



Dipartimento di  
Ingegneria

# 9th AIGE-IIETA International Conference and 19th AIGE Conference



**June 3 - 5, 2024 Caserta, Italy**

## ***PROGRAM AT A GLANCE***

### ***Monday, June 3***

13:00	<b>Registration</b>	
14:00-14:30	<b>Opening Ceremony</b>	
14:30-15:30	<b>AULA "A1"</b> <b>Keynote Lecture</b> <i>Inverse Problems in Thermal Energy Processes and Systems</i> <b>Yogesh Jaluria</b> , Rutgers University, NJ, USA Chair: Oronzio Manca	
15:30-15:45	<b>Coffee Break</b>	
15:45-17:00	<b>AULA "A1" Session A:</b>	<b>AULA "A2" Session B:</b>
17:45	<b>Guided visit of the Reggia di Caserta</b>	

### ***Tuesday, June 4***

9:30-12:30	<b>AULA "A1"</b> <b>Round table on Renewable Energy Communities</b> Chair: Guglielmina Mutani	
12:30-13:20	<b>Lunch with Poster Session A</b>	
13:20-14:00	<b>Innovation and Research Project Session</b>	
14:00-16:00	<b>AULA "A1" Session C</b>	<b>AULA "A2" Session D</b>
16:00-16:15	<b>Coffee Break</b>	
16:15-17:00	<b>AULA "A1"</b> <b>Open Meeting AIGE – Assemblea Soci AIGE in Italian</b>	
20:00-22:00	<b>Social Dinner</b>	

### ***Wednesday, June 5***

9:00-11:30	<b>AULA "A1"</b> <b>Round table on Energy Storage</b> <b>Keynote Lecture</b> <i>Sustainability through an International Heat Market,</i> <b>Kamel Hooman</b> , TUDelft, The Netherlands Chair: Sergio Nardini	
11:30-11:45	<b>Coffee Break</b>	
11:45-12:30	<b>AULA "A1" Session E1:</b>	<b>AULA "A2" Session F1:</b>
12:35-13:00	<b>AULA "A1" Award Ceremony</b>	
13:00-14:00	<b>Lunch with Poster Session B</b>	
14:00-15:30	<b>AULA "A1" Session E2</b>	<b>AULA "A2" Session F2</b>
15:30-16:00	<b>AULA "A1"</b> <b>Closing Ceremony</b>	

# Program

9th AIGE-IIETA International Conference and 19th AIGE Conference

June 3 - 5, 2024 Caserta, Italy

Venue: Centro Conferenze - Rettorato di Caserta, Università degli Studi della Campania "Luigi Vanvitelli" Viale Ellittico 31, 81100 Caserta

## Monday, June 3

13:00 Registration at Conference Center

AULA "A1"

14:00-14:30 Opening Ceremony

14:30-15:30 Keynote Lecture

Inverse Problems in Thermal Energy Processes and Systems

Yogesh Jaluria, Rutgers University, NJ, USA

Chair: Oronzio Manca

15:30-15:45 Coffee Break

15:45-17:00

Aula "A1" - Session A: Energy modelling

AIGE-IIETA-24-153 Conventional building energy performance and actual energy costs: a critical reflection, by Gatti C., Lodi C., Muscio A.

AIGE-IIETA-24-172 On the onset of convection cells within buildings' vertical double-layer walls, by Lazzari S., Celli M., Barletta A., Brandão P. V., Ghedini E.

AIGE-IIETA-24-167 Modelling hydrogen refuelling for light-duty passenger vehicles, by Atif Mahmood M., Massarotti N., Vanoli L.

AIGE-IIETA-24-145 Urban Building Energy Modeling: A Comparative Study of Process-driven and Data-driven Models, by Montazeri A., Usta Y., Mutani G.

AIGE-IIETA-24-216 Numerical Study on Forced Convection Gas Slip Flow in Kelvin Cell Metal Foam, presented by Sabet S., Barisik M., Buonomo B., Manca O.

Aula "A2" - Session B: Energy analysis and Renewable energies

AIGE-IIETA-24-183 Assessing the integration of biomass gasification and high-power charging stations for battery electric buses: a case study in the city of Carpi, by Morselli N., Covezzi G., Puglia M., Pedrazzi S., Allesina G.

