



27th Internation Conference on Heating, Cooling and Air-Conditioning

Vodice, Croatia, The Imperial Park Hotel Hotel
26 - 28 March 2025



Programme

Organized by:



FSB



University of Maribor



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HRVATSKA KOMORA
INŽENJERA STROJARSTVA



HORKT



HVDiT
Hrvatsko udruženje za dizalice topline
Croatian Heat Pump Association

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PROGRAMME

Wednesday, 26 March 2025

8:30 - 10:00

- > gathering and registration of participants
- > furnishing and arranging exhibition spaces of co-organizers

10:00 - 10:30 KLIMA-FORUM 2025 & INTER-KLIMA 2025 Conference

- > introductory word from the Organizer
- > welcome and introductory speeches:

prof. emer. Tonko ĆURKO, Croatian Refrigeration Air-Conditioning and Heat Pumps Association, Zagreb, Croatia

10:30 - 11:30 KLIMA-FORUM 2025

1st Thematic Section: GLOBALLY and LOCALLY

- > presentations and one on one interviews:

Višnja GRGASOVIĆ, dipl. ing., Ministry of Environmental Protection and Green Transition, Zagreb, Croatia - A NEW EUROPEAN AND NATIONAL LEGISLATION IN THE FIELD OF SUBSTANCES THAT DAMAGE THE OZONE LAYER AND FLUORINATED GREENHOUSE GASES

prof. dr. sc. Marino GROZDEK, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - THE FUTURE IS NATURAL! (one on one interview)

Jarosław STALEWSKI, A-Gas Nederland B.V., Eindhoven, Netherlands - CLOSED LOOP SYSTEM FOR USED SYNTHETIC REFRIGERANTS

Hrvoje KRAPANIĆ, dipl. ing., Daikin Hrvatska d.o.o., Zagreb, Croatia - NATURAL REFRIGERANTS STRIKE BACK (one on one interview)

Luka ĆAPIN, mag. ing. industr., Samsung Electronics Adriatic, Branch Office Zagreb, Zagreb, Croatia - THE FUTURE OF HVAC: INTEGRATION OF SMART SYSTEMS FOR MAXIMUM EFFICIENCY

- > discussion

11:30 - 12:00 coffee break

12:00 - 14:00 INTER-KLIMA 2025 Conference

FRAN BOŠNJAKOVIĆ DAY - 1st Part

- > invited lecture:

prof. dr. Andrej KITANOVSKI, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia - COOLING AND HEAT PUMP TECHNOLOGIES - OVERVIEW AND PERSPECTIVES

- > presentations:

Siniša PRODANOVIĆ, Öko-Recherche GmbH, Frankfurt am Main, Germany, **Jan GROEZINGER** and **Jakob HOFFMANN**, Guidehouse, Berlin, Germany, **Felix HEYDEL** and **Maria PUSHKAREVA**, Öko Recherche GmbH, Frankfurt am Main, Germany - LATEST DEVELOPMENTS IN NATIONAL COOLING STRATEGIES (NCS) AND NATIONAL COOLING PLANS (NCAP) IN THE MENA REGION AND TÜRKİYE

doc. dr. sc. Luka BOBAN and **doc. dr. sc. Saša MUDRINIĆ**, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia, **prof. dr. Andrej KITANOVSKI** and **doc. dr. Katja KLINAR**, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia and **prof. dr. sc. Vladimir SOLDO**, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - EVALUATION OF WORKING FLUIDS FOR HIGH-TEMPERATURE REVERSED BRAYTON CYCLE HEAT PUMP

Urška NOVOSEL, **doc. dr. Brigita FERČEC** and **prof. dr. Jurij AVSEC**, University of Maribor, Faculty for Energy Technology, Krško, Slovenia - THE HISTORICAL AND FUTURE DEVELOPMENT OF HEAT PUMPS IN THE PROCESS OF IMPLEMENTING THE GREEN TRANSITION

PROGRAMME

Wednesday, 26 March 2025

doc. dr. sc. Gordan LJEŠIĆ, University of Mostar, Faculty of Mechanical Engineering, Computing and Electrical Engineering, Mostar, Bosnia and Herzegovina and **prof. dr. sc. Vladimir SOLDO**, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - THE INFLUENCE OF INTERNAL HEAT EXCHANGER ON THE EFFICIENCY OF THE REFRIGERATION PROCESS WITH PROPANE AS A REFRIGERANT

