

Thermal

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



ICHMT



AIHTC



ASTFE



AUTSE



EUROTHERM

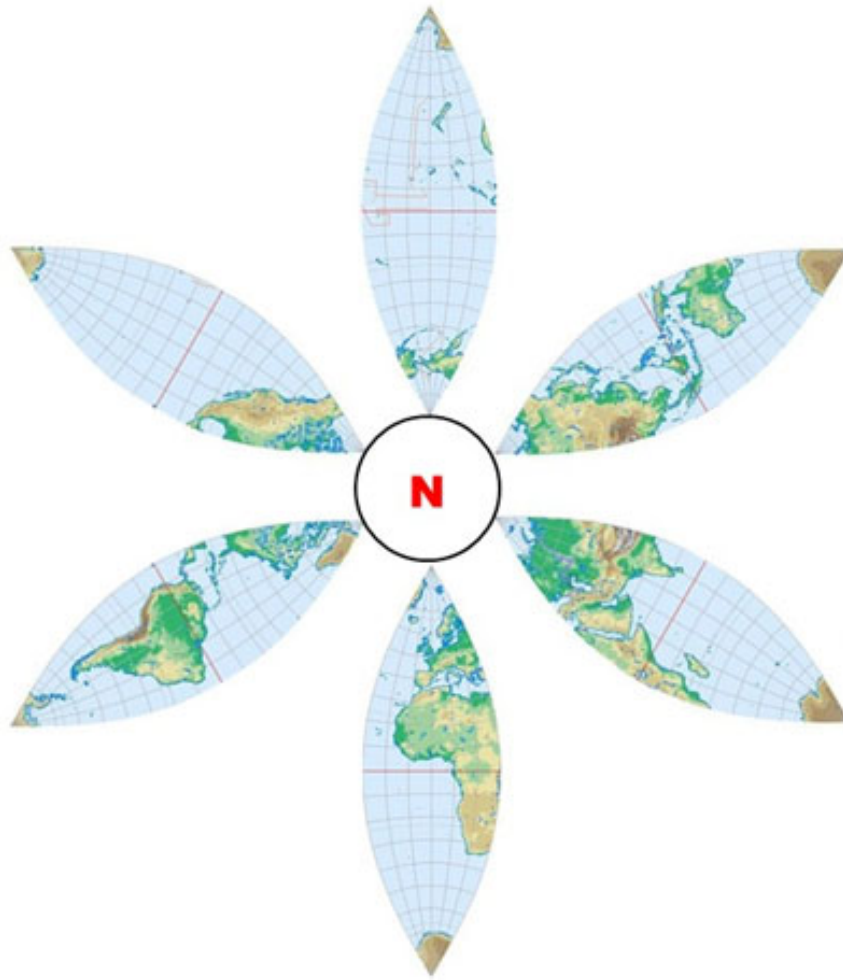
Part 1

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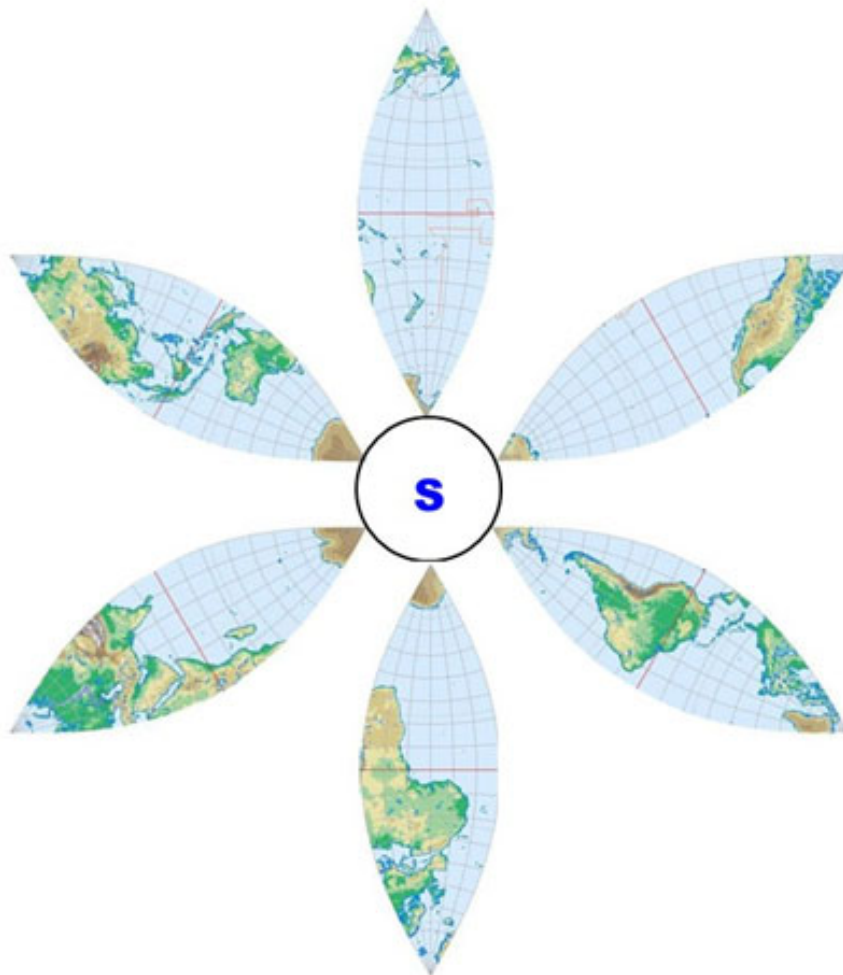
Part 2

This part is newly introduced for spontaneous submissions from the members of the above organizations. Although their contents are free, only the title of the first article is defined as "Overview" of each member. After the second article, research topics, opinions, essays, etc. are welcome. The only restriction is that its length is no more than 2 pages.

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Part 1



Asian Union of Thermal Science and Engineering (AUTSE)

Yasuyuki Takata, President

Kyushu University, Japan, takata@mech.kyushu-u.ac.jp



New member

In October 2021, AUTSE welcomed Singapore as the 7th member country. AUTSE started with three countries, which are China, Korea and Japan in 2015 and then expanded to six countries/regions by adding India in 2017, Chinese Taipei in 2018 and Australia in 2019. The professional organization representing Singapore is the Cooling Energy Science and Technology Singapore (CoolestSG) which consists of industry, academia and government research institutes. We are very pleased to have Singapore as a new member and expect further enhancement of scientific activities in AUTSE.

AUTSE Fellows

AUTSE has established a fellowship in June 2021. AUTSE Fellow is a title for those who have demonstrated significant individual responsibility and should have sustained achievements and professionalism in the field of thermal sciences and engineering. We selected 24 individuals as Founding Fellows who are listed in the AUTSE website. Call for nomination for AUTSE Fellows will be made every two years and selected by the Fellow Review Committee. The detail is available through AUTSE website.

Activities

The 2nd Asian Conference on Thermal Sciences (ACTS) was successfully held on October 3-7, 2021, after one year postponement. AUTSE sponsored the ACTS chaired by Prof. K. Hanamura at Tokyo Institute of Technology with the Heat Transfer Society of Japan (HTSJ) as the host organization. The conference consisted of 340 participants from 11 countries/regions (China, Korea, Chinese Taipei, Australia, India, Singapore, Thailand, Netherland, UK, USA and Japan), 274 presentations, 7 plenary and 23 Keynotes.



Prof. Ken Okazaki
Tokyo Institute of Technology



Prof. Sang Yong Lee
Korean Advanced Institute of Science and Technology

During the conference, award ceremony and lectures of the AUTSE Outstanding Achievement Award for **Prof. Ken Okazaki** and **Prof. Sang Yong Lee** were conducted followed by the conferment of AUTSE Young Scientist Award for three young researchers. In addition to above events, award ceremony and lecture of Nukiyama Memorial Award 2020 were conducted with Prof. Ronggui Yang, awardee of NMA2020.

On Oct. 4, 2021, we had the 10th Executive Board Meeting online. As introduced above, participation of Singapore as a new member and an establishment of the Fellow Review Committee chaired by Prof. Sung Jin Kim were approved. Regarding the 3rd ACTS, Prof. Chang-Ying Zhao reported that the conference is tentatively scheduled for June 23–27, 2024 at Fuyue Hotel, Shanghai, China.



Thermal Filler 1 World Languages on Thermal

Afrikaans	warmte- en massa-oordrag	termiese wetenskappe en ingenieurswese	temperatuur
Arabic	انتقال الحرارة والكتلة	العلوم و الهندسة الحرارية	درجة الحرارة
Chinese	传热传质 (chuan re chuan zhi)	热科学与工程 (re ke xue yu gong cheng)	温度 (wen du)
Dutch	warmte- en massaoverdracht	thermische ingenieurwetenschappen	temperatuur
English	heat and mass transfer	thermal science and engineering	temperature
French	transfert de chaleur et de masse	thermique	température
German	Wärme- und Stoffübertragung	Thermische Ingenieurwissenschaften	Temperatur
Greek	Μεταφορά Θερμότητας και Μάζας ΜΕΤΑΦΟΡΑ ΘΕΡΜΟΤΗΤΑΣ ΚΑΙ ΜΑΖΑΣ	Επιστήμη και Μηχανική της Θερμότητας ΕΠΙΣΤΗΜΗ ΚΑΙ ΜΗΧΑΝΙΚΗ ΤΗΣ ΘΕΡΜΟΤΗΤΑΣ	Θερμοκρασία ΘΕΡΜΟΚΡΑΣΙΑ
Hebrew	מעבר חום ומסה (ma'avar chom ve-masa)	מדעים והנדסה תרמיים (mada'im ve-handasa termi'im)	טמפרטורה (temperatura)
Hindi	ऊष्मा एवं द्रव्यमान प्रचारण ūsmā ēvaṁ dravyamāna pracāraṇa	ऊष्मीय विज्ञान एवं अभियांत्रिकी ūsmīya vijñāna ēvaṁ abhiyāntrikī	तापमान tāpamāna
Italian	Trasporto di calore e di massa	Scienze e ingegneria termiche (not really used in Italian)	temperatura
Japanese	熱物質輸送 (netsu busshitsu yuso)	熱科学工学 (netsu kagaku kogaku)	温度 (ondo)
Korean	열물질전달 (yeol muljil jeondal)	열과학공학 (yeol kwahak konghak)	온도 (ondo)
Polish	Transport masy i ciepła	Technika cieplna	Temperatura
Portuguese	Transferência de calor e massa	Engenharia e Ciências Térmicas	Temperatura
Russian	тепло- и массообмен	теплофизика и теплотехника	температура
Spanish	Transferencia de Calor y Masa	Ciencia e Ingenier Tmica	Temperatura
Swedish	värme- och massöverföring	termisk vetenskap och ingenjörskonst	temperatur
Turkish	Isı ve Kütle Transferi	Isı Bilimi ve Mühendisliği	Sıcaklık

EUROTHERM

Janusz Szmyd, President

AGH University of Science and Technology, Kraków, Poland

janusz.szmyd@agh.edu.pl



Recent Eurotherm Seminars

- Eurotherm Seminar No. 115 - Caloric Heating and Cooling

This seminar was held virtually from 13rd to 15th July, 2021. It was chaired by Profs. Ekkes Brück, Mina Shahi and Muhammet S. Toprak.

Young Scientist Prize and Awards

The Eurotherm Committee confers, every four years, one Eurotherm Young Scientist Prize and two Eurotherm Awards. The prizes are presented at the European Thermal Sciences Conference. The candidates must have obtained within one of the Eurotherm countries a Ph.D. degree in the field of Thermal Sciences and Heat Transfer. They should be younger than 35 years at the date of the prize. Each European country is allowed to submit to the Prize Committee a maximum of two candidates for the Prize and the Awards. The Prize Committee is nominated every four years by the Eurotherm Committee, and consists of six members chosen within its delegates. In 2020, the Prize Committee is constituted by Profs. Andrzej Nowak, Stephan Kabelac, Michel de Paepe, Gian Luca Morini, Peter Stephan, Theo van der Meer.

The 2020 Eurotherm Young Scientist Prize was awarded to **Dr. Zhen Cao**, from the Lund University, Sweden. His Ph.D. thesis, entitled “*Pool Boiling on Structured Surfaces: Heat Transfer and Critical Heat Flux: Experiments and Mechanistic Modelling*”, was completed in 2019. The two 2020 Eurotherm Young Scientist Awards were given to **Dr. Jaume Garcia**, from the University of Lleida, in Spain, and **Dr. Germilly Barreto**, from the University of Évora, in Portugal. Jaume Garcia completed the Ph.D. in 2018 with a thesis entitled “*Technological requirements in latent heat thermal energy storage systems: Study of the partial load operating conditions and the dynamic melting enhancement technique*”. Germilly Barreto completed the Ph.D. in 2020 with a thesis entitled “*Modelling and optimisation of porous volumetric receivers in point-focus solar concentration systems*”.

8th European Thermal Sciences Conference

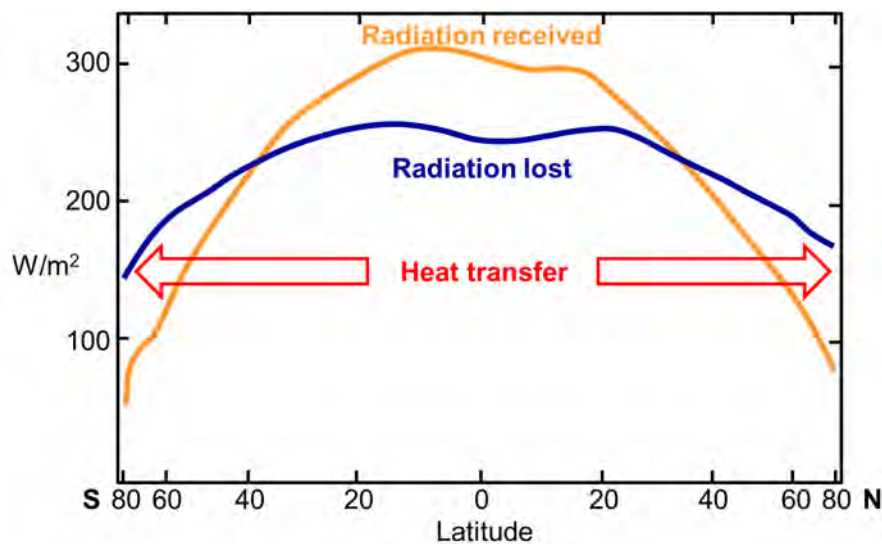
The 8th European Thermal Sciences Conference was held virtually from the 20th to the 22nd September, 2021. It was chaired by Professor Pedro Coelho, from Instituto superior Técnico, University of Lisbon, Portugal. All submitted papers were peer reviewed, and 130 papers were accepted for presentation at the conference (116 for oral presentation and 14 for poster presentation). The contributed oral presentations are organized in 24 sessions that are scheduled in blocks of three parallel sessions.

In addition, eight state-of-the-art keynote lectures were delivered by world leading experts, namely Maria da Graça Carvalho from Instituto Superior Técnico, University of Lisbon (currently member of the European Parliament), Helcio Orlando from the Federal University of Rio de Janeiro, Brazil, Denis Maillet, from the University of Lorraine, France, Ryszard Bialecki from the Silesian University of Technology, Gliwice, Poland, Wojciech Lipiński from the Australian National University, Canberra, Australia, Pinar Mengüç from the Özyeğin University, Istanbul, Turkey, Sung Jin Kim from the Korea Advanced Institute of Science and Technology, Daejeon, South Korea and Bengt Sundén from the Lund University, Lund, Sweden. Invited lectures were also delivered by Dr.

Zhen Cao, who received the 2020 Eurotherm Young Scientist Prize, and Dr. Germilly Barreto, who received a 2020 Eurotherm Young Scientist Award.

The conference proceedings were published in the *Journal of Physics: Conference Series* (<https://iopscience.iop.org/issue/1742-6596/2116/1>). The authors of the best papers, selected by the members of the organization and scientific committees who attended the conference and the session chairs, were invited after the conference to submit full manuscripts to special issues of two international journals: *Applied Thermal Engineering* and *Heat and Mass Transfer*. The submitted papers will be peer reviewed following the standard process for these journals.

Thermal Filler 2 The Greatest Heat Transfer on the Earth



Comparison of the incoming solar radiation and outgoing terrestrial radiation based on “Satellite Observations of the Earth’s Radiation Budget” by T. H. Vonder Haar, and V. E. Suomi, *Science*, 163 (3868), 1969.

International Centre for Heat and Mass Transfer (ICHMT)

Terrence Simon, President

University of Minnesota, Minneapolis, U.S.A., simon002@umn.edu

Ilker Tari, Tugba Gun

ICHMT



Heat and Mass Transfer are of major importance to our human activity: chemical processing, energy conversion, power generation, food and pharmaceuticals processing, materials and metallurgy, transportation, space exploration, thermal control and manufacturing of electronics, bioengineering and biomedical applications, indoor climate, addressing worldwide climate change, and more. Much of the technology needed for sustainable development while minimizing the impact of our activities on the climate requires continued advancement of our knowledge of heat and mass transfer. The community has addressed this continuing need for decades, contributing greatly to modern medicine, transportation, electronics, manufacturing, living comfort, protection of the environment, and so much more. The science and applications of heat and mass transfer continue to mature and prepare our society to confront renewed challenges. The development of new techniques, new instruments, and new methods will allow our society to continue to flourish. The present reality is that clearly, heat and mass transfer advancements will be crucial to satisfying our existential need to save our planet. Heat and mass transfer development is needed to allow civilization to continue to develop and prosper with attention to health, comfort, productivity and mobility while paying increasingly more attention to reducing stresses on the environment. The multiple facets of heat and mass transfer continue to widen into more advanced methods in medicine, transportation, efficient use of chemicals, nuclear energy, solar and wind power, and mitigation of polluting our soil, water, and air. Much awaits us with greater understanding of phenomena and continued development of the knowledge needed to support our worldwide activities. We continue to advance our computer simulations in concert with increasingly sophisticated optimization routines and experimental and diagnostic techniques. We will continue to open new frontiers of discovery that we can only imagine at this time. We have come far since the beginning of the International Centre for Heat and Mass Transfer over fifty years ago. Our continued endeavors are now taking us to ever widening scales, from the size of sub-atomic particles to the expanse of galaxies. Presently, the rapid pace in development supported by our heat and mass transfer research is yielding vast new opportunities as we create integrated processes and new materials designed to address the thermal technology needs of future generations.

In 2018, the ICHMT celebrated its 50th year advancing its noble mission of providing apolitical forums for the world's leading scientists and engineers in all branches of heat and mass transfer to communicate, collaborate, and pursue excellence. The Centre continues to foster international exchange and cooperation. Its prime activities are the scientific and engineering conferences and symposia, problem-focused meetings, forums, international schools and short courses, as well as publications of proceedings archived as ICHMT publications, all aimed at promoting research and education, as well as mutual understanding and good will for the benefit of humankind. The fast pace that we will realize in the future will require ever more effective communication.

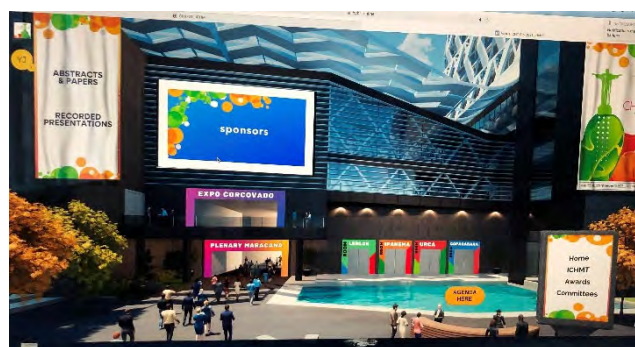


2020 Online EC Meeting of ICHMT

Meetings Organized by ICHMT:

As you well know, many international conferences scheduled last year have been postponed or cancelled because of COVID-19. Meetings Organized by ICHMT and Co-Sponsored by ICHMT is also postponed to 2021 and 2022. Below please find the details of these meetings;

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



Meetings Co-Sponsored by ICHMT:

“5-6th Thermal and Fluids Engineering Conference, TFEC-2021”, 26 – 28 May 2021, in New Orleans LA, USA (the conference was a virtual conference held entirely online). The Symposium Co-Chairmen were Dr. Ting Wang and Dr. Michael W. Plesniak.