AIGE-IIETA-24-177 Enclosed barn conditioning system: a comparison between traditional and indirect evaporative cooling, by Puglia M., Mirandola S., Cossu M., Morselli N., Allesina G., Pedrazzi S., Muscio A., Tartarini P.

AIGE-IIETA-24-180 Effect of Phase Change Material Addition on the Properties of Clay Bricks, by Ibe I. I., Di Leo S., Cosmi C., D'Angola A.

AIGE-IIETA-24-218 Reducing CO2 emissions from a coal fired power plant by using a Molten Carbonate Fuel Cell, by Milewski J., Szczeńniak A., Martsinchyk A.

AIGE-IIETA-24-160 The supply and Use framework can be exploited for comparing technologies serving similar needs: the case of Italian heavy-duty road sector, by Vinciguerra A., Rinaldi L., Rocco M. V., Colombo E.

17:45 The guided visit of the Reggia di Caserta starts (for preregistered delegates).

## **Tuesday, June 4**

9:30-12:30 AULA "A1"

Round table on Renewable Energy Communities

Chair: Guglielmina Mutani

9:30 Renewable Energy Communities (CER) as a driving force for territorial development: the value of self-management, Sergio Olivero, Energy Center, Politecnico di Torino

9:45 Purpose of Renewable Energy Communities, Maurizio Sasso, Università degli Studi del Sannio

10:00 How energy communities can play an important role in the University's energy planning, Paolo Tartarini, Università degli Studi di Modena e Reggio Emilia

10:15 Energy communities in ports and city-port hinterlands: a new paradigm for a green harbour, Corrado Schenone, Università di Genova

10:30 Renewable Energy Communities: tools and opportunities for a sustainable transition, Fabio Armanasco, Chief Executive Officer Kairoscope

10:45 The ENEA tools to support Energy Communities, Gilda Massa, Lab CROSS, ENEA

11:00 Territorial Planning of Renewable Energy Communities, Guglielmina Mutani, Politecnico di Torino

11:15 Energy communities and positive energy districts: towards the decarbonization of civil sector, Maurizio Cellura, Università di Palermo

11:30 Discussion

12:30-13:20 Lunch with Poster Session A

Poster Session A

- AIGE-IIETA-24-138 Energy Consumption in the EU district heating sector. A decomposition analysis, by Bianco V., Cascetta F., Nardini S., Mauro A.
- AIGE-IIETA-24-159 Experimental Assessment of Environmental and Economic Impacts of Dampers' and Filters' Faults in a Typical Air-Handling Unit in Southern Italy, by Rosato A., Mercuri R., Romanucci F., El Youssef M.
- AIGE-IIETA-24-146 Life Cycle Assessment of implementation of an innovative solar thermal technology in Italian ceramic industry, by Buonomo B., Manca O., Nardini S., Plomitallo R. E., Gobio Thomas L., Stojceska V.
- AIGE-IIETA-24-151 Thermal and Technological Integration of Processes in Metallurgy, by Mihailov E., Ivanova M., Choshnova D., Asenova M., Mitov I, Petrova I.
- AIGE-IIETA-24-162 Mathematical Model For Sizing And Optimizing A Test Bench For Electric Motors of Electric Vehicles, by Lustrissimi E., Bianco B., Caravaggi S., Rosato A.
- AIGE-IIETA-24-163 Maritime Energy Efficiency: Emerging Trends and Key Performance Indicators, by Battaglia V., Angrisani M., Ferretti M., Risitano M.
- AIGE-IIETA-24-169 Influence of Italian Climatic Conditions on Performance of a 3D Printed Building Second-Skin Façade with 20% Gyroid Filling: Simulation Assessment, by Tufano L., Scorpio M., Andreozzi B., Carola A., Donisi M., Rosato A., Ciampi G.
- AIGE-IIETA-24-187 Sizing of thermal storage under the eco-exergetic operation optimization of distributed energy systems: application to a real case study in Italy, by Bianco N., Di Somma M. L., Graditi G., Mongibello L.
- AIGE-IIETA-24-188 Experimental validation of a tool for the economic operation optimization of a Hybrid Energy System, by Bianco N., Di Somma M. L., Graditi G., Mongibello L.
- AIGE-IIETA-24-201 Examining numbers to explore a portable cooling system that integrates a thermal storage unit with a phase change for the purpose of preserving food, by Cirillo L., Greco A., Masselli C.
- AIGE-IIETA-24-208 CO.M.E.O.: Academic methodologies and research transfer to the industrial coating processes: the case study of the CO.M.E.O. project, presented by Iossa R.
- AIGE-IIETA-24-210 "Smart Powertrain" Project: A Methodology for Optimal Sizing of Zero CO2 Emission Powertrain, by Gimelli A., Giardiello G., Iossa R., Maccario A., Tufano F.
- AIGE-IIETA-24-214 "Optimizing Efficiency: Innovative Heat Exchanger for Enhanced Performance of Hybrid Concentrated Photovoltaic Panels" by Gimelli A., Giardiello G., Iossa R. 1, Maccario A., Tufano F.

