

# 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

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# Part 1



## EUROTHERM

**Pedro Jorge Martins Coelho, Secretary**

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- **Eurotherm Seminar No. 114 - Nanoscale and Microscale Heat Transfer VII**

The Eurotherm Seminar No. 114 was the Nanoscale and Microscale Heat Transfer VII conference. It was held in Palermo (Italy), from 29<sup>th</sup> May to 3<sup>rd</sup> June, 2022, as a purely on-site event. It was the seventh event of a series of successful conferences taking place every two years, the last one being held in 2018 (the 2020 edition did not take place because of the Covid crisis) in Levi (Finland). The organizing committee was constituted by Riccardo Messina and Philippe Ben-Abdallah from the Laboratoire Charles Fabry, CNRS, Palaiseau, France, Svend-Age Biehs from Carl von Ossietzky Universität, Oldenburg, Germany and F. Xavier Alvarez from Universitat Autònoma de Barcelona, Spain. The conference has welcomed 8 invited presentations in the form of 4 pedagogic tutorial talks (D. Donadio, F. Giazotto, P. Hänggi and C. Henkel), 4 keynote presentations (S. Fan, B. Gotsmann, M. Martín-González and B. Li), and contributed (both oral and poster) presentations. More specifically, 49 oral presentations have been delivered, divided in the following thematic sections: Near-field radiative heat transfer and TPV conversion devices, numerical methods in conduction, interface phenomena, scanning thermal microscopy, conduction, cooling, energy-conversion and thermal devices, heat transport at atomic and molecular scale, thin film and 2D materials, far-field radiation. 44 poster presentations have been on display during the entire duration of the conference. This, in conjunction with a poster session, has allowed to foster discussion and scientific exchange between all participants.

Four years after the previous edition of the same conference, this event has been indeed a great occasion to gather and discuss both fundamental and more applicative topics on heat transfer and the micro- and nano-scale. One of the main aims of this conference, namely to reinforce the bond between the phononic and photonic communities, has been indeed met during the event. It has been possible to discuss and explore all open problems and challenges in the topic of nanoscale and microscale heat transfer, and the next edition (2024) of the conference has been scheduled to be organized in Barcelona, Spain.

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

**Prof. Terrence Simon, President**

University of Minnesota, Minneapolis, U.S.A., [simon002@umn.edu](mailto:simon002@umn.edu)

**Prof. Ilker Tari, Secretary General**

Middle East Technical University, Turkiye, [ilker@ichmt.org](mailto:ilker@ichmt.org)

**Tugba Gun, Executive Secretary**

Middle East Technical University, Turkiye, [ichmt@ichmt.org](mailto:ichmt@ichmt.org)



Heat and Mass Transfer processes 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.

In 2018, the ICHMT celebrated its 50<sup>th</sup> 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 throughout the world (thirty-five countries represented by the Scientific Council). 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 our community will realize in the future will require ever more effective communication and the formats of ICHMT events are poised to effect that communication.



2022 EC Meeting of ICHMT was held partially online virtual and in person on June 6, in Izmir, Turkiye

### **Meetings Organized by ICHMT:**

ICHMT organized one international symposium and sponsored four in 2022. THMT22 conference scheduled this summer have been postponed to 2023 because of war in Europe. Below please find the details of these meetings;

**“3rd International Symposium on Convective Heat and Mass Transfer (Hybrid), CONV-22”** was held in hybrid format, during June 5 – 10, 2022 in Izmir, Turkiye. The Symposium Co-Chairmen were Dr. Mourad Rebay, University of Reims, France and Dr. Alpaslan Turgut, Dokuz Eylul University, Izmir, Turkiye. Detailed information can be found on the Web site: <https://www.ichmt.org/conv-22>



**Meetings 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 were Dr. Darrell W. Pepper, University of Nevada, USA and Dr. Nesrin Ozalp, Purdue University Northwest, USA.

**“14th International Conference on Thermal Engineering Theory and Applications, ICTEA-2022”**, 22 – 24 May 2022, in Baku, Azerbaijan. The Symposium Co-Chairmen were Professor Yusif Abdullayev, Baku Engineering University, Azerbaijan and Professor M.Ziad Saghir, Ryerson University, Canada.

**“16th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics and the Editorial Board of Applied Thermal Engineering, ATE-HEFAT 2022”**, 8 - 10 August 2022, in Amsterdam, Netherlands. The symposium Chairman is Professor Josua P. Meyer, University of Pretoria, South Africa.

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

**Meetings to be Organized by ICHMT:**

**“10th International Symposium on Radiative Transfer, RAD-23”**, 11 - 16 June, 2023, in TBD. The Symposium Chairmen are Prof. Brent Webb, Brigham Young University, USA and Dr. Denis Lemonnier, ISAE-ENSMA, France. Web site is under construction.

**“4th International Symposium on Gas Turbine Heat and Mass Transfer, Turbine-23”**, (tentatively) September 2023, Roma La Sapienza University, Roma, Italy. The symposium Chairmen are Professor Richard

Goldstein, University of Minnesota, USA and Professor Terrence W. Simon, University of Minnesota, USA. Web site is under construction.

**“10th International Symposium on Turbulence Heat and Mass Transfer, THMT-23”**, (tentatively) September 2023, in Roma, Italy. The Symposium Co-Chairmen are Professor K. Hanjalic, Delft University of Technology, The Netherlands, and Professor K. Suga, Osaka Prefecture University, Japan. Web site is under construction.

**Meetings to be Co-sponsored by ICHMT:**

**“1st International Conference on Energy Storage and Savings, ICENSS”** will be held in hybrid format, during 20 – 23 October 2022, in Xi’an, China. The Symposium Co-Chairmen are Dr. Yulong Ding from University of Birmingham, U.K.; Dr. Ho Seok Park from Sungkyunkwan University, South Korea and Dr. Qiuwang Wang, Xi’an from Jiaotong University, China.

**“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, Turkiye; 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”**, 14 – 18 August 2023, Cape Town, South Africa. The symposium Chairman is Josua P. Meyer, Stellenbosch University, South Africa. Detailed information can be found on the Web site: <https://ihtc17.org/>

**Organization:**

- 40 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)

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

[Other Publications](https://www.ichmt.org/p/other-publications)

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

[ICHMT Digital Library](http://dl.begellhouse.com/references/1bb331655c289a0a.html)

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



**AIHTC**

**17th International Heat Transfer Conference (IHTC-17)  
14 – 18 August 2023, Cape Town**

<https://ihtc17.org/>



Cape Town International Convention Centre, Cape Town, South Africa



Organized by  
**HEFAT**

Under the auspices of  
**The Assembly for International Heat Transfer Conferences**

Supported by  
**The South African Institution of Mechanical Engineers  
International Centre for Heat and Mass Transfer  
American Society of Thermal and Fluids Engineers**



### **Mode of the Conference**

The AIHTC has decided that the “mode/format” of the conference will be a face-to-face conference in Cape Town. However, it might be changed to a hybrid format for delegates only that cannot travel from countries with Covid or other major force restrictions.

