

出席「國際理論及力學聯盟 2006 年理事會」報告

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前言

「國際理論及力學聯盟」為 International Union of Theoretical and Applied Mechanics 之翻譯，國內、外大部份研習力學的人士通常都逕以英文簡稱它為 IUTAM (網站 <http://www.iutam.org/>)。IUTAM 為國際科學界有名的 International Council for Science (ICSU)之一員，由世界上各主要國家地區的相關力學學會或組織所聯合組成，為目前世界上有關理論及應用力學方面最具知名度也最具國際學術權威的國際學術組織。IUTAM 歷史悠久，自 1924 年開始，即由其前身的 International Committee for the Congress of Applied Mechanics 每隔二到四年於歐美各地舉辦 International Congress of Applied Mechanics，直到 1964 年後才變更為現在的組織及名字，並每隔四年舉辦一次 IUTAM 最重要的 International Congress on Theoretical and Applied Mechanics，IUTAM 最近一次 Congress 係於 2004 年在波蘭 Warsaw 舉行，下次 Congress 則將於 2008 年 8 月 24 日至 30 日在澳洲 Adelaide 舉行(網站 <http://prandtl.maths.adelaide.edu.au/ictam2008/>)。世界上目前有 49 個國家地區 (見附件一) 以 Adhering Organizations 名義加入 IUTAM，並有其他許多國際力學相關組織以 Affiliated Organizations (見附件二) 的名義加入。各國家地區依其學會或組織大小不同，繳交不同等級的年費，並依該等級比例推派一至五位 Representatives (以下稱「代表」或稱「理事」)，與 IUTAM 依法定規則所選出的八位 Members of the Bureau (含理事會選出的 President、Vice-President、Treasurer、Secretary-General 及其他四位資深學者專家)與理事會選出的 Members-at-large 共同組成理事會(General Assembly)，Affiliated Organizations 的代表及其他力學相關人士雖應邀參加理事會但不具投票權。近年來，理事會通常每隔兩年召開一次，其中一次係配合四年一次 Congress 的舉行而召開，同時選出任期四年新的 Members of the Bureau；另外一次則於 Congress 舉辦的二年後，在 President (理事長)所任職的地方召開。以上兩次理事會議中的重要事件為決定下次 Congress 的舉辦地點以及未來兩年內 IUTAM 所贊助的學術會議(Symposia)題材為何及其將在何時、何地舉行，這些 Symposia 通常都是在競爭的環境下，由學會 Symposium Panels 就世界各地區力學學會或組織所提出的近三十個計畫書預先審查及彙整意見後，再提交理事們於理事會議中議決所產生的。國際理論及應用力學組織對於經由審查通過每年在各地舉辦的 IUTAM Symposia(二年約有十六個)的要求與管理十分嚴格且其學術評價極高，一般皆要求發表的論文以邀請方式向各方面國際上頂尖的學者邀請參加，以確保其高標準的學術要求。目前為止，國內有舉辦 IUTAM Symposium 經驗者僅有成大航太所邱輝煌教授及台大前應力所李紹林所長。而申請舉辦 IUTAM Symposium 的過程也相當耗時而繁瑣，需在欲主辦 IUTAM

Symposium 之前二年即須將完整規劃書送交國際理論及應用力學聯盟的秘書處。IUTAM Symposium Panels 由 10 位學者組成，固體力學(J. D. Achenbach (chairman), F. L.Chernousk, W. Ehlers, V. Tvergaard, J. Willis)及流體力學 (P. Huerre (chairman), D. Henningson, T. Kambe, L.G. Leal, D. H. Peregrine) 各五位，每二年開會一次決定二年後世界各地所提出舉辦 IUTAM Symposium 的優先順序，並提報大會 (IUTAM General Assembly) 討論確認。