AIGE-IIETA-24-175 Sustainable Energy Paths: Harnessing Residual Biomass potential in Southern Italy, Battaglia V., Di Fraia S., Vanoli L.

13:20-14:00

Aula "A1" - Innovation and Research Project Session

AIGE-IIETA-24-220 In the Green Future, presented by Dinacci R.

AIGE-IIETA-24-221 SHERLOCK: Supporting the Energy Transition of the building stock, presented by Bianco V.

AIGE-IIETA-24-205 VISIONS: Evolutionary Design of Innovative heat transfer devices, presented by Iasiello M.

14:00-16:00

Aula "A1" - Session C: Thermofluid dynamics and heat transfer for energy systems

AIGE-IIETA-24-170 Modelling of daytime radiative cooling integrated with heat pump systems, by Forte D., Morciano M., Chiavazzo E., Asinari P., Fasano M.

AIGE-IIETA-24-154 Assessment of the downward longwave radiation through experimental and numerical investigations, by Arcidiacono Aneli G., Tina S., G. M., Gagliano A.

AIGE-IIETA-24-134 Shape uncertainty analysis of laminar forced convection in a round microchannel with viscous dissipation, by Barletta A., Celli M., Sphaier L. A., Brandão P. V., Lazzari S., Ghedini E.

AIGE-IIETA-24-135 Laminar forced convection characteristics in a round microchannel with shape uncertainty: effect of wall slip, by Sphaier L. A., Barletta A., Celli M., Brandão P. V., Lazzari S., Ghedini E.

AIGE-IIETA-24-181 Numerical Analysis of Mixed Convection in an Open Cavity with Hybrid Nanofluid, PCM and Metal Foam, by Kaya H., Buonomo B., Sabet S., Manca O.

AIGE-IIETA-24-212 Evaluation of Thermo-physical and Rheological Properties of Ethylene Glycol/Water Mixture Modified with Metal Oxide for Heat Transfer Applications, Jebali M., Colangelo G., Starace G., Gómez-Merino A. I.

AIGE-IIETA-24-178 Turbulent flow and heat transfer characteristics of resonant impinging jets. State of the Art Review, Matar M, El Hassan M., Bukharin N., Sakout A., Hammoud A., Assoum H. H.

AIGE-IIETA-24-179 CFD study of prism-shaped vortex generators' impact within a coaxial heat exchanger, by El Hassan M., Bukharin N., Alotaibi N., Matar M, Assoum H. H.