## Scope and Background of Conference

Heat transfer, a major academic discipline originating from seminal studies of thermal non-equilibrium phenomena, has grown to include the science of transport phenomena for ions, electrons, and chemical species. Thus it deals with essential fundamentals such as energy, materials, food and water, and also with a range of technologies that support modern lifestyles. Heat transfer is now a vitally important field, as scientists and engineers face difficult challenges: the SARS-COV-2 pandemic diffusion, development of cutting-edge technologies for highly efficient energy systems, massive information/communication equipment, high-value-added manufacturing, and comfortable living environments, to name but a few. Due to its enormous scope and impact, heat transfer is often called “thermal science.”

The International Heat Transfer Conference (IHTC), nicknamed the “Heat Transfer Olympics,” is the world’s premier conference for scientists and engineers in the heat and mass transfer research community, who convene every four years to exchange the latest information. Previous conferences have greatly enhanced mutual exchanges of knowledge and experience, and nurtured new and/or interdisciplinary research areas. Future conferences should realize an increasingly important mission: to foster international cooperation and facilitate the exchange of ideas among colleagues in order to solve urgent problems and improve peoples’ lives in the years ahead.

To pursue these aims, we invite forward-looking scientists, engineers, and researchers from all over the world to attend IHTC-17. In addition to exploring traditional research areas, IHTC-17 also asks an important question (asked already at IHTC-15) so that we may better serve society : “What is the role of thermal science in meeting societal challenges?” Clearly, we face major issues such as ensuring sustainable development, healthy ageing, sufficient food for all, and economic growth, and we need to develop scientific and technological solutions. To do this, we should shape our current and future roles more concretely, and start to formulate an interdisciplinary framework for collaboration among colleagues active across a wider range of physical, life, and information sciences.

## Paper Submission

Abstracts for IHTC-17 should be submitted on-line via the IHTC-17 web page. They will initially be reviewed by the regional International Scientific Committee (ISC) members. Once an abstract has been accepted, the full-length manuscript will be requested by the due date. The full-length manuscripts will then be reviewed by reviewers assigned by the regional ISC members. A copyright transfer form must be submitted with the final manuscript. All papers will be presented in a poster paper format venue with a short oral presentation. Approximately 50 keynote papers will be presented as oral papers. Each accepted manuscript (also keynote papers) must have at least one paid registered author before a paper can be presented and be published in the conference proceedings. The registration fees are published on the conference website, and it should be noted that the fees for face-to-face participation and online participation, when applicable, will be the same.

## Important Dates

Abstract submission: 15 October 2022

Notification of abstract acceptance: 31 October 2022

Full paper submission: 31 December 2022

Notification of full paper acceptance: 30 April 2023

Submission of final manuscript: 31 May 2023

Author registration due: 31 May 2023 (for papers to be included in the proceedings)

## IHTC Digital Library (IDL)

The AIHTC and Begell House have agreed to establish the IHTC Digital Library (IDL). The IDL is an online archival library which features an interactive web interface and an advanced search engine. The library includes all past and future Proceedings of the International Heat Transfer Conferences under the auspices of the AIHTC. All the papers presented at IHTC-17 will be uploaded into the library after the conference.

### Conference Chair

Prof Josua Meyer Stellenbosch University  
Email: josua7meyer@gmail.com

### Secretariat

Prof Jat du Toit North-West University  
Email: jat.dutoit@nwu.ac.za

### South African Advisory Committee

Prof Tunde Bello-Ochende  
Univ. of Cape Town  
Prof Jat du Toit North-West Univ.  
Prof Weihu Ho Univ. of Witwatersrand  
Prof Jaap Hoffman Stellenbosch Univ.  
Prof Z Huan Tshwane Univ. of Technology  
Dr Sunita Kruger Univ. of Johannesburg  
Prof Mohsen Sharifpur Univ. of Pretoria  
Prof Glen Snedden Univ. of Kwazulu-Natal

### Local Organizing Committee

Prof Josua Meyer (Chair) Stellenbosch Univ.  
Prof Jat du Toit (Co-chair) North-West Univ.  
Prof Mohsen Sharifpur Univ. of Pretoria  
Prof Johan vd Spuy Stellenbosch Univ.  
Prof Jaap Hoffmann Stellenbosch Univ.  
Dr Andrew Gill Stellenbosch Univ.  
Dr Michael Owen Stellenbosch Univ.  
Prof Craig McGregor Stellenbosch Univ.  
Dr Hannes Pretorius Stellenbosch Univ.  
Mr Carl Tshamala Stellenbosch Univ.  
Mrs Taneha Hans Stellenbosch Univ.  
Mr Matthew Meas Stellenbosch Univ.  
Mr Angus Morton Africa Massive  
Mr Ralph Meyers Africa Massive

### International Scientific Committee

Australia	Steven Armfield
	Victoria Timchenko
Brazil	Gherhardt Ribatski
	Helcio R.B. Orlande
Canada	Sunny Ri Li
	Dominic Groulx
China	Qiuwang Wang
	Bingyang Cao
France	Denis Maillet
	Sebastian Volz
Germany	Ulrich Gross
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	Yuji Suzuki
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	Vitor A. F. Costa
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	Alexander I. Leontiev
South Africa	Charl G. du Toit
	Josua P. Meyer
Switzerland	Dimos Poulidakos
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The Netherlands	Michel de Paepe
	Wilko Rohlf
UK	Francesco Coletti
	Tassos Karayiannis
USA	Raj M. Manglik
	Mohamed S. El-Genk

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

### 1. Report on the 7th Thermal and Fluids Engineering Conference (TFEC 2022)

Darrell Pepper, Nesrin Ozalp, Krishna Kota and Ankur Jain

### 2. The 8th Thermal and Fluids Engineering Conference (TFEC 2023)

#### 1. Report on the 7th Thermal and Fluids Engineering Conference (TFEC 2022)



May 16-18, 2022  
 Prof. Darrell Pepper, University of Nevada Las Vegas  
 (darrell.pepper@unlv.edu)  
 Prof. Nesrin Ozalp, Purdue University Northwest  
 (nozalp@pnw.edu)  
 Prof. Krishna Kota, New Mexico State University  
 (kkota@nmsu.edu)  
 Prof. Ankur Jain, University of Texas Arlington  
 (jaina@uta.edu)

The 7th Thermal and Fluids Engineering Conference (TFEC 2022) was held in a hybrid (in person and virtual) mode during May 16-18, 2022. The chair and co-chair of the conference were Drs. Darrell Pepper and Nesrin Ozalp, and the program chair and co-chair were Drs. Krishna Kota and Ankur Jain. The conference was hosted by the University of Nevada in Las Vegas, Nevada and has received 464 submissions in the form of full papers, extended abstracts, and presentation-only papers. Participants from over 30 countries on nearly all continents attended the hybrid conference. There were 20 in-person sessions and 24 virtual sessions. The technical program also hosted 4 plenary speakers, 9 keynote presentations, and 4 invited speakers in the Technology, Entrepreneurship and Communication (TEC-talk) session. These distinguished speakers from academia, industry, national labs, and federal agencies have covered a broad range of topics such as model validation, engineering education in post-corona future, next generation heat transfer fluids, tuning of phonon transport, gas turbine heat transfer and internal flow aerodynamics, sustainable energy and buildings, concentrating solar power, water-energy nexus, spacecraft engineering, distributed combustion, heat in hypersonics, and machine learning in CFD etc. In addition, a special luncheon talk was organized on the history of Area 51 from a technological perspective. A panel on Multiphase CFD: Risks, Rewards, and Remorse was also organized. During the award luncheon on the second day of the conference, ASTFE fellow awards were presented to Professors Jane Davidson, Wilson Chiu and Darrell Pepper. In addition, the 2022 Thermal and Fluids Engineering Award was presented to Professor Sivaramakrishnan (Bala) Balachandar of University of Florida in recognition of substantial contributions to the field of multiphase flows and environmental flows. The complete program can be found online at [https://www.astfe.org/conferences/tfec2022/TFEC\\_2022\\_Program.pdf](https://www.astfe.org/conferences/tfec2022/TFEC_2022_Program.pdf).

