



ICF13 REPORT

By

ICF13 Organizing Committee

Final Report on

The Thirteenth International Conference on Fracture (ICF13)

to

International Congress on Fracture

January 2014

Beijing, China

FOREWORD

This report is submitted to the President and Executive Committee of the International Congress on Fracture in respect of Thirteenth International Conference on Fracture (ICF13) held during 16–21 June, 2013 in Beijing, China. The report provides informative organisation and conduct of the conference followed the very comprehensive report of ICF12 prepared by Prof. Mimoun Elboujdaini. In the same way, it is sincerely hopeful that some useful indications and suggestions from our efforts and experiences will be derived for future ICF conferences in this report.

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Shouwen Yu
ICF13 Executive Chairman
and the ICF13 Organizing Committee

FINAL REPORT

ICF13 Beijing, China

June 16-21, 2013

Introduction

Founded by Professor T. Yokobori in 1965, the International Congress on Fracture has become the premier international body for promotion of industrial, experimental & theoretical research, education and worldwide cooperation among scientists and engineers concerned with mechanics and mechanisms of fracture, fatigue and structural integrity of materials, components and systems. The International Congress on Fracture devotes itself in promoting the intercommunication and corporation among the researchers in fracture all around the world, for which purpose the quadrennial International Conferences on Fracture have been playing a significant role. The thirteenth International Conference on Fracture (ICF13) was held from 16–21 June, 2013 in Beijing, China. This was the first time that this celebrated quadrennial conferences came to China.

Since 2009, the ICF13 organization has been endeavored for four years by the organizing committee to make this conference a successful continuation of the honored tradition and, at the same time, to create a dynamic and leading conference which stretches the boundaries of the exciting disciplines for the new era. The organization was hosted powerfully by The Chinese Society of Theoretical and Applied Mechanics, Fracture Group of Hong Kong of China, Chinese Mechanical Engineering Society, Chinese Materials Research Society, Chinese Society of Corrosion and Protection, Chinese Society of Aeronautics and Astronautics, The China Structural Integrity Consortium, and Chinese Society for Metals. The organizers and the members of the organizing committee are listed in Appendixes 1 and 2, respectively.

Part 1: Technical Program

The ICF13 has covered almost all active research fields in solids mechanics and probed into the role of fracture in the most advanced academic developments, from fundamental theories to engineering applications, from the traditional topics to the exciting and edge-cutting arenas—from biomedicine to geophysics, from nano/atomic to macro scales, and from physical to holistic and system modelling.

The Technical program of ICF13 was organized into 69 scientific topics with a number of sessions dedicated to specialized areas. This was done under the direction of the organizing committee Chair, Prof. Shouwen Yu with input and help from International Scientific Committee and an International Scientific Advisory Board and the ICF13 Organizing Committee. The memberships of International Scientific Advisory Board and

International Scientific Committee are shown in Appendix 3. 196 influential scientists and engineers working on the frontline of the fields of fracture and the relevant compose the International Scientific Committee and are in charge of the organization and technical standard of the 54 Sessions and 15 Mini-Symposiums on ICF13.

The technical content of ICF13 included:

Honour Lectures: The Opening Honour Lecture was given by Professor Subra Suresh (USA); the President Honour Lecture was given by Professor Alberto Carpinteri (Italy) and the Closing Honour Lecture was given by Professor Yiu-Wing Mai (Australia). Abstracts of the Honour Lectures were found in Appendix 4.

Plenary Lectures: Plenary Lectures were proposed by International Scientific Advisory Board of ICF13 and decided by the ICF13 Organizing Committee by considering the distributions of countries and research areas. Twelve Plenary Lectures were delivered by Professor James R. Rice (USA), Professor J.W. Hutchinson (USA), Professor Huajian Gao (USA), Professor B. L. Karihaloo (UK), Professor Wei Yang (China), Professor Yuri V. Petrov (Russia), Professor Qingping Sun (Hong Kong, China), Professor Reinhard Pippan (Austria), Professor Peter Gumbsch (Germany), Professor Y. Murakami (Japan), Professor Ashok Saxena (USA), and Professor Jun Sun (China). The titles and the lecturers are listed in Appendix 5.

Keynote Lectures: Keynote lectures were “invited lectures” by the ICF13 organizing committee, and each keynote speaker is well known for his or her expertise or accomplishments in fracture fields. The conference had 316 keynote lectures and the speech time for each keynote lecture was 30 minutes.

Conference Paper Presentations: Individual presentations were given in the 54 sessions and 15 mini-symposiums in the conference, and the presentation time for each oral presentation was 20 minutes.

In addition, 12 **ICF13 Outstanding Paper Awards by Young Researchers** were chosen by an Academic Selection Committee from all papers presented in the conference by young scholars 35 years or less in age on June 30, 2013. The membership of the Academic Selection Committee is listed in Appendix 6.

Abstracts were submitted electronically to the conference website, and acceptance was carried out electronically. The Topic Organizers reviewed each submitted abstract as to its suitability for the conference and a notice of acceptance was sent by the Conference Secretariat. Papers were also submitted electronically and reviewed by one or two reviewers selected by the conference organizers. There was one review cycle for each paper. After the review-revision process a final Notice of Acceptance of Papers was sent by the Conference Secretariat.

As in the ICF tradition, both a Short Abstract (150 words) in a conference book and a full paper in a conference CD-ROM were published. The Conference Proceedings, Book of

Abstracts and Conference Program were distributed to the conference delegates at registration. ICF13 Timetable and Program Overview were given in Appendixes 7 and 8, respectively.

Key statistics of the Technical Program at ICF13 are as follows:

Presentations

Honour Lectures	3
Plenary Lectures	12
Keynote Papers	316
Topic Areas	69
Parallel Sessions	240
Total Presentations	743

Best Paper Awards

Best Papers by Young Researchers	12
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Part 2: Conference Planning and Organization

An agreement was signed in May, 2010 between ICF and CSTAM, which outlined the responsibilities of each sides and the financial arrangements. CSTAM acted as the ICF13 Secretariat throughout the entire planning of ICF13. A dedicated project team was assigned to plan and manage ICF13 and the assigned manager was a member of the organizing committee.

Planning Challenges

- Change of the Conference time due to its conflict with “China Beijing International Fair for Trade in Services”, which was unexpected in 2005 when the ICF13 schedule was made.
- Global economic recession and the effects on fundraising efforts, attraction of exhibitors, and on the number of attendees and subsequent finances.
- H7N9 virus outbreak in China
- Significant appreciation of the RMB from 2009 to 2013.

Highlights

- Effective management system of submitted papers using the Internet, and sophisticated programming to transmit author presentations to 24 parallel rooms simultaneously over the entire duration of the conference.
- Using of the Push System to arranging the uploading of the presentations.
- User-friendly U-Disk with multiple search features cross-referenced with the Book of Abstracts.
- Informative web site.
- Delicious lunch provided to all registered delegates for free.

Key Planning Dates

- Web Site Development – 2010
- First Announcement – June 30, 2011
- Second Announcement and Call for Papers – May 31, 2012
- Deadline for Abstract Submission – October 31, 2012
- Notification of Acceptance of Abstracts – November 25, 2012
- Deadline for Submission of Papers – February 28, 2013
- Notification of Acceptance of Papers – March 25, 2013
- Deadline for Early Bird Registration – March 31, 2013
- Deadline for Hotel Reservation and Cancellation – May 14, 2013
- Conference – June 16-21, 2013

Venue and Dates

The 13th International Conference on Fracture – ICF13, took place in Beijing, China, from June 16 to 21, 2013. The Conference Venue is the China National Convention Center (CNCC) which is ideally located in the heart of the Olympic Green of Beijing, adjacent to the National Stadium (Bird's Nest) and the National Aquatics Center (Water Cube).

Website

Extensive effort and resources went into creating and particularly in maintaining accurate and up-to-date information. The web site was used to allow all delegates access to do the Registration, Submission of Abstracts/Full Papers, Paying Fees on-line, Checking and Downloading the necessary information. It also included importantly all ICF-related material and reports and the Photo Gallery of ICF13.

Abstract /Paper Press

All accepted papers were published in the proceedings of ICF13 in the form of CD-ROM. The proceedings, together with a book of Abstracts, were provided to the participants at registration..

Publications

All accepted papers were published in the proceedings of ICF13 in the form of CD-ROM. The proceedings, together with a book of Abstracts, were provided to the participants. Selected papers were published in some special issues of international journals and pad on the Website of ICF--<http://www.ICF.org>.

The following provides a list of items that were produced in support of the various committees, for volunteers and for attendees:

- First Announcement
- Second Announcement and Call for Papers
- Abstracts (ISBN 978-988-12265-2-5)

- Program
- Note Book
- CD ROM of Proceedings
- Exhibitor Prospectus
- Certificate of Attendance
- Volunteer T-Shirt
- Attendee Name Card
- Opening Reception, Banquet and Accompanying Persons Tickets
- Conference Badges (various categories i.e. delegate, accompanying person, guest, media, exhibitor, ICF13 Committee, ICF Council, Staff, Secretariat)

Graphic Design

Internal and external graphic artists were used to produce items such as Announcements, Advertisements, Web site, Book of Abstracts, Final Program, U-Disk, Notebook, etc.

Information Technology Requirements

Information technology was a very important aspect of the planning and its importance in event planning continues to grow. Below are some of the areas where IT played a significant part in the planning of ICF13:

- numerous electronic broadcasts as reminders or “Notices”
- receipt, processing and review of both Abstracts and Papers
- Paper Management System to allow authors to upload their presentations using the Internet
- use of web for all conference information
- dedicated e-mail address for the conference
- daily communications

Budget

The budget was in a constant state of updating over the years of planning, especially due to a number of external factors such as working lunches and appreciating of the Conference Venue and the facilities. The objective from the very beginning was to break even. Despite a lower attendance than originally forecast (1,200 – 1,500), we prepared for a total attendance of approximately 1,000. We suffered another financial setback when paid attendance fell about 800 with a small number of on-site registrations.

A Budget Summary is reported in Appendix 11.

Registration Statistics

Number of Full Registrations: 509

Number of Students: 235

Number of Registered Accompanying Persons: 31
Number of Complimentary Registrations with waived registration fees: 30
Number of Exhibitors: 10
Volunteers: 75
Number of Banquet tickets: 340

The total number of registration is about 890.

