

REPORT 2021

INTERNATIONAL UNION OF THEORETICAL AND
APPLIED MECHANICS

REPORT 2021



Institute of Fundamental Technological Research
Polish Academy of Sciences
Warsaw, Poland

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Bureau: Officers and Members

The following members of the Bureau of IUTAM have been elected for the period 1 November 2020 (2021 in the case of the Treasurer) to 31 October 2024:

Officers

Professor N.A. Fleck (UK)	President
Professor N. Aubry (USA)	Vice-President
Professor P. Ariza (Spain)	Treasurer
Professor H. Petryk (Poland)	Secretary-General

Members

Professor A.P.S. Freire (Brazil)	(elected 2016)
Professor I.G. Goryacheva (Russia)	(elected 2016)
Professor K. Kishimoto (Japan)	(elected 2020)
Professor D. Lohse (Netherlands)	(elected 2020)

Secretariat

IUTAM-Secretariat, Institute of Fundamental Technological Research,
Polish Academy of Sciences, Pawińskiego 5B, 02-106 Warsaw, Poland
Telephone: +48 22 826 98 34
E-mail: IUTAM.Petryk@ippt.pan.pl
Internet: <https://www.iutam.org>

Past Officers

<i>Elected</i>	<i>President</i>	<i>Vice-President</i>	<i>Treasurer</i>	<i>Secretary</i>
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.J. Pedley (UK)	L.B. Freund (USA)	N. Olhoff (Denmark)	F. Dias (France)
2012	V. Tvergaard (Denmark)	T.J. Pedley (UK)	P. Eberhard (Germany)	F. Dias (Ireland)
2016	N. Aubry (USA)	V. Tvergaard (Denmark)	P. Eberhard (Germany)	H. Petryk (Poland)
2020			D. Henningson (Sweden)	

– until June 2021

Past Congress Presidents

<i>No.</i>	<i>Year</i>	<i>Place</i>	<i>Congress-President</i>
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. Colonnetti
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
24	2016	Montréal, Canada	J.M. Floryan
25	2021	Milano, Italy (virtual)	A. Corigliano

Adhering Organizations

Armenia (2016) (*Associate Organization*)

Armenian National Committee on Theoretical and Applied Mechanics
24B Marshall Baghramyan Ave., 0019 Yerevan
President/Chair: Prof. A. (Ara) Avetisyan
Representative in IUTAM: Prof. A.V. (Avetik) Sahakyan

Australia (1964)

The Australian National Committee for Mechanical and Engineering Sciences of the
Australian Academy of Science
GPO Box 783, ACT 2601, Canberra City
President/Chair: Prof. M. (Mark) Bradford
Representatives in IUTAM: Prof. M. (Mark) Bradford, Prof. J.E. (John) Sader

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. M. (Manfred) Kaltenbacher
Contact: Prof. F. (Franz) Rammerstorfer
Representative in IUTAM: Prof. C. (Christian) Hellmich

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. P. (Patrick) Guillaume
Representatives in IUTAM: Prof. W. (Wim) Desmet, Prof. P. (Patrick) Guillaume,
Prof. D.V.H. (Dirk) Vandepitte

Brazil (1982)

Associação Brasileira de Engenharia e Ciências Mecânicas – ABCM
Avenida Rio Branco 124/18° andar, 20040-001 Rio de Janeiro
President/Chair: Prof. G. (Gherhardt) Ribatski
Contact: Prof. A.P.S. (Atila) Freire
Representatives in IUTAM: Prof. J.B.R. (Juliana) Loureiro,
Prof. M.A.F. (Marcello) de Medeiros

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, Canadian National Committee for IUTAM
1200 Montreal Road, Building M-50, Ontario K1A 0R6, Ottawa

President/Chair: Prof. M. (Marco) Amabili

Secretary: Prof. P. (Peidong) Wu

Representatives in IUTAM: Prof. M. (Marco) Amabili, Prof. K. (Kamran) Behdinan,
Prof. M. (Marilyn) Lightstone, Prof. P.A. (Peichun Amy) Tsai

Chile (1996)

The Chile National Committee on Theoretical and Applied Mechanics

Academia Chilena de Ciencias

Almirante Montt 454, Santiago

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, 100190 Beijing

President/Chair: Prof. D. (Daining) Fang

Secretary: Prof. Y.Z. (Yazheng) Yang

Contact: Mr. J. (Jie) Chen

Representatives in IUTAM: Prof. D. (Daining) Fang, Prof. G.W. (Guowei) He,
Prof. T.J. (Tianjian) Lu, Prof. W. (Wei) Yang, Prof. X.J. (Xiaojing) Zheng

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 Avenue, Kowloon Tong, Hong Kong

President/Chair: Prof. L. (Li) Cheng

Secretary: Prof. Z.-Q. (Zhong-Qing) Su

Representative in IUTAM: Prof. Q.-P. (Qing-Ping) Sun

China-Taipei (1980)

The Society of Theoretical and Applied Mechanics
Department of Civil Engineering, National Taiwan University
No. 1, Sec. 4, Roosevelt Rd., 10617 Taipei
President/Chair: Prof. C.-S. (Chuin-Shan “David”) Chen
Secretary: Prof. S.-W. (Shu-Wei) Chang
Contact: Prof. S.-W. (Shu-Wei) Chang
Representatives in IUTAM: Prof. S.-S. (Shu-San) Hsiau,
Prof. W.-C. (Wei-Chung) Wang

Croatia (1994)

Croatian Society of Mechanics
Ivana Lučića 5, HR-10000 Zagreb
President/Chair: Prof. Z. (Zdenko) Tonković
Contact: Prof. G. (Goran) Turkalj
Representative in IUTAM: Prof. G. (Goran) Turkalj

Czech Republic (2018/1949)

Czech Society for Mechanics
Dolejškova 5, CZ-18200 Prague 8
President/Chair: Prof. J. (Jindrich) Petruska
Secretary: Dr. J. (Jiri) Naprstek
Contact: Prof. M. (Miloslav) Okrouhlik
Representative in IUTAM: Prof. M. (Miloslav) Okrouhlik

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
Contact: Prof. C. (Christian) Niordson, Prof. J.N. (Jens Nørkær) Sørensen
Representatives in IUTAM: Prof. 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, 11516 Cairo
President/Chair: Prof. M. (Mahmoud) Sakr
Contact: Prof. S. (Sameh) Soror, Dr. O. (Osama) Marzouk
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
Representative in IUTAM: Prof. A. (Andrus) Salupere

Finland (1952)

The Finnish National Committee on Mechanics
Tampere University, Attent. Prof. Reijo Kouhia, PO Box 600, FI-33014 Tampere
President/Chair: Prof. R. (Reijo) Kouhia
Secretary: Prof. J. (Jarkko) Niiranen
Contact: Prof. R. (Reijo) Kouhia
Representatives in IUTAM: Prof. R. (Reijo) Kouhia, Prof. J. (Jarkko) Niiranen

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
Representatives in IUTAM: Prof. S. (Samuel) Forest, Prof. F. (Francois) Hild,
Prof. J. (Jacques) Magnaudet, Prof. S. (Stéphane) Popinet

Georgia (2000)

Georgian National Committee of Theoretical and Applied Mechanics
I. Vekua Institute of Applied Mathematics of Iv. Javakishvili Tbilisi State University
2 University Str., 0186 Tbilisi
President/Chair: Prof. G. (George) Jaiani
Representative in IUTAM: Prof. G. (George) Jaiani

Germany (1950)

Gesellschaft für angewandte Mathematik und Mechanik/Deutsches Komitee für
Mechanik (GAMM/DEKOMECH)
Hamburg University of Technology, Institute of Mechanics and Ocean Engineering,
Eissendorfer Strasse 42, D-21073, Hamburg
President/Chair: Prof. R. (Robert) Seifried
Contact: Prof. R. (Robert) Seifried
Representatives in IUTAM: Prof. M. (Marc) Avila, Prof. M. (Michael) Hanss,
Prof. S. (Stefan) Hartmann, Prof. J. (Jörg) Schumacher

Greece (1979)

Hellenic Society for Theoretical and Applied Mechanics
National Technical University of Athens, Mechanics Division
Zographou Campus, GR-15773, Athens
President/Chair: Prof. G.E. (Georgios) Stavroulakis
Secretary: Prof. G.C. (George) Tsiatas
Representative in IUTAM: Prof. G.E. (Georgios) Stavroulakis

Hungary (1948)

Hungarian National Committee for IUTAM
Department of Applied Mechanics, Budapest University of Technology and Economics
Műegyetem rkp. 3, H-1521 Budapest
President/Chair: Prof. G. (Gábor) Stépán
Secretary: Dr. P. (Peter) Varkonyi
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, 110 002 New Delhi
President/Chair: Prof. S. (Santosh) Kapuria
Representatives in IUTAM: Prof. S. (Santosh) Kapuria, Prof. V. (V.) Kumaran,
Prof. G.P. Rajasekhar

Ireland (1984)

Irish National Committee for Mathematical Sciences
Royal Irish Academy, 19 Dawson Street, Dublin 2
Representative in IUTAM: Prof. M.D. (Michael) Gilchrist

Israel (1950)

Israel Society for Theoretical and Applied Mechanics (ISTAM)
Faculty of Mechanical Engineering, Technion-Israel Institute of Technology
32000 Haifa
President/Chair: Prof. R. (Reuven) Segev
Contact: Prof. M.B. (Miles) Rubin
Representatives in IUTAM: Prof. M.B. (Miles) Rubin, Prof. R. (Reuven) Segev

Italy (1949)

Associazione Italiana di Meccanica Teorica ed Applicata
Piazza Leonardo da Vinci 32, I-20133 Milano
President/Chair: Prof. S. (Stefano) Lenci
Secretary: Prof. S. (Sandra) Carillo
Contact: Prof. S. (Stefano) Lenci
Representatives in IUTAM: Prof. D. (Davide) Bigoni, Prof. A. (Alessandro) Bottaro,
Dr. E. (Enrico) De Bernardis, Prof. G. (Giuseppe) Rega

Japan (1951)

The National Committee for Theoretical and Applied Mechanics
Science Council of Japan, 7- 22-34 Roppongi, Minato-ku, 106-8555 Tokyo
President/Chair: Prof. Y. (Yasuyuki) Takata
Secretary: Prof. S. (Shu) Takagi
Contact: Prof. K. (Kikuo) Kishimoto
Representatives in IUTAM: Prof. K. (Koichi) Hishida, Prof. M. (Muneo) Hori,
Prof. K. (Kikuo) Kishimoto, Prof. O. (Osamu) Sano

Korea, Republic of (2012/1989)

Korean Committee for Theoretical and Applied Mechanics
c/o The Korean Society of Mechanical Engineers
Room 702, KSTC New Bld., 635-4, Yeogsam-dong, Kangnam-ku, 135-703 Seoul
President/Chair: Prof. H.D. (Heuy Dong) Kim
Contact: Prof. S. (Simon) Song
Representative in IUTAM: Prof. H.J. (Hyung Jin) Sung

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. G.J.F. (GertJan) van Heijst
Secretary: Prof. D.H. (Dick) van Campen
Representatives in IUTAM: Prof. G.J.F. (GertJan) van Heijst, Prof. P. (Patrick) Onck

New Zealand (1979)

Royal Society Te Apārangi
P.O. Box 598, 6140 Wellington
Representative in IUTAM: A/Prof. R.J. (Richard) Clarke

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

Pawinskiego 5B, 02-106 Warsaw

President/Chair: Prof. S. (Stanislaw) Stupkiewicz

Contact: Prof. H. (Henryk) Petryk

Representatives in IUTAM: Prof. T. (Tomasz) Kapitaniak,

Prof. S. (Stanislaw) Stupkiewicz

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. J. (Jose) Cesar de Sa

Contact: Prof. C.A.B. (Carlos) Pina

Representative in IUTAM: Prof. J.A.C. (Jorge) Ambrósio

Romania (1956)

Romanian Academy, Department of Mathematics

Romanian National Committee of Theoretical and Applied Mechanics

Calea Victoriei 125, 71102 Bucharest

Russia (1992/1956)

Russian National Committee of Theoretical and Applied Mechanics of the Russian Academy of Sciences

Prospekt Vernadskogo 101 : 1, 119526 Moscow

President/Chair: Prof. I.G. (Irina) Goryacheva

Secretary: Prof. V. (Vladimir) Karev

Representatives in IUTAM: Prof. F.L. (Felix) Chernousko, Prof. I.G. (Irina) Goryacheva,

Prof. V.A. (Vladimir) Levin, Prof. N.F. (Nikita) Morozov

Saudi Arabia (1988)

King Abdulaziz City for Science and Technology

Directorate of Technology and International Cooperation

P.O. Box 6086, 11442 Riyadh

President/Chair: 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. N. (Nenad) Filipovic

Secretary: Dr. D. (Dalibor) Nikolic

Representative in IUTAM: Prof. N. (Nenad) Filipovic

Singapore (2021)

Council on Theoretical and Applied Mechanics of the Materials Research Society of Singapore

Nanyang Technological University, 60 Nanyang Drive, 637551, Singapore

President/Chair: Prof. H. (Huajian) Gao

Contact: Prof. K.J. (K. Jimmy) Hsia

Representative in IUTAM: Prof. H. (Huajian) Gao, Prof. K.J. (K. Jimmy) Hsia

Slovenia (1994)

Slovene Mechanics Society

Jamova 2, 1000 Ljubljana

President/Chair: Prof. J. (Janko) Slavič

Secretary: Dr. M. (Martin) Česnik

Representative in IUTAM: Prof. J. (Janko) Slavič

South Africa (1994)

National Research Foundation (NRF)

South African Association for Theoretical and Applied Mechanics (SAAM)

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

President/Chair: Prof. D.N. (Daniel) Wilke

Contact: Prof. D.N. (Daniel) Wilke

Representative in IUTAM: Prof. D.N. (Daniel) Wilke

Spain (2018/1950)

Sociedad Española de Mecánica Teórica y Aplicada (SEMATA)

ETSI, Camino de los descubrimientos s/n, 41092, Sevilla

President/Chair: Prof. P. (Pilar) Ariza

Representative in IUTAM: Prof. P. (Pilar) Ariza

Sweden (1950)

Swedish National Committee for Mechanics

Lund University, Avdelning för Hållfasthetslära, Box 118, SE-22100 Lund

President/Chair: Prof. M. (Matti) Ristinmaa

Secretary: Prof. H. (Hakan) Hallberg

Representatives in IUTAM: Prof. P. (Peter) Gudmundson, Prof. D. (Dan) Henningson,
Prof. S. (Staffan) Lundström,

Switzerland (1950)

Board of the Federal Institutes of Technology

(Rat der Eidgenössischen Technischen Hochschulen)

ETH-Zentrum, CH-8092 Zürich

President/Chair: Prof. M. (Michael) Hengartner

Representatives in IUTAM: Prof. J. (Jürg) Dual, Prof. F. (François) Gallaire

Turkey (1977)

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

UK (1948)

The Royal Society, UK Panel for IUTAM
6 Carlton House Terrace, SW1Y 5AG London
President/Chair: Prof. A. (Anne) Juel
Secretary: Prof. A. (Alan) Cocks
Representatives in IUTAM: Prof. I.D. (David) Abrahams, Prof. A. (Alan) Cocks,
Prof. A. (Anne) Juel, Prof. H. (Helen) Wilson

Ukraine (1995)

National Committee of Ukraine on Theoretical and Applied Mechanics
S.P.Timoshenko Institute of Mechanics, 3 Nesterov Str., 03680 Kyiv
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 for Theoretical and Applied Mechanics of the National
Academies of Science, Engineering and Medicine
500 Fifth Street NW, DC 20001, Washington
President/Chair: Prof. B.J. (Beverly) McKeon
Secretary: Prof. L. (Linda) Franzoni
Representatives in IUTAM: Prof. K. (Krishnaswamy) Ravi-Chandar,
Prof. H. (Horacio) Espinosa, Prof. L. (Linda) Franzoni, Prof. B.J. (Beverly) McKeon,
Prof. G.H. (Gareth) McKinley

Viet Nam (1990)

Vietnamese Association of Mechanics (VAM)
Hoi Co Hoc Vietnam, 264 Doi Can, Hanoi
President/Chair: Prof. N. (Nguyen) Tien Khiem
Secretary: Prof. T. (Tran) Van Lien
Contact: Prof. H. (Hung) Nguyen-Xuan
Representative in IUTAM: Prof. H. (Hung) Nguyen-Xuan

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. Alfredo Soldati and Prof. Wolfgang A. Wall
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. (Frédéric) Dias

ICHMT (1972)

International Centre for Heat and Mass Transfer
Mechanical Engineering Department E-104, Middle East Technical University,
Dumlupınar Bulvarı No:1, 06800 Çankaya Ankara, Turkey
President/Chair: Prof. T.W. (Terrence) Simon
Secretary: Prof. I. (Ilker) Tari
Contact: Prof. I. (Ilker) Tari
Representative of ICHMT in IUTAM: Prof. F. (Faruk) Arinc
Representative of IUTAM in ICHMT: Dr. R. (Rudolf) Dvorák

ICR (1974)

International Committee on Rheology
President/Chair: Prof. P.R. (Paulo) de Souza Mendes
Secretary: Prof. G. (Gerald) Fuller
Contact: Prof. G. (Gerald) Fuller
Representative of ICR in IUTAM: Prof. L.G. (Gary) Leal
Representative of IUTAM in ICR: Prof. G.H. (Gareth) McKinley

IAVSD (1977)

International Association for Vehicle System Dynamics
Institute of Mechanics and Mechatronics, TU Wien, Getreidemarkt 9, 1060, Vienna,
Austria
President/Chair: Prof. T. (Tim) Gordon
Secretary: Prof. M. (Manfred) Plöchl
Representative of IAVSD in IUTAM: Prof. M. (Mats) Berg
Representative of IUTAM in IAVSD: Prof. R. (Robert) Seifried

EUROMECH (1978)

European Mechanics Society

4 impasse Nikola Tesla, CS 40006, 13453, Marseille Cedex 13, France

President/Chair: Prof. M.G.D. (Marc) Geers

Secretary: Prof. J. (Jacques) Magnaudet

Representative of EUROMECH in IUTAM: Prof. A. (Anne) Juel

Representative of IUTAM in EUROMECH: Prof. N.A. (Norman) Fleck

ISIMM (1978)

International Society for the Interaction of Mechanics and Mathematics

President/Chair: Prof. A. (Anja) Schlömerkemper

Secretary: Dr. P. (Paolo) Piovano

Representative of ISIMM in IUTAM: Prof. A. (Alain) Goriely

Representative of IUTAM in ISIMM: Prof. F.L. (Felix) Chernousko

ICF (1978)

International Congress on Fracture

Research Institute for Strength and Fracture of Materials, Tohoku University,
Sendai, Japan

President/Chair: Prof. R.M. (Robert) McMeeking

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

Representative of ICF in IUTAM: Prof. L. (Leslie) Banks-Sills

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

ICM (1982)

International Conference on the Mechanical Behaviour of Materials

President/Chair: Dr. R. (Raj) Das

Secretary: Prof. Y. (Yoshihiko) Uematsu

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

Representative of IUTAM in ICM: Prof. C. (Christian) Niordson

AFMC (1982)

Asian Fluid Mechanics Committee

Center for Atmospheric and Oceanic Sciences

Indian Institute of Science, 560012 Bangalore, India

President/Chair: Prof. S. (Song) Fu

Representative of AFMC in IUTAM: Prof. G.S. (Ganapati Shankar) Bhat

Representative of IUTAM in AFMC: Prof. F. (Frédéric) 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. A. (Antonio) Huerta
Secretary: Prof. J. (John) Dolbow
Representative of IACM in IUTAM: Prof. P. (Pierre) Ladevèze
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. N. (Naoshi) Nishimura
Representative of IABEM in IUTAM: Prof. N. (Naoshi) Nishimura
Representative of IUTAM in IABEM: Prof. N. (Naoshi) Nishimura

ISSMO (1996)

International Society for Structural and Multidisciplinary Optimization
Structural Engineering Department, University of California San Diego,
9500 Gilman Drive, Mail Code 0085, CA 92093, San Diego, USA
President/Chair: Prof. W. (Wei) Chen
Secretary: Prof. H.A. (Alicia) Kim
Contact: Prof. H.A. (Alicia) Kim
Representative of ISSMO in IUTAM: Prof. J.K. (James) Guest
Representative of IUTAM in ISSMO: Prof. N. (Niels) Olhoff

HYDROMAG (1996)

International Association for Hydromagnetic Phenomena and Applications
Applied Mathematics Research Centre, Coventry University,
Priory Street, Coventry, CV1 5FB, UK
President/Chair: Prof. A. (Alban) Pothérat
Contact: Prof. A. (Alban) Pothérat
Representative of HYDROMAG in IUTAM: Prof. A. (Alban) Pothérat
Representative of IUTAM in HYDROMAG: Prof. H.K. (Keith) Moffatt

IIAV (1997)

International Institute of Acoustics and Vibration
Dept. of Mechanical Engineering, Auburn University,
201 Ross Hall, Auburn, AL 36849 USA
President/Chair: Prof. M. (Marek) Pawelczyk
Secretary: Mr. R.M. (Rupert) Thornely-Taylor
Contact: Prof. M.J. (Malcolm) Crocker
Representative of IIAV in IUTAM: Prof. M.J. (Malcolm) Crocker
Representative of IUTAM in IIAV: Prof. P. (Peter) Eberhard

ICA (1998)

International Commission for Acoustics
President/Chair: Prof. M. (Mark) Hamilton
Secretary: Prof. A. (Antonino) Di Bella
Contact: Prof. A. (Antonino) Di Bella
Representative of ICA in IUTAM: Prof. A. (Andrew) Norris
Representative of IUTAM in ICA: Prof. A. (Andrew) Norris

ICTS (2002)

International Congresses on Thermal Stresses
Department of Mechanical Science & Engineering, University of Illinois Urbana-Champaign, USA
President/Chair: Prof. M. (Martin) Ostoja-Starzewski
Secretary: Prof. K.K. (Kumar) Tamma
Representative of ICTS in IUTAM: Prof. M. (Martin) Ostoja-Starzewski
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. D. (Daining) Fang
Representative of BICTAM in IUTAM: Prof. D. (Daining) Fang
Representative of IUTAM in BICTAM: Prof. N. (Narinder) Gupta

LACCOTAM (2010)

Latin American and Caribbean Conference on Theoretical and Applied Mechanics
The Department of Math and Computer Science, The University of the West Indies,
St. Augustine, Trinidad, West Indies
President/Chair: Prof. H. (Harold) Ramkissoon
Secretary: Dr. D. (Donna) Comissiong
Contact: Prof. H. (Harold) Ramkissoon
Representative of LACCOTAM in IUTAM: Dr. S.R. (Sreedhara Rao) Gunakala
Representative of IUTAM in LACCOTAM: Prof. A.P.S. (Atila) Freire

IASCM (2014)

International Association for Structural Control and Monitoring

President/Chair: Prof. H. (Hui) Li

Secretary: Prof. S. (Sami) Masri

Representative of IASCM in IUTAM: Prof. S. (Sami) Masri

Representative of IUTAM in IASCM: Prof. R. (Robert) Seifried

IMSD (2014)

International Association for Multibody System Dynamics

President/Chair: Prof. J. (Jorge) Ambrosio

Secretary: Prof. J. (Javier) Cuadrado

Representative of IMSD in IUTAM: Prof. P. (Peter) Eberhard

Representative of IUTAM in IMSD: Prof. W. (Werner) Schiehlen

WCB (2016)

World Council of Biomechanics

President/Chair: Prof. P. (Peter) Hunter

Secretary: Prof. L. (Lynne) Bilston

Representative of WCB in IUTAM: Prof. P. (Peter) Hunter

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

Members of the General Assembly

<i>Member</i>	<i>Representative of</i>	<i>Remarks</i>
Prof. I.D. (David) Abrahams	UK	
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Prof. N. (Nadine) Aubry		Bureau member
Prof. M. (Marc) Avila	Germany	
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Prof. M. (Michael) Hanss	Germany	
Prof. S. (Stefan) Hartmann	Germany	
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Prof. G.J.F. (GertJan) van Heijst	Netherlands	