台灣的中華民國力學學會自 1980 年即與大陸的中國力學學會同時加入 IUTAM，並繳交會費及推派 IUTAM 代表(Representatives)，據聞當時雙方係分別以 China-Taipei 與 China-Beijing 的名稱加入的，惟不知自何時開始，IUTAM 的書面資料所記載的名稱已分別變成 China-Taipei 與 China；而香港的相關力學學會則於 1996 年才加入 IUTAM，其名稱為 China-Hong Kong。IUTAM 理事會主要的成員當然是前面所提到的各國代表，目前美國繳交十二份年費及推派 5 位代表進入理事會；中國大陸與英、加、德、法、義、俄、日等國各繳交八份年費及推派 4 位代表；比利時、印度、荷蘭、瑞典等國各繳交五份年費及推派 3 位代表；香港繳交一份年費及推派 1 位代表；我國則繳交三份年費（約十萬台幣，可向中研院申請支付）及推派 2 位代表進入理事會。近年來中國大陸常有力學人士被選入 Members of the Bureau 及其他相關的 Working Parties，相當積極的參與 IUTAM 各項活動。我國目前力學學會 IUTAM 的代表則係由中華民國力學學會理事會議(95 年 3 月 24 日)所選出的筆者(劍清、偉中)擔任，因學會思及需積極參與 IUTAM 活動，讓國際力學研究人士重視我國的力學相關研究與發展，同時平衡大陸近年來的積極擴大參與 IUTAM 活動，由力學學會理事長吳政忠教授擔任主辦人，劍清為聯絡人於今年二月底向 IUTAM 秘書處提出於 2008 年在台北舉辦一項特別學術領域 Symposium 的申請書，在與會前已被秘書處通知獲得相當不錯的初審評論。為進一步呈現我國參與 IUTAM 活動的態度與決心，並積極爭取前述 Symposium 的舉辦，此次由劍清領團，連同偉中與擔任中華民國力學學會秘書長的文方共同組成三人團隊，於七月初函送國科會提出組團申請，並獲得全額的經費補助，飛往現任 IUTAM President Ben Freund 教授執教位於美國羅德島州的布朗大學(Brown University)，參加 IUTAM 2006 General Assembly Meeting (理事會議)。

IUTAM 理事會的議程內容與經過

IUTAM 2006 General Assembly Meeting 所排定的議程為 8/11-8/14 (見附件三)，偉中於 8/11 即由台北飛抵布朗大學所在的 Providence 市參加會議之 Reception 等活動，劍清與文方則因班機訂位困難所致，花了將近四十小時的時間，於 8/12 上午九時才輾轉抵達布朗大學，隨即報到與會。值得一提的是，本代表團在離台前正值三個颱風同時在台灣海域形成，幸好在搭機前皆已通過台灣海域，另外，8 月 10 日英國破獲恐怖集團計畫同時攻擊由英飛美的十多架飛機，使得美國班機的安全檢查嚴格許多，本代表團赴美的行程雖受到颱風及恐怖攻擊的影響，但終能如期抵達大會會場，並住進大會提供的學生宿舍。本次大會的主辦單位提供與會者早、中、晚三餐的服務，設想周到並使與會

者能專心開會。依大會提供的會議資料記載，此次會議計有包括美、英、加、德、法、義、俄、日、巴西、荷蘭、比利時、愛爾蘭、奧地利、瑞士、波蘭、匈牙利、瑞典、芬蘭、愛沙尼亞、克羅埃西亞、南非、埃及、以色列、印度、澳大利亞、紐西蘭、台灣、中國大陸等近百位力學界的人士參與，中國大陸方面仍然相當積極的有六位人士前往與會，其中包括中國科學院院士程耿東教授(前大連大學校長)、剛接任浙江大學校長的楊衛教授(亦為科學院院士，以下時稱「楊校長」、中國科學院白亦龍院士及鄭正明院士，中國力學學會並派遣楊亞政副秘書長辦公室主任及康小姐與會。楊校長與劍清二十多年前曾同時就讀於布朗大學並共同接受現任 IUTAM President Freund 教授的指導，目前三位師生各自在自己的崗位上努力。事實上，楊校長於十年前擔任北京清華大學教授時，還曾應劍清邀請前來台大訪問研究四個月，經過幾年的努力，他現已為一所有四、五萬學子就讀的重點大學校長，與筆者等人常在國內外許多學術研討會的場合上見面、共處，我想現今兩岸學術界朋友競合的關係就是如此，而人生本來也就是難料！

此次 IUTAM 會議的議程除理事會議外，尚包括 Executive Committee of Congress Committee (for 2006 Congress in Adelaide, Australia)、Symposium Panels、Bureau Subcommittee、Congress Committee、Bureau 等會議以及兩個 Mechanics Lectures，其中的重頭戲當然是理事會議，猶如前述，它需議決通過未來兩年(2008 and 2009)IUTAM Endorsed Symposia 舉辦的時間、地點與組織，同時完成少數 Committee 與 Working Parties 部份人員的改選。文方雖非理事，但因想瞭解會議運作的模式，而理事會議也沒嚴謹要求非理事者不能與會(但猶如前述、不具投票權)，所以仍然全程列席會議。由於第一天(8月11日) IUTAM 各委員會先行開過會，已將本次理事會議的重要討論事項及提案作意見的交換及決策，這對於8月12日及13日下午的大會進行有很大的助益。第一階段的理事會議於8/12下午召開，在四個多小時的會議中，先由 Secretary-General (荷蘭 Eindhoven University of Technology 的 D. H. van Campen 教授) 報告會務，重點包括(一) Call for IUTAM Symposia and Summer Schools for 2008 and 2009 — 計有 26 個單位提出，已經 Symposia Panels 的初審審查，將待理事會議議決；(二)將於當天與次日兩天會議中，抽空討論設立 Associate Membership 之可行性；(三)Caribbean Congress of Fluid Dynamics (CACOFD)改名為 Latin American and Caribbean Congress of Theoretical and Applied Mechanics (LACCOTAM)後，其與 IUTAM 的關係可待大家抽空討論；(四)部份 IUTAM Working Parties 的部份人員有待改選。