Contracts

Our main contractors were:

China National Convention Center (Facility rental, Accommodation)
Grand Skylight Catic Hotel Beijing (Accommodation)
Pure Water Studio (Designing of the materials)
Uda Beijing Century Technology Company Ltd. (A/V facilities)
M-Event (Presentations Pushing System)
Silver Guard (guard)
China Peace (Tours and Airport pick-up)

All suppliers had to be kept well informed and a coordinated approach was essential. This was accomplished through a series of meetings and documentation prepared by the Conference Secretariat and was fine-tuned as we approached the implementation phase of our planning.

Visas

Chinese visa is a permit issued to a foreigner by the Chinese visa authorities for entry into, exit from or transit through the Chinese territory. The Chinese visa authorities issue a diplomatic, courtesy, service or ordinary visa to a foreigner according to his identity, purpose of visit to China and passport type. Once confirmation of acceptance of the paper was sent, the Secretariat automatically sent a letter of invitation to all accepted authors to help them initiate their application.

Certificate of Attendance

As for most international meetings, many delegates require an official document confirming their attendance. When preparing personalized delegate envelopes, with the name badge, lunch tickets, etc., a certificate was produced for everyone who had registered and inserted it into the kit. For those registering on site, the capability was provided to produce certificates on site.

Art player

A performance of traditional Chinese music and dance was carried out for all delegates on the Opening Ceremony. The performance has two parts. The first part is Rosy clouds chasing the moon, one of classical folk music pieces in China. A beautiful melody describes the beauty of the night sky, as if the clouds and moon are frolicking in the picture. The second part is Tai Chi Dance. The dance is derived from the Chinese ancient boxing "Tai Chi". With classical Chinese folk music melody, the performance artists of Tai Chi dancing move slowly, powerfully, and ornamentally.

Tours & Travel

3 Post Conference Tours

PT1 Highlight China Tour (Beijing-Xi'an-Shanghai 4 nights / 5 days)

PT2 Traditional Silk Road Tour (Beijing-Xian-Dunhuang-Turpan-Urumqi-Beijing 6 nights / 7 days)

PT3 Yangtze River Cruise Tour (Beijing – Chengdu – Chongqing – Yangtze River – Shanghai 8N / 9D)

Airport Transfer Service

For the convenience of ICF13 participants, the Conference Secretariat provided airport transfer service to our participants.

Medical Service at Conference Office

The medical service is provided for the participants during the conference in the Conference Office room. Participants also could go to the Conference Office for help in case of the Registration Desk unavailable.

Food

We provided the welcome reception and lunches with delicious Chinese food during the conference for all the regular participants as well as students participants for free. Also, there was a banquet available for the delegates.

Accommodation

There are a number of hotels of different categories, close to the Conference Venue. We recommend 4 hotels, which are listed below. Special rates for Conference attendees were available for registered delegates.

No.	Hotel Name	Street	Distance to Conference Venue
1	CNCC Grand Hotel	8 Beichen West Rd.	0.5km
2	Grand Skylight CATIC Hotel	18 Beichen East Rd.	1.5km

3	National Jade Hotel	19 Huizhong Rd.	1.5km
4	Yayuncun Hotel	8 Beichen East Rd.	1.9km

Fundraising

Fundraising group was established for linking organizations, foundations, associations and universities for the sponsorship of ICF13.

Sponsorship and International Links:

The memberships of sponsorship and international links are shown in Appendix 9.

Speaker Ready Room /Internet Center

All presenters uploaded their presentation to an M Events protected sever prior to arrival or onsite at the Speaker Ready Room prior to their scheduled presentations. The presentations were delivered to the lecture rooms via a network-based presentation system, which ensured perfect quality of all presentations along with a conference-specific interface. All meeting rooms were equipped with necessary technical requirements, and additional back-up systems.

WIFI were provided in the CNCC. Meanwhile, a computer area was reserved and set up for all registered conference delegates to access the Internet in order to send and retrieve e-mails, which was located in the main lobby of CNCC.

Exhibition

The exhibition was an integral part of ICF13 with the intention to provide up to-date information on Fracture. Excellent exhibition facilities in close proximity to the session halls were available at the conference venue. 10 companies/organizations participated the exhibition (Appendix 10).

Conference Service

- **Speaker Ready Room (SRR)**

All presenters were requested to upload their presentation to an M Events protected sever prior to arrival or onsite at the Speaker Ready Room (Room VIP2-1 and 201, 2nd floor of CNCC) at least 12 hours prior to their scheduled presentations. The presentations were delivered to the lecture rooms via a network-based presentation system. All meeting rooms were equipped with the necessary technical requirements, and additional back-up systems. Under no circumstances personal laptops were permitted.

- **Information Center**

The Information Center (Scientific Program) was located in the main lobby of CNCC next to the Registration Desk. Participants could get information or related instructions

on the oral presentation, conference schedule and academic affairs at the Information Center.

- **Medical Service at Conference Office**

The medical service was provided for the participants during the conference in the Conference Office room. Participants also could go to the Conference Office for help in case of the Registration Desk unavailable.

- **Internet Center**

WIFI access the Internet was provided in the CNCC. Meanwhile, a computer area had been reserved and set up for all registered conference delegates to access the Internet in order to send and retrieve e-mails.

- **Business Center**

The CNCC was available to provide services to all conference participants.

- **Lost and Found**

Articles found were taken to the Registration Desk.

Volunteers

The ICF13 Organizing Committee would like to make attendees aware of the group of university students who had volunteered their time to assist in making experience at the conference an enjoyable one. The volunteers were at the Registration Desk, in the Information Center, the Internet Center, the Speaker Ready Room and in the session rooms. To facilitate recognition, they were wearing green T-shirts with ICF13 conference logo on the front. There were 60 volunteers during the conference.

Coordination

The Conference Secretariat was involved in all aspects of the planning of ICF13 and worked hand-in-hand with each committee chair and sub-committee. This was imperative for the smooth running of the meeting and facilitated information coordination, and contributed to the overall effectiveness of the organizing committee and success of ICF13.

Innovations at ICF13

1. Constance Tipper Silver Medals were presented, for the first time, during ICF13 to three female scientists, including Julia E. King from UK, Diane A. Lados from USA and Namrata Gundiah from India, in recognition of their significant contributions to fracture research. This medal was named to honour the memory of Dr. Constance Tipper, one of the very early female pioneers in the field of fracture.
2. ICF Paul C. Paris Gold Medals were also added during ICF13 to present to senior researchers whose pioneering contributions have had a lasting impact on structural integrity assessment methods. Professor Alberto Carpinteri from Italy and Professor Yukitaka Murakami from Japan received the medals.

3. Two mini-symposiums were successfully organized in memory of Professors Sir Alan H. Cotterell and Professor Anthony G. Evans, who made significant contributions in the field on fracture
4. Best Paper Awards were presented to 12 young scholars no more than 35 years old.
5. Pushing System for Presentations was used to ensure the exact program of the conference.
6. More than seventy volunteers provided high-quality services to all participants.



ICF George Irwin Gold Medal recipient Professor James R. Rice and ICF13 Chairman, Professor Alberto Carpinteri.

ICF/ICF13 Liaison

Following the MoU between ICF and ICF13 signed in May 2010, the ICF Treasurer Professor David Taplin (DT) was appointed ICF/ICF13 Liaison Officer. This directly followed the pattern at ICF12, and involved DT being a member of the ICF13 Organizing Committee and attending meetings of the ICF13 Committee on the following occasions:

- During May 8 – 11, 2010, Professor Yiu-Wing Mai and Professor David Taplin visited Beijing and had a meeting with the representatives ICF13 Organized Committee and CSTAM.
- During March 27 – 30, 2011, President ICF, Professor Alberto Carpinteri and Immediately Former President of ICF, Professor Krishnaswamy Ravi-Chandar visited Beijing and had a meeting with the representatives ICF13 Organized Committee and CSTAM.
- During June 14 – 22, 2013, the Executive Committee of ICF listened and discussed the report of Professor Shouwen Yu, on behalf of the organizers of ICF13, about the preparation and program of ICF13.

Part 3: Social Functions

The Social Functions comprised:

A **Welcoming Reception**, included in the registration fees, on Sunday, June 16, 2013, from 6:00 to 8:00 p.m., in the China National Convention Center.

An **Opening Ceremony** on Monday, June 17, 2013, from 9:00 to 9:40 a.m., in the Confederation Ballroom. It included the following programs.

- Welcoming speeches addressed by the Vice-President of China Association for Science and Technology, the President of National Natural Science Foundation of China, the Chairman of ICF13, the President of ICF, the President of Chinese Society of Theoretical and Applied Mechanics. The opening remarks are included as Appendix 13.
- High-level performances of Chinese Music and Dance were carried out on Monday, June 17, 2013, from 9:30 to 9:40 a.m. The classical folk music Rosy Clouds Chasing The Moon and the ancient boxing Tai Chi Dance were exhibited with the aim to introduce the traditional Chinese culture to all ICF13 Participants.

A **Banquet** was hold on June 20, 2013 (Tuesday), from 7:00 to 9:00 p.m., in the China National Convention Center. Professor Shouwen Yu, Professor Alberto Carpinteri, Professor David Taplin, Professor Paul C. Paris, Professor James R. Rices, Professor Yiu-Wing Mai, Professor Krishnaswamy Ravi-Chandar, Professor Shandong Tu, and some other scientists addressed speeches during the banquet.

Lunch: Lunches for 5 days were included in the registration fees for participants and students.

Closing Ceremony on Friday, June 21, 2013, from 11:30 a.m. to 00:10 p.m. in the China National Convention Center, Confederation Ballroom. It included:

- Presentation of Best Paper Awards by Young Authors
- Announcement of new ICF Honour Fellows
- Speech by Prof. Shouwen Yu, Executive Chairman of ICF13 & new President of ICF
- Speech by Prof. David Taplin, CEO (defacto) & Treasurer of ICF.

A Closing Note

The ICF13 team endeavoured for four years to make this conference a successful continuation of the honoured tradition and, at the same time, to create a dynamic and leading conference which stretches the boundaries of the exciting disciplines for the new era. ICF13 was not only that platform, but also a new start to continue the quest for new heights in this fascinating and diverse field of fracture. We expect that ICF will go to a more brilliant tomorrow. We appeal for ICF14, to warmly embrace the next Conference in Rhodes, Greece in June 18–23, 2017.