During the TFEC 2022, the Executive Committee (EC) of American Society of Thermal and Fluids Engineers was introduced to the conference attendees. EC leads the society's essential functions in planning conferences and membership initiatives. Members of ASTFE and thermal/fluid engineering community at large are encouraged to contact EC and to get involved in the society activities. They can contact the members of EC and for more information, contact [info@astfe.org](mailto:info@astfe.org).



**Chair**  
 Lorenzo Cremaschi  
 Auburn University

**Vice-Chair**  
 Jon Longtin  
 Stony Brook Univ.

**Outreach & Conference  
 Liaison,** Nesrin Ozalp  
 Purdue University Northwest

**Membership**  
 Wilson K. S. Chiu  
 University of Connecticut

**Treasurer**  
 Ting Wang  
 University of New Orleans

## 2. The 8th Thermal and Fluids Engineering Conference (TFEC 2023)



**ASTFE**

American Society of Thermal and Fluids Engineers

# 8<sup>TH</sup> THERMAL AND FLUIDS ENGINEERING CONFERENCE (Hybrid)

Partially online virtual and in person  
at University of Maryland, College Park, MD

26-29  
MARCH  
2023

[www.astfe.org/tfec2023/](http://www.astfe.org/tfec2023/)

The 2023 American Society of Thermal and Fluids Engineers (ASTFE) Conference (Hybrid) will be held in March 26-29, 2023 partially online virtual and in person at University of Maryland, College Park, MD, USA. ASTFE is the premier international society by and for professionals within the thermal and fluids science and engineering community. The 2023 ASTFE conference, TFEC 2023 provides an international forum for the dissemination of the latest research and knowledge in the thermal and fluid sciences. Authors are invited to submit abstracts covering, but not limited to, the following areas:

- Advanced Energy Systems
- Aerospace Applications
- Aluminia
- Combustion, Fire and Fuel
- Computational Methods/Tools in Thermal-Fluid Systems
- Cryogenics
- Electric, Magnetic, Flow and Thermal Phenomena in Micro and Nano-Scale Systems
- Energy and Sustainability
- Energy Storage Systems
- Energy-Water-Food Nexus
- Engineering Equipment and Environmental Systems
- Engineering Fundamentals and Methodology
- Experimental Methods/Tools and Instrumentation in Fluid Mechanics and Heat/Mass Transfer
- Flow and Heat Transfer in Biological Systems
- Flow and Heat Transfer in Materials Processing Science and Manufacturing
- Flow in Internal Multiphase Flows
- Flow Instability
- Fluid Flow and Heat Transfer in Industrial and Commercial Processes
- Fluid Flow and Heat Transfer Multiphase Phenomena
- Fluid Heat Exchangers and Instrumentation
- Fluid Mechanics and Rheology of Anisotropic Materials and Complex Fluids
- Fuel Cells
- Fundamentals in Fluid Flow and Heat/Mass and Momentum Transfer
- Heat Exchangers: Compact, Novel, Networks
- Heat Pipes
- Heat Pipes
- Heat/Mass Transfer Enhancement Techniques
- Industry Problems: CO<sub>2</sub> Capture
- Materials Issues, Composites, Low Thermal Conductivity
- Measurements and Modeling of Environmental Flows
- Multiphase Flows
- Nano and Micro Fluids Applications
- Materials and Built Environments
- Plasma Physics and Engineering
- Refrigeration, Air Conditioning Systems, and Refrigerants
- Solar Energy Equipment and Processes
- Thermo-economic Analysis of Energy Systems
- Thermo-Fluid Education
- Transportation
- Turbulent Flows
- Wind Turbines Aerodynamics and Control

Authors will have options to present their research work as presentation only, extended abstract (maximum of 4 pages), or full-length paper (5-10 pages). The conference proceedings will contain both peer-reviewed extended abstracts and papers, and will be distributed in a digital form, the ASTFE Digital Library. Authors will also have the option to submit their full conference papers to a technical journal of their choice after the conference. The full conference papers should have significant changes made before submitting to any journals. The same full conference papers cannot be submitted to any journal publications. Authors may share their original manuscripts with the public but must include a citation and a link to the published paper (conference paper or journal paper).

**SUBMIT YOUR PAPER ABSTRACT BY SEPTEMBER 17, 2022 TO:** <http://submission.astfe.org>

Please check <http://astfe.org/tfec2023/> regularly for conference updates or contact any member of the organizing committee for further inquiries.

### DEADLINES

- September 17, 2022  
Abstract Due
- September 27, 2022  
Notification of Abstract Accept / Decline
- October 21, 2022  
Draft Paper / Extended Abstract Due
- November 11, 2022  
Draft Paper / Extended Abstract Reviews Completed
- December 16, 2022  
Authors Notified of Paper / Abstract Status
- January 31, 2023  
Revised Manuscript Due
- January 31, 2023  
Presentations Only Abstracts Deadline / Final Paper / Extended Abstract Due

### ORGANIZING COMMITTEE

- Conference Chair:  
Dr. Samuel Graham, University of Maryland
- Conference Co-Chair:  
Dr. Nesrin Ozalp, Purdue University Northwest
- Conference Co-Chair:  
Vikram C. Patel, University of Maryland
- Technical Program Chair:  
Dr. Kevin R. Anderson, Cal State Poly
- Technical Program Co-chair:  
Dr. M. Reza Shari, Advanced Cooling Technologies, Inc.
- Technical Program Co-chair:  
Dr. Krishna Kota, New Mexico State University



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# Part 2



**Members in the five world organizations**

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

<b>Member †</b>	<b>ICHMT</b>	<b>AIHTC</b>	<b>ASTFE</b>	<b>EUROTHERM</b>	<b>AUTSE</b>
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					
<b>40</b>	<b>31</b>	<b>18</b>	<b>2</b>	<b>16</b>	<b>7</b>

† The meaning of “Member” is different for the five world 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](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 (2)

### 1. Report on the 12<sup>th</sup> Australasian Heat and Mass Transfer Conference (12AHMTC)

Chengwang Lei

#### 1. Report on the 12<sup>th</sup> Australasian Heat and Mass Transfer Conference (12AHMTC)



##### Chengwang Lei

*Chair of the 12AHMTC*

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[sydney.edu.au/engineering/about/our-people/academic-staff/chengwang-lei.html](https://sydney.edu.au/engineering/about/our-people/academic-staff/chengwang-lei.html)

The *Australasian Heat and Mass Transfer Conference* (AHMTC) is typically a bi-annual research forum in Australia and New Zealand organised under the auspices of the **Australasian Fluid and Thermal Engineering Society (AFTES)** for disseminating new knowledge to the Heat and Mass Transfer research community. This conference series covers both fundamental and applied topics in the broad areas of convection, conduction, radiation, turbulence, multi-phase flow, combustion, drying, heat exchangers, computational methods, experimental methods, and other significant thermal processes in environmental and industrial settings.