Member	Representative of	Remarks
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Prof. D. (Dan) Henningson	Sweden	
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Prof. M. (Muneo) Hori	Japan	
Prof. K.J. (K. Jimmy) Hsia	Singapore	
Prof. S.-S. (Shu-San) Hsiau	China-Taipei	
Prof. M.K. (Mohamed) Ismail	Egypt	
Prof. G. (George) Jaiani	Georgia	
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Prof. T. (Tomasz) Kapitaniak	Poland	
Prof. S. (Santosh) Kapuria	India	
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Prof. V. (V.) Kumaran	India	
Prof. V.A. (Vladimir) Levin	Russia	
Prof. M. (Marilyn) Lightstone	Canada	
Prof. D. (Detlef) Lohse		Bureau member Chair SP Fluids
Prof. J.B.R. (Juliana) Loureiro	Brazil	
Prof. T.J. (Tianjian) Lu	China	
Prof. F. (Fernando) Lund	Chile	
Prof. S. (Staffan) Lundström	Sweden	
Prof. J. (Jacques) Magnaudet	France	
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Prof. B.J. (Beverley) McKeon	USA	
Prof. G.H. (Gareth) McKinley	USA	
Prof. R.M. (Robert) McMeeking		Member-at-Large
Prof. M.A.F. (Marcello) de Medeiros	Brazil	
Prof. S. (Sanjay) Mittal		Secretary CC
Prof. N.F. (Nikita) Morozov	Russia	
Prof. H. (Hung) Nguyen-Xuan	Viet Nam	
A/Prof. J. (Jarkko) Niiranen	Finland	
Prof. C. (Christian) Niordson	Denmark	
Prof. M. (Miloslav) Okrouhlik	Czech Republic	
Prof. N. (Niels) Olhoff		Member-at-Large
Prof. P. (Patrick) Onck	Netherlands	
Prof. T.J. (Timothy) Pedley		Member-at-Large
Prof. H. (Henryk) Petryk		Bureau member
Prof. S. (Stéphane) Popinet	France	

<i>Member</i>	<i>Representative of</i>	<i>Remarks</i>
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Prof. G.P. (G.P.) Rajasekhar	India	
Prof. E. (Eduardo) Ramos	Mexico	
Prof. K. (Krishnaswamy) Ravi-Chandar	USA	
Prof. G. (Giuseppe) Rega	Italy	
Prof. M.B. (Miles) Rubin	Israel	
Prof. J.E. (John) Sader	Australia	
Prof. A.V. (Avetik) Sahakyan	Armenia	<i>Observer</i>
Prof. J. (Jean) Salençon		Member-at-Large
Prof. A. (Andrus) Salupere	Estonia	
Prof. O. (Osamu) Sano	Japan	
Prof. W. (Werner) Schiehlen		Member-at-Large
Prof. B.A. (Bernhard) Schrefler		Member-at-Large Representative of CISM
Prof. J. (Jörg) Schumacher	Germany	
Prof. R. (Reuven) Segev	Israel	
Prof. J. (Janko) Slavič	Slovenia	
Prof. G.E. (Georgios) Stavroulakis	Greece	
Prof. G. (Gábor) Stépán	Hungary	
Prof. S. (Stanislaw) Stupkiewicz	Poland	
Prof. E.S. (Erdogan) Suhubi	Turkey	
Prof. Q.-P. (Qing-Ping) Sun	China-Hong Kong	
Prof. H.J. (Hyung Jin) Sung	Republic of Korea	
Prof. J.N. (Jens Nørkær) Sørensen	Denmark	
Prof. P.A. (Peichun Amy) Tsai	Canada	
Prof. G. (Goran) Turkalj	Croatia	
Prof. V. (Viggo) Tvergaard		Member-at-Large
Prof. D.V.H. (Dirk) Vandepitte	Belgium	
Prof. W.-C. (Wei-Chung) Wang	China-Taipei	
Prof. D.N. (Daniel) Wilke	South Africa	
Prof. H. (Helen) Wilson	UK	
Prof. W. (Wei) Yang	China	
Prof. X.J. (Xiaojing) Zheng	China	

Observers to the General Assembly

<i>Name</i>	<i>Country</i>	<i>Representative of</i>
Prof. F. (Faruk) Arinc	Turkey	ICHMT
Prof. L. (Leslie) Banks-Sills	Israel	ICF
Prof. M. (Mats) Berg	Sweden	IAVSD
Prof. G.S. (Ganapati Shankar) Bhat	India	AFMC
Prof. M.J. (Malcolm) Crocker	USA	IIAV
Prof. A. (Alain) Goriely	UK	ISIMM
Prof. J.K. (James) Guest	USA	ISSMO
Dr. S.R. (Sreedhara Rao) Gunakala	Trinidad & Tobago	LACCOTAM
Prof. P. (Peter) Hunter	New Zealand	WCB
Prof. P. (Pierre) Ladevèze	France	IACM
Prof. L.G. (Gary) Leal	USA	ICR
Prof. S. (Sami) Masri	USA	IASCM
Prof. S.W. (Soo Woo) Nam	Republic of Korea	ICM
Prof. N. (Naoshi) Nishimura	Japan	IABEM
Prof. A. (Andrew) Norris	USA	ICA
Prof. M. (Martin) Ostoja-Starzewski	USA	ICTS
Prof. A. (Alban) Pothérat	UK	HYDROMAG

Members of the Congress Committee

*Year indicates end of term

<i>Member</i>	<i>Country</i>	<i>Year*</i>	<i>Remarks</i>
Prof. P. (Pilar) Ariza	Spain	2024	
Prof. E. (Ellen) Arruda	USA	2024	
Prof. L. (Leslie) Banks-Sills	Israel	2024	Member of XCCC
Prof. D. (Davide) Bigoni	Italy	2022	
Prof. L.C. (Catherine) Brinson	USA	2024	
Prof. S. (Shiyi) Chen	China	2024	Member of XCCC
Prof. A. (Alan) Cocks	UK	2022	
Prof. A. (Alberto) Corigliano	Italy	2024	Member of XCCC
Prof. A. (Anne) De Wit	Belgium	2022	
Prof. N.A. (Norman) Fleck	UK	2024	Chair of XCCC
Prof. J.M. (Maciej) Floryan	Canada	2024	
Prof. S. (Samuel) Forest	France	2024	
Prof. P. (Peter) Frick	Russia	2024	
Prof. M.D. (Michael) Gilchrist	Ireland	2022	
Prof. E. (Elisabeth) Guazzelli	France	2024	
Prof. S. (Stefan) Hartmann	Germany	2024	
Prof. P. (Peter) Hunter	New Zealand	2024	
Prof. A. (Anne) Juel	UK	2022	
Prof. H.D. (Heuy Dong) Kim	Republic of Korea	2024	Member of XCCC
Prof. P.F. (Paul) Linden	UK	2024	Member of XCCC
Prof. D. (Detlef) Lohse	Netherlands	2022	
Prof. G. (Gareth) McKinley	USA	2024	
Prof. S. (Sanjay) Mittal	India	2024	Secretary of XCCC
Prof. H. (Henryk) Petryk	Poland	2024	
Prof. S. (Stéphane) Popinet	France	2024	
Prof. G. (Gherhardt) Ribatski	Brazil	2024	
Prof. M.V. (Maria Vittoria) Salvetti	Italy	2024	
Prof. A. (Alfredo) Soldati	Austria	2024	
Prof. K.J. (Kathleen) Stebe	USA	2024	
Prof. S. (Shu) Takagi	Japan	2022	
Prof. J.X. (Jianxiang) Wang	China	2022	
Prof. W.-C. (Wei-Chung) Wang	China-Taipei	2022	
Prof. H. (Hiroshi) Yabuno	Japan	2024	
Prof. X.J. (Xiaojing) Zheng	China	2024	

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.

Symposia Panel for Fluid Mechanics:			
<i>Member</i>	<i>Country</i>	<i>Year*</i>	<i>Remarks</i>
Prof. R. (Rama) Govindarajan	India	2022	
Prof. E. (Elisabeth) Guazzelli	France	2024	
Prof. A. (Ann) Karagozian	USA	2022	
Prof. H. (Hua) Liu	China	2024	
Prof. D. (Detlef) Lohse	Netherlands	2024	Chair
Symposia Panel for Solid Mechanics			
<i>Member</i>	<i>Country</i>	<i>Year*</i>	<i>Remarks</i>
Prof. L. (Leslie) Banks-Sills	Israel	2022	
Prof. A. (Alexander) Belyaev	Russia	2024	
Prof. D. (Davide) Bigoni	Italy	2024	
Prof. H. (Huajian) Gao	Singapore	2024	Chair
Prof. T.J. (Tianjian) Lu	China	2022	

*Year indicates end of term

Donations in 2021

Donations given to IUTAM Symposia are recorded under the heading “Financial Support” of the Reports of Symposia held in 2021.

IUTAM Representation in ISC and its Scientific Committees

<i>Acronym</i>	<i>Organization/Scientific Committee</i>	<i>Representative of IUTAM</i>
ISC	International Science Council	Prof. N.A. Fleck
CODATA	Committee on Data	Prof. F. Chinesta
COSPAR	Committee on Space Research	Prof. G. Ravichandran
SCOR	Scientific Committee on Oceanic Research	<i>To be nominated</i>

Reports of the IUTAM Symposia held in 2021

Due to the COVID-19 pandemic, only three IUTAM Symposia and one IUTAM Special Event were held in 2021. The remaining IUTAM Symposia scheduled for 2021 were postponed to 2022 or 2023, following a decision of the IUTAM Bureau allowing such postponement.

21-1 IUTAM Symposium on Mechanics of Smart and Tough Gels Austin, Texas, USA (online event), May 24 – May 29, 2021

a) Scientific Committee

Constantino Creton, ESPCI Paris (France)
Alfred J. Crosby, University of Massachusetts
Jianping Gong, Hokkaido University (Japan)
Hua Li, Nanyang Technological University (Singapore)
Zhigang Suo, Harvard University
Xuanhe Zhao (co-chair), MIT
Rui Huang (co-chair), University of Texas at Austin
Norman Fleck (IUTAM Representative), Cambridge University (UK)

b) Short summary of scientific progress achieved

The symposium brought together researchers who through the use of experiment, theory and numerical modeling work to understand the complex mechanics and physics that govern function and fracture of gels. This included mechanics, materials scientists, applied physicists, and polymer chemists. This diversity of backgrounds resulted in the cross-fertilization of ideas and approaches that are now fostering significant advances to the field.

The symposium was originally scheduled to occur in June 2020, but was moved to May 2021 due to the pandemic. The format of the symposium was also changed from in-person to online via Zoom. The organization of the symposium started in 2019. We formed the scientific and organizing committees and prepared a list of over 100 potential participants. Invitations to submit an abstract were sent and the symposium was advertised at professional conferences and on online media. Most of the positive responses to the invitations were accepted.

We had 48 invited speakers from 11 different countries. We organized the primary technical content of the symposium over 6 days in a single session to enhance interactions among participants. Each speaker had 30 minutes for their presentation and questions. Additionally, there was an open panel discussion following each session, moderated by the session chairs. The number of online participants ranged from 50 to 300, varying from session to session. A Zoom registration is required but

free to all. The program, including Zoom recordings, is available online at: <https://sites.utexas.edu/iutam2021/program/>.

Overall, we consider the symposium to have been a success as the participants uniformly provided enthusiastic complementary remarks on the technical content, the discussions, and the online platform.

e) Countries represented and number of participants

We had 48 invited speakers from 11 different countries: USA (28), China (6), Japan (4), France (3), Singapore (1), UK (1), Switzerland (1), Germany (1), Austria (1), Israel (1), Korea (1). In addition, there could be online participants from other countries that we did not keep track.

d) Publication of Proceedings of the Symposium

No publication is planned for the proceedings of the symposium. The program, including Zoom recordings, is available online at:

<https://sites.utexas.edu/iutam2021/program/> .

e) Financial support

No financial support was provided by IUTAM. The online platform was hosted by the University of Texas at Austin and was free, which allowed zero cost for the organizers and the participants.

f) Scientific program

Monday (5/24/2021)

1. Monday Morning Session (9-11am EDT):

Session Chair: Xuanhe Zhao (MIT)

1A. Zhigang Suo, Harvard University

Elastic dissipaters: highly fatigue-resistant materials

1B. Takamasa Sakai, University of Tokyo (Japan)

Negative energy elasticity in a rubber-like gel

1C. Nate Richbourg and Nicholas Peppas, UT Austin

Predicting hydrogel mechanics from network structure: possibilities and pitfalls

1D. Franck Vernerey, University of Colorado Boulder

Mechanics of transient networks: harnessing the dynamic competition between flow and elasticity

2. Monday Evening Session (7-9pm EDT)

Session Chair: Jian Ping Gong (Hokkaido University)

2A. Kunpeng Cui and Jian Ping Gong, Hokkaido University (Japan)

Tough and self-healing physical hydrogels composed of polyampholytes

2B. Alan Zehnder, Cornell University

Deformation and fracture mechanics of a dual cross-link hydrogel

2C. Koichi Mayumi, University of Tokyo (Japan)
Tough and robust hydrogels: self-reinforcement by strain-induced crystallization

2D. Tongqing Lu, Xi'an Jiaotong University (China)
A phenomenological model for strain softening behavior of tough gels

Tuesday (5/25/2021)

3. Tuesday Morning Session (9-11am EDT)

Session Chair: Zhigang Suo (Harvard University)

3A. Matteo Ciccotti, ESPCI Paris (France)
Adhesion rupture in laminated glass: influence of adhesion on the energy dissipation mechanisms

3B. Rong Long, University of Colorado Boulder
Experimental characterization of crack propagation in soft materials with a particle tracking method

3C. Philippe Coussot, Univ. Paris-Est (France)
Wetting and dewetting of hydrogels (as model materials of plant-like systems) governed by water diffusion through the structure

3D. Robert Style, ETH Zürich (Switzerland)
Controlling phase separation with soft gels

4. Tuesday Evening Session (7-9pm EDT)

Session Chair: Tongqing Lu (Xi'an Jiaotong University)

4A. Hua Li, Nanyang Technological University (Singapore)
A multiphysics modelling of urea-sensitive hydrogel

4B. Lihua Jin, University of California, Los Angeles
Spatiotemporal behavior of responsive hydrogels

4C. Manuel Rausch, UT Austin
The mechanics of blood clot as the body's own hydrogel

4D. Wei Hong, Southern University of Science and Technology (China)
Mechanics of physical gels

Wednesday (5/26/2021)

5. Wednesday Morning Session (9-11am EDT)

Session Chair: Constantino Creton (ESPCI Paris)

5A. Alfred J. Crosby, University of Massachusetts Amherst
Polymer gels for synthetic Latch-mediated Spring Actuation (LaMSA) systems

5B. Liheng Cai, University of Virginia
Adaptive soft materials from sequence-controlled supramolecular assembly

5C. Ryan Hayward, University of Colorado-Boulder
Light-driven buckling, assembly, and motion of nanocomposite hydrogel sheets at air/water interfaces

5D. Megan Valentine, University of California, Santa Barbara
Nature-inspired materials for load-bearing and actuation

6. Wednesday Evening Session (7-9pm EDT)

Session Chair: Hua Li (Nanyang Technological University)

6A. Wenguang Liu, Tianjin University (China)

PNAGA and its variant hydrogels for diverse biomedical applications

6B. Stevin Gehrke, University of Kansas

Control and evaluation of network structures of hydrogels designed for biomedical applications by mechanical testing and low field NMR

6C. Michael Sacks, University of Texas at Austin

High fidelity simulation of heart valve interstitial cell contractile behaviour in 3D gels

6D. Jingda Tang, Xi'an Jiaotong University (China)

Fabricating soft materials of complex shapes and high fatigue resistance to mimic biological tissues

Thursday (5/27/2021)

7. Thursday Morning Session (9-11am EDT)

Session Chair: Al Crosby (University of Massachusetts)

7A. Christoph Keplinger, Max Planck Institute (Germany)

Artificial muscles for a new generation of lifelike robots

7B. Martin Kaltenbrunner/Guoyong Mao, Johannes Kepler University Linz (Austria)

Degradable Biogels with Extreme Mechanics for Soft Robots and Electronics

7C. Timothy J. White, University of Colorado Boulder

Programmable, Adaptive, and Nonlinear Mechanics in Liquid Crystalline Elastomers

7D. Shu Yang, University of Pennsylvania

Programmable geometric liquid crystal elastomers with embedded intelligence

8. Thursday Evening Session (7-9pm EDT)

Session Chair: Ruobing Bai (Northeastern University)

8A. Shaoting Lin and Xuanhe Zhao, MIT

Extreme hydrogel technology

8B. Bruce P. Lee, Michigan Tech. Univ.

Smart adhesive hydrogels based on mussel chemistry

8C. Yang Gao, Xi'an Jiaotong University (China)

Hydrogel adhesion: the detachability, universality and medical application

8D. Qiming Wang, University of Southern California

Mechanics of self-healing polymer networks

Friday (5/28/2021)

9. Friday Morning Session (9-11am EDT)

Session Chair: K. Ravi-Chandar (university of Texas at Austin)

9A. Tristan Baumberger, Sorbonne University (Paris, France).

Environmental control of crack propagation in soft gels

9B. Michelle L. Oyen, East Carolina University

Failure and fracture of hydrogel spheres and hydrogel composites

9C. Shelby Hutchens, University of Illinois Urbana-Champaign

On the relation between cutting energy and tearing energy

9D. Konstantin Volokh, Technion – Israel Institute of Technology (Israel)

Modeling cracks in soft materials

10. Friday Evening Session (7-9pm EDT)

Session Chair: Qiming Wang (University of Southern California)

10A. Guihua Yu, University of Texas at Austin

Multifunctional Hydrogels for Sustainable Energy and Environment

10B. Teng Zhang, Syracuse University

Transformative appetite, a smart hydrogel

10C. Shengqiang Cai, UCSD

3D printing of functionally graded liquid crystal elastomers

10D. Jeong-Yun Sun, Seoul National University (Korea)

Ionic spiderwebs

Saturday (5/29/2021)

11. Saturday Morning Session (9-11am EDT)

Session Chair: Nikolas Bouklas (Cornell University)

11A. Si Chen and K. Ravi-Chandar, UT Austin

Modeling and calibration of the nonlinear poroviscoelastic response of gelatin-based hydrogel

11B. Shawn Chester, New Jersey Institute of Technology

Inelasticity in polymeric gels

11C. Yuhang Hu, Georgia Institute of Technology

Contact mechanics of hydrogels

11D. Isaac Kuo-Kang Liu, University of Warwick (UK)

Characterizing mechanical and interfacial properties of hydrogel to study cell mechanics

12. Saturday Evening Session (7-9pm EDT)

Session Chair: Rong Long (University of Colorado Boulder)

12A: Nikolaos Bouklas, Cornell University

Affine and non-affine microsphere models for chain scission in polydisperse elastomer networks

12B. Shaoxing Qu, Zhejiang University (China)

Mechanical properties of frozen hydrogel

12C. Naoyuki Sakumichi, University of Tokyo (Japan)

Velocity jump of crack propagation in rubber-like materials

12D. Rui Huang, UT Austin

A multiscale cohesive zone model for rate-dependent fracture of polymer interfaces

Report composed by Rui Huang and Xuanhe Zhao

21-2 IUTAM Symposium on Computational Methods for Large-Scale and Complex Wave Problems

Tokyo, Japan (online event), June 25 – June 26 and July 2 – July 3, 2021

a) Organization

(1) Chairperson

Kikuo Kishimoto, Tokyo Institute of Technology, Japan

Co-chair: Naoshi Nishimura, Kyoto University, Japan

(2) Scientific Committee

Nadine Aubry, Tufts University, USA, IUTAM Representative

Kikuo Kishimoto, Tokyo Institute of Technology, Tokyo, Japan

Naoshi Nishimura, Kyoto University, Kyoto, Japan

Marc Bonnet, ENSTA, Palaiseau, France

Eric Darve, Stanford University, Stanford, USA

Sohichi Hirose, Tokyo Institute of Technology, Tokyo, Japan

Yijun Liu, SUSTech, China

Martin Schanz, Graz University of Technology, Graz, Austria

(3) Local Organizing Committee

Sohichi Hirose, Tokyo Institute of Technology, Tokyo, Japan

Hirotsugu Inoue, Tokyo Institute of Technology, Tokyo, Japan

Kenji Amaya, Tokyo Institute of Technology, Tokyo, Japan

Kazuaki Inaba, Tokyo Institute of Technology, Tokyo, Japan

Yuki Onishi, Tokyo Institute of Technology, Tokyo, Japan

Yu Kurokawa, Tokyo Institute of Technology, Tokyo, Japan

b) Short summary of scientific progress achieved

Computational methods in wave problems have been of interest in various branches of theoretical and applied mechanics. Even today, there is still an enormous computational challenge such as dealing with large scale problems associated with acoustic fields in concert halls, elastic waves related to earthquakes, etc. There are novel developments also in mechanics such as acoustic metamaterials or eigenfrequency problems for open domains which require new computational techniques for better understanding of the phenomena. This symposium focused on computational methods for these large-scale and/or complex wave problems. In this symposium, we paid particular attention to new fast boundary integral method. We were also interested in other various innovative computational methods which may open new dimensions in the analysis of large-scale and complex wave phenomena. Thirty-five invited papers from America, Asia, and Europe regions were presented. Topics of papers covered broadly as (1) boundary integral method, (2) adaptive method, (3) mathematical method, (4) fast method, (5) finite element method, (6)

inverse problem, (7) wave phenomena, (8) solid and fluid mechanics, and (9) seismic problem. Fruitful discussions were performed among participants and the developments in this field can be overviewed.

Despite the desire we organized an in-person symposium as usual IUTAM symposium, unfortunately the pandemic situation was forcing us to abandon our idea. We decided that the symposium was held as a fully virtual one. To minimize the difficulties related to different time zones, session was scheduled for four hours per day in a time range chosen. This symposium was also opened to their colleagues, staffs and students by taking advantage of virtual meeting. Organizers believed this attempt contributed to stimulate also the research activities of young generations.

c) Countries represented and number of participants

(1) Countries represented and number of presentations

Austria (1), China (5), Germany (1), France (4), India (1), Italy (1), Israel (1), Japan (12), UK (3), Switzerland (1), USA (5)

(2) Number of participants

Total number of participants is 61 including 35 speakers, 16 audiences and 10 organizers.

d) Publication of Proceedings of the Symposium

Booklet of abstracts was edited and distributed to the participants. Publication of proceedings is not planned.

e) Financial support

Since the symposium has held as a fully virtual one, registration was free of charge. The spending of the symposium was as follows.

