

International Union of Theoretical and Applied Mechanics (IUTAM)

Activities' Report - Year 2019

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1. Introduction

Formally established on September 26, 1946, main objectives of IUTAM (<http://iutam.org/>) are the organization of international congresses of Theoretical and Applied Mechanics, and the promotion of Mechanics and related sciences. Over 100 scientific agencies are involved at IUTAM, representing 50 countries. IUTAM adheres to the International Science Council (ISC) (see the Notes).

The highest authority in the organizational structure of the International Union of Theoretical and Applied Mechanics (IUTAM) is its General Assembly. The IUTAM General Assembly has decision-making power on all matters affecting the Union.

The main category of members of the IUTAM General Assembly with voting rights is composed of members of the Adhering Organization. An Adhering Organization is an organization of scientists operating in the field of Mechanics that represents a defined country or territory.

The Affiliated Organizations of the Union are international organizations mainly involved in sub-sectors of Mechanics or sectors closely related to that of the Union. Each Affiliated Organization is represented in the IUTAM General Assembly by an observer who has no voting rights.

While the IUTAM General Assembly is the body that adopts decisions relating to IUTAM, the execution of these decisions rests with the Bureau, which is appointed by the General Assembly for a period of four years. The members of the Bureau are *ex officio* members of the General Assembly.

Every two years the IUTAM General Assembly deliberates a list of Symposia or Summer Schools sponsored by IUTAM. To this end, the General Assembly relies on two groups of experts, one in the field of Fluid Mechanics and one in the field of Solid Mechanics. The members of the groups are appointed by the General Assembly for a period of four years.

The General Assembly establishes the Permanent Congress Committee that is responsible for the Organization of International Congresses of Theoretical and Applied Mechanics (ICTAM) at four-year intervals. The Congress Committee appoints an Executive Committee (XCCC) that takes all necessary actions on its behalf in the period between two successive congresses.

The result of the Union's activities is its publications. Five categories of IUTAM publications exist: annual reports, newsletters, IUTAM symposium proceedings, ICTAM proceedings and publications on the history of IUTAM.

Annual reports, with detailed information on IUTAM activities, are available at the following address: <http://iutam.org/publications/annual-reports/>.

The six-monthly publication of the newsletter provides information about the upcoming Symposia and Summer Schools and news in general concerning also the International Congress of Theoretical and Applied Mechanics (ICTAM) <http://iutam.org/publications/newsletters/>.

A diagram illustrating the operational structure of the IUTAM organization appears in the Notes.

2. Main activities carried on by (Union name) during 2019 relevant for Italy and for CNR

Due to the breadth of disciplinary interests of CNR and the involvement on topics of Mechanics, the whole body of the activities (Symposia and Summer Schools) carried out, or sponsored, annually by IUTAM, is the object of potential interest for this part of the Italian scientific community. The initiatives carried out during 2019 are listed, in chronological order, grouped by type.

IUTAM Symposia

IUTAM Symposium on Phase transformation in shape memory materials: modeling and applications.

Place: Austin, USA. Date: April 28 – May 2, 2019.

Chairman: Prof. C. Landis, University of Texas, 210 East 24th street, 78712 Austin, Texas, USA

Email: landis@utexas.edu

Co-Chairman: Prof. S. Kyriakides, University of Texas, 210 East 24th street, 78712 Austin, Texas, USA

Email: skk@utexas.edu

Co-Chairman: Prof. D. Lagoudas, Texas A&M University, 3141 TAMU, College Station TX 77843-3141, USA

Email: lagoudas@aero.tamu.edu

IUTAM Symposium on Physics and mechanics of sea ice.

Place: Espoo, Finland. Date: June 3 – June 7, 2019.

Chairman: Prof. J. Tuhkuri, Aalto University, School of Engineering, Dept. of Mechanical Engineering, P.O. Box 14300, FI-00076 Espoo, Finland

Email: jukka.tuhkuri@aalto.fi

IUTAM Symposium on Computational modelling of instabilities and turbulence in separated two-phase flows.

Place: Dublin, Ireland. Date: June 10 – June 12, 2019.