Juraj ČUKELJ, mag. ing. mech. and **prof. dr. sc. Marino GROZDEK**, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia, **doc. dr. sc. Tomislav VELIKI**, University North, Varaždin, Croatia and **doc. dr. sc. Vlasta ZANKI**, University of Zagreb, Faculty of Geotechnical Engineering, Varaždin, Croatia - ASSESSING THE DELIVERED ENERGY IN BUILDINGS

> discussion

*Remark: Presentations are held solely in English.***14:00 - 14:15 coffee break****14:15 - 15:15 KLIMA-FORUM 2025****2nd Thematic Section: SYSTEMS and REGULATION**

> presentations:

Dr.-Ing. Maciej DANIELAK, Kampmann GmbH & Co. KG, Lingen (Ems), Germany - COMFORTABLE CLIMATE: FACTORS, MEASUREMENTS AND DESIGN

Marko PRPIĆ, mag. ing. mech., Flexy Sustavi d.o.o., Zagreb, Croatia - LENNOX EVIO - REVOLUTIONARY ROOF-TOP UNIT OF THE NEW GENERATION

Milan FISTONIĆ, dipl. ing., PTMG d.o.o., Gornji Stupnik, Croatia - PE-HD PREINSULATED PIPING SYSTEMS FOR TRANSPORT OF COOLING MEDIA

Tomislav ĆUTIĆ, mag. ing. mech., Wolf GmbH, Mainburg, Germany and Aleksandar JOVANOSKI, Pro-klima d.o.o., Samobor, Croatia - RETROFIT OF VENTILATION UNITS (AIR CONDITIONING UNITS) - INCREASING ENERGY EFFICIENCY IN CENTRAL AIR CONDITIONING PROCESSES

> discussion

15:15 lunch**19:30 - 20:30 dinner****20:30 social programme**

> Pub Quiz

> DJ

by **FRIGO-VE** &

PROGRAMME

Thursday, 27 March 2025

09:00 - 11:00 INTER-KLIMA 2025 Conference

FRAN BOŠNJAKOVIĆ DAY - 2nd Part

> presentations:

Prof. Dr. Ahmet CAN, Istanbul Rumeli University, Faculty of Engineering and Natural Sciences, Istanbul, Türkiye,
Prof. Dr. Ertan BUYRUK, Sivas State University, Mechanical Engineering Department, Sivas, Türkiye, **Dr. Emre TO-RUN**, Sivas Demirağ Organized Industrial Zone Directorate, Sivas, Türkiye and **Assist. Prof. Dr. Mustafa CANER**, Sivas State University, Mechanical Engineering Department, Sivas, Türkiye - USE OF PHASE CHANGE MATERIALS IN BUILDINGS

Vasilis CHRISTODOULIDES, Dr.-Ing. **Paris A. FOKAIDES** and **Nicholas AFXENTIOU**, Frederick University, Nicosia, Cyprus - UTILIZING DIGITAL TWIN TECHNOLOGY FOR IMPROVED PREDICTIVE MODELLING OF ENERGY CONSUMPTION IN SMART BUILDINGS

dr. sc. Marko MIMICA, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - ENERGY SYSTEM MODELLING FOR GREEN DEVELOPMENT OF AFRICA

Luka SIMIĆ, mag. ing. mech., izv. prof. dr. sc. Tomislav PUKŠEC, Josip MIŠKIĆ, mag. ing. mech., Vid ANDRAŠIĆ and Lovro PUČEK, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - ANALYSIS OF IMPACT OF BUILDING REFURBISHMENT STRATEGIES ON THE TRANSITION TO LOW-TEMPERATURE DISTRICT HEATING

Goran STUNJEK, mag. ing. mech., Roko MUCIĆ, Andrija GLAVAŠ and Mario MIHETEC, dipl. ing., University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia, **Dominik RAŠIĆ, mag. ing. mech.**, Cirkularni energetski resursi d.o.o., Zagreb, Croatia, **Andrej MAJDIŠ, dipl. ing.** and **Mario MARJANOVIĆ, dipl. ing.**, HEP Toplinarstvo d.o.o., Zagreb, Croatia, **Gordana MIKULČIĆ KRNJAJA**, City of Velika Gorica, Velika Gorica, Croatia, **dr. sc. Marko MIMICA, dr. sc. Nikola MATAK, dr. sc. Stanislav BOLDYRYEV and izv. prof. dr. sc. Goran KRAJAČIĆ**, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - OPTIMIZING HEAT PUMP INTEGRATION FOR THE DECARBONIZATION OF DISTRICT HEATING IN VELIKA GORICA - META BUILD