Cost of Zoom webinar	500	20,680	JPY
Student staff compensation (4)		80,000	JPY
<u>Total</u>		<u>100,680</u>	<u>JPY</u>

f) Scientific program

Time Table *JST [UTC +9:00]

(1) June 25(fri), 2021

20:00-20:15 Opening

20:15-21:25 Boundary Integral Equation

21:35-22:15 Mathematical methods in wave problems

22:25-23:45 Fast methods

(2) June 26(sat), 2021

20:00-21:10 Convolution quadrature method

21:20-22:20 Wave applications
 22:30-23:30 Computational methods in solid and fluid mechanics
 (3) July 2(fri), 2021
 20:00-21:10 Adaptive methods and related topics
 21:20-22:20 Finite element method for dynamic problems
 22:30-23:30 Inverse problems
 23:30-23:50 Seismic problems and related topics (1)
 (4) July 3(sat), 2021
 20:00-20:50 Seismic problems and related topics (2)
 21:00-22:40 Wave phenomena
 22:40- Closing

List of Presentations (The presenters are indicated by name underlined)

Boundary Integral Equation

(1) *General-purpose kernel regularization via density interpolation for solving large-scale BEM problems in acoustic and elastic wave propagation*

Luiz M. Faria, Carlos Pérez-Arancibia and Marc Bonnet

POEMS (CNRS-ENSTA-INRIA), ENSTA Paris, Palaiseau, France

(2) *Calderon's preconditioner for the electric field integral equation discretised with the B-spline basis function and collocation*

Kazuki Niino, Kanta Tahara and Naoshi Nishimura

Department of Advanced Mathematical Sciences, Graduate School of Informatics, Kyoto University, Japan

(3) *Energetic BEM for the numerical solution of exterior problems in elastodynamics*

Alessandra Aimi, Giulia Di Credico, Chiara Guardasoni

Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy

Mathematical methods

(4) *Mixed-dimensional coupling for elastodynamics using the DtN method*

Dan Givoli and Daniel Rabinovich

Department of Aerospace Engineering, Technion – Israel Institute of Technology, Israel

(5) *Efficient numerical scheme for near-infrared propagation in turbid media*

Hiroshi Fujiwara

Graduate School of Informatics, Kyoto University, Japan

Fast methods

(6) *Electrostatic simulations with Bempp and Exafmm - A black-box coupling approach*

Tingyu Wang, Christopher D. Cooper, Timo Betcke*, and Lorena Barba

*Department of Mathematics, University College London, UK

(7) *Extensions and applications of the fast time-domain boundary element method for the 3D wave equation*

Toru Takahashi, Masaki Tanigawa, Naoya Miyazawa, Hiroshi Isakari and Toshiro Matsumoto

Department of Mechanical Systems Engineering, Graduate School of Engineering, Nagoya University, Japan

(8) *"Interpolated Factored Green Function" Method for accelerated solution of scattering problems*

Oscar P. Bruno

Computing and Mathematical Sciences, Caltech, USA

(9) *Wigner-Smit methods for electromagnetic analysis*

Eric Michielssen

Department of Electrical Engineering, University of Michigan, USA

Convolution quadrature method

(10) *Fast convolution quadrature based BEM - Application of a generalized ACA*

Anita M. Haider and Martin Schanz

Institute of Applied Mechanics, Graz University of Technology, Austria

(11) *Convolution quadrature based time-domain boundary element method for wave propagation*

Takahiro Saitoh

Department of Civil and Environmental Engineering, Gunma University, Japan

(12) *Efficiency of fast BEM solvers in the frequency domain to simulate fluid-structure interactions in the time domain*

Marc Bonnet, Stéphanie Chaillat*, Bruno Leblé and Damien Mavaleix-Marchessoux

* Laboratoire POEMS, ENSTA Paris, France

Wave applications

(13) *Active cloak of elastic wave metamaterials*

Hong-Yuan Bao and Yi-Ze Wang

Department of Mechanics, Tianjin University, China

(14) *Boundary element method for frequency-differentiated Helmholtz' equation and its applications*

Hiroshi Isakari

Faculty of Science and Technology, Keio University, Japan

(15) *Wave-particle drag effects in flexoelectric semiconductors - A one-dimensional model for Silicon nanowires*

Yilin Qu and Feng Jin

State Key Laboratory for Strength and Vibration of Mechanical Structures

Xi'an Jiaotong University, China

Computational methods in solid and fluid mechanics

(16) *A new arbitrary Lagrangian Eulerian formulation for a system of first order conservation laws in large strain fast dynamics*

Chun Hean Lee*, Antonio J. Gil, Hojjat Badnava, Thomas Di Giusto, and Javier Bonet

*Glasgow Computational Engineering Centre, University of Glasgow, UK

(17) *Frontal wave structure of water hammer*

Kazuaki Inaba and Kikuo Kishimoto

Department of Transdisciplinary Science and Engineering, Tokyo Institute of Technology, Japan

(18) *The shifted boundary method for hyperbolic systems - Embedded domain computations of acoustic waves and shallow water flows*

Ting Song, Alex Main, Guglielmo Scovazzi*, and Mario Ricchiuto

* Department of Civil & Environmental Engineering, Duke University, USA

Adaptive methods and related topics

(19) *An adaptive model order reduction method for the boundary element method in solving acoustic wave problems*

Xiang Xie and Yijun Liu

Department of Mechanics and Aerospace Engineering, Southern University of Science and Technology, China

(20) *High-order boundary element methods in the time domain*

Heiko Gimperlein

Department of Mathematics, Heriot-Watt University, UK

(21) *Overview of structured low-rank approximation methods*

Rio Yokota

GSIC, Tokyo Institute of Technology, Japan

Finite element method for dynamic problems

(22) *A discontinuous Galerkin method for phase field approximations of dynamic fracture*

Kerstin Weinberg* and Christian Wieners

* Chair of Solid Mechanics, University of Siegen, Germany

(23) *Stabilized leapfrog based local time-stepping method for wave propagation*

Marcus J. Grote, Simon Michel and Stefan A. Sauter

Department of Mathematics and Computer Science, University of Basel, Switzerland

(24) *Modal and dynamic explicit analyses with the latest tetrahedral smoothed finite element method*

Yuki Onishi

Department of Systems and Control Engineering, Tokyo Institute of Technology, Japan

Inverse problems

(25) *Qualitative and quantitative reconstruction of inner cavities in plate structures by scattering data of ultrasonic guided waves*

Bin Wang, Chen Yang, Shuai Jiao and Zhenghua Qian

College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics, China

(26) *ANN-based efficient surrogate models for the modeling of elastic waves propagating in elastic metamaterials*

Chao Qian and Wenjing Ye

Department of Mechanical and Aerospace Engineering, The Hong Kong University of Science and Technology, China

(27) *Solving wave-based inverse problems with deep learning*

Lexing Ying

Department of Mathematics, Stanford University, USA

Seismic problems and related topics

(28) *Modeling seismic wave propagation in 3D heterogeneous visco-elastic anisotropic media with varying topography: a spectral element discretization approach*

Ludovic Métivier and Romain Brossier

Univ. Grenoble Alpes, CNRS, France

(29) *Earthquake simulation with nonlinear wave propagation analysis on low-order unstructured finite elements enhanced by fast scalable implicit matrix solver*

Tsuyoshi Ichimura

Research Center for Computational Earth Science, Earthquake Research Institute & Department of Civil Engineering, The University of Tokyo, Japan

(30) *Numerical simulation of wave propagation in large-scale randomly-fluctuating heterogeneous media*

Régis Cottureau*, Ruben Sevilla and Luciano De Carvalho Paludo

Aix-Marseille University, CNRS, France

Wave phenomena

(31) *Rayleigh-type waves in multi-layered elastic media containing voids: Haskell matrix method*

Aarti Khurana, Savkirat and S K Tomar

Department of Mathematics, Panjab University, India

(32) *A numerical continuation approach to semi-analytical finite element system for dispersion curve calculation*

Kazuyuki Nakahata and Taizo Maruyama

Department of Civil and Environmental Engineering, Ehime University, Japan

(33) *Multiple scattering of elastic waves by a cluster of aligned cylindrical scatterers*

Shiro Biwa and Naoki Ito

Department of Aeronautics and Astronautics, Graduate School of Engineering,
Kyoto University, Japan

(34) *3-D steady-state wave scattering by a crack with contact acoustic nonlinearity*

Taizo Maruyama and Kazuyuki Nakahata,

Department of Civil and Environmental Engineering, Ehime University, Japan

(35) *Dispersion engineering of metamaterials for wave propagation control*

Heedong Goh and Loukas F. Kallivokas

Department of Civil, Architectural and Environmental Engineering, The University
of Texas at Austin, USA

Report composed by Kikuo Kishimoto

21-3 IUTAM Symposium on Generalized Continua Emerging from Microstructures

Paris, France (hybrid event), July 19 – July 23, 2021

a) Scientific Committee

Symposium Chair: Samuel Forest, MINES ParisTech, Paris, France

Symposium Co-Chair: Francesco dell'Isola, Universita dell'Aquila, Italy

Members:

Peter Gumbsch (KIT, Karlsruhe, Germany)

Gengkai Hu (Beijing Institute of Technology, China)

Varvara Kouznetsova (TU Eindhoven, The Netherlands)

Jeffrey Kysar (Columbia, New York, USA)

David McDowell (GeorgiaTech, Atlanta, USA)

Graeme Milton (University of Utah, Salt Lake City, USA)

Christian Niordson (DTU, Lingby, Denmark)

IUTAM representative: Norman Fleck (Cambridge, UK)

The local organizing committee was composed of Sandrine Laurent-Fontaine, Aldo Marano and Jean-Michel Scherer from MINES ParisTech.

b) Short summary of scientific progress achieved

The symposium showed that generalized continuum mechanics has penetrated many areas of solid mechanics and materials mechanics, which were illustrated in dedicated half-day sessions. It emphasised the need to link the enhanced properties of these media with the elements of the microstructure of materials and structures responsible for the observed scaling effects. All classes of materials and microstructures were covered: metallic alloys, polymers, soils and civil engineering materials, composite materials, ceramics and oxides. The mastery of scale change methods then allows the design of microstructures, architected engineering materials and metamaterials. All types of behaviour have been discussed: elasticity, viscoplasticity, damage and failure, under static or dynamic loading conditions. Theoretical, experimental and numerical aspects were addressed for these different topics.

The first half-day was devoted to the theory of generalized continua, in particular the second gradient theory, that of micromorphic and Cosserat media. The elasticity of these media was discussed. In particular, advances in contact mechanics for Cosserat media were reported. The second day began with the study of crystal plasticity, a particularly fertile field for gradient plasticity, with the physical notions of dislocation density tensor and strain localisation within the grains of polycrystals. Note in particular the first works on stochastic models of crystal plasticity. Gradient plasticity

for isotropic media was then discussed with emphasis on the effect of complex loading and thermal coupling. The third day was devoted to homogenisation methods with emphasis on the construction of generalised continuum media from periodic microstructures.

The importance of internal lengths for the description of instabilities and localisation phenomena in materials and structures was the subject of the fourth day. In particular, regularisation methods for the simulation of material failure were discussed. The use of gradient models to simulate environmental effects (hydrogen) on the fracture of metals was also tackled. Finally, the phase field approaches applied to mechanical coupling, diffusion, phase change and recrystallisation were discussed. The last half-day highlighted the dynamics of metamaterials and its representation by second gradient theories.

The symposium favoured discussions between researchers working on very different applications in order to reach a unified vision of the mechanics of generalized continua. These transdisciplinary discussions highlighted common methods of scale transition from the microstructure to the effective medium. We invited several young researchers who have a promising career.

The symposium was held in a hybrid format, mixing presentations by participants physically present and remote presentations using the zoom software. Thanks to the chairmans' facilitation, stimulating discussions took place with a harmonious mix of questions from the audience and the remote participants. The fact that the IUTAM Symposium does not have parallel sessions makes it easier for remote participants to get involved. The scientific discussions on the different themes were very interesting.

The Symposium was an opportunity for researchers who were deprived of conferences by the pandemic to reunite, which was unfortunately impossible to share with the remote participants. The Symposium took place in a very pleasant atmosphere: welcome cocktail, lunches in the gardens of the Ecole des Mines adjoining the Luxembourg Garden, visit of the mineralogy museum, wine and cheese evening on the terrace of the Ecole des Mines. The whole event was carried out in compliance with health regulations.

e) Countries represented and number of participants

Number of oral presentations: $52 = 22 \text{ present} + 30 \text{ remote}$

Number of participants: $67 = 25 \text{ present} + 42 \text{ remote}$

Present participants had affiliations in: France, Italy, Germany, USA, UK

Remote participants had affiliations in: Poland, The Netherlands, India, Sweden, China, Denmark, Finland, Singapore, Spain

d) Publication of Proceedings of the Symposium

We have not planned to publish proceedings of this Symposium. Instead recorded presentations will be available on the MEMOCS youtube channel
https://www.youtube.com/channel/UCiy-GdIDdcAad83_1B7L6Q

The website for the symposium can be found here:

<https://iutam-2021-gc.sciencesconf.org/>

The detailed booklet of the Symposium:

https://iutam-2021-gc.sciencesconf.org/data/pages/ProgramIUTAM21gc_5.pdf

The book of abstracts:

<https://iutam-2021-gc.sciencesconf.org/data/pages/BoAIUTAMgc.pdf>

e) Financial support

IUTAM kindly supported the Symposium by a grant of 4113 euros.
CNRS IRP Coss&Vita supported the event by a grant of 2000 euros:
<https://f2m.cnrs.fr/irp-cossvita/>

Fees of 120 euros were paid by the present participants not belonging to Mines ParisTech. No fees were requested from remote participants.

f) Scientific program**Monday 19 July 2021**

- 12:00 Registration and welcome (mini) lunch at Mines ParisTech
- 13:45 *Introduction of the Symposium and presentation of the IUTAM*
Samuel Forest and Henryk Petryk
- 14:00 *Explicit harmonic structure of bidimensional linear strain-gradient elasticity*
Nicolas Auffray (Université Gustave Eiffel)
- 14:30 *Multiphase continua for fiber-reinforced materials*
Jeremy Bleyer (Ecole des Ponts ParisTech)
- 15:00 *Microtwist elasticity: Zero modes and polarization in kagome lattices*
Hussein Nassar, Hui Chen, Guoliang Huang (Univ. of Missouri)
- 15:30-16:00 Coffee break
- 16:00 *Gradient materials: The different behavior of free boundaries of a body and the fictitious cut around some subbody*
Arnold Krawietz (priv. doz. Berlin)
- 16:30 *Modelling contact interactions of generalized continua: microblock contact model for a Cosserat body* by M. Lewandowski-Szewczyk,

Stanislaw Stupkiewicz (IPPT, Polish Academy of Sciences)

17:00 *Three-dimensional solids and structures within strain gradient elasticity: numerical methods and model comparisons*

by Jarkko Niiranen (Aalto University, Finland), Viacheslav Balobanov

18:00-19:30 Get together cocktail and buffet

Tuesday 20 July 2021

8:30 *A FFT-based approach for Mesoscale Field Dislocation Mechanics: applications to internal length scale effects in polycrystals and steel matrix composites* by Stephane Berbenni (Université de Lorraine, France)

9:00 *A mesoscale continuum approach of dislocation dynamics and the approximation by discontinuous Galerkin methods* by Christian Wieners, K. Schulz (KIT, Germany)

9:30 *Modeling plastic slip localization within polycrystals*
Aldo Marano (CEA Saclay, France), L. Gélébart, S. Forest

10:00 *On the control of elastic gaps in Gurtin-type strain gradient crystal plasticity theories using uncoupled dissipation assumption*
Mohamed Jebahi, L. Cai, F. Abed-Merain (Université de Lorraine, France)

10:30-11:00 Coffee break

11:00 *Microstructural aspects of gradient-enhanced crystal plasticity*
Henryk Petryk (IPPT, Polish Academy of Sciences)

11:30 *Plastic flow and dislocation strengthening in a continuum formulation of dislocation dynamics*
Katrin Schulz (KIT, Germany), C. Wieners

12:00 *Analytic solutions for strengthening of a strain gradient plasticity material reinforced by small elastic particles*
Jonas Faleskog (KTH, Stockholm, Sweden), P. Gudmunson

12:30-14:00 Lunch buffet at Mines ParisTech

14:00 *Distortion gradient plasticity modelling of the small-scale behaviour of metals under non-proportional loading*
Lorenzo Bardella (Brescia University, Italy), A. Panteghini

14:30 *A phase field fracture and strain gradient plasticity-based model for predicting hydrogen embrittlement* by Emilio Martinez-Paneda (Imperial College, UK), P.K. Kristensen, C. Niordson

15:00 *Modeling micron-scale compression molding* by Christian F. Niordson (DTU, Denmark), K.L. Nielsen, B. Zhang, W.J. Meng, J.W. Hutchinson

15:30 *Enhanced Strength of Cu-Gr-Cu nanolaminates*
S. Rastogi, C.F. Niordson, E. Martinez-Paneda, Jeffrey W. Kysar (Columbia, University, USA)

16:00-16:30 Coffee break

16:30 *The evolution of Hooke's law under finite plastic deformations for fiber reinforced materials*

- 17:00 Albrecht Bertram (TU Berlin, Germany), O. Stahn, W.H. Mueller
A stochastic solver based on the residence time algorithm for crystal plasticity models
Q. Yu, E. Martinez, J. Segurado, Jaime Marian (UCLA, USA)
- 17:30 *Gradient models for softening thermo-plasticity at large strain* by Jerzy Pamin (Cracow University of Technology, Poland), B. Wcislo, M. Mucha

Wednesday 21 July 2021

- 8:30 *Green functions and integral representation of anisotropic second gradient continua: The case of pantographic lattices*
Claude Boutin (ENTPE, Lyon, France), F. dell'Isola
- 9:00 *Predictive strain-gradient homogenization of a pantographic material with compliant junctions and experimental evidence* by B. Durand, Arthur Lebée (Ecole des Ponts, France), P. Seppecher, K. Sab
- 9:30 *Nonlinear gradient models in hyper-elasticity: from slender structures to architected materials* by Claire Lestringant (Cambridge University, UK)
- 10:00 *Direct FE2 for concurrent multiscale modelling of heterogeneous thin plate structures* by J. Xu, P. Li, Leong Hien Poh (NUS, Singapore), B.C. Tan
- 10:30-11:00 Coffee break
- 11:00 *Interpretation of the moduli of isotropic micromorphic elasticity by harmonic decomposition and analytical homogenisation*
Gerald Hütter (TU Bergakademie Freiberg, Germany)
- 11:30 *Hashin-Shtrikman bounds on the effective properties of stress-gradient materials* by S. Brisard, V.P. Tran, Karam Sab (Ecole des Ponts, France)
- 12:00 *Enhanced flexoelectricity in heterogeneous piezoelectric composites using topology optimization* by Julien Yvonnet (Gustave Eiffel University, France), X. Chen, H.S. Park, S. Yao
- 12:30 *Analysis of the failure of heterogeneous materials: a bottom-up approach*
E. Eid, R. Seghir, Julien Réthoré (Centrale Nantes, France)
- 13:00 *Direct and energy based homogenization approaches within the second gradient elasticity theory: examples and general relations*
Yuri Solyaev (IAM RUS, Russia), S. Lurie
- 13:30-14:30 Lunch buffet at Mines ParisTech
- 17:00-18:00 Visit of the Mineralogy Museum at Mines ParisTech
- 18:00-19:30 Wine and cheese session at Mines ParisTech

Thursday 22 July 2021

- 8:30 *Generalized continuum models confronted to cell-commensurate instabilities in structured media* by Christelle Combescure (Ecoles Saint-Cyr Coetquidan, France)
- 9:00 *Capturing microscopic and macroscopic instabilities in mechanical metamaterials by micromorphic computational homogenization*

- Ron Peerlings (TU Eindhoven, Netherlands), S. van Bree, M. Ameen, M. Doskar, O. Rokos, Marc Geers
- 9:30 *Determination of homogenized continua behaviors from actual printed microstructures* by Maxence Wangermez (ENS Paris-Saclay, France), M. Poncelet, N. Auffray
- 10:00 *A gradient-extended large-strain anisotropic damage model with crack orientation director*
Stephan Wulfinghoff (Kiel University, Germany), C. Dorn
- 10:30-11:00 Coffee break
- 11:00 *A strain-gradient plasticity model of ductile failure in porous single crystals*
Jean-Michel Scherer (Ecole Polytechnique et Ecole des Ponts, France), J. Besson, S. Forest, J. Hure, B. Tanguy
- 11:30 *Thermal pressurization of earthquake faults under large co-seismic slip using Cosserat continuum*
Alexandros Stathas (Centrale Nantes, France), I. Stefanou
- 12:00 *A granular-based elasto-plastic--damage energy formulation for strain gradient solids* by Luca Placidi (International Telematic University Uninettuno, Rome, Italy), E. Barchiesi, F. dell'Isola, V. Maksimov, A. Misra, N. Rezaei, A. Scrofani, D. Timofeev
- 12:30-14:00 Lunch buffet at Mines ParisTech
- 14:00 *Development, implementation and application of a second-gradient model for porous ductile solids*
Jean-Baptiste Leblond (Sorbonne University, France), J.M. Bergheau
- 14:30 *An FFT framework for simulating non-local ductile failure heterogeneous materials* by Javier Segurado (IMDEA, Madrid, Spain), M. Magri
- 15:00 *Energetic versus dissipative gradient damage models: A comparative analysis* by K. Kpotufe, R. Abdelmoula, Djimed Kondo (Sorbonne University, France)
- 15:30 *Damage in periodic composite materials resulting from a micromechanics-based phase field approach* by Marco Paggi (IMT School for Advanced Studies Lucca, Italy), F. Fantoni, A. Bacigalupo, J. Reinoso
- 16:00-16:30 Coffee break
- 16:30 *Mass transport and shape changes in nonhomogeneous sintering*
Sinisa Mesarovic
- 17:00 *Phase field modeling of deformation twinning in beta-metastable titanium alloys* by Benoit Appolaire (Université de Lorraine, Nancy, France), J. Hamma, Y. Le Bouar, A. Finel
- 17:30 *A phase-field enhanced Cosserat model for prediction of microstructure evolution*
Anna Ask (ONERA, Châtillon, France), S. Forest, B. Appolaire

Friday 23 July 2021

- 8:30 *Some perspectives on the Willis equations*
Graeme Milton (University of Utah, Salt Lake City, USA)
- 9:00 *Interfacial wave between two acoustic bianisotropic materials*
Z. Li, H.F. Qu, H.K. Zhang, X. Liu, Gengkai Hu (Beijing Institute of Technology, China)
- 9:30 *An examination of primitive causality in linear generalized continuum theories* by Venkata Mutnuri (IIT Bangalore, India), S.Gopalakrishnan
- 10:00 *Elastic wave propagation in non-centrosymmetric and chiral architected materials: insights from strain gradient elasticity*
Giuseppe Rosi (Gustave Eiffel University, France), N. Auffray
- 10:30-11:00 Coffee break
- 11:00 *An enriched continuum framework for metamaterial panels obtained through computational homogenization and model order reduction*
Varvara Kouznetsova (TU Eindhoven, Netherlands), L. Liu, T. Lenders, M. Geers
- 11:30 *Wave propagation control in active metamaterial with shunted piezoelectric microstructure* by Maria Laura De Bellis (University of Chieti-Pescara), A. Bacigalupo, D. Misseroni
- 12:00 *Local material symmetry group for first- and second-order strain gradient materials with application to fluids and subfluids*
Victor Eremeyev (Gdansk University of Technology, Poland)
- 12:30 *Piola transformation of stress and double stress in second gradient continua*
Francesco dell'Isola (University dell'Aquila, Italy), S. Eugster, R. Fedele, P. Seppecher
- 13:00-14:00 Lunch buffet at Mines ParisTech

Report composed by Samuel Forest

21-S IUTAM Special Event: Fluid Mechanics in the Spirit of G. K. Batchelor

Cambridge, UK (online event), March 29 – March 31, 2021

This symposium sponsored by IUTAM, EUROMECH, Cambridge University Press and Trinity College, Cambridge was to celebrate the centenary of the birth of Professor George Batchelor FRS. Originally intended to be held in person in Cambridge in March 2020 it was postponed for a year as a result of Covid-19 and held as an on-line meeting from 29-31 March 2021.

The initial programme consisted of invited lectures from the previous Batchelor Prize winners, Howard Stone (Princeton, USA), Detlef Lohse (Twente, Netherlands) and Ray Goldstein (Cambridge, UK), and plenary lectures from Berengere Dubrulle (SPEC, Saclay, France), Rama Govindarajan (ICTS, Bengaluru, India) and Xiaojing Zheng (Lanzhou, China) along with invited lectures selected by the scientific organising committee and featuring a number of early career researchers.

The scientific committee consisting of Paul Linden (chair, Cambridge, UK), Elisabeth Guazzelli (CNRS, France), Beverley McKeon (Caltech, USA), Keith Moffatt (Cambridge, UK), Tim Pedley (Cambridge, UK) and Ke-qing Xia (Sustech, PRC) decided to limit the online presentations to the prize lectures and plenary lectures along with a lecture by Keith Moffatt on the life and work of Batchelor. Typical online attendance at these lectures exceeded 300 participants.

The initial speakers were all invited to submit articles to a special issue of the Journal of Fluid Mechanics Volume 914 and a total of 38 papers are included in the volume. All papers are Open Access and details of the meeting, access to the papers and recording of some introductions can be found at <https://www.cambridge.org/core/browse-subjects/mathematics/fluid-mechanics-hub/george-batchelor-centenary-event>

Programme:

Monday 29th March

1230 Welcome

1300 Ray Goldstein: *Two stories of fluids and light: algal phototaxis and dinoflagellate bioluminescence*

1400 Rama Govindarajan: *Stratified viscosity: a singular and nonlinear tale*

Tuesday 30th March

1230 Patrick Huerre: *George Batchelor and the founding of EUROMECH*

1300 Detlef Lohse: *Physicochemical hydrodynamics of droplets and bubbles out of equilibrium*

1400 Berengere Dubrulle: *On the small scale structure of turbulence*

Wednesday 31st March

- 1230 Xiaojing Zheng: *Turbulence effects in wind-blown sand movements*
1330 Howard Stone: *Modern applications of classical ideas in fluid mechanics: thin films, physical chemistry and molecular biology*
1430 Keith Moffatt: *George Batchelor - a personal reminiscence*

Report composed by Paul Linden

Reports of the IUTAM Summer Schools held in 2021

Due to the COVID-19 pandemic, the IUTAM-CISM Summer School scheduled for 2021 was postponed to 2022.

ICTAM Milano 2020+1 – Virtual

President: Alberto Corigliano

Secretary General: Umberto Perego

AIMETA representative: Carlo Cinquini

The 25th International Congress of Theoretical and Applied Mechanics (25th ICTAM) was held from 22 to 27 August 2021. Due to the covid-19 pandemic, the 25th ICTAM was organized in a fully virtual format for the first time in the ICTAM history. The meeting's scientific program consisted of plenary opening and closing lectures, sectional lectures, mini-symposia, and contributed papers presented in oral and "short oral with posters" sessions. These covered all aspects of mechanics. There were also two additional plenary lectures, the Rodney Hill Prize Lecture and the G.K. Batchelor Prize Lecture.

The list of Lectures, Mini symposia, Thematic Sessions and relevant co-chairs given in this report is referred to the final version. Some Co-chairs invited from the CC, initially agreed in co-organizing the MS or TS but decided to not participate at the 25th ICTAM-Virtual. Few Thematic Sessions initially announced were later canceled due to the reduced number of participants.