Chairman: Prof. L. O’Naraigh, University College Dublin, Belfield D04 V1W8 Dublin, Ireland

Email: onaraigh@maths.ucd.ie

Website: <https://maths.ucd.ie/cfd2019>

IUTAM Symposium on Vortex dynamics in science, nature and technology

Place: San Diego, USA. Date: June 24 – June 28, 2019.

Chairman: Prof. S. Llewellyn Smith, University of California, San Diego, Dept. of Mathematical and Aerospace Engineering, 9500 Gilman Dr 92093-0411 La Jolla, USA

Email: sgls@ucsd.edu

IUTAM Symposium on Fluid-structure interaction – in honour of Michael Paidoussis

Place: Montreal, Canada. Date: August 12 – August 15, 2019.

Chairman: Prof. M. Amabili, McGill University, Department of Mechanical Engineering, 817 Sherbrooke Street West H3A 0C3 Montreal, Canada

Email: marco.amabili@mcgill.ca

Co-Chairman: Dr. K. Karazis, Framatome Ltd Lychburg, USA

Email: kostas.karazis@framatome.com

Website: <http://fsi.symposium.mcgill.ca>

IUTAM Symposium on Laminar turbulent transition

Place: London, UK. Date: September 2 – September 6, 2019.

Chairman: Prof. P. Schmid, Imperial College London, Dept. of Mathematics, South Kensington Campus SW7 2AZ London, UK

Email: pjschmid@imperial.ac.uk

Website: <http://www.iutamtransition2019.org>

IUTAM Symposium on Viscoplastic flows: from theory to application

Place: Cambridge, UK. Date: September 16 – September 20, 2019.

Chairman: Prof. G. McKinley, MIT, Room 3-254, 77 Massachusetts Avenue, MA 02139 Cambridge, USA

Email: gareth@mit.edu

Co-Chairman: Prof. I. Wilson, University of Cambridge, Cambridge, UK

Email: diw11@cam.ac.uk

Website: <https://vpf8.ceb.cam.ac.uk>

IUTAM Summer Schools

IUTAM-BICTAM Summer School on Violent flows with a free surface

Place: Shanghai, China. Event dates: June 2 – June 8, 2019.

Coordinator: Prof. H. Liu, Shanghai Jiao Tong University, 800 Dong Chuan road, 200240 Shanghai, China

Email: hliu@sjtu.edu.cn

Website: <http://bictam.org.cn/iutam2019>

IUTAM-CISM Summer School on Plant biomechanics

Place: Udine, Italy. Event dates: July 8 – July 12, 2019.

Coordinators:

Prof. C. Eloy, IRPHE, Aix-Marseille University, 49 rue Joliot Curie, 13013 Marseille, France

Email: eloy@irphe.univ-mrs.fr

Prof. Y. Forterre, CNRS/Aix-Marseille University, 5 rue Enrico Fermi, 13453 Marseille cedex 13, France

Email: yoel.forterre@univ-amu.fr, Website : <http://www.cism.it/courses/C1908>

3. Activities carried on by (Italian Delegate name) within the Union during 2019 and impact on the Italian scientific community

The procedure for recognizing the role of representative within IUTAM took a few months to complete. In fact, the Adhering Organization for Italy (and therefore the only one entitled to express a representation at the IUTAM General Assembly) is AIMETA (Italian Association of Theoretical and Applied Mechanics).

CNR is not an organization “visible” by IUTAM, except for administrative reasons: it is, in fact, the funding organization of the membership fee of AIMETA. Actually, this circumstance is a significant part of an agreement (not formalized) in which CNR is recognized the privilege to nominate a person to be included in the group of those (four, in the current configuration) AIMETA has the right to express as representatives within the IUTAM General Assembly.

The lack of any formal reference to this cooperation scheme requested to reconstruct the entire procedure. Following a letter from CNR President to AIMETA President, Prof. Stefano Lenci, AIMETA Board of Directors approved the appointment of the undersigned (that is also a long-term AIMETA member) as representative in the IUTAM General Assembly. Notice was given at the AIMETA Members Assembly of 18/09, during AIMETA 2019, the Association’s XXIV Congress, organized at the Faculty of Civil and Industrial Engineering of Sapienza University of Rome.

