimental investigations;
  - 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.
- \*) Article II adopted by the General Assembly on August 18, 2004, in Warsaw, Poland*
- 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 XII) 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 XII);
- c) members-at-large. The term of a member-at-large 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.

The following categories of observers are invited to take part in the General Assembly without voting rights:

- i) representatives of affiliated organizations (Article XI);
- ii) Secretary of the Congress Committee (Article XIII);
- iii) chairmen of the Symposia Panels;
- iv) chairmen of the Working Parties;
- v) representatives of adhering associated organisations (Article IX);
- vi) representatives of countries applying for membership;
- vii) representatives of committees and groups of scientists, if so decided by the General Assembly.

*\*\* Article VI adopted by the General Assembly on August 27, 2008, in Adelaide (Australia)*

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.\*\*\* Organisations of scientists in theoretical or applied mechanics which represent independent scientific activity in a country or territory of the developing world and

which are not already represented by an adhering organisation of the Union may, with the written support of one adhering organisation, be admitted as an adhering associate organisation of the Union. The name of the proposed adhering organisation must be unambiguous and politically neutral in order to avoid misunderstanding about the country or territory being represented.

*\*\*\*) Article IX adopted by the General Assembly on August 27, 2008, in Adelaide (Australia)*

X.\*\*\*\* 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 XV. Each adhering associate organisation shall have one representative as a nonvoting observer in the General Assembly of the Union, and shall pay a single subscription once for each four-year period in accordance with Article XVI.

*\*\*\*\*) Article X adopted by the General Assembly on August 27, 2008, in Adelaide (Australia)*

XI. 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 X) 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 of and 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.

XII\*\*\*\*. 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.

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.

\*\*\*\*\*) *Article XII adopted by the General Assembly on September 2, 1990, in Vienna (Austria)*

XIII. 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.

XIV.\*\*\*\*\* The financial means of the Union are formed by:

- a) the annual subscriptions of the adhering organizations;
- b) the subscriptions of the adhering associate organisations;
- c) 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.

\*\*\*\*\*) *Article XIV adopted by the General Assembly on August 27, 2008, in Adelaide (Australia)*

XV. 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 representatives	Units of annual 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.

XVI.\*\*\*\*\* The subscription of an associate adhering organisation shall be set to cover a four-year period, and the level of this single payment shall be equal to the current annual subscription of a Category I adhering organisation. Admission as an associate adhering organisation shall be conditional on receipt of this subscription by the Treasurer. The status of each adhering associate organisation shall be reviewed after the initial four years and again after a further four years. Associate Membership shall normally be limited to a maximum of eight years. The option to apply for Category I Membership shall be open to an Associate Member at any time.

\*\*\*\*\*) *Article XVI adopted by the General Assembly on August 27, 2008, in Adelaide (Australia)*

XVII\*\*\*\*\*. 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, Netherlands*

### **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 those voting members and observers of the GA indicated under a), b), c), i) and ii) in Article VI of the Statutes, 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.
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 adopted by the General Assembly on August 18, 2004, in Warsaw, Poland*

**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 August 26, 1992, in Haifa, Israel*

## List of Publications

Five 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. Since 2013, all these Annual Reports are available as pdf files on the IUTAM website.

**b) Newsletters**

At the meeting of the Bureau of IUTAM held in Warsaw in August 2001 it was agreed that the IUTAM Newsletter should be revived.

A primary purpose of the Newsletter, in conjunction with the IUTAM website, is to provide information concerning future activities of IUTAM, particularly its Symposia and Summer Schools, and concerning the International Congress of Theoretical and Applied Mechanics (ICTAM).

The Newsletter will also serve to keep members of IUTAM informed about any other current developments of concern to IUTAM.

The IUTAM Newsletters are available from the IUTAM website.

**c) Proceedings of IUTAM Symposia**

Since 2011, the official publisher for proceedings of IUTAM Symposia is Elsevier, under the newly created Procedia IUTAM series. Procedia IUTAM is open access. All proceedings are freely available on the website of Procedia IUTAM <http://www.journals.elsevier.com/procedia-iutam>

**d) Proceedings of the International Congresses on Theoretical and Applied Mechanics (ICTAM)**

Until 2008, they were only available by direct ordering from the publisher. The Proceedings of ICTAM 2012 have been published under the Procedia IUTAM series. The link is [www.sciencedirect.com/science/journal/22109838/10](http://www.sciencedirect.com/science/journal/22109838/10)

**e) Publications on the history of IUTAM**

See page 128

**Proceedings of IUTAM Symposia**

The Proceedings of IUTAM Symposia published since 2000 are listed below. The names of the editors and of the publisher are given in every case. A complete listing of all published Proceedings can be found at the IUTAM website <http://www.iutam.net> or <http://www.iutam.org>.