“15th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, HEFAT-2021”, 26 - 28 July, 2021, in Amsterdam, Netherlands. The symposium Chairman was Professor Josua P. Meyer.

“6th International Workshop on Heat/Mass Transfer Advances for Energy Conservation and Pollution Control (on-line), IWHT-2021”, 13 - 16 August 2021 in Harbin, China. The Symposium Co-Chairmen were Y.J. Li, Q.W. Wang and Y.T. Chen.

The organization of several future meetings have continued. These are;

Meetings to be Organized by ICHMT:

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



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



Meetings to be Co-sponsored by ICHMT:

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

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

“16th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics and the Editorial Board of Applied Thermal Engineering, HEFAT-ATE 2022”, 8 - 10 August, 2022, in Amsterdam, Netherlands. The symposium Chairman is Professor Josua P. Meyer, University of Pretoria, South Africa. Detailed information can be found on the Web site: <https://hefat2022.org/>

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

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

Officers of ICHMT

Executive Committee 1.1.2019 - 31.12.2022		
President		
Terrence W. SIMON United States of America		
Vice Presidents		
Yildiz BAYAZITOGLU United States of America	Peter STEPHAN Germany	
Secretary General		
Ilker TARI Turkey		
Executive Committee Chairman		Executive Committee Vice Chairman
Pedro Jorge Martins COELHO Portugal		Pinar MENGÜÇ Turkey
Elected Executive Committee Members		
Pedro Jorge Martins COELHO Portugal	Renato M. COTTA Brazil	Paolo DI MARCO Italy
Leonid DOMBROVSKY Russia	Ulrich GROSS Germany	Yogesh JALURIA United States of America
Denis LEMONNIER France	Wojciech LIPINSKI Poland	Pinar MENGÜÇ Turkey
Abdulmajeed MOHAMAD Canada	Jacques PADET France	John THOME Switzerland
Brent WEBB United States of America	Hideo YOSHIDA Japan	Xing ZHANG China
Financial Auditors		
Kyle DAUN Canada	Yogesh JALURIA United States of America	Mikhail A. SHEREMET Russia
Past Presidents who are ex-officio voting members of the Executive Committee		
Maurizio CUMO Italy	Richard J. GOLDSTEIN United States of America	Kemal HANJALIC Bosnia Herzegovina

<https://www.ichmt.org/p/officers-of-ichmt>

Organization:

- 42 Member Institutions from 31 countries
- More than 200 Scientific Council members
- Officers: President, Vice Presidents, Secretary General, Executive Committee (15 members), Financial Auditors

Publications:

Proceedings of ICHMT Meetings

<https://www.ichmt.org/p/proceedings-of-ichmt-meetings>

Other Publications

<https://www.ichmt.org/p/other-publications>

ICHMT Digital Library

<http://dl.begellhouse.com/references/1bb331655c289a0a.html>



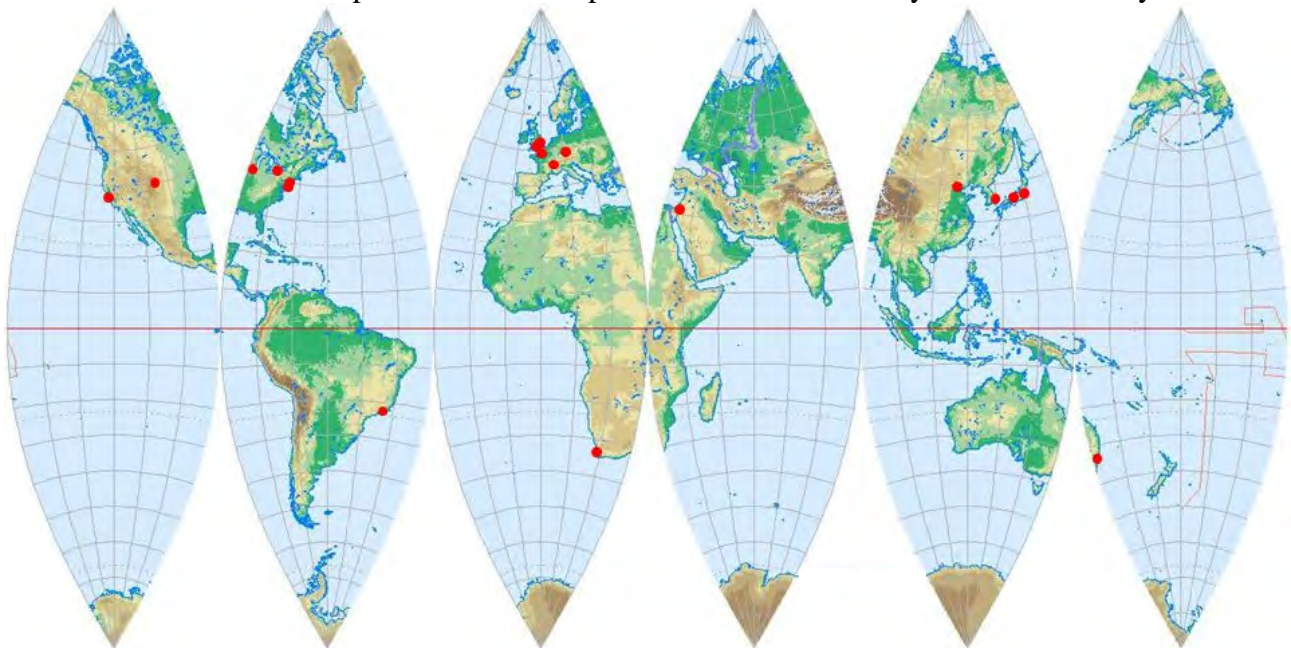
AIHTC
IHTC-17 03 – 07 JULY 2023, Cape Town
17th International Heat Transfer Conference
<https://ihtc17.org/>



History of IHTC and AIHTC

The Assembly for International Heat Transfer Conferences (AIHTC) organizes the series of quadrennial International Heat Transfer Conferences (IHTCs) – the Heat Transfer Olympics – since 1966. The origin of the IHTCs is an International Discussion on Heat Transfer held in London (Chair, O.A. Saunders) and Atlantic City (Chair, A.P. Colburn) 1951; this was regarded as IHTC-1. Ten years later, a succeeding International Heat Transfer Conference was held in Boulder 1961 and in London 1962, which was regarded as IHTC-2. After IHTC-3 held in Chicago 1966, IHTCs have been continuously held every four years having the recent one IHTC-16 held in Beijing 2018 followed by the next two in **Cape Town 2022 (postponed to 2023)** and Rio de Janeiro 2026. It has been organized in 17 cities of 10 countries.

For over 70 years, IHTC has been the largest worldwide forum on heat transfer (HT) and thermal science and engineering (TSE), and devoted to meet the scientific and social challenges as the thermal energy usage, environmental sustainability, material processing, bio-science, etc. The mission of IHTC has become more important with the rapid increase in the activity of human society.



Important Dates of IHTC-17

Call for Papers	Monday, 02 May 2022
<u>Abstract Submission Deadline</u>	<u>Wednesday, 31 August 2022</u>
Abstract Acceptance Notification	Friday, 30 September 2022
Full-Length Draft Paper Submission Deadline	Saturday, 31 December 2022
Registration Opens	Wednesday, 01 March 2023
Full-Length Draft Paper, Post-Review, Acceptance Notification	Wednesday, 15 March 2023
Final Full-Length Paper Submission Deadline	Monday, 01 May 2023
Final Registration and Payment Deadline	Monday, 15 May 2023

American Society of Thermal and Fluids Engineers (ASTFE)

Yong X. Tao, President

Cleveland State University, Cleveland OH, U.S.A., ytao19@csuohio.edu



New Executive Committee

Formed in January 2022, the Executive Committee (EC) of American Society of Thermal and Fluids Engineers will lead the society's essential functions in planning conferences and membership initiatives. Reporting to the ASTFE Board of Directors, the Executive Committee consists of five members, Professor Wilson Chiu of University of Connecticut, Professor Lorenzo Cremaschi of Auburn University (EC Chair), Professor Jon Longtin of Stoney Brook University, Professor Nesrin Ozalp of Purdue University Northwest and Professor Ting Wang of University of New Orleans. For more information, contact info@astfe.org.

2022 ASTFE Fellows and Thermal and Fluids Engineering Awardee

ASTFE continues to honor our members for impressive achievements and contributions. Three new distinguished scholars, Professors Jane Davidson, Wilson Chiu and Darrell Pepper have been elected as Fellows in 2022. In addition, the 2022 Thermal and Fluids Engineering Award will be presented to Professor Sivaramakrishnan (Bala) Balachandar of University of Florida in recognition of substantial contributions to the field. These awards will be presented at the 7th Thermal and Fluids Engineers Conference (TFEC), May 16-18, 2022, in Las Vegas.



Prof.
Sivaramakrishnan
(Bala) Balachandar
University of Florida

Annual Conferences

The 5th-6th Thermal and Fluids Engineering Conference

(TFEC 2021) was held virtually during May 26-28, 2021. The Chairs of the conference were Drs. Ting Wang and Michael W. Plesniak, and program chair and co-chair were Drs. Ankur Jain and Lorenzo Cremaschi. Due to the Covid-19 pandemic, TFEC 2020, which was originally planned to be held in New Orleans, Louisiana, in April 2020, was postponed and combined with the 6th Thermal and Fluids Engineering Conference (TFEC 2021) and held as a virtual conference. For this combined conference 150 participants



Prof. Jane Davidson
University of
Minnesota



Prof. Wilson Chiu
University of
Connecticut

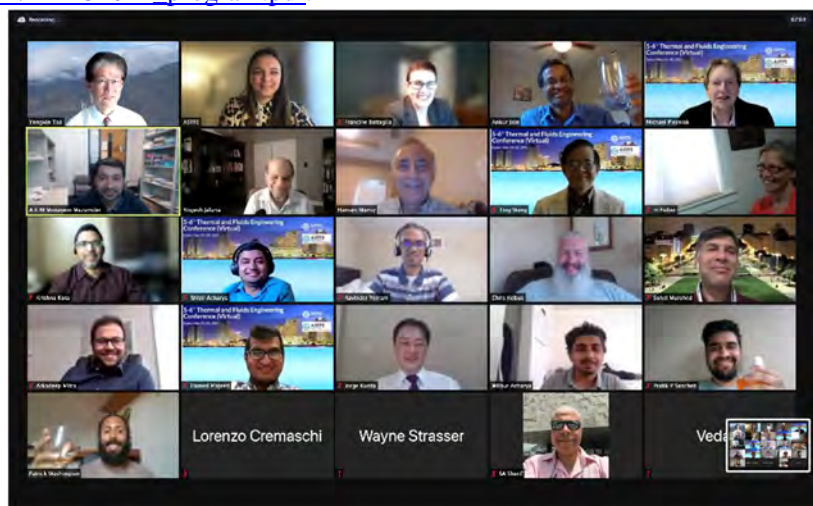


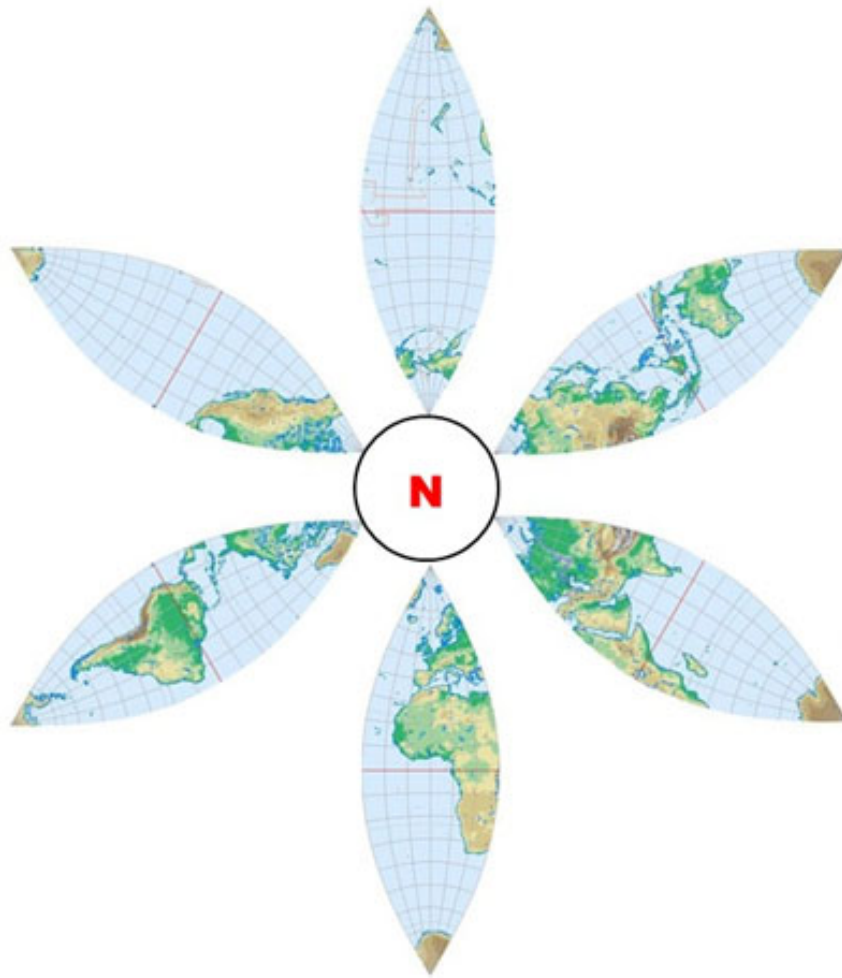
Prof. Darrell Pepper
University of
Nevada Las Vegas

carried over from 2020 attended and presented, in addition to another 105 new participants for this year's 2021 conference. Participants from over 30 countries on nearly all continents attended the virtual conference. The technical program also hosted 4 plenary speakers, 9 keynote presentations, and 4 invited speakers in the Technology, Entrepreneurship and Communication (TEC-talk) session. In addition, invited speakers from 8 special panel sessions and one NSF-sponsored student session attended the conference. These sessions were: River Management and Flood Control Panel, Federal Research Funding Outlook and Opportunities, TEC Talks, the Sustainability Tank, Fluid Mechanics of Speech, and Industrial Multiphase CFD. The complete program can be found at https://www.astfe.org/conferences/tfec2021/TFEC2021_program.pdf.

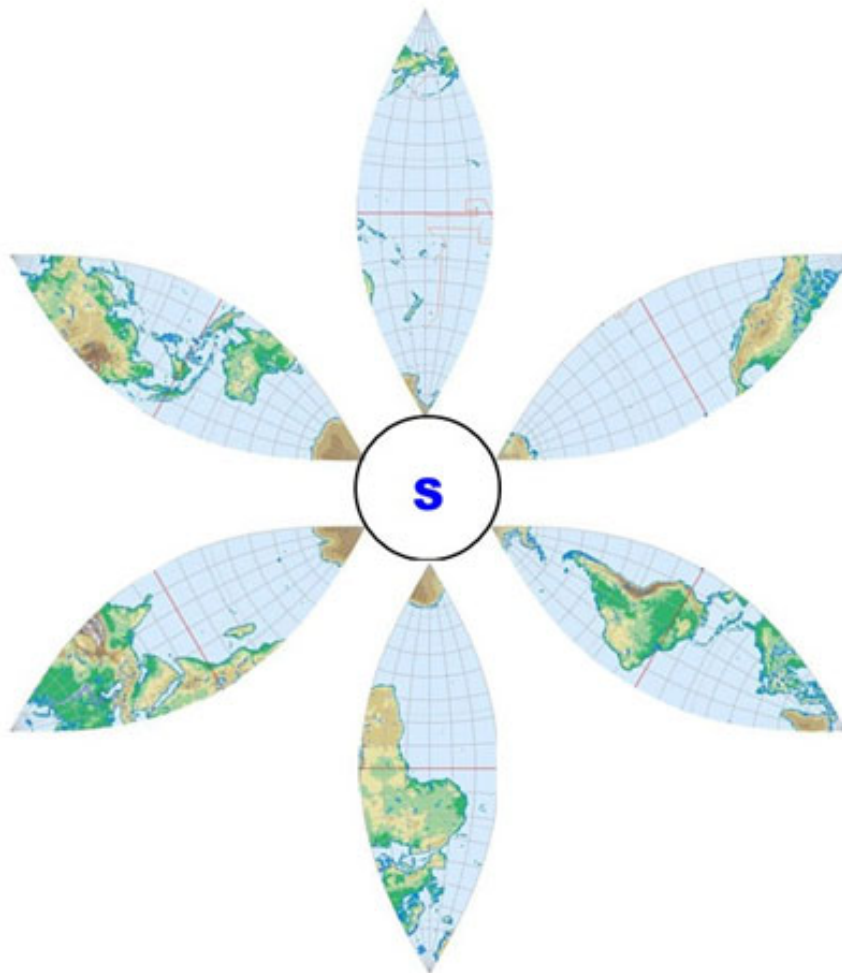
The 26th National 4th International ISHMT-ASTFE Heat and Mass Transfer Conference (IHMT 2021)

ASTFE continues its international collaboration with the Indian Society of Heat and Mass Transfer (ISHMT) for the 2021 ISHMT-ASTFE conference, held virtually in December 17-20, 2021, and jointly celebrating the 50th anniversary of the ISHMT with the organizing team at IIT Madras led by Professor T. Sundararajan.





Part 2



Members in the five international organizations

(The order of ASTFE, EUROTHERM and AUTSE is changed corresponding to the geographical one.)

Member †	ICHMT	AIHTC	ASTFE	EUROTHERM	AUTSE
Australia					
Austria					
Belarus					
Belgium					
Brazil					
Canada					
China					
Chinese Taipei					
Czech Republic					
Egypt					
Finland					
France					
Germany					
Greece					
Hungary					
India					
Ireland					
Israel					
Italy					
Japan					
Mexico					
Morocco					
New Zealand					
Poland					
Portugal					
Romania					
Russia					
Serbia					
Singapore					
South Africa					
South Korea					
Slovenia					
Spain					
Sweden					
Switzerland					
Thailand					
The Netherlands					
Turkey					
UK					
USA					
40	31	18	2	16	7

† The meaning of “Member” is different for the five international organizations.

ICHMT: Members are based on Member Institutions. <https://www.ichmt.org/p/member-institutions>

AIHTC: Members are based on Countries. <http://www.aihtc.org/officers.html>

ASTFE: USA (but, basically worldwide, particularly North America). <https://www.astfe.org/about/>

AUTSE: Members are based on Countries/Regions. http://autse-asia.org/?page_id=21

EUROTHERM: Members are based on Countries. <http://www.eurothermcommittee.eu/membership.php>

Australia

Member of ICHMT, AIHTC, AUTSE

(1) Overview

(Australia Standard Time: from UTC+8 to UTC+10, Population: 27.1 million)



1. Organizations

Engineers Australia is the national forum for the advancement of engineering and the professional development of our members. With more than 100,000 members embracing all disciplines of the engineering team, Engineers Australia is the largest and most diverse professional body for engineers in Australia.

The Heat and Mass Transfer and Thermal Fluid Mechanics community in Australia is represented by **Australasian Fluid and Thermal Engineering Society (AFTES)**. The general mission of the Society is to promote and foster the understanding and application of fluid mechanics, thermodynamics, heat and mass transfer and related subjects within Australasia to the general benefit of the community at large. The society publishes an occasional newsletter and runs conferences, workshops and seminars.