Special Lectures, Mini-Symposia and Pre-nominated Sessions

Opening Lecture

Nicola M. Pugno (Italy): *Bio-inspired nanomechanics*

Closing Lecture

Elisabeth Guazzelli (France): *Rheology of dense granular suspensions*

Batchelor Prize Lecture

Alexander J. Smits (USA): *Measurements in wall-bounded turbulence*

Rodney Hill Prize Lecture

Vikram S. Deshpande (United Kingdom): *Mechanics of living cells-order amongst disorder*

Sectional Lectures

Balakumar Balachandran (USA): *Nonlinear dynamics: a journey through experiments and computations*

Alessandro Bottaro (Italy): *Modeling flows over natural or engineered surfaces*

Antonio De Simone (Italy): *Morphing and shape control: from mechano-biology to engineering*

Frederic Dias (Ireland): *What makes ocean waves go rogue in the real world?*

Xi-Qiao Feng (China): *Dynamics of Collective Cells and Biological Tissues*

Genta Kawahara (Japan): *Simple invariant solutions representing fluid turbulence*

Ellen Kuhl (USA): *Modeling Dementia*

Eric Lauga (United Kingdom): *When biology inspires fluid mechanics*

Jean-Baptiste Leblond (France): *Theoretical analyses of configurational instability of crack propagation in mixed mode I+III or I+II+III: a review*

Christian Niordson (Denmark): *Size-effects in porous metal plasticity*

Clarence Rowley (USA): *Data-driven modeling of fluids*

Miles Rubin (Israel): *Eulerian formulation of inelasticity – from metal plasticity to growth of biological tissues*

Stefanie Reese (Germany): *Data-driven mechanics - theoretical and numerical aspects in the context of inelastic material behaviour*

Cameron Tropea (Germany): *Transient Spray Cooling*

Roberto Verzicco (Italy): *Electro-Fluid-Mechanics of the Heart*

Emmanuel Villermaux (France): *Fragmentation Versus Cohesion*

Mini-Symposia and their Chairs

MS01: Modelling and controlling turbulent shear flows

Chairs: Ivan Marusic (Australia), Beverley McKeon (USA).

Keynote lecturers:

Kunihiko Taira: *Resolvent analysis of separated flows over airfoils.*

Mitul Luhar: *Low-complexity models for passive control of wall turbulence.*

Dennice Gayme: *Restricted nonlinear modeling for high Reynolds number wall-bounded turbulence.*

Bharathram Ganapathisubramani: *Experiments and modelling of synthetic jet in cross flow.*

MS02: Local mechanics of climate processes

Chairs: Eberhard Bodenschatz (Germany), John Wettlaufer (USA).

Keynote lecturers:

Valerio Lucarini: *Global stability properties of the climate: melancholia states, invariant measures, and phase transitions.*

Freddy Bouchet: *Extreme events and precursors in climate dynamics: sampling using machine learning and rare event algorithms.*

MS03: Biological fluid-structure interaction at the microscale

Chairs: Prosenjit Bagchi (USA), Anne-Virginie Salsac (France).

Keynote lecturers:

Eric Shaqfeh: *High-throughput measurement of an individual's red blood cell shear modulus distribution.*

Sylvie Lorthois: *Spatial distribution of red blood cells in periodic microfluidic networks.*

MS04: Nonlinear Dynamics for Design

Chairs: Remco Leine (Germany), Stefano Lenci (Italy).

Keynote lecturers:

Nicolas Noiray: *Nonlinear dynamics for designing annular thermo-acoustic systems.*

Walter Lacarbonara: *Harnessing hysteresis nonlinearities in multi-scale structures.*

Ivana Kovacic: *On nonlinear vibration isolation via quasi-zero stiffness characteristic: benefits and challenges.*

Emmanuel Detournay: *Stability and steerability of rotary steerable systems.*

MS05: Mechanics of additive manufacturing

Chairs: Ferdinando Auricchio (Italy), Matthew Begley (USA).

Keynote lecturers:

Ole Sigmund: *Optimization and evaluation of am infill and lattice structures.*

Ernst Rank: *Immersed boundary methods for simulation in additive manufacturing.*

Lorenzo Valdevit: *Nanoarchitected materials: from truss lattices to plate- and shell-based topologies.*

MS06: Mechanics of C-allotropic materials and structures

Chair: Roberto Paroni (Italy)

Keynote lecturers:

Pedro Reis: *Smooth triaxial weaving using curved strips.*

Paolo Podio-Guidugli: *On the continuum mechanical modelling of bilayer graphene.*

Horacio D. Espinosa: *Nano and microscale origami engineering: present and future.*

Thematic Sessions and Their Organizers:

Fluid Mechanics	
<p>FM01. Biological Fluid Mechanics Sunny Jung, (USA) Sylvie Lorthois (France)</p> <p>FM02. Boundary Layers Maurizio Quadrio (Italy)</p> <p>FM03. Combustion and Flames Bruno Denet (France) Daniel Haworth (USA)</p>	<p>FM10. Geophysical and Environmental Fluid Dynamics Nathalie Vriend (United Kingdom) Jifu Zhou (China)</p> <p>FM11. Low-Reynolds-number Flows and Suspensions Sebastien Michelin (France) Amy Tsai (Canada)</p>

<p>FM04. Compressible Flow Sanjiva K. Lele (USA) XiYun Lu (China)</p> <p>FM05. Convection Lutz Lesshafft (France) Detlef Lohse (The Netherlands)</p> <p>FM06. Drops, Bubbles and Multiphase Flows Andrea Prosperetti (USA) Emmanuel Villiermaux (France)</p> <p>FM07. Multiphase and Particle-Laden Flows Jose Gilberto Dalgre Filho (Brazil) Roseanna Zia (USA)</p> <p>FM08. Flow Instability and Transition Marcello Augusto Faraco de Medeiros (Brazil) Alexander Gelfgat (Israel)</p> <p>FM09. Thin Film Flows Omar K. Matar (United Kingdom) Howard Stone (USA)</p>	<p>FM12. Micro- and Nano-fluidics Amy Shen (Japan) Minami Yoda (USA)</p> <p>FM13. Non-Newtonian and Complex Fluids Wei Jinjia (China)</p> <p>FM14. Computational Fluid Dynamics Alfio Quarteroni (Italy)</p> <p>FM15. Turbulence Martin Oberlack (Germany)</p> <p>FM16. Vortex Dynamics Carlo Barenghi (United Kingdom) Jianjun Tao (China)</p> <p>FM17. Waves in Fluids Maurizio Brocchini (Italy) Thierry Dauxois (France)</p> <p>FM18. Electro- and Magneto-Hydrodynamics (Co-Sponsored by HYDROMAG) Alban Potherat (United Kingdom) Laurent Davoust (France)</p>
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Solid Mechanics

<p>SM01. Biomechanics and Biomaterials Ellen Arruda (United States) Paolo Bisegna (Italy)</p> <p>SM02. Tribology - Contact and Friction Paolo Pennacchi (Italy) Mitjan Kalin (Slovenia)</p> <p>SM03. Damage Mechanics Claudia Comi (Italy) Jean-Francois Molinari (Switzerland)</p> <p>SM04. Elasticity Tom Pence (USA)</p>	<p>SM10. Sizescale Effects in Materials Nguyen Xuan Hung (Vietnam)</p> <p>SM11. Multibody and Vehicle Dynamics Sebastian Stichel (Sweden) Alessandro Tasora (Italy)</p> <p>SM12. Nanostructures and MEMS Attilio Frangi (Italy) Slava Krylov (Israel)</p> <p>SM13. Plasticity, Viscoplasticity and Creep Odd Sture Hopperstad (Norway) Pedro Ponte Castañeda (USA)</p>
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<p>SM05. Fracture Mechanics Chad Landis (USA) Veronique Lazarus (France)</p> <p>SM06. Geomechanics and Geophysics Tomasz Hueckel (USA) Claudio Di Prisco (Italy)</p> <p>SM07. Impact Mechanics and Wave Propagation Kikuo Kishimoto (Japan) Daniel Rittel (Israel)</p> <p>SM08. Multi-component, Composites and Hierarchical Materials Pedro Camanho (Portugal) Erasmio Carrera (Italy)</p> <p>SM09. Phase Transformations and Thermomechanical Phenomena Paolo Biscari (Italy) Stanislaw Stupkiewicz (Poland)</p>	<p>SM14. Stability and Instability of Materials and Structures Nicolas Triantafyllides (France)</p> <p>SM15. Computational Solid Mechanics Andreas Menzel (Sweden) Stefanie Reese (Germany)</p> <p>SM16. Vibrations and Control of Structures Vikram Pakrashi (Ireland) Jerzy Warminski (Poland)</p> <p>SM17. Soft Materials and Extremely Deformable Structures Katia Bertoldi (USA) Pedro Reis (Switzerland)</p> <p>SM18. Metamaterials Richard Craster (United kingdom) Vincent Laude (France)</p>
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Fluids-Solids Mechanics

<p>FS01. Acoustics Linda Franzoni (USA) Peter Jordan (France)</p> <p>FS02. Exascale Computing Dan Meiron (USA) Philipp Schlatter (Sweden)</p> <p>FS03. Experimental Methods in Mechanics Jerry Westerweel (The Netherlands) Francois Hild (France)</p> <p>FS04. Nonlinear dynamics and Pattern Formation Laurette Tuckerman (France) Jean Luc Thiffeault (USA)</p> <p>FS05. Porous Media Ruben Juanes (USA) Michel Quintard (France)</p>	<p>FS06. Fluid Structure Interactions Marco Amabili (Canada)</p> <p>FS07. /</p> <p>FS08. Granular Materials and Flows Pascale Aussillous (France) Diego Berzi (Italy)</p> <p>FS09. Foams and Cellular Materials Chang-Qing Chen (China)</p> <p>FS10. Optimization for Solids and Fluids Matteo Bruggi (Italy) James Guest (USA)</p> <p>FS11. /</p> <p>FS12. Education in Mechanics Michael Gilchrist (Ireland)</p>
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All contributed papers were peer reviewed. Recommendations were received from Pre-selection Committees of the National Committees of eight countries: Italy, France, Germany, China, Poland, Russia, UK and USA. Recommendations were also received from the Chairs of the Mini-Symposia and Chairs of the Thematic Sessions. During its deliberations, the International Papers Committee (IPC) paid careful attention to these recommendations.

The submission of abstracts was subdivided into two calls. The first call ended in January 2020 with a total of 3158 eligible submissions. The second call was opened in Autumn 2020 after the decision to postpone the Congress of one year, for “short oral with poster” only, it ended with a total of 237 eligible abstracts.

At the end of their meetings organized in a fully virtual format, 3108 (91,5%) of the 3395 eligible submissions were invited by the IPC for presentation at the Congress. Finally, 1423 contributed papers including 128 invited keynote lectures, were given during ICTAM2020+1 Virtual-Milano, in addition to the 4 Plenaries and 16 Sectional Lectures.

Of the total 1423 contributed papers and presented during ICTAM2020+1-Virtual, 617 of these were in the area of Fluid Mechanics, 594 in the area of Solid Mechanics, 212 were in the area of Fluid-Solid Mechanics. Of the total 128 invited papers for the Mini-Symposia and Thematic Sessions, 52 of these were in the area of Fluid Mechanics, 47 in the area of Solid Mechanics, 29 in the area of Fluid-Solid Mechanics. The total number of participants and accepted papers relative to the previous congresses is given in Table 1. The breakdown by topic is given in Table 2. Table 3 displays country statistics of the presentations.

As has been the tradition since ICTAM 1988 in Grenoble, the IUTAM Bureau selected three outstanding young scientists for Bureau prizes, based upon their papers, and their presentations at the Congress. The recipients of the prizes at ICTAM 2020+1-Virtual were:

Dr. Adrien Bussonnière of the University of Rennes and CNRS, IPR, Rennes, France, for his paper entitled *Soap film deformations: toward a local rheological model for foams*, presented during an oral session (fluid mechanics).

Dr. Alessandro Marengo of Politecnico di Milano, Italy, for his paper entitled *A robust explicit algorithm for phase-field modelling of quasi-brittle fracture*, presented during an oral session (solid mechanics).

Dr. Michael M. Selwanis of Polytechnique Montreal, Quebec, Canada and Military Technical College, Cairo, Egypt, for his paper entitled *Multi balls rotating in a circular track efficiently mitigate flow-induced vibrations*, presented during a “short oral with poster” session.

Proceedings with all papers presented during ICTAM 2020+1 has been published by IUTAM as:

25th Congress of Theoretical and Applied Mechanics- August 22-27, 2021, Book of abstracts. Editor: Alberto Corigliano, (2021). ISBN: 978 -83-65550-31-6.

[https://iutam.org/wp-](https://iutam.org/wp-content/uploads/2021/09/ABSTRACT_BOOK_ICTAM_2021.pdf)

[content/uploads/2021/09/ABSTRACT BOOK ICTAM 2021.pdf](https://iutam.org/wp-content/uploads/2021/09/ABSTRACT_BOOK_ICTAM_2021.pdf)

ICTAM	Submitted Papers	Number of Papers Presented		Participants	
		All	Host Country	All	Host Country
Grenoble 1988	1262	573	n.a.	951	340
Haifa 1992	1183	420	n.a.	525	85
Kyoto 1996	1642	703	192	936	332
Chicago 2000	1953	1126	445	1430	587
Warsaw 2004	2086	1273	144	1515	194
Adelaide 2008	1517	901	109	1176	139
Beijing 2012	1887	1271	400	1561	612
Montreal 2016	2308	1686	185	2106	239
Milano 2020+1-Virtual	3158 (first call) + 237 (second call for posters) = 3395	1443	129	1740	148

Table 1. A comparison of the attendance figures for the past nine congresses.

Session	Oral presentations	Short oral presentations with poster	Keynotes	Total
FM01 Biological Fluid Mechanics	20	9	2	31
FM02 Boundary Layers	16	12	4	32

FM03 Combustion and Flames	10	5	0	15
FM04 Compressible Flow	13	14	1	28
FM05 Convection	12	11	4	27
FM06 Drops, Bubbles and Interfaces	40	19	2	61
FM07 Multiphase and Particle-Laden Flows	16	13	4	33
FM08 Flow Instability and Transition	46	20	3	69
FM09 Thin Films flows	15	8	2	25
FM10 Geophysical and Environmental Fluid Dynamics	11	8	3	22
FM11 Low Reynolds Number Flows and suspension	17	7	4	28
FM12 Micro- and Nano-fluidics	11	6	3	20
FM13 Non-Newtonian and Complex Fluids	18	6	3	27
FM14 Computational Fluid Dynamics	14	7	3	24
FM15 Turbulence	35	12	2	49
FM16 Vortex Dynamics	17	1	2	20
FM17 Waves in Fluids	15	9	1	25
FM18 Electro- and Magneto-Hydrodynamics	13	14	3	30
SM01 Biomechanics and Biomaterials	31	16	1	48
SM02 Tribology-Contact and Friction	15	11	0	26
SM03 Damage Mechanics	25	3	3	31
SM04 Elasticity	20	3	2	25
SM05 Fracture Mechanics	34	8	3	45
SM06 Geomechanics and Geophysics	10	2	2	14

SM07 Impact Mechanics and Wave Propagation	14	4	3	21
SM08 Multi-component, Composites and Hierarchical Materials	14	7	2	23
SM09 Phase Transformations and Thermomechanical Phenomena	16	3	1	20
SM10 Scalescale Effects in Materials	7	7	1	15
SM11 Multibody and Vehicle Dynamics	16	7	1	24
SM12 Nanostructures and MEMS	16	7	2	25
SM13 Plasticity, Viscoplasticity and Creep	18	4	3	25
SM14 Stability and instability of Materials and Structures	18	7	1	26
SM15 Computational Solid Mechanics	25	17	4	46
SM16 Vibrations and Control of Structures	9	7	4	20
SM17 Soft Materials and Extremely Deformable Structures	34	15	3	52
SM18 Metamaterials	28	9	1	38
FS01 Acoustics	6	4	1	11
FS02 Exascale Computing	3	0	4	7
FS03 Experimental Methods in Mechanics	10	2	3	15
FS04 Nonlinear dynamics and Pattern Formation	17	3	4	24
FS05 Porous Media	15	9	3	27
FS06 Fluid Structure Interactions	13	14	2	29
FS08 Granular Materials and Flows	16	5	3	24

FS09 Foams and Cellular Materials	11	4	1	16
FS10 Optimization for Solids and Fluids	19	6	2	27
FS12 Education in Mechanics	3	3	4	10
MS01 Modeling and controlling turbulent shear flows	35	7	4	46
MS02 Local mechanics of climate processes	3	0	2	5
MS03 Biological fluid-structure interaction at the microscale	17	3	2	22
MS04 Nonlinear dynamics for design	38	6	4	48
MS05 Mechanics of additive manufacturing	9	4	3	16
MS06 Mechanics of C-allotropic materials and structures	3	0	3	6
Grand Total	907	388	128	1423

Table 2. ICTAM 2020+1 SESSION STATISTICS: The table provides a breakdown of the numbers of contributed papers presented in each technical session and mini-symposium (including 128 invited talks).

Country (alphabetical order)	Nr.	Country (order n° of papers)	Nr.
ARGENTINA	1	FRANCE	192
ARMENIA	2	USA	159
AUSTRALIA	11	CHINA	130
AUSTRIA	10	ITALY	129
BELGIUM	11	UNITED KINGDOM	108
BRAZIL	28	GERMANY	94
CANADA	37	JAPAN	85
CHILE	1	RUSSIA	59
CHINA	130	INDIA	43

CYPRUS	2	POLAND	43
CZECH REPUBLIC	7	SWITZERLAND	41
DENMARK	11	CANADA	37
ESTONIA	2	THE NETHERLANDS	36
FINLAND	5	BRAZIL	28
FRANCE	192	SWEDEN	27
GERMANY	94	ISRAEL	26
GREECE	5	SPAIN	22
HONG KONG	2	SOUTH KOREA	18
HUNGARY	5	TURKEY	13
ICELAND	1	AUSTRALIA	11
INDIA	43	BELGIUM	11
IRAN	3	DENMARK	11
IRELAND	7	AUSTRIA	10
ISRAEL	26	CZECH REPUBLIC	7
ITALY	129	IRELAND	7
JAPAN	85	FINLAND	5
LATVIA	3	GREECE	5
MEXICO	3	HUNGARY	5
NEW ZEALAND	1	PORTUGAL	5
NIGERIA	1	SAUDI ARABIA	5
NORWAY	3	SERBIA	5
OMAN	1	TAIWAN	4
PAKISTAN	1	IRAN	3
PARAGUAY	1	LATVIA	3
PERU	1	MEXICO	3
POLAND	43	NORWAY	3
PORTUGAL	5	SLOVENIA	3
QATAR	1	ARMENIA	2
ROMANIA	1	CYPRUS	2
RUSSIA	59	ESTONIA	2
SAUDI ARABIA	5	HONG KONG	2
SERBIA	5	SOUTH AFRICA	2
SINGAPORE	1	ARGENTINA	1

SLOVENIA	3	CHILE	1
SOUTH AFRICA	2	ICELAND	1
SOUTH KOREA	18	NEW ZEALAND	1
SPAIN	22	NIGERIA	1
SWEDEN	27	OMAN	1
SWITZERLAND	41	PAKISTAN	1
TAIWAN	4	PARAGUAY	1
THE NETHERLANDS	36	PERU	1
TRINIDAD - TOBAGO	1	QATAR	1
TUNISIA	1	ROMANIA	1
TURKEY	13	SINGAPORE	1
UKRAINE	1	TRINIDAD - TOBAGO	1
UNITED ARAB EMIRATES	1	TUNISIA	1
UNITED KINGDOM	108	UKRAINE	1
USA	159	UNITED ARAB EMIRATES	1
VIETNAM	1	VIETNAM	1
TOTAL	1.423	TOTAL	1.423

Table 3. ICTAM 2020+1 COUNTRY STATISTICS: The table provides a breakdown of the number of papers presented from 59 countries of the 72 countries which originally submitted a paper.

Alberto Corigliano, President of 25° ICTAM 2020+1 – Virtual - Milano

Summary Record of the General Assembly Meeting 2021

Summary Record of the General Assembly of IUTAM virtual meeting on 22 and 25 August 2021

The General Assembly of IUTAM convened remotely in 2021. The schedule of sessions was as follows:

Sunday, 22 August 2021

14:00 – 17:00 CEST

General Assembly: 1st session

Wednesday, 25 August 2021

16:15 – 17:15 CEST

General Assembly: 2nd session

Attendance:

Members with voting rights:

I.D. Abrahams (UK), M. Amabili (Canada), J.A.C. Ambrósio (Portugal), P. Ariza (Spain), N. Aubry (USA), M. Avila (Germany), Y. Bai (China, Member-at-Large), K. Behdinan (Canada), D. Bigoni (Italy), A. Bottaro (Italy), F.L. Chernousko (Russia), A. Cocks (UK), E. De Bernardis (Italy), J. Dual (Switzerland), P. Eberhard (Germany, Member-at-Large), H. Espinosa (USA), D. Fang (China), N. Filipovic (Serbia), N.A. Fleck (UK), S. Forest (France), L. Franzoni (USA), A.P.S. Freire (Brazil), H. Gao (Singapore), M.D. Gilchrist (Ireland), I.G. Goryacheva (Russia), J. Grue (Norway), P. Gudmundson (Sweden), S. Hartmann (Germany), C. Hellmich (Austria), F. Hild (France), K. Hishida (Japan), M. Hori (Japan), K.J. Hsia (Singapore), S.-S. Hsiau (China-Taipei), G. Jaiani (Georgia), A. Juel (UK), T. Kapitaniak (Poland), S. Kapuria (India), K. Kishimoto (Japan), R. Kouhia (Finland), V.A. Levin (Russia), M. Lightstone (Canada), D. Lohse (Netherlands), J.B.R. Loureiro (Brazil), T.J. Lu (China), F. Lund (Chile), J. Magnaudet (France), B. McKeon (USA), G. McKinley (USA), R.M. McMeeking (USA), M.A.F. de Medeiros (Brazil), S. Mittal (India), N.F. Morozov (Russia), J. Niiranen (Finland), C. Niordson (Denmark), P. Onck (Netherlands), T.J. Pedley (UK, Member-at-Large), H. Petryk (Poland), S. Popinet (France), G.P. Raja Sekhar (India), K. Ravi-Chandar (USA), G. Rega (Italy), M.B. Rubin (Israel), J. Salençon (France, Member-at-Large), A. Salupere (Estonia), O. Sano (Japan), W. Schiehlen (Germany, Member-at-Large), B.A. Schrefler (Italy, Member-at-Large), J. Schumacher (Germany), R. Segev (Israel), R. Seifried (Germany), S. Skatulla (South Africa), J.N. Sørensen (Denmark), G.E. Stavroulakis (Greece), G. Stépán (Hungary), S. Stupkiewicz (Poland), Q.-P. Sun (China-Hong Kong), P.A. Tsai (Canada), G. Turkalj (Croatia), D.V.H. Vandepitte (Belgium), W.-C. Wang (China-Taipei), X.J. Zheng (China)

Non-voting observers:

A. Corigliano (Italy, President of the 25th ICTAM, organizer of the meeting), A. Ferreras (USA, representative of NAS), S.R. Gunakala (representative of LACCOTAM)

Per Article V of IUTAM's Statutes, no proxies were allowed at the virtual meeting.

Agenda Sunday, 22 August 2021, 14:00 – 17:00 CEST

1. Opening of the meeting by the President
 - Agenda of the meeting
 - Summary Record of the General Assembly virtual meeting on 25-26/08/2020 (IUTAM Report 2020, pp. 25-45)
2. Brief report by the Secretary-General
3. Matters concerning Adhering Organizations
 - Saudi Arabia
 - Egypt
 - Norway
4. Proposal of the Electoral Committee for election of Treasurer
5. Discussion on registration of IUTAM
6. Presentation by Diversity Working Group and discussion

Agenda Wednesday, 25 August 2021, 16:15 – 17:15 CEST

7. Final decisions regarding Adhering Organizations
 - Saudi Arabia
 - Egypt
 - Norway
8. Election of Treasurer
9. Continued discussion and adoption of resolutions on registration of IUTAM
10. Date and venue of the next General Assembly meeting
11. Any other business

Proceedings of the General Assembly**Item 1 – Opening of the meeting by the President**

The President, Professor Norman Fleck, welcomed all members and observers. Then the President formally opened the meeting. The President explained the rule of signaling the wish to speak by using the electronic feature of raising hand, and of voting during the meeting which was held in a virtual format due to the pandemic.

The President reported with great sadness on the death of a distinguished fluid mechanic who served the IUTAM community in many capacities:

Professor Roddam Narasimha, a former member of the IUTAM Bureau (2000-2004), Congress Committee (1986-1994), and Symposia Panel for Fluid Mechanics (1984-2000), as well as a member (1982-1988) and finally Member-at-Large (2008-2020) of the General Assembly of IUTAM, passed away on 14 December 2020.