The 12th Australasian Heat and Mass Transfer Conference (12AHMTC, <https://12ahmtc-eng.sydney.edu.au/>) was initially planned for July 2021. Due to the COVID-19 pandemic and lockdown in Sydney, it was postponed to 2022. Thanks to the improved pandemic situation in Australia and globally, the 12AHMTC was successfully held in person on 30 June – 1 July 2022 at The University of Sydney, New South Wales. For many of the participants, the 12AHMTC was the first in-person conference for more than two years. The 12AHMTC attracted significant interest from researchers and research students. In total 80+ abstracts and 60+ full papers were received. Among them, 42 papers were accepted for presentation over the two-day conference. In addition, there were 4 keynote and invited lectures given by high-calibre researchers including

- **Prof Atsuki Komiya** (Tohoku University), *Possibility of Mass Diffusion Control: Effect of Pore Size of Separated Membrane*
- **Prof Gary Rosengarten** (RMIT University), *When Surfaces Matter: Using Nano-scaled Surface Features to Control Macro-scale Transport*
- **Prof Emilie Sauret** (Queensland University of Technology), *Hybrid Lattice Boltzmann Method for Viscoelastic Fluid Flow Instabilities and Elastic Turbulence*
- **Dr Nicholas Williamson** (The University of Sydney), *Turbulent Vertical Natural Convection Boundary Layers – Insights Gained from DNS up to  $Gr_d = 1.8 \times 10^8$*

The 12AHMTC was attended by over 50 participants. A significant number of the participants were research students. The conference presented two Best Student Presentation Awards, judged by an Award Committee. The winners of the Best Student Presentation Awards at the 12AHMTC are

- **Ms Sneha Murali**, Monash University
- **Mr Bihai Sun**, Monash University

The success of the 12AHMTC is a result of the combined efforts of the many involved. Primarily I wish to acknowledge the deep commitment from the Local Organising Committee members: Professors Steven Armfield and John Patterson, Associate Professor Michael Kirkpatrick, Dr Kapil Chauhan, Associate Professor Victoria Timchenko and Professor Guan Yeoh. I also gratefully acknowledge the participation by the keynote and invited speakers and thank them for their outstanding presentations, and further extend my thanks to all the other authors who presented their work, without whom we would not have the conference.

The next AHMTC conference (13AHMTC) will be hosted by Curtin University in 2025.



## Japan, Member of ICHMT, AIHTC, AUTSE (2)

### 1. Accelerating international collaboration with DX

Junichiro Shiomi

### 2. Report on 59th national heat transfer symposium of Japan (NHTSJ 2022)

Yoshinori Itaya and Hirofumi Hattori

#### 1. Accelerating international collaboration with DX



**Junichiro Shiomi**, Dept. of Mech. Eng., The University of Tokyo  
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The pandemic took a heavy toll on the world, forcing us to change the way we work, learn, and interact with others. It has been difficult time for the international academic community as well, as many of our scheduled events had to be cancelled or postponed. While there was disappointment and confusion, especially in the initial phase of the pandemic, it was encouraging to see that the academic societies immediately rose to the occasion and organized international conferences online, not only as an alternative to on-site but also to add values to the conferences with the help of digital transformation (DX). Such was the case with the international heat transfer community. Some of the online conferences I attended might have been difficult to achieve prior to DX. One example was “*International Colloquia on Thermal Innovations (InnoTherm)*” series (<http://meche.mit.edu/international-colloquia-thermal-innovations>) organized by the colleagues at MIT (chaired by Prof. Gang Chen) aiming to stimulate and highlight innovations and advances in thermal energy conversion, storage, transport, and utilization. I had a pleasure to moderate a couple of sessions and was thrilled to see hundreds of participants from around the world vividly discussing across different disciplines.

Learning the usefulness of DX to discuss new interdisciplinary topics, Prof. Chris Dames (UC Berkeley), Prof. Tengfei Luo (University of Notre Dame), Prof. Koji Tsuda (University of Tokyo), and I organized “*NSF-JST Joint Workshop on Thermal Transport, Materials Informatics and Quantum Computing*” (<https://aithermworkshop.nd.edu>) in March 2021. The workshop aimed to initiate conversations between the greater machine learning, materials informatics, quantum computing community and the thermal transport community to promote international collaboration initiatives. Over the past few decades, research in thermal transport has led to significant advancement in the understanding of fundamental physics and computational tools that can predict thermal properties with high fidelity. However, applying such established knowledge and tools to design new materials for relevant applications had been rather ad-hoc. With the recent prosperity of artificial intelligence (AI) and quantum computing, there is an opportunity to leverage them to further advance thermal transport fundamental science and maximize the ability to systematically develop thermal materials and processes with desirable performance. With this in mind, we invited speakers on four topics: data infrastructure; simulation-aided materials informatics and thermal transport; AI-driven experiments; and quantum computing. The dialogue between researchers within and between each topic was very productive. Constructive discussions were also held with other stakeholders such as governments and funding agencies. The workshop output several important action plans, including a computational round-robin study, thermal transport property database, and international autonomous experimentation, which initiated the on-going world-wide collaborations including researchers from Europe and China. Such a simultaneous multi-stakeholder dialogue would have been difficult without the DX.

Of course, online events have their drawbacks. Time zones have been a major issue, especially for international conferences. Many of us have given or heard a talk in the middle of the night fighting sleepiness. Recently, there have been hybrid conferences, where the on-site and online events are held on different days, but in such cases, the online portion is usually rather empty. Now that, in many places, the on-site events are restarting, we are re-recognizing how precious it is to meet and discuss in person. In fact, we had so much fun in the recent *National Heat Transfer Symposium of Japan* held on-site (reported on the next page)!

While I very much look forward to the resumption of international heat transfer conferences on-site, an important question may be “Are we going back to where we were before the pandemic?” or “Are there ways to improve on-site international conferences utilizing DX?” The world is now facing a sustainability crisis and there are growing expectations for academia to help solve it. Not to mention, the potential contribution from the field of heat transfer is significant, and the issues need to be tackled internationally. Such social demands have been always there, but the urgency is more than ever with critical timelines, which calls for efficient international collaboration rather than competition. That requires more in-depth discussion in the international conferences, but how do we

do it? One idea is a “flip conference”. Like the “flip class”, DX schemes could be used to provide participants with digital contents of presentation in advance so that they can spend more time for discussion on site. This can help the participants understand better each other’s work and facilitate actual collaboration. Perhaps now is a good timing to think about transforming international conferences?