2. Major meetings

The Australasian Heat and Mass Transfer Conference (AHMTC) series, initiated in 1973, are organised under the auspices of the AFTES. It provides a research forum for disseminating new knowledge to the Heat and Mass Transfer research community and for networking and exchanging research ideas. The AHMTC series covers both fundamental and applied topics in broad areas of convection, conduction, radiation, turbulence, multi-phase flow, combustion, drying, heat exchangers, computational and experimental methods, and other significant thermal processes in built environment and in environmental and industrial processes.

Previous AHMTC conferences were held in Melbourne (1973, 1985, 2011, 2018), Sydney (1977, 1996), Christchurch (1989), Brisbane (1993, 2016), Townsville (2000) and Perth (2005). While the AHMTC is mainly based in Australia and New Zealand, the previous conferences have attracted high-profile international keynote and invited speakers and a significant number of international participants from US, Europe, China, Canada, Japan, Malaysia and Singapore etc. We welcome researchers from all over the world to participate in the conferences.

The 12th Australasian Heat and Mass Transfer Conference (AHMTC) will be held in Sydney on 30 June to 1 July 2022. Please visit the [AHMTC](#) website for further information.

In addition to the AHMTC series, the **Australasian Natural Convection Workshops (ANCW)** are held regularly for a focused interest group. The most recent one, the [11ANCW](#), was held in Sydney. AFTES members also actively participate in the biennial **Australasian Fluid Mechanics Conferences (AFMC)**. The next [AFMC](#) conference will also be held in Sydney.

3. Major Journals

- Australian Journal of Mechanical Engineering
- Australian Journal of Multi-disciplinary Engineering
- Australasian Journal of Engineering Education

4. Awards

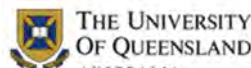
The AFTES offers awards such as Best Student Presentation Award and Best Paper Award at the AHMTC and the ANCW.

5. Education (Undergraduate/Graduate)

- Primary School, 6 years; High School 6 years. Undergraduate Engineering University, 4 years.
- Each University's Engineering program is regularly accredited by the Engineers Australia Accreditation Board.
- Research-based Master's degree have a typical duration of 2 years, while Doctorate program (PhD) runs in average for 3.5 to 4 years to complete.

6. University system.

There are approximately 40 universities in Australia which are mostly publicly funded. Most Universities in Australia offer Engineering degrees and courses. The best-known Australian universities are the **Group of Eight Universities** comprising Australia's most research-intensive institutions including the University of Adelaide, the Australian National University, the University of Melbourne, Monash University, UNSW Sydney, the University of Queensland, the University of Sydney and the University of Western Australia.



The academic positions are lecturer, senior lecturer, associate professor and professor. Further information about Australian universities may be found on the [Universities Australia](#) web site.

7. Common Scientific Research Funding Agencies

- Australian Research Council (ARC)
- National Health and Medical Research Council (NHMRC)
- Australian Renewable Energy Agency (ARENA)
- Cooperative Research Centres (CRC)

8. Major Federal Public Research Institutes

- Commonwealth Scientific and Industrial Research Organization (CSIRO)
- Defense Science and Technology Group (DSTG)

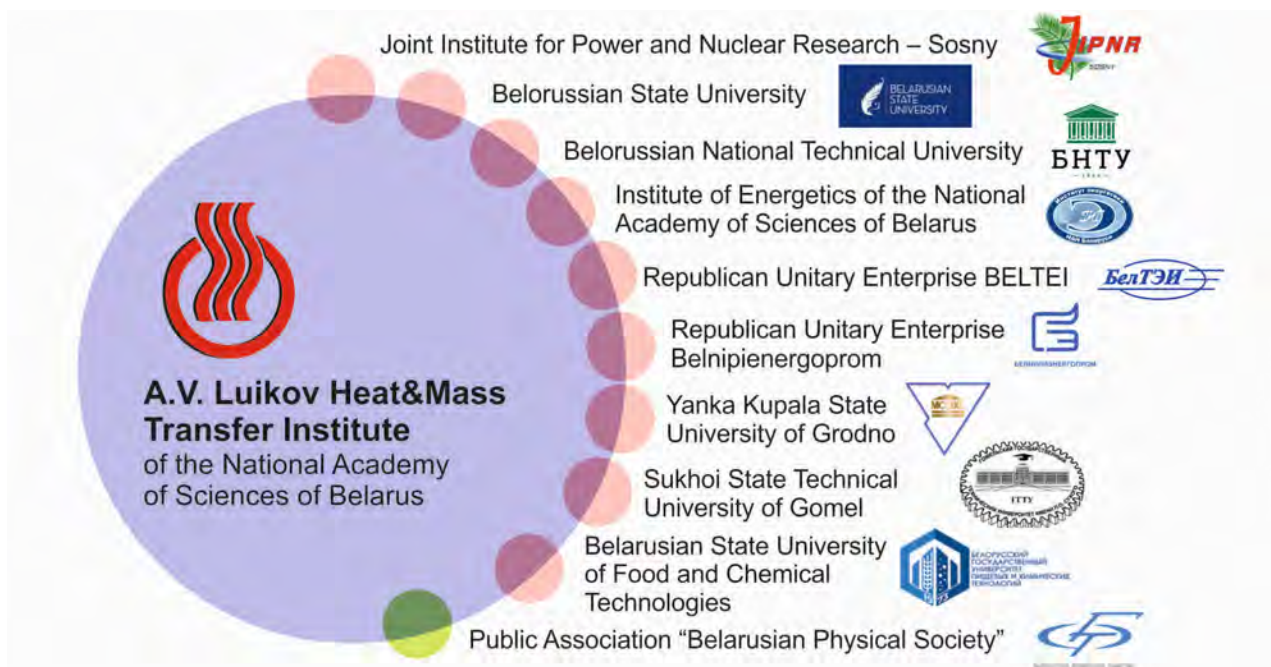
by Victoria Timchenko (ICHMT, AIHTC) and Chengwang Lei (AUTSE)

Belarus Member of ICHMT (1) Overview

(Moscow Standard Time, MSK: UTC+3, Population 9.4 million)

1. Major Societies

Thermal science and engineering in Belarus are mostly concentrated in A.V. Luikov Heat & Mass Transfer Institute of the National Academy of Sciences of Belarus (www.itmo.by). A number of specialists in thermal science belong to the Joint Institute for Power and Nuclear Research – Sosny, Belorussian State University, Belorussian National Technical University, Institute of Energetics of the National Academy of Sciences of Belarus, Republican Unitary Enterprise BELTEI, Republican Unitary Enterprise Belnpienergoprom, Yanka Kupala State University of Grodno, Sukhoi State Technical University of Gomel, Belarusian State University of Food and Chemical Technologies. Most of Belorussian scientists and engineers in thermophysics and engineering are members of Public Association “Belarusian Physical Society” which is an independent scientific public association of scientists, specialists and students working in the field of physics and related fields of science.



2. Major Meetings

Minsk International Heat and Mass Transfer Forum

Since 1961 (once in 4 years)

Place: A.V. Luikov Heat&Mass Transfer Institute of the National Academy of Sciences of Belarus

Participants: about 400 (maximum in 1972 - about 1335)

Minsk International Seminar Heat Pipes, Heat Pumps, Refrigerators, Power Sources

Since 1993 (once in 3 years)

Place: A.V. Luikov Heat&Mass Transfer Institute of the National Academy of Sciences of Belarus

Participants: about 100

International Scientific-Technical Conference "Alternative sources of raw materials and fuel"

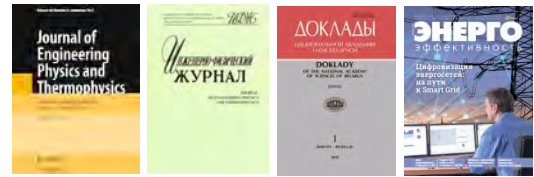
Since 2009 (every 2 years)

Place: Institute of Chemistry of New Materials of the National Academy of Sciences of Belarus

Participants: about 120

3. Major Journals

Journal of Engineering Physics and Thermophysics (bimonthly). It is published in Russian (Minsk) and in English (Springer)



Doklady of the National Academy of Sciences of Belarus (bimonthly). It is the main journal of the National Academy of Sciences of Belarus. It is published in Russian (Minsk).

Energy Efficiency is the journal of Belarus Department for Energy Efficiency. It is published in Russian (Minsk).

4. Awards

A. V. Luikov International Award of the National Academy of Sciences of Belarus

Theme: Problems of Heat and Mass Transfer

Periodicity: Once in 2 years

Number of Awards: Two (Belarusian and International)



5. Education

All pupils must follow the basic education curriculum up to the age of 15, and the vast majority of pupils stay at school until they finish their high school education at 18.

At the age of 15, pupils that have successfully completed basic education can attend college or professional technical institutions where they can focus on completing their high school education and work toward a professional certificate.

6. Completion of a high school or professional certificate allows students to apply to continue their education at the university level

Most university courses run for 4-6 years. Master course is 1-2 years, and Doctor course is 3 years. There are two levels of doctoral degree - Candidate of Science (PhD) and Doctor of Science (DrSc).

In May 2015 Belarus officially joined the Bologna Process – the European Higher Education Area.

7. Foundations of Scientific Research

- The National Academy of Sciences of Belarus
- State Committee on Science and Technology of the Republic of Belarus
- The Ministry of Education in Belarus

8. Addendum

Belarus is a beautiful country located in the very heart of Europe. It borders five other states. The regions bordering Poland are in the west of the country, the north-western part is close to Lithuania, in the north Belarusian territories border Latvia and Russia, in the south our country is close to the Ukraine and in the east and north-east – to Russia. Most of the national landscapes are flat. Almost fifty percent of the territory is covered with fields, forests and meadows. It is often named “blue-eyed” as there are over thirteen thousand absolutely beautiful water pieces (lakes and rivers) here. There are two official languages within the education system in Belarus, Russian and Belarusian. The first and the largest city of Belarus is its capital Minsk which is quite a modern European city with almost two million people living there.



Director
A.V. Luikov Heat&Mass Transfer Institute
 of the National Academy of Sciences of Belarus

Oleg PENYAZKOV

penyaz@dnpi.itmo.by
 office@hmti.ac.by

Brazil

Member of ICHMT, AIHTC

(1) Overview

(Time Zone: Most of the population resides in regions with time zone GMT-3, but the Brazilian territory spreads from zones GMT-5 to GMT-2. Population: 214.1 million)

1. Organizations

The major organization that congregates thermal scientists in Brazil is **ABCM – Brazilian Society of Mechanical Engineering and Sciences** (www.abcm.org.br). ABCM was founded on April 19, 1975. It is a non-profit organization with about 700 individual members and 4 institutional members. Although ABCM is a general mechanical engineering organization, it counts with 19 Technical Committees, many of them related to thermal sciences. ABCM is the Representative National Organization at AIHTC and at ICHMT.

ABCM's goal is to congregate individuals and companies that share an interest in Engineering and Mechanical Sciences, in order to:

- Contribute for the development of Engineering and Mechanical Sciences in Brazil;
- Promote research, as well as the interchange/diffusion of knowledge;
- Encourage an effective cooperation between Universities, Research Centers and Industries, in order to contribute for the development of Brazil;
- Encourage the spreading of knowledge in Engineering and Mechanical Sciences through the publication of textbooks, monographies, magazines, journals and other communication media;
- Promote collaboration with related Institutes and Societies in Brazil and abroad;
- Promote Congresses, Symposia, Conferences and Courses.



2. Major Meetings

ABCM regularly promotes 12 scientific conferences. The largest conference held under the auspices of ABCM is **COBEM, the International Congress of Mechanical Engineering**, which is held every other year since 1971, and counts with about 1100 participants.

The **Brazilian Congress of Thermal Sciences – ENCIT** is held every other year since 1986 and counts with about 400 participants. The 19th edition of ENCIT will be held during November 06 to 10, 2022, in the beautiful wine production region of Brazil (<https://eventos.abcm.org.br/encit2022/>).



Other ABCM regular events related to thermal sciences include: EPTT – The International Spring School on Transition and Turbulence, EBCEM – The Brazilian Meeting on Boiling, Condensation and Gas-Liquid Multiphase Flow, EVR – Summer School on Refrigeration and EdC – School on Combustion.

3. Major Journals

The **Journal of the Brazilian Society of Mechanical Sciences and Engineering** (JBSMSE - ISSN: 1678-5878) has been regularly published since 1979. The purpose of the JBSMSE Journal is to publish articles of permanent interest dealing with research, development and design related to science and technology in Mechanical Sciences and Engineering, encompassing interfaces with other branches of Engineering, as well as with Physics and Applied Mathematics. The JBSMSE Journal is currently published by Springer (<https://www.springer.com/journal/40430>) and it is indexed in JCR (quartile Q2, 64/133 in the category Engineering, Mechanical) with 2020 Impact factor of 2.22.

ABCM also regularly publishes online the journal **Thermal Engineering** (<https://abcm.org.br/pb/thermal-engineering>), which counts with technical and scientific contributions.



4. University System and Engineering Education

The University System in Brazil includes public and private institutions. Public Universities are run either by the Federal or local state governments; they are totally free for students from undergraduate to Ph.D. studies. Research in engineering is mainly conducted in public Universities, except for few well-ranked private Universities.

An engineering degree in Brazil takes about 5 years of studies. Engineers graduating from a Brazilian University automatically receive an authorization from the National Board of Engineers to act as a professional. Graduate studies in general require a minimum number of courses to be taken before the student can conduct research, both at the Master and Ph.D. levels. Students usually obtain a Master degree in 24 months, and a Ph.D. degree in 48 months.

5. Foundations of Scientific Research

Brazil counts with State Research Foundations (FAPs) with the mission to support research projects in the respective states of the Brazilian Federation and two major agencies of the federal government that sponsor research and graduate studies:

CNPq from the Ministry of Science and Technology (<https://www.gov.br/cnpq/pt-br>) and CAPES from the Ministry of Education (<https://www.gov.br/capes/pt-br>).

By Helcio R. B. Orlande and Gherhardt Ribatski, Brazilian delegates in AIHTC

Canada Member of ICHMT, AIHTC, ASTFE (1) Overview

(From UTC-3:30 to UTC-8, Population: 38 million)

1. Major Societies

Canadian engineers and researchers in the field of heat transfer can be members of the Canadian Society for Mechanical Engineering (**CSME**), where they can be active participants in the Heat Transfer Technical Committee and the Advanced Energy Systems Technical Committee. Engineers and researchers in the field of mass transfer are more often chemical engineers and therefore can be members of the Canadian Society for Chemical Engineering (**CSCHE**).

Due to its close proximity with the United States, many engineers and researchers in the fields of heat and mass transfer are also members of the American Society of Mechanical Engineers (**ASME**) and its Heat Transfer Division, the American Society of Thermal and Fluids Engineers (**ASTFE**) and the American Society of Heating, Refrigeration and Air-Conditioning Engineers (**ASHRAE**).

2. Major Meetings

The CSME holds a Congress annually, typically in June. A Heat Transfer Symposium is part of the Congress. Full conference papers or abstract are required, leading to oral presentations.
Place: moves from coast to coast annually. The next one in June 2022 to be held in Edmonton, Alberta.
Period: three to four days in June

The CSCHE holds a Conference annually, typically in October. Full conference papers or abstract are required, leading to oral presentations.
Place: moves from coast to coast annually. The next one in October 2022 to be held in Vancouver, BC.
Period: four to five days in October

3. Major Journals

CSME
Transaction of the Canadian Society for Mechanical Engineering (4 issues per year)
(<https://cdnsiencepub.com/journal/tcsme>)

CSCHE
The Canadian Journal of Chemical Engineering (12 issues per year)
(<https://onlinelibrary.wiley.com/journal/1939019x>)



4. Awards

- The Jules Stachiewicz Medal is awarded alternately by the CSME and the CSCHE on a yearly basis for outstanding contributions to the Heat Transfer discipline in Canada.

This medal was established in 1978 to honour Professor Jules Stachiewicz who was a professor in Mechanical Engineering (1950-76) and Chair of the Department at McGill University from 1972 until his death in 1976.

5. Education (Undergraduate/Graduate School)

- Education is either in English or French; with textbooks in both languages.
- Elementary School, 6 years; Secondary School (through 1 or more Schools), 5 to 6 years depending on the Province; CEGEP (In Québec), 2 years, Undergraduate Engineering University, 4 years.
- School year in elementary and secondary schools runs from early September to late June. University terms run from September to December (Fall term), January to April (Winter term) and May to August (Summer term).
- A large teaching emphasis is placed on Engineering Design in University Engineering programs. And each program is regularly accredited through the Canadian Engineering Accreditation Board (CEAB).
- Research-based Master's degree have a typical duration of 2 years, while Doctorate program now take an average of 4 to 5 years to complete.
- A push is underway in Canadian universities to increase the percentage of women in the programs to 30% by 2030.

6. University System

- Engineering programs are offered at more than 30 Universities in the country.
- Most university professors are also researchers, and they are ranked at one of three level: professor, associate professor, and assistant professor.
- Every professor, irrespective of rank, can supervise graduate student and apply for independent research funding.
- Most engineering university professor are also required to be professional engineers recognized through a provincial engineering association or order.

7. Common Scientific Research Funding Agencies

- Natural Science and Engineering Research Council (NSERC) of Canada
- Canadian Foundation for Innovation (CFI) (Infrastructure funding)
- Public and Private Research Chairs
- MITACS

Some Canadian Provinces also have their own funding agencies.

8. Major Federal Public Research Institutes

- National Research Council (NRC) laboratories
- Natural Resources Canada
- Canadian Space Agency
- Canadian Nuclear Laboratories (CNL)

Some Canadian Provinces also run their own research laboratories.

By Dr. Dominic Groulx, P.Eng.
(FCSME, ASME, ASTFE and Canadian Representative on AIHTC and ICHMT)

China

Member of ICHMT, AIHTC, AUTSE

(1) Overview

(China Standard Time, CST: UTC+8, Population: 1.41 billion)

1 Major Societies



Scholars in the field of thermal science and engineering in China mainly belong to the Chinese Society of Engineering Thermophysics (CSET), which was established in 1978 with its main office in Beijing and affiliated with the Institute of Engineering Thermophysics, Chinese Academy of Sciences. There are nearly 3,000 members, including scientific and technological workers from colleges and universities, scientific research

institutions and industrial departments in the fields of high-efficiency and low-pollution utilization of energy, aerospace propulsion, power generation, refrigeration, etc. It covers information technology, material science, space technology, environmental protection, advanced manufacturing technology, life science and agriculture and other disciplines.

The CSET conducts academic exchange activities in the disciplines of engineering thermodynamics, heat engine aerodynamic thermodynamics, heat and mass transfer, combustion, multiphase flow, and fluid mechanics. Each discipline branch and professional committee regularly holds national academic conferences every year to encourage interdisciplinary, exchange the latest academic achievements, and promote the development of disciplines.

2 Major Meetings

2.1 CSET Heat and Mass Transfer Conference

Sponsored by the Heat and Mass Transfer Branch of CSET and the National Natural Science Foundation of China (NSFC), the conference is held once a year with a scale of about 1500 people.

2.2 China National Symposium on Combustion

Sponsored by the Combustion Branch of CSET and NSFC, the conference is held once a year with a scale of about 1500 people.

2.3 CSET Engineering Thermodynamics and Energy Utilization Conference

Sponsored by the Engineering Thermodynamics Branch of CSET and NSFC, the conference is held once a year with a scale of about 1000 people.

2.4 CSET Multiphase Flow Conference

Sponsored by the Multiphase Flow Branch of CSET and NSFC, the conference is held once a year with a scale of about 650 people.