The memory of Professor Roddam Narasimha was honored by the General Assembly with a moment of silence.

The Agenda of the meeting was unanimously approved.

The Summary Record of the General Assembly virtual meeting in 2020 was approved.

Item 2 – Brief report by the Secretary-General

The Secretary-General, Professor Henryk Petryk, submitted the following report to the General Assembly on the activities of IUTAM since the last General Assembly held by electronic means on 25 and 26 August 2020:

Mr. President, distinguished Colleagues,

It is a great honor for me to deliver my report in front of the General Assembly. One year has passed since we met online in August 2020, and in this exceptional situation my report will be more concise than usual. As Mr. President has reported, during that time we had the sad duty of recording the death of our distinguished colleague and friend Roddam Narasimha. A summary of his achievements has been posted on the IUTAM website.

IUTAM Report and IUTAM Newsletters

IUTAM Report 2020 and two IUTAM Newsletters 2020-2 and 2021-1 have been distributed and published on the IUTAM website; the report is also available in paper form.

Adhering Organizations

The matters concerning three out of the 48 adhering organizations will be addressed under item 3 on the Agenda.

I have nothing new to report on *Associate or Affiliated Organizations*

IUTAM Symposia and Summer Schools

The statistics of IUTAM Symposia and Summer Schools are strongly affected by the Covid-19 pandemic. No IUTAM Symposium or Summer School took place in 2020, and 4 IUTAM Symposia, including one Special Event, were held so far in 2021, three of them online and 1 in a hybrid format. In the time of the pandemic, organizers are free to choose an in-person, hybrid or fully virtual format for their Symposia. The Bureau has also exceptionally allowed postponement of Symposia originally planned for 2020 or 2021 to 2022. Details concerning forthcoming Symposia in the years 2022 and 2023 can be found in the last Newsletter published in June, but the situation is changing as the organizers may need to postpone the events. Currently, 4 more Symposia in 2021, 13 Symposia and 3 Summer Schools in 2022, and 5 Symposia in 2023 are planned.

The next call for proposals for IUTAM Symposia and IUTAM Summer Schools for the years 2024 and 2025 will be open online at the end of this year.

IUTAM endorsed events

In 2021, three IUTAM endorsed events took place in a virtual format and one event is still to be held. There are also three IUTAM endorsed events scheduled for 2022.

IUTAM website

The IUTAM website is running smoothly and it is the basic and frequently updated source of public information about the current activities of IUTAM, its history and future events.

Publications

As reported earlier, we have an agreement with Springer for publication of the 'IUTAM Bookseries' until the end of 2023.

The basic conditions are very convenient for IUTAM. Publication in the Series, recommended by IUTAM since 2018, is voluntary and free of charge, with temporary free access to online proceedings granted to all participants of a Symposium. This is an opportunity to leave a published legacy of a meeting, regardless of whether it is an in-person or a virtual event due to the pandemic. Seven volumes have already appeared since 2018. Other acceptable formats for proceedings are special issues of high-quality journals or other forms previously approved by the Bureau of IUTAM.

Registration of IUTAM

This topic will be dealt with under item 5 on the Agenda.

Mr. President, this concludes my brief report.

Henryk Petryk, Secretary-General

The report by the Secretary-General was unanimously adopted.

The President thanked the Secretary-General for his report.

Item 3 –Matters concerning Adhering Organizations

Saudi Arabia

The King Abdulaziz City for Science and Technology (KACST), the Saudi Arabian Adhering Organization of IUTAM since 1988, has not paid its dues to IUTAM since 2014. Multiple messages were sent to KACST, mentioning possible suspension, including an official registered letter of April 2018 from the Secretary-General, and an official letter of April 2021 from the President, without any response.

The Bureau recommended suspension of the Adhering Organization from Saudi Arabia. The recommendation was put to the vote in the second session of the General Assembly under Item 7.

Egypt

The Academy of Scientific Research and Technology, Egyptian Committee of Theoretical and Applied Mechanics, the Egyptian Adhering Organization of IUTAM since 1976, has not paid its dues to IUTAM since 2016. After multiple emails, an official letter raising this issue was sent to the Egyptian side by the Secretary-General in January 2020. In a response in February 2020, payment of dues for 2019-2020 was promised, but not actually made. Reminders were sent to Egypt, including an official letter from the President in April 2021, mentioning possible suspension. In May 2021 an official response arrived, requesting postponement of suspension of Egypt until 3 July 2021. The missing dues were never paid.

The Bureau recommended suspension of the Adhering Organization from Egypt. The recommendation was put to the vote in the second session of the General Assembly under Item 7.

Norway

In January 2020 an email arrived from the Norwegian Academy of Science and Letters, whose National Committee on Theoretical and Applied Mechanics is the Norwegian Adhering Organization of IUTAM since 1949. They declared discontinuation of payment of membership dues to IUTAM. The Academy stated that

they were negotiating with the most relevant Norwegian academic institutions to select a new Norwegian Adhering Organization and that IUTAM would be informed of the progress in the next couple of months. It was subsequently confirmed that the Academy is unwilling to be the Norwegian adhering organization of IUTAM.

The Bureau recommended suspension of the Adhering Organization from Norway. The recommendation was put to the vote in the second session of the General Assembly under Item 7.

In the discussion it was clarified that IUTAM remains open to the possibility of reviewing another application and of re-establishing formal ties with the mechanics community from each of the three countries.

Item 4 – Proposal of the Electoral Committee for election of Treasurer

The President reported that the Electoral Committee, consisting of Professor Norman Fleck (UK, Chair *ex officio* as President), Professor Timothy Pedley (UK), Professor Werner Schiehlen (Germany) and Professor Wei Yang (China), proposed the following candidate for the vacant position of Treasurer for the remaining three years of the current term as follows:

Treasurer: Professor Pilar Ariza Moreno (Solids, Spain).

Professor Pilar Ariza Moreno had accepted the nomination and provided a short bio distributed to the General Assembly members ahead of the meeting.

No other candidate was proposed in addition to the proposal by the Electoral Committee.

The nomination was put to the vote in the second session of the General Assembly under Item 8.

Item 5 – Discussion on registration of IUTAM

As an introduction to the discussion, the President presented the major reasons to establish, in addition to the current IUTAM organization, a new IUTAM Association in the Netherlands as an entity with full legal capacity. The President explained that the new Association requires its own statutes called the Articles of Association that satisfy the requirements of Dutch Civil Law. The relationship between the current IUTAM Statutes and the structure of the Articles of Association was discussed and illustrated graphically.

The Secretary-General presented the draft Resolution proposed by the Bureau which had been distributed to the General Assembly members in advance of the meeting.

Draft Resolution (proposed by the IUTAM Bureau):

The IUTAM General Assembly authorizes the Bureau to continue working with Dutch lawyers to draw up the articles of incorporation of an association in the Netherlands for IUTAM, henceforth called IUTAM Association, and accepts the following basic assumptions:

- *There will be two coexisting entities: IUTAM as an organization, henceforth referred to as “the IUTAM organization” and a new IUTAM Association;*
- *The IUTAM organization will continue to exist as an international non-governmental scientific organization;*
- *The IUTAM Association will be established as a new legal entity based on Dutch law that will undertake all legal actions instead of the IUTAM organization;*
- *The registered seat of the IUTAM Association will be in the municipality of Amsterdam, the Netherlands, while the IUTAM Association will not need to have an office in the Netherlands;*
- *Any assets and liabilities held by the IUTAM organization will be transferred to the IUTAM Association;*
- *Only a voting member of the General Assembly of the IUTAM organization can be a member of the IUTAM Association;*
- *Membership of the bodies of the IUTAM organization (General Assembly, Bureau) and of the IUTAM Association (General Meeting of Members, Board of Directors) will be, respectively, identical to the maximum extent legally possible;*
- *Meetings of the bodies of IUTAM Association will be treated as meetings of the respective bodies of the IUTAM organization.*

The Secretary-General pointed out that the essence of the Resolution is the set of basic assumptions which need to be considered jointly as they define one project. Different variants of the basic assumptions for drawing up the Articles of Association had been considered, and finally the solution proposed was selected as the best one found so far. In the lawyers' opinion, registration of IUTAM as a Dutch association with all the adhering organizations as members would not be possible, as some adhering organizations may have a status of a non-legal committee. The Secretary-General explained briefly the project by using the form of a graphical abstract. The legal activities of the IUTAM Association would be complementary to the public activities of IUTAM which would remain an international union as it is. The two coexisting entities would be strictly connected to each other and in fact representing one IUTAM. The consequences and differences with respect to the current state were outlined.

In the discussion opened by the President, several delegations raised concerns as to whether the Adhering Organizations of IUTAM would be able to transfer fees to the Association, especially if its members would be natural persons. It was suggested to investigate this issue further along with all the financial and organizational details. Another concern arose as to whether the new arrangement would actually resolve the problem of legal liability of the members of the General Assembly of IUTAM, even if the members of the Association were not personally liable for any financial problems of this legal entity. It remained to be clarified whether persons representing the Adhering Organizations would be responsible for ensuring the payment of the subscription fees.

Item 6 – Presentation by Diversity Working Group and discussion

The President informed the General Assembly (GA) members that following the discussion at the last GA meeting in August 2020, the Bureau had appointed the Diversity Working Group (DWG). The President mentioned that diversity means the range of human differences, including those listed in the IUTAM Statute IV, and fostering diversity means valuing those differences. He asked the Chair of the DWG, Professor Pilar Ariza, to present the report of the DWG.

Professor Pilar Ariza presented the report which had been distributed to the GA Members in advance of the meeting. The report was based on the historical data on IUTAM bodies available on the IUTAM website, and on the data provided by the representatives of adhering organizations of IUTAM via a questionnaire. The DWG decided to focus on four points of the diversity topic, namely geography, gender, age and mechanics disciplines. The presentation of the DWG report was concluded with several recommendations.

The President opened a discussion on the report and recommendations by the DWG. After an exchange of comments, it was accepted that the Bureau would take on board these comments and recommendations, work at them and propose the best way forward before the next General Assembly meeting in Cambridge.

The President thanked the participants for all the input and concluded that it had been a very constructive and useful meeting.

The meeting then adjourned.

The meeting reconvened on 25 August 2021 at 16:15 CEST.

The President, Professor Norman Fleck, opened the second session of the meeting.

The President reported with great sadness on the death that morning of a distinguished colleague Professor Zhemín Zhèng, a former President of The Chinese Society of Theoretical and Applied Mechanics, a former member of the IUTAM Bureau and of the General Assembly of IUTAM. The memory of Professor Zhemín Zhèng was honored by the General Assembly with a moment of silence.

Item 7 – Final decisions regarding Adhering Organizations

The President asked the IT support to move non-voting Observers to a waiting room for the time of secret voting.

Saudi Arabia

The General Assembly decided to suspend the King Abdulaziz City for Science and Technology as the Adhering Organization from Saudi Arabia.

Egypt

The General Assembly decided to suspend the Academy of Scientific Research and Technology, Egyptian Committee of Theoretical and Applied Mechanics as the Adhering Organization from Egypt.

Norway

The General Assembly decided to suspend the National Committee on Theoretical and Applied Mechanics, Norwegian Academy of Science and Letters as the Adhering Organization from Norway.

Item 8 – Election of Treasurer

The General Assembly elected by secret voting Professor Pilar Ariza Moreno (Spain) to the vacant position of Treasurer for the three-year term 2021-2024 effective from 1st November 2021.

Item 9 – Continued discussion and adoption of resolutions on registration of IUTAM

The Secretary-General thanked the General-Assembly members for all the comments and concerns expressed during the first session on Sunday. He summarized briefly the assumptions of the proposed resolution in the light of the discussion.

The discussion from Sunday then continued. The concerns previously reported and listed under Item 5 above were considered. It was confirmed that the financial and liability issues needed further investigation. It was suggested to check registration routes chosen by other international unions.

The President thanked the participants for the very helpful discussion both on Sunday and Wednesday, and launched a secret vote on the Resolution presented under Item 5.

The results of the voting were as follows: 31 yes, 30 no, 11 abstain.

The President concluded that the voting results did not provide a clear mandate to accept this resolution, given the constraints of the voting system and signals from some GA members that they were struggling to cast their vote, and that at least one of them failed to do so.

The following statement was accepted by the General Assembly by an informal vote.

The General Assembly (GA) recognizes the need for registration of IUTAM as a legal entity so that it can open bank accounts, protect its members (particularly the Bureau and GA) from liability, and handle contracts. The GA wishes the Bureau to continue to work on the registration of IUTAM and report back any progress at the next GA in August 2022.

Item 10 – Date and venue of the next General Assembly meeting

The General Assembly agreed to hold its next meeting in Cambridge, UK, 21-24 August 2022.

Item 11 – Any other business

On the proposal by the President, the General Assembly adopted by an informal vote the following action plan regarding the diversity issue.

- 1. Recommendations of DWG, and Bureau's initial reaction, will be circulated to GA.*
- 2. Bureau will request written feedback from GA members on the DWG report, its recommendations and on the reaction by Bureau.*
- 3. Bureau will request GA members for written views on Diversity within IUTAM, and on best practice (present and future) within IUTAM committees and within adhering organizations.*
- 4. In the light of this feedback from the GA, the Bureau will consider Diversity within the IUTAM committee structure and will work towards a resolution at the next GA meeting in August 2022.*
- 5. The precise nature of a resolution depends upon feedback from GA, upon legal advice on what can be put on the IUTAM website, which aspects of Diversity need to be addressed, and how they might be addressed.*

Then, the President closed the meeting.

Henryk Petryk, Secretary-General

Treasurer's Report 2021

Statement of Change in Fund Balance	U.S. Dollars
Balance, 31 December 2020	759.929,86
Net revenues minus expenses for 2021	49.248,43
Balance, 31 December 2021	809.178,29
Statement of Cash Revenues Collected over Expenses Paid	
Revenues collected during 2021:	
Subscription dues	119.145,77
Total	119.145,77
Expenses paid during 2021:	
Interest income (negative interest during 2021)	2.843,23
IUTAM Symposia	5.919,68
Travel, Bureau	0,00
Travel, Executive Committee of Congress Committee	0,00
Travel, others	0,00
Contribution to ISC	4.928,71
Auditor's fee	2.908,00
Administration Website	3.632,69
Transfer	0,00
Bank fees	1.137,86
Insurance	1.408,73
Office costs Secretary General	22.477,28
Bureau price	2.081,22
IUTAM registration	11.927,61
Total	59.265,01
Revenues minus expenses for 2021	59.880,76
Gain from exchange of currency	-10.632,33
Net revenues minus expenses for 2021	49.248,43

IUTAM Bank Accounts 2021**Running Accounts**

Bank	Balance 31 Dec. 20	Withdrawals 2021	Deposits 2021	Balance 31 Dec. 21	Currency
Spar Nord Bank Aalborg 9236 457 73 07097*	618.297,38	-58.509,21	119.145,77	678.933,94	USD
Spar Nord Bank Aalborg 9236 457 73 07089	3.276,99	-73,46	0,00	3.203,53	EUR
Spar Nord Bank Aalborg 9236 457 22 92520	6.076,87	-1.446,35	0,00	4.630,52	DKK
Nordea Bank Horsholm 6887 390 760 (Account is not used but required by the bank)	0,00	0,00	0,00	0,00	DKK
Nordea Bank Horsholm 0745 417 701	827.712,00	-2.806,17	0,00	824.905,83	DKK

Savings Account

Bank	Balance 31 Dec. 20	Withdrawals 2021	Deposits 2021	Balance 31 Dec. 21	Currency
Nordea Bank Horsholm	0,00	0,00	0,00	0,00	DKK

Treasurer:

Professor Pilar Ariza, School of Engineering, University of Seville, Camino de los descubrimientos, s.n., 41092 Sevilla, Spain

Assistant Treasurer:

Professor Jens Nørkær Sørensen, Department of Wind Energy, Technical University of Denmark, Nils Koppels Allé 403, 2800 Kgs. Lyngby, Denmark

Payment of Dues Record 2021

<i>Adhering Organization</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>
Armenia		1				1
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	1	1	1
Canada	8	8	8	8	8	8
Chile	1	1	1	1	1	1
China/Beijing	8	12	12	12	12	12
China/Hong Kong	1	1	1	-	-	-
China/Taipei	3	3	3	3	3	3
Croatia	1	1	1	1	1	1
Czech Republic	1	1	1	1	1	1
Denmark	3	3	3	3	3	3
Egypt	-	-	-	-	-	-
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	-	-	-
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	-
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	1	1	1
Mexico	1	1	1	-	-	-
Netherlands	3	3	3	3	3	3
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	-	-
Russia	8	8	8	8	8	8
Saudi Arabia	-	-	-	-	-	-
Serbia	1	1	1	1	1	1
Singapore**						3
Slovenia	1	1	1	1	1	1
South Africa	1	1	1	1	1	1
Spain	1	1	1	1	1	1
Sweden	5	5	5	5	5	5
Switzerland	3	3	3	3	3	3
Turkey	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 December 31, 2021. Dues are expressed in membership units of 1, 3, 5, 8 or 12, corresponding to category of membership from I through V, respectively.

**Singapore paid the dues for 2021-2024 in 2020 (3 units each year).

Saudi Arabia and Egypt memberships were suspended in GA 2021.

Pilar Ariza, IUTAM Treasurer

Reports on Affiliated Organizations

AFMC (Asian Fluid Mechanics Committee)

<https://acfm.iisc.ac.in>

The Asian Fluid Mechanics Committee (AFMC) continues to promote scientific and technical cooperation and exchanges in fluid mechanics among Asian countries, despite of the continuous impact of the COVID-19 global pandemic. In 2021, the AFMC made the following efforts:

- The membership of AFMC was updated by involving more young people from Asian fluid mechanics community with their academic authority, passion and devotion.
- The AFMC discussed events related to the next Asian Congress of Fluid Mechanics (ACFM17) to be held in Beijing, China. The AFMC decided to postpone the ACFM17 to the summer of 2023, and most committee members hoped to hold the conference offline.
- The local organizing committee (LOC) of ACFM17 was formed. Prof. Qingquan Liu of Beijing Institute of Technology is the LOC Chair of ACFM 17, and Prof. Jifu Zhou of Institute of Mechanics, CAS, is the LOC Co-Chair. Several meetings of the LOC were held for the preparation of ACFM17. The first announcement was scheduled to send out in August of 2022.

Report composed by Weixi Huang and Song Fu

BICTAM (Beijing International Center for Theoretical and Applied Mechanics)

www.bictam.org.cn

BICTAM promotes the development and application of mechanics and related interdisciplinary branches in the Asia-Pacific region and around the world via conferences and publications. Due to the ongoing Covid-19 pandemic, several conferences of the Center initially scheduled for 2021 were postponed to 2022. BICTAM will start to organize Webinars in 2022 to promote advances in mechanics and exchanges among scholars from different fields.

The 1st BICTAM-CISM Symposium on Dispersed Multiphase Flows: From Measuring to Modeling

The Symposium, initially scheduled for 4-6 March 2020, was successfully held online on 2-5 March 2021. More than 70 experts and scholars from 12 countries attended the Symposium on ZOOM platform. The live streaming platform attracted over 1,100 views from 23 countries around the globe. The event consisted of 8 keynote lectures and 53 regular lectures of the topics related to a wide selection of topics in the broad area of dispersed multiphase flows. The Symposium provides an opportunity to promote the exchange and sharing of achievements and ideas of dispersed multiphase flows between experts from Asia and Europe. The 2nd BICTAM-CISM Symposium will be held in Udine, Italy in 2023.

The 3rd Seminar on Intelligent Simulation and Control of Mechanics of Complex Systems

The 3rd Seminar was held in Beijing, China on 3 September 2021. It consisted of 18 keynote lectures focused on data intelligent simulation, as well as basic algorithms and platform construction. The event provided an important platform for the intensive exchange among researchers in the field of mechanics of complex systems. More than 500 experts and students attended the Seminar in-person or online.

Official Publication of BICTAM: Theoretical & Applied Mechanics Letters (TAML)

TAML provides fast publication of letter-sized articles and invited reviews within 40 days, which greatly shortens the time for publication and guarantees that articles will be read when they are still fresh and valuable. TAML has published a total of 60 articles in 2021, including special issues of “Mechanics of flexible structures and functional systems” and “Fluid mechanics problems in wind energy”.

Report composed by Yewen Zhang

CISM (International Centre for Mechanical Sciences)

www.cism.it

1. Courses and Seminars

The emergency situation caused by the pandemic has conditioned the implementation of scheduled activities also in 2021. However, comparing with 2020, spring and summer have shown a less aggressive grip of the pandemic, thanks to the massive use of vaccination. Yet, concrete difficulties have emerged in the mobility of lecturers and participants, although to a lesser extent than in 2020.

In March 2021 the Scientific Council realized that the difficulties created by the pandemic were not over and has delegated the Rectors' Committee to monitor the situation and to adjust the course planning by considering also the possibility to hold the activities as videoconferences.

Three international courses have been held between April and June with this format, while, starting from July, the courses were held in a blended format (both in the presence and on-line).

Indeed, even if some lecturers had to operate remotely, a productive interaction was possible among all people both in the presence and on-line. However, eleven courses, among the twenty scheduled, could not be realized. In particular, the courses scheduled for the first session have been postponed to 2022 with the goal to hold them in the presence at the Centre.

The 25th CISM-IUTAM International Summer School on "Instability and Bifurcation of Solids Including Coupled Field Phenomena", originally planned for 2020 and firstly postponed to 2021, has been rescheduled for 2022, along with other two CISM-IUTAM courses.

Here below the list of courses held in 2021:

- ***Optimization of Shape and Material Properties: Advanced Mathematical Methods and 3D***
(webinar, April 12 - 16)
Giovanni Noselli (SISSA, Trieste, Italy), Rodica Toader (University of Udine, Italy)
- ***Advanced Theories for Deformation, Damage and Failure in Materials***
(webinar, May 3 - 7)
Holm Altenbach (Otto von Guericke University Magdeburg, Germany) and Artur Ganczarski (Cracow University of Technology, Poland)
- ***Physics of Granular Suspensions: Micro-Mechanics of Geophysical Flows***
(webinar, June 14 - 18)
Marco Mazzuoli (University of Genoa, Italy) and Laurent Lacaze (MFT-CNRS, Toulouse, France)
- ***Metamaterial in Acoustics, Elastodynamics and Electromagnetism***
(blended format, July 12 - 16)
Agnès Maurel (Institut Langevin, Paris, France) and Habib Ammari (ETH, Zürich, Switzerland)
- ***Advanced Professional Training on Discrete Computational Mechanics of Masonry Structures***

(blended format, July 26 - 30)

Katalin Bagi (Budapest University of Technology and Economics, Hungary) and Maurizio Angelillo (University of Salerno, Italy)

- ***Bone Cell and Tissue Mechanics***

(blended format, September 6 - 10)

Bert van Rietbergen (Eindhoven University of Technology, The Netherlands)

- ***Batteries – Basic Principles, Experimental Investigations and Modeling across Scales***

(blended format, September 20 - 24)

Arnulf Latz (Helmholtz Institute Ulm, Germany) and Wolfgang A. Wall (Technical University of Munich, Germany)

- ***CISM-ECCOMAS Advanced School on “Computational Mechanics for Novel Designs of Advanced Materials”***

(blended format, October 4 - 8)

Michele Marino (Leibniz Universität Hannover, Germany) and Jörg Schröder (Universität Duisburg-Essen, Germany)

- ***Metal Additive Manufacturing: Fundamentals, Modeling, Materials, and Implementation***

(blended format, October 18 - 22)

Christoph Meier (Technical University of Munich, Germany) and A. John Hart (Massachusetts Institute of Technology, Cambridge, MA, USA)

2. Scholarships

A number of scholarships was offered 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.

3. International Participation

In 2021, **57** lecturers participated in CISM’s activities. They came from the following **17** countries (21 in presence and 36 remotely): Austria, Belgium, China, Denmark, France, Germany, Hungary, Italy, Netherlands, Poland, Portugal, Russia, South Korea, Sweden, Switzerland, UK, USA.

The **102** on-site participants came from the following **6** countries: France, Germany, Italy, Poland, Switzerland, The Netherlands.

The **371** online participants came from the following **36** countries: Australia, Austria, Belgium, Canada, Chile, China, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Iran, Ireland, Italy, Kazakhstan,

Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Singapore, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, Turkey, UK, USA.

Report composed by Bernhard Schrefler

EUROMECH (European Mechanics Society)

www.euomech.org

EUROMECH - European Mechanics Society is an international non-governmental non-profit scientific organization. The objective of the Society is to engage in all activities intended to promote in Europe the development of mechanics as a branch of science and engineering. The society is governed by the Council whose members are being elected according to rules set in 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 (30-50) 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 include:

- European Fluid Mechanics Conference (EFMC), held every two years;
- European Mechanics of Materials Conference (EMMC), held every two years.
- European Nonlinear Oscillations Conference (ENOC), held every three years;
- European Solid Mechanics Conference (ESMC), held every three years;
- European Turbulence Conference (ETC), held every two years.