APPENDIX 1: ICF13 ORGANIZATION

Organizers

The Chinese Society of Theoretical and Applied Mechanics (CSTAM)

Fracture Group of Hong Kong, China (FGHKC)

Chinese Mechanical Engineering Society (CMES)

Chinese Materials Research Society (CMRS)

Chinese Society of Corrosion and Protection (CSCP)

Chinese Society of Aeronautics and Astronautics (CSAA)

The China Structural Integrity Consortium (CSIC)

Chinese Society for Metals (CSM)

APPENDIX 2: ORGANIZING COMMITTEE

Organizing Committee



Chairman
Shouwen Yu
Tsinghua University



Co-chairman
Wei Yang
National Natural Science Foundation of
China



Co-chairman
Tongyi Zhang
The Hong Kong University of Science &
Technology



Local academic committee chairman
Youshi Hong
Institute of Mechanics, Chinese Academy
of Sciences



Secretary
Xi-Qiao Feng
Tsinghua University



Secretary
Yazheng Yang
The Chinese Society of Theoretical and
Applied Mechanics

Local Academic Committee Members:

Biao Wang (Sun Yat-sen University)
Bin Liu (Tsinghua University)
Changqing Chen (Tsinghua University)
Cunfa Gao (Nanjing University of Aeronautics and Astronautics)
Daining Fang (Peking University)
Enhou Han (Institute of Metal Research, Chinese Academy of Sciences)
Gangfeng Wang (Xi'an Jiaotong University)
Guozheng Kang (Southwest Jiaotong University)
Hongping Zhao (Tsinghua University)
Huiji Shi (Tsinghua University)
Huiimin Xie (Tsinghua University)
Jianxiang Wang (Peking University)
Jun Sun (Xi'an Jiaotong University)
Lijie Qiao (University of Science & Technology Beijing)
Linzhi Wu (Harbin Institute of Technology)
Minghao Zhao (Zhengzhou University)
Quanshui Zheng (Tsinghua University)
Qunyang Li (Tsinghua University)
Shandong Tu (East China University of Science and Technology)
Shaoyun Fu (Technical Institute of Physics and Chemistry, Chinese Academy of Sciences)
Tianjian Lu (Xi'an Jiaotong University)
Tiejun Wang (Xi'an Jiaotong University)
Wanlin Guo (Nanjing University of Aeronautics and Astronautics)
Weiqiu Chen (Zhejiang University)
Wen Chen (Hohai University)
Xianghe Peng (Chongqing University)
Xide Li (Tsinghua University)
Xishu Wang (Tsinghua University)
Xu Han (Hunan University)
Xue Feng (Tsinghua University)
Xuefeng Yao (Tsinghua University)
Xueren Wu (Beijing Institute of Aeronautical Materials)
Yajun Yin (Tsinghua University)
Yanping Cao (Tsinghua University)
Yapu Zhao (Institute of Mechanics, Chinese Academy of Sciences)
Yichun Zhou (Xiangtan University)
Yilan Kang (Tianjin University)
Yinghua Liu (Tsinghua University)
Yueguang Wei (Institute of Mechanics, Chinese Academy of Sciences)
Yulong Li (Northwestern Polytechnical University)
Zhanli Liu (Tsinghua University)
Zheng Zhong (Tongji University)
Zhenhan Yao (Tsinghua University)
Zhihai Xiang (Tsinghua University)

Zhiping Xu (Tsinghua University)
Zhong Zhang (National Center for Nanoscience and Technology)
Zhuo Zhuang (Tsinghua University)

Secretariat:

Yannan Tang (The Chinese Society of Theoretical and Applied Mechanics)
Dongdong Zhou (The Chinese Society of Theoretical and Applied Mechanics)
Jie Chen (The Chinese Society of Theoretical and Applied Mechanics)
Junli Liu (The Chinese Society of Theoretical and Applied Mechanics)
Liang Guo (The Chinese Society of Theoretical and Applied Mechanics)
Liyuan Zhang (Tsinghua University)
Mangong Zhang (Tsinghua University)
Xiangying Ji (Tsinghua University)
Xiao Huang (Tsinghua University)
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Secretariat Office:

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Email: ICF13@cstam.org.cn

APPENDIX 3: INTERNATIONAL ORGANIZATION

International Scientific Advisory Board

Leslie Banks-Sills (Israel)
Grigory I. Barenblatt (USA)
Claude Bathias (France)
Alberto Carpinteri (Italy)
René de Borst (The Netherlands)
Robert H. Dodds (USA)
Mimoun Elboujdaini (Oman)
Fernand Ellyin (Canada)
Giuseppe Ferro (Italy)
Huajian Gao (USA)
Emmanuel E. Gdoutos (Greece)
Robert Goldstein (Russia)
Dietmar Gross (Germany)
En-Hou Han (China)
Mark Hoffman (Australia)
Youshi Hong (China)
Xiao Zhi Hu (Australia)
Yonggang Huang (USA)
John W. Hutchinson (USA)
Keh-Chih Hwang (China)
Anthony R. Ingraffea (USA)
Bhushan L. Karihaloo (UK)
Takayuki Kitamura (Japan)
John F. Knott (UK)
Jian Lu (Hong Kong, China)
Digby D. MacDonald (USA)
Yiu-Wing Mai (Australia)
Arthur J. McEvily (USA)
Nikita F. Morozov (Russia)
Ramarathnam Narasimhan (India)
Andrzej Neimitz (Poland)
James C. Newman (USA)
Paul C. Paris (USA)
Lijie Qiao (China)
Krishnaswamy Ravi-Chandar (USA)
Robert O. Ritchie (USA)
Claudio Ruggieri (Brazil)
Ashok Saxena (USA)
George C. Sih (China)
Jun Sun (China)
Zhiqiang Suo (USA)

David Taplin (UK)
Shandong Tu (China)
Viggo Tvergaard (Denmark)
Cynthia A. Volkert (Germany)
Kim Wallin (Finland)
Gordon Williams (UK)
Xue-Ren Wu (China)
Wei Yang (China)
Lin Ye (Australia)
Toshimitsu Yokobori (Japan)
Shouwen Yu (China)
Tongyi Zhang (Hong Kong, China)
Zhiliang Zhang (Norway)

International Scientific Committee

S01	Advanced Manufacture and Processing (Including Welding, Cutting, Surface Treatment, etc.) Daolun Chen (Canada) Xiao Huang (Canada) Minghao Zhao (China)
S02	Aeronautics and Aerospace Francis Collombet (France) Weixing Yao (China) Huang Yuan (Germany)
S03	Aging Wenbo Luo (China) Yingshe Luo (China)
S04	Analytical Models Michele Ciavarella (Italy) Tianyou Fan (China) Youwen Liu (China) Baolin Wang (China) Linzhi Wu (China)
S05	Biomaterials and Tissues Francois Barthelat (Canada) Huajian Gao (USA) Yuan Lin (Hong Kong, China) Nicola Pugno (Italy) Robert O. Ritchie (USA) Yajun Yin (China)
S06	Biomechanics Raj Das (New Zealand) Baohua Ji (China) Chwee Teck Lim (Singapore) Tian-Jian Lu (China) H. Jerry Qi (USA) Yajun Yin (China)
S07	Ceramics/Ceramic Matrix Composites Jia Li (France) Marcos Pereira (Brazil) Yi Sun (China) Xiaosu Yi (China)
S08	Computational Mechanics René de Borst (the Netherlands) Yuantong Gu (Australia) Seyoung Im (Korea) Guirong Liu (USA)

	Wing Kam Liu (USA) Zhuo Zhuang (China)
S09	Concrete and Rock Xiating Feng (China) Gang Wang (Hong Kong, China) Qiang Yang (China)
S10	Corrosion, Environmentally Assisted Cracking and Corrosion Fatigue Wolfgang Dietzel (Germany) Xishu Wang (China)
S11	Criteria of Fracture and Failure Dietmar Gross (Germany) Fuzhen Xuan (China) Maohong Yu (China) Robert Bell (Canada)
S12	Damage and Micromechanics Michal Basista (Poland) Oleg B. Naimark (Russia) Tie-Jun Wang (China)
S13	Dislocations and Defects Khanh Chau Le (Germany) Xiaolei Wu (China) Stefan Wurster (Austria)
S14	Education on Fracture and Fatigue Shouwen Yu (China)
S15	Electronic Materials Xu Chen (China) Fei Fang (China) Fuqian Yang (USA)
S16	Embrittlement Kewei Gao (China) Hryhoryi Nykyforchyn (Ukraine) Jesús Toribio (Spain)
S17	Failure Analysis Andreas Klenk (Germany) Teng Li (USA) Bin Liu (China)
S18	Fatigue Myriam Brochu (Canada) Huiji Shi (China) Xishu Wang (China) Xue-Ren Wu (China)

S19	Functionally Graded Materials Zhihe Jin (USA) Wei Pan (China) Zheng Zhong (China)
S20	Geophysics and Tectonics Qunyang Li (China) A. P. S. Selvadurai (Canada)
S21	Health Monitoring of Structures Lijuan Li (China) Zhihai Xiang (China) Dietmar Eifler (Germany)
S22	High Temperature and Creep Xue Feng (China) Ashok Saxena (USA) Huiji Shi (China) Yichun Zhou (China)
S23	History of Fracture Mechanics and Fatigue Shouwen Yu (China) Wilfried Becker (Germany)
S24	Impact and Dynamics Yulong Li (China) Krishnaswamy Ravi-Chandar (USA) Jialing Yang (China)
S25	Instability Yanping Cao (China) Xi Chen (USA)
S26	Interaction between Structures and Liquid (or Ice) Zhiping Xu (China)
S27	Inverse Problems Zhihai Xiang (China) Huizhu Yang (China) Lin Ye (Australia)
S28	Lightweight Materials and Structures Dan M. Constantinescu (Romania) Tie-Jun Wang (China) Fei Xu (China)
S29	Materials in a Space and Severe Environment Xue Feng (China) Jiecai Han (China)
S30	MEMS and NEMS Xuejun Fan (USA) Yang Ju (Japan)

	Masumi Saka (Japan) Yapu Zhao (China)
S31	Mesoscale Modeling Yong Ni (China) Jie Wang (China) Xiong Zhang (China)
S32	Mixed Mode and Constraint Effects Bill Y. J. Chao (USA) Emmanuel E. Gdoutos (Greece) Wanlin Guo (China)
S33	Multi-field Coupling Zengtao Chen (Canada) Qinghua Qin (Australia) Qingsheng Yang (China)
S34	Multiscale Experiments and Modeling Bill Y. J. Chao (USA) Yilan Kang (China) Xide Li (China) Wei-Chung Wang (Taipei, China) Huimin Xie (China)
S35	Nano- or Micro-scale Xide Li (China) Xiaolei Wu (China) Quan-Shui Zheng (China)
S36	Nanomaterials Ning Hu (Japan) A. K. Soh (Hong Kong, China) Zhong Zhang (China)
S37	Nondestructive Examination Lixun Cai (China) Zheng Li (China) Zhihai Xiang (China)
S38	Nonlinear Fracture Mechanics Yue-Guang Wei (China) Qingda Yang (USA) Zhi-Liang Zhang (Norway)
S39	Physical Aspects Wanlin Guo (China) Yapu Zhao (China)
S40	Pipelines and Pressure Vessels Yinghua Liu (China) Minxu Lu (China)