2.5 China National Symposium on Aerothermodynamics and Fluid Machinery

Sponsored by the CSET and NSFC, the conference is held once a year with a scale of about 650 people.

3 Major Journals

Journal of Engineering Thermophysics was founded in 1980 by Professor Zhonghua Wu, a famous engineering thermophysicist and academician of the Chinese Academy of Sciences, and is jointly sponsored by CSET and the Institute of Engineering Thermophysics, Chinese Academy of Sciences now. Since 2008, it has changed from bimonthly to single monthly. The journal mainly publishes innovative academic papers on experimental testing methods and techniques in engineering thermodynamics and energy utilization, heat engine aerodynamic thermodynamics, heat and mass transfer, combustion, multiphase flow, fluid machinery and engineering thermophysics research. It actively reports the frontier work of basic theoretical research and applied basic research, actively reports applied research results, and reflects the future development direction and academic level of engineering thermophysics.

4 Foundations of Scientific Research



National Natural Science
Foundation of China

The NSFC has established Key Program, General Program, Youth Program and other programs to support original scientific research. At the same time, it has also established talent projects such as the Distinguished Young Scholars Fund and the Excellent Young Scientists Fund (including overseas projects) to explore and support scholars with academic potential to make important contributions to the development of the discipline.

5 Major Universities and Research Institutes

(The fourth round of discipline assessment A and above universities)

- ✓ Tsinghua University <https://www.tsinghua.edu.cn/>
- ✓ Xi'an Jiaotong University <http://www.xjtu.edu.cn/>
- ✓ Shanghai Jiao Tong University <https://www.sjtu.edu.cn/>
- ✓ Zhejiang University <https://www.zju.edu.cn/>
- ✓ Tianjin University <http://www.tju.edu.cn/>
- ✓ North China Electric Power University <https://www.ncepu.edu.cn/>
- ✓ Harbin Institute of Technology <http://www.hit.edu.cn/>
- ✓ Huazhong University of Science and Technology <https://www.hust.edu.cn/>
- ✓ Institute of Engineering Thermophysics, Chinese Academy of Sciences <http://www.etp.ac.cn/>

President of CSET, Hongguang Jin, 金红光

Chinese Taipei

Member of AUTSE

(1) Overview

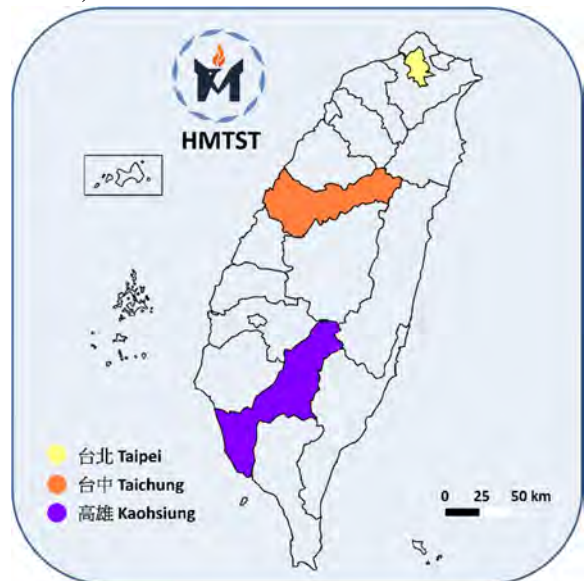
(National Standard Time, NST: UTC+8, Population: 23 million)

1. Brief history

Heat and Mass Transfer Society of Taiwan (hereby “HMTST”) was established in Hsinchu, Taiwan in 2016. As an international, professional, non-governmental, and non-profit organization, HMTST aims to facilitate advances in the fields of mechanical engineering in industry and academia. For this purpose, HMTST proactively interacts with world’s leading researchers by participating international research organization, and devotes in contributing networking for researchers in Taiwan.

2. Core missions

HMTST has six missions. These missions aim to offer good chances for specialists to interact with each other and activate further potential cooperation. HMTST also confers awards to scientists in honor of their achievements.



Website: <https://hmtst.tw>

3. Key persons



Dr. Da-Jeng Yao 饒達仁
(Executive Supervisor)

Professor
Dept. of Power Mechanical Eng.
National Tsing Hua University



Dr. Ming-Chang Lu 呂明璋
(Chairman)

Professor
Dept. of Mechanical Eng.
National Taiwan University



Dr. Chin-Hsiang Cheng 鄭金祥
(Director, Thermal Science and Fluid Dynamics Program, MOST)

Distinguished Professor
Dept. of Aeronautics and Astronautics
National Cheng Kung University



Dr. Li Xu 許麗
(Secretary General)

Assistant Professor
Dept. of Mechanical Eng.
National Taiwan University



Dr. Ming-Tsang Lee 李明蒼
(Executive Board Member)

Associate Professor
Dept. of Power Mechanical Eng.
National Tsing Hua University



Dr. Yu-Bin Chen 陳玉彬
(Honorary Chairman)

Professor
Dept. of Power Mechanical Eng.
National Tsing Hua University

4. Major events

HMTST has organized 7 workshops and one international conference by the end of 2022. A brief summary is illustrated below:

(1) Workshop

HMTST hosts workshops regularly. The workshops provide an important platform for specialists from academia, industry or government sections to exchange opinions, brainstorm, and investigate potential cooperation.



(2) International conference

Participants were from Japan, South Korea, U.S., Australia, and Taiwan. Topics of the conference included combustion, computational fluid dynamic, electronics cooling, functional and complex fluids, laser fabrication, phase change heat transfer, phonon transport, power generation system, renewable energy, thermal radiation, transport phenomena in manufacturing, emerging topics of thermofluids. The conference ended with fruitful results:

- Bring in latest researches from world's leading scientists and expand international visibility of Taiwan;
- Share applications and breakthrough in relevant fields;
- Increase cooperation and interaction with neighbor countries

Poster presentation for students was held together with the international conference. Students were offered opportunities to present their work to the participants and receive various and valuable feedback.



4. Awards

HMTST currently confer two awards, Achievement Award and Outstanding Scholar Award. Achievement Award is to recognize distinguished engineering achievement for senior scientists. Outstanding Scholar Award is to encourage young potential scientists to pursue researches in the field of thermal sciences and engineering. 2020 award winners are shown below.



Achievement Award Winner (2020)
Dr. Chi-Chuan Wang 王啟川
Chair Professor
Dept. of Mechanical Eng.
National Yang Ming Chiao Tung University
Chairman of HMTST



Outstanding Scholar Award Winner (2020)
Dr. Ching-Wen Lo 羅景文
Assistant Professor
Dept. of Mechanical Eng.
National Chung Hsing University
Ming-Chang Lu 呂明璋 mingchanglu@ntu.edu.tw

France

Member of ICHMT, AIHTC, EUROTHERM

(1) Overview

(Central European Time Zone, CET: UTC+1 (winter) and UTC+2 (summer), Population: 67.4 million)

1. Organizations

Most scientists and and engineers specialized in thermal sciences and heat transfer in France belong to Société Française de Thermique (SFT).

SFT was founded in 1961 as a non-profit organization. The organization published “La Revue Générale de Thermique” until 1995, before its publication by Elsevier as the “International Journal of Thermal Sciences”.



Its purpose is :

- Development and enhancing the influence of thermal sciences,
- Study of miscellaneous problems, of public interest linked to thermal sciences in a direct or indirect way, such as the study of the use of diverse energy sources for example
- Link to associations and French groups of thermal scientists, as well as to other scientific fields
- Animation and promotion within the community of thermal sciences in industry, teaching and research
- Exchanges and diffusion of knowledge between their creators and their users
- The representation of thermal sciences and of thermal scientists at the national, European and international levels

President of SFT (2021-2023): Christophe Le Niliot, Aix-Marseille University (christophe.leniliot@univ-amu.fr)

2. Members

- 450 individual members in the year book
- 30 collective members: University /CNRS research labs, and companies

3. Structure and communication

SFT is organized around an administration board, a scientific committee and thematic groups. The main organization is described below

- An elected board, with a two year mandate for the President and for the head of the scientific committee with four meetings per year.
- A scientific council in charge of the congress
- 3 organic commissions for:
 - Scientific foresight
 - Programs to organize the scientific seminars
 - Communication and education to promote the association and the scientific activities
- 19 thematic groups in charge of the animation of a scientific activity such as: radiation, heat exchangers, transfers in porous media ... The list of the topics is presented on the website <https://www.sft.asso.fr/>
- A website with upcoming meetings and open access to proceedings of the yearly conference, of seminars and advanced schools, as well as a directory of members: <https://www.sft.asso.fr/>
- A LinkedIn Page:



<https://www.linkedin.com/company/sftasso/?viewAsMember=true>

Germany Member of ICHMT, AIHTC, EUROTHERM (1) Overview

(Central European Time Zone, CET: UTC+1 (winter) and UTC+2 (summer), Population: 83.2 million)

1. Major Societies

The largest and leading engineering network in Germany is the VDI – The Association of German Engineers (Verein Deutscher Ingenieure). It has approximately 150.000 personal members from all engineering disciplines in all professional functions including students, scientists, and engineers in industry. It serves as a knowledge and competence platform for new technologies and technical solutions. The VDI comprises 12 professional sub-societies which host a large number of working groups addressing specific topics. The most relevant sub-societies for thermal sciences and engineering are: (i) Energy and Environment, (ii) Process and Chemical Engineering (GVC). ‘Energy and Environment’ hosts a working group *Thermodynamics* with elected members from academia and industry. It is closely collaborating with DECHEMA, an independent expert society for chemical engineering and biotechnology in Germany with about 5.800 members. VDI-GVC and DECHEMA jointly initiated and run PROCESSNET, a professional platform for process engineering, chemical engineering and technical chemistry. PROCESSNET hosts several subject divisions among which *Heat and Mass Transfer* and *Thermodynamics* are the most relevant to thermal science and engineering.



2. Major Meetings

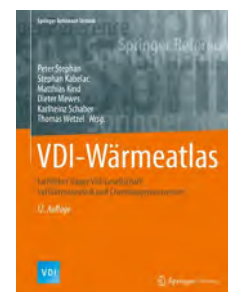
On a national level, major meetings related to thermal science and engineering are

- the joint annual meeting ‘Thermodynamics’ of the above mentioned VDI working group and ProcessNet subject division,
- the annual meeting ‘Heat and Mass Transfer’ of the above mentioned ProcessNet subject division.

3. Major Journals and the VDI Heat Atlas

Formerly Springer published a journal entitled ‘Wärme- und Stoffübertragung’ with papers also in German. Since 1995 this journal is publishing under the title ‘Heat and Mass Transfer’ with papers in English only.

For more than 50 years now, the VDI-Wärmeatlas (VDI Heat Atlas) is established as an indispensable working tool for German engineers in industry and academia dealing with heat transfer issues. Today it is published by Springer Publishing Company. More than 60 authors present state of the art calculation methods in different chapters on all topics relevant for the design of technical apparatus and plants, e.g. in process and power engineering. The 12th German edition (VDI-Wärmeatlas) was published in 2019, the 2nd English edition (VDI Heat Atlas) in 2010.



4. University System and Engineering Education

Germany has a system with two types of universities: (i) Universities of Applied Sciences (formerly called Fachhochschulen), (ii) Universities. Universities of Applied Sciences are mainly focused on

engineering subjects and educate their students more towards application-oriented professionals. Universities address the full range of academic professions and educate their students more towards science-oriented professionals.

The course programs are subdivided according to the Bachelor level and Master level. The Bachelor degree typically needs 3 years of full-time studies, the Master degree another 2 years.

The academic degree “Dr.-Ing.” is awarded after successful research studies and examination by all Universities and some Universities of Applied Sciences. In engineering science, doctoral candidates are typically employed in nonpermanent full-time positions as junior scientists by their institutions. The typical duration is 3 to 5 years. Apart from their research studies they quite often also assist approximately 2 hours per week in teaching, e.g. by supervising student exercise classes.

Quite atypical in comparison to international customs, professors in engineering sciences in Germany are relatively often appointed back to the university from positions in industry. At Universities of Applied Sciences this practical experience is even a prerequisite for an appointment.

5. Foundations of Scientific Research

The German Research Foundation (DFG) is the main organization funding basic research in Germany. Researchers can apply with individual proposals as well as with joint proposals for collaborative research. Proposals are always peer-reviewed, before the DFG committees make a final decision.

Several ministries, e.g. the Federal Ministry of Education and Research or the Federal Ministry of Economic Affairs and Climate Action, have their funding programs focusing on more application-oriented research.

by Peter Stephan, Ulrich Groß, Stephan Kabelac, Stephan Scholl

Ireland

Member of EUROTHERM

(1) Overview

(Greenwich Mean Time, GMT: UTC+0, Population: 4.9 million)

1. Organisations

There are no organisations strictly related to heat and mass transfer, but rather the following general or Mechanical Engineering associations:

- Engineers Ireland (Irish Association of Professional Chartered Engineers)
<https://www.engineersireland.ie/>
- Engineers Ireland, Mechanical and Manufacturing Division
<https://www.engineersireland.ie/Mechanical-and-manufacturing>

2. Major Meetings

There are no national meetings specifically focusing on heat transfer, however the annual Sir Bernard Crossland Symposium provides a national forum for postgraduate students in mechanical engineering to present their work in a paper and poster competition. The Sir Bernard Crossland Symposium is an “all-Ireland” event, open to participants from (the Republic of) Ireland and Northern Ireland (UK). The Symposium is organized on a rotating basis by members of the Council of Professors of Mechanical Engineering in Irish Universities (<https://www.ulster.ac.uk/conference/sbc22>, <https://www.ucd.ie/mecheng/sirbernardcrossland2018/>)

3. Major Journals

There are no national journals on heat and mass transfer.

4. Foundations of Scientific Research

Most State-funded research grants are administered by the following agencies:

- Science Foundation Ireland
<https://www.sfi.ie/>
- Irish Research Council
<https://research.ie/>
- Enterprise Ireland
<https://www.enterprise-ireland.com/en/>
- Sustainable Energy Authority of Ireland
<https://www.seai.ie/>

5. Education

The Irish education system is made up of primary, second, third-level and further education. State-funded education is available at all levels.

- Primary (first-level) education: 6 years, starting at age 6
- Second-level education starts at age 12 and consists of a 3-year junior cycle followed by a 2-year or 3-year senior cycle depending on whether an optional Transition Year is taken following the Junior Certificate or Junior Cycle (JCPA) examination, which is taken at age 15.
- The optional Transition Year (age 16) follows the JCPA examination and is free from formal examinations. It allows students to experience a wide range of educational inputs, including work experience.
- During their final 2-3 years in the senior cycle (ages 16-18), students take one of 3 programmes, each leading to a State examination - the established Leaving Certificate, the Leaving Certificate Vocational Programme or the Leaving Certificate Applied.
- The established Leaving Certificate is the main basis upon which places in universities are allocated.
- Third-level education is made up of 7 universities, 3 technological universities (TUs) and 7 institutes of technology (ITs), substantially funded by the State.

- The [National Framework of Qualifications \(NFQ\)](#) is a system of 10 levels to classify the different standards. Third-level qualifications are Levels 6-10, and universities offer degree programmes at the Ordinary Bachelor's degrees (NFQ Level 7) or Honours Bachelor's degrees (NFQ Level 8), Masters (NFQ Level 9) and Doctorate level (NFQ Level 10).

6. University System

The [Higher Education Authority](#) is the statutory agency overseeing the State funding of universities. It has an advisory role in relation to the whole sector of third-level education. Although universities in Ireland are State-funded, they are autonomous and self-governing bodies.

There are 7 universities in Ireland:

- The University of Dublin, Trinity College, generally known as [Trinity College Dublin \(TCD\)](#)
- The National University of Ireland (NUI) which is the umbrella university covering [University College Dublin \(UCD\)](#), [National University of Ireland, Galway](#), [University College Cork](#), and [National University of Ireland, Maynooth](#).
- The [University of Limerick \(UL\)](#)
- [Dublin City University \(DCU\)](#)

Most universities are organised with research activities clustered in research groups with laboratories usually headed by one or more full professors or chairs, associate professors, and assistant professors. Some assistant professors have tenure track positions.

The mandatory retirement age for public sector workers in Ireland is 70.

7. Major Public/Private Research Institutes

Much of the academic engineering research activity in Ireland is associated with one or more of the [Science Foundation Ireland Research Centres](#). The SFI Research Centres most relevant for heat and mass transfer are:

- [CONNECT](#) (SFI Research Centre for Future Networks & Communications),
- [AMBER](#) (SFI Research Centre for Advanced Materials and BioEngineering Research),
- [MaREI](#) (SFI Research Centre for Energy, Climate and Marine),
- [SSPC](#) (SFI Research Centre for Pharmaceuticals)

All these research centres are funded partly by the State and partly by a consortium of industry partners. In addition, there are other autonomous research institutes with relevance to heat and mass transfer:

- [Tyndall National Institute](#), a leading research centre in integrated ICT (Information and Communications Technology) hardware and systems,
- [CRANN](#) (Centre for Research on Adaptive Nanostructures and Nanodevices), Ireland's leading nanoscience institute,
- [ESRI](#) (Economic & Social Research Institute)

by Tim Persoons (Eurotherm)

Israel

Member of ICHMT, AIHTC

(1) Overview

(Israel Standard Time, IST: UTC+2, Population: 9.5 million)

1. Major Societies

There are no organizations strictly related to heat and mass transfer. AEAI – The Association of Engineers, Architects and Graduates in Technological Sciences in Israel is the national umbrella organization representing its members in Israel. The Association aims to foster the development and improvement of human resources and technological expertise in all fields of industry.

<https://www.aeai.org.il/about-english/>

https://en.wikipedia.org/wiki/Association_of_Engineers_in_Israel

Within the Association of Engineers there are professional societies in various technological fields, including Mechanical Engineering and Chemical Engineering.

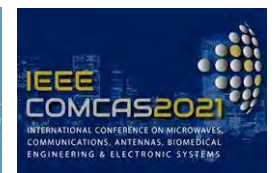
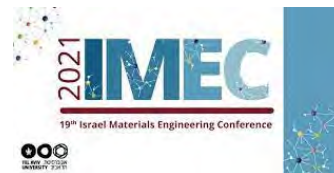


2. Major Meetings

There are no national meetings on heat transfer and thermal sciences, but these subjects are integrated in the following annual or bi-annual major meetings held in Israel, where special tracks and sessions on heat and mass transfer are included and presented prominently:



ICME - Israeli Conference on Mechanical Engineering
 IICHE - Meeting of the Israel Institute of Chemical Engineers
 IMEC - Israeli Materials Engineering Conference
 COMCAS – International Conference on Microwaves, Communications and Electronic Systems.



3. Major Journals

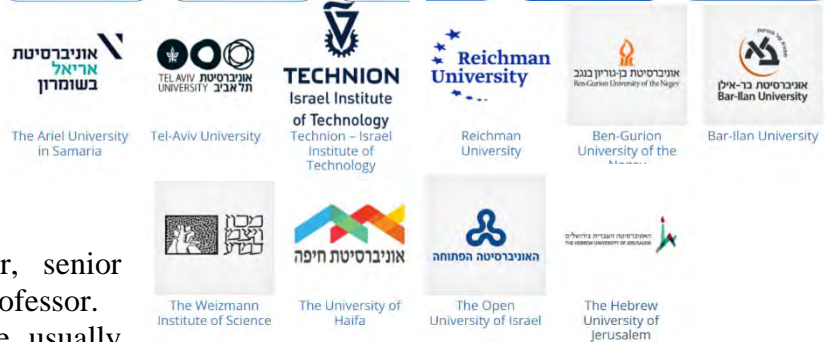
There are no Israeli journals on heat and mass transfer. Israeli researchers in all fields of science and engineering publish their works in well-established English-language international journals and serve on their editorial boards.