**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, 2000. ISBN 0-7923-6737-5.
- 00-2 *IUTAM Symposium on Bluff Body Wakes and Vortex-induced Vibration*  
(Marseille, France, 13-16 June 2000).  
The Proceedings of the Symposium edited by T. Leweke, P.W. Bearman and C.H.K. Williamson, have been published by Academic Press in the Journal of Fluids and Structures, Special Issue on Bluff Body Wakes and Vortex-Induced Vibrations, London, 2001. ISSN 0889-9746, Vol. 15, nos. 3/4.
- 00-2a *IUTAM Symposium on Scaling Laws in Ice Mechanics and Ice Dynamics*  
(Fairbanks, Alaska, USA, 13-16 June 2000).  
The Proceedings of the Symposium, edited by J.P. Dempsey and H.H. Shen, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2001. ISBN 1-4020-0171-1.
- 00-3 *IUTAM Symposium on Mechanical Waves for Composite Structures Characterization*  
(Chania, Crete, Greece, 14-17 June 2000).  
The Proceedings of the Symposium, edited by D.A. Sotiropoulos, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2001. ISBN 0-7923-7164-X.
- 00-4 *IUTAM Symposium on Advances in Mathematical Modelling of Atmosphere and Ocean Dynamics*  
(Limerick, Ireland, 2-7 July 2000).  
The Proceedings of the Symposium, edited by P.F. Hodnett, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2001. ISBN 0-7923-7075-9.
- 00-5 *IUTAM Symposium on Free Surface Flows*  
(Birmingham, United Kingdom, 10-14 July 2000).

The Proceedings of the Symposium, edited by A.C. King and Y.D. Shikhmurzaev, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2001. ISBN 0-7923-7085-6.

- 00-6 *IUTAM Symposium on Diffraction and Scattering in Fluid Mechanics and Elasticity*  
(Manchester, England, 17-20 July 2000).  
The Proceedings of the Symposium, edited by I.D. Abrahams, P.A. Martin and M.J. Simon, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2002. ISBN 1-4020-0590-3.
- 00-7 *IUTAM Symposium on Field Analyses for Determination of Material Parameters-Experimental and Numerical Aspects*  
(Kiruna, Sweden, 31 July-4 August 2000).  
The Proceedings of the Symposium, edited by P. Stahle and K.G. Sundin, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003. ISBN 1-4020-1283-7.
- 00-8 *IUTAM Symposium on Smart Structures and Structronic Systems*  
(Magdeburg, Germany, 26-29 September 2000).  
The Proceedings of the Symposium, edited by U. Gabbert and H.S. Tzou, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2001. ISBN 0-7923-6968-8.
- 00-9 *IUTAM Symposium on Designing for Quietness*  
(Bangalore, India, 12-14 December 2000).  
The Proceedings of the Symposium, edited by M.L. Munjal, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2002. ISBN 1-4020-0765-5.
- 2001**
- 01-1 *IUTAM Symposium on Flow in Collapsible Tubes and Past Other Highly Compliant Boundaries*  
(Warwick, Coventry, March 26-30, 2001).  
The Proceedings of the Symposium, edited by P.W. Carpenter and T.J. Pedley, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003. ISBN 1-4020-1161-X.
- 01-2 *IUTAM Symposium on Material Instabilities and the Effect of Microstructure*  
(Austin, Texas, USA, 7-11 May 2001).  
The Proceedings of the Symposium, edited by S. Kyriakides and N. Triantafyllidis, have been published by Elsevier as a special issue of the International Journal of Solids and Structures, Volume 39, Issues 13-14, 2002.

- 01-3 *IUTAM Symposium on Turbulent Mixing and Combustion*  
(Kingston, Ontario, Canada, 3-6 June 2001).  
The Proceedings of the Symposium, edited by A. Pollard and S. Candel, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2002. ISBN 1-4020-0747-7.
- 01-4 *IUTAM Symposium on Micromechanics of Martensitic Phase Transformation in Solids*  
(Hong Kong, 11-15 June 2001).  
The Proceedings of the Symposium, edited by Q.P. Sun, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2002. ISBN 1-4020-0741-8
- 01-5 *IUTAM Symposium on Analytical and Computational Fracture Mechanics of Non-Homogeneous Materials*  
(Cardiff, England, 18-22 June 2001).  
The Proceedings of the Symposium, edited by B.L. Karihaloo, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2002. ISBN 1-4020-0510-5
- 01-6 *IUTAM Symposium on Computational Mechanics of Solid Materials at Large Strains*  
(Stuttgart, Germany, 20-24 August 2001).  
The Proceedings of the Symposium, edited by C. Miehe, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003. ISBN 1-4020-1170-9
- 01-7 *IUTAM Symposium on Tubes, Sheets and Singularities In Fluid Dynamics*  
(Zakopane, Poland, 2-7 September 2001).  
The Proceedings of the Symposium, edited by K. Bajer and H.K. Moffatt, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2002. ISBN 1-4020-0980-1
- 2002**
- 02-1 *IUTAM Symposium on Micromechanics of Fluid Suspensions and Solid Composites*  
(Austin, Texas, USA, 3-5 April 2002).  
The Proceedings of the Symposium have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, in a special issue of the Philosophical Transactions: Mathematical, Physical & Engineering Sciences in May 2003
- 02-2 *IUTAM Symposium on Unsteady Separated Flows*