Juraj KUZLE, mag. ing. mech., prof. dr. sc. Damir DOVIĆ and dr. sc. Ivan HORVAT, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - COST-OPTIMAL ANALYSIS OF THE REFERENCE MULTI-APARTMENT nZEB/ZEB BUILDING IN CROATIA

> discussion

Remark: Presentations are held solely in English.

11:00 - 11:30 coffee break

11:30 - 13:00 KLIMA-FORUM 2025

3rd Thematic Section: PROJECTS and SOLUTIONS

> presentations:

prof. dr. sc. Vladimir SOLDO, Katarina ŽUNIĆ and doc. dr. sc. Luka BOBAN, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - LABORATORY SET-UP AT THE FACULTY OF MECHANICAL ENGINEERING AND NAVAL ARCHITECTURE OF THE UNIVERSITY OF ZAGREB FOR HEAT PUMPS TESTING IN REAL SURROUNDINGS

Klaus ACHENBACH, Condair GmbH, Garching, Germany - RELEVANCE OF ADIABATIC HUMIDIFICATION SYSTEMS IN TODAY'S BUILDING TECHNOLOGY

PROGRAMME

Thursday, 27 March 2025

Dimitrije LEVACIĆ, bacc. ing. mech., Carrier Kaltetechnik Austria GmbH, Zagreb Main Branch Office, Zagreb, Croatia - NATURAL REFRIGERANT R 744 (CO₂) AND ITS APPLICATIONS IN INDUSTRIAL COOLING AND HEAT PUMPS

Stjepan MIKLEUŠEVIĆ, Viessmann d.o.o., Zagreb, Croatia - VIESSMANN CLIMATE SOLUTIONS - POWER PLAY AS ONE TEAM

Samo ŠMID, univ. dipl. inž. str., BELIMO AG, Technical Office, Kranj, Slovenia - BELIMO ZoneEaseTM - A SYSTEM FOR A SIMPLE ZONE INTEGRATION

Vedran VUKASOVIĆ, Atrea d.o.o., Rijeka, Croatia - KITCHEN VENTILATION CEILING ATREA TPV - PERFECT FUNCTIONALITY WITH ATTRACTIVE DESIGN

> discussion

13:00 - 13:15 coffee break

13:15 - 15:15 INTER-KLIMA 2025 Conference

ENERGY EFFICIENCY AND RENEWABLES - 1st Part

> presentations:

Ana Daria BOKAN, dr. sc. Marko MIMICA and izv. prof. dr. sc. Goran KRAJAČIĆ, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - INSTITUTIONAL TRANSFORMATION IN HIGHER EDUCATION: ADVANCING R&I EXCELLENCE FOR THE GREEN AND DIGITAL TRANSITION

dr. sc. Dušan STRUŠNIK, Energetika Ljubljana d.o.o., TE-TOL Unit, Ljubljana, Slovenia and **prof. dr. Jurij AVSEC**, University of Maribor, Faculty for Energy Technology, Krško, Slovenia - MEASUREMENT OF DEVIATIONS IN THE CHARACTERISTIC POINTS OF THE TURBINE CONDENSATE PUMP AFTER TEN YEARS OPERATION

Danijel ZADRAVEC, mag. ing. mech. and izv. prof. dr. sc. Nenad FERDELJI University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - EXERGY ANALYSIS OF BATCH DISTILLATION PROCESS

Nikola BOROVNIK, mag. ing. mech. doc. dr. sc. Saša MUDRINIĆ and izv. prof. dr. sc. Nenad FERDELJI, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - MULTISCALE MODELING OF HEAT TRANSFER INSIDE THE VACUUM CHAMBER FOR TRANSFORMER DRYING PROCESS

dr. sc. Alen CUKROV, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia, **Dr. Yohei SATO**, Paul Scherrer Institute, Laboratory for Simulation and Modelling, PSI Center for Scientific Computing, Theory and Data, Villigen, Switzerland, **prof. dr. sc. Ivanka BORAS**, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia, **Dr. Bojan NIČENO**, Paul Scherrer Institute, Laboratory for Simulation and Modelling, PSI Center for Scientific Computing, Theory and Data, Villigen, Switzerland and **prof. emer. Antun GALOVIĆ**, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - THE APPLICABILITY OF THE QUASI-STEADY SOLUTION TO STEFAN PROBLEM IN DETERMINATION OF INTERFACE POSITION FOR VARIOUS WALL SUPERHEATS

Andre BILOGLAV, Marko RILJIN, univ. bacc. ing. mech., Iva SLATINA, mag. ing. mech. and prof. dr. sc.

