

# Thermal

No. 1 July 29, 2018

Temperature-, Heat-, Energy-, Reaction-, Mass-related Alliance to Communicate within, and Publicize beyond, the International Thermal Science and Engineering Community



ICHMT



AIHTC



ASTFE



AUTSE



EUROTHERM

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

### Kemal Hanjalić

President of International Centre for Heat and Mass Transfer

*Delft University of Technology, The Netherlands, and*

*University of Sarajevo, Bosnia and Herzegovina, [khanjalic@gmail.com](mailto:khanjalic@gmail.com)*



The field of heat and mass transfer holds some of the key phenomena of human activities and in many branches of industry: chemical, energy conversion and power generation, food-processing and pharmaceuticals, material processing and metallurgy, transportation and space technology, electronics cooling, bioengineering and biomedical applications, indoor climate, and the care for the environment. Issues in sustainable development and climate change are directly related to problems of heat and mass transfer. Despite decades of development, the science and engineering of heat and mass transfer are continuously being confronted with new challenges in search of new and improved technologies. Some of the multiple facets of heat and mass transfer are still awaiting proper understanding and continue to be in worldwide research focus. Developments in computer simulations in synergy with sophisticated experimental and diagnostics techniques open new frontiers for discoveries and innovation in both conventional and emerging technologies. Recently, we have witnessed expansion of scales into micro and nano scales, where some very new technologies are in the offing, and into mega- and giga-scales encountered in the atmosphere, oceans, interior of the Earth, and outer space. In this rapidly changing field, we need to nurture all means by which we can exchange our ideas in settings that encourage interpersonal and inter-institutional contacts. The International Centre for Heat and Mass Transfer (ICHMT) offers such ambience.

### Brief History

The ICHMT was founded in 1968 in Yugoslavia by a group of prominent world scientists in the field, E.A. Brun, E.R.G. Eckert, U. Grigull, J.R. Hartnett, T.F. Irvine, S.S. Kutateladze, A. Luikov, W.M. Rohsenow, D.B. Spalding and M.A. Stirikovich (see, [Appendix 1](#)). The leadership and initiatives of the first Secretary General, Zoran Zaric and, later, Naim Afgan, made the Centre grow to reach maturity. In 1994, the Centre, having moved to Middle-East Technical University (METU), Ankara, Turkey, elected a new Secretary General, Faruk Arinç, who has been re-elected every four years until his retirement this year. Since 1968, the Center organized over 120 highly successful conferences, mostly on Aegean and Mediterranean coasts, but also elsewhere throughout the world, providing excellent settings for scientific and social gatherings. Chaired by prominent researchers in the field from the ICHMT Scientific Council and beyond, such events, promoting interesting and novel scientific work and achievements, have always been met with great interest by the scientific, technical, and industrial communities, attracting since its first meeting in 1968, over 10000 participants from over 60 countries. The Centre has published nearly 100 proceedings on various specific aspects of heat and mass transfer emerging from its events. In order to reach as many scientists and researchers as possible, the Centre signed publication agreements with Begell House, Inc. and the Annals of New York Academy of Sciences (NYAS). In 2006, the agreement between ICHMT and Begell House, Inc. was renewed and expanded to include the creation of an ICHMT Digital Library Online (<http://www.ichmt.org>).

### Organization and Management

The Centre is managed by its Executive Committee advised by its Scientific Council, which meets regularly at least twice a year. Both the Committee and the Council consist of thermal engineers and scientists from throughout the world. The organizational structure also includes the President and two Vice-Presidents who, along with Past-Presidents, are ex-officio members of the Executive Committee. The business office of the Centre is headquartered at METU in Ankara, Turkey. This office supports the Secretariat of the Centre and staff who run the Centre, manage the finances, and organize the conferences, symposia and other events sponsored by the Centre.

This year, ICHMT marks the 50<sup>th</sup> anniversary of its continuous striving to fulfill its mission as an apolitical forum for the world scientists and engineers to pursue excellence and foster international exchange and cooperation in all branches of heat and mass transfer. With this purpose in mind, the Centre strives to be a reliable and state-of-the-art source of information in all of its publications archived in the ICHMT/Begell House Digital Library, and to create the means for generating international synergy, enthusiasm, and

motivation among the scientists and researchers that will lead to new ideas, procedures, products, and standards to improve productivity and efficiency and to promote living in a cleaner environment.