- (Toulouse, France, 8-12 April 2002).  
The Proceedings of the Symposium edited by M. Braza, Ch. Hirsch and F. Hussain, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, in a special issue of *Flow, Turbulence and Combustion*, Volume 71, Nos 1-4, 2003. ISSN 1386-6184.
- 02-3 *IUTAM Symposium on Dynamics of Advanced Materials and Smart Structures* (Yamagata, Japan, 20-24 May 2002).  
The Proceedings of the Symposium edited by K. Watanabe and F. Ziegler, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003. ISBN 1-4020-1061-3.
- 02-4 *IUTAM Symposium on Asymptotics, Singularities and Homogenisation in Problems of Mechanics* (Liverpool, UK, 8-11 July 2002).  
The Proceedings of the Symposium edited by A.B. Movchan, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003. ISBN 1-4020-1780-4.
- 02-5 *IUTAM Symposium on Complementary, \_Dual Variational Principles in Nonlinear Mechanics* (Shanghai, China, 13-16 August 2002).  
The Proceedings of the Symposium edited by David Y. Gao have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, in 2004. ISBN 1-4020-7887-0 (HB) and ISBN 1-4020-7888-9 (E-book)
- 02-6 *IUTAM Symposium on Nonlinear Stochastic Systems* (Urbana-Champaign, Illinois, USA, 25-31 August 2002).  
The Proceedings of the Symposium edited by N. Sri Namachchivaya and Y.K. Lin, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003. ISBN 1-4020-1471-6.
- 02-7 *IUTAM Symposium Transsonicum IV* (Göttingen, Germany, 02-06 September 2002).  
The Proceedings of the Symposium edited by H. Sobieczky, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003. ISBN 1-4020-1608-5.
- 02-8 *IUTAM Symposium on Reynolds Number Scaling in Turbulent Flow* (Princeton, N.J. USA, 11-13 September 2002).  
The Proceedings of the Symposium edited by A.J. Smits, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003. ISBN 1-4020-1775-8.
- 02-9 *IUTAM Symposium on Evolutionary Methods in Mechanics*



- (Cracow, Poland, 24-27 September 2002).  
The Proceedings of the Symposium edited by Tadeusz Burczynski and Andrzej Osyczka have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, in 2004.  
ISBN 1-4020-2266-2 (HB) and ISBN 1-4020-2267-0 (E-book)
- 02-10 *IUTAM Symposium on Multiscale Modeling and Characterization of Elastic-Inelastic Behavior of Engineering Materials*  
(Marrakech, Morocco, 20-25 October 2002).  
The Proceedings of the Symposium edited by S. Ahzi, M. Charkaoui, M.A. Khaleel, H.M. Zbib, M.A. Zikry, and B. LaMatina, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003.  
ISBN 1-4020-1861-4.
- 2003**
- 03-1 *IUTAM Symposium on Mechanics of Physicochemical and Electromechanical Interactions in Porous Media*  
(Kerkrade, The Netherlands 18-23 May 2003).  
The Proceedings of the Symposium edited by J.M. Huyghe, P.A.C. Raats and S.C. Cowin, have been published by Springer, Dordrecht, The Netherlands in 2006.  
ISBN: 978-1-4020-3864-8
- 03-2 *IUTAM Symposium on Integrated Modeling of Fully Coupled Fluid-Structure Interactions*  
(Rutgers, N.J. USA 02-06 June 2003).  
The Proceedings of the Symposium edited by Haym Benaroya and Thomothy Wei, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003. ISBN 1-4020-1806-1.
- 03-3 *IUTAM Symposium on Chaotic Dynamics and Control of Systems and Processes in Mechanics*  
(Rome, Italy, 08-13 June 2003).  
The Proceedings of the Symposium edited by G. Rega and F. Vestroni have been published by Springer, Dordrecht, The Netherlands in 2005.  
ISBN 1-4020-3267-6 (HB) and ISBN 1-4020-3268-4 (E-book)
- 03-4 *IUTAM Symposium on Mesoscopic Dynamics of Fracture Process and Materials Strength*  
(Osaka, Japan, 06-11 July 2003).  
The Proceedings of the Symposium edited by H. Kitagawa and Y. Shibutani, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2004. ISBN 1-4020-2037-6 (HB) and ISBN 1-4020-2111-9

(e-book).

## 2004

- 04-1 *IUTAM Symposium on Size Effects on Material and Structural Behavior at Micron- and Nano-Scales*  
(Hong Kong, China, 30 May-4 June, 2004)  
The Proceedings of the Symposium edited by Q.P. Sun and P. Tong, have been published by Springer, Dordrecht, The Netherlands in 2006.  
ISBN 1-4020-4945-5
- 04-3 *IUTAM Symposium on Non-Uniqueness of Solutions to the Navier-Stokes equations and their Connection with Laminar-Turbulent Transition*  
(Manchester, UK, 9-11 August, 2004)  
The Proceedings of the Symposium edited by T. Mullin and R.R. Kerswell, have been published by Springer, Dordrecht, The Netherlands in 2005.  
ISBN 1-4020-4048-2
- 04-4 *IUTAM Symposium on One Hundred Years of Boundary Layer Research*  
(Göttingen, Germany, 12-14 August, 2004)  
The Proceedings of the Symposium edited by G.E.A. Meier, K.R. Sreenivasan et al, have been published by Springer, Dordrecht, The Netherlands in 2006.  
ISBN 1-4020-4149-7
- 04-5 *IUTAM Symposium on Elastohydrodynamics and Microelastohydrodynamics*  
(Cardiff, UK, 1-3 September, 2004)  
The Proceedings of the Symposium edited by R.W. Snidle and H.P. Evans, have been published by Springer, Dordrecht, The Netherlands in 2006.  
ISBN 1-4020-4532-8
- 04-6 *IUTAM Symposium on Mechanics and Reliability of Actuating Materials*  
(Beijing, China, 1-3 September, 2004)  
The Proceedings of the Symposium edited by W. Yang, have been published by Springer, Dordrecht, The Netherlands in 2005. ISBN 1-4020-4130-6
- 04-7 *IUTAM Symposium on Computational Approaches to Multiphase Flow*  
(Argonne, Illinois, USA, 4-7 October, 2004)  
The Proceedings of the Symposium edited by S. Balachandar and A. Prosperetti, have been published by Springer, Dordrecht, The Netherlands in 2006.  
ISBN 1-4020-4976-5
- 04-8 *IUTAM Symposium on Elementary Vortices and Coherent Structures: Significance in Turbulence Dynamics*  
(Kyoto, Japan, 26-28 October, 2004)