自上次於波蘭舉辦的 Congress 與 General Assembly Meeting 後，IUTAM 已 endorsed 幾個國家地區學會舉辦了多場 IUTAM Symposia 及一場 Summer School。而目前 IUTAM 的 Working Parties 包括：

- (1) WP-1 Non-Newtonian Fluid Mechanics and Rheology ；
- (2) WP-2 Dynamical Systems and Mechatronics ；
- (3) WP-3 Mechanics of Materials ；
- (4) WP-4 Materials Processing ；

- (5) WP-5 Computational Fluid and Solid Mechanics ;
- (6) WP-6 Biomechanics ;
- (7) WP-7 Nano- and Micro-Scale Phenomena in Mechanics ;
- (8) WP-8 Geophysical and Environmental Mechanics ;
- (9) WP-9 Education in Mechanics and Capacity Building 。

在理事會中，Secretary-General 也簡單略述了研討會舉辦單位及 Working Parties 所提出的書面報告。接著，由 Treasurer 向理事們提出年度財務報告；再由部份 Affiliated Organizations 代表人員提出他們的工作報告；其中有關前提 CACOFD 改名為 LACCOTAM 一事，理事長裁決因該組織僅係 IUTAM 的 Affiliated 而非 Adhering Organization，該事應非屬理事會同意的範疇，但也建議該組織會議應適當、謹慎的納入周遭國家的參與，才會名實相符。另值得一提之事為前任 President、現任 Vice-President (此為 IUTAM 的規定) Professor Moffatt 的口頭報告，他係 IUTAM 指派為 ICSU 的代表之一，他於報告中簡略提到 2005 年十月代表 IUTAM 參加在中國杭州舉行 ICSU General Assembly Meeting 之見聞，其中包括約有 250 人與會、Mission Statement of ICSU 為 Strengthening International SCIENCE for the Benefit of SOCIETY、Universality of Science and Capacity Building、Environment, Sustainable Development, and Renewable Energy、ICSU Finances and the ICSU Grants Programme 等觀念及事項，之中，他指出 IUTAM 有許多研究可配合 ICSU 所揭櫫的 Environment, Sustainable Development, and Renewable Energy 等議題發展；他也提到 UNESCO 自 2007 年開始可能減少對 ICSU 的補助等事項。

於中場休息 20 分鐘後，8/12 下午理事會議的討論事項轉移到由流力及固力兩 Symposia Panels 分別報告他們嚴謹審查總共二十多件將於 2008-2009 舉行 IUTAM Symposia Proposal (計畫書)的結果，通常 Panel Committee 的委員會就各計畫書的優劣分別評以 A、B、C 等三級的分數，經各委員評分的平均或討論後，再向理事會建議給予個別計畫 A、B、C 的等級總評，獲評定為 A 等級(包括 A₋ 有 5 個共有 12 個)的計畫通常可在第二天第二階段的理事會議中獲得決議通過；獲評定為 C 等級(有 1 個)的計畫則會在第二階段的理事會議中被退回；獲評定為 B 等級(包括 B₊ 及 B 共有 10 個)的計畫則有待理事會進一步討論最後再決定取捨。在經過各 Symposium Panel 召集人對個別計畫書的一一說明及理事們的冗長討論、補充說明及評述後，理事長依過去的慣例作成決議：當日若經理事會議討論及決議，可將 Symposium Panels 針對某一計畫的評比由 A 調降或由 C 調升至 B，否則一律維持現有 A、B、C 的評比，留待第二天第二階段理事會議時議決。我國力學學會所提將於 2008 年六月舉辦 IUTAM Symposium on Recent Advances of Acoustic Waves in Solids 的計畫書(見附件四)在眾多計畫書中獲得 Symposium Panels 評為 A 等級的最優評比，應可在第二天受到 IUTAM 理事會的肯定及核可，我們此次匆匆赴會及旅途上的辛苦，應該會有好的結果。

8/13 上午會議主辦單位安排兩場 Lectures on Mechanics，聽眾相當踴躍，首場演講係由布朗大學 Walter H. Annenberg University Professor and Professor of Engineering 的 Dr.