S41	Plasticity Yanyao Jiang (USA) Guozheng Kang (China) Takayuki Kitamura (Japan) Xianghe Peng (China) Shaoxing Qu (China)
S42	Polymer- and Metal-Matrix Composites Shanyi Du (China) Shaoyun Fu (China) Jingshen Wu (Hong Kong, China) Xuefeng Yao (China) Zhong Zhang (China)
S43	Polymers Moussa Naït Abdelaziz (France) Rafael Estevez (France) Tie-Jun Wang (China)
S44	Railways U. Zerbst (Germany) Yongxiang Zhao (China)
S45	Reliability, Durability and Life Cycle Modeling Hans-Peter Gänser (Austria) Liyang Xie (China)
S46	Residual Stresses Jian Lu (Hong Kong, China) Shaker A. Meguid (Canada) Huimin Xie (China) Xuefeng Yao (China)
S47	Scaling Laws and Size Effects Yangtse Cheng (USA) A. Hansen (Norway) Toshiyuki Meshii (Japan) Gangfeng Wang (China) Yapu Zhao (China)
S48	Smart Materials and Structures Changqing Chen (China) Wei-Qiu Chen (China) Qinghua Qin (Australia) Qingping Sun (Hong Kong, China)
S49	Soft Matter/Materials Yanping Cao (China) Wen Chen (China) Patricia Frontini (Argentina) Wei Hong (USA)

	Hua Li (Singapore)
S50	Statistical Physics and Fracture Daniel Bonamy (France) Davy Dalmas (France) Laurent Ponson (France) Jizeng Wang (China)
S51	Structural Integrity and Safety Assessment Sergei Alexandrov (Russia) Yinghua Liu (China) Suyuan Yu (China)
S52	Surfaces and Interfaces Huiling Duan (China) Nimal Rajapakse (Canada) Gangfeng Wang (China)
S53	Thin Films, Coating, and Membranes David Bahr (USA) Alex A. Volinsky (USA) Biao Wang (China) Tongyi Zhang (Hong Kong, China) Minghao Zhao (China)
S54	Transportation Infrastructure: Bridges and Roads Su Hao (USA) Qunyang Li (China) Chunsheng Wang (China)
M01	Professor Sir Alan Howard Cottrell Memorial Symposium Xi-Qiao Feng (China) James Marrow (UK) David Taplin (UK) Wei Zhou (Singapore)
M02	Professor Anthony G. Evans Memorial Symposium Roberto Ballarini (USA) William Curtin (Switzerland) John W. Hutchinson (USA) Michael Thouless (USA) Xuanhe Zhao (USA)
M03	Challenging Issues in Smart Materials and Structures Dai-Ning Fang (China) Cunfa Gao (China) Yasuhide Shindo (Japan) Tongyi Zhang (Hong Kong, China)
M04	Very High Cycle Fatigue Claude Bathias (France)

	Youshi Hong (China) Qingyuan Wang (China)
M05	Extended Finite Element Methods and Their Applications Zhanli Liu (China) Zhuo Zhuang (China)
M06	Materials and Structures under Severe Conditions Davide Bigoni (Italy) Nicola Pugno (Italy)
M07	Strategic International Cooperative Research on the Predicting Methods of the Life of Crack Growth and Initiation under High Temperature– Creep Fatigue Conditions Kamran Nikbin (UK) Masaaki Tabuchi (Japan) Toshimitsu Yokobori (Japan)
M08	Reliability and Integrity of Engineering Structures Yinghua Liu (China) Ernian Pan (USA) Shandong Tu (China)
M09	Boundary Element Methods and Applications Zhenhan Yao (China) Chuanzeng Zhang (Germany)
M10	Local Approaches to Cleavage and Ductile Fracture Boris Margolin (Russia) Claudio Ruggieri (Brazil) Kim Wallin (Finland)
M11	Multiscale Modeling of Biological Systems Francois Barthelat (Canada) Markus Buehler (USA) Zhiping Xu (China)
M12	Fracture and Instabilities in Soft Solids Wei Hong (USA) Oscar Lopez-Pamies (USA)

APPENDIX 4: HONOUR LECTURES

Opening Honour Lecture

Fracture and fatigue: From macro to nano scales and from engineered materials to biological systems

Professor Subra Suresh

President-Elect, Carnegie Mellon University, Pittsburgh, PA 15213, USA

Professor Subra Suresh is the Vannevar Bush Professor of Engineering (on leave) at the Massachusetts Institute of Technology. Since October 2010, he has been serving as the 13th director of the National Science Foundation (NSF) for a six-year term. Prior to assuming this position, Professor Suresh was MIT's dean of engineering. As a mechanical engineer who later became interested in materials science and biology, Suresh has done pioneering work in the biomechanics of blood cells under the influence of diseases such as malaria. From 2000 to 2006, Suresh served as the head of the MIT Department of Materials Science and Engineering. He joined MIT in 1993 as the R.P. Simmons Professor of Materials Science and Engineering and held joint faculty appointments in the Departments of Mechanical Engineering and Biological Engineering, as well as the Division of Health Sciences and Technology. Suresh holds a bachelor's degree from the Indian Institute of Technology in Madras, a master's degree from Iowa State University, and earned his ScD from MIT in 1981.



Abstract:

This presentation will begin with a discussion of advances in our understanding of the role of length scales, from macroscopic structural components to nanostructured materials, in influencing fracture and fatigue of engineered materials. Particular attention will be devoted to recent developments of some strategies that demonstrate means by which the strength of metals can be significantly enhanced without compromising ductility and damage tolerance under monotonic and cyclic loading conditions. Possible future directions for such strategies as well as their current limitations will be highlighted. Focus will then be shifted to the effects of reduction in structural length scale to the nanometer regime in influencing ductility and damage tolerance of some biological systems. The presentation will conclude with a brief examination of some topics dealing with studies of fracture and fatigue in the context of human health and disease, especially connecting engineering approaches with cell and molecular-level mechanistic phenomena.

ICF President Honour Lecture

Piezonuclear fission reactions produced by fracture and earthquakes: From the chemical evolution of our planet to the so-called cold fusion

Professor Alberto Carpinteri

Politecnico di Torino, Department of Structural, Geotechnical and Building Engineering, 10129 Torino, Italy

Professor Alberto Carpinteri is the President of the National Research Institute of Metrology in Italy, INRIM (2011-2015). He is also the Chair of Structural Mechanics at the Politecnico di Torino (Italy), and the Director of the Laboratory of Fracture Mechanics, since 1986. He has held different responsibilities during this period, among which: Head of the Department of Structural Engineering (1989-1995), and Founding Member and Director of the Post-graduate School in Structural Engineering (1990-). He has been a Visiting Scientist at Lehigh University, Pennsylvania, USA (1982-1983), and a Fellow of different Academies and Institutions, among which: European Academy of Sciences (2009-), International Academy of Engineering (2010-), Turin Academy of Sciences (2005-), American Society of



Civil Engineers (1996-). Prof. Carpinteri is President of the International Congress on Fracture, ICF (2009-2013), and has been President of the European Structural Integrity Society, ESIS (2002-2006), the International Association of Fracture Mechanics for Concrete and Concrete Structures, IA-FraMCoS (2004-2007), the Italian Group of Fracture, IGF (1998-2005). He is a Member of the Congress Committee of the International Union of Theoretical and Applied Mechanics, IUTAM (2004-2012), a member of the editorial board of thirteen international journals, the editor-in-chief of the journal "Meccanica", and the author of over 700 publications, of which more than 300 are papers in refereed international journals and 42 are books. Prof. Carpinteri received numerous honours and awards: the Robert L'Hermite Medal from RILEM (1982), the Japan Society of Mechanical Engineers Medal (1993), the Honorary Professorship from the Nanjing Architectural and Civil Engineering Institute, China (1996), and from the Albert Schweitzer University, Geneva, Switzerland (2000), the Wessex Institute of Technology Eminent Scientist Medal, UK (2000), the Griffith Medal from ESIS (2008), the inclusion in the "Top 100 Scientists" list of the International Biographical Centre, Cambridge, UK (2009), the Honorary Fellowship Award from ICF (2009), and the Swedlow Memorial Lecture Award from ASTM (2011).

Abstract:

Piezonuclear reactions are fissions of non radioactive, relatively light elements (iron or lighter ones) that split without a concomitant generation of gamma radiation or radioactive waste but give rise to neutron emissions. As evoked by the Greek root of the word, they are caused by pressure waves, in both liquids and solids. The earliest

experiences in liquids were carried out at the National Research Council (CNR) in Rome by exposing aqueous solutions of iron salts to ultrasounds, whereas the initial experiments in solids were performed at the Politecnico di Torino, using granitic and basaltic rocks loaded in compression up to brittle failure.

The salient results, which have already appeared in authoritative international journals of experimental physics and mechanics, provide direct and indirect evidence of the occurrence of piezonuclear reactions. Indirect evidence includes the neutron emissions that have been detected in a regular and reproducible fashion using different types of detector. It should be noted that, as a function of different parameters, including specimen size scale, the highest intensity emissions were recorded at the time of crushing failure with neutron counts exceeding the background value by one to three orders of magnitude [1-3]. Direct evidence of piezonuclear reactions was obtained through a brand-new spectroscopic technique, EDS [4], which, by comparing a statistically significant number of points lying on the outer surface and the fracture faces of the specimen, and aiming directly on the only two iron ores present – Phengite and Biotite – was able to ascertain that iron, on average, was locally reduced by 25% and was replaced with atoms of aluminium (atomic number =13, half that of iron), silicon (atomic number =14) and magnesium (atomic number =12). Thus, the split was symmetrical in the case of aluminium, asymmetrical in the other instances. If these reactions can take place in a laboratory, where pressure and temperature conditions are much lower and, especially, the masses at play are much smaller than those found in the deep layers of the earth's crust, they are bound to take place on a much larger scale within the latter, triggered by fracturing and crushing phenomena of seismic and tectonic origin.