4. Education (Undergraduate/Graduate School)

- Elementary School, 6 years; Junior High School, 3 years; High School, 3 years.
- Undergraduate Studies in Engineering, 4 years (Undergraduate Studies in Sciences, 3 years).
- In general, the first semester starts in late October (after the Jewish Holy Days), while the second semester starts in late February.
- Most of undergraduate education is carried out by using English-language textbooks.
- Senior students engage in final projects (undergraduate theses) by doing experimental/theoretical studies under their supervisors from academia or industry.
- Master course is usually 2 years, for outstanding students there are fast Bachelor-Master tracks (5 years), a thesis is mandatory.
- Doctor course is 4 years for full-time students, and may take more time. There are direct Master-Doctor tracks for outstanding students.

5. University System

- The Council for Higher Education (CHE) is the official authority for higher education in Israel and determines policy for the higher education system.
- The CHE was founded pursuant to the Council for Higher Education Law, 1958, as an independent and unaffiliated statutory corporation. It was established in order to separate Israel's political system from its higher education system, to prevent interference with academic freedom.
- In Israel, higher education may be obtained from universities or colleges (the latter usually do not have advanced degrees, and cannot award Ph.D. in any case).
- According to CHE, there are ten universities in Israel.
- The academic ranks are lecturer, senior lecturer, associate professor and full professor.
- At all ranks, faculty members are usually independent and run their own research group (similar to the US university system).
- Tenure is commonly awarded after 5-7 years since the appointment.
- The mandatory retirement age for faculty members is 68. Usually, the retired professors are awarded an "emeritus/ emerita" title, and continue active research.



6. Foundations of Scientific Research

- The Israel Science Foundation is the main body supporting breakthrough basic science in Israel, based on scientific excellence within the different fields of knowledge, in a wide variety of funding opportunities.
- The Ministry of Science, Technology and Space promotes projects to encourage research and is focused on leading strategic infrastructure research.
- The Israel Innovation Authority, an independent publicly funded agency, was created to provide a variety of practical tools and funding platforms aimed at effectively addressing the dynamic and changing needs of the local and international innovation ecosystems.
- The Ministry of Energy is responsible for all of Israel's energy sectors and its natural resources, including electricity, fuel, LPG, natural gas, conservation of energy, petroleum explorations, minerals, earth science and marine research and more.



7. Major Public/Private Research Institutes

- Most major laboratories in thermal sciences and heat transfer are in the universities.
- Active research in thermal field takes place also in the Nuclear Research Center Negev and in the defense sector companies.

8. Addendum

Hebrew (עברית, [iv'rit] or [Siv'rit]) is a Northwest Semitic language of the Afroasiatic language family. Modern Hebrew is the official language of the State of Israel. Hebrew serves as the only truly successful example of a dead language that has been revived.



by Neima Brauner (ICHMT, AIHTC) and Gennady Ziskind (ICHMT, AIHTC)

Italy

Member of ICHMT, AIHTC, EURO THERM

(1) Overview

(Italian Standard Time, PST: UTC+1, Population: 60 million)

1. Organizations

There are two national organizations related to heat and mass transfer:

UIT (Italian Union of Thermal-Fluid Dynamics). UIT is a non-profit organization. The UIT mission is to bring together Italian researchers, engineers and people interested in thermal and fluids problems and applications, to link them with each other and with their peers in Europe and worldwide, fostering cooperation and promoting new generations of researchers.
<https://www.uitonline.it>

ATI (Italian Association of Heat Transfer and Thermal Management). Officially founded in 1947, but active since 1918, ATI is a non-profit organization which promote the applied thermal engineering in the scientific, technical and industrial fields. It handles also committees and technical regulations in the field.
<https://www.atinazionale.it>

Other two national organizations are devoted to energy management and design of HVAC systems:

AIGE (Italian Association of Energy Management) spreads studies, research, experiences and activities carried out in academic, industrial and public administration environments, in the field of energy management and energy policies.
<http://www.aigeancona2021.univpm.it/>

AICARR (Italian Association of Air Conditioning Heating and Refrigeration) promotes production and dissemination of the culture of sustainable comfort and energy savings in HVAC systems.
<https://www.aicarr.org>



2. Major meetings

The heat transfer community is gathered yearly during the following conferences; the meeting are participated by many foreign scientist and experts.

- UIT Heat Transfer Conference (yearly , since 1983)
- ATI National Conference (yearly , since 1946)
- AICARR Conference (yearly , since 1969)
- AIGE Conference (yearly , since 2007)

3. Major journals

“La Termotecnica” is the monthly journal of ATI, in Italian, devoted to divulgation of latest technological progresses and national codes and regulations.

There exists a Journal on HVAC system design: AICARR Journal (Journal of the Italian Association of Air Conditioning Heating and Refrigeration) https://www.aicarr.org/Pages/EN/Resources and Publications/AiCARR_Journal.aspx

In addition, an on-line UIT Newsletter is published and sent monthly by email to the members of the association.

4. Foundations of Scientific Research

Ministry of University and Research MUR (Ministero dell'Università e della Ricerca)

<https://www.mur.gov.it>

5. Education (Undergraduate/Graduate School)

Elementary School, 5 years; Junior High School, 3 years; High School, 5 years.

Most of undergraduate school education is carried out by using Italian textbooks.

The Italian higher education system is in compliance with the Bologna Process guidelines (see https://ec.europa.eu/education/policies/higher-education/bologna-process-and-european-higher-education-area_en), which introduced an European Credit Transfer System (ECTS) in study cycles, ERASMUS mobility mechanisms, diploma supplement.

Higher education is organized on three cycles of studies, leading to the academic degrees of bachelor, master and philosophy doctor.

- First cycle, 3 years, Bachelor's degree (Universities and Polytechnic Schools)
- Second cycle, 2 years, Master's degree (Universities and Polytechnic Schools)
- Third cycle, 3 years, Doctor's degree (Universities)

Courses are generally held in Italian or in English for specific paths.

6. University System

Italian higher education system is articulated in public and private institutions. The private higher education institutions have to obtain prior recognition of the Ministry with the authority of the Higher Education. There is no difference between University schools and Polytechnics for the engineering education.

Both University and Polytechnic education are guided by a perspective of applied research and development, aimed at understanding and solving practical and technical problems and at providing a solid cultural and technical training at the higher level, developing the capacity for innovation and critical analysis. Scientific knowledge of theoretical and practical nature, for the scope of professional activities, also provided.

There are more than 96 public universities in Italy. Most of them offer courses in Physics and in different branches of Engineering (Civil, Industrial and Computer/Electronics).

7. Major Public/Private Research Institutes

CNR – National Research Council (Consiglio Nazionale delle Ricerche).

<https://www.cnr.it/en>

ENEA - Italian National Agency for New Technologies, Energy and Sustainable Economic Development (Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile)

<https://www.enea.it/en>

by Gian Luca Morini (ICHMT, Eurotherm) and Paolo Di Marco (ICHMT, AIHTC, Eurotherm)

Japan
Member of ICHMT, AIHTC, AUTSE
(1) Overview

(Japan Standard Time, JST: UTC+9, Population: 125 million)

1. Major Societies

Most of Japanese scientists and engineers in thermal science and engineering (or more specifically heat and mass transfer) belong to the Heat Transfer Society of Japan (HTSJ), Thermal Engineering Division of the Japan Society of Mechanical Engineers (JSME-TED), and Division of Thermal Engineering of the Society of Chemical Engineering (SCEJ-DTE). The relationships among the three major societies are expressed as shown in Fig. 1. Although the number of members of HTSJ are much less than that of JSME-TED, HTSJ is a core society of heat and mass transfer. This is because JSME-TED consists of a wide variety of thermal engineering applications.

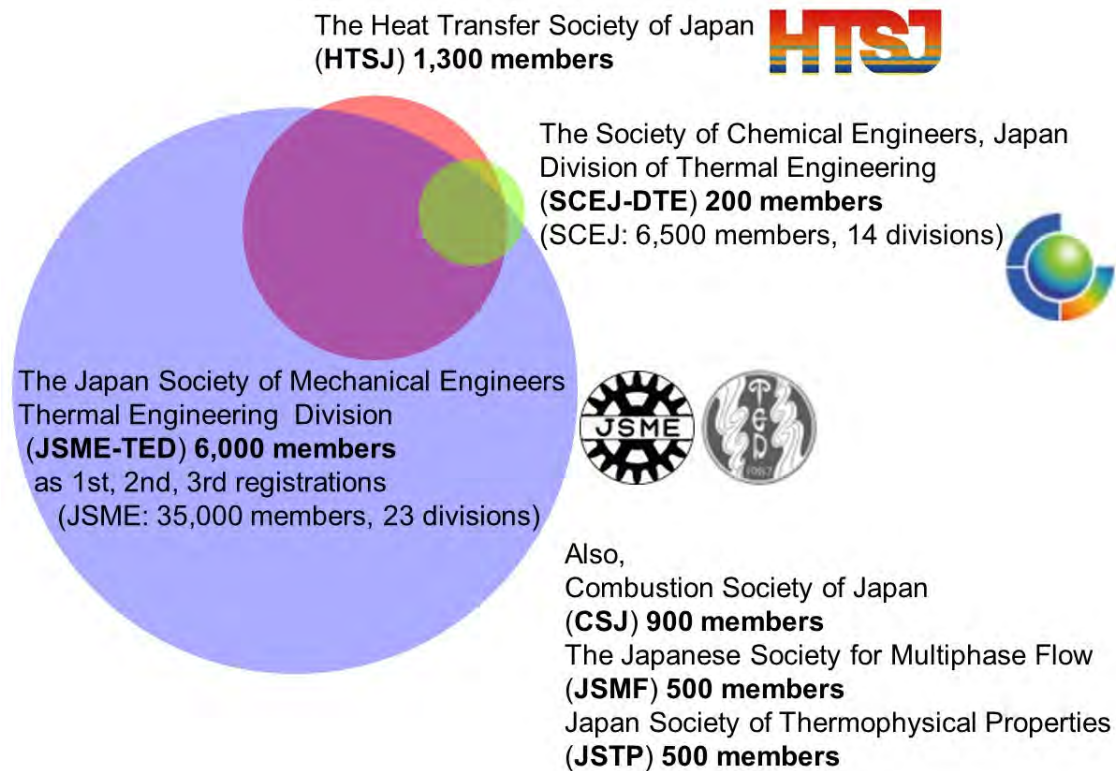


Fig. 1 Relationships among three major societies of thermal science and engineering

2. Major Meetings

National Heat Transfer Symposium by HTSJ
 Since 1964, annually held (the 58th in 2021)
 Place: rotated among 8 branches (see Fig. 2)
 Period: three days in late May or early June
 Participants: about 800
 Paper presentations (oral): about 350

Thermal Engineering Conference by JSME-TED
 annually held
 Period: 2 days in October
 Place: University campus

Thermal Engineering Session by JSME-TED
 during Annual Meeting of JSME (in September)
 Place: University campus



Fig.2 Eight branches of HTSJ

Thermal Engineering Session by SCEJ-DTE
 during Annual Meeting of SCEJ (in March)
 during Autumn Meeting of SCEJ (in September)
 Place: University campus



3. Major Journals

JSME

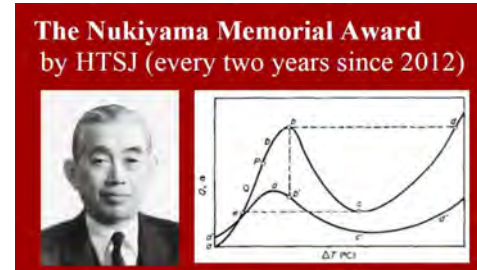
- The Journal of Thermal Science and Technology (JTST) (in English, every 4/6 months)
- Mechanical Engineering Journal (in English, bimonthly)
- Transactions of the JSME (in Japanese, monthly)

SCEJ

- Journal of Chemical Engineering of Japan (in English, monthly)
- Kagaku Kogaku Ronbunshu (in Japanese, bimonthly)

HTSJ

- Thermal Science and Engineering (in Japanese/English, quarterly)



4. Education (Undergraduate/Graduate School)

- Elementary School, 6 years; Junior High School, 3 years; High School, 3 years; Undergraduate School, 4 years. After Junior High School, there is an alternative choice of College of Technology, 5 years.
- In general, the first semester starts in April (cherry blossom season), while the second semester starts in October.
- Most of undergraduate school education is carried out by using Japanese textbooks.
- Senior students engage in bachelor theses by doing experimental/theoretical studies under his/her supervisors.
- Master course is usually 2 years, and Doctor course is 3 years on average.
- The deadlines of theses of (doctor,) master and senior students are usually in January or February.
- Traditionally, female students are not so many in the faculty of engineering, which is an urgent matter for us.

5. University System

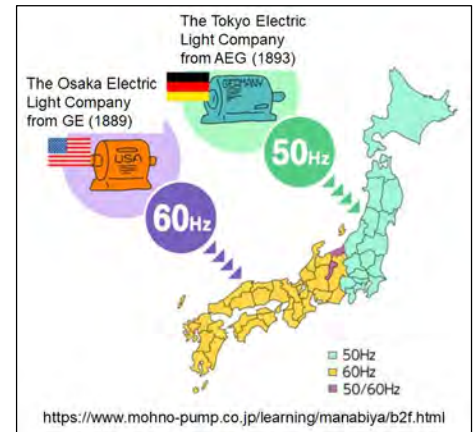
- Some laboratories are based on the chair system such as professor, associate professor, and assistant professor.
- Recently, however, laboratories based on the independent system are increasing.
- At most of universities, the retirement age is about 65.

6. Foundations of Scientific Research

- Ministry of Education, Culture, Sports, Science and Technology (MEXT)
- The Japan Society for the Promotion of Science (JSPS)
- Japan Science and Technology Agency (JST)
- New Energy and Industrial Technology Development Organization (NEDO)

7. Major Public/Private Research Institutes

- National Institute of Advanced Industrial Science and Technology (AIST)
- RIKEN (the Institute of Physical and Chemical Research)
- Japan Atomic Energy Agency
- Toyota Central R&D Labs., etc.



By-product of “war of the currents”

8. Addendum

Japanese language belongs to Altaic languages; one of their typical features is a subject-object-verb (SOV) structure. After Chinese characters were transferred to Japan in the 4th century, Hiragana and Katakana (Japanese characters) were developed in the 8-9th century. As a result, we combinedly use the above three characters as shown in this example.



- President of HTSJ
- President of JSME-TED
- President of SCEJ-DTE

- MUNAKATA Tetsuo 宗像 鉄雄
- OHARA Taku 小原 拓
- KOBAYASHI Nobusuke 小林 信介

- t.munakata@aist.go.jp
- ohara@ifs.tohoku.ac.jp
- nsuke@gifu-u.ac.jp

Morocco
Member of ICHMT
(1) Overview

(West Africa Time : UTC +1, Population: 37 million)

1. Organizations

The Moroccan Association of Thermal Sciences (AMT) is the leading association of Moroccan academic scientific researchers and professionals dealing with thermal sciences and related areas such as heat and mass transfer, fluid mechanics, thermodynamics, combustion, solar energy applications and other energy systems. It was founded in 2008 in the city of Settat following a national conference on thermal sciences and transport phenomena organized at the Faculty of Sciences and Technology, University Hassan I.

AMT is a non-governmental and non-profit organization that aims to gather all Moroccan scientific researchers in the thermal sciences field. It is an institutional member of Int. Heat and Mass Center (ICHMT) since May 2010.

Presently, the secretariat of AMT is located at the Faculty of Sciences Ain-Chock which belong to Hassan II University in Casablanca.

The main objectives of AMT is to establish and promote scientific cooperation and exchange of the fundamental as well as applied knowledge in the field of thermal sciences among researchers in the Moroccan academic institutions and industry practitioners. In addition to promote and foster international cooperation in thermal sciences and applications. To this end, AMT organizes regular national and international scientific meetings.

Website: <http://amth.ma/>



2. Major meetings

The major scientific meeting of the Moroccan Association of Thermal Sciences (AMT) is the International Congress on Thermal Sciences, which is a biennial conference that have been initiated in 2010 in partnership with Moroccan Universities. This conference used to attract over 200 scientists and researchers with typically more than 150 papers. In addition to the Moroccan researchers, the participants are from Maghreb countries, especially Algeria and Tunisia, but also from European and American countries. The Congress aims to be a platform for researchers, academic scientists and practitioners to share their experiences on all aspects of thermal sciences. It promotes collaboration between university laboratories and professionals, and stimulates collaboration between national researchers and their international counterparts. Each edition of the Congress focuses on a main topic related to the Moroccan energy context. Beside the main theme, the Congress used to cover other topics such as heat and mass transfer, fluid mechanics, energy efficiency and renewable energies thermal applications, industry thermal processes, thermal systems and combustion, materials thermal characterization, materials for energy, thermal measurement techniques, etc.

International Congress on Thermal Sciences previous editions:

Edition	Main Theme / Topic	Location & University partner
AMT'2010	Moroccan renewable energy strategy	Hassan I University, Settat
AMT'2012	Energy Efficiency in Industry	Hassan Second University, Casablanca
AMT'2014	Thermal Solar Energy & Environment	Ibn Zohr University, Agadir
AMT'2016	Buildings Regulation in Morocco	Moulay Ismail University, Meknes
AMT'2018	Thermal Energy & Sustainable Development.	Cadi Ayyad University, Safi
AMT'2020	Thermal Energy & Industrial Issues	S. M. Slimane University, Khouribga
AMT'2022	Energy Efficiency	Ibn Zohr University, Ouarzazate

AMT also used to organize specific national and international seminars and workshops as well as trainings for Doctoral students. Some major past seminars are listed below

Event	Topic	Location & Partners
1st Seminar on Concentrating Solar Power & Energy Efficiency 26-28 April 2011	R&D opportunities in Concentrating Solar Power Plants & Energy Efficiency in Buildings	Location : Cadi Ayyad University Marrakech Partners: CNEREE Marrakech, CNRST Rabat, PSA Almeria Spain
Training on TRNSYS software 9-11 June 2015	Training on TRNSYS software for Moroccan Doctoral students	Location : Cadi Ayyad University Marrakech Partner: CNEREE Marrakech
Workshop on Construction Materials Characterization 9 July 2019	Thermal Characterization Methods of Construction Materials	Location : Hassan II University, Casablanca Partner: ENSEM Casablanca



3. Major journals

There is no national journal specifically dedicated to heat and mass transfers.

Some national journals publish papers on heat and mass transfers. Many journals are endorsed by the Moroccan Institute for Scientific and Technologic Information IMIST, which belong to the National Center for Scientific and Technology Research: <https://revues.imist.ma>

4. Foundations of Scientific Research

Most State-funded research grants are administered by the following institutions:

- National Center for Scientific and Technology Research www.cnrst.ma
- Institute of Research on Solar Energy and New Energies www.iresen.org
- Hassan II Academy of Sciences and Technology <http://www.academie.hassan2.sciences.ma>
- OCP Group Foundation <https://www.ocpfoundation.org>

Mostly, scientific research is conducted in public and public-private-partnership universities as well as in engineering higher schools. Other public or private institutions deal with scientific research such as IRESEN via its Green Energy Park platform (<https://www.greenenergypark.ma>), MASEN (Moroccan Agency of Sustainable Energy <https://www.masen.ma>), CNESTEN (National Center of Nuclear Energy, Sciences and Techniques <https://www.cnesten.org>), MOOS (Morocco OUKAIMEDEN Sky Survey astronomic observatory www.moss-observatory.org), MAScIR (Moroccan Foundation for Advanced Science, Innovation and Research, <https://www.mascir.com>).

The Superior Council of Education, Training and Scientific Research (CSE <https://www.csefrs.ma>) is an independent and consultative institution that deals with public policy in education and scientific research. Higher education and scientific research is managed at the government level by the Ministry of Higher Education, Research and Innovation (ESRI, <https://www.enssup.gov.ma>).