Huajian Gao(高華建教授)所主講(見圖 1)，講題為 Mechanics Cohesive Laws: Inspiration from Hierarchical Adhesion Systems in Nature，內容主要係陳述他過去幾年來，將連體、破壞力學受微奈米尺寸效應影響限制考慮後，輔以統計與量子力學理論，並以多層結構的觀念，分析計算出微小物件(如蒼蠅、壁虎之爪掌)與其附著面間之附著力及其相關物理量，這些結果與生物或其他學界所實際量測出來的數值相當吻合。由其演講可知，高教授的思路相當清晰，講解的也十分生動，筆者以為他自己必然相當優秀、努力，才能年紀不大(四十多歲)就被布朗大學延攬獲聘為講座教授；但其成名應該也要拜現今奈米、生物科技當道，讓他有機會由原來所學現今較為冷門的古典力學延伸至目前所為相當熱門的研究題材吧。

8/13 上午第二場演講偏重於流力方面，講者為布朗大學應用數學系的 Professor George Karniadakis，講題為 Predictability and Uncertainty in Computational Mechanics。顧名思義，Professor Karniadakis 首先指出無論數學建模、邊界條件、系統本身、系統參數或系統輸入量等等皆有其不確定性或量測不準度，所以吾人不應盲目相信經過繁複、甚至超級電腦計算出來的紊流漩渦形成等結果是完全正確的，而需小心看待並加以解釋。就此，他把大家焦點拉到他在繁複計算之外，將部份計算所用到的物理量考量為 stochastic quantities，並依物理量的特性適當建模，結合原有力學理論的分析。大家可以想像，以上的計算量必然更為龐大；而且所用到的數學除(流體)力學外，尚有機率、隨機過程等，也因此必然有點艱深；所以 Professor Karniadakis 於演講中，僅顯示一些分析的圖表結果，而無法向聽眾做更清楚的說明。事實上，筆者以為，少部份從事力學研究的人士，難免會在某些階段或某些時機將機率理論引入他們的分析之中，而此種作法之合理性或適當性總也有見仁見智的看法。

8/13 下午舉行本次理事會議之第二階段，主要將 8/12 下午初步討論過的事項進行表決及確定。首先是由十個列為 B 級的 IUTAM Symposia 進行討論及表決，這十個 Symposia 的主辦單位幾乎都有代表在場提出說明所主辦的 Symposia 的學術性及重要性，也有其他代表敘述對於某一個 Symposium 的支持及看法。經過約一個多小時的討論，最後進行投票表決，由十個列為 B 級的 Symposium 中選出四個，競爭相當激烈。選出的四個 B 級的 Symposia 連同十二個 A 級的 Symposia 共有十六個 IUTAM Symposia (見附件五)將於 2008 及 2009 兩年內於世界各地舉行。接著討論通過由義大利及中國所提出舉辦的兩個 Summer School。

由這次評選 IUTAM Symposia 的過程可知最重要的也是最決定性的關鍵其實是由 Symposium Panels 所評定的等級，若為 A 級則幾乎可確定通過；若為 B 級，除非獲得多數與會代表的強力支持，否則出線的機會不大。我國此次由三人組團參加，其實主要顯示參與 IUTAM 組織的熱誠，萬一需當場提出討論時，能有機會說明所提出舉辦 Symposium 的重要性以增加入選的機會。此次會議中，中國大陸和加拿大各出動相當人馬，極力爭取 2012 年 IUTAM Congress 的主辦權，此項結果將於 2008 年在澳洲 Adelaide 舉行的 IUTAM Congress 中決定。我國雖不可能立即接辦 IUTAM Congress，但在此次會議中也爭取到一次 Symposium 的主辦權，為了維持我國在國際上的學術地位，我國應

再接再厲的辦理不同主題的 Symposium；另外，亦應積極參與各 Working Parties 以發揮影響力

在討論完 Symposia 和 Summer Schools 之後休息二十分鐘，接著針對九個 Working Parties 的負責人，Congress Committee of IUTAM 以及 Symposium Panels 的成員進行選舉及確認，最後確定下次的 IUTAM 理事代表大會將於 2008 年 8 月 26 日及 27 日於 IUTAM Congress 的舉辦地點澳洲 Adelaide 同時舉行。兩天的 IUTAM 理事會終於在下午五點多結束，並在晚上舉行晚宴(見圖 2)。

8/14 上午大會安排了普羅維登斯市的義工帶領與會的代表及眷屬以徒步的方式講解該市的發展歷史及特色，我國的三位代表也全程參與此次的導覽，抒解了一些因前二天緊湊的大會議程的辛勞。中午過後二位代表(劍清、文方)趕往波士頓搭機返國，而偉中則因長榮航空至 8 月 16 日清晨才有班機自紐約起飛，必須多留一天，故特地安排前往距 Brown University 一小時的羅德島大學(University of Rhode Island) Professor Shukla 的動態破壞實驗室參觀訪問。此次行程特別感謝國科會全額的經費補助，才能參與此次大會並順利完成爭取舉辦 IUTAM Symposium 的重要任務。