## 2. Report on 59th national heat transfer symposium of Japan (NHTSJ 2022)

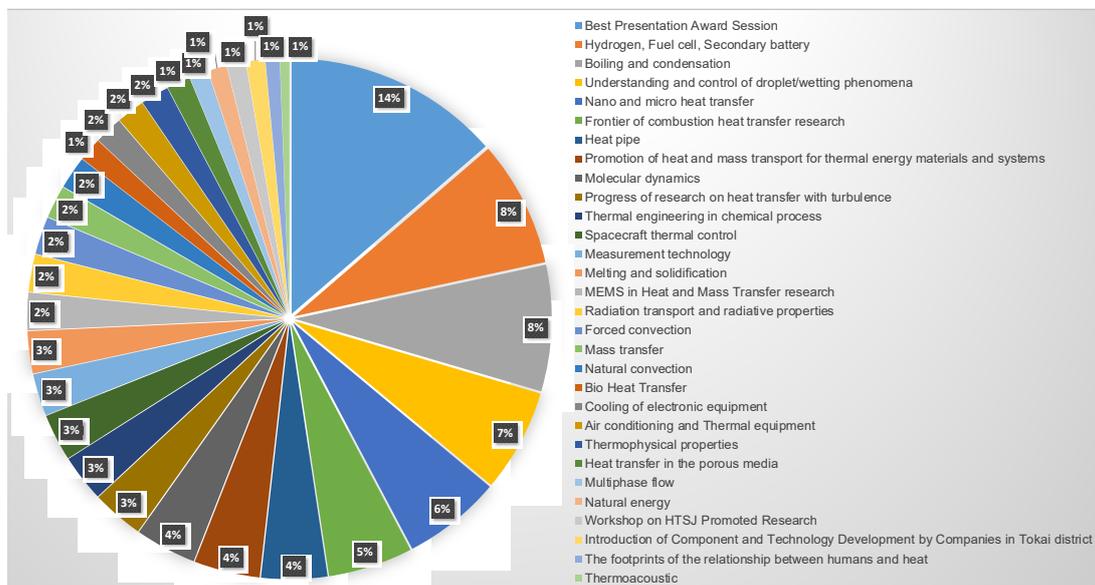


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NHTSJ 2022 ([https://htsj-conf.org/symp2022/index\\_e.html](https://htsj-conf.org/symp2022/index_e.html)) took place in face-to-face and on-line virtual ways during May 18 to 20, 2022 in Gifu (Tokai district).

Totally 338 papers were presented including 9 keynotes through 30 sessions in the symposium. The share of number of the presentation in each session is seen in **Fig. 2.1**. *The Best Presentation Award Session* is a poster session presented by young researchers and students, and 6 candidates were awarded. The awarded researches were 1) 3D analysis of heat transfer in human body core, 2) molecular structure and affinity at inorganic solid/polymer interface, 3) heat transfer of latent heat storage pellets for high temperature, 4) solid-solution photon upconversion crystal for improving solar energy utilization efficiency, 5) spin caloritronics by sensitive lock-in thermorefectance of thermochromic liquid crystal, and 6) visualization of heat transport in oscillating heat pipes by neutron radiography. The top 3 sessions in which there were the most presentations were “*hydrogen, fuel cell, secondary battery*”, “*boiling and condensation*” and “*understanding and control of droplet/wetting phenomena*”. The trends reflect recent needs to innovative R&D on greatly efficient energy conversion and conservation technologies for establishing carbon neutral system. Additionally, heat and mass transfer phenomena are faced to complicated systems including multiphase flow, phase change, catalytic and non-catalytic reactions, electrochemistry, electromagnetic, vibration, nano-scale dynamics etc. In the session “*workshop on HTSJ promoted research*”, the research activities of groups admitted in HTSJ were reported on the following topics in this year: 1) heat transfer using microsensors and/or devices, 2) heat and physical environment in bio-cells, 3) heat transfer for solar energy utilization and 4) turbulence heat transfer, combustion and pioneer of complex fluid for future energy system. Those researches are expected to be greatly promoted and progress under funding for an innovation of heat transfer in a near future. The session of “*introduction of component and technology development by companies in Tokai district*” opened under the organization by researcher/engineers in industrial sector. Tokai district is one of the largest industrial area in Japan, and several fields of industry, i.e. automobile, machinery, steel, chemical, petrochemical, energy, ceramics, aerospace etc. are concentrated and yield the greatest percentage of Japanese GDP. Four local companies introduced their technology on 1) low density silicon thermal interface material, 2) thermal design of printing products and electronic parts, 3) compact and light heat exchanger for vehicles and products working with low power, 4) application of IDCAE into thermal design. In this symposium, mutual exchange through earnest discussion were actively performed and could be closed successfully although face-to-face meeting had not been held for three years due to COVID-19 pandemic.



**Fig. 2.1** Sessions (total 338 presentations)

## Serbia, Member of ICHMT (2)

### The Society of Thermal Engineers of Serbia

Dissemination of the heat and mass transfer scientific research results through publications of the International Journal THERMAL SCIENCE (Open access Journal)

#### 1. Dissemination of the heat and mass transfer scientific research results through publications of the International Journal THERMAL SCIENCE



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The main objective of the Society of Thermal Engineers of Yugoslavia (founded in 1962, today **The Society of Thermal Engineers of Serbia** <https://www.drustvo-termicara.com/>) 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 through International Conferences and Journal. The realization of these tasks in the period 1968-1993 was performed by editing Journal TERMOTEHNIKA (in Serbian, since 1975) and the most important by initiating organization of the International Center for Heat and Mass Transfer 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 general secretary (1985-1993). The list of 47 international scientific events/meetings/ organized by ICHMT in that period and Proceedings can be found at <http://thermalscience.vinca.rs/pdfs/papers-2020/TSCI200628265S.pdf>.

Due to international sanctions against Yugoslavia since May 1992 (until 2001), and induced problems for the scientific research institutions, Prof Simeon Oka, based on long term international cooperation of the Laboratory for Thermal Engineering and Energy with a number of worlds’ reputed Institutes and Universities, had initiated and started since 1997 to edit international journal *Thermal Science* with scientific papers from relevant international community. Despite numerous difficulties and barriers, Editorial Board lead by Prof Simeon Oka, supported also by International Advisory Board (26 reputed scientists from Sweden, Denmark, Canada, Russia, Netherland, Estonia, Belarus, Germany, North Macedonia, USA, Japan, Italy, and United Kingdom), had succeeded to pass a long way, and create excellent Open Access International Scientific Journal with a brand name THERMAL SCIENCE.

Initial scope of the Journal in the areas: (a) fluid mechanics (primarily, turbulent flows), heat and mass transfer, combustion and chemical processes, (b) multiphase and multicomponent flows, (c) high temperature flows with chemical reactions, (d) processes in fluidized systems, (e) renewable energy sources, (f) energy efficiency and sustainable development and (g) thermal processes, taking place in conventional and modern technologies, was lately was lately widened on previously unknown systems - cooling of electronic devices, flows and heat transfer in micro canals, flows and heat transfer of nanofluids, the production of micro and nanofibers, and processes in the atmosphere related to the climate change. THERMAL SCIENCE in recent years, included new scientific areas in which the number of papers is constantly growing, and which have been initially opened in Supplements and Special Issues:

- Nanofluids, processes in them and their use in new technologies,
- Processes during the formation and production of nanofibers,
- Physical models of fluid flow and thermal processes by using fractal mathematics,

- Fractal mathematics and application of fractal methods in solving equations describing fluid flows and in thermal processes,
- Processes in the atmosphere and origins of the climate change.