5. Education

- Primary School, 6 years; Secondary School, 3 years; High School (*Baccalaureate Diploma*), 3 years.
- Undergraduate Studies in Vocational Training at Universities and OFPPT (*Technician Diploma*), 2 years.
- Undergraduate Studies in Sciences at Universities (*Licence/Bachelor Diploma*), 3-4 years.
- Undergraduate Studies in Engineering at Universities and Non-University Higher Schools (*Engineer Diploma*), 5 years.
- Graduate Studies: Master, 2 years; Doctoral, 3-4 years.

6. University System

Since 2003, the higher education in Morocco followed the European Bologna Process, LMD system, with “*Licence*”, “*Master*” and “*Doctorate*”. Since 2021, a Bachelor system is implemented in public universities instead of the six-semester *Licence* system.

Undergraduate studies are organized in universities and Non-University Higher Schools.

There is 12 public universities located in the main cities. 11 other universities are currently approved by the State. Most of them are private ones while the others belong to a public-private-partnership via public institutions.

Major engineering studies are implemented in Engineering Higher Schools, affiliated or not to universities, specialized in the major fields of engineering including thermal sciences. Engineering studies lead to Engineer's Degree equivalent to Master Degree. Most of these Engineering Schools are public ones. Some private Engineering Schools, that do not belong to any private university, have received the State approval.

The retirement age for university professors is 65.

by Prof. Kaoutar KHALLAKI (Vice Secretary General of AMT, k.khallaki@usms.ma)
 Prof. Brahim BENHAMOU (Secretary General of AMT, B.Benhamou@uca.ma)

New Zealand Member of ICHMT (1) Overview

(New Zealand Standard Time, NZST: UTC+12, Population: 5.1 million)

1. Organizations

There is no specialist society for heat and mass transfer engineers in New Zealand. Engineers are typically members of Engineering New Zealand (formerly the Institution of Professional Engineers, IPENZ), which encompasses all disciplines. Membership of international societies such as ASME and IMechE is common.



2. Meetings

Local conferences tend to be run in conjunction with Australia as an Australasian (ie: south of Asia) meeting. Both the Australasian Fluid Mechanics Conference and Australasian Natural Convection Workshop have been hosted in Auckland and Christchurch by the local universities.

3. Foundations Supporting Scientific Research

The societies and agencies that support scientific research are:

The Royal Society of New Zealand – promotes science, distributes contestable grants, and awards medals.

Callaghan Innovation – a crown agency supporting business research.

Ministry of Business, Innovation, and Employment (MBIE) – government ministry that provides public funding for research within New Zealand.

4. University System

Research lead tertiary education is provided by Universities which are funded by the state. There are eight universities, six of which have engineering faculties or schools. These are:

The Universities with engineering faculties or schools are:

- University of Auckland (Auckland)
- Auckland University of Technology (AUT) (Auckland)
- University of Waikato (Hamilton)
- Massey University (Palmerston North)
- Victoria University (Wellington)
- University of Canterbury (Christchurch)

The other universities are:

- Lincoln University (Lincoln, near Christchurch)
- University of Otago (Dunedin)

Degrees offered are typically

- Bachelor of Engineering (BE) – 4 years
- Master of Engineering (ME) – 1 or 1.5 years
- Doctor of Philosophy (PhD) – 3 or more years

A number of taught Masters programmes are also available.

The academic year typically has two semesters starting in March. They are not named autumn (or fall) and spring; doing so would lead to confusion since seasons are opposite of those in the northern hemisphere.

Academic grades are typically Lecturer, Senior Lecturer, Associate Professor, Professor, and Distinguished Professor. The majority of staff at New Zealand universities have permanent positions.

5. Research Institutes

Research is also undertaken by a number of crown and private research institutes, the latter of which are normally funded by industry bodies. The type of research undertaken reflects the dominance of primary industry and the food chain in New Zealand's economy, and special interests such as geothermal energy. Those with a particular interest in heat and mass transfer topics include:

- GNS Science (Geological and Nuclear Sciences) – geothermal energy
- Scion (New Zealand Forest Research Institute) – wood processing and biomass energy

by Dr S.E. Norris (University of Auckland, EngNZ)

Poland

Member of ICHMT, EURO THERM

(1) Overview

(Poland Standard Time: UTC+1 / UTC+2, Population: 38.2 million)

1. Organizations

There are two streams of activities related to heat transfer in Poland: scientific and professional engineering. The scientific stream is represented by the Committee for Thermodynamics and Combustion of the Polish Academy of Sciences (PAS). The thirty members of the Committee are elected in a voting process. The electorate consists of researchers with at least a Doctor of Science degree (Polish habilitation) and scientific interests in thermal science-related disciplines.

The Polish Federation of Engineering Associations FSNT–NOT (Polish: Naczelna Organizacja Techniczna NOT) is focused on professional engineering applications of thermal sciences. The organization, gathering 110 000 members, represents professional engineers and technicians in 49 regional and 39 professional engineering organizations. NOT is a member of FEANI (Fédération Européenne d'associations d'Ingénieurs), Brussels-based, associations of engineering organizations from 33 European countries and having a consultative status of UNESCO, UNIDO and the European Council.

Heat transfer research and engineering are in the focus of activities of several member organizations of NOT. The Association of Polish Mechanical Engineers and Technicians and the Association of Fire Engineers are the two most notable examples.

2. Major meetings

Symposium of Heat and Mass transfer organized every three years and Meeting of Thermodynamics, also held every three years. Universities organize both events under the auspices of the Committee of Thermodynamics and Combustion of the PAS.

3. Major journals

Archive of Thermodynamics publishes papers in English and has an international Editorial Board. The journal is published by the Committee of Thermodynamics of the PAS. A no-fee open access policy is implemented. *Journal of Power Technologies* is published by the Institute of Heat Engineering of the Warsaw University of Technology.

4. Education (Undergraduate/Graduate)

- 8 years of primary school education
- 4 years of high school education
- 3–4 years of undergraduate engineering education
- 1.5 and 4 years of Master's and doctoral education, respectively

5. University system

There are over 400 institutions of higher education in Poland, of which about 100 are publicly funded. Engineering and technology programs are offered at 18 universities of technology (UT) and 37 higher vocational schools. The majority of the latter institutions offer technical subjects at the bachelor's level. Engineering courses are also offered in selected general universities.

The main engineering education institutions are Warsaw UT, Gdańsk UT, Silesian UT, Wrocław UT, Poznań (UT), Kraków UT, Łódź UT, Lublin UT, Rzeszów UT, and the AGH Science and Technology University. Warsaw UT, Gdańsk UT, Silesian UT, and AGH are among Poland's top 10 research and higher-education institutions. The financial support and ability to grant doctoral and habilitation degrees depend on a position

in a national ranking. The ranking is conducted every four years. The teaching programs are regularly accredited by a state accreditation body.

The academic ranks are: assistant (Polish: asystent), assistant professor (Polish: adiunkt), associate professor (Polish: profesor uczelni), and full professor (Polish: profesor).

In addition to the higher-education system, research institutes form networks. The leading examples are the institutes of the PAS and the Łukasiewicz network.

by R. Białecki and W. Lipiński

Portugal

Member of ICHMT, AIHTC, EUROTHERM

(1) Overview

(Portuguese Standard Time, PST: UTC+00:00, Population: 10 million)

1. Organizations

There are no organizations strictly related to heat and mass transfer, but rather the following general or Mechanical Engineering associations:

Portuguese Engineers Association (Ordem dos Engenheiros)

<https://www.ordemengenheiros.pt/pt/>

APMTAC – Portuguese Association of Theoretical, Applied and Computational Mechanics

http://www-ext.lnec.pt/APMTAC/welcome_eng.html

EFRIARC - Portuguese Association of Refrigerating and Air-Conditioning Engineers

<https://efriarc.pt/>

2. Major meetings

There are no national meetings on heat transfer, but this subject is integrated in the following congress jointly organized by APMTAC and SEMNI (<http://www.cimne.com/semni>):

Congress on Numerical Methods in Engineering (every two years, from 2002)

3. Major journals

There are no Portuguese journals on heat and mass transfer

Ingenium (Journal of the Portuguese Engineers Association, issued every two months, in Portuguese)

<https://www.ordemengenheiros.pt/pt/centro-de-informacao/publicacoes/revista-ingenium/>

4. Foundations of Scientific Research

Ministry of Science, Technology and Higher Education

<https://www.portugal.gov.pt/pt/gc21/area-de-governo/ciencia-tecnologia-e-ensino-superior>

Portuguese Science Foundation (Fundação para a Ciência e Tecnologia)

<https://www.fct.pt/>

National Innovation Agency

<https://www.ani.pt/>

5. Education (Undergraduate/Graduate School)

In 2005 a process of reform of the Basic Law of the Educational System was started in order to implement the Bologna Process (https://ec.europa.eu/education/policies/higher-education/bologna-process-and-european-higher-education-area_en), with the introduction of the European Credit Transfer System (ECTS) in study cycles, mobility mechanisms, diploma supplement, among others. Higher education began to have a new structure of three cycles of studies, leading to the academic degrees of bachelor, master and doctor. This structure was introduced in 2006.

Higher education system with three cycles of studies:

- First cycle, 3 years, Bachelor's degree (Universities and Polytechnic Schools)
- Second cycle, 2 years, Master's degree (Universities and Polytechnic Schools)
- Third cycle, ≥ 3 years, Doctor's degree (Universities)



The first cycle education is carried out by using Portuguese or English textbooks, while the second and third cycles use mostly English textbooks.

- Senior students engage in bachelor theses by doing experimental/theoretical studies under his/her supervisors.

6. University System

Portuguese higher education is organized in a binary system that integrates university education and polytechnic education and is taught in public and private institutions. The private higher education institutions have to obtain prior recognition of the Ministry with the authority of the Higher Education. University education includes universities, university institutes and other university teaching institutions. Polytechnic education comprises polytechnic institutes and other polytechnic teaching institutions.

University education is guided by a perspective of research promotion and creation of knowledge and aims to ensure solid scientific and cultural preparation and provide technical training to enable for the exercise of professional and cultural activities and promote the development of design capabilities, innovation and critical analysis.

Polytechnic education is guided by a perspective of applied research and development aimed at understanding and solving concrete problems and aims at providing a solid cultural and technical training at the higher level, developing the capacity for innovation and critical analysis and providing scientific knowledge of theoretical and practical nature and their applications for the exercise of professional activities.

Public universities in continental Portugal:

- Minho University - <https://www.uminho.pt/EN/Pages/default.aspx>
- University of Trás-os-Montes and Alto Douro - <https://www.utad.pt/en/>
- Porto University - <https://sigarra.up.pt/up/en/>
- Aveiro University - <https://www.ua.pt/>
- Coimbra University - <https://www.uc.pt/en>
- Beira Interior University - <https://www.ubi.pt/en/>
- Lisboa University - <https://www.ulisboa.pt/en>
- Nova University Lisbon - <https://www.ulisboa.pt/en>
- University of Évora - <https://www.uevora.pt/en>
- University of Algarve - <https://www.ualg.pt/en>

Polytechnic Institutes (<https://ccisp.pt/en/home/>): one per district, on the average

7. Major Public/Private Research Institutes

INETI – National Institute of Engineering, Technology and Innovation (Instituto Nacional de Engenharia, Tecnologia e Inovação)

<https://ineti.pt/>

LNEC - National Laboratory of Civil Engineering (Laboratório Nacional de Engenharia Civil)

<http://www.lnec.pt/en/>

by Vítor Costa (AIHTC) and Pedro Coelho (ICHMT, AIHTC, Eurotherm)

Russia

Member of ICHMT, AIHTC

(1) Overview

**National Committee for Heat and Mass Transfer,
Russian Academy of Sciences
OIVT RAN, 17A, Krasnokazarmennaya Str.,
Moscow, 111116, Russia
nchmt@iht.mpei.ac.ru
www.nchmt.ru**

(Moscow standard time, MST: UTC+3, Population: 146 million)

The National Committee for Heat and Mass Transfer (NCHMT) was organized on June 10, 1971.

Academician M.A. Styrikovich was elected the first chairman of the NCHMT and remained in his position until 1994.



M.A. Styrikovich



Academics S.S. Kutateladze, A.V. Luikov and M.A. Styrikovich were among the founders and creators of the International Centre for Heat and Mass Transfer (ICHMT, <http://www.ichmt.org/>).

S.S. Kutateladze



A.V. Luikov

Since its foundation, the National Committee for Heat and Mass Transfer has been an institutional member of the International Centre for Heat and Mass Transfer.

Michael A. Styrikovich was president of the International Centre of Heat and Mass Transfer from 1972 to 1976, and Alexander I. Leontiev was vice-president of the ICHMT from 2002 to 2006.

Leonid A. Dombrovsky is currently a member of the ICHMT Executive Committee.

Twenty Russian scientists are members of the Scientific Council of the ICHMT. This is the second largest national representation in the Scientific Council after the USA.

From 1971 to 1992, the National Committee for Heat and Mass Transfer provided information and organizational support for the participation of delegations of researchers at more than 89 international scientific events on various problems of heat and mass transfer.



Delegates from Russia to the Assembly of International Conferences on Heat Transfer are Leonid Dombrovsky and Alexander Leontiev.

Alexander I. Leontiev



Leonid A. Dombrovsky

The main goals of the National Committee for Heat and Mass Transfer are:

- ✚ Analyze new information in the field of heat and mass transfer from the world's leading universities and research centers;

- ✚ Information and organizational support for the participation of Russian scientists in the activities of the International Centre for Heat and Mass Transfer;
- ✚ Holding Russian national conferences on heat transfer;
- ✚ Organization of Seminar Schools on heat transfer problems for young scientists and engineers;
- ✚ Functional support for the Russian journal "Thermal Processes in Engineering"
<https://mai.ru/science/publish/>

Since 1994, the Russian National Heat Transfer Conferences have been held every four years. The total number of papers presented by Russian researchers was about 500 at each conference. In 2022, the 8th Russian National Heat Transfer Conference is scheduled to take place at the Moscow Power Engineering Institute on October 17-22. <https://rnhtc.mpei.ru/>

School-Seminar of young scientists and specialists under the scientific leadership of Professor A.I. Leontiev "Problems of Heat and Mass Transfer and Gas Dynamics in Power Plants" has been held once every two years since 1977. The School-Seminar brings together young scientists and engineers working in the field of thermal physics and heat transfer, providing an open forum to discuss current and future research directions. As a rule, the School-Seminar is held in different cities of the Russian Federation.

The XXIII school-seminar was held on May 24-28, 2021 in Yekaterinburg on the basis of the Institute of Thermal Physics of the Russian Academy of Sciences. There were about 200 presentations by young researchers and 29 lectures by distinguished professors. www.nchmt.ru; <http://itpekb.ru>



Memorable photos from various conferences and School-Seminars. Among the participants in a number of School-Seminars were Professors D.B. Spalding, J.R. Lloyd, A. Bar-Cohen, J.R. Howell, and T.W. Simon.

Serbia

Member of ICHMT

(1) Overview

(Central European Time, CET: UTC+1, Population: 7 million)

1. Organizations

1.1 **The Society of Thermal Engineers of Serbia** (<https://www.drustvo-termicara.com/>) is the leading professional association in Serbia of scientific researchers, professors and engineers dealing with heat and mass transfer, fluid mechanics, thermodynamics, combustion, power and energy system, etc. It is legal successor of the Society of Thermal Engineers of Yugoslavia that was founded in 1962 following the idea and initiative of the researchers from the Thermal Engineering Laboratory of the Institute “Boris Kidrič” (today’s Thermal Engineering and Energy Laboratory of the Institute of Nuclear Sciences in Vinča, <http://www.lte-vinca.rs/public/lang/rs>). The main objective of the Society was/is to establish/promote better cooperation and exchange of the fundamental/applied knowledge in the field of heat and mass transfer between research/educational institutions and industry in the country, region and the world. Following these ideas leading researchers from the Institute “Vinča” in September 1968 organized in Yugoslavia, 1st International Symposium/ summer school titled “Heat and Mass Transfer in Turbulent Boundary Layers” which participated 115 leading world experts from 11 countries, from Europe, USA Canada and USSR. In spite of difficult political situation (due to Cold war) at that time in the world, based on excellent organization and high level of presented papers, most of the present experts agreed that such international cooperation should be continued by organizing regularly Symposia on different subjects/problems in heat and mass transfer. For the realization of these tasks the INTERNATIONAL CENTRE FOR HEAT AND MASS TRANSFER was established with Head office in The Institute of Nuclear Sciences “VINČA”, led by Professor Zoran Zarić as general secretary (1968-1985) and Professor Naim Afgan as scientific secretary (1968-1985) and later as general secretary (1985-1993) until the Center was relocated to Turkey in 1993. In period 1968-1993, ICHMT organized 47 international scientific events/meetings. Proceedings, published by world leading publishing companies, mostly edited by Professor Naim Afgan, are still among the best archive scientific publications/literature for the related area of heat and mass transfer (list of meetings, publications can be found at <http://thermalscience.vinca.rs/pdfs/papers-2020/TSCI200628265S.pdf>)

1.1.1. Publications

Journal TERMOTEHNIKA (in Serbian since 1975, <http://termotehnika.vinca.rs/>) published by **The Society of Thermal Engineers** in cooperation with the Laboratory for Thermal Engineering and Energy of the Institute VINČA.

International Journal THERMAL SCIENCE (in English since 1997, <http://thermalscience.vinca.rs>) Due to international sanctions imposed against Yugoslavia in May 1992 (until 2001), which caused extreme problems for the scientific research institutions in Yugoslavia, including barriers for their international cooperation, in 1994 Prof. Simeon Oka from the Laboratory for Thermal Engineering and Energy of the Institute VINČA, initiated the publication of one issue per year in English of the Journal Termotehnika, and in 1996 he initiated and started editing the **International Journal THERMAL SCIENCE** with scientific papers from the relevant international community. International Journal Thermal Science (Open Access Journal), founded by the **Society of Thermal Engineers of Serbia** and published by the **Institute of Nuclear Sciences “VINČA”** is on SCI list since 2009, with a constant increase of the number of published papers and Impact factor value.

1.1.2 Meetings

International Symposia on heat and mass transfer (since 1964), since 2003 biannually in cooperation with **Faculty of Mechanical Engineering – University of Niš** (last, 19th International Conference on Thermal Science and Engineering of Serbia on October 22-25, 2019).

International Conference POWER PLANTS since 2004, biannually (9th International Conference on November 16-17, 2021, <https://e2021.drustvo-termicara.com>)

Regional IEEP Conference Industrial Energy and Environmental Protection in South Eastern European Countries, biannually (last, 7th Conference on June 19-22, 2019).

ENERGY DAY SERBIA Annual meeting organized in cooperation with **ENERGOPROJEKT ENTEL** since 2011 (last, June 2019).