The Proceedings of the Symposium edited by Kida, Shigea, have been published by Springer, Dordrecht, The Netherlands in 2006.  
ISBN 1-4020-4180-2

04-9 *IUTAM Symposium on Laminar-Turbulent Transition*  
(Bangalore, India, 13-17 December, 2004)

The Proceedings of the Symposium edited by Govindarajan, Rama, have been published by Springer, Dordrecht, The Netherlands in 2006.  
ISBN 1-4020-3459-8

**2005**

05-1 *IUTAM Symposium on Multiscale Modelling of Damage and Fracture Processes in Composite Materials*  
(Kazimierz Dolny, Poland 23-27 May, 2005).

The Proceedings of the Symposium edited by T. Sadowski, have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2006.  
ISBN 978-1-4020-4565-3.

05-2 *IUTAM Symposium on IUTAM Symposium on Mechanical Behavior and Micro-mechanics of Nanostructured Materials*  
(Beijing, China 27-30 June 2005).

The Proceedings of the Symposium edited by Y.L. Bai, Q.S. Zheng and Y.G. Wei have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2007. ISBN 978-1-4020-5623-9.

05-3 *IUTAM Symposium on Impact Biomechanics: From Fundamental Insights to Applications*  
(Dublin, Ireland 11-15 July, 2005).

The Proceedings of the Symposium edited by M.D. Gilchrist, have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2005.  
ISBN 978-1-4020-3795-5.

05-4 *IUTAM Symposium on Vibration Control of Nonlinear Mechanisms and Structures*  
(Munich, Germany 18-22 July, 2005).

The Proceedings of the Symposium edited by H. Ulbrich and W. Günthner, have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2005. ISBN 978-1-4020-4160-0.

05-5 *IUTAM Symposium on Topological Design Optimization of Structures, Machines and Materials - Status and Perspectives*  
(Aalborg and Lyngby, Denmark, 26-29 October, 2005).

The Proceedings of the Symposium edited by M.P. Bendsøe, N. Olhoff and O. Sigmund, have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2006. ISBN 978-1-4020-4729-9.

## 2006

- 06-1 *IUTAM Symposium on Multiscale Problems in Multibody System Contacts* (Stuttgart, Germany, February 20-23, 2006).  
The Proceedings of the Symposium edited by Peter Eberhard, have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2006. ISBN 978-1-4020-5980-3
- 06-2 *IUTAM Symposium on Interactions for Dispersed Systems in Newtonian and Viscoelastic Fluids* (Guanajuato, Mexico, March 26-31, 2006).  
A report on the Symposium was published and appeared in *Physics of Fluids*, Vol 18, 121501-1, 2006.
- 06-3 *IUTAM Symposium on Plasticity at the Micron Scale* (Lyngby, Denmark, May 21 - May 25, 2006).  
The Proceedings of the Symposium edited by V. Tvergaard, have been published by IOP Publishing, in a special issue of *Modelling and Simulation in Materials Science and Engineering*, Volume 15, number 1, 2007, ISSN 0965-0393.
- 06-4 *IUTAM Symposium on Hamiltonian Dynamics, Vortex Structures, Turbulence* (Moscow, Russia, August 25-30, 2006).  
The Proceedings of the Symposium edited by Borisov, A.V., Kozlov, V.V. et.al., have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2007. ISBN 978-1-4020-6743-3
- 06-5 *IUTAM Symposium on Discretization Methods for Evolving Discontinuities* (Lyon, France, September 04-07, 2006).  
The Proceedings of the Symposium edited by Combescure, Alain, Borst, René de, Belytschko, Ted, have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2007. ISBN 978-1-4020-6529-3
- 06-6 *IUTAM Symposium on Computational Physics and new Perspectives in Turbulence* (Nagoya, Japan, September 11-14, 2006).  
The Proceedings of the Symposium edited by Kaneda, Yukio, have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2007. ISBN 978-1-4020-6471-5

- 06-7 *IUTAM Symposium on Dynamics and Control of Nonlinear Systems with Uncertainty*  
(Nanjing, China, September 18-22, 2006).  
The Proceedings of the Symposium edited by Hu, H.Y., Kreuzer E.J., have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2007. ISBN 978-1-4020-6331-2
- 06-8 *IUTAM Symposium on Flow Control and MEMS*  
(London, UK, September 19-22, 2006).  
The Proceedings of the Symposium edited by Morrison, J.F., Birch, D.M., Lavoie, P., have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2007. ISBN 978-1-4020-6857-7
- 06-9 *IUTAM Symposium on Computational Contact Mechanics*  
(Hannover, Germany, November 05-09, 2006).  
The Proceedings of the Symposium edited by Wriggers, Peter, Neckenhorst, Udo have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2007. ISBN 978-1-4020-6404-3
- 2007**
- 07-1 *IUTAM Symposium on Shell, Plate, Beam and 3D Models*  
(Tbilisi, Georgia, April 23-28, 2007).  
The Proceedings of the Symposium edited by Jaiani, George; Podio-Guidugli, Paolo, have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2008. ISBN 978-1-4020-8773-8.
- 07-2 *IUTAM Symposium on Recent Advances in Multiphase Flows: Numerical and Experimental* (Istanbul, Turkey, June 11-14, 2007).  
The Proceedings of the Symposium have been published as a regular issue of the journal *Physics of Fluids*, Vol. 20, Issue 4, April 2008, together with selected papers from the meeting, all of which will have gone through the standard reviewing process of that journal.
- 07-3 *IUTAM Symposium on Unsteady Separated Flows and their Control*  
(Corfu, Greece, June 18-22, 2007).  
The Proceedings of the Symposium edited by Braza, Marianna; Hourigan, K. have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2009, and as a special issue of the *Journal of Fluids and Structures*, Vol. 24, Issue 8, November 2008. ISBN: 978-1-4020 9897-0.
- 07-4 *IUTAM Symposium on Scaling in Solid Mechanics*  
(Cardiff, UK, June 25-29, 2007).  
The Proceedings of the Symposium edited by Borodich, F., have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2009. ISBN