The membership in the Centre is open to all non-governmental, non-profit, national and international organizations working in the field of heat and mass transfer. The number of member institutions of the Centre is now over 40, from 30 different countries (see <http://www.ichmt.org/page/39/memberins>).

The Centre offers various awards and medals in recognition for contributions to the field and for travel to conferences organized by the Centre (see the honours and awards at (<http://www.ichmt.org/page/52/grants>)).

### **Recent Activity and New Horizons**

The ICHMT website page (<http://www.ichmt.org/>) notes its recent conferences:

#### *Sponsored:*

- 7th International Symposium on Advances in Computational Heat Transfer, CHT-17, Napoli, Italy, June 2017
- 8th International Symposium on Radiative Transfer, RAD-16, Cappadocia, Turkey, June 2016

#### *Co-Sponsored:*

- 3rd Thermal and Fluids Engineering Conference (TFEC), Fort Lauderdale, FL, USA, March 2018
- 11th International Conference on Thermal Engineering Theory and Applications, ICTEA 2018, Doha, Qatar, February 2018
- 24th National and 2nd International ISHMT-ASTFE Heat and Mass Transfer Conference, IHMTC - 2017, Telangana, India, December 2017
- The 14th International Conference on Flow Dynamics (ICFD2017), Sendai, Japan, December 2017
- 10th Mediterranean Combustion Symposium, MCS-17, Napoli, Italy, September 2017
- UK National Heat Transfer Conference, London, U.K., September 2017
- 13th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT2017), Portorož, Slovenia, July 2017
- 2nd Thermal and Fluids Engineering Conference and 4th International Workshop on Heat Transfer, Las Vegas, NV, U.S.A., April 2017

The site presently also notes plans for the following upcoming meetings:

#### *Sponsored:*

- 9th International Symposium on Turbulence Heat and Mass Transfer, THMT-18, 10-13 July 2018, Rio de Janeiro, Brazil
- 3rd International Symposium on Convective Heat & Mass Transfer, CONV-19, August 2019, Çeşme, Turkey

#### *Co-Sponsored:*

- 16th International Heat Transfer Conference, IHTC-16, 10-15 August 2018, Chinese National Convention Center, Beijing, China
- 12th International Conference on Thermal Engineering Theory and Applications, ICTEA 2019, 23-26 February 2019, Gandhinagar, Gujarat, India
- 4th Thermal and Fluids Engineering Conference, (TFEC 2019), 14-17 April 2019, Westin Las Vegas Hotel & Spa, Las Vegas, NV, USA

The present officers of the Centre are listed at <http://www.ichmt.org/page/4/officers>.

### **Please note the most upcoming event:**

Jubilee International Conference, X Minsk International Seminar  
Heat Pipes, Heat Pumps, Refrigerators, Power Sources  
September 10–13, 2018, Minsk, Belarus  
<https://minskheatpipes.by/>



## Assembly for International Heat Transfer Conferences (AIHTC) — Toward International Union of Thermal Science and Engineering

Hideo Yoshida

President of Assembly for International Heat Transfer Conferences  
Kyoto University, Japan, [sakura@hideoyoshida.com](mailto:sakura@hideoyoshida.com)



### Start of International Newsletter for Closer Cooperation among the Five Organizations

This year marks the 250th anniversary of Joseph Fourier's birth and the 200th anniversary of James Prescott Joule's birth. Also, I am very pleased to state that 2018 will be recorded as the start of the international newsletter '*Thermal*,' which will enhance cooperation among the five international organizations. For me, nothing can be more valuable than such cooperation. Since 2006, I have had many discussions about the desirable future direction of the Assembly for International Heat Transfer Conferences (AIHTC) and other related organizations with the late Prof. Nobuhide Kasagi, the former vice president of AIHTC. Although he unfortunately passed away after completing his role as the chair of the organizing committee of the 15th International Heat Transfer Conference (IHTC-15), a small part of his final wishes has been realized in the form of this newsletter (see, Appendix 5).