後記

為了使力學學會會員了解本次組團參加 IUTAM 理事會的詳細過程及 IUTAM 相關資訊，特別由參與本次 IUTAM 理事會的三位與會人員共同完成此份報告，並刊登於力學會刊中。另 IUTAM 秘書處於 8 月 23 日來函(見附件六)確認 IUTAM 已通過我國申請舉辦的 IUTAM Symposium，唯將我國申請舉辦的時間由 2008 年改為 2009 年。



圖 1 Lectures on Mechanics (布朗大學高華建教授專題演講)



圖 2 IUTAM 2006 General Assembly Meeting 晚宴

Adhering Organizations

Argentina (1959)

Asociacion Argentina de Mecanica Computacional

Australia (1964)

The Australia National Committee for Theoretical and Applied Mechanics of the Australian Academy of Sciences

Austria (1951)

Austria National Committee for Theoretical and Applied Mechanics of the Austrian Academy of Science

Belgium (1949)

The National Committee for Theoretical and Applied Mechanics of the Royal Academies for Science and Arts of Belgium

Brazil (1982)

Associação Brasileira de Ciências Mecânicas

Bulgaria (1969)

Bulgaria National Committee on Theoretical and Applied Mechanics of the Bulgarian Academy of Sciences

Canada (1963)

The National Research Council of Canada

Chile (1996)

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

China (1980)

The Chinese Society of Theoretical and Applied Mechanics

China-Hong Kong (1996)

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

China-Taipei (1980)

The Society of Theoretical and Applied Mechanics

Croatia (1994)

Croatian Society of Mechanics

Czech Republic (1993/1949)

The National Committee of Theoretical and Applied Mechanics

Denmark (1949)

National Committee for Theoretical & Applied Mechanics

Egypt (1976)

Academy of Scientific Research and Technologys

Estonia (1992)

Estonian Committee for Mechanics

Finland (1952)

The Finnish National Committee on Mechanics

France (1949)

Comité National Français de Mécanique, Académie des Sciences

Georgia (2000)

National Committee of Theoretical and Applied Mechanics

Germany (1950)

Deutsches Komitee für Mechanik (DEKOMECH)

Greece (1979)

Hellenic Society for Theoretical and Applied Mechanics

Hungary (1948)

Hungarian National Cpmmittee for IUTAM

India (1950)

National Committee for Theoretical and Applied Mechanics of the Indian National Science Academy

Ireland (1984)

Irish National Committee for Theoretical and Applied Mechanics Royal Irish Academy

Israel (1950)

Irish National Committee for Theoretical and Applied Mechanics

Italy (1949)

Associazione Italiana di Meccanica Teorica ed Applicata

Japan (1951)

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

Korea, Republic of (1989)

Korean Society of Theoretical and Applied Mechanics

Latvia (1992)

Latvian National Committee for Mechanics, Latvian Academy of Sciences

Netherlands (1952)

Netherland Mechanics Committee, c/o Eindhoven University of Technology

New Zealand (1979)

The Royal Society of New Zealand

Norway (1949)

National Committee on Theoretical and Applied Mechanic

Poland (1952)

Committee for Mechanics of the Polish Academy of Sciences

Portugal (1968)

Portuguese Society of Theoretical, Applied and Computational Mechanics, Laboratório Nacional de Engenharia Civil

Romania (1956)

Romanian Academy, Department of Mathematics, Romanian National Committee of Theoretical and Applied Mechanics

Russia (1992/1956)

Russian National Committee on Theoretical and Applied Mechanics

Saudi Arabia (1988)

King Abdullah City for Science and Technology, Directorate of Technology and International Cooperation

Serbia and Montenegro (2002/1952)

Yugoslav Society of Mechanics

Slovakia (1993)

The Slovak Society for Mechanics, Council of Scientific Societies

Slovenia (1994)

Slovene Mechanics Society

South Africa (1994)

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

Spain (1950)

Instituto Nacional de Técnica Aeroespacial

Sweden (1950)

Swedish National Committee for Mechanics, Malmö University

Switzerland (1950)

Board of the Federal Institutes of Technology

Turkey (1977)

Turkish National Committee of Theoretical and Applied Mechanics

UK (1948)

The Royal Society, UK Panel for IUTAM

Ukraine (1995)

National Committee of Ukraine on Theoretical and Applied Mechanics

USA (1949)

The U.S. National Committee on Theoretical and Applied Mechanics, The National Academies

Viet Nam (1990)

Vietnamese Association of Mechanics (VAM)

附件二

Affiliated Organizations

CISM (1970)

International Centre for Mechanical Sciences

ICHMT (1972)

International Centre for Heat and Mass Transfer

ICR (1974)