The subsequent notice sent by AIMETA President to IUTAM (21/09) was reflected in the welcome messages of the Secretary-General, Prof. Henryk Petryk (23/09) and of the President, Prof. Nadine Aubry (28/09), which officially started the activity of the undersigned as a member of the IUTAM General Assembly.

Due to the abovementioned troubles, no activity was carried out within the frame of institutional commitments. Typical ones, as the dissemination of information relating to symposia and summer schools, were by then outdated. As it can be seen from the list on the previous pages, the last initiative of the series took place in September.

4. Evaluation of the participation in terms of benefits and membership cost

The economic commitment of financing the AIMETA membership, while being – like other CNR initiatives – a form of contribution to the national research community in a disciplinary frame on which CNR is involved, can be more generally justified by a widespread participation in AIMETA / IUTAM initiatives on a scientific and organizational level.

Certainly, access to representation opens up the possibility of a more direct involvement of CNR researchers in the organization's scientific and educational activities. Beyond the scope of these, to be assessed from time to time also with respect to the interests of individuals, the fact remains that the global scenario, the only possible reference for our initiatives, requires the search for contacts on which to develop broad and articulated forms of cooperation.

Having said that about the substance of CNR involvement in this initiative, it would be advisable to formalize the relationship between CNR and AIMETA, in such a way as to include the economic and representative aspects as part of a compact with broader scope. A memorandum of understanding between the two organizations could also represent a sort of framework agreement for the realization of common initiatives.

5. Evaluation of Italians’ attendance and how to improve interest and involvement

The Italian involvement does not seem to be particularly significant in research initiatives, as the organization / venue and coordination of the IUTAM Symposia are taken into consideration. Things are better on the educational initiatives side, where CISM, the only Italian Affiliated Organization, is present with a vast program of organization of IUTAM Summer Schools. In addition to that, already mentioned above, in the list

of initiatives carried out in 2019, another one is scheduled for the current year and, so far, still present in the program with the original dates (the impact of the measures planned to combat the Covid-19 epidemic has to be verified).

IUTAM-CISM Summer School on Instability and bifurcation of solids including coupled field phenomena

Place: Udine, Italy. Event dates: June 22 – June 26, 2020.

Coordinators:

Prof. R. Ogden, University of Glasgow, School of Mathematics and Statistics,

University Place G12 8SQ Glasgow, UK

Email: Raymond.Ogden@glasgow.ac.uk

Prof. L. Dorfmann, Tufts University, Department of Civil and Environmental Engineering,
200 College Avenue Medford, MA 02155, USA

Email: Luis.Dorfmann@tufts.edu

Website: <http://www.cism.it/courses/C2008/>

The four-year Congress, which in this edition assigned the organization to Italy, has already been postponed. The XXV International Congress of Theoretical and Applied Mechanics, ICTAM 2020 – which will retain this denomination – will be held in Milan 22 August – 27 August 2021. For subsequent updates one can check the website: <http://www.ictam2020.org>.

A more significant Italian involvement, at least in terms of the participation of the scientific community of CNR, would require widespread information action and deep awareness of the dimension of the scientific team within CNR involved in the field of Theoretical and Applied Mechanics. To this end, after a survey through AIMETA, starting from the AIMETA members of CNR, it could be possible to promote a census of those who are already involved, or wish to activate contacts, within the community. A concrete objective could be to reach the organization / coordination of IUTAM Symposia and Summer Schools, based on the scientific and educational experiences developed at CNR.

6. Italian experts with important roles within the Union or within related Commissions and Programs (if known)

- Maria Vittoria Salvetti, Congress Committee member, appointed by the General Assembly at ICTAM 2016 (see page 7 of the Newsletter N-2016-2);
- Davide Bigoni, Congress Committee member, appointed by the General Assembly in 2014 (see page 8 of the Newsletter N-2014-2), confirmed in office in 2018 (see page 8 of the Newsletter N-2018-2);
- Alberto Corigliano, President of ICTAM 2020, *ex officio* member of the Congress Committee, starting on 2016 (see page 7 of the Newsletter N-2016-2);
- Umberto Perego, Secretary-General of ICTAM 2020, will be invited at the meetings of the Executive Committee, as guest and observer (see page 8 of the Newsletter N-2016-2).