### Origin of IHTC's Development to Quadrennial IHTCs

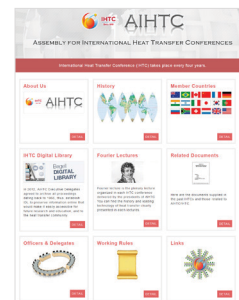
As described in the AIHTC website, AIHTC has organized a series of quadrennial IHTCs—the Heat Transfer Olympics—since 1966 (see, Appendix 4). The origin of the IHTCs was an international discussion on heat transfer held in London and Atlantic City in 1951; this was regarded as IHTC-1. Ten years later, the next International Heat Transfer Conference was held in Boulder in 1961 and in London in 1962, which was regarded as IHTC-2. IHTC-3 was held in Chicago in 1966, and since then IHTCs have been continuously held every four years.

### IHTC Digital Library

On this occasion, particularly for young colleagues, I would like to introduce William (Bill) Begell (1927–2009), who had a long history in publishing, starting as a co-founder of Scripta Technica in 1962 and then founding Hemisphere Publishing Corporation in 1966 and Begell House Inc. in 1991. Many books related to the IHTCs have been published by Hemisphere and Begell House. In 2014, the *IHTC Digital library (IDL)* was established thanks to the efforts of the former AIHTC president, Prof. Avram Bar-Cohen and the late Prof. Kasagi. Compared with *the Symposium (International) on Combustion* (1928–1998) and *Proceedings of the Combustion Institute* (2000–), however, because of the limited availability of our proceedings before IDL, the numbers of citations of IDL is still modest. I do hope that we can foster IDL as one of the principal publications in the field of thermal science and engineering.

### AIHTC Website as a Hub of Internet Archives of Thermal Science and Engineering

Since 2016, with the help of Prof. Kazuya Tatsumi and Prof. Hiroshi Iwai, special assistants to the president, I have been renovating the AIHTC website; you can now find many historical documents as well as many links to related websites including tributes and prestigious awards. To further improve the website as a hub of internet archives of thermal science and engineering, your cooperation is highly appreciated.



### Toward International Union of Thermal Science and Engineering

I believe that AIHTC's function is not only to organize IHTCs but also to apply a centripetal force to the international community of thermal science and engineering. Although AIHTC and the IHTCs have greatly contributed to thermal science and engineering, their visibility in the scientific world is not yet high enough. That is, similarly to the International Union of Theoretical and Applied Mechanics (IUTAM), the visibility of our community should be increased. As one option, in the near future, we aim to participate as a scientific union member of International Science Council (ISC), which is the body formed by the recent merge of the International Council for Science (ICSU) and International Social Science Council (ISSC). One of our main motivations is to provide a better framework for future generations of our community, which will also contribute to the happiness and prosperity of humanity through thermal science and engineering.

### Acknowledgments

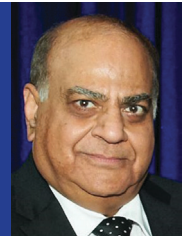
We thank Begell House for their assistance in the cover design and editing of this newsletter. We express our sincere gratitude to Ms. Yelena Shafeyeva, the President of Begell House.

## American Society of Thermal and Fluids Engineers (ASTFE)

**Yogesh Jaluria**

President of American Society of Thermal and Fluids Engineers

*Rutgers, the State University of New Jersey, USA, [jaluria@jove.rutgers.edu](mailto:jaluria@jove.rutgers.edu)*



The American Society of Thermal and Fluids Engineers (ASTFE) was founded in 2014 with an objective of bringing researchers and engineers in the areas of thermal sciences and fluid mechanics together and to bring in a strong component of international and industrial collaboration and interaction. It was visualized as an agile organization that would focus on meeting the grand challenges in these areas by emphasizing new and emerging applications, while also including traditional topics of research. It was taken as essential to contribute and grow as a society driven by the membership with a clear focus on the industrial needs in these areas.

Thus, the long-term vision of the society is to be an agile leading organization that brings thermal and fluids engineers together to exchange ideas and present results to impact on new, emerging and challenging problems in research and technology. It is focused on international collaborations, strong interactions with industry and providing a dynamic atmosphere for young and upcoming researchers and engineers in this field.

ASTFE has organized international conferences each year, starting with the one in New York City in 2015. This first conference, which had over 300 attendees, was followed by a conference in Las Vegas, Nevada, in 2017 and one in Fort Lauderdale, Florida, in 2018. These last two conferences had over 400 attendees and around 300 presentations. All the conferences were held in March-April, or Spring, time frame. The attendees were from around the world, covering over 30 countries, and from industry, national labs and academia. The Las Vegas conference was organized with the International Workshop in Heat Transfer, which brought in a large contingent from China and the Far East. Another conference, the Pacific Rim Conference, was held in 2016, jointly with the Japan Society of Mechanical Engineers and the Korea Society of Mechanical Engineers in Hawaii. The Society has collaborated with other international and national societies and has co-sponsored conferences around the world. One of these conferences has been the one held with the Indian Society of Heat and Mass Transfer in India in January 2016 and December 2017. About 800 participants attended these conferences.