On the other hand, as pointed out in the works by Kuzhevskij et al. (2003), neutron fluxes up to a thousand times the natural background level may be detected before and during earthquakes, including medium magnitude ones. It may be surprising to learn from the data of Earth Science literature that piezonuclear reactions of the type we have described as having taken place almost instantaneously in granite specimens are deemed to have occurred in comparable proportions during the formation and through most of the activity of the tectonic plates (from 3.8 through 2.5 billion years ago) [5]. In particular, it has been ascertained that the iron content in the earth's crust has decreased from 8% to 4% by mass, while at the same time aluminium has increased from 4% to 8%. The location of all the major reserves of aluminium along the main fault lines (the perimeters of the tectonic plates) surely bears witness to the aforementioned considerations. Over even longer time spans we get a more complete picture encompassing all the most important elements: not just iron, nickel, aluminium, silicon, magnesium, but also calcium, potassium, sodium, oxygen, nitrogen, carbon, hydrogen. While alkaline earth elements convert into the alkali elements that immediately precede them by releasing a proton, the balance turns out just right if one considers the well-known, and still unexplained, 3% increase in oxygen, the so-called Great Oxidation Event, with the ensuing formation of the oceans and origin of life. It is also interesting to consider that a proportion of the magnesium converted into carbon (atomic number =6, half that of magnesium) and formed the earth's early carbon dioxide and methane rich atmospheres. Maybe even more striking is the realization that simple calculations will show how excess calcium turned into the water of the oceans

while excess magnesium became the carbon of prototerrestrial atmospheres. Similarly, sodium chloride (sodium =11, chlorine =17) is thought to originate from the fission of nickel (28). Iron and nickel are becoming extinguished, especially in the oceans [5].

Several evidences of anomalous nuclear reactions occurring in condensed matter have been observed during electrolysis, in addition to solid fracture and liquid cavitation. Despite the great amount of experimental results coming from the so-called Cold Nuclear Fusion and Low Energy Nuclear Reaction research fields, the comprehension of these phenomena still remains unanswered. On the other hand, as reported by most articles devoted to Cold Nuclear Fusion, one of the principal features is the appearance of micro-cracks on the electrode surfaces after the experiments. A mechanical explanation is proposed considering the previously introduced piezonuclear reactions, which should be a consequence of hydrogen embrittlement of the electrodes during electrolysis. Energy emissions in the form of neutrons and alpha particles were measured during the experiments, where the electrolysis is obtained using Ni-Fe and Cr-Co electrodes in an aqueous solution. The electrode compositions were analyzed both before and after the experiments recognizing the effects of piezonuclear fissions occurring in the host lattices.

Closing Honour Lecture

On the Nano-toughening of Polymers and Fibre Composites

Professor Yiu-Wing Mai

Centre for Advanced Materials Technology (CAMT), School of Aeronautics, Mechanical & Mechatronic Engineering J07, The University of Sydney, Sydney, NSW 2006, Australia

Professor Yiu-Wing Mai obtained his undergraduate education and postgraduate research training in mechanical engineering at the University of Hong Kong, China. He previously worked in the US (University of Michigan and NIST), the UK (Imperial College) and Hong Kong (HKUST, CityU, HKU and PolyU). He holds a University Chair in Mechanical Engineering at the University of Sydney. Prof Mai's major current research interest is on polymer nanocomposites. His published work has contributed to the development of asbestos-free fibre cements, testing protocols for fracture toughness of polymer films and improved composites manufacturing processes with global impact. Professor Mai is Fellow of the Royal Society and the Royal Academy of Engineering.



Abstract

In recent years, the availability of a wide range of nano-sized modifiers and particles and their increasing ease of being incorporated into polymer matrices has seen an evolution of conventional composite materials to a new class of polymer nanocomposites. Many engineering applications of polymer nanocomposites (e.g., thermal interface materials, LED devices, etc) require them to possess not only superior mechanical (e.g., toughness, stiffness, strength, etc) but also improved physical properties (e.g., thermal conductivity, permeability, optical transparency, fire retardancy, etc). Herein, these two aspects will be discussed.

Consider the scientific and engineering issues of nano-toughening in thermosetting and thermoplastic polymers by way of their fracture and fatigue characteristics. First, the toughening of epoxy thermosets is studied using a block ionomer of sulfonated SEBS which yields phase-separated inclusions with different length scales from nanometers to tens of microns. Further studies on the toughening of epoxies incorporated with 100 nm nano-rubber and 20 nm nano-silica particles are also conducted. All the toughness results obtained have confirmed the existence of a “nano” effect on toughening the epoxy matrix. By contrast, adding nanoparticles, like clay, into thermoplastics, like nylon, often embrittles rather than toughens the matrix. TEM results obtained from interrupted tensile tests performed on nylon/nano-clay and nylon/nano-rubber systems have identified different deformation mechanisms which lead to embrittlement and toughening in these two nanocomposites, respectively. These observations indicate that an effective way to

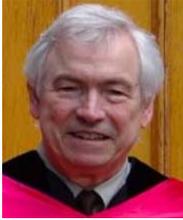
toughen thermoplastics is to incorporate two different types of nanoparticles in the matrix. The toughness results obtained for two ternary nanocomposites, epoxy/rubber/silica and nylon/rubber/clay, have supported this approach. The detailed toughening mechanisms evident from the fracture surface and around the crack-tip region of these binary and ternary nanocomposites are analyzed. In cyclic fatigue, the nanoparticles affect the crack growth rates (CGRs) in the polymer matrix in a continuous fashion as the relevant toughening mechanisms are increasingly involved and they come to a full effect when the nanocomposite fracture toughness is reached. Fatigue crack propagation studies have also been performed on epoxies filled with different amount of silica, rubber and silica/rubber nanoparticles to ascertain their influence on the fatigue thresholds and CGRs.

An unusual way of toughening thermoplastics (with and without nanoparticles) is by introducing submicron voids. This technique has been adapted to process multifunctional nanocomposites in which porous polymers are filled with nanoparticles having desired functional properties. Examples on polymer nanocomposites with improved mechanical and physical properties are illustrated.

Integrating nanoparticles in polymer matrices reinforced with conventional fibres and synthesizing carbon nanotubes (CNTs) on carbon fibres to produce hierarchical fibres in composites have been a recent development over the last few years and have produced some promising results on increased delamination toughness of composite laminates under mode I and mode II fracture. Recent examples using silica and rubber nanoparticles as well as flame synthesized CNTs@carbon fibre in epoxy/carbon fibre composites are presented.

Finally, some personal thoughts on the toughening efficiency of nano-scale particles versus micro-scale particles for polymer matrices in terms of their resistance to fracture and fatigue are given.

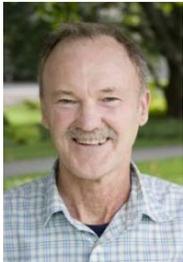
Appendix 5: PLENARY LECTURES



Control of the width of antarctic ice streams by near-crack-tip processes in a creeping and partially melting medium

James R. Rice

School of Engineering and Applied Sciences
Harvard University
USA



Mechanics and simulations of ductile fracture

John W. Hutchinson

School of Engineering and Applied Sciences
Harvard University
USA



Hydrogen embrittlement mechanism from the viewpoint of mechanics-microstructure-environment interactions

Yuditaka Murakami

International Institute for Carbon-Neutral Energy
Research (WPI-I2CNER)
Kyushu University
Japan



Deformation and fracture in nanotwinned metals and structures

Huajian Gao

School of Engineering
Brown University
USA



Simulation of fracture processes from atoms to snow slab avalanches

Peter Gumbsch

department of material sciences
Karlsruhe Institute of Technology
Germany



Thermomechanical response and fatigue failure of shape memory alloys under cyclic phase transition

Qing-Ping Sun

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



Prognostics of high temperature component reliability

Ashok Saxena

Department of Mechanical Engineering, University of
Arkansas
USA



Failure and toughening at a nano-scale

Wei Yang

Institute of Applied Mechanics
Zhejiang University
China



Spatio-temporal nature of scales in the fracture process

Yuri V. Petrov

Department of Elasticity Mathematics & Mechanics
Faculty
St.-Petersburg State University
Russia



Advances in extended finite element methods for fracture

Bhushan L. Karihaloo

Institute of Mechanics and Advanced Materials
Cardiff University
UK



Fracture surface contact in fatigue

Reinhard Pippan

Department of Material Physics

Erich Schmid Institute of Material Sciences of the

Austrian Academy of Sciences

Australia



*Size effects on deformation behaviors of metallic
single crystals*

Jun Sun

State Key Laboratory for Mechanical Behavior of

Materials

Xi'an Jiaotong University

China

APPENDIX 6: ACADEMIC SELECTION COMMITTEE

Academic Selection Committee for ICF13 Outstanding Paper Awards by Young Researchers

(In alphabetical order of last name)

Prof. Claude **Bathias** (France)
Prof. Alberto **Carpinteri** (Italy)
Prof. Mimoun Elboudjaini (Canada)
Prof. Xi-Qiao **Feng** (China)
Prof. Emmanuel **Gdoutos** (Greece)
Prof. Robert **Goldstein** (Russia)
Prof. Jidong **Kang** (China)
Prof. Masaki **Kitagawa** (Japan)
Prof. Y. **Murakami** (Japan)
Prof. **Namrata** (India)
Prof. Andre **Pineau** (France)
Prof. R. **Pippan** (Australia)
Prof. Robert **Ritchie** (USA)
Prof. Ashok **Saxena** (USA)
Prof. David **Wilkinson** (Canada)
Prof. A.T. **Yokobori** (Japan)
Prof. Shouwen **Yu** (China)
Prof. Tongyi **Zhang** (China)

APPENDIX 7: ICF13 TIMETABLE

ICF13 Timetable

	Sunday June 16	Monday June 17	Tuesday June 18	Wednesday June 19	Thursday June 20	Friday June 21
08:30–09:00						
09:00–10:10		Opening Ceremony and Opening Honour Lecture	Plenary Lectures	Presidential Honour Lecture and Plenary Lecture	Plenary Lectures	Plenary Lectures
10:10–10:30	Registration	Coffee Break				
10:30–12:10		Coffee Break	Parallel Sessions	Parallel Sessions	Parallel Sessions	Closing Honour Lecture and Closing Ceremony
12:10–13:30		Lunch Time				
13:30–14:00						
14:00–15:40		Plenary Lectures	Plenary Lectures	Parallel Sessions	Parallel Sessions	
15:40–16:00	Coffee Break					
16:00–18:00		Parallel Sessions	Parallel Sessions	Parallel Sessions	Parallel Sessions	
18:00–20:00	Registration and Welcome Reception					
08:00–18:00		Exhibition	Exhibition	Exhibition	Exhibition	Exhibition
19:00–21:00		ICF ExCo. Meeting	ICF Council Meeting	ICF ExCo. Meeting	Banquet	