978-1-4020-9032-5.

- 07-5 *IUTAM Symposium on Fluid- Structure Interaction in Ocean Engineering* (Hamburg, Germany, July 23-26, 2007).  
The Proceedings of the Symposium edited by Edwin Kreuzer, have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2008. ISBN 978-1-4020-8629-8
- 07-6 *IUTAM Symposium on Swelling and Shrinking of Porous Materials: From Colloid Science to Poromechanics* (Petrópolis, Brazil, August 6-10, 2007).  
The Proceedings of the Symposium have been published as a special issue of the *Anais da Academia Brasileira de Ciencias*, Vol. 82(1), Mar. 2010.
- 07-7 *IUTAM Symposium on Advances in Micro- and Nanofluidics* (Dresden, Germany, September 6-8, 2007).  
The Proceedings of the Symposium edited by Ellero, M.; Hu, X.; Fröhlich, J.; Adams, N., have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2009. ISBN 978-90-481-2625-5.
- 07-8 *IUTAM Symposium on Mechanical Properties of Cellular Materials* (Cachan, France, September 17-20, 2007).  
The Proceedings of the Symposium edited by Zhao, Han; Fleck, N.A., have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2009. ISBN 978-1-4020-9403-3.
- 07-9 *IUTAM Symposium on Multi- Scale Plasticity of Crystalline Materials* (Eindhoven, The Netherlands, November 05-09, 2007).  
The Proceedings of the Symposium have been published as a special issue of the *Philosophical Magazine* (Publisher: Taylor & Francis), Vol. 88, Issue 30 – 32, October 2008.

## 2008

- 08-1 *IUTAM Symposium on Theoretical, Computational and Modelling Aspects of Inelastic Media* (Cape Town, South Africa, January 14-18, 2008).  
The Proceedings of the Symposium edited by Daya Reddy have been published by Springer Academic Publishers, The Netherlands, 2008. ISBN: 978-1-4020-9089-9
- 08-2 *IUTAM Symposium on Modelling Nanomaterials and Nanosystems* (Aalborg, Denmark, 19-22 May, 2008).  
The Proceedings of the Symposium edited by Pyrz, R. and Rauhe, Jens C. have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2009. ISBN: 978-1-4020-9556-6
- 08-3 *IUTAM Symposium on Cellular, Molecular and Tissue Mechanics* (Woods Hole, Mass., USA, June 18-21, 2008).

- The Proceedings of the Symposium edited by Garikipati, Krishna and Arruda, Ellen M. have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2010. ISBN: 978-90-481-3347-5
- 08-4 *IUTAM Symposium on Variational Concepts with Applications to the Mechanics of Materials* (Bochum, Germany, September 22-26, 2008).  
The Proceedings of the Symposium edited by Hackl, Klaus have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2010 ISBN: 978-90-481-9194-9
- 08-5 *IUTAM Symposium on 150 Years of Vortex Dynamics* (Technical University of Denmark, October 12-16, 2008).  
The Proceedings of the Symposium edited by Aref, Hassan have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2010 ISBN: 978-90-481-8583-2
- 08-6 *IUTAM Symposium on Progress in the Theory and Numerics of Configurational Mechanics* (Erlangen, Germany, October 20-24, 2008).  
The Proceedings of the Symposium edited by Steinmann, Paul have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2009 ISBN: 978-90-481-3446-5
- 08-7 *IUTAM Symposium on Turbulence in the Atmosphere and Oceans* (Cambridge, UK, December 8 — 12, 2008).  
The Proceedings of the Symposium edited by Dritschel, David have been published by Springer, 2010. ISBN:978-94-007-0359-9
- 08-8 *IUTAM Symposium on Multi-Functional Material Structures and Systems* (Bangalore, India, December 10-12, 2008).  
The Proceedings of the Symposium edited by Dattaguru, B., Gopalakrishnan, Srinivasan and Aatre, V. K. have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2010. ISBN: 978-90-481-3770-1
- 2009**
- 09-1 *IUTAM Symposium on Dynamic Fracture and Fragmentation* (Austin, USA, March 8-12, 2009).  
The Proceedings of the Symposium have been published as a special issue of the International Journal of Fracture (Publisher: Springer), 2010 and by Springer (Ravi-Chandar, Krishnaswamy; Vogler, Tracy J. (Eds.) 2010) ISBN 978-90-481-9759-0
- 09-2 *IUTAM Symposium on Emerging Trends in Rotor Dynamics* (New Delhi, India, March 23 - March 26, 2009)