They are open to all those interested and generally have a number of participants between 250 and 1000, 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.

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 2021

[609] *Granular pattern in oscillatory flows*, 8-10 September, Genova, Italy.

[611] *Jet noise modelling and control*, 30 August-1 September, Poitiers, France.

[613]* *Microstructures and micromechanisms in metallic additive manufacturing*, 7-9 July, Palaiseau, France.

[614] *Machine learning methods for prediction and control of separated turbulent flows*, 16-18 June, Paris, France.

[615]** *Biomechanics of the brain*, 26-30 September, Leiden, The Netherlands.

[618]* *Uncertainty quantification in computational mechanics*, 13-14 December, Luxembourg.

[620]* *Extreme dissipation and intermittency in turbulence*, 17-19 May, Delft, The Netherlands.

[621]* *Transport and fluxes in dispersed turbulent flows*, 30 June-2 July, Reykjavik, Iceland.

[626]* *Mechanics of high-contrast elastic composite*, 6-8 September, Keele, UK.

[627]** *Current challenges in soft tissue mechanics*, 6-8 April, Frankfurt, Germany.

Due to the COVID 19 pandemic, the above planning was seriously disturbed. EUROMECH established close contacts with the organizers to determine the best option for each event. Colloquia marked with ** were postponed to 2022. Colloquia marked with * were held virtually. The other colloquia were generally held in hybrid form. EUROMECH proposed a professional virtual platform to the organizers willing to hold colloquia in virtual or hybrid form. In this case, instead of providing seeding money to the organizer, EUROMECH supported most of the cost asked by the company to operate this platform during the colloquium.

EUROMECH Conferences initially planned in 2021

ENOC10 – 10th *European Nonlinear Oscillations Conference*, 5-10 July, Lyon, France.

EFMTC – *European Fluid Mechanics and Turbulence Conference*, 20-24 June, Zurich, Switzerland.

ESMC11 – 11th *European Solid Mechanics Conference*, 5-9 July, Galway, Ireland.

Due to the COVID 19 pandemic, none of the above conferences could take place. ENOC10 and ESMC11 have been postponed to July 2022. In April 2020, EFMTC13 was postponed to June 2021, and merged with ETC18 which was originally scheduled on August 23-26, 2021, i.e. on the same week as the re-scheduled ICTAM in Milan. Unfortunately, this merged conference, called EFMTC, could not take place either and was eventually cancelled.

For more details see www.euromech.org

Report composed by Jacques Magnaudet

HYDROMAG (International Association for Hydromagnetic Phenomena and Applications)

<https://hydromag.wordpress.com>

No report has been submitted by HYDROMAG.

IABEM (International Association for Boundary Element Methods)

www.iabem.org

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 in <http://www.iabem.org>.

The main scientific activities of IABEM are found in the biannual IABEM symposia in addition to minisymposia in related conferences or workshops in the field of BEM.

We have still been unable to have the IABEM symposium, originally planned to be in Hong Kong, China in 8-10 April, 2020, due to the COVID19 pandemic. We remark, however, that many active members of IABEM participated in the IUTAM Symposium on Computational methods for large-scale and complex wave problems, held online on 25-26 June and 2-3 July, 2021.

Report composed by Naoshi Nishimura

IACM (International Association for Computational Mechanics)

<https://iacm.info>

WCCM XIV- ECCOMAS 2020 was postponed to January 2021 due to Covid-19:

The ***14th World Congress on Computational Mechanics*** jointly organized with the ***ECCOMAS*** in a virtual format.

Further details are available at: <http://wccm-eccomas2020.org/frontal/>

IACM 21st Computational Fluids Conference:

[21st International Conference on Finite Elements in Flow Problems- CFC 2021](#)
17-21 October 2021 / Hangzhou, China

The following IACM Special Interest Conferences took place in 2021:

[9th International Conference on Computational Methods in Marine Engineering - Marine 2021](#)

2-4 June 2021 / Edinburgh, Scotland, UK

[9th International Conference on Coupled Problems in Science and Engineering - COUPLED PROBLEMS 2021](#)

13-16 June 2021 / Chia Laguna, Sardinia, Italy

[International Conference on Adaptive Modeling and Simulation - ADMOS 2021](#)

21-23 June 2021 / Gothenburg, Sweden

[16th International Conference on Computational Plasticity. Fundamentals and Applications - COMPLAS 2021](#)

7-10 September 2021 / Barcelona, Spain

10th International Conference on Textile Composites and Inflatable Structures -
Structural Membranes 2021

13-15 September 2021 / Munich, Germany

1st IACM MMLDT/CSET Mechanistic Machine Learning and Digital Twins for
Computational Science, Engineering & Technology

September 26-29, 2021, San Diego, USA

7th International Conference on Particle-Based Methods. Fundamentals and
Applications -PARTICLES 2021

4-6 October 2021 / Hamburg, Germany

Report composed by Cristina Vizcaya

IASCM (International Association for Structural Control and Monitoring)

The *International Association of Structural Control and Monitoring* (IASCM) represents the diverse and interdisciplinary community of international researchers engaged in advancing the state-of-the-art in structural control and monitoring technologies.

The main activity of IASCM in 2021 was the planning the *Eighth World Conference on Structural Control and Monitoring* (8WCSCM) which is being organized by the US Panel of the IASCM. The 8WCSCM is to be held during the period 5-9 June 2022 in Orlando, Florida, U.S.A. The preceding conferences have been held in Pasadena - USA (1994), Kyoto - Japan (1998), Como - Italy (2002), La Jolla - USA (2006), Tokyo - Japan (2010), Barcelona - Spain (2014), and Qingdao - China (2018). The 8WCSCM will be hosted by the University of Central Florida (UCF). As one of the most prominent conferences in the interdisciplinary field of Structural Control and Monitoring, the 8WCSCM will cover all major related topics, including smart control and sensing devices; smart and multi-functioning materials; important infrastructures, such as bridges, buildings, tunnels, road and rail structures; wind, earthquake and multi-hazards issues; Bayesian inference and uncertainty quantification; life-cycle assessment; machine-learning and computer-vision applications; smart communities applications; recent research advances; and more

Report composed by Sami F. Masri

IAVSD (International Association for Vehicle Systems Dynamics)

www.iavsd.org

The 27th IAVSD Symposium was planned to be held at the Emperor Alexander I St. Petersburg State Transport University in Saint-Petersburg, Russia, August 16-20, 2021. Due to the Covid-19 pandemic the Board and organizer of the symposium decided in February 2021 that the symposium should be held online from August 17-19. The traditional format of the symposium was adapted considering the big difference in time zones for a live symposium. The aim was to make the online symposium as close as possible to an in-person symposium, and this was achieved successfully.

The Symposium was organized by the Department of Railway Cars and Railcars maintenance at the Emperor Alexander I St. Petersburg State Transport University, Scientific Center “Vagony”, All-Union Research and Development Center for Transportation Technology (Saint-Petersburg, Russia) with Professor A.M. Orlova as Chairperson of the Symposium. Professor A.M. Orlova was the chairperson for rail-related topics, Prof. David Cole (University of Cambridge) for road related topics. Both will edit the proceedings of the symposium. The proceedings will be indexed in Scopus and fully peer-reviewed.

Additionally, five invited state-of-the-art presentations/papers were presented:

- A state-of-the-art review: toward a novel vehicle dynamics control concept taking the driveline of electric vehicles into account as promising control actuators
- Challenges and progress in the understanding and modelling of the wheel–rail creep forces
- Minimum-lap-time optimisation and simulation
- Contributions of vehicle dynamics to the energy efficient operation of road and rail vehicles
- Analysis of the ‘dynamics of railway vehicles’ research field development using scientometric approach

All SoA papers were published in Issue #7, Volume 59 of Vehicle System Dynamics (VSD) and have been made free access (for free download) until February 2022.

In total 233 abstracts were submitted with 155 accepted for Oral or Poster Presentation and 78 rejected. There were 35 Poster Workshop presentations (20 on Road, 15 on Rail) plus a Workshop on the Results and Outcome of the Switches & Crossings Benchmark 2020. 235 delegates attended the symposium online from more than 20 countries.

Professor Roger Goodall was announced honorary member of IAVSD during the Closing Ceremony.

Report composed by Manfred Plöchl

ICA (International Commission for Acoustics)

www.icacommission.org

1. ICA Governance. The ICA is composed of the acoustical societies from member countries plus international affiliate organizations which themselves have individual members distributed across the world and also organize international conferences every one or two years.

The ICA is now composed of 47 Member Societies, 8 International Affiliate Members, and 5 Observer Members.

The 2021 ICA Board meetings were held online on July 8 and 9. The key decisions made during the Board Meetings were reported to the members of the General Assembly via an online consultation. The 2022 Board Meeting and General Assembly are scheduled to be in-person at the 2022 Congress in Gyeongju, Korea (see below). The meetings this year are particularly important as the voting for the renewal of the Board will take place.

2. International Year of Sound 2020-2021



The International Year of Sound that was declared by the International Commission for Acoustics has come to its end. Due to the pandemic, the International Year that was originally planned for 2020 was extended to 2021.

The central actions by the ICA involved the opening at Sorbonne University in January 2020, the production of a film on the importance of sound in our lives which is available in short and long version, and an international student competition. The student competition received over 650 entries for the primary school level and nearly 100 stanzas and videos for the high school level. There will be various closing events

around the world, with the final closing during the ICA congress in Korea, 24-28 October 2022.

The structure of the IYS relied on the local societies to organize activities. The majority of those were planned to occur soon after the opening in Paris in January 2020, which unfortunately had to be cancelled or postponed while developing alternative ways to hold the events. As the year unfolded and we all began to realize that we could continue to promote the message using modern technology, many novel and innovative activities were added to the program. Close to 200 events have been held in 31 countries.

The website of the IYS 2020-2021 www.sound2020.org has been pivotal to the success of the IYS. It includes information of the IYS events and resources. In the resources category there are almost 100 online and special projects that have been made available. In addition, there have been many publications covering the IYS, both within the scientific community (e.g., *Acoustics Today*) and the general media (i.e., newspapers and magazines). The co-organizers also participated in a number of media interviews and podcasts.

The achievements of the IYS will be summarized during special sessions at the International Congress on Acoustics to be held in South Korea, October 24-28, 2022 (ica2022korea.org).

After the closing of the International Year, the continued actions by the acoustics community will aim to ensure that the achievements of the IYS in promoting the importance of sound in our world are not forgotten.

3. *Symposium Support.* The ICA allocates up to EUR 5,000 annually for sponsorship of specialty symposia in acoustics. In conjunction with the Acoustical Society of America (ASA), the ICA accepts applications for allocation of up to USD 2,000 for specialty symposia that comply with the conditions for the special ASA support.

This application was evaluated by a committee composed of the ICA Executive Committee and the funding allocations were approved by the ICA Board.

The symposia receiving funding are:

- 4th Vienna Talk on Music Acoustics (Austria)
- 2nd International Symposium on Fluid Acoustics (Poland)
- New Sounds 2022 - 10th International Conference on Second Language Speech (Spain)
- ICUA2022 International Conference on Underwater Acoustics (UK)

4. 2022 ICA Congress in Korea. The 24th International Congress Acoustics, ICA 2022 (www.ica2022korea.org), will be held in Gyeongju from October 24 to 28, 2022.

Gyeongju is a city located in the southeastern part of the Korean Peninsula, which had been the capital of the Silla Dynasty for a thousand years during AD 1-9c. For more info see http://www.gyeongju.go.kr/open_content/eng/index.do.

The venue of ICA2022, Gyeongju Hwabaek Convention Center (HICO, <http://www.crowncity.kr/hico/en/main/main.do>) was built specifically for international meetings and conventions. During ICA 2022, all participants will have exclusive use of all HICO facilities to themselves.

The Acoustical Society of Korea (ASK, <http://en.ask.or.kr/>) is ready and eager to host ICA 2022, which will be the first ICA congress in Korea. Over the years, ASK has contributed to the development of acoustics education and research, and the economy in Korea, by emphasizing the importance of sound in various industrial fields. It also has participated actively in the ICA, and has hosted international conferences like Inter-Noise 2003 and ICSLP 2004. ASK will be honoured to help promote the global advancement of acoustics by hosting a successful ICA 2022.

The organizing committee consists of Prof. Jeong-Guon Ih (Mechanical Eng.) as the General Chair, Profs. Chan-Hoon Hann (Architectural Eng.) and Han-Seok Ko (Communication Eng.) as the Technical Co-Chairs, and Prof. Sung-Hwan Shin (Automotive Eng.) as the Secretary General.

Approximately 900 abstracts have been accepted for presentation in the congress, covering all areas of acoustics. The congress will be held with physical presence of the participants, but there is an option to participate remotely through internet facilities if for some reason they are not able to travel to Korea.

Report composed by Mark Hamilton

ICF (International Congress on Fracture)

www.icfweb.org

The COVID crisis has changed the face of education and conferences. Use of platforms such as ZOOM have become commonplace. Meeting colleagues over coffee at conferences seems to be a pleasure of the past. However, ICF is planning to have its 15th International Conference on Fracture in Atlanta, Georgia, USA in person from June 11 to 16, 2023.

Downtown Atlanta is the heart of the 9th largest metropolitan area in the United States. Atlanta has flights offering non-stop service to more than 150 U.S. destinations and 60 international destinations and boasts many world-class attractions, making it the 7th most visited city in the U.S. The conference will be hosted at the Omni Hotel and the Georgia World Congress Center. Low cost housing will also be available in nearby Georgia Tech dormitories.

The conference is held every four years, and ICF15 will be returning to the continental United States after 34 years. It will focus on the latest interdisciplinary research in the field of fracture and is a must attend event for senior and young researchers, students, post-doctoral fellows, and industry professionals working in the field of fracture throughout the world. The web site may be found at www.icf15.org

ICF Honor Lecture speakers

- ICF Opening Honor Lecture- Prof. David McDowell, Georgia Tech, USA, "Advancing Fatigue Resistant Microstructure Selection and Design via Computation and Data Science"
- ICF Presidential Lecture- Prof. Robert McMeeking, UC-Santa Barbara, USA, "Fracture and the Limitation it Places on Technology and Sustainability: from Lithium-Ion Batteries to Medical Implants"
- ICF Closing Honor Lecture- Prof. Robert Ritchie, UC Berkeley, USA, "Mechanics and Mechanisms of Fracture in Multiple-Element Structural Materials"

ICF Plenary Lecture speakers

- Prof. Subra Suresh, NTU, Singapore, "Fracture Mechanisms Across Living and Engineered Systems: Deep Analysis and Learning from Nature and Machines"
- Prof. R. Narasimhan, Indian Institute of Science, Bengaluru, India, "Tensile Twinning: Bane or Boon for Fracture of Magnesium Alloys"
- Prof. Tong-Yi Zhang, Shanghai University, China, "Microstructures and Fracture in Multiferoic Materials, Machine Learning Approaches"
- Prof. A.T. Yokobori, Teikyo University, Japan, "Noninvasive Diagnosis of Blood Vessel Diseases Related to Visco- elastic Deterioration of Blood Vessel Wall"
- Prof. Claudio Ruggieri, University of Sao Paulo, Brazil, "Critical Concerns and Challenges in Fracture and Fatigue Assessments of Corrosion Resistant Alloy (CRA) Pipes with Dissimilar Weldments: Subsea Applications and Beyond"
- Prof. Bill Curtin, EPFL/Switzerland, "Understanding Ductility in BCC High Entropy Alloys"

- Prof. David Wilkinson, McMaster University, Canada, "The Path to High Formability and Damage Tolerance in 3rd Generation Steels"
- Prof. Sylvie Pommier, University of Paris-Saclay France, "Modeling Fretting Fatigue in Multiaxial and Variable Loading Conditions"
- Prof. Norman Fleck, Cambridge University, UK, "The Failure of Adhesive Layers: From Fast Fracture to Stress Corrosion"
- Prof. Huseyin Sehitoglu, University of Illinois, USA, "Interface Nanostructures and Mechanisms Critical for Fatigue"

There will be 20 Symposia. Details may be found in the web site. Select papers from the symposia will be published in special volumes of international journals with the symposium organizers serving as guest editors. Abstracts are due October 1, 2022. Hope to see you all in Atlanta.

Report composed by Leslie Banks-Sills

ICHMT (International Centre for Heat and Mass Transfer)

www.ichmt.org

ICHMT organized one international symposium and sponsored three in 2021. Details of these meetings can be found on the web site, <http://www.ichmt.org>.

Meetings Organized by ICHMT:

“8th International Symposium on Advances in Computational Heat Transfer, CHT-21” was held in a full online format, during August 15 – 19, 2021. The Symposium Co-Chairmen were Professor Yogesh Jaluria, Rutgers University, USA and Professor Helcio R. B. Orlande, Federal University of Rio de Janeiro, UFRJ, Brazil. Detailed information can be found on the Web site: <https://www.ichmt.org/cht-21>

Meetings Co-Sponsored by ICHMT:

“5-6th Thermal and Fluids Engineering Conference, TFEC-2021”, 26 – 28 May 2021, while they were planning to hold their meeting in New Orleans LA, due to ongoing COVID-19 concerns, the conference was a virtual conference held entirely ***online***. The Symposium Co-Chairmen were Dr. Ting Wang, University of New Orleans, USA and Dr. Michael W. Plesniak, The George Washington University, USA.

“15th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, HEFAT-2021”, 26 - 28 July, 2021, in NH Collection Amsterdam Grand Hotel Krasnapolsky, Amsterdam, Netherlands. The symposium Chairman was Professor Josua P. Meyer, University of Pretoria, South Africa.

“6th International Workshop on Heat/Mass Transfer Advances for Energy Conservation and Pollution Control (on-line), IWHT-2021”, 13 - 16 August 2021 in Harbin, China. The Symposium Co-Chairmen were Y.J. Li, Harbin Engineering University, China; Q.W. Wang, Xi’an Jiaotong University, China; Y.T. Chen, University of Nevada Las Vegas, USA.

Meetings to be Organized by ICHMT:

“3rd International Symposium on Convective Heat and Mass Transfer (Hybrid), CONV-22”, 5 - 10 June, 2022, Izmir, Turkey. The symposium Chairmen are Dr. Mourad Rebay, University of Reims, France and Dr. Alpaslan Turgut, Dokuz Eylul University, Izmir, Turkey. Detailed information can be found on the Web site: <https://www.ichmt.org/conv-22>

“10th International Symposium on Turbulence Heat and Mass Transfer, THMT-22”, 5 – 8 July 2022, in St. Petersburg, Russia. The Symposium Chairman is Professor D. Markovich, Kutateladze Institute of Thermophysics, Siberian Branch of Russian Academy of Sciences, Russia. The Symposium Co-Chairmen are Professor K. Hanjalic, Delft University of Technology, The Netherlands and Professor K. Suga, Osaka Prefecture University, Japan. Detailed information can be found on the Web site: <http://www.thmt-22.org/>

Meetings to be Co-sponsored by ICHMT:

“7th Thermal and Fluids Engineering Conference (Hybrid), TFEC-2022”, 16 - 18 May 2022, partially online virtual and in person at University of Nevada, Las Vegas, NV, USA. The Symposium Co-Chairmen are Dr. Darrell W. Pepper, University of Nevada, USA and Dr. Nesrin Ozalp, Purdue University Northwest, USA. Detailed information can be found on the Web site: <https://www.astfe.org/tfec2022/>

“14th International Conference on Thermal Engineering Theory and Applications, ICTEA-2022”, 22 – 24 May 2022, in Baku, Azerbaijan. The Symposium Co-Chairmen are Professor Yusif Abdullayev, Baku Engineering University, Azerbaijan and Professor M.Ziad Saghir, Ryerson University, Canada. Detailed information can be found on the Web site: <https://www.ictea.ca/>

“16th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics and the Editorial Board of Applied Thermal Engineering, ATE-

HEFAT 2022", 8 - 12 August, 2022, in Amsterdam, Netherlands. The symposium Chairman was Professor Josua P. Meyer, University of Pretoria, South Africa. Detailed information can be found on the Web site: <https://hefat2022.org/>

"12th Mediterranean Combustion Symposium, MCS-2023", 23 – 26 January 2023, Luxor, Egypt. The symposium Co-Chairmen are Dr. Federico Beretta, Consiglio Nazionale delle Ricerche, Napoli, Italy; Prof. Nevin Selcuk, Middle East Technical University, Ankara, Turkey; Prof. Mohy S. Mansour, American University in Cairo, Egypt and Prof. Andrea d'Anna, Università degli Studi di Napoli Federico II, Naples, Italy. Detailed information can be found on the Web site: <https://www.combustioninstitute.org/ci-event/12th-mediterranean-combustion-symposium/>

"17th International Heat Transfer Conference, IHTC-17", 3 – 7 July 2023, Cape Town, South Africa. The symposium Chairman is Josua P. Meyer, University of Pretoria, South Africa. Detailed information can be found on the Web site: <https://ihtc17.org/>

Report composed by Tugba Gün

ICM (International Conference on the Mechanical Behaviour of Materials)
<https://www.icm-13.com>

International Congress on the Mechanical Behaviour of Materials (ICM) has the objective to foster research on the mechanical behaviour 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.

The congress holds the International Conference on Mechanical Behaviour of Materials every four years, and last ICM-13 was held at Melbourne, Australia on 11-14 June 2019. At that conference, it was decided that the next ICM-14 will be held at Santiago, Chile in July 2023 (The date is tentative). In 2021, ICM did not have any executive committee meeting due to the Covid-19 pandemic. But ICM-14 will be held as scheduled in 2023.

Report composed by Yoshihiko Uematsu

ICR (International Committee on Rheology)

<http://icrheology.org/dat/index.html>

The science of rheology is well-represented throughout the world. The major rheology meetings in North America, Europe, and Asia continue to attract greater numbers of registrants. The 2020 International Congress on Rheology was organized by the Brazilian Society of Rheology. Originally scheduled to be held in-person in Rio de Janeiro, it took place online from December 12 to 18, 2020, attracted 877 participants from 41 countries. This healthy growth in the rheological community reflects the vital position of our science in addressing world-wide technological challenges in energy, the environment, and manufacturing.

The current roster of active member societies of the ICR can be found on the Committee's website (<http://icrheology.org/dat/index.html>) and includes representation from 31 countries.

The XIXth International Congress on Rheology will be held in Athens, Greece. It will take place from July 29 to August 4, 2023 (<https://www.erasmus.gr/microsites/1221>), organized by Hellenic Society of Rheology. Chairman of the Organizing Committee is Prof. Dimitris Vlassopoulos, University of Crete. The Congress in Athens, initiates a scheduling of this meeting that avoids overlap with the ICTAM meetings.

The large, annual meetings of member societies are now being held in-person with the Annual European Rheology Conference being held in Seville, Spain in May, 2022 and the Annual Meeting of The Society of Rheology to be held in Chicago in October, 2022.

Report composed by Gerald G. Fuller

ICTS (International Congresses on Thermal Stresses)

<https://www.tandfonline.com/toc/uths20/current>

The 13th ICTS had originally been planned to be held June 6-9, 2021, in Minneapolis, with Prof. Kumar K. Tamma serving as the General Chair. Due to the coronavirus pandemic, that congress was cancelled.

The 13th ICTS is currently being organized for June 4-8, 2023, in Luleå, Sweden, with Prof. Lars-Erik Lindgren (Luleå University of Technology) serving as the General Chair.

Report composed by Martin Ostoja-Starzewski and Kumar K. Tamma

IIAV (International Institute of Acoustics and Vibration)

www.iiav.org

The Covid-19 pandemic beginning in early 2020 and continuing into 2021 has had a serious effect on IIAV functions. The ICSV annual congresses have been postponed and/or held only as virtual events, The Executive, Board of Directors and Members meetings were held in July 2021 as virtual events.

The organizational structure of IIAV, the International Institute of Acoustics and Vibration, is president, president-elect, two vice-presidents, secretary, and treasurer. The current officers are: President: Marek Pawelczyk, Poland; Immediate Past President, Eleonora Carletti, Italy; President-Elect, Jian Kang, UK; Vice-President for Professional Relations, Marek Pawelczyk, Poland; Vice-President for Communications, Hans Boden, Sweden; Secretary, Rupert Thornely Taylor, UK; and Treasurer, Zhuang Li, USA.

There are twenty directors from different countries. IIAV also has an Executive Director, Malcolm Crocker, USA. The president serves a two-year term, the vice-presidents serve overlapping four-year terms, and the directors serve overlapping four-year terms. IIAV cooperates with scientific and engineering societies and institutes around the world and lists 52 such affiliated organisations on its website at www.iiav.org. IIAV also has individual members in 55 countries.