APPENDIX 8: PROGRAM ORVERVIEW

	Plenary Hall B, 4th floor	202 A	202 B	203 A	203 B	205 A	205 B	206 A
Monday June 17								
09:00 - 10:40	Opening Ceremony & Honour Lecture							
10:40 - 11:00	COFFEE, East Foyer of 4th Floor							
11:00 - 12:40	Plenary 1 & Plenary 2							
12:40 - 14:00	LUNCH, South Lobby of 1st Floor							
14:00 - 15:40	Plenary 3 & Plenary 4							
15:40 - 16:00	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor							
16:00 - 18:00	S18-S1	M01-S1	S44-S1	S41-S1	M08-S1	S22-S1	S25-S1	S07-S1
19:00 - 21:00	ICF ExCo. Meeting							
Tuesday June 18								
08:30 - 10:10	Plenary 5 & Plenary 6							
10:10 - 10:30	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor							
10:30 - 12:20	S18-S3	M01-S2	S44-S2	S41-S2	M08-S2	S22-S2	S25-S2	S07-S2
12:20 - 13:30	LUNCH, South Lobby of 1st Floor							
14:00 - 15:40	Plenary 7 & Plenary 8							
15:40 - 16:00	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor							
16:00 - 18:00	S18-S5	M12-S1	S41-S3	M08-S3	S22-S3	S38-S1	S42-S1	
19:00 - 21:00								
Wednesday June 19								
08:30 - 10:20	Presidential Honour Lecture & Plenary 9							
10:20 - 10:30	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor							
10:30 - 12:20	S18-S7	S15-S1	M12-S2	S41-S4	M08-S4	S22-S4	S38-S2	S42-S2
12:20 - 13:30	LUNCH, South Lobby of 1st Floor							
13:30 - 15:40		S06-S1	S52-S1	S41-S5	M08-S5	S22-S5	S38-S3	S42-S3
15:40 - 16:00	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor							
16:00 - 18:00		S06-S2	S52-S2	S13-S1	M15-S1	S39-S1	S51-S1	S43-S1
19:00 - 21:00								
Thursday June 20								
08:30 - 10:10	Plenary 10 & Plenary 11							
10:10 - 10:30	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor							
10:30 - 12:20	S18-S12	S06-S3	S52-S3	S13-S2	M15-S2	S39-S2	S51-S2	S43-S2
12:20 - 13:30	LUNCH, South Lobby of 1st Floor							
13:30 - 15:40		S06-S4	S18-S14	S20-S1	M15-S3	S39-S3	S51-S3	S43-S3
15:40 - 16:00	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor							
16:00 - 18:00		M11-S1	S29-S1	S20-S2	S18-S16	S39-S4	S51-S4	S43-S4
Friday June 21								
08:30 - 10:10	Plenary 12 & Plenary 13							
10:10 - 10:30	COFFEE, East Foyer of 4th Floor							
10:30 - 12:10	Honour Lecture & Closing Ceremony							

12:10 - 13:30	LUNCH, South Lobby of 1st Floor										
	206 B	207	208 A	208 B	209 A	209 B	210 A	210 B	211	212 A	212 B
Monday June 17											
09:00 - 10:40											
10:40 - 11:00	COFFEE, East Foyer of 5th Floor										
11:00 - 12:40											
12:40 - 14:00	LUNCH, South Lobby of 2st Floor										
14:00 - 15:40											
15:40 - 16:00	COFFEE, East Foyer of 4th Floor and East Foyer of 3rd Floor										
16:00 - 18:00	S21-S1	M10-S1	M03-S1	M05-S1	S24-S1	S04-S1	S11-S1	M04-S1	S46-S1		M13-S1
19:00 - 21:00											
Tuesday June 18											
08:30 - 10:10											
10:10 - 10:30	COFFEE, East Foyer of 4th Floor and East Foyer of 3rd Floor										
10:30 - 12:20	S21-S2	M10-S2	M03-S2	M05-S2	S24-S2	S04-S2	S11-S2	M04-S2	S46-S2	S31-S1	M13-S2
12:20 - 13:30	LUNCH, South Lobby of 2st Floor										
14:00 - 15:40											
15:40 - 16:00	COFFEE, East Foyer of 4th Floor and East Foyer of 4nd Floor										
16:00 - 18:00	S54-S1	M10-S3	M03-S3	M05-S3	S24-S3	S04-S3	S11-S3	M04-S3	S37-S1	S31-S2	M13-S3
19:00 - 21:00											
Wednesday June 19											
08:30 - 10:20											
10:20 - 10:30	COFFEE, East Foyer of 4th Floor and East Foyer of 4nd Floor										
10:30 - 12:20	S54-S2	M10-S4	M06-S1	M05-S4	S24-S4	S04-S4	S11-S4	M04-S4	S37-S2	S31-S3	M13-S4
12:20 - 13:30	LUNCH, South Lobby of 3st Floor										
13:30 - 15:40	S28-S1	S34-S1	S48-S1	S18-S9	S24-S5	S04-S5	S11-S5	M04-S5	S45-S1	S32-S1	M13-S5
15:40 - 16:00	COFFEE, East Foyer of 4th Floor and East Foyer of 4nd Floor										
16:00 - 18:00	S28-S2	S34-S2	S48-S2	S35-S1	S24-S6	S04-S6	S11-S6	M04-S6	S45-S2	S32-S2	
19:00 - 21:00											
Thursday June 20											
08:30 - 10:10											
10:10 - 10:30	COFFEE, East Foyer of 4th Floor and East Foyer of 4nd Floor										
10:30 - 12:20	S28-S3	S34-S3	S48-S3	S35-S2	S19-S1	S02-S1	S40-S1		S45-S3	S32-S3	M09-S1
12:20 - 13:30	LUNCH, South Lobby of 3st Floor										
13:30 - 15:40	S28-S4	M07-S1	S48-S4	S35-S3	S19-S2	S02-S2	S40-S2	S03-S1	S47-S1	S32-S4	M09-S2
15:40 - 16:00	COFFEE, East Foyer of 4th Floor and East Foyer of 4nd Floor										
16:00 - 18:00		M07-S2		S35-S4	S19-S3	S02-S3	S40-S3	S03-S2	S47-S2		M09-S3
Friday June 21											
08:30 - 10:10											
10:10 - 10:30	COFFEE, East Foyer of 6th Floor										
10:30 - 12:10											
12:10 - 13:30	LUNCH, South Lobby of 3st Floor										

	213 A	213 B	215	401	402 A	402 B	403	405	406	407
Monday June 17										
09:00 - 10:40										
10:40 - 11:00	COFFEE, East Foyer of 4th Floor									
11:00 - 12:40										
12:40 - 14:00	LUNCH, South Lobby of 1st Floor									
14:00 - 15:40										
15:40 - 16:00	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor									
16:00 - 18:00	S53-S1	S01-S1	M14-S1	M02-S1	S08-S1	S12-S1	S17-S1	S05-S1	S18-S2	S10-S1
19:00 - 21:00										
Tuesday June 18										
08:30 - 10:10										
10:10 - 10:30	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor									
10:30 - 12:20	S53-S2	S01-S2	M14-S2	M02-S2	S08-S2	S12-S2	S17-S2	S05-S2	S18-S4	S10-S2
12:20 - 13:30	LUNCH, South Lobby of 1st Floor									
14:00 - 15:40										
15:40 - 16:00	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor									
16:00 - 18:00	S53-S3	S01-S3		M02-S3	S08-S3	S12-S3	S17-S3	S05-S3	S18-S6	S10-S3
19:00 - 21:00	ICF Council Meeting									
Wednesday June 19										
08:30 - 10:20										
10:20 - 10:30	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor									
10:30 - 12:20	S53-S4	S09-S1	S30-S1	M02-S4	S08-S4	S12-S4	S17-S4	S05-S4	S18-S8	S16-S1
12:20 - 13:30	LUNCH, South Lobby of 1st Floor									
13:30 - 15:40	S53-S5	S09-S2	S30-S2	S50-S1	S08-S5	S12-S5	S17-S5	S05-S5	S18-S10	S16-S2
15:40 - 16:00	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor									
16:00 - 18:00	S53-S6	S09-S3	S30-S3	S50-S2	S08-S6	S12-S6	S17-S6	S05-S6	S18-S11	S16-S3
19:00 - 21:00	ICF ExCo. Meeting									
Thursday June 20										
08:30 - 10:10										
10:10 - 10:30	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor									
10:30 - 12:20	S49-S1	S09-S4	S36-S1	S50-S3	S08-S7	S12-S7	S17-S7	S33-S1	S18-S13	S16-S4
12:20 - 13:30	LUNCH, South Lobby of 1st Floor									
13:30 - 15:40	S49-S2	S09-S5	S36-S2	S50-S4	S08-S8	S12-S8	S17-S8	S33-S2	S18-S15	S27-S1
15:40 - 16:00	COFFEE, East Foyer of 4th Floor and East Foyer of 2nd Floor									
16:00 - 18:00	S49-S3		S36-S3	S50-S5		S12-S9		S33-S3	S18-S17	S27-S2
Friday June 21										
08:30 - 10:10										
10:10 - 10:30	COFFEE, East Foyer of 4th Floor									
10:30 - 12:10										
12:10 - 13:30	LUNCH, South Lobby of 1st Floor									

APPENDIX 9: HOSTS, ORGANIZORS AND SPONSERS

Co-Host



ICF13 Beijing



The International
Congress on Fracture
(ICF)

Organizers



The Chinese Society of
Theoretical and Applied
Mechanics (CSTAM)

FGHKC

Fracture Group of Hong
Kong, China (FGHKC)



Chinese Mechanical
Engineering Society (CMES)



Chinese Materials
Research Society (CMRS)



Chinese Society of Corrosion
and Protection (CSCP)



Chinese Society of
Aeronautics and
Astronautics (CSAA)



The China Structural
Integrity Consortium (CSIC)



Chinese Society for Metals
(CSM)