Starting from 2009, when THERMAL SCIENCE received its first Impact Factor and was included on the Web of Science, the authors' interest in publishing papers in the journal has been growing rapidly from 80 to 500 per year (Table 1). According to the values of the Impact Factor, THERMAL SCIENCE is in the top 50% journals in its field. The most famous databases: Web of Science, SCOPUS, EBSCO, ProQuest, DOAJ, CNKI and COPERNICUS, announce data on papers published in THERMAL SCIENCE.

Table 1 – Number of published papers and Impact Factor of the journal THERMAL SCIENCE

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
Number of published	Regular Issues	4	4	4	5	5	5	6	6	6 (8)	6 (8)	6 (10)	6 (11)	6 (12)
	Papers	82	100	122	165	171	185	239	224	287	281	389	408	445
	Supplements	-	1	2	2	-	2	2	5	3	5	6	1	2
	Papers	-	25	23	51	-	56	68	159	91	153	219	41	56
	Total papers	82	125	145	216	171	241	307	383	378	434	608	449	501
Impact Factor	<b>0.407</b>	<b>0.706</b>	<b>0.779</b>	<b>0.838</b>	<b>0.962</b>	<b>1.222</b>	<b>0.939</b>	<b>1.093</b>	<b>1.431</b>	<b>1.541</b>	<b>1.574</b>	<b>1.625</b>	<b>1.971</b>	

Thermal Science published papers of the authors from Universities or Institutes from more than 70 countries. The share of published papers from different countries has been drastically changed since 2001. The Fig. 1 shows the share of regions and countries in the period from 2016 to 2019.

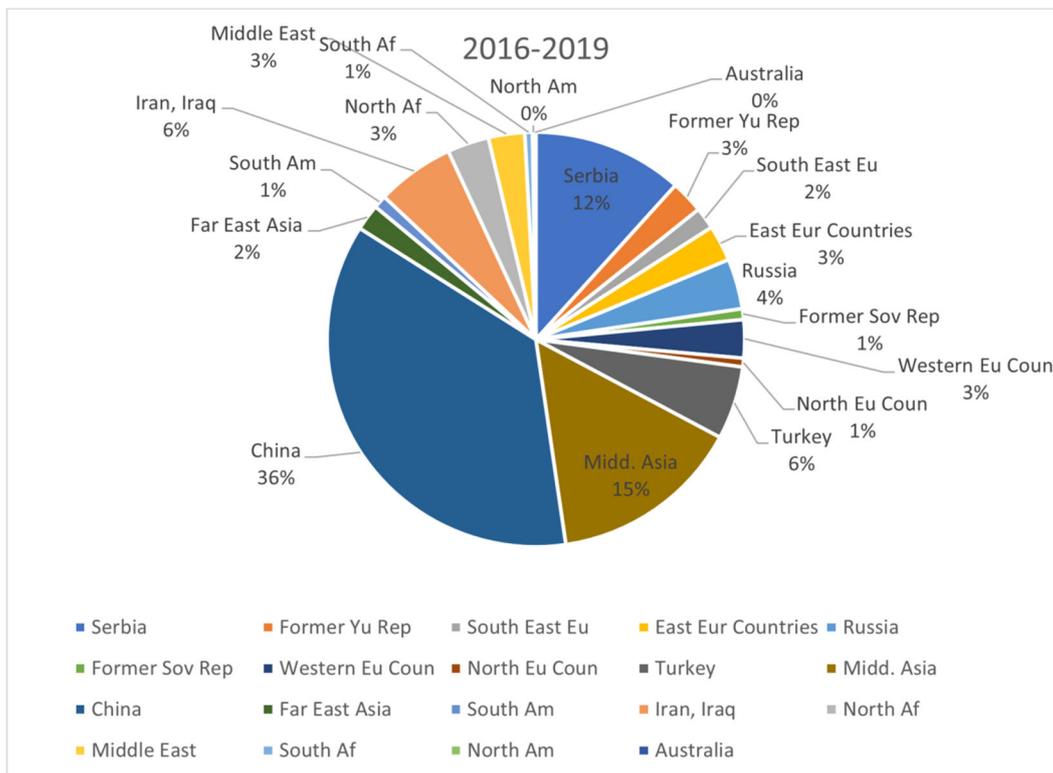


Fig. 1 Share of the papers from some large countries and Regions in the World Published by THERMAL SCIENCE in regular issues in the period 2016 – 2019

The Society of Thermal Engineers of Serbia as a non-profit organization by publishing Thermal Science as an OPEN ACCESS Journal enable researchers in the world to receive latest scientific information free of charge and authors to publish their papers only by compensating the cost of the “production” of the journal. Additional information about International Journal THERMAL SCIENCE could be found on web site: <http://thermalscience.vinca.rs>.

## South Korea, Member of ICHMT, AIHTC, AUTSE (2)

### 1. International Activities of Thermal Engineering Societies in Korea

Bong Jae Lee and Ji Hwan Jeong

### 2. Report on Thermal Engineering Conference (Spring 2022)

Hyunjin Lee and Bong Jae Lee

#### 1. International Activities of Thermal Engineering Societies in Korea



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Most Korean scientists and engineers in heat and mass transfer belong to the Thermal Engineering Division of the Korean Society of Mechanical Engineers (KSME), Division of Nuclear Thermal Hydraulics of the Korean Nuclear Society (KNS), Society of Air-conditioning and Refrigerating Engineers of Korea (SAREK). The following are the past and future international conferences at which the aforementioned societies take leadership roles.

#### **Internal Symposium on Oscillating & Pulsating Heat Pipe (ISOPHP), September 2019, KAIST, Korea**

- Symposium consisted of 4 keynote lectures, 7 oral sessions, and 1 poster session.
- There was a panel discussion titled “Status of PHP Applications in Industry” organized by Prof. J. Thome.

#### **13<sup>th</sup> International Energy Agency Heat Pump Conference (HPC2020), April 2021, Jeju, Korea**

- There were 3 plenary lectures, 36 keynote lectures, 36 oral sessions, and 4 poster tracks.

#### **27<sup>th</sup> IIR International Congress of Refrigeration (ICR2027), August 2027, Seoul, Korea**

- Conference chair: Prof. Yong Tae Kang (SAREK President)
- Congress program will provide plenary sessions, short courses, technical sessions, panel and forum sessions, technical seminars for industrial sponsors, technical excursions, and general tours for accompanying persons as well as IIR meetings, reception, banquet, etc. during 5 days.

#### **9<sup>th</sup> Korea-China Workshop on Nuclear Reactor Thermal-Hydraulics (WORTH-9), May, 2019, Chongqing, China**

- Co-organizing of the conference
- Conference co-chair: Dr. Chul Hwa Song (Korea Atomic Energy Research Institute)
- There were 2 plenary lectures, 8 keynote lectures, 15 oral sessions, 6 post sessions and 100 participants.