Annual elections were held again in November 2020, and, as a result, five new directors and two officers, took up their positions in July 2021 after the IIAV annual board of directors meeting. The new directors were Francesco Asdrubali, Italy; Adrian Brown, UK; Francisco Denia, Spain; Jim Kok, The Netherlands; Roshun Pauroballi, Qatar; the new officers were VP for Professional Relations: John Davy, Australia; and President elect: Jian Kang, UK.

IIAV normally holds international congresses on sound and vibration (ICSVs) annually in major cities all around the world. The Twenty-fifth International Congress on Sound and Vibration (ICSV25) took place in Hiroshima, Japan, 8-12 July 2018 in cooperation with the Japanese Acoustical Society. ICSV26 was held in Montreal, Canada, 7-11 July 2019 in cooperation with the Canadian Acoustical Association. The ICSV25 and ICSV26 technical proceedings were made available to all delegates at the congresses. The ICSV25 and ICSV26 proceedings include all abstracts and the full texts of all the accepted papers and are now also available open access to everyone on the IIAV website.

ICSV27 had been scheduled to take place live in Prague in July 2020, but because of the Covid-19 pandemic, the decision was made twice to postpone it by three years to

July 2023 as ICSV29 (a total of 1489 abstracts had been submitted). ICSV27 was held as a purely virtual congress in July 2021 with 565 papers. It is now planned to hold ICSV28 partly live in Singapore and partly virtual in July 2022. The ICSV30 was planned to be held live in St. Petersburg, Russia in July 2024, but it was cancelled in March 2022 because of the Russian invasion of Ukraine. Alternative proposals from Amsterdam and Brussels are being considered for ICSV30 in July 2024.

The International Journal of Acoustics and Vibration (IJAV), the quarterly refereed 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. Issues of IJAV have now been made open access for all interested scientists and engineers around the world to view, starting with the first issue published in 2016. An increasing number of papers are being submitted and published by authors from China. There is an increase in the number of papers from India as well.

Report composed by Malcolm J. Crocker

IMSD (International Association of Multibody System Dynamics)

www.itm.uni-stuttgart.de/imsd

IMSD is a successor to the Joint International Conference on Multibody System Dynamics formed on May 26, 2010. It is the essential mission of the Association to establish biannual international conferences on multibody system dynamics that address computational mechanics, nonlinear dynamics and control design; to foster research on the dynamics of multibody systems and related fields; and to promote international cooperation between scientists and engineers in industry.

The IMSD conference is a biannual series that serves as a meeting point for the international multibody community and as an opportunity to exchange high-level, current information on the theory and applications of multibody systems. As a rapidly growing branch of engineering dynamics, Multibody System Dynamics is seeing more and more use, and is becoming increasingly important in the development of complex systems. The continual new challenges faced by the IMSD community demand productive conference forums where ideas are freely exchanged and a spirit of cooperation is encouraged.

Information about IMSD can be found at www.itm.uni-stuttgart.de/imsd including the activities, committees, bylaws, and more.

Every year, the IMSD International Steering Committee takes place next to a major Conference in the field. In the odd years, the ECCOMAS Multibody Dynamics Conference is the focal point, while, in the even years, the meeting takes place during the IMSD Conference. Due to the pandemic situation, and because of the uncertainty regarding mobility in 2021, it was not possible to hold the ECCOMAS Multibody Dynamics Conference as planned in Budapest, in July 2021. Instead, it was held as an online event in December 2021, not being possible to substitute the onsite meeting by a telemeeting.

During 2021, three conferences were organized, online:

COSIM 2021 - International Symposium on Co-Simulation and Solver Coupling in Dynamics, Ferrol, Spain, May 24-25, 2021. (by Francisco J. González and Javier Cuadrado)

MUSME 2021 - 7th International Symposium on Multibody Systems and Mechatronics, Córdoba, Argentina, October 12-15, 2021. (by Martín Pucheta and Alberto Cardona)

Multibody 2021 - ECCOMAS Multibody Dynamics Conference, Budapest, Hungary, December 12-15, 2021. (by Gábor Stépán, József Kövecses, Tamás Insperger, László Bencsik and Ambrus Zelei)

Both COSIM 2021 and Multibody 2021 Conferences generated online proceedings and special Issues of the IMSD associated journal *Multibody System Dynamics*. The MUSME 2021 had its proceedings published by Springer.

The Conferences, initially scheduled for 2020 and postponed for 2022, are:

Our flagship biennial conference and the 6th in the series, IMSD 2020¹, was postponed and will now be held in New Delhi, India, on 16-20 October. IMSD 2022 is being held onsite in conjunction with the 10th Asian Conference on Multibody Dynamics, and a large number of attendees are expected.

IMSD displays some information on the association at the end of each number of the Springer journal *Multibody System Dynamics* which is the official journal of IMSD. This journal is the leading publication organ in multibody system dynamics.

Notable members of the International Steering Committee for IMSD include:

Jorge Ambrosio, Chairman of IMSD

¹ <http://imsdacmd2020.iitd.ac.in/>

John McPhee, Vice-Chairman of IMSD
Javier Cuadrado, Secretary of IMSD
Peter Eberhard, Representative of IMSD in IUTAM GA
Werner Schiehlen, Representative of IUTAM in IMSD ISC

Report composed by Jorge Ambrósio, John McPhee, and Javier Cuadrado

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

<http://isimm.unipg.it>

The International Society for the Interaction of Mechanics and Mathematics fosters the interaction of mathematics and mechanics. The Society was founded in 1977 in Kozubnik in Southern Poland. There had been a planning period before that time which had culminated in a meeting in Lecce, Apulia, Italy two years earlier. The main activities of the Society consist in the organization of the *Symposium on Trend in Applications of Mathematics to Mechanics* (STAMM) and the publication of the book series *Interaction of Mechanics and Mathematics Series* (IMM), and, more recently, special issues gathering contributions from STAMM participants.

The 2021 activities of ISIMM have been unfortunately still strongly affected by the pandemic situation. However, activities have been slowly moved towards a normalization. In particular, the online event named *ISIMM Virtual Meeting 2020+1* took place on September 17th, 2021 in order to award the already announced 2020 ISIMM Senior and Junior Prizes. In such event, the awardees of the prizes, namely Prof. Robin Knops for the ISIMM Senior prize and Dr. Vito Crismale and Dr. Michele Curatolo for the ISIMM Junior Prizes, presented a seminar and a roundtable with title “The history of ISIMM and an outlook to the future” has been chaired by Prof. Hans-Dieter Alber. Furthermore, in December 2021 the procedures to assign the 2022 ISIMM Prizes have been started by nominating the Prize Committee and by calling for the prize nominations from ISIMM members. Finally, the organization of the *XXIII Symposium on Trend in Applications of Mathematics to Mechanics* (STAMM) started. The conference is planned to be held mainly in presence (with the possibility of remote participation) in Brescia at the Università Cattolica del Sacro Cuore in the period of June 15-17, 2022. The location is the same originally planned for STAMM 2020, because STAMM 2020 was then not held in presence due to the pandemic.

Report composed by Paolo Piovano

ISSMO (International Society for Structural and Multidisciplinary Optimization)

www.issmo.net

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

The ISSMO 2021 World Congress was held remotely, June 13-18, 2021.

Organizing Committee

Kurt Maute (Chair), Alireza Doostan, John Evans, James Guest, Julian Norato

There were 586 registrants from 31 countries, with 478 oral presentations.

The Conference Proceedings were published *Advances in Structural and Multidisciplinary Optimization, Proceedings of the 13th World Congress of Structural and Multidisciplinary Optimization (WCSMO13)*, Guo, X., Huang, H. (Eds.), Dalian University of Technology Electronic & Audio-Visual Press, 2019. Available at <https://www.issmo.net/wp-content/uploads/WCSMO13-Proceeding.pdf>

Select WCSMO-14 papers were also collected for a Special Issue appearing in *Structural and Multidisciplinary Optimization* (Springer Verlag) titled “Selected papers from 14th World Congress on Structural and Multidisciplinary Optimization” and is to be published in 2022.

WCSMO-15: The proposal to host WCSMO-15 in Cork, Ireland in 2023, with Conference Chairman Prof. Denis Keliher, was selected.

2. Young Researcher ISSMO/ Springer Prize

The ISSMO-Springer Prize 2021 was awarded to:

Yuan Liang (Dalian University of Technology, China) “Explicit control of 3D structural complexity by discrete variable topology optimization method”, with Xin Yu Yan and GengDong Cheng as co-authors.

The award ceremony will be held at the WCSMO-15.

3. Haftka Young Investigator Award

ISSMO initiated the new Haftka Young Investigator Awards to recognize outstanding

researchers early in their careers for achievements and promising groundbreaking research in the field of structural and multidisciplinary optimization. This new award has been named in honor of the foundational research contributions of Professor Raphael T. Haftka and recognizes his passion for mentoring young researchers.

The first Haftka Young Investigator award was awarded to:

Professor Niels Aage (Technical University of Denmark) for his outstanding research achievements and contributions in large scale topology optimization and topology optimization across multiple physics, as well as his tremendously impactful contributions to the ISSMO community including the creation of open source software and free apps that have enabled researchers with new capabilities, educated students, and broadly promoted ISSMO research areas.

4. Top Webinar broadcasted monthly a series of presentations based on recent literature in the field of topology optimization, and are archived at <https://www.youtube.com/channel/UCfknafkFQBuTOtHJH8I4qLQ>

5. ISSMO endorsed the following international scientific meetings during 2021:

- ICTAM – 25th International Congress of Theoretical and Applied Mechanics, virtual, 22-27 August 2021
- AIAA Scitech Forum, virtual, Jan 2021
- AIAA Aviation Forum, virtual, Jun 2021
- National Conference on Multidisciplinary Analysis and Optimization, India, October 7-9, 2021
- 16th US National Congress on Computational Mechanics, USA, virtual, July 25-29, 2021

6. To date, ISSMO has endorsed the following international scientific meetings to be held in 2022:

- ACSMO 2022 – Asian Congress of Structural and Multidisciplinary Optimization, Matsue, Japan, 22-26 May, 2022
- AIAA SciTech Forum (hybrid), San Diego, Jan 2022
- AIAA Aviation Forum (hybrid), Chicago, June 27 – July 1, 2022

Please consult the website www.issmo.net for more information about ISSMO.

Report composed by H. Alicia Kim and Wei Chen

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

In 2021, we officially launched the first LACCOTAM virtual seminar series in Fluid Mechanics. This is a collaborative effort between LACCOTAM and the Department of Mathematics and Statistics, The University of the West Indies, St Augustine Campus, Trinidad and Tobago.

The first seminar took place on 9th September 2021, with invited speaker Professor Jitendra Kumar from the Department of Mathematics, Indian Institute of Technology, Kharagpur, India. The title of his lecture was “Computational and Modelling Challenges in Simulating Particulate Systems”. This seminar was attended by regional graduate students and active researchers with an interest in Fluid Mechanics. Confirmation has already been received from three other experts (from India, Botswana and the USA) – with virtual talks scheduled for the last quarter of 2022.

Report composed by Donna M. G. Comissiong

WCB (World Council of Biomechanics)

<https://wc-biomechanics.org>

The objective of the World Council of Biomechanics is to provide permanence and stability for the periodic meetings of the World Congress of Biomechanics every 4 years, and to communicate information about the World Congress and any associated satellite meetings, as well as about the scientific priorities in Biomechanics, to as many people interested in the subject as possible. The next World Congress of Biomechanics is planned to be held in Taipei in July 2022. The World Council of Biomechanics has the responsibility for selection of future meeting sites. The World Council also sponsors specialty meetings especially in countries in which biomechanics is an evolving discipline.

Activities of the Council in 2021 include:

1. Planning for Ninth World Congress of Biomechanics

July 2022 | Taipei

The Council has continued to assist the organizers of World Congress of Biomechanics in 2022, including:

- Coordinated the nomination of, and approved, the plenary speakers for WCB2022

- Held teleconferences with the congress organizing committee, including reviewing both logistical and scientific plans and adjustments required due to the COVID-19 pandemic
- Finalizing the criteria for the WCB Travel Awards and student travel bursaries (assessment of applications to be done in 2022)

2. Other Activities

- The council selected the site for the next Congress, to be held in Vancouver, Canada in 2026.
- The council reviewed membership and began planning for elections of new council members (to be held in 2022)

For more details see <https://www.wc-biomechanics.org>

Report composed by Lynne Bilston

Reports on ISC and its Scientific Committees

ISC (International Science Council)

<https://council.science/>

The International Science Council (ISC) has had a busy year despite the on-line nature of much of the activity. For example, the ISC is collecting various information from the international scientific community on the war in Ukraine. See:

<https://council.science/current/news/statements-international-scientific-community-conflict-ukraine/>

ISC has a General Assembly every 3 years under normal circumstances. It held an Extraordinary General Assembly 1-5 February 2021 which centred on re-writing of their statutes and a 2nd ISC General Assembly 10-15 October 2021. During the 2nd ISC General Assembly (GA) week, over 300 delegates connected from all over the world to reflect on the Council's activities and achievements during its first term, and to discuss the projects and priorities for the following three years. Geoffrey Boulton, Governing Board member of ISC, presented the proposals for action to reform scientific publishing in the frame of the ISC Future of Scientific Publishing project.

Prior to the 2nd ISC GA there was an informal pre-conference including several discussions organized and facilitated by ISC Members around topics such as membership strategy, gender equality in science, and the Scientists Without Borders initiative. The IUTAM President actively steered a discussion session on Registration of Scientific Unions. It was very helpful to work with ISC over the past 1 year in fact-finding of ways to register a Scientific Union. In particular, the President of IUTAM has held several on-line meetings with the Secretary Generals of other unions (such as IUPAP) and was also able to attend as an observer the General Assembly of IUPAP.

In a closing address to the 2nd ISC General Assembly, outgoing ISC President Daya Reddy (and an IUTAM colleague) recalled key values of scientific freedom and responsibility, and the importance of promoting inclusivity in global scientific collaboration. He shared how experiencing the sheer diversity of approaches, people and ideas in the ISC network was one of the most positive experiences in his time as ISC President. Daya Reddy reminded ISC Members of the increasing urgency of action on the global challenges facing societies today, and the need to respond to threats to scientific freedom. From the IUTAM perspective, there is a clear opportunity for IUTAM to engage in the mechanics aspects of global challenges, such as renewable energy supply and use, sustainability, global warming.

The new President of ISC is Sir Peter Gluckman has written and spoken extensively on science-policy, risk assessment, science-diplomacy, and science-society interactions. Peter Gluckman is Director of Koi Tū: The Centre for Informed Futures at the University of Auckland, New Zealand. From 2009-2018 he was first Chief Science Advisor to the Prime Minister of New Zealand and from 2012-2018 Science Envoy for the New Zealand Ministry of Foreign Affairs and Trade.

Report composed by Norman Fleck, President of IUTAM

CODATA (Committee on Data)

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

2021 was again a difficult year for CODATA as for most of the associations worldwide, strongly impacted by the COVID pandemic.

The most important event in 2021 was the (virtual) CODATA general assembly, November 15th-16th, with different important points in the agenda:

- 1 - Approval of Task Groups for 2021-2023
- 2 - Elections of Officers and the EC2021-2023
- 3 - Approval of the Revision of the National Dues structure
- 4 - Update on CODATA activities and presentation of the Strategic plan

IUTAM is specially involved in the first item, where different Task Groups concern the domain of mechanics in its largest sense, and IUTAM was involved in the Task Group DRUM discussed later.

Four proposals for new Task Groups were submitted:

1. Creative Living and Aging through Cross-disciplinary Utilization of Data
2. Data Ethics
3. Extension of InChI for nanomaterials
4. Towards a Paradigm Shift for Open Data in Planning Resilience Cities

and eight existing Task Groups applied for renewal:

5. Advanced mathematical tools for data-driven applied systems analysis
6. Agriculture Data, Knowledge for Learning and Innovation
7. Applying Data Integration and Data Science Tools toward Research of Urban Life and Smart Cities

8. CODATA–WDS TG on Data from Participatory Mapping for the SDGs and Knowledge
9. Digital Representation of Units of Measurement (DRUM)
10. FAIR Data for Disaster Risk Research (FAIR-DRR)
11. Improving Data Access and Reusability (IDAR)
12. Preservation of and Access to Scientific and Technical Data in/for/with Developing Countries (PASTD)

As the different task groups titles suggest, particular interests exist around the human being (living and aging), the human centric smart city and nation with all their dimensions: transport and mobility, infrastructures -diagnosis and prognosis for the appropriate decision making-, resilience, disaster risk, development, air quality, energy, industry, with data as one of the main protagonists, constrained by aspects like ethics, reusability, confidentiality, accessibility, quality and veracity.

Even closer to the IUTAM community, one task group was proposed on nanomaterials, that even if its main focus is on nomenclature, the implications and use touch a number of fields including materials science and technology, environmental sciences, health, toxicity etc.

The one in which IUTAM is more active concerns DRUM (Digital Representation of Units of Measurement). In 2020 a very interesting (virtual) discussion on “Units of Measure for Humans and Machines: Making Units Clear for Machine Learning and Beyond” (*“If God wanted us to use the metric system, He would have given us ten fingers and ten toes” — Judith Stone, Light Elements: Essays in Science from Gravity to Levity*) was organized to address major questions on the importance of units, initiatives around Digital Representation of Units of Measure, and requesting for ambassadors and use cases.

Now, during the GA of 2021, the main objective of this task group (candidate to be renewed) was emphasized: to work with the International Science Unions to raise awareness of, educate, and enable their communities in the understanding and implementation of digital unit representation. This will be done with reference to each of the three objectives of the CODATA Decadal Programme, namely:

1. Enabling Technologies and Good Practice for Data-Intensive Science
2. Mobilising Domains and Breaking Down Silos
3. Advancing Interoperability Through Cross-Domain Exemplary Case Studies

Each of the above objectives can be addressed by awareness of the different units of measurement representations that are currently available (see the inventory developed in the 2018 - 2021 TG).

This, coupled with the movement toward FAIR data, will be used to promote the idea that units of measurement are not second-class citizens in science, but rather the most important aspect of what is needed to make data FAIR. The IUTAM community working Data-Driven mechanics certainly agrees with this point. Without any surprise the recommendation was strongly endorse.

Report composed by Francisco Chinesta

COSPAR (Committee on Space Research)

<https://cosparhq.cnes.fr/>

The Committee on Space Research (COSPAR) was established by the International Council for Science (ICSU) in 1958. The Purpose of COSPAR is "to promote at an international level scientific research in space, with emphasis on the exchange of results, information, and opinions, and to provide a forum, open to all scientists, for the discussion of problems that may affect scientific space research. The objectives of COSPAR are to be achieved through the organization of scientific assemblies, publications, or any other means." Unfortunately, the global COVID-19 pandemic continued to impact the events of COSPAR. As a result, the 43rd Scientific Assembly, initially scheduled in Sydney, Australia, in August 2020, was postponed. Instead, it was held as a hybrid assembly (virtual and in-person) from 28 January-4 February 2021. The assembly's theme was "Connecting space research for global impact," which attracted participation from nearly all the participating nations of COSPAR. The 44th Scientific Assembly is scheduled to occur in person in Athens, Greece, during 16-24 July 2022.

Report composed by Guruswami Ravichandran

SCOR (Scientific Committee on Oceanic Research)

<https://scor-int.org/>

Report will be provided when an IUTAM representative has been appointed.

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. XIII 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. Une réunion de l'Assemblée Générale peut être tenue en présence physique des membres (réunion en personne) ou peut être tenue par des moyens électroniques (réunion virtuelle).

***) Article III adopté par l'Assemblée Générale de l'Union, le 27 mai 2020 par des moyens électroniques

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 en personne peut désigner, à l'avance et par lettre ou messagerie électronique 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 ou par des moyens électroniques sur proposition formulée par le Bureau (cf. Art. XII 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.

***) *Article V adopté par l'Assemblée Générale de l'Union, le 24 juillet 2018 à Boston, États-Unis et modifié le 27 mai 2020 par des moyens électroniques*

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. XII);
- c) des membres cooptés par l'Assemblée Générale de l'Union;
- d) le Secrétaire du Comité de Congrès (cf. art. XIII c);
- e) les présidents des «Symposia Panels» Fluides et Solides nommés par le Bureau.

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. XI);
- ii) les présidents des «Working Parties»;
- iii) des représentants des «organisations associées adhérentes» (cf. art. IX)
- iv) des représentants des pays candidats à l'adhésion;
- v) 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 19 août 2014 à Lyngby, Danemark*

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 XII) 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. Les candidats aux sept postes doivent avoir été membres de l'Assemblée Générale à un moment de la période précédant de six 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 1^{er} 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 19 août 2014 à Lyngby, Danemark*

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

- a) Le Président de l'Union préside aussi le CC.
- b) Le CC nomme un Secrétaire parmi ses membres, sous entendu que cette personne soit d'accord pour être nommée. A partir de la recommandation du CC, l'Assemblée Générale élit le Secrétaire pour un mandat de quatre ans, renouvelable une fois. Il est souhaitable que le Secrétaire ait été membre du CC pour au moins quatre ans avant d'être nommé.
- c) Les Membres du CC sont élus par l'Assemblée Générale; ce sont des scientifiques actifs en mécanique théorique ou appliquée, n'appartenant pas nécessairement à l'Assemblée Générale. Avant une Assemblée Générale, le Secrétaire du CC sollicite des nominations des membres du CC, de l'Assemblée Générale, des organisations adhérentes et des organisations affiliées, et des autres sous-comités tels que les « Symposia Panels » et les « Working Parties ». La taille du CC ne doit pas dépasser un tiers de la taille de l'Assemblée Générale. Les mandats des membres du CC sont limités, sauf cas particuliers, à deux mandats successifs.

Il est souhaitable que la composition du CC soit représentative des différentes branches des sciences mécaniques ainsi que de la diversité de la communauté des sciences mécaniques.

- d) Le CC nomme un Comité Exécutif parmi ses membres. Le Président de l'IUTAM et le Secrétaire du CC jouent automatiquement les rôles respectifs de Président et de Secrétaire du comité exécutif. Quatre membres supplémentaires sont nommés. Le Président du Congrès International de Mécanique Théorique et Appliquée à venir peut également être nommé au sein du comité exécutif « ex officio ». L'un des prérequis pour être nommé au sein du comité exécutif est d'avoir une solide expérience de grands congrès. A partir des nominations effectuées par le CC, l'Assemblée Générale élit le comité exécutif du CC. Les

mandats des membres supplémentaires du comité exécutif CC sont limités à deux mandats successifs.

- e) Les règles de fonctionnement du CC sont soumises à l'approbation de l'Assemblée Générale.

*****) *Article XIII adopté par l'Assemblée Générale de l'Union, le 19 août 2014 à Lyngby, Danemark*

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 à chaque fois que l'Assemblée Générale se réunit et une telle réunion doit suivre le format (en personne ou par des moyens électroniques (virtuelle)) de la réunion de l'Assemblée Générale. Typiquement, cela veut dire tous les deux ans, à l'occasion de l'Assemblée Générale entre congrès et à l'occasion du Congrès International.
2. Pendant un Congrès International, le CC passe en revue les propositions pour le Congrès International suivant et sélectionne le lieu par un vote des membres du CC présents (les votes par procuration ne sont pas autorisés). Ce processus de sélection se déroule au cours de deux réunions distinctes du CC.
3. Le Comité Exécutif est chargé de prendre au nom du CC 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 Secrétaire doit rester en contact avec tous les membres du CC et les solliciter lorsqu'il y a des questions importantes à traiter.
4. L'organisation effective d'un Congrès est confiée à un Président et à un Secrétaire-Général du Congrès, identifiés par l'organisation qui invite. Le Président et le Secrétaire-Général du Congrès sont responsables de tous les aspects du succès du Congrès, et en particulier de la publication des Comptes rendus du Congrès. Le Président et le Secrétaire-Général du Congrès maintiendront un dialogue constant avec le Comité Exécutif, feront un rapport annuel au Comité Exécutif et un rapport au CC à chaque réunion du CC, depuis le moment où le lieu a été choisi jusqu'à ce que le Congrès ait eu lieu.
5. Le Président et le Secrétaire-Général du Congrès devront obtenir l'approbation du CC (normalement par l'intermédiaire du Comité Exécutif) pour toutes les questions relevant de la politique générale du CC, en particulier pour celles qui concernent:

- 5.1. le but du Congrès;
 - 5.2. la sélection des communications pour le Congrès;
 - 5.3. le choix des conférences générales pour le Congrès;
 - 5.4. la désignation des présidents de sessions du Congrès;
 - 5.5. les principes généraux régissant les arrangements financiers du Congrès.
6. Les organisateurs percevront, de tous les membres du congrès, une contribution afin de couvrir les dépenses administratives du CC. Ces contributions seront reversées à l'IUTAM immédiatement après le congrès. Le montant de ces contributions restera du même ordre de grandeur de congrès à congrès.