Sponsors



China Association for
Science and Technology



National Natural Science
Foundation of China

Co-Sponsors



Institute of Mechanics,
Chinese Academy of
Sciences



Tsinghua University



Sichuan University



East China University of Science and Technology



South China University of Technology



Tianjin University



Zhejiang University



Xiangtan University



Tongji University

International Links



American Society for Testing and Materials (ASTM)



Deutscher Verband für Materialforschung und –prüfung e.V. (DVM)



Gruppo Italiano Frattura (IGF)



L'Association Française de Mécanique (AFM)



Sociedade Portuguesa de Materiais (SPM)

APPENDIX 10: EXHIBITION

Exhibitors

1. Elsevier
2. CARE
3. John Wiley & Sons Australia
4. Consysgroup
5. Springer
6. MTS
7. RUMUL
8. AIP
9. AMS

APPENDIX 11: REVENUE AND EXPENDITURE

ICF13 Summary of Revenue and Expenditures

I – Expenditures

Printing	CNY 24,000
Registration and administration	CNY 935,804
Publication	CNY 186,500
Rentals	CNY 1,168,324
Meeting expenses	CNY 1,119,097
Entertainment	CNY 1,264,000
Exhibit	CNY 40,000
Web-site	CNY 45,000
Workforce and working conditions, volunteers	CNY 211,361
Wireless network hires	CNY 160,000
Entertainment Show	CNY 99,000
Security	CNY 80,000
Medical care	CNY 45,000
Transportation service	CNY 15,000
ICF levy (net payment)	CNY 65,325
Total Expenditures	CNY 5,458,411

II- Revenue

Grant from foundation and association	CNY 700,000
Partnerships	CNY 180,000
Exhibits	CNY 180,000
Registration fees	CNY 3,302,800
Subtotal Revenue	CNY 4,362,800

Levy	CNY
CNY 2,714,500×5%	135,725
Expenditures	70,400
Gold Medals	52,000
Certificates	4,000
ICF support financially to 3 scientists from developing countries	14,400
Net total payment to ICF	65,325

Total Surplus * CNY –1,095,611

***Note (31,May,2014): ICF13 Organizing Committee Covers this deficit completely and the final balance ---CNY 00.00.**

APPENDIX 12 ICF14 ANNOUNCEMENT

ICF14 Ad in Final Program: the popularization for the next ICF meeting (Greece 2015):

ICF14
14th International Conference on
Fracture

Rhodes, Greece
June 18-23, 2017



<http://www.icf14.org>

Under the auspices of the
International Congress on Fracture – The World
Academy of Structural Integrity
(ICF-WASI)

Conference Chairman

Emmanuel E. Gdoutos
egdoutos@civil.duth.gr

Technical Programme Chairs: M. Konsta-Gdoutos, J. Marrow
Industrial Programme Chair: D. Klingbeil
Int. Steering Committee Chair: D. Taplin

Location

The conference will take place in the Rodos Palace hotel in the idyllic island of Rhodes, located in the south east part of Greece between the Aegean and Mediterranean seas. Rhodes has a unique scenic beauty with areas of historical interest and archeological importance. Take a stroll and admire the gates, the towers, the squares, the medieval churches, the bridges, the Castle of Knights, the old Clock, the Acropolis, the ancient monuments, the Temple of Zeus, Athena and Apollo, the Palace of the Grand Master, the stadium. Visit the valley of the butterflies, the Minoan city of Ialysos, the ancient picturesque city of Lindos with its Acropolis, temple and towers, the monastery of Panagia Tsambika with its miracle-working icon. Welcome to the island of sea nymph Rhode, daughter of Poseidon (Neptune), bride of Helios (Sun). Enjoy the sun-rays scattered from Helios that made Rhodes the brightest and sunniest island of the Aegean Sea.

Special Symposia

A series of special symposia in cutting-edge technologies honoring renowned scientists will be organized.

Transportation

There are regular international flights to and from Rhodes International airport from most European cities.



Conference venue: Rodos Palace hotel



Meeting room



Castle - Old town

APPENDIX 13: OPENING AND CLOSING REMARKS

13.1 Opening remarks and welcome speech of Professor Weichen Shen, the Executive Vice-President and Chief Executive Secretary of China Association for Science and Technology



Dear Mr. Chairman, Ladies, Gentlemen, and all Friends:

Today, more than one thousand respectable experts and scholars in the field of fracture from over forty countries are gathering at Beijing to attend the 13th International Conference on Fracture. This is the first time that China hosts this influential conference since China joined the International Congress on Fracture in 1977. This conference is a great event in international academic community in relevant fields. On behalf of the China Association for Science and Technology, I am delighted to extend warm congratulations to the opening of the conference and sincerely welcome all distinguished attendees.

During the past half century, the International Conference on Fracture has been successfully held for 12 times. It has made significant contributions to the prosperity of fracture research, the academic exchanges and cooperation of experts all over the world, as well as the safe development of human beings. The subject of fracture is not only one of the greatest contributions to human science in the twentieth century, but also a leading subject full of revolutionary and discipline penetration in a diversity of fields, e.g. mechanics, mechanical engineering, materials science. The investigation on the failure mechanism and crack propagation of materials and structures, are closely related with the security problem in many engineering fields. Fracture research concerns various fracture accidents in real life, and provides important theoretical support for preventing catastrophic accidents. Its basic theory and methods have been widely used in all aspects of human production practice, such as aerospace, petrochemical, mechanical engineering, energy and environment, national defense, civil engineering, biological medicine industry and so on, guiding the safety design and production.

Two thousand and three hundred years ago, Chinese great thinker and philosopher Han Fei told us “A long dike will collapse because of an ant-hole in it; a tall building will be burned down because of a spark from a chimney's chink”. It described the safety and failure problem in the engineering structures. At present, China is entering an era of rapid economic development. This development exhibits more dependence on the safety of materials, structures, and systems than ever. This trend brings a great opportunity for Chinese scientists, and also poses a huge challenge at the same time. Economic development is the common road all international societies take, and we need to make sure the safety of the road. China is facing some safety problems, just like other countries. With the rapid development of science and technology, as well as the popularization and application of new technologies, new materials, new processes and new equipments, it puts forward new challenges to the development of fracture. How to deal with these challenges is a problem that scientists need to ponder and explore. So we must work hard, actively strengthen international exchanges and cooperation. I sincerely hope that the 13th International Conference on Fracture will open a new page in the history of international academic exchanges. China Association for Science and Technology will dedicate to serving scientists to make new contributions and promoting international exchange and cooperation of science and technology.

Dear guests and friends, the 13th International Conference on Fracture will provide a forum to communicate and learn from each other for Chinese and foreign scientists. Definitely, it will play a positive role in promoting the rapid development of related fields in China. I believe that this conference will achieve fruitful results and promote the development of related disciplines and, meanwhile, it will enhance the friendship and cooperation between the scientists from all over the world.

Finally, I sincerely wish the 13th International Conference on Fracture a great success!

Ladies and gentlemen, I wish all of you good health, happiness and success in your work!

Thank you!

13.2. Opening remarks of Professor Wei Yang, President of National Natural Science Foundation of China:



Dear President, dear distinguished delegates, ladies, and gentlemen:

On behalf of the National Natural Science Foundation of China, I am pleased to extend a warm welcome to all participants of the 13th International Conference on Fracture (ICF13), one of the most prestigious international conferences in the field of mechanics, materials science and relevant fields.

Fracture, fatigue and structural integrity of materials and structures are of critical significance in the development of human being's civilization, and lay the foundation for the improvements in different arenas of science and technology. The International Congress on Fracture devotes itself in promoting the intercommunication and corporation among the researchers in fracture all around the world, for which purpose the quadrennial International Conferences on Fracture have been playing a significant role. The ICF13 team has endeavored for years to make this conference a successful continuation of the honored tradition and, at the same time, to create a dynamic and leading conference which stretches the boundaries of the exciting disciplines for the new era. We can see that ICF13 covers almost all active research fields in solids mechanics and aims at probing into the role of fracture in the most advanced academic developments, from fundamental theories to engineering applications. We appreciate the endeavor of the International Congress on Fracture and the ICF13 team in providing us a wonderful platform for exchange and collaboration, and I am sure that the conference will offer all delegates a wealth of information and many opportunities for discussions.

The National Natural Science Foundation of China (NSFC) was established in 1986. At that time, I just got my PhD from Brown University and took a faculty position in Department of Engineering Mechanics, Tsinghua University. Ever since then, NSFC has gradually developed its funding system with the focus on three categories of programs of research promotion, talent fostering, and infrastructure construction for basic research. Being a researcher in mechanics for over 30 years, I agree with the viewpoint that

mechanics is still at its best time. Nowadays, the close interaction of mechanics with other disciplines has raised numerous interesting and challenging issues as those will be presented in this conference. Mechanics is intensively involved in all these three categories and will continue to be an important funding field of NSFC.

The National Natural Science Foundation of China has continuously stressed on the importance of international cooperation and exchange. We strive to create a favorable environment regarding cooperative channels, funding and operational mechanisms so as to facilitate the participation of Chinese scientists in the international cooperation and exchange. Among others, International Conferences of Fracture provide a wonderful chance for Chinese scholars to learn from the world and for the globe to know the recent developments in China.

Please accept my best wishes for a productive and successful ICF13.

Thank you!

13.3. Opening remarks of Professor Shouwen Yu, the Chairman of ICF13



Your Excellency, Mr. Shen Weichen, Chief Executive Secretary of the China Association for Science and Technology,
Your Excellency, Professor Yang Wei, President of the National Natural Science Foundation of China,
Your Excellency, Professor Alberto Carpinteri, President of the International Congress on Fracture,
Your Excellency, Professor Hu Haiyan, President of the Chinese Society of Theoretical and Applied Mechanics,

Dear guests, ladies and gentlemen, good morning!

On behalf of the Organizing Committee of the 13th International Conference on Fracture, I'd like to extend my warmest welcome to all the delegates present here today. Today, the hospitable Chinese people are delightfully holding in Beijing the quadrennial event at the Olympic Green. We are joined by 800 delegates from 46 countries, some of whom are scholars from scientific research community, while others are engineers from engineering and technological fields. We are brought together by this event to exchange scientific and technological research results in fracture, fatigue, damage, material strength and other related fields. It also provides a forum to promote research cooperation and cement friendship among scientists. On this early summer day in Beijing, I hope that all delegates will have pleasant exchanges and reap a bumper harvest in scientific fields. I also urge you to take the opportunity to tour this country with time-honored civilization, especially Beijing, an ancient capital of history and culture.