#### **11<sup>th</sup> Symposium Japan-Korea Symposium on Nuclear Thermal Hydraulics and Safety (NTHAS-11), November 2018, Busan, Korea**

- Biennial international joint workshop between Korean and Japanese nuclear energy societies
- Conference chair: Dr. Young Seok Bang (Korea Institute of Nuclear Safety)
- There were 4 plenary lectures, 6 keynote lectures, 24 oral sessions, and 200 participants.

#### **12<sup>th</sup> Symposium Japan-Korea Symposium on Nuclear Thermal Hydraulics and Safety (NTHAS-12), October 30-November 2, 2022, Miyazaki, Japan**

- Co-organizing of the conference
- Conference co-chair: Prof. Jae Jun Jeong (Pusan National University)
- Conference program will provide plenary sessions, keynote lectures and technical sessions.

**2. Report on Thermal Engineering Conference (Spring 2022)**

April 20 – 22, 2022 in Gyeongju-si



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The Thermal & Fluid Engineering Division of KSME was established in 1980, and the first Thermal & Fluid Engineering conference was held in 1993. In 1998, the Thermal Engineering Division (TED) was separated, and the Thermal Engineering Conference has been independently held ever since. This year, KSME TED was able to organize a fully in-person conference from April 20–22 in Gyeongju-si, Korea. There were 535 attendees and 292 presentations (205 Oral and 87 Poster) about all areas of heat and mass transfer (see Fig. 2 below).

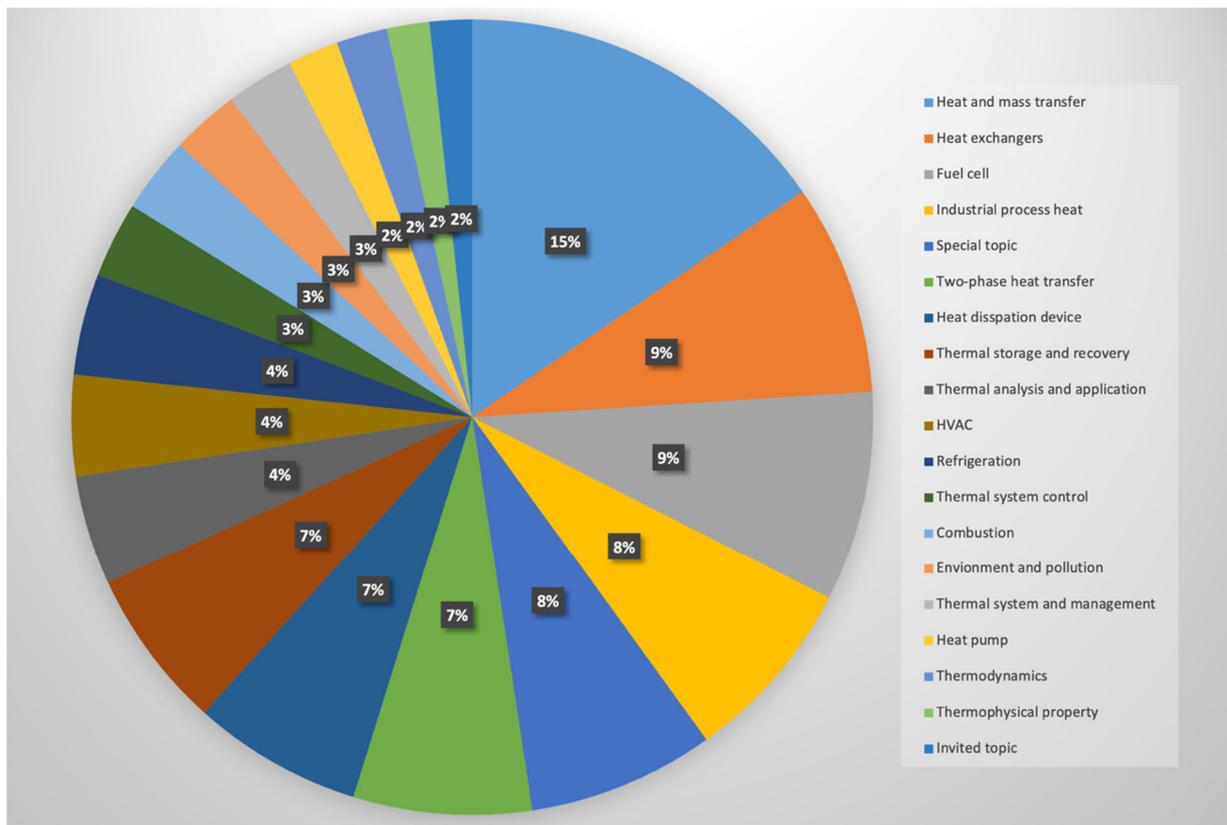


Fig. 2 Sessions (total 292 presentations)

## Turkey, Member of ICHMT (2)

### 1. Collaboration with Sectoral Institutions: ASHRAE Turkish Chapter, TOBB HVAC-R, MMO and TTMD

Atilla Biyikoglu

### 2. Report on 23<sup>rd</sup> Congress of Thermal Sciences and Technology (ULIBTK'21)

Atilla Biyikoglu

#### 1. Collaboration with Sectoral Institutions: ASHRAE Turkish Chapter, TOBB HVAC-R, MMO, TTMD and ISIB



**Atilla Biyikoglu**, Dept. of Mech. Eng., The University of Gazi, 2020-2022 President of ASHRAE Turkish Chapter [abiyik@gazi.edu.tr](mailto:abiyik@gazi.edu.tr) <https://ashrae.org.tr/>

The 22nd Congress on Thermal Science and Technology (ULIBTK'19) was organized in cooperation with Kocaeli University (<http://www.kocaeli.edu.tr>) and ASHRAE Turkish Chapter (<http://ashrae.org.tr>) under the roof of Turkish Society of Thermal Science and Technology (TIBTD) (<http://tibtd.org.tr/>). Within the scope of the announcement of the Congress, scientific associations and research centers operating in Turkey and abroad were contacted. During the congress, negotiations are underway to organize certified free trainings for students and young engineers in cooperation with Autodesk Turkey, TTMD, Chamber of Mechanical Engineers (MMO), the CYPE Turkey and NUMESYS.

In order to promote the congress, TIBTD and ULIBTK-19 promotional activities were carried out through one-on-one meetings with companies at TESKON-2019 Congress and SODEX fair held in İzmir between 17-20 April 2019. The 22nd Congress of Thermal Sciences and Technology which was held on 2019 at Kocaeli University was decided to be organized internationally in collaboration with ASHRAE Turkish Chapter (<https://ashrae.org.tr/>). The Joint Congress was introduced by the worldwide member network of ASHRAE community which has more than 56 thousands of members from 132 different nations over 15 different Regions. The 2018 – 2019 ASHRAE president, Sheila Hayter (<https://www.nrel.gov/research/sheila-hayter.html>) had been invited to the Joint Conference as Distinguished Lecturer and the invitation was confirmed by herself. It was also organized Student Branch Meetings over RAL (<https://ashraeral.org/>) and European Regions (<https://ashrae.eu/>) of ASHRAE connecting international students with Turkish ones. Training programmes were planned for both students and young engineers.