Vladimir SOLDO, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - POTENTIAL OF SEWAGE WATER HEAT PUMPS IN A SUSTAINABLE DISTRICT HEATING SYSTEM

> discussion

Remark: Presentations are held solely in English.

15:15 lunch

19:30 - 20:30 dinner

20:30 social programme

- > Karaoke Show
- > DJ

PROGRAMME

Friday, 28 March 2025

9:00 - 10:30 KLIMA-FORUM 2025

4th Thematic Section: **EFFICIENCY and COMFORT**

> presentations:

Toni LACIĆ, mag. ing. mech., Rittal d.o.o., Zagreb, Croatia - CHALLENGES IN IT COOLING - DEVELOPMENT AND INVESTMENTS

Luka CERAJ, mag. ing. mech., Flexy Sustavi d.o.o., Zagreb, Croatia - SODECA - STAIRWAY PRESSURIZATION SYSTEMS ACCORDING TO EN 12 101-13

prof. dr. sc. Zlatko JANKOSKI, University of Split, University Department for Professional Studies, Department of Mechanical Engineering, Split, Croatia - AIR AS A ENERGY CARRIER - SYSTEMS IN EDUCATION FUNCTION

prof. dr. sc. Antonio PETOŠIĆ, doc. dr. sc. Mia SUHANEK, Zvonko LELAS and Andrija PERŠUN, University of Zagreb, Faculty of Electrical Engineering and Computing, Zagreb, Croatia - PRACTICAL CONSIDERATIONS FOR MODELLING NOISE LEVELS FROM HVAC SYSTEMS

> discussion

10:30 - 11:00 coffee break

11:00 - 13:00 INTER-KLIMA 2025 Conference

ENERGY EFFICIENCY AND RENEWABLES - 2nd Part

> presentations:

Maša MILANOVIĆ-LITRE, mag. ing. mech., izv. prof. dr. sc. Marko KATIĆ, dr. sc. Martina ODELJAN and prof. emer. Antun GALOVIĆ, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - DETERMINATION OF TEMPERATURE INDUCED X-RAY SOURCE SHIFTS IN A CT SCANNER

prof. dr. sc. Antonio PETOŠIĆ, doc. dr. sc. Mia SUHANEK, Andrija PERŠUN and Zvonko LELAS, University of Zagreb, Faculty of Electrical Engineering and Computing, Zagreb, Croatia - PRACTICAL CONSIDERATIONS FOR MODELLING NOISE LEVELS FROM HVAC SYSTEMS

doc. dr. sc. Saša MUDRINIĆ, Nikola BOROVNIK, mag. ing. mech. and doc. dr. sc. Luka BOBAN, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - ENERGY AND EXERGY ANALYSIS OF A DIRECT-EXPANSION SOLAR-ASSISTED HEAT PUMP SYSTEM

Stjepan HERCEG, mag. ing. mech., izv. prof. dr. sc. Nikola VLADIMIR and prof. dr. sc. Vladimir SOLDO, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - THE USE OF WASTE HEAT FOR COOLING PURPOSES ONBOARD SHIPS

dr. sc. Ivan HORVAT, prof. dr. sc. Damir DOVIĆ and Petar FILIPOVIĆ, mag. ing. mech., University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - ENHANCING THERMAL IMAGING INTERPRETATION: AN INTERACTIVE TOOL FOR UNDERSTANDING APPARENT AND ACTUAL TEMPERATURE

Petar FILIPOVIĆ, mag. ing. mech., prof. dr. sc. Damir DOVIĆ and dr. sc. Ivan HORVAT, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia - EVALUATION OF THERMAL CHARACTERISTICS OF AIR HANDLING UNIT MODEL BOX

> discussion

Remark: Presentations are held solely in English.

13:00 a final word from the Organizer

13:15 lunch