An interesting element that has been introduced by ASTFE in its conferences is TEC (Technology Entrepreneurship Communication) talks. These talks are given by engineers working in applied areas in industry, private business, national labs or academia and focus on innovation, entrepreneurship and communication. Typically, 6 presentations are given in each conference covering a diversity of topics. The talks are then uploaded on to the Society website for access to the members.

The Society has expanded the Begell House Digital Library to include the papers presented at these conferences and has published special issues of archival journals. Several Begell House journals are affiliated with the Society and authors are encouraged to submit their papers to these journals. Special courses and workshops have also been sponsored by ASTFE.

The Society encourages interested students, educators, engineers and researchers to become members. The annual membership fees are quite nominal, but it allows ASTFE to inform the members about future conferences, workshops, courses and other items of interest to the community.

It is expected that the Society will expand its reach and impact with greater international collaborations, additional workshops, focused conferences, special courses and greater interaction with industry. Its aim is to provide a valuable forum for industry to seek appropriate talent and resources in the society.

The Society will soon introduce the level of Fellow to honor people with impressive achievements and contributions. Other awards and honors are expected to follow. Currently, a best paper award is presented at each conference.

## Asian Union of Thermal Science and Engineering (AUTSE)

**Sung Jin Kim**

President of Asian Union of Thermal Science and Engineering  
KAIST, Republic of Korea, [sungjinkim@kaist.ac.kr](mailto:sungjinkim@kaist.ac.kr)



### Brief History

There are many emerging countries and regions in Asia that are winning recognition in the world heat transfer community. An effective regional networking system like Eurotherm is needed to enhance the scientific interactions between Asian researchers. The establishment of such an Asian networking system will also increase the presence of Asians in the global heat transfer community. AUTSE was founded on this background. The aim of Asian Union of Thermal Science and Engineering (AUTSE) is to promote and foster cooperation among Asian scientists and engineers working in the area of thermal sciences and heat transfer.

AUTSE establishment was proposed by lead scientists of China, Japan, and Korea in 2015 and approved by national representative societies of Heat and Mass Transfer Society of China (HMTSC), Heat Transfer Society of Japan (HTSJ), Thermal Engineering Division of Korean Society of Mechanical Engineers (KSME-TED) in the same year. The first Executive Board (EB) Meeting was held on November 12, 2015 in Jeju, Korea and this was the official date of establishment of AUTSE. Prof. Sang Yong Lee of KAIST served as the founding president of AUTSE until March, 2017.

### Member Countries and Structure

As of 2018, there are four member countries: China, Japan, and Korea are lead-member countries and India joined AUTSE as a member country in 2017. India's representative national organization is the Indian Society for Heat and Mass Transfer (ISHMT). New member countries are solicited from Southeast Asia, including Thailand and Vietnam. AUTSE membership is considered upon submission of a written application to the President of the Union by a representative local (national/regional) organization. AUTSE has a structure of Executive Board (EB), Scientific Council (SC), and Honorary Advisory Board (HAB).

### Past and Future Activities

As a general and regular meeting of AUTSE, the Union is going to hold the Asian Conference on Thermal Sciences (ACTS) every four years in cooperation with a local heat-transfer society/organization within the Asian region. The first ACTS was held in Jeju, Korea on March 26-30, 2017. In total, 719 participants registered and 550 papers were presented including 8 Plenary and 25 Keynote speeches. The second ACTS will be held in Miyazaki, Japan, during November 15-19, 2020, which is organized by Heat Transfer Society of Japan and co-organized by Heat and Mass Transfer Society of China and the Thermal Engineering Division of Korean Society of Mechanical Engineers. More details can be found on the official website, <http://acts2020jp.org>.

In addition, other international conferences and seminars on specific topics have been sponsored by the Union. These include the following: The International Symposium on Measurement Technology in Thermal Science and Engineering was held in November, 2017 and the 10th International Conference on Boiling and Condensation Heat Transfer held in March, 2018. Past, present, and future activities are introduced on the Union's website at <http://www.autse.org>.