International Forum for clean energy technologies in cooperation with **Faculty of Technical Sciences – University of Novi Sad** (14th Forum September 28-29, 2021)

1.2 **Serbian Chemical Society** (founded in 1897, <https://www.shd.org.rs/>)

1.2.1 **Publications:**

International Journal of the Serbian Chemical Society (Open Access Journal in English, Vol. 89 in 2021, <https://www.shd-pub.org.rs/index.php/JSCS/index>)

1.3 **Association of Chemical Engineers of Serbia** (founded in 1953, <http://www.ache.org.rs/index.php/sr/>)

1.3.1 **Publications:**

Chemical Industry (since 1947, in Serbian/English Open Access Journal, Vol. 75 in 2021, <https://www.ache-pub.org.rs/index.php/HemInd/>)

Chemical Industry & Chemical Engineering Quarterly (since 1995, Open Access Journal in English, Vol. 27 in 2021 <http://www.ache.org.rs/CICEQ/>)

1.4 **Union of Engineers and Technicians of Serbia** (founded in 1868, is union of different professional societies, associations/unions, sections and branches, <https://www.sits.org.rs>)

1.4.1 **Publications:**

Magazine TEHNIKA (since 1945 in Serbian, 6 issues/year, Vol. 76 in 2021 <https://www.sits.org.rs/textview.php?file=348.html>)

1.5 **Union of Mechanical and Electrical Engineers and Technicians of Serbia** (founded in 1951, is association of different professional societies, sections and branches <https://www.smeits.rs/eng/>)

1.5.1 **Serbian Society for Heating, Ventilating, Air-Conditioning & Refrigeration**

1.5.1.1 **Publications:**

Journal KGH (since 1972 in Serbian, 4 numbers/year, Vol. 50 in 2021 <https://izdanja.smeits.rs/index.php/kgh/issue/view/380>)

1.5.1.2 **Meetings:** International HVA&R Congress with Exhibition, every December (52th in 2021)

1.5.2 **Serbian Society for Processing (former Process Engineering Section)**

1.5.2.1 **Publications:** Journal Procesna tehnika/Process Engineering (since 1984 in Serbian, 2 numbers/year, Vol. 33 in 2021 <https://izdanja.smeits.rs/index.php/procteh/issue/view/378>)

1.5.2.2 **Meetings:** International Congress on Process Engineering - Processing (annual meeting, 34th in 2021)

2. **Founds for Scientific Research**

Ministry for Education, Science and Technological Development of the Republic of Serbia (<https://www.mpn.gov.rs/>)

EU founds

3. **System of Education**

According to Bologna declaration (first semester starts in October, second semester in February):

Bachelor academic studies 6 semesters (3 years)

Master academic studies 4 semesters (Master degree Σ 3+2 years)

Doctoral academic studies 6 semesters (PhD degree Σ 3+2+3 years)

4. **Education/Research institutions**

4.1 **Faculty of Mechanical Engineering – University of Belgrade** (<https://www.mas.bg.ac.rs/eng/start>)

4.1.1 **Publications** FME Transactions (Open Access Journal in English, since 1970, Vol. 41 in 2021 <https://www.mas.bg.ac.rs/istrazivanje/fme/start>)

4.2 **Faculty of Mechanical Engineering – University of Niš** (<https://www.masfak.ni.ac.rs/index.php/en/>)

4.2.1 **Publications**

Facta Universitatis, Series: Mechanical Engineering, (Open Access Journal in English, since 1986, Vol. 19 in 2021 http://casopisi.junis.ni.ac.rs/public/journals/8/homeHeaderTitleImage_en_US.png)

4.3 **Faculty of Technical Sciences – University of Novi Sad** (<http://ftn.uns.ac.rs>)

4.4 **Faculty of Engineering – University of Kragujevac** (<http://www.fink.rs/en/>)

4.5 **Faculty of Mechanical and Civil Engineering Kraljevo – University of Kragujevac** (<https://www.mfkv.rs/>)

5. **Research Institutions**

5.1 **Institute of Nuclear Sciences “Vinča”, Laboratory for Thermal Engineering and Energy**, (<http://www.lte-vinca.rs/public/lang/rs>)

Singapore Member Of AuTSE (1) Overview

(Singapore Time, SGT: UTC+8, Population: 5.5 million)

1. Organizations

The relationships among our engineering societies are approximately shown in **Fig. 1**.

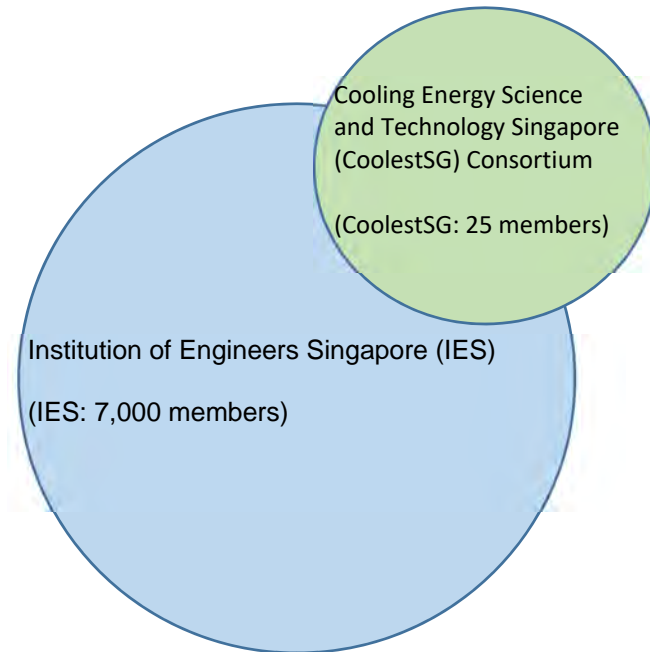


Fig. 1 Structure of Singapore Societies of Thermal Science and Engineering

2. Major Meetings

World Engineers Summit (bi-annual event hosted by IES) (remark: the meeting does not focus on Thermal Science and Engineering)

3. Major Journals

IES Newsletter (weekly)

CoolestSG Newsletter (quarterly)

4. Foundations of Scientific Research

Ministry of Education (MOE) Singapore

National Scientific Foundation (NRF) Singapore

Agency for Science, Technology and Research (A*Star) Singapore

5. Education (Undergraduate/Graduate School)

- There are two semesters in a year; the first semester starts in January, while the second semester starts in August.
- Undergraduate school education is taught in English and uses English textbooks.
- Senior students are required to do a final year project under supervision by faculty member.
- Master course: usually 2 years
- Doctor course: usually 4 years

6. University System (Faculty, Employment, etc.)

In Singapore, there are two major public universities with engineering programs:

National University of Singapore (2500 Academic staff, about 35,000 students including 27, 000 undergraduate and 8,000 postgraduate students)

Nanyang Technological University (1700 Academic staff, about 31,000 students including 23, 000 undergraduate and 8,000 postgraduate students)

7. Major Public/Private Research Institutes

- Advanced Remanufacturing and Technology Centre (ARTC)
- Institute of High-Performance Computing (IHPC)
- Institute of Microelectronics (IME)
- Singapore Institute of Manufacturing Technology (SIMTech)

by P.S. Lee (CoolestSG) and S.K. Chou (IES)

South Africa Member of AIHTC (1) Overview

(Greenwich Mean Time, UTC/GMT+2, Population: 59 million)

1. Organizations

South Africa has no specific heat transfer and/or thermal science societies and most scholars conducting heat transfer research are members of the South African Institute of Mechanical Engineers (SAIMEchE) or the South African Institution of Chemical Engineers (SAIChE).

2. Major Meetings

There are no regular national meetings dedicated to heat transfer and thermal sciences. However, contributions on heat transfer and thermal sciences can be presented at the South African Conference on Computational and Applied Mechanics (SACAM) which takes place every two years. Further, 15 major international conferences under the auspices of HEFAT (International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics) have been organized from South Africa since 2002 by Prof Josua Meyer. Four of these conferences were presented in South Africa. The next HEFAT2022 conference has been scheduled for 8 – 10 August 2022 in Amsterdam. The conference website is available on: hefat2022.org



South Africa was also selected by the AIHTC as venue for the next 17th International Heat Transfer Conferences (IHTC17); which is considered as the “Olympics of Heat Transfer” and is being presented only every fourth year. The conference was scheduled to be presented in Cape Town in August 2022. Because of the Covid-19 international travel restrictions the conference has been postponed to 3 – 7 July 2023. The conference website is available on: IHTC17.org



IHTC
SINCE 1951

17th International Heat Transfer Conference

Cape Town International Convention Centre,
Cape Town, South Africa

03 – 07 July 2023

3. Major journals

There are no South African journals dedicated to heat transfer or thermal sciences. However, articles on heat transfer and thermal sciences are accepted for publication in the accredited R&D Journal of the SAIMEchE. Most scholars publish their work in well-established English journals listed on the International Scientific Index (ISI) and/or articles listed by Scopus. Articles published in these journals earn funding from the Department of

Education that subsidizes most universities in South Africa. At many universities financial incentives exist to publish in journals with high impact factors.

4. Education (undergraduate and postgraduate studies)

South Africa has 27 universities of which many offers engineering. The quality and standards vary but the quality of the below eight universities are very high as these Universities has been accredited by the Engineering Council of South Africa (ECSA). Since ECSA is a signatory of the Washington Accord the programmes are accepted for professional registration via the International Engineering Alliance in the following 20 countries: Korea, Russia, Malaysia, China, South Africa, New Zealand, Australia, Canada, Ireland, Hong Kong China, Chinese Taipei, Singapore, Sri Lanka, Japan, India, United States, Turkey, United Kingdom, Costa Rica, Pakistan and Peru.

University of Cape Town
University of Kwazulu-Natal
Nelson Mandela Metropolitan University
North-West University
University of Pretoria
University of Johannesburg
University of Stellenbosch
University of the Witwatersrand

All the above universities present four-year bachelor's degree, followed by a honours and/or masters and then a PhD-degree.

5. University System

The Council on Higher Education (CHE) is an independent statutory quality council for South African higher education. Its vision is to "... lead and manage quality assurance; research and monitor trends and development; initiate critical discourse on contemporary higher education issues; and provide advice to the Minister on strategy and policy. The main areas of work of the CHE are to: provide advice to the Minister of Higher Education and Training on all higher education matters on request, and proactively; promote a system of quality assurance for all higher education institutions, including private providers of higher education, which focuses on programme accreditation, institutional audits, national reviews, standards development, quality promotion and capacity development; monitor the state of higher education and publish information regarding developments in higher education on a regular basis; and contribute to the development of higher education through intellectual engagement with key issues in a number of activities in partnership with relevant stakeholders".

The academic ranks at most universities are junior lecturer, lecturer, senior lecture, associate professor and professor. Tenure is commonly awarded after 2 years since the appointment. The mandatory retirement age is 65. In some exceptional cases further contract appointments are made. Retired professors are usually appointed after retirement as "emeritus professors" and may continue conducting research and supervision of postgraduate students.

6. Foundations of Scientific Research

The only general foundation of research support is the National Research Foundation (NRF). It is an independent statutory body that funds research, high-end human capacity and critical research infrastructure to promote knowledge production across all disciplinary fields. Funding levels are usually very low and therefore most scholars rely on international research foundations and industry for research funding.

7. Major Public/Private Research Institutes

Most research in heat transfer is conducted by individuals or research groups within universities. Usually in programmes that offers mechanical-, chemical- and/or nuclear engineering.

by Prof Josua P Meyer (University of Pretoria) and Prof Jat du Toit (North-West University)

South Korea

Member of ICHMT, AIHTC, AUTSE

(1) Overview

(Korea Standard Time, KST: UTC+9, Population: 51.8 million)

1. Major Societies

Most of Korean scientists and engineers in thermal science and engineering (or more specifically heat and mass transfer) belong to the Thermal Engineering Division of the Korean Society of Mechanical Engineers (**KSME**; approximately 27,000 registered members), Division of Nuclear Thermal Hydraulics of Korean Nuclear Society (**KNS**; approximately 5,000 registered members), Society of Air-conditioning and Refrigerating Engineers of Korea (**SAREK**; approximately 9,000 registered members), and/or Korean Society of Combustion (**KOSCO**; approximately 800 registered members). KSME-TED is a core society of heat and mass transfer in Korea.

2. Major Meetings

Thermal Engineering Conferences by KSME-TED

during Spring (April) of KSME-TED and Fall Annual Meeting of KSME (November)

Place: mostly Hotel or Convention Center around the country

Seasonal Conferences by KNS

during Spring (May) and Autumn (October) Annual Meetings

Place: mostly Hotel or Convention Center around the country

Seasonal Conference by SAREK

during summer (June) and winter (November)

Place: mostly Hotel or Convention Center around the country

Seasonal Conference by KOSCO

during spring (May) and winter (November)

Place: mostly Hotel or Convention Center around the country

3. Major Journals

KSME

Journal of Mechanical Science and Technology (in English, monthly)

JMST Advances (in English, quarterly)

Transactions of the KSME A/B/C (in Korean, monthly)

KNS

Nuclear Engineering and Technology (in English, monthly)

SAREK

International Journal of Air-Conditioning and Refrigeration (in English, quarterly)

Korean Journal of Air-Conditioning and Refrigeration Engineering (in Korean, monthly)

KOSCO

Journal of The Korean Society of Combustion (in Korean, quarterly)



4. Education (Undergraduate/Graduate School)

- Elementary School, 6 years; Middle School, 3 years; High School, 3 years; Undergraduate School, 4 years.
- In most universities, the first semester starts in March, while the second semester starts in September.
- Most of undergraduate school education is carried out by using English textbooks, and some of the lectures are taught in English.
- Master course is usually 2 years, and Doctor course is 4 years on average (integrated Ph.D. course is often 5 years).
- Recently, there exist growing needs for female or international faculty in engineering schools.

5. University System

- Tenure-track professors are usually independent and run their own laboratory (similar to the US university system).
- At most of universities, the retirement age is 65.

6. Foundations of Scientific Research

- National Research Foundation of Korea (NRF)
- Korea Institute of Energy Technology Evaluation and Planning (KETEP)
- Korea Evaluation Institute of Industrial Technology (KEIT)

7. Major Public Research Institutes

- Korea Institute of Machinery and Materials (KIMM)
- Korea Atomic Energy Research Institute (KAERI)
- Korea Institute of Science and Technology (KIST)
- Korea Institute of Energy Research (KIER)
- Korea Institute of Industrial Technology (KITECH)



8. Addendum

Korean is the national language of both North Korea and South Korea. Modern Korean is written in Hangeul, i.e., Korean alphabet that was originally developed by King Sejong in 1446. Modern Hangeul uses 24 basic letters (14 consonant letters and 10 vowel letters) just like the modern English alphabet.

便 : 사 새 내 문 무 니 이 文 나
 說 : 례 로 이 흥 춤 르 린 훈 字 랫
 ㅁ : 마 스 룰 노 내 고 전 ㅁ ㅁ
 ㅂ : 다 물 을 노 미 제 저 초 와 ㅂ
 ㅅ : 휘 여 을 호 하 하 배 로 서 미
 ㅈ : 고 여 름 흥 아 니 를 흥 로 서 ㅈ
 ㅊ : 저 수 ㅈ ㅈ ㅈ ㅈ 이 린 ㅊ
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President of KSME-TED
 President of KNS
 President of SAREK
 President of KOSCO

Tong Seop KIM
 Dong-Wook JERNG
 Min Soo KIM
 Jeong PARK

kts@inha.ac.kr
dwjerng@cau.ac.kr
minkim@snu.ac.kr
jeongpark@pknu.ac.kr

Sweden

Member of ICHMT, EUROTHERM

(1) Overview

(Central European Time Zone, CET: UTC+1, Population: 10 million)

1. Organizations

There are no specific organizations for Heat Transfer in Sweden.

2. Major Meetings

There are no regular national meetings dedicated to Heat Transfer in Sweden

3. Major Journals

There are no national journals on Heat Transfer in Sweden. All research is published in international journals, normally in the English language.

4. Foundations of Scientific Research

- The Swedish Energy Agency, <https://www.energimyndigheten.se/en/>
- VINNOVA, Sweden's Innovation Agency, <https://www.vinnova.se/en/>
- VR, Swedish research council, <https://www.vr.se/english.html>
- Opportunities exist through various programs within the European Union

5. Education (Undergraduate/Graduate School)

- Nine year of compulsory school, starting at the age of seven.
- Three years of high school required for admittance to university studies

6. University system

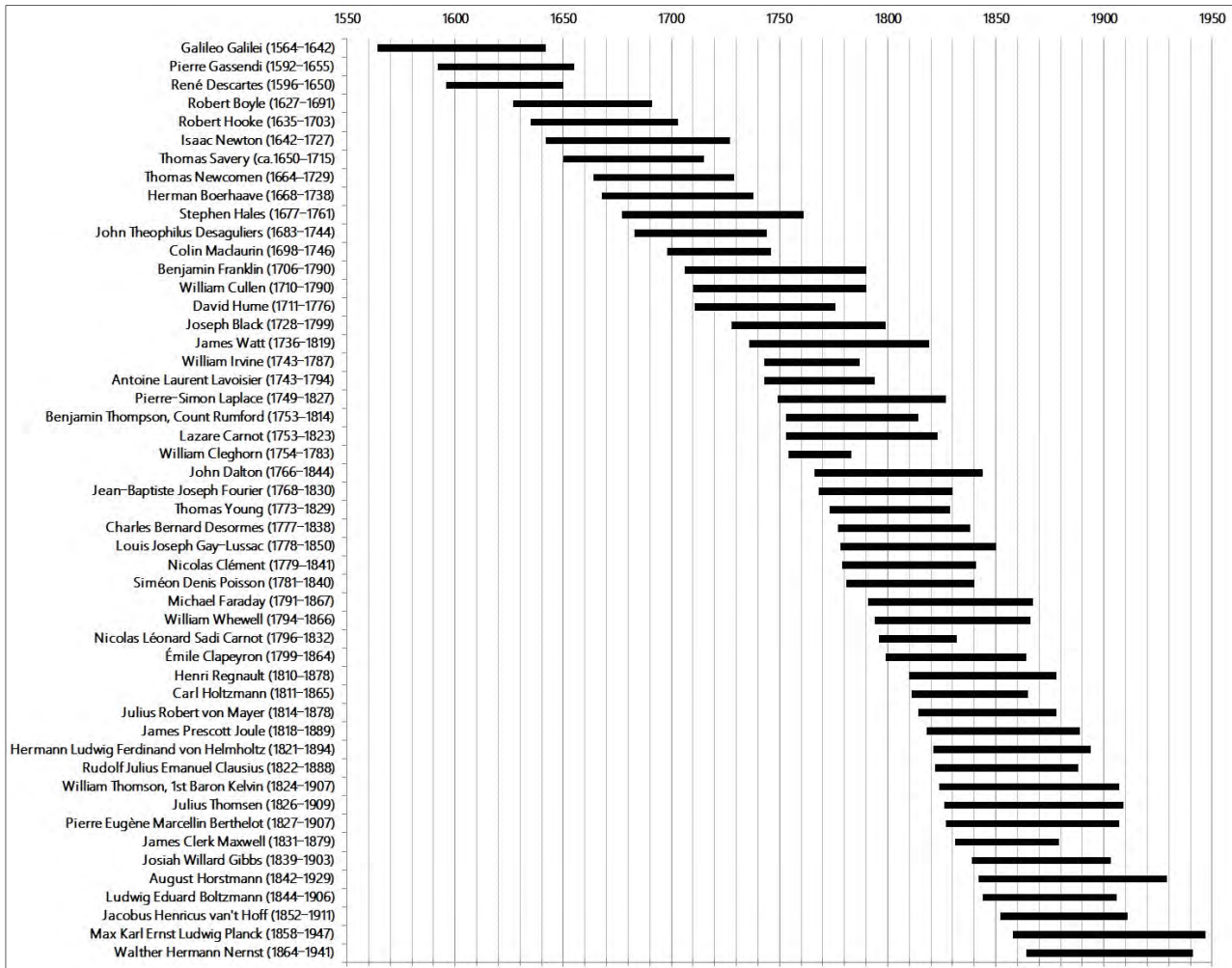
- B.Sc. degree after three years of studies, in Swedish.
- M. Sc. degree after another two years, often in English
- Ph.D. degree after yet another five years (nominally four years).