- The Proceedings of the Symposium edited by Gupta, K. have been published by Springer, 2011. ISBN 978-94-007-0019-2
- 09-3 *IUTAM Symposium on Recent Advances of Acoustic Waves in Solids* (Taipei, Taiwan, May 25-28, 2009)  
The Proceedings of the Symposium edited by Wu, Tsung-Tsong and Ma, Chien-Ching have been published by Springer, 2010  
ISBN 978-90-481-9892-4
- 09-4 *IUTAM Symposium on Laminar-Turbulent Transition* (Stockholm, Sweden, 2009).  
The Proceedings of the Symposium edited by Schlatter, Philipp and Henningson, Dan S. have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2010. ISBN: 978-90-481-3722-0
- 09-5 *IUTAM Symposium on the Vibration Analysis of Structures with Uncertainties* (St. Petersburg, Russia, July 5–9, 2009)  
The Proceedings of the Symposium edited by Belyaev, Alexander K. and Langley, Robin S. have been published by Springer, 2011  
ISBN 978-94-007-0288-2
- 09-6 *IUTAM Symposium on The Physics of Wall-Bounded Turbulent Flows on Rough Walls* (Cambridge, UK, July 7-9, 2009).  
The Proceedings of the Symposium edited by Nickels, T. B. have been published by Springer Academic Publishers, Dordrecht, The Netherlands, 2010  
ISBN: 978-90-481-9630-2
- 09-7 *IUTAM Symposium on Multiscale Modelling of Fatigue, Damage and Fracture in Smart Materials* (Freiberg, Germany, September 1-4, 2009)  
The Proceedings of the Symposium edited by Kuna, Meinhard and Ricoeur, Andreas have been published by Springer, 2011. ISBN 978-90-481-9886-3
- 09-8 *IUTAM Symposium on Mathematical Modeling and Physical Instances of Granular Flows* (Cambridge, UK, July 7-9, 2009).  
The Proceedings of the Symposium edited by Joe Goddard, J.T. Jenkins and P. Giovine have been published as AIP Conference Proceedings 1227, April 2010  
ISBN 978-0-7354-0772-5

## 2010

- 10-1 *IUTAM Symposium on Computational Aero-Acoustics for Aircraft Noise Prediction* (Southampton, UK, March 29 – 31, 2010)  
The Proceedings of the Symposium edited by Astley, Jeremy and Gabard, Gwenael have been published by Elsevier, 2011, as the first issue of the IUTAM e-Procedia series. **Procedia IUTAM Volume 1**



- 10-2 *IUTAM Symposium on Nonlinear Stochastic Dynamics and Control* (Hangzhou, China, May 10-14, 2010)  
The Proceedings of the Symposium edited by Zhu, W.Q., Lin, Y.K. and Cai, G. Q. have been published by Springer, 2011. ISBN 978-94-007-0731-3
- 10-3 *IUTAM Symposium on Dynamics Modeling and Interaction Control in Virtual and Real Environments* (Budapest, Hungary, June 7-11, 2010)  
The Proceedings of the Symposium edited by Stépán, Gábor, Kovács, László L. and Tóth, András have been published by Springer, 2010  
ISBN 978-94-007-1642-1
- 10-4 *IUTAM Symposium on Bluff Body Wakes and Vortex-Induced Vibrations* (Capri, Italy, June 22-25, 2010)  
The Proceedings of the Symposium edited by Leweke, Thomas and Williamson, Charles, have been published by Elsevier, as a special issue of the Journal of Fluids and Structures, Volume 27, Issues 5-6, Pages 637-884, July-August 2011.
- 10-5 *IUTAM Symposium on Nonlinear Dynamics for Advanced Technologies and Engineering Design (NDATED)* (Aberdeen, UK, July 27-30, 2010)  
The Proceedings of the Symposium edited by Marian Wiercigroch and Giuseppe Rega have been published by Springer, 2013  
ISBN 978-94-007-5742-4
- 10-6 *IUTAM Symposium on Surface Effects in the Mechanics of Nanomaterials and Heterostructures* (Beijing, China, August 8-12, 2010)  
The Proceedings of the Symposium edited by Cocks, Alan and Wang, Jianxiang, have been published by Springer, 2012. ISBN 978-94-007-4910-8
- 10-7 *IUTAM Symposium on Human Movement Analysis and Simulation* (Leuven, Belgium, September 13-15, 2010)  
The Proceedings of the Symposium edited by Jonkers, Ilse and Vander Sloten, Jos, have been published online, 2010  
[www.mech.kuleuven.be/iutam2010/IUTAM\\_proceedings/index.html](http://www.mech.kuleuven.be/iutam2010/IUTAM_proceedings/index.html)  
ISBN 978-94-6018-247-1
- 2011**
- 11-1 *IUTAM Symposium on Mechanics of Liquid and Solid Foams* (Austin, USA, May 8-13, 2011)  
The Proceedings of the Symposium edited by Kyriakides, Stelios and Kraynik, Andrew, have been published by Elsevier, as a special issue of the International Journal of Solids and Structures, 2012, and of the Journal of Rheology, Volume 56, Issue 3, Pages i-665, May 2012.