### Awards

There are two kinds of awards conferred by the Union: OAA (Outstanding Achievement Award) and YSA (Young Scientist Award). The OAA will be conferred every four years at the ACTS Conferences, and YSA may be presented every two years at appropriate topical seminars sponsored by the Union. In 2017, AUTSE conferred the OAA on Prof. Zeng-Yuan Guo of Tsinghua University, China and the YSA's on Prof. Li Chen of Xi'an Jiatong University, China and Prof. Haidong Wang of Kyushu University, Japan. For 2018, three YSA awardees have been decided and will be awarded at the banquet of IHTC-16. They are Ming-Jia Li of Xi'an Jiatong University, China, Lin Chen of Tohoku University, Japan and Dong-Kyu Kim of Chung-Ang University, Korea.

## EUROTHERM

**Paolo Di Marco**

President of EUROTHERM

*University of Pisa, Italy, p.dimarco@ing.unipi.it*



The EUROTHERM Committee was formed in Brussels on 16 October 1986, following an initiative taken at the 8th International Heat Transfer Conference in San Francisco earlier that year, by: G.F. Hewitt (U.K.), C.J. Hoogendoorn (The Netherlands), K. Stephan (F.R.G.), M. Cumo (Italy), J.P. Bardon (France), M. Combarous (France - ICHMT), J. Gosse (France), J.F. Sacadura (France). The statute of the EUROTHERM Committee has been approved by the major appropriate European scientific bodies and communities.

The aim of EUROTHERM is to promote and foster European cooperation in Thermal Sciences and Heat Transfer by gathering together scientists and engineers working in specialized areas. The Committee cooperates with the AIHTC, the ICHMT, and other international boards to promote harmonization of the activities.

The Committee consists of members (up to two from each country) representing and appointed by national bodies in the European countries. The Committee gathers one or two times in a year. The Committee currently has 30 representatives from 16 European countries (see list at <http://www.eurothermcommittee.eu/membership.php>) and elects a President and a Secretary from within its members. The terms for President and Secretary are four years, and the same person cannot hold one of these positions for more than two terms. Past presidents and founding members continue to sit on the Committee as honorary members. The current President is Professor Paolo Di Marco, University of Pisa, Italy, and the Secretary (2014-2018) is Professor Janusz S. Szmyd, AGH - University of Science and Technology, Krakow, Poland. A new President and Secretary will take their place during the next International Heat Transfer Conference in Beijing, in August 2018.

The main activities of EUROTHERM can be summarized as follows:

- Organization of seminars in the field of Thermal Sciences and Heat Transfer.
- Organization of a European Thermal Sciences Conference every four years.
- Liaison with the EU on thermal sciences and energy related topics. Stimulation of participation of EU programs through network function of EUROTHERM.
- Contacts and cooperation between the different national bodies on thermal sciences.
- Stimulation of young heat transfer scientists by the EUROTHERM Young Scientist Prizes.

Every four years a general European Thermal Sciences Conference is organized, in cooperation with a national heat transfer organization, being started in 1992 (Birmingham, UK). Successive conferences were held in 1996 (Rome, I), 2000 (Heidelberg, D), 2004 (Birmingham, UK), 2008 (Eindhoven, NL), 2012 (Poitiers, F), 2016 (Krakow, PL). The next conference will be held in Lisbon (Portugal) from September 6<sup>th</sup> to September 10<sup>th</sup>, 2020. Every conference gathers about 300-400 participants, mostly from (but not limited to) European countries. All contributed papers are peer-reviewed and published in conference proceedings; no copyright is generally requested.

The main EUROTHERM scientific events are specialized Seminars, covering a large variety of confined topics (both fundamental and applied) in heat transfer, which are always held within the EU countries. EUROTHERM strives to have participation from industries, universities and research institutes to stimulate discussion and liaison between specialists' groups. Scientists and engineers from countries outside the EU can participate in the seminars. About 5 Seminars are held each year, attracting 30 to 100 participants each. The first Seminar was held in 1988, for a total of 112 Seminars to date. Seminars on particular topics (i.e. Radiation Heat Transfer, Thermal Storage, and so on) are repeated cyclically after a number of years. The papers presented in almost all the Seminars are stored by the president and secretary, and are available upon a simple request. The proceedings of some Seminars are also published independently; publication on international journals of the presented papers is encouraged. The local organization is responsible for administrative and financial aspects of each Seminar.