International Committee on Rheology

IAVSD (1977)

International Association for Vehicle System Dynamics

EUROMECH (1978)

European Mechanics Society

ISIMM (1978)

International Society for the Interaction of Mechanics and Mathematics

ICF (1978)

International Congress on Fracture

ICM (1982)

International Congress on Mechanical Behavior of Materials

AFMC (1982)

Asian Fluid Mechanics Committee

IACM (1984)

International Association for Computation Mechanics

CACOFD (1992)

Caribbean Congress of Fluid Dynamics

IABEM (1994)

International Association for Boundary Element Methods

ISSMO (1996)

International Society for Structural and Multidisciplinary Optimization

HYDROMAG (1996)

International Association for Hydromagnetic Phenomena and Applications

IIAV (1997)

International Institute of Acoustics and Vibration

ICA (1998)

International Commission for Acoustics

ICTS (2002)

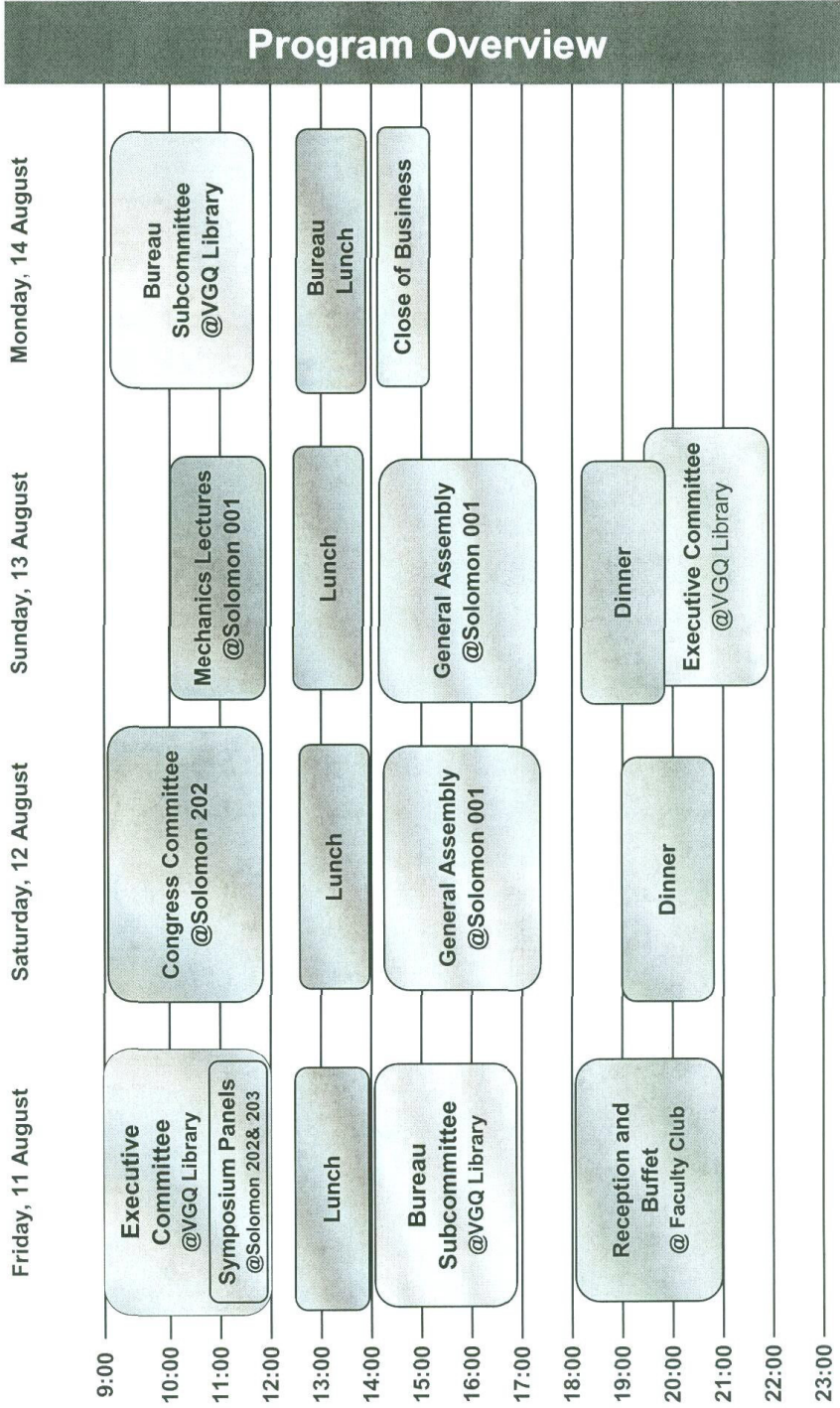
International Congress on Thermal Stresses