- 11-2 *IUTAM Symposium on Linking Scales in Computations: From Microstructure to Macro-scale Properties* (Pensacola, USA, May 17-19, 2011)  
The Proceedings of the Symposium edited by Cazacu, Oana, have been published by Elsevier, 2012, as the third issue of the IUTAM e-Procedia series. **Procedia IUTAM Volume 3**
- 11-3 *IUTAM Symposium on Human Body Dynamics*  
(Waterloo, Canada, June 5-8, 2011)  
The Proceedings of the Symposium edited by McPhee, John and Kovacs, Jozsef, have been published by Elsevier, 2011, as the second issue of the IUTAM e-Procedia series. **Procedia IUTAM Volume 2**
- 11-4 *IUTAM Symposium on Full-field Measurements and Identification in Solid Mechanics* (Cachan, France, July 4-8, 2011)  
The Proceedings of the Symposium edited by Hild, F. and Espinosa, H.D., have been published by Elsevier, 2011, as the fourth issue of the IUTAM e-Procedia series. **Procedia IUTAM Volume 4**
- 11-5 *IUTAM Symposium on Impact Biomechanics in Sport*  
(Dublin, Ireland, July 7-9, 2011)  
The Proceedings of the Symposium edited by Michael Gilchrist and Manuel Forero Rueda have been published as a special issue of the Proceedings of the Institution of Mechanical Engineers, Part P: Journal of Sports Engineering and Technology, Volume 226, No 3-4, 2012.
- 11-6 *IUTAM Symposium on Computer Models in Biomechanics*  
(Stanford University, USA, August 29 – September 02, 2011)  
The Proceedings of the Symposium edited by Holzapfel, Gerhard A. and Kuhl, Ellen have been published by Springer, 2013. ISBN 978-94-007-5464-5
- 11-7 *IUTAM Symposium on 50 Years of Chaos: Applied and Theoretical* (Kyoto, Japan, November 28 – December 2, 2011)  
The Proceedings of the Symposium edited by Hikiyama, Takashi have been published by Elsevier, 2012, as the fifth issue of the IUTAM e-Procedia series. **Procedia IUTAM Volume 5**

## 2012

- 12-1 *IUTAM Symposium on Mobile Particulate Systems: Kinematics, Rheology and Complex Phenomena*  
(Bangalore, India, January 23-27, 2012)  
The Proceedings of the Symposium edited by P.R. Nott, R.H. Davis, M. Reeks, D. Saintillan and S. Sundaresan have been published as a special issue of Physics of Fluids, Volume 25, Issue 7, July 2013.

- 12-2 *IUTAM Symposium on Advanced Materials Modelling for Structures*  
(Paris, France, April 23-27, 2012)  
The Proceedings of the Symposium edited by Altenbach, Holm and Kruch, Serge have been published by Springer, 2013. ISBN 978-3-642-35167-9
- 12-3 *IUTAM Symposium on From Mechanical to Biological Systems: an Integrated Approach*  
(Izhvesk, Russia, June 5-10, 2012)  
The Proceedings of the Symposium edited by V.V. Kozlov and A.V. Borisov have been published as a special issue of *Regular and Chaotic Dynamics*, Volume 18, No. 1-2, 2013.
- 12-4 *IUTAM Symposium on Waves in Fluids: Effects of Nonlinearity, Rotation, Stratification and Dissipation* (Moscow, Russia, June 18-22, 2012)  
The Proceedings of the Symposium edited by Y. Chashechkin and D. Dritschel have been published by Elsevier, 2013, as the eighth issue of the IUTAM e-Procedia series. **Procedia IUTAM Volume 8**
- 12-5 *IUTAM Symposium on Multiscale Problems in Stochastic Mechanics*  
(Karlsruhe, Germany, June 25-28, 2012)  
The Proceedings of the Symposium edited by C. Proppe and J.-M. Bourinet have been published by Elsevier, 2013, as the sixth issue of the IUTAM e-Procedia series. **Procedia IUTAM Volume 6**
- 12-6 *IUTAM Symposium on Fracture Phenomena in Nature and Technology*  
(Brescia, Italy, July 1-5, 2012)  
The Proceedings of the Symposium will be published by Elsevier, in the IUTAM e-Procedia series. **Procedia IUTAM**
- 12-7 *IUTAM Symposium on Understanding Common Aspects of Extreme Events in Fluids*  
(Dublin, Ireland, July 2-6, 2012)  
The Proceedings of the Symposium edited by M. Bustamante, A.C. Newell, R.M. Kerr and M. Tsubota have been published by Elsevier, 2013, as the ninth issue of the IUTAM e-Procedia series. **Procedia IUTAM Volume 9**
- 12-8 *IUTAM Symposium on Topological Fluid Dynamics: Theory and Applications*  
(Cambridge, UK, July 23-27, 2012)  
The Proceedings of the Symposium edited by H.K. Moffatt, K. Bajer and Y. Kimura have been published by Elsevier, 2013, as the seventh issue of the IUTAM e-Procedia series. **Procedia IUTAM Volume 7**
- 12-10 *IUTAM Symposium on Particle Methods in Fluid Mechanics*  
(Lyngby, Denmark, October 15-17, 2012)

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The Proceedings of the Symposium will be published by Elsevier, in the IUTAM e-Procedia series. **Procedia IUTAM**