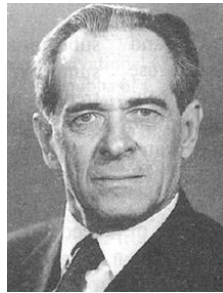


Young scientists need to be properly and quickly introduced in the scientific community, and this is the aim of the EUROTHERM initiative through the Young Scientist Prize and Awards. One EUROTHERM Prize and two Awards are presented, during the EUROTHERM Thermal Sciences Conference, to young researchers (under 35 years at the date of the prize) for the best PhD-thesis in Thermal Sciences in the past four years. Candidates are PhDs, up to two from each represented country, selected by national bodies or committees. To select the prize winners, the Committee appoints a Prize-committee from its members.

### Appendix 1: The Founding Fathers of ICHMT



**E.A. Brun**  
(1898–1979)



**M.A. Styrikovich**  
(1902–1995)



**E.R.G. Eckert**  
(1904–2004)



**A.V. Luikov**  
(1910–1974)



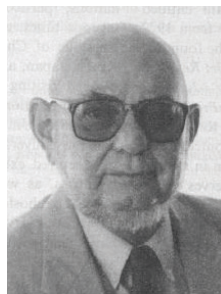
**U. Grigull**  
(1912–2003)



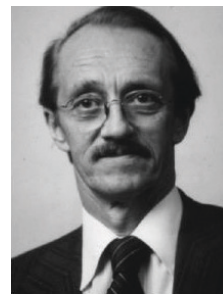
**S.S. Kutateladze**  
(1914–1986)



**W.M. Rohsenow**  
(1921–2011)



**T.F. Irvine**  
(1922–2001)



**D.B. Spalding**  
(1923–2016)



**J.P. Hartnett**  
(1924–2005)

(In order of their birth year)



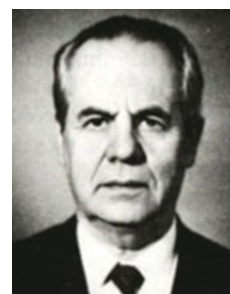
**Z. Zarić** (1929–1985)  
Secretary General (1968–1985)



**N. Afgan** (1930–)  
Scientific Secretary (1968–1985)  
Secretary General (1985–1993)

“...On the next day, **September 7, 1968**, Professor Brun convened the initial meeting of the Scientific Council... On the same day, Professor Afgan chaired a meeting of the Organization Committee attended by A.I. Leontiev (representing M.A. Styrikovich, USSR), D.B. Spalding, Z. Zarić and myself. The major business was the selection of “Heat and Mass Transfer in Separated Flows” as the topic for the 1969 conference...”

From “*Origins of the International Centre for Heat and Mass Transfer*”  
by The Late, J.P. Hartnett  
<http://www.ichmt.org/page/12/earlydays>