**) Procédure adoptée par l'Assemblée Générale de l'Union, le 19 août 2014 à Lyngby (Danemark) et modifié le 27 mai 2020 par des moyens électroniques*

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*

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. A meeting of the General Assembly may be held with physical attendance of members (in-person meeting) or may be held by electronic means (virtual meeting).

****) Article III adopted by the General Assembly on May 27, 2020 by electronic means*

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 an in-person meeting may by a letter or notification via electronic mail 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 or by electronic means upon proposals made by the Bureau (Article XII); 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.

***) *Article V adopted by the General Assembly on July 24, 2018, in Boston, USA and amended on May 27, 2020 by electronic means*

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;
- d) the Secretary of the Congress Committee (Article XIII c);
- e) the Chairs of the Fluids and Solids Symposia panels appointed by the Bureau.

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) chairmen of the Working Parties;
- iii) representatives of adhering associated organisations (Article IX);
- iv) representatives of countries applying for membership;
- v) representatives of committees and groups of scientists, if so decided by the General Assembly.

****) *Article VI adopted by the General Assembly on August 19, 2014, in Lyngby (Denmark)*

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. The candidates for all seven positions must have been full, voting members of the General Assembly at some time within the six 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 are 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 August 19, 2014, in Lyngby (Denmark)*

XIII.***** The General Assembly establishes a standing Congress Committee (henceforth abbreviated CC) 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 chair of the CC.

b) The CC shall nominate a Secretary from its membership subject to that person's willingness to be nominated. Based on the CC nomination, the General Assembly elects the Secretary of the CC for a four-year term with the possibility of renewal for a second term. It is desirable that the Secretary should have been a member of the CC for at least four years prior to nomination.

c) Members of the CC are elected by the General Assembly as individuals active in theoretical and applied mechanics and need not be members of the General Assembly. Prior to a General Assembly, the Secretary of the CC shall invite nominations from members of the CC, the General Assembly, Adhering and Affiliated Organizations, and any appropriate subcommittees, such as the Symposia Panels and Working Parties. The size of the CC shall not exceed one-third the size of the General Assembly. Terms of service as a member of the CC shall generally be limited to two, successive four-year terms.

It is desired that the composition of the CC be representative of the various mechanics disciplines, and of the diversity of the mechanics community.

d) The CC shall nominate an Executive Committee from its membership. The President of IUTAM and the Secretary of the CC automatically serve as Chair and Secretary of the Executive Committee, respectively. Four additional members shall be nominated. The President of the upcoming International Congress may also be appointed to the Executive Committee ex officio. Experience with large congresses is a desirable quality of nominees for the Executive Committee. Based on the CC nominations, the General Assembly elects the Executive Committee of the CC. Terms of service of the additional members on the Executive Committee of the CC are generally limited to two four-year terms.

e) The rules of procedure of the CC shall be approved by the General Assembly.

*****) *Article XIII adopted by the General Assembly on August 19, 2014, in Lyngby (Denmark)*

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 XVII adopted by the General Assembly on August 28, 1994, in Amsterdam, Netherlands*

Rules of procedure for the Congress Committee (CC) of IUTAM*

1. The CC shall hold meetings whenever the General Assembly meets and such a meeting shall follow the format (in-person or by electronic means (virtual)) of the General Assembly meeting. Typically, this is every two years, during the General Assembly meeting between congresses and during the International Congress.
2. During an International Congress, the CC shall review proposals for the next International Congress and select the location by a vote of the CC members present (i.e., proxy votes are not permitted). This selection process will typically be accomplished over two separate meetings of the CC.
3. The Executive Committee handles matters arising on behalf of the CC during the period between General Assemblies. At each General Assembly the Secretary of the CC reports on all such matters and their disposition since the last General Assembly. The Secretary should stay in close contact with the full membership of the CC and solicit input on substantive issues.
4. The actual organization of a Congress is delegated to a President and Secretary-General of the Congress, identified by the host. The President and the Secretary-General of the Congress are responsible to IUTAM for all aspects of the successful conduct of the Congress, including the publication of its Proceedings. The President and the Secretary-General of the Congress shall maintain an ongoing dialog with the Executive Committee, and shall make an annual report on progress to the Executive Committee, and a report to the full committee at every meeting of the CC, from the time the congress location is selected until the congress has been held.
5. The President and the Secretary-General of the Congress shall obtain the approval of the CC (often through the Executive Committee) with regard to all matters affecting the general policy of the CC, and in particular with regard to:
 - 5.1. the scope of the Congress;
 - 5.2. the screening of papers for the Congress;
 - 5.3. the selection of general lectures for the Congress;
 - 5.4. the appointment of chairs of sessions of the Congress;
 - 5.5. the broad principles regarding financial arrangements for the Congress.
6. Following the congress, the host will pay a fee to IUTAM equivalent to a percentage of the registration fee paid by all attendees. The Executive Committee will ascertain that the level of the fee is consistent from congress to congress.

**) Procedure adopted by the General Assembly on August 19, 2014, in Lyngby, Denmark and amended on May 27, 2020 by electronic means*

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 (GA) provided for in Article VI(c) of the Statutes.
2. Proposals, by members of the GA with voting rights, for Members-at-Large must be received by the Bureau at least three months before the meeting of the GA 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 GA such proposals as it deems will have at least a reasonable support by the GA, provided however that the total number of Members-at-Large is not to exceed approximately one eighth (1/8) of the total GA membership with voting rights. Such proposals will be circulated to all members of the GA 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 GA before its second session.
5. The GA will vote on those candidates mentioned in the proposals of §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 2018, the recommended form of publication of proceedings of IUTAM Symposia is the IUTAM Bookseries by Springer. The website of the series is <https://www.springer.com/series/7695>

From 2011 to 2017, the official publisher for proceedings of IUTAM Symposia was Elsevier, under the Procedia IUTAM series. Procedia IUTAM is open access. All proceedings are freely available on the website of Procedia IUTAM

<https://www.sciencedirect.com/journal/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.

The Proceedings of ICTAM 2016 have been published under the Procedia IUTAM series. The link is www.sciencedirect.com/science/journal/22109838/20. All two-page abstracts of papers presented at ICTAM 2016 have been published by IUTAM and are available at www.iutam.org/publications/ictam-proceedings/ictam_2016.

All two-page abstracts of papers presented at ICTAM 2020+1 have been published by IUTAM and are available at https://iutam.org/publications/ictam-proceedings/ictam_2020/.

- e) **Publications on the history of IUTAM**
See page 140.

Proceedings of IUTAM Symposia

The Proceedings of IUTAM Symposia published since 2010 are listed below. A complete listing of all published Proceedings can be found on the IUTAM website <https://www.iutam.org>.

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. 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 Hikiyara, Takashi have been published by Elsevier, 2012, as the fifth issue of the IUTAM e-Procedia series. Procedia IUTAM Volume 5
- 11-8 *IUTAM Symposium on Bluff Body Flows* (Kanpur, India, December 12-16, 2011).
The Proceedings of the Symposium edited by Mittal, Sanjay and Biswas, Gautam have been published as a special issue of the Journal of Fluids and Structures, Volume 41, Pages 1-186, August 2013.

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* (Izhskesk, 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 edited by D. Bigoni, A. Carini, M. Gei and A. Salvadori have been published as a Special Issue of the International Journal of Fracture, Volume 184, Issues 1-2, November 2013, and by Springer, 2014. ISBN 978-3-319-04396-8
- 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).
The Proceedings of the Symposium edited by J.H. Walther have been published by Elsevier, 2016, in the IUTAM e-Procedia series. Procedia IUTAM Volume 18

2013

- 13-1 *IUTAM Symposium on Vortex Dynamics: Formation, Structure and Function* (Fukuoka, Japan, March 10-14, 2013).
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
- 13-3 *IUTAM Symposium on Recent Development of Experimental Techniques under Impact Loading* (Xi'an, China, May 6-10, 2013).
The Proceedings of the Symposium edited by Yulong Li and Han Zhao have been published as a special issue of the International Journal of Impact Engineering, Volume 79, 2015.

- 13-4 *IUTAM Symposium on Materials and Interfaces under High Strain Rate and Large Deformation* (Metz, France, June 17-21, 2013).
The Proceedings of the Symposium edited by S. Mercier, J.F. Molinari and D. Rittel have been published as a special issue of *Mechanics of Materials*, Volume 80, Part B, pp 163-374, 2015.
- 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. Papadarakakis 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 edited by N. Huang have been published by Elsevier, 2016, as the seventeenth issue of the IUTAM e-Procedia series.
Procedia IUTAM Volume 17

2014

- 14-1 *IUTAM Symposium on Transition and Turbulence in the Flow through Deformable Tubes and Channels* (Bangalore, India, January 20-24, 2014).
The Proceedings of the Symposium edited by Shankar, V. and Kumaran, V. have been published as a special issue of *Sadhana*, Volume 40, Issue 3, May 2015.
- 14-2 *IUTAM Symposium on Mechanics of Soft Active Materials* (Haifa, Israel, May 12-15, 2014).
The Proceedings of the Symposium edited by Volokh, K. and Jabareen, M. have been published by Elsevier, 2015, as the 12th issue of the IUTAM e-Procedia series. *Procedia IUTAM Volume 12*
- 14-3 *IUTAM Symposium on Connecting Multiscale Mechanics to Complex Material Design* (Evanston, USA, May 13-16, 2014).
The Proceedings of the Symposium edited by Liu, W.K., Fish, J., Chen, J.S. and Camanho, P.P. have been published as a special issue of *Computational Mechanics*, Volume 57, Issue 3, March 2016.
- 14-4 *IUTAM Symposium on Micromechanics of Defects in Solids* (Seville, Spain, June 9-13, 2014).
The Proceedings of the Symposium edited by Ariza, P., Ortiz, M. and Tvergaard, V. have been published as a special issue of *Mechanics of Materials*, Volume 90, Pages 1-268, November 2015.

- 14-5 *IUTAM Symposium on Dynamical Analysis of Multibody Systems with Design Uncertainties* (Stuttgart, Germany, June 9-13, 2014).
The Proceedings of the Symposium edited by Hanss, M. have been published by Elsevier, 2015, as the 13th issue of the IUTAM e-Procedia series.
Procedia IUTAM Volume 13
- 14-7 *IUTAM Symposium on Dynamics of Capsules, Vesicles and Cells in Flow* (Compiègne, France, July 15-18, 2014).
The Proceedings of the Symposium edited by Barthès-Biesel, D., Blyth, M.G. and Salsac, A.-V. have been published by Elsevier, 2015, as the 16th issue of the IUTAM e-Procedia series. Procedia IUTAM Volume 16
- 14-8 *IUTAM Symposium on Innovative Numerical Approaches for Multi-Field and Multi-Scale Problems* (Burg Schnellenberg, Germany, September 1-4, 2014).
The Proceedings of the Symposium edited by Weinberg, K. and Pandolfi, A. have been published in the Lecture Notes in Applied and Computational Mechanics series by Springer, 2016. ISBN 978-3-319-39021-5
- 14-9 *IUTAM Symposium on Complexity of Nonlinear Waves* (Tallinn, Estonia, September 8-12, 2014).
The Proceedings of the Symposium edited by Salupere, A. and Maugin, G.A. have been published as a special issue of the Proceedings of the Estonian Academy of Sciences, Volume 64, Issue 3S, 2015.
- 14-10 *IUTAM Symposium on Multiphase Flows with Phase Change: Challenges and Opportunities* (Hyderabad, India, December 8-11, 2014).
The Proceedings of the Symposium edited by Sahu, K.C. have been published by Elsevier, 2015, as the 15th issue of the IUTAM e-Procedia series.
Procedia IUTAM Volume 15
- 14-11 *IUTAM Symposium on Advances in Computation, Modeling and Control of Transitional and Turbulent Flows* (Goa, India, December 15-18, 2014).
The Proceedings of the Symposium edited by Sengupta, T.K., Lele, S.K., Sreenivasan, K.R. and Davidson, P.A. have been published by World Scientific, 2016. ISBN 978-981-4635-15-8
- IUTAM-ABCM Symposium on Laminar Turbulent Transition*
(Rio de Janeiro, Brazil, September 8-12, 2014).
The Proceedings of the Symposium edited by Medeiros, M.A.F. and Meneghini, J.R. have been published by Elsevier, 2015, as the 14th issue of the IUTAM e-Procedia series. Procedia IUTAM Volume 14

2015

- 15-2 *IUTAM Symposium on Ductile Failure and Localization*
(Paris, France, March 17-20, 2015).
The Proceedings of the Symposium edited by Mohr, D. and Ravi-Chandar, K. have been published as a special issue of the International Journal of Fracture, Volume 200, Issue 1-2, 2016.
- 15-3 *IUTAM Symposium on Growing Solids*
(Moscow, Russia, June 23-27, 2015).
The Proceedings of the Symposium edited by Manzhirov, A.V., Altenbach, H., and Gupta, N. have been published by Elsevier, 2017, as the 23rd issue of the IUTAM e-Procedia series. Procedia IUTAM Volume 23
- 15-4 *IUTAM Symposium on Analytical Methods in Nonlinear Dynamics*
(Frankfurt, Germany, June 6-9, 2015).
The Proceedings of the Symposium edited by Hagedorn, P. and Clerkin, E. have been published by Elsevier, 2016, as the 19th issue of the IUTAM e-Procedia series. Procedia IUTAM Volume 19

2016

- 16-1 *IUTAM Symposium on Filling Gaps in Material Property Space*
(Cambridge, UK, March 14-16, 2016).
The Proceedings of the Symposium edited by Deshpande, V.S. and Fleck, N.A. have been published as a special issue of Extreme Mechanics Letters, Volume 10, Pages 1-78, 2017.
- 16-2 *IUTAM Symposium on Mechanics of Stretchable Electronics*
(Hangzhou, China, March 17-18, 2016).
A report on the Symposium by Song, J. has been published in Journal of Applied Mechanics, Volume 83, 128001, 2016.
- 16-3 *IUTAM Symposium on Helicity, Structures and Singularity in Fluid and Plasma Dynamics* (Venice, Italy, April 11-15, 2016).
The Proceedings of the Symposium edited by Fukumoto, Y., Ricca, R.L., Boyland, P., and Eggers, J. have been published as a special issue of Fluid Dynamics Research, Volume 50, Issue 1, 2018.
- 16-4 *IUTAM Symposium on Advances in Biomechanics of Hearing*
(Stuttgart, Germany, May 17-20, 2016).
The Proceedings of the Symposium edited by Ziegler, P. have been published by Elsevier, 2017, as the 24th issue of the IUTAM e-Procedia series. Procedia IUTAM Volume 24

- 16-5 *IUTAM Symposium on Dynamic Instabilities in Solids*
(Madrid, Spain, May 17-20, 2016).
The Proceedings of the Symposium edited by Rittel, D. and Rodriguez-Martinez, J.A. have been published as a special issue of *Mechanics of Materials*, Volume 116, 2018.
- 16-6 *IUTAM Symposium on Nanoscale Physical Mechanics*
(Nanjing, China, May 23-27, 2016).
The Proceedings of the Symposium edited by Guo, W. have been published by Elsevier, 2017, as the 21st issue of the IUTAM e-Procedia series. *Procedia IUTAM* Volume 21
- 16-7 *IUTAM Symposium on Integrated Computational Structure-Material Modeling of Deformation and Failure under Extreme Conditions*
(Baltimore, USA, June 20-22, 2016).
The Proceedings of the Symposium edited by Ghosh, S. and Bronkhorst, C.A. have been published as a special issue of *Computational Mechanics*, Volume 61, Issue 1-2, 2018, and as a special issue of the *International Journal of Fracture*, Volume 208, Issue 1-2, 2017.
- 16-8 *IUTAM Symposium on Jet Noise Modelling and Control*
(Palaiseau, France, September 28-30, 2016).
The Proceedings of the Symposium edited by Lesshafft, L., Jordan, P. and Agarwal, A. have been published as a special issue of *Comptes Rendus Mécanique*, Volume 346, Issue 10, 2018.
- 16-9 *IUTAM Symposium on Storm Surge Modelling and Forecasting*
(Shanghai, China, October 17-20, 2016).
The Proceedings of the Symposium edited by Liu, H. and Dias, F. have been published by Elsevier, 2017, as the 25th issue of the IUTAM e-Procedia series. *Procedia IUTAM* Volume 25
- 16-10 *IUTAM Symposium on Nonlinear and Delayed Dynamics of Mechatronic Systems* (Nanjing, China, October 17-21, 2016).
The Proceedings of the Symposium edited by Wang, Z., Insperger, T., and Zhang, L. have been published by Elsevier, 2017, as the 22nd issue of the IUTAM e-Procedia series. *Procedia IUTAM* Volume 22

2017

- 17-3 *IUTAM Symposium on Multi-Scale Fatigue, Fracture and Damage of Materials in Harsh Environments*
(Galway, Ireland, August 28 – September 1, 2017).

The Proceedings of the Symposium edited by Leen, S., O'Donoghue, P. and Barrett, R. have been published as a special issue of the International Journal of Fatigue, October 2018.

- 17-4 *IUTAM Symposium on Wind Waves*
(London, UK, September 4-8, 2017).
The Proceedings of the Symposium edited by Grimshaw, R., Hunt, J., and Johnson, E. have been published by Elsevier, 2018, as the 26th issue of the IUTAM e-Procedia series. Procedia IUTAM Volume 26
- 17-5 *IUTAM Symposium on Intelligent Multibody Systems – Dynamics, Control, Simulation* (Sozopol, Bulgaria, September 11-15, 2017).
The Proceedings of the Symposium edited by Zahariev, E.V. and Cuadrado, J. have been published by Springer, 2019, as Volume 33 of the IUTAM Bookseries. ISBN 978-3-030-00527-6
- 17-6 *IUTAM Symposium on Co-Simulation and Solver Coupling – Recent Developments in Theory and Application*
(Darmstadt, Germany, September 18-20, 2017).
The Proceedings of the Symposium edited by Schweizer, B. have been published by Springer, 2019, as Volume 35 of the IUTAM Bookseries. ISBN 978-3-030-14883-6
- 2018**
- 18-1 *IUTAM Symposium on Recent Advances in Moving Boundary Problems in Mechanics* (Christchurch, New Zealand, February 12-15, 2018).
The Proceedings of the Symposium edited by Gutschmidt, S., Hewett, J.N. and Sellier, M. have been published by Springer, 2019, as Volume 34 of the IUTAM Bookseries. ISBN 978-3-030-13720-5
- 18-4 *IUTAM Symposium on Model Order Reduction of Coupled Systems (MORCOS 2018)* (Stuttgart, Germany, May 22-25, 2018).
The Proceedings of the Symposium edited by Fehr, J. and Haasdonk, B. have been published by Springer, 2020, as Volume 36 of the IUTAM Bookseries. ISBN 978-3-030-21012-0
- 18-7 *IUTAM Symposium on Critical Flow Dynamics Involving Moving/Deformable Structures with Design Applications*
(Santorini Island, Greece, June 18–22, 2018).
The Proceedings of the Symposium edited by Braza, M., Hourigan, K. and Triantafyllou, M.S. have been published by Springer, 2021, as Volume 147 of the series Notes on Numerical Fluid Mechanics and Multidisciplinary Design. ISBN 978-3-030-55593-1

- 18-8 *IUTAM Symposium on Mechanical Environments of Living Cells* (Xi'an, China, June 28-30, 2018).
The Proceedings of the Symposium edited by Xu, F., Lu, T.J., Genin, G.M. and Huang, G. have been published as a special issue of *Acta Mechanica Sinica*, Volume 35, Issue 2, 2019.
- 18-9 *IUTAM Symposium on Exploiting Nonlinear Dynamics for Engineering Systems (ENOLIDES 2018)* (Novi Sad, Serbia, July 15-19, 2018).
The Proceedings of the Symposium edited by Kovacic, I. and Lenci, S. have been published by Springer, 2020, as Volume 37 of the IUTAM Bookseries. ISBN 978-3-030-23691-5
- 18-11 *IUTAM Symposium on Mechanics of Electro/Magneto-Active Materials and Structures* (Beijing, China, August 26-30, 2018).
The Proceedings of the Symposium edited by Li, F. and Hong, W. have been published as a focus collection in *Smart Materials and Structures*, Volume 28, Issues 2-5, 2019.
- 18-13 *IUTAM Symposium on Architected Material Mechanics* (Chicago, USA, September 17-19, 2018).
The Proceedings of the Symposium edited by Siegmund, T. and Barthelat, F. have been published as a special issue of the *Journal of Applied Mechanics*, Volume 86, Issue 11, 2019.

2019

- 19-1 *IUTAM Symposium on Phase Transformations in Shape Memory Materials: Modeling and Applications* (Austin, TX USA, April 28 – May 2, 2019).
The Proceedings of the Symposium edited by Shaw, J.A., Stebner, A., Landis, C.M. and Kyriakides, S. have been published as a special issue of the *International Journal of Solids and Structures*, Volume 221, 2021.
- 19-2 *IUTAM Symposium on Physics and Mechanics of Sea Ice* (Espoo, Finland, June 3 – June 7, 2019).
The Proceedings of the Symposium edited by Tuhkuri, J. and Polojärvi, A. have been published by Springer, 2022, as Volume 39 of the IUTAM Bookseries. ISBN 978-3-030-80438-1.
- 19-6 *IUTAM Symposium on Laminar Turbulent Transition* (London, UK, September 2 – September 6, 2019).
The Proceedings of the Symposium edited by Sherwin, S., Schmid, P. and Wu, X. have been published by Springer, 2021, as Volume 38 of the IUTAM Bookseries. ISBN 978-3-030-67901-9.

19-7 *IUTAM Symposium on Viscoplastic Fluids: from Theory to Application (VPF8)*
(Cambridge, UK, September 16 – September 20, 2019).

The Proceedings of the Symposium edited by McKinley, G., Wilson, D.I. and Hewitt, D. have been published as an article collection in the Journal of Non-Newtonian Fluid Mechanics, 2020-2021.

2021

21-S *IUTAM Special Event: Fluid Mechanics in the Spirit of G. K. Batchelor*
(Cambridge, UK (online event), March 29 – March 31, 2021)

The Proceedings of the Symposium edited by Linden, P. have been published as a special issue of the Journal of Fluid Mechanics, Volume 914, 2021.

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

21st 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. Kowalewski, have been published by Springer, Dordrecht, The Netherlands, 2005. ISBN 1-4020-3456-3

22nd 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).

23rd 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

24th International Congress on Theoretical and Applied Mechanics (ICTAM), Montreal (Canada), 22-26 August 2016.

The Proceedings, entitled "Mechanics – Foundation of Multidisciplinary Research" and edited by J. M. Floryan, have been published by Elsevier, 2017, as the twentieth issue of the IUTAM e-Procedia series. Procedia IUTAM Volume 20

All 2-page papers presented during ICTAM 2016 are collected in the e-book entitled "Contributions to the Foundations of Multidisciplinary Research in Mechanics", edited by J.M. Floryan and published by IUTAM, 2017. The book is available on the IUTAM website. ISBN 978-0-660-05459-9

25th International Congress on Theoretical and Applied Mechanics (ICTAM), Milano (Italy), 22-27 August 2021 (ICTAM 2020+1, virtual congress).

The Proceedings have not been published. All 2-page papers presented during ICTAM 2020+1 are collected in the e-book entitled "25th International Congress of Theoretical and Applied Mechanics – Book of Abstracts", edited by A. Corigliano and published by IUTAM, 2021. The book is available on the IUTAM website. ISBN 978-83-65550-31-6

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.

The second, updated and revised, edition of the book:

IUTAM - A Short History, Second Edition,

edited by P. Eberhard and S. Juhasz, has been published by Springer International Publishing, 2016. ISBN 978-3-319-31061-9 (Print), 978-3-319-31063-3 (Online); DOI: 10.1007/978-3-319-31063-3.

The book is available free of charge at www.springer.com/de/book/9783319310619.

Mechanics at the Turn of the Century,

edited by W. Schiehlen and L. van Wijngaarden, has been published by Shaker Verlag, Aachen, Germany, 2000. ISBN 3-8265-7714-0.

This Report is the result of an initiative of the Bureau of IUTAM to provide some landmarks on the developments in Mechanics during the 20th Century, to report on the 50 years of impulse to Mechanics by the International Union of Theoretical and Applied Mechanics (IUTAM), to visualize by a poster Meters of Motion on the occasion of the 20th International Congress of Theoretical and Applied Mechanics (ICTAM), to look ahead on a very personal basis and to show the broad international involvement of scientists in IUTAM in recent years.

The booklet “Mechanics at the Turn of the Century” is accessible free of charge on the website of Shaker Verlag. The internet address is www.shaker.de and search for Schiehlen as the author. Moreover, this booklet is available upon request at the IUTAM Secretariat.

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