7. Major Public / Private Research Institutes

- Royal Institute of Technology, KTH
- Chalmers University of Technology, CTH
- Engineering faculty (LTH) of Lund University (LU)
- Uppsala University (UU)
- Engineering faculty (LiTH) within Linköping University (LiU)
- Mälardalen University
- Luleå University of Technology
- Research Institutes of Sweden, RI.SE

by Björn Palm (Eurotherm)
by Bengt Sunden (ICHMT, Eurotherm)

Thermal Filler 3 From Galilei to Nernst in Thermal Science



Born in the sixteenth century

- Galileo Galilei (1564–1642)
- Pierre Gassendi (1592–1655)
- René Descartes (1596–1650)

Born in the seventeenth century

- Robert Boyle (1627–1691)
- Robert Hooke (1635–1703)
- Isaac Newton (1642–1727)
- Thomas Savery (ca.1650–1715)
- Thomas Newcomen (1664–1729)
- Herman Boerhaave (1668–1738)
- Stephen Hales (1677–1761)
- John Theophilus Desaguliers (1683–1744)
- Colin Maclaurin (1698–1746)

Born in the eighteenth century

- Benjamin Franklin (1706–1790)
- William Cullen (1710–1790)
- David Hume (1711–1776)
- Joseph Black (1728–1799)
- James Watt (1736–1819)
- William Irvine (1743–1787)
- Antoine Laurent Lavoisier (1743–1794)
- Pierre-Simon Laplace (1749–1827)
- Benjamin Thompson, Count von Rumford (1753–1814)
- Lazare Carnot (1753–1823)
- William Cleghorn (1754–1783)
- John Dalton (1766–1844)

- Jean-Baptiste Joseph Fourier (1768–1830)
- Thomas Young (1773–1829)
- Charles Bernard Desormes (1777–1838)
- Louis Joseph Gay-Lussac (1778–1850)
- Nicolas Clément (1779–1841)
- Siméon Denis Poisson (1781–1840)
- Michael Faraday (1791–1867)
- William Whewell (1794–1866)
- Nicolas Léonard Sadi Carnot (1796–1832)
- Émile Clapeyron (1799–1864)

Born in the nineteenth century

- Henri Regnault (1810–1878)
- Carl Holtzmann (1811–1865)
- Julius Robert von Mayer (1814–1878)
- James Prescott Joule (1818–1889)
- Hermann Ludwig Ferdinand von Helmholtz (1821–1894)
- Rudolf Julius Emanuel Clausius (1822–1888)
- William Thomson, 1st Baron Kelvin (1824–1907)
- Julius Thomsen (1826–1909)
- Pierre Eugène Marcellin Berthelot (1827–1907)
- James Clerk Maxwell (1831–1879)
- Josiah Willard Gibbs (1839–1903)
- August Horstmann (1842–1929)
- Ludwig Eduard Boltzmann (1844–1906)
- Jacobus Henricus van't Hoff (1852–1911)
- Max Karl Ernst Ludwig Planck (1858–1947)
- Walther Hermann Nernst (1864–1941)

Thailand Member of ICHMT (1) Overview

(Thailand Standard Time, THA: UTC+7, Population: 69.8 million)

1. Major Societies

Most of Thai scientists and engineers in thermal science and engineering (or more specifically heat and mass transfer) belong to the **Thai Society of Mechanical Engineers (TSME)**. The objectives of the society are

1. To support harmonization among members in the practice of mechanical engineer and other related professions in treating society without being contrary to morality and the laws of the country.
2. To cooperate between members of the association, academic departments and other organizations, both government and private sectors in having a good purpose and ideology in any actions that the association has the ability to develop the nation to prosper equally to other countries.
3. To be a center for research studies and academic consultations in mechanical engineering for members and interested parties.
4. To proceed with academic focus that is beneficial to public without aiming for benefits and not having any role in politics. Do not relate to gambling, profit sharing as well as degrading morals, customs and good culture of the nation. The symbol of the society is as shown in **Fig. 1**.



Fig. 1 The logo representing the TSME association of thermal science and engineering

2. Major Meetings

The National Conference of the Mechanical Engineering Network of Thailand (ME-NETT)

Since 1987, annually held (the 35th in 2021)

Place: rotated among all institutional members around the country

Period: 3 days in July

Participants: about 400

Paper presentations (oral): about 250

The International Conference on Mechanical Engineering (TSME-ICoME)

Since 2010, annually held (the 11th in 2020)

Place: rotated among all institutional members around the country

Period: 3 days in December

Participants: about 300

Paper presentations (oral): about 150

3. Major Journals

Journal of Research and Applications in Mechanical Engineering (JRAME) (in English, every 6 months), <https://ph01.tci-thaijo.org/index.php/jrame>.



Fig. 2 The cover of Journal of Research and Applications in Mechanical Engineering (JRAME)

4. Education (Undergraduate/Graduate School)

- Elementary School, 6 years; Junior High School, 3 years; High School, 3 years; Undergraduate School, 4 years. After Junior High School, there is an alternative choice of Technical colleges and Vocational schools, 3-5 years.
- In general, the first semester of Elementary School, Junior High School and High School starts in May, while the second semester starts in October. The first semester of Undergraduate School starts in June – August, while the second semester starts in November – January.
- Most of undergraduate school education is carried out by using English and Thai textbooks.
- Senior students engage in bachelor thesis by doing experimental/theoretical studies under his/her supervisors.
- Master course is usually 2 years, and Doctoral course is 3 years on average.
- The graduation deadlines of doctoral, master and bachelor students are usually at the end of each semester.
- Female students in the faculty of engineering have increased gradually.

5. University System

- Academic positions are based assistant professor, associate professor, and professor.
- The academic position criteria are revised according to the global academic position criteria.
- All public universities, the retirement age is 60.

6. Foundations of Scientific Research

- Ministry of Higher Education, Science, Research and Innovation (MHESI)
- National Research and Innovation Information System (NRIIS)
- National Science and Technology Development Agency (NSTDA)

7. Major Public/Private Research Institutes

- 32 Institutional members of Thai Society of Mechanical Engineers (TSME)
- National Science and Technology Development Agency (NSTDA)
- National Research Council of Thailand (NRCT)
- Private Research Institutes

8. Addendum

Thai language has 44 consonant letters, 21 vowel nuclei providing 32 sounds and 5 phonemic tones: mid, low, falling, high, and rising.

President of TSME KULACHATE Pianthong K.Pianthong@gmail.com
kulachate.p@ubu.ac.th

The Netherlands

Member of ICHMT, AIHTC, EOROTHERM

(1) Overview

(Central European Time, CET: UTC+1, Population: 17.5 million)

1. Major Societies



The Netherlands has one large society for all engineering disciplines: the **KIVI** (Koninklijk Instituut voor Ingenieurs). KIVI has 40 divisions, such as **energy and heat technology**, process technology, mechanical engineering. The **energy and heat technology division of KIVI** organizes several small-scale symposia per year on a large variety of specific topics.

Most of Dutch scientists and engineers in heat and mass transfer from the Dutch universities belong together with the scientists in fluid mechanics to the **J.M. Burgerscentrum**.



The **J.M. Burgerscentrum** is the national research school for fluid mechanics. About sixty professors with their groups with a total of 120 senior scientific staff participate in it. With the combined knowledge, skills and facilities of these research groups the JMBC offers a very stimulating, multidisciplinary environment for advanced research in fluid mechanics and heat transfer and for the education of talented graduate and postgraduate students. At present more than 350 PhD-students and 60 postdocs participate in the JMBC. JMBC has contact groups on multiphase flow, CFD, combustion, Lattice-Boltzmann techniques, turbulence, experimental techniques, biological fluid mechanics and microfluidics.

Next to the contact group on combustion within the JMBC in the Netherlands there is also a national section of the Combustion Institute. The main event organized by the Dutch Section is the annually 1-day symposium "Combura" in cooperation with the Dutch Section of IFRF "Nederlandse Vereniging voor Vlamonderzoek" (NVV).

2. Major Meetings

The **Burgers Symposium** is the national meeting of the J.M. Burgerscentrum. This is an annual 2-day event at the end of May or early June, with about 200 participants. The program consists of a mix of invited lectures given by (foreign) senior scientists and short presentations by the PhDs from the J.M. Burgerscentrum.

COMBURA, the national meeting of the Dutch section of the Combustion Institute (CI). This is an annual 2-day meeting in November with about 60 participants. The program consists of a few invited lectures given by (foreign) senior scientists and lectures from Dutch members of the CI.

4. Education (Undergraduate/Graduate School)

- Elementary School, 6 years; High School, 6 years; Bachelor program of 3 years; Master program of 2 years.
- After High School, there is an alternative choice for a HBO (Hoger BeroepsOnderwijs: Higher Professional Education), sometimes called a University of Applied Sciences leading to a bachelor title in 4 years. Since a few years, some HBOs also offer a limited number of Master programs.
- There are 11 regular universities, of which 3 (Delft, Eindhoven and Twente) are technical universities with engineering faculties. The universities of Wageningen and Groningen offer a restricted number of engineering programs.
- There are 37 HBOs.
- All programs start early September, and are divided either in semesters or in quarters.
- All Bachelor and Master programs at the regular universities use the English language. This has led to a large inflow of foreign students in our programs.
- Most of the Bachelor programs at the HBOs use the Dutch language.
- After a Master program our students have the option to apply for a 4-years PhD program.
- In the engineering faculties there still is a severe gender imbalance with a low percentage of female students.

5. University System

- Most universities are based upon research groups, which each have one or more full professors (chairs) and some associate and assistant professors, in which part of the latter have a tenure track position.
- The educational part of some of the PhD programs is organized in national research schools, such as the J.M. Burgerscentrum.
- The retirement age in the Netherlands gradually increases towards 67 in the year 2024.

6. Foundations of Scientific Research

- Dutch research council NWO (Nederlandse Organisatie voor Wetenschappelijk Onderzoek).
- The ministry of economic affairs sponsors cooperation between research institutes/universities and industry in 10 top sectors. One of these top sectors is Energy.
- There are ample possibilities for research funding by programs of the European Union.

7. Major Public/Private Research Institutes

- TNO - Netherlands Organization for Applied Scientific Research
- ECN - Energy Centre Netherlands
- Marin - Maritime Research Institute Netherlands
- Deltares - National Research Centre for Water and Subsurface
- NLR - National Aerospace Laboratory
- ISPT - Institute for Sustainable Process Technology

8. Addendum

The Netherlands is member of the AIHTC, where it also represents Belgium, Luxembourg, Denmark, Finland, Sweden and Norway

President of the Division Energy and Heat Technology of KIVI: Bendix Jan BOERSMA (b.j.boersma@tudelft.nl)
President of J.M. Burgers Centre: Ruud HENKES (r.a.w.m.henkes@tudelft.nl)

Turkey
Member of ICHMT
(1) Overview

(Eastern European Time, EET: UTC+3, Population: 84 million)

1. Organizations

The relationships among our societies are roughly expressed as shown in **Table 1**.

Table 1 . Transition steps from associations to sectoral structuring with historical order

Society	Members	Founding Date
Chambers of Mechanical Engineers (MMO)	119554	1954
Turkish Society of Thermal Sciences and Technology (TIBTD)	1217	1977
Turkish Society of HVAC and Sanitary Engineers (TTMD)	2101	1992
The Union of Chambers and Commodity Exchanges of Turkey (TOBB) Air Conditioning Assembly (with 14 sub-societies)	61	2005
ASHRAE Turkish Chapter (ASHRAE-TC)	154	2013

2. Major Meetings

Congress on Thermal Science and Technology

organized by TIBTD

- Since 1977, held every two years
- Place : University campus (all around the country)
- Period : 2 days at September
- Paper Presentations (oral) : about 250

National Installation Engineering Congress TESKON-SODEX fair

organized by MMO and Deutsche Messe AG

- Congress : Since 1993, held every two years
- Joint Congress and Fair : Since 2009, held every two years
- Period : 3 days around Spring
- Paper Presentations (oral) : about 200

Energy Efficiency Congress

organized by MMO

- Congress : Since 2007, held every two years
- Place : Kocaeli
- Participants : about 800
- Paper Presentations (oral) : about 100

Solar Energy Systems Symposium and Exhibition

organized by MMO

- Congress : Since 2003, held every two years
- Place : Mersin
- Participants : about 800
- Paper Presentations (oral) : about 100

UCTEA Energy Symposium

organized by ,TMMOB

(The Union of Chambers of Turkish Engineers and Architects/ MMO is member of TMMOB)

- Congress : Since 1995, held every two years
- Place : Ankara
- Period : 3 days

3. Major Journals

Turkey's Energy Outlook Report

by MMO

- published in every two years since 2010.

Journal of Thermal Sciences and Technology

by TIBTD

- published in English, published in April and October every year since 1977.

Engineer and Machinery

by MMO

- published in every three months since 1954

Installation Engineering

by MMO

- published in every two months since 2000.

4. Foundations of Scientific Research

The Scientific and Technological Research Council of Turkey (TÜBİTAK)

Republic Of Turkey Ministry of Industry and Technology

5. Education (Undergraduate/Graduate School)

- In general, the first semester starts in September, while the second semester starts in January.
- The language of education could be fully in Turkish, partially in English-Turkish or fully in English. Textbooks are selected in the same language as the language in which the course is taught.
- Senior students engage in bachelor studies with their supervisors and co-supervisors.
- Master of Science Degrees: 2 years
- Doctorate Degrees: 4 years

6. University System (Faculty, Employment, etc.)

- Entrance Examinations : Higher Education Institutions Examination (YKS)
- Entrance without Exam : Vocational High School in Air Conditioning Systems and Refrigeration can enter associate degrees in related field.
- Associate Degrees (2 years) : Air conditioning and Refrigeration Technology
- Bachelor Degrees (4 years) : Mechanical Engineering
- Employment : Mechanical Engineers could work at HVAC-R employment, Mechanical engineers with related certification of MMO can design HVAC-R projects.

by Murat ERBAŞ (TIBTD), Atilla BIYIKOĞLU (TIBTD – ASHRAE-TC), and Özgür BAYER (MMO)

United Kingdom Member of ICHMT, AIHTC, EURO THERM (1) Overview

(Greenwich Mean Time, GMT: UTC, Population: 67 million)

1. Organizations

The Heat Transfer community in the United Kingdom is represented at national level by the **UK National Heat Transfer Committee (UKNHTC: www.uknhtc.org/)** which was established in 1982 as a joint committee of the **Institution of Chemical Engineers (IChemE)** and **Institution of Mechanical and Engineers (IMechE)**. The founding Chair and IChemE representative was the late Professor Geoffrey Hewitt of Imperial College London, while Professor Hugh Simpson of Strathclyde University represented the IMechE at the time. Other professional bodies whose members have an interest in heat transfer include the **Energy Institute**, the **Institute of Refrigeration** and the **Chartered Institution of Building Services Engineers**.

The mission of the UKNHTC is to advance the development and exchange of knowledge in the Heat Transfer field and in particular to:

- Promote excellence in Heat Transfer education, research and practice
- Facilitate the exchange of relevant knowledge in Heat Transfer
- Promote collaboration between industry, universities, government, and professional societies
- Facilitate public understanding of technical issues related to Heat Transfer
- Raise the international profile of the UK Heat Transfer community

2. Major Meetings organized or supported by the UK Heat Transfer Committee.

UK National Heat Transfer Conference (UKHTC)

Since 1984, initially held every four years, now every 2 years.

Place: rotated among various universities

Period: two or three days in September

Participants: about 200

Micro and Nano Flow Conference (MNF)

Since 2006, held every 2 years

Period: Normally in September

Participants: about 150

IHTC

Providing support by organizing the refereeing process for papers submitted from the UK and countries allocated by the AIHTC



Joint Academia-Industry Workshop by UKNHTC

Annually held; Period: 1 day in April; Participants: about 100

Example: “Heat Transfer Research, Education and Practice in the UK” 2019 (Series Interrupted due to Covid19).

UKNHTC Seminars (sometimes co-sponsored with Research Centres in Academic Institutions)

Examples for 2021:

- Advances on the Evaporation and Wetting of Drops, Professor Khellil Sefiane, University of Edinburgh
- Opportunities and challenges for additive manufacturing in chemical engineering research, Dr Jonathan McDonough, University of Newcastle

- Increasing the capacity factor of concentrated solar thermal power plants, Professor Kamel Hooman, University of Queensland
- Decarbonized Combustion: Research Needs for Zero Pollution, Professor Yannis Hardalupas, Imperial College London
- Simulating vapour nucleation at nanoscale through diffuse interface modelling, Professor Marco Marengo, University of Brighton
- Carbon Capture & Storage: Current Status of Technology, Dr Salman Masoudi, Brunel University London.

3. Major Journals

Special Issues based on the UK NHTC conferences are organized.

Examples from the most recent conference held in Nottingham are included in *Advances in Heat Transfer and Thermal Engineering – Proc. of the 16th UK Heat Transfer Conference*, Ed C. wen and Y. Yan, Springer, 2021, <https://doi.org/10.1007/978-981-33-4765-6>.

Journal of Mechanical Engineering Science -Proc. IMechE, Part C (Thermodynamics and Heat Transfer Section).

4. Education (Undergraduate/Graduate School)

The UK education system is worldwide recognized for its teaching and research excellence. Education policy is devolved to the four countries of the UK. The degree structure in England, Wales and Northern Ireland is common, however Scotland traditionally operates with undergraduate degree programmes which are one year longer than those in the remainder of the UK (RUK). Entry to UG degrees in RUK is normally after 13 years of formal education, with A levels being the standard entry qualification, while in Scotland students can enter undergraduate programmes after 12 years of schooling with Scottish Highers being the standard entry qualifications. Universities admit students with a range of other qualifications. Undergraduate bachelor level courses (BA, BSc and BEng) in the RUK are 3 years, and 4 years in Scotland. Several universities offer 4-year undergraduate courses, where the students complete one year in a workplace, usually prior to their final year. In engineering and the sciences professional bodies require an academic qualification at masters level for professional recognition. Many universities offer integrated masters degrees, e.g. MEng, MPhys or MChem which are one year longer than the corresponding bachelors degree. Postgraduate taught (MSc) and research degrees (MPhil, PhD) are also offered in several universities. MSc and MPhil degrees are typically one year long while a PhD is three years. A four years Doctor of Engineering (EngD) degrees are also awarded by UK institutions and hosted by industry.

Heat transfer is taught in a range of undergraduate and postgraduate programmes, typically in Mechanical, Aerospace, Chemical and Building Engineering departments across the UK.

5. University System

There are 164 universities and higher education institutions in the UK, some 50% of these offer engineering degrees. All UK universities are independent institutions with degree awarding powers granted by Royal Charter or Act of Parliament. The titles of the universities and their degrees are legally protected. Funding is from a variety of sources including government grant, student fees, research grants and endowments. The quality of university education throughout the UK (and delivered by UK institutions operating overseas) is monitored and maintained by the UK Quality Assurance Agency for Higher Education (QAA) and all degree courses are assessed against relevant benchmark statements for the subjects. Degrees may also be accredited by appropriate professional institutions. The requirements for accreditation of BEng, MEng and MSc degrees are laid out by the Engineering Council.

6. Foundations of Scientific Research

Research in Heat Transfer and related areas is usually funded by:

- Engineering and Physical Sciences Research Council (EPSRC)
- Royal Academy of Engineering
- Innovate UK
- Industry
- Royal Society
- The European Union (with the UK participating after Brexit)

7. Heat Transfer awards

[Heat Transfer prizes \(uknhtc.org\)](http://uknhtc.org)

- Geoffrey Hewitt award for best PhD thesis relating to heat transfer
- David Kenning Award for excellence in research in two-phase (boiling) heat transfer
- UKNHTC undergraduate and postgraduate awards for best thesis (BEng, MEng and MSc) relating to heat transfer

By Professor Tassos Karayiannis (UKNHTC, AIHTC), Professor Khellil Sefiane (UKNHTC, EURO THERM), Dr. Peter Kew (UKNHTC), Dr. Francesco Coletti (UKNHTC, AIHTC).