**A.I. Leontiev**  
(1927–)





C. Gazley, E.R.G. Eckert, U. Grigull, R. Maxwell, J.P. Hartnett, O.A. Saunders, A.J. Ede

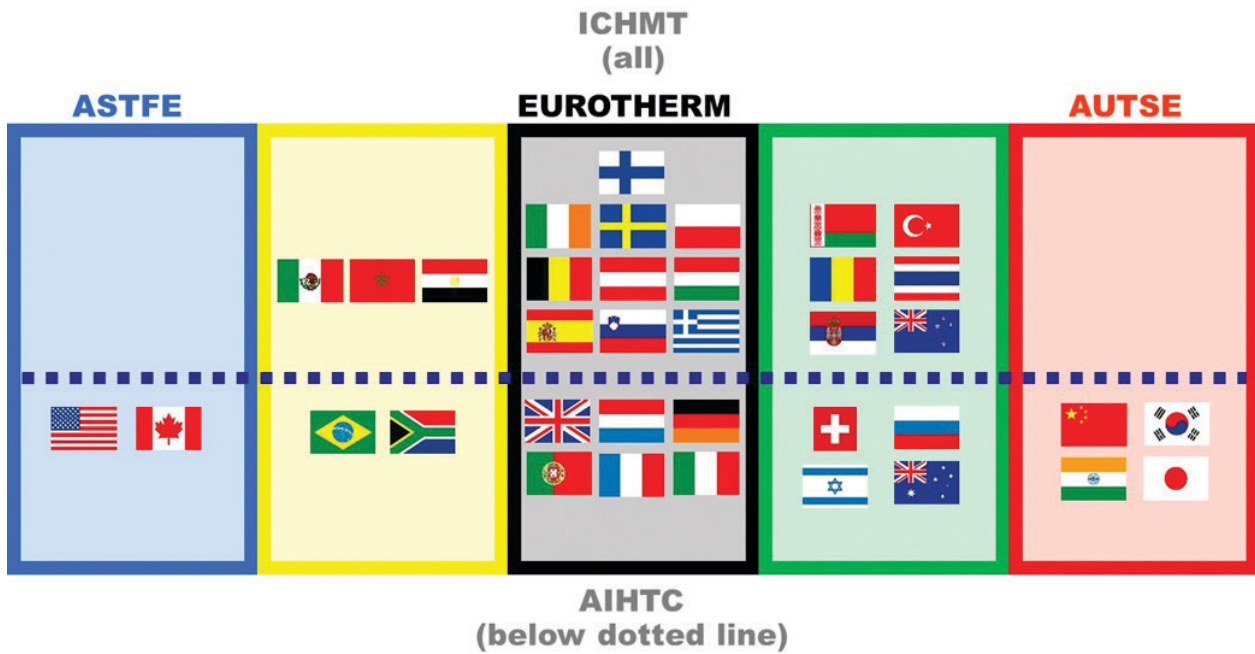


(Unknown), N. Afgan, D.B. Spalding, T.F. Irvine  
J.P. Hartnett, E. Hahne, D.A. de Vries, Z. Zaric



September, 1982 in München (IHTC-7)

cf. Many tributes were collected from the website: <http://wattandedison.com/IJHMT.html>

**Appendix 2: Member Countries of the Five Organizations****Appendix 3: Principal International Conferences/Symposia of Each Organization after 2018**

	ICHMT				
	Turbulence, Heat and Mass Transfer <b>THMT</b>	Convective Heat and Mass Transfer, <b>CONV</b>	Radiative Transfer, <b>RAD</b>	Adv. in Comp. Heat Transfer, <b>CHT</b>	Gas Turbine Heat and Mass Transfer, <b>Turbine</b>
2018	Rio de Janeiro Brazil				
2019		Çeşme Turkey	Athens Greece		
2020	St. Petersburg Russia			Izmir* Turkey	Rhodes Island* Greece
2021		Izmir* Turkey			
2022					

(\*) not-yet-approved

	AIHTC	ASTFE	AUTSE	EUROTHERM
2018	Beijing China	Fort Lauderdale USA		
2019		Las Vegas USA	Hawaii (J-KSME) USA	
2020			Miyazaki Japan	Lisbon Portugal
2021				
2022	Cape Town South Africa			

**Appendix 4: Series of Quadrennial World Events after 1964**

Year	#	Summer Olympic Games	#	Winter Olympic Games	#	FIFA World Cup	#	 Int. Heat Transfer Conf.
1964	18	 Tokyo, Japan	9	 Innsbruck, Austria				
1966					8	 England	3	 Chicago, US
1968	19	 Mexico City, Mexico	10	 Grenoble, France				
1970					9	 Mexico	4	 Paris Versailles, France
1972	20	 München, W. Germany	11	 Sapporo, Japan				
1974					10	 W. Germany	5	 Tokyo, Japan
1976	21	 Montreal, Canada	12	 Innsbruck, Austria				
1978					11	 Argentina	6	 Toronto, Canada
1980	22	 Moscow, Soviet Union	13	 Lake Placid, US				
1982					12	 Spain	7	 München, W. Germany
1984	23	 Los Angeles, US	14	 Sarajevo, Yugoslavia				
1986					13	 Mexico	8	 San Francisco, US
1988	24	 Seoul, S. Korea	15	 Calgary, Canada				
1990					14	 Italy	9	 Jerusalem, Israel
1992	25	 Barcelona, Spain	16	 Albertville, France				
1994			17	 Lillehammer, Norway	15	 US	10	 Brighton, UK
1996	26	 Atlanta, US						
1998			18	 Nagano, Japan	16	 France	11	 Kyongju, S. Korea
2000	27	 Sydney, Australia						
2002			19	 Salt Lake City, US	17	 S. Korea, Japan	12	 Grenoble, France
2004	28	 Athens, Greece						
2006			20	 Turin, Italy	18	 Germany	13	 Sydney, Australia
2008	29	 Beijing, China						
2010			21	 Vancouver, Canada	19	 S. Africa	14	 Washington, US
2012	30	 London, UK						
2014			22	 Sochi, Russia	20	 Brazil	15	 Kyoto, Japan
2016	31	 Rio de Janeiro, Brazil						
2018			23	 Pyeongchang, S. Korea	21	 Russia	16	 Beijing, China
2020	32	 Tokyo, Japan						
2022			24	 Beijing, China	22	 Qatar	17	 Cape Town, S. Africa