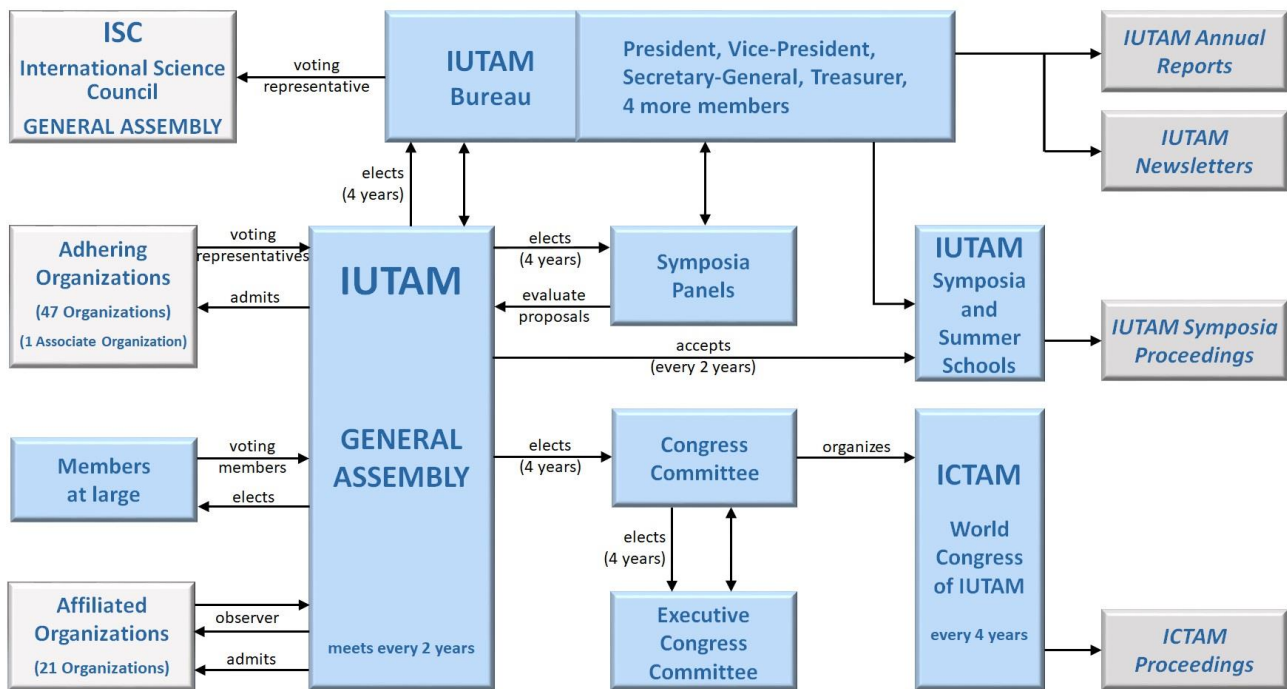
7. If Union with CNR Commission, short summary about the 2019 CNR Commission activities

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8. Notes (if any)

It was mentioned in the introduction about IUTAM's membership of the International Science Council. ISC is an international non-governmental organization, including both natural and social sciences. It was founded in 2018 after the merger of the International Council for Science (ICSU) with the International Social Science Council (ISSC), and is the largest organization of this type in the world. The ISC membership currently comprises around 40 international scientific unions and associations (IUTAM is one of them) and 140 national and regional scientific organizations, including Academies of Science and Research Councils.

The interaction of IUTAM with the ISC is illustrated in the operational scheme of the IUTAM organization, described in the figure on the following page.



Operational scheme of the IUTAM organization.

9. Conclusions

As discussed above, at points 4. and 5., the next two years will be crucial for reasoning about the commitment of CNR, through (and in close coordination with) AIMETA within IUTAM. ICTAM 2020 Congress that will be held in August next year could actually be the opportunity for an intermediate term assessment. In the meantime, other circumstances will be considered, starting from a precise monitoring of the participation in the scientific and educational initiatives that will take place within the framework of the Organization's programs.

Frosinone, April 24, 2020

Signature

(Enrico De Bernardis)