The goal of the society through this term, in the direction of president's theme, is to be more active both in national and international scientific arena and to develop cooperation and collaboration with other industrial, educational and scientific communities, and to increase the number and quality in scientific activities. In this respect, principally, a collaboration protocol had been prepared with Turkish Society of HVAC and Sanitary Engineers (TTMD). A similar protocol had been signed and get into action with ASHRAE Turkish Chapter. During the congresses, it was planned to provide certified trainings (Carrier HAP, REVIT, etc.) for students and young engineers. These trainings were especially planned for ASHRAE student members and Young Engineer in ASHRAE (YEA) members as well as undergraduate and graduate students who will participate in both domestic and foreign. A presentation was made by the president of the society for the congress promotion at the meeting of Climate Council of Turkey's Union of Chambers and Commodity Exchanges (TOBB-HVAC-R) (<https://www.tobb.org.tr>) which was held on December 13th, 2018 at the Union's Building in Istanbul. Approximately 35 senior representatives from industrial firms, institutions and organizations representing the air conditioning sector were attended to the meeting. Hereby it is aimed to strengthen the university – industry association and get support as a sponsor.

The goal of the society through this term, in the direction of president's theme, is to be more active both in national and international scientific arena and to develop cooperation and collaboration with other industrial, educational and scientific communities, and to increase the number and quality in scientific activities. Within this scope, our searches for cooperation as an association are ongoing.

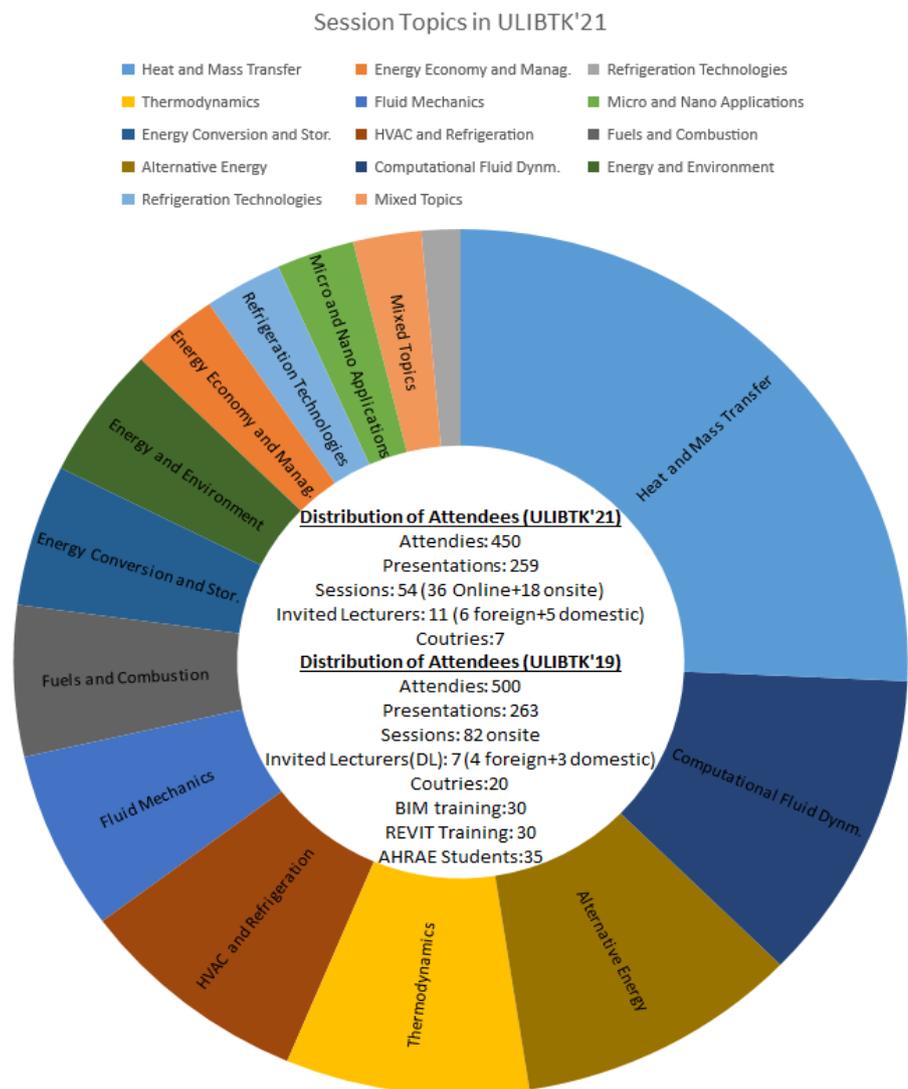
2. Report on 22<sup>nd</sup> and 23<sup>rd</sup> Congresses of Thermal Sciences and Technology (ULIBTK'19 and ULIBTK'21)



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ULIBTK'21 (<http://ulibtk2021.gantep.edu.tr/>) took place in face-to-face and on-line virtual ways during September 8 to 10, 2021 in Gaziantep University (Southeastern district). Totally 284 papers were presented including 11 keynotes through 54 sessions in the symposium. The distribution of attendees and topics are seen in **Fig. 2.1**. Session topics (no. of presentations, percentage) in ULIBTK are listed as 1-Heat and Mass Transfer (73, %26) 2- Energy Economy and Manag. (9, %3) 3- Refrigeration Technologies (4, %1) 4- Thermodynamics (25, %9) 5- Fluid Mechanics (19, %7) 6- Micro and Nano Applications (8, %3) 7- Energy Conversion and Storage (15, %5) 8- HVAC and Refrigeration (24, %8) 9- Fuels and Combustion (16, %6) 10- Alternative Energy (29, %10) 11- Computational Fluid Dynamics (33, %12) 12- Energy and Environment (14, %5) 13- Refrigeration Technologies (8, %3) 14- Mixed Topics (7, %2). Turkish Thermal Science and Technology (TIBTD) Congress; It has been held at a different university every two years for 44 years since 1977. The congress was held in Gaziantep between 8- 10 September 2021 with international participation this year. The use of the name of the congress as "Thermal Science and Technology Congress (ULIBTK 2021)" was preferred to preserve the institutional memory. Thermal Science and Technology Congresses have been successfully held at the national level in the past years. 22. ULIBTK 2019 was held internationally under the responsibility of Kocaeli University. 23rd ULIBTK 2021, on the other hand, was organized as international and hybrid (onsite/online) in cooperation with Gaziantep University and Turkish Thermal Science and Technology Association.

The main purpose of ULIBTK 2021 is to bring together academic scientists and researchers from all over the world to share the latest research results of scientists on innovative and advanced engineering applications in heat science and technology. In this context, ULIBTK 2021 has been a platform for researchers to share information on heat science and technology. The congress held covers the formation, transformation and use of energy and its environmental effects. In addition, green and sustainable energy systems, improving energy efficiency, low-cost and environmentally friendly thermal systems are also discussed. Within the scope of the congress, new and original research and development studies on thermal systems and applications of alternative energy technologies are also included.



**Fig. 2.1** Session Topics Wheel and Conference Statistics