The study of fracture is expanding from classical areas to new frontiers, such as fracture and fatigue mechanism on nano-scale and fracture and damage in natural materials and biomaterials. To capture the latest dynamics, the sessions and symposiums cover a wide range of fresh topics. In mini-symposiums, a series of interesting subjects from engineering aspects of research and applied field of fracture will be discussed, Let us join

hands to harness these research results to benefit the whole world, to build a safer environment for more than 6 billion people on this planet and to materialize scientific advancements into humanity's happiness and well beings.

The 13th ICF marks the first time this quadrennial convenes in China. It has drawn enormous enthusiasm from Chinese scientists. As far back as 550 AD, Chinese scholar Liu Zhi already recognized the perils of fissures in a structure. He wrote, "Solid walls collapse due to cracks; Sharp swords break because of split". In modern times, Chinese geologist Li Siguang applied Griffith's theory to his study of stratum and geological structure, and founded China's geomechanics. In the 1970s, scientists at Central Iron and Steel Institute formed a large cooperation network which set the first national standard for elastic-plastic fracture toughness in then Chinese materials and mechanics community. The standard laid the foundation for later adopted standards CVDA-84 and GB-2004 and other guidelines which generated tremendous social and economic benefits. In recent years, they have scored major achievements beyond traditional arenas, for example, fatigue of smart materials, fracture and strength of nano-materials and so on.

The studies on fracture, fatigue and damage is well developed in China. For nearly four decades, eight societies and regional research teams have cooperated harmoniously. The biennial National Conferences on Fatigue and Fracture have been held 16 times in turns by close collaboration of the Chinese Society of Theoretical and Applied Mechanics, and other 5 Societies, the Chinese Societies The Fracture Group of Hong Kong and the Federation of Fracture and Structural integrity in South of China also actively engage in the preparation of ICF 13.

Today's opening ceremony is a great event for the entire fracture community. I'd like to thank my colleagues at ICF for their advice on this conference and related societies and associations around the world for their support. My gratitude also goes to CAST, China Association for Science and Technology and NSFC, National Natural Science Foundation of China, for their largesse. I'd like to extend my deepest appreciation to colleagues at the organizing committee and the secretariat for their great efforts invested in this event.

I wish the 13th International Conference on Fracture a full success, and hope that all delegates will have a pleasant stay and enjoy a good health in Beijing.

13.4. Opening remarks of Professor Alberto Carpinteri, President of International Congress on Fracture



Dear Colleagues,

ICF sends the very warmest greetings to our global community of scientists, technologists, engineers and others working in the very diverse and wide-ranging field of structural integrity. ICF was founded in 1969 at ICF2 in Brighton, England, by Professor Takeo Yokobori with origins at ICF1 in Sendai, Japan in 1965. The International Congress on Fracture (ICF) is today the premier international body for the promotion of industrial, experimental & theoretical research, education and worldwide cooperation among scientists and engineers concerned with the mechanics and mechanisms of fracture, fatigue and structural integrity & safe design of materials, components, structures, and systems.

Over the decades since 1965, ICF has made considerable progress in providing an international forum for fostering and highlighting individual, industrial and national accomplishments in the overall field of fracture and structural integrity in a wide range of disciplines beyond the traditional arenas – from Biomedical to Geophysics, from nano to mega scales, and from the physical to the holistic and systems modelling. This conveys what ICF means by the general term “Structural Integrity”.

The ICF brand is very well established and ICF since May 2011 is known also as “ICF: The World Academy of Structural Integrity”. This leading world recognition for some fifty years has been mainly accomplished through the series of quadrennial conferences but also through a series of interquadrennial conferences. Sharing diversity in scientific, technical, educational, social as well as historical aspects, creating thereby synergistic effects as essentially an “Academy”.

ICF: The World Academy of Structural Integrity is delighted to have recently signed Memoranda of Understanding (MoU’s) with ASTM, CSTAM, DVM, IGF, GGF and others developing thereby a springboard for creative collaboration of ICF: WASI in many

countries. We have established a series of Gold Medals and other major Awards for the encouragement and recognition of accomplishments in this field and created a community with a global reach in over 50 countries, ever expanding.

ICF13 will be a very special Quadrennial Conference in Beijing, China, in June 2013 as the First Quadrennial of this new era under the chairmanship of Professor Shouwen Yu, and we have plans well developed for the Quadrennial, Interquadrennial and other events over the next decade in many countries and in a range of specialist areas.

ICF: WASI is developing new strategies to meet the growing challenges for the next decade and beyond to provide enhanced safety, integrity and understandings as well as friendly co-operations for the common good globally in this critical field of Structural Integrity in its very widest sense. All documents, Minutes, Reports, Blogs are openly available as well as most importantly all the Proceedings and Research Papers from 1965 onwards, especially on our archival section of the new ICF: WASI website under development, and via the Quadrennial and Interquadrennial websites. We will welcome comprehensive dialogue and creative input from you through the ICF: WASI website.

Thank you!

13.5. Opening remarks of Professor Haiyan Hu, President of Chinese Society of Theoretical and Applied Mechanics



Dear President Professor Carpinteri, dear Chairman Professor Yu, distinguished colleagues, ladies and gentlemen:

On behalf of the main organizer, the Chinese Society of Theoretical and Applied Mechanics (CSTAM), I would like to thank you for attending the conference. Please accept our warm welcome to the delegates from all around the world.

Founded by Professor T. Yokobori in 1965, the International Congress on Fracture (ICF) has become the premier international body for promotion of industrial, experimental & theoretical research, education and worldwide cooperation among scientists and engineers concerned with mechanics and mechanisms of fracture, fatigue and structural integrity of materials, components and systems. Over the decades, ICF has made considerable progress in providing an opportunity for highlighting individual and national accomplishments in a wide range of disciplines beyond the traditional arenas. This is the first time that this celebrated quadrennial conference comes to China, which is a privilege and a great honor for the Chinese society of mechanics.

Studies in mechanics had a long history in China. Our ancestors had implemented the knowledge of mechanics in their daily lives for more than 2000 years. For example, Heng Zhang (in AD 132) invented the world's first seismometer, which could discern the cardinal direction of an earthquake 500 km away. The Anji Bridge (also known as Zhaozhou Bridge) was constructed 1400 years ago; it is still standing beautifully in Hebei Province and is now the world's oldest open-spandrel stone segmental arch bridge. Unfortunately, due to historical reasons, the ancient scientific advancements in mechanics

were not properly kept and further developed. Studies in modern mechanics in China were initiated by a generation of mechanicians in 1940s-1950s who got trained in Europe and United States. Among the early researchers are well-known scientists Xuesen Qian (Tsien, HS), Peiyuan Zhou (Chou, Peiyuan), Weichang Qian (Chien, WZ) and Yonghuai Guo (Kuo, YH). The framework of the discipline, mechanics, was formalized and laid out by these pioneering researchers and the study of fracture mechanics in China also commenced from there.

The Chinese Society of Theoretical and Applied Mechanics (CSTAM) was founded in 1957. During the last 50 years, it has made significant contributions to the advancement of mechanics progress by bringing together scientists in the mechanics community to participate in various conferences, congresses and symposia. Following the International Congress on Theoretical and Applied Mechanics (ICTAM2012) last year, CSTAM has endeavored to make the 13th International Conference on Fracture another successful event. With the general guidance of the congress and supports from the National Natural Science Foundation of China (NSFC), the China Association of Science and Technology (CAST), we strive to provide better meeting services and create an enjoyable platform for this world-class conference.

Dear colleagues, ladies and gentlemen, China is undertaking a major structural reform in the new century to create a more vibrant environment for scientific research. The discipline of fracture mechanics in China is evolving rapidly in the new era. I believe this great conference will enhance the scholarly exchanges between Chinese and international researchers, which is sure to be beneficial for the global mechanics society.

Finally, I wish the 13th International Conference on Fracture a great success and a wonderful and memorable event.

Thank you!

13.6. Closing Speech of Prof. Shouwen Yu, President of ICF (2013-2017), Chairman of ICF13 Organization Committee



Dear guests, ladies and gentlemen, good morning!

The 13th International Conference on Fracture is closing today. During the past five days, delegates have made in-depth exchanges and developed new friendship during this fruitful conference.

We are grateful to all the speakers of honour lectures, plenary lectures, keynote lectures and presentations, to the session chairs and paper reviewers, to all the members of on the Advisory Board and the Scientific Committee, and to all the staff and volunteers of the Conference for their work. And I also extend my congratulations to all medalists and honorees!

Let's explore and discuss the possible strategies for development of the subject of fracture in the new era.

1) The external environment that research of fracture is confronting with has taken great changes. For example,

- Fast advancement of the frontier-technologies, such as nano-, bio-and information technologies;
- Stronger and closer interactions across different disciplines invite more innovation and greater creativity;
- Complex engineering systems are encountering several grant problems, e.g. world energy consumption, global climate changes, human health and security.

All these provide a new challenges as well as an opportunity for further development of fracture.

2) From philosophical point of view, fracture describes the halving and fragmentation process of matters. The general objective of fracture study is to pursue a better understanding of the integrity of materials and structures. As far as human health problems and biomedical engineering are concerned, we are looking to explore and develop self-healing and re-growth of materials. The task is never going to be easy but it has a far-reaching significance.

3) In the large community of ICF, scientific research and engineering applications are closely connected, creating a scientific, democratic, and harmonious platform for communication and corporation. Fundamental research and innovative application interact and help each other forward. The research works focus on the fracture and the integrity of materials and structures and the results benefit the life and sustainable development of human beings. The education and popularization of fracture are also emphasized. ICF is also dedicated to the introduction and generalization of the research achievements, from which both developed and developing countries can benefit. In addition, the arena for fracture research continues to be broadened. A wide range of disciplines beyond the traditional ones—from biomedicine to geophysics, from nano/atomic to macro scales, and from physical to holistic and system modeling, have been included in, and the influence of ICF on the development of the whole society is in a rapid growth.

4) The ICF statutes regulate the aim and properties of ICF. It is hoped that in more and more countries and regions, the local research effort can be accumulated and strengthened. Strategies are to be established to help the fast and beneficial development of young scientists and engineers. More platforms will be built for academic exchange and collaboration. We expect that after about 50 years' development, ICF will go to a more brilliant tomorrow.

Like the slogan of 2008 Olympic Games said, One World, One Dream, in today's fracture community, we shall try our best to realize a brilliant dream. Let us continue the quest for new heights in this fascinating and diverse field. Let us embrace the next Conference in Rhodes, Greece with new research results.

I wish all delegates a pleasant journey to home and a prolific academic career!