International Union of Theoretical and Applied Mechanics

Meetings Scheduled in Conjunction with the 2006 General Assembly

Providence, Rhode Island, USA

11-14 August 2006



Proposal for an IUTAM Symposium

Instructions: Please print out this form on your local printer. Then print or type the information on the form, and return the form by **March 1, 2006**, to:

Professor Dick H. van Campen,
IUTAM Secretary-General,
Department of Mechanical Engineering,
Eindhoven University of Technology,
P.O.Box 513, 5600 MB Eindhoven,
The Netherlands. Fax: +31 40 243 7175
Email: sg@iutam.net

Proposed year for symposium (circle one): **2008** 2009 (tentative schedule June 2-4, 2008)

Short Title: IUTAM Symposium on Recent Advances of Acoustic Waves in Solids

Proposed Host Institution: Institute of Applied Mechanics, National Taiwan University

Is the proposed host institution prepared to accept responsibility for the **local organization** of the symposium (Yes/No)? Yes

Detailed description of subject:

This symposium aims at bringing scientists from wave electronics, phononic crystals, and waves in anisotropic solids and/or electro-, magneto- interaction problems together to discuss different aspects and latest advances of acoustic waves in solids. It is hope that new research directions and applications can be triggered through the interdisciplinary discussions at the single session symposium.

Rapid growth of the mobile communication market has triggered extensive research on the bulk as well as surface acoustic wave devices in the last decade. Quite a few important results on the modeling and simulation of Film Bulk Acoustic Resonator (FBAR) and Layered SAW devices were reported recently. The other recent advance of acoustic waves in solids is the so-called phononic crystals or phononic band-gap materials. Analogous to the band-gap of light in photonic crystals, acoustic waves in periodic elastic structures also exhibit band-gap. Important applications of phononic band gap materials can potentially be found with creating a vibration free environment in microstructures, and design of advanced acoustic frequency filter, etc. In addition

to the wave electronics and phononic crystals, to facilitate the emerging needs in the quantitative nondestructive evaluation of materials, waves in anisotropic solids and/or electro-, magneto- interaction problems also regained much attention recently. The purpose of this symposium is to address the recent advances of acoustic waves in the above mentioned areas. Firstly, propagation of waves in layered piezoelectric crystals, numerical simulation techniques and testing methods of BAW and SAW devices will be included. Bulk and surface acoustic wave propagation on phononic structures consist of isotropic as well as anisotropic (include piezoelectric) materials, both theoretical and experimental aspects of phononic crystal research will be addressed. Finally, the symposium will highlight the recent works on waves in anisotropic solids and/or electro-, magneto- interaction problems.

This symposium will assemble researchers in mechanical engineering, electric engineering, physics and applied mathematics together to share the new developments and to provide new directions in acoustic waves of solids. In summary, this symposium will foster the interaction by including state-of-the-art presentations on the following topics.

- Waves in piezoelectric crystals
- Simulation of advanced BAW and SAW devices
- Analysis of band gaps in phononic structures
- Experimental investigation of phononic structures
- Waves in multilayered media
- Waves in anisotropic solids and/or electro-, magneto- interaction problems

Could the proposed symposium be sponsored **jointly with another Union or Affiliated Organisation** (Yes/No)? No (See list of Affiliated Organisations in IUTAM Annual Report)

If so, **please specify:**

Please suggest not more than seven **prospective members** of the Scientific Committee. Normally, not more than two prospective members should be resident in the same country. Please note that it is the IUTAM Bureau which nominates the Scientific Committee. It usually consists of about eight persons.

<p>1. <i>Full name and postal address:</i> Professor Ken-Ya Hashimoto Department of Electrical and Mechanical Engineering, Chiba University, 1-33 Yayoi-cho, Inage-ku, Chiba-shi, 263-8522, Japan</p>	<p><i>Fax:</i> 81-43-290-3320</p>
	<p><i>Email:</i> k.hashimoto@faculty.chiba-u.jp</p>
<p>2. <i>Full name and postal address:</i> Professor Y. K. Yong</p>	<p><i>Fax:</i> (732) 445-0577</p>