## Appendix 5: Report on Plenary Panel at IHTC-15 “The Role of Thermal Science in Meeting Societal Challenges”



N. Kasagi



Y. Bayazitoglu



Y. Jaluria



J. S. Lee



D. Poulikakos



P. Stephan

## Preface

This record of the plenary panel session is a lasting legacy that the late Professor Nobuhide Kasagi has given us. After completing this panel session on August 14, 2014, he received continuous medical treatment, and passed away on July 29, 2015. Also, I would like to add that he spent several months thoughtfully preparing it with Professors Yildiz Bayazitoglu, Yogesh Jaluria, Joon Sik Lee, Dimos Poulidakos and Peter Stephan.

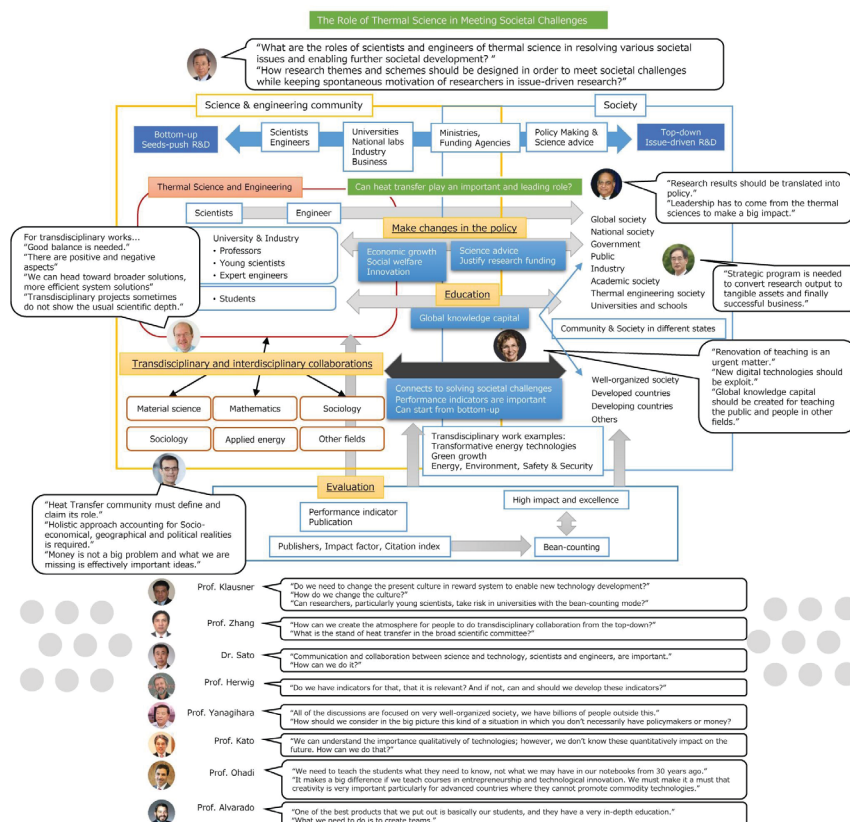
Professor Kazuya Tatsumi, who served as assistant at the panel session, has devoted extraordinary efforts to editing the panel session, through lengthy discussions with Professor Hiroshi Iwai and me.

I am very grateful to these Professors, and to all the Panelists and Attendees, whose outstanding contributions made IHTC-15 a great success.

May 8, 2016

Hideo Yoshida, Chair of Executive Committee

### Visualization of Relationships among Panelists' Messages and Discussion from the Floor



<http://www.ihtc-15.org/IHTC-15-plenary-panel.shtml>