**2013**

- 13-1 *IUTAM Symposium on Vortex Dynamics: Formation, Structure and Function* (Fukuoka, Japan, March 10-14, 2014)  
The Proceedings of the Symposium edited by Y. Fukumoto have been published as a special issue of Fluid Dynamics Research, Volume 46, No. 3, 2014.
- 13-2 *IUTAM Symposium on Nonlinear Interfacial Wave Phenomena from the micro- to the macro-scale* (Limassol, Cyprus, April 14-18, 2013)  
The Proceedings of the Symposium edited by Papageorgiou D.T., Smyrlis, Y.S., Vanden-Broeck J.-M. and Christodoulides, P. have been published by Elsevier, 2014, as the eleventh issue of the IUTAM e-Procedia series. **Procedia IUTAM Volume 11**
- 13-4 *IUTAM Symposium on Materials and Interfaces under High Strain Rate and Large Deformation* (Metz, France, June 17-21, 2014)  
The Proceedings of the Symposium edited by S. Mercier and J.F. Molinari have been published as a special issue of Mechanics of Materials, 2014.
- 13-5 *IUTAM Symposium on Multiscale Modeling and Uncertainty Quantification of Materials and Structures* (Santorini Island, Greece, September 9-11, 2013)  
The Proceedings of the Symposium edited by M. Papadrakakis and G. Stefanou have been published by Springer, 2014. ISBN 978-3-319-06330-0
- 13-6 *IUTAM Symposium on the Dynamics of Extreme Events Influenced by Climate Change* (Lanzhou, China, September 23-25, 2013)  
The Proceedings of the Symposium will be published by Elsevier, in the IUTAM e-Procedia series. **Procedia IUTAM**

**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 (were 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.

*13th International Congress on Theoretical and Applied Mechanics (ICTAM)*, Moscow (USSR), 21-26 August 1972.

The Proceedings, edited by E. Becker and G.K. Mikhailov, have been published by Springer-Verlag, Berlin (Germany), 1973.

*14th International Congress on Theoretical and Applied Mechanics (ICTAM)*, Delft (Netherlands), 30 August-4 September 1976.

The Proceedings, edited by W.T. Koiter, have been published by North-Holland Publishing Company, Amsterdam-New York-Oxford, 1976, 1977.

*15th International Congress on Theoretical and Applied Mechanics (ICTAM)*, Toronto (Canada), 17-23 August 1980

The Proceedings, edited by F.P.J. Rimrott and B. Tabarrok, have been published by North-Holland Publishing Company, Amsterdam-New York-Oxford 1980.

*16th International Congress on Theoretical and Applied Mechanics (ICTAM)*,  
Lyngby (Denmark), 19-25 August 1984.

The Proceedings, edited by F.I. Niordson and N. Olhoff, have been published by Elsevier Science Publishers (North-Holland), Amsterdam, 1985.

*17th International Congress on Theoretical and Applied Mechanics (ICTAM)*,  
Grenoble (France), 21-27 August 1988.

The Proceedings, edited by P. Germain, M. Piau and D. Caillerie, have been published by North-Holland, Elsevier Science Publishers, Amsterdam, 1989. ISBN 0-444-87302-3.

*18th International Congress on Theoretical and Applied Mechanics (ICTAM)*,  
Haifa (Israel), 22-28 August 1992.

The Proceedings, edited by S.R. Bodner, J. Singer, A. Solan and Z. Hashin, have been published by Elsevier Science Publishers, Amsterdam, 1993. ISBN 0-444-88889-6.

*19th International Congress on Theoretical and Applied Mechanics (ICTAM)*,  
Kyoto (Japan), 25-31 August 1996.

The Proceedings, edited by T. Tatsumi, E. Watanabe, T. Kambe, have been published by Elsevier Science Publishers, Amsterdam, 1997. ISBN 0-444-82446-4.

*20th International Congress on Theoretical and Applied Mechanics (ICTAM)*,  
Chicago (USA), 27 August-2 September 2000.

The Proceedings, entitled "Mechanics for a new Millenium and edited by H.Aref and J.W.Phillips, have been published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2001. ISBN 0-7923-7156-9.

*21th International Congress on Theoretical and Applied Mechanics (ICTAM)*,  
Warsaw (Poland), 15-21 August 2004.

The Proceedings, entitled "Mechanics of the 21st Century" and edited by W. Gutkowski and T.A. Kowaleski, have been published by Springer, Dordrecht, The Netherlands, 2005. ISBN 1-4020-3456-3.

*22<sup>nd</sup> International Congress on Theoretical and Applied Mechanics (ICTAM)*,  
Adelaide (Australia), 24-29 August 2008.

The Proceedings, entitled "Mechanics Down Under" and edited by J. Denier and M. Finn, have been published by Springer, Dordrecht, The Netherlands, 2013, both as an eBook (ISBN 978-94-007-5968-8) and as a Hardcover (ISBN 978-94-007-5967-1).

*23<sup>rd</sup> International Congress on Theoretical and Applied Mechanics (ICTAM)*,  
Beijing (China), 19-24 August 2012.

The Proceedings, entitled "Mechanics for the World" and edited by Y. Bai, J. Wang and D. Fang, have been published by Elsevier, 2014, as the tenth issue of the IUTAM e-Procedia series. **Procedia IUTAM Volume 10.**

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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 978-3-540-50043-8 (Print), 978-3-642-45649-7 (Online).

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](http://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 Proceedings of IUTAM Symposia published under **Procedia IUTAM** are open access. The other publications listed above, with the exception of the Annual Reports 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>



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## List of Addresses

A full mailing list is available upon request to the Secretary General of IUTAM.

### List by Country

#### Argentina

Sergio Idelsohn, Luis Thomas

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**ISBN-978-2-909968-99-5**