Department of Civil Engineering, Rutgers University, 623 Bowser Road Piscataway, NJ 08854, USA	<i>Email:</i> yyong@rci.rutgers.edu
3. <i>Full name and postal address:</i> Dr. I. E. Psarobas Department of Physics - Section of Solid State Physics, The University of Athens, Greece	<i>Fax:</i> +30 210 7276711 <i>Email:</i> ipsarob@phys.uoa.gr
4. <i>Full name and postal address:</i> Dr. Vicent Laude LPMO department, FEMTO-ST institute, CNRS, Besancon, Cedex, France	<i>Fax:</i> +33 3 81 85 39 30 <i>Email:</i> vincent.laude@femto-st.fr
5. <i>Full name and postal address:</i> Professor A. G. Every School of Physics, University of Witwatersrand, Johannesburg, South Africa	<i>Fax:</i> +27 11 717 6823 <i>Email:</i> EveryA@physics.wits.ac.za
6. <i>Full name and postal address:</i> Professor C. S. Yeh Institute of Applied Mechanics, National Taiwan University, Taipei, Taiwan	<i>Fax:</i> +886 2 23639290 <i>Email:</i> csyeh@spring.iam.ntu.edu.tw
7. <i>Full name and postal address:</i> Professor Tsung-Tsong Wu Institute of Applied Mechanics, National Taiwan University, Taipei, Taiwan	<i>Fax:</i> +886 2 33665664 <i>Email:</i> wutt@ndt.iam.ntu.edu.tw
Is a prospective member of the Scientific Committee prepared to accept the responsibility of Chairman (Yes/No)? <u>Yes</u>	
If so, who? Tsung-Tsong Wu	
Did you discuss this proposal with your National Organization (Yes/No)? <u>Yes</u>	
Did you discuss this proposal with a relevant Working Party (Yes/No)? <u>No</u>	
If so, please attach advice	
Is an IUTAM grant needed for the proposed Symposium? (Yes/No)? <u>Yes</u>	
Information on grants for Symposia is provided in items 7 and 8 of the Rules for Symposia Chairs (see IUTAM website).	
<i>Proposer's full name and postal address</i>	<i>Fax:</i> +886 2 23631755

Professor Ching-Chien Ma

Dept. of Mechanical Eng., National
Taiwan University, Taipei, Taiwan, ROC

Email: ccma@ntu.edu.tw

Date submitted: February 23, 2006

附件五

List of IUTAM Symposia 2008-2009

No	Title	Location	Chairman	Year
F.1	150 Years of Vortex Dynamics	Lyngby, Denmark	H. Aref	2008
F.2	Turbulence in the Atmosphere and Oceans	St. Andrews, UK	D. Dritschel	2008
F.3	The Physics of Wall-Bounded Turbulent Flows on Rough Walls	Cambridge, UK	T. Nickel	2008
F.6	Laminar-Turbulent Transition	Stockholm, Sweden	D. Henningson	2009
F/S.2	Mathematical Modeling and Physical Instances of Granular Flows	Reggio Calabria, Italy	J. Goddard	2009
S.1	The Vibration Analysis of Structures with Uncertainties	St. Petersburg, Russia	A. Belyaev R. Langley	2008
S.2	Modelling Nanomaterials and Nanosystems	Aalborg, Denmark	R. Pyrz	2008
S.3	Recent Advances of Acoustic Waves in Solids	China-Taipei	T. T. Wu	2008
S.4	Emerging Trends in Rotor Dynamics	New Delhi, India	K. Gupta	2008
S.5	Multi Functional Material Structures and Systems	Bangalore, India	B. Dattaguru	2008
S.6	Progress in the Theory and Numerics of Configurational Mechanics	Kaiserslautern, Germany	P. Steinmann	2008
S.7	Cellular, Molecular and Tissue Mechanics	Ann Arbor, USA	E. Arruda K. Garikipati	2008
S.8	Dynamic Fracture and Fragmentation	Albuquerque, USA	K. Ravi-Chandar T. Vogler	2008
S.11	Variational Concepts with Applications to the Mechanics of Materials	Bochum, Germany	K. Hackl S. Conti	2008
S.12	Theoretical, Modelling and Computational Aspects of Inelastic Media	Rondebosch, South Africa	B. D. Reddy	2008
S.14	Multiscale Modelling of Fatigue, Damage and Fracture in Smart Materials Systems	Freiberg, Germany	M. Kuna	2008

International Union of Theoretical and Applied Mechanics



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Email: D.H.v.Campen@tue.nl
Internet: <http://www.iutam.net/>

Treasurer:
Professor Juri Engelbrecht
Institute of Cybernetics
12618 Tallinn, Estonia

Your reference

Our reference DvC/fo/6823

Date August 2006

Subject: Acceptance of Symposium proposal

Dear Professor Ma,

It gives me genuine pleasure to be able to inform you that the IUTAM General Assembly at its recent meeting in Providence, Rhode Island has accepted your proposal for an IUTAM Symposium on Recent Advances of Acoustic Waves in Solids, to be organized in **2009**.

I have assigned to your Symposium the code GA.06-08.

I will address you before mid-October of this year with further details about the organization of your IUTAM Symposium and its Scientific Committee as approved by the IUTAM Bureau.

With kind regards,

Yours sincerely,

A handwritten signature in black ink that reads 'Dick H. van Campen'. The signature is written in a cursive, flowing style.

Dick H. van Campen
Secretary-General of IUTAM