Aula “A2” – Session D: Climate change mitigation and economic impact

- AIGE-IIETA-24-202 Critical raw materials hidden in the products life cycle: the case study of a power supply unit, by Longo S., Cellura M., Affranchi A., Guarino F., Rincione R.
- AIGE-IIETA-24-215 Guidelines toward an expansive exergy based fiscal system that encourages energy transition and societal wellness, by Trancossi M., Pascoa J., Catellani T.
- AIGE-IIETA-24-217 Toward an integrated forcing, exergetic and constructal analysis of climate change and definition of the possible mitigation measures, by Trancossi M., Pascoa J.
- AIGE-IIETA-24-184 Mitigating high internal temperatures using affordable solutions, by Ramezani A., Manzan M.
- AIGE-IIETA-24-209 Degradation of Hazardous Pollutants From Aquatic Media Through Photo-Assisted Advanced Oxidation Process By Using Photocatalyst, Alp E.
- AIGE-IIETA-24-165 Hybrid Solid-State Hydrogen and Battery Energy Storage as an Energy Transition Strategy in Commercial Buildings: A Techno-Economic Investigation, Jahanbin A., Berardi U.
- AIGE-IIETA-24-131 Integrating Energy Efficiency and Occupancy Control in Shared Public Buildings: A Data-Driven Approach, by Franco A., Crisostomi E., Sodini A., Tili M., Mugnani A.
- 16:00-16:15 Coffee Break
- 16:15-17:00 AULA “A1”
- Open Meeting AIGE – Assemblea Soci AIGE in Italian
- 20:00-22:00 Social Dinner at Antica Hostaria Massa, via Giuseppe Mazzini 55, Caserta

**Wednesday, June 5**

- 9:00-11:30 AULA “A1”
- Round table on Energy Storage
- Chairman: Sergio Nardini
- 9:00 Sustainability through an International Heat Market, Keynote Lecture, Kamel Hooman, TUDelft, The Netherlands
- 9:45 The role of energy storage in grid efficiency and energy transition, Federico Vitali, FAAM, FIB S.p.A.
- 10:00 Research trends in energy storage within the NEST project, Vittorio Verda, Politecnico di Torino

10:15 Relevance of thermal energy storage technologies in the EU building energy flexibility context, Andrea Frazzica, CNR-Istituto Di Tecnologie Avanzate Per L'Energia "Nicola Giordano"

10:30 Hydrogen and fuel cells applications for fixed and mobile applications carried out at the Mediterranea University of Reggio Calabria, Matilde Pietrafesa, Università Mediterranea di Reggio Calabria

10:45 Data driven optimization of materials for energy storage applications, Eliodoro Chiavazzo, Politecnico di Torino

11:00 Discussion

11:30-11:45 Coffee Break

11:45-12:30

Aula "A1" - Session E1: Energy storage

AIGE-IIETA-24-203 Groundwater thermal storage coupled with third generation district heating, by Verda V., Capone M.

AIGE-IIETA-24-190 Investigation on sorption composite materials for long-duration sorption thermochemical energy storage, by Brancato V., Fotia A., Mastronardo E., Calabrese L., La Rosa D., Costa F., Palomba V., Frazzica A.

AIGE-IIETA-24-171 The thermal behavior of a PCM enhanced radiant floor system and of a water storage tank: a comparative analysis, by Cesari S., Bottarelli M.

Aula A2 - Session F1: Heat transfer in energy systems

AIGE-IIETA-24-173 Efficient Two-Phase Cooling System Design for Electric Vehicle Battery Thermal Management, by Cattani L., Malavasi M., Bozzoli F., Sacchelli F., Sciancalepore C.

AIGE-IIETA-24-206 Distribution of the Magnetocaloric Material on the Matrix of a Rotary Magnetic Refrigerator Prototype, Effects of Geometric Parameters in the Case of a Parallel Plates Matrix, Bocanegra J. A., Scarpa F., Tagliafico L. A.

AIGE-IIETA-24-155 Development of a Renewable Energy Forecasting Strategy Based on Numerical Weather Prediction for the Cold Ironing System at the Port of Ancona (Italy), by Colarossi D., D'Alessandro V., Giannicchio L., Falone M., Ricci R.

12:35-13:00 AULA "A1" Award Ceremony

13:00-14:00 Lunch with Poster Session B



## Poster Session B

- AIGE-IIETA-24-139 Electrification of Heat Demand: an Estimation of the Impact on the Future Italian Energy System, by Pozzi M., Muliere G., Fattori F., Motta M., Mazzarella L.
- AIGE-IIETA-24-142 Energy communities and requalification. Towards energy transition and self-sufficiency: a “challenge” for the Olympic Village, by Zagaria M., Fiorini C., Mancini F., Clemente C.
- AIGE-IIETA-24-161 Influence of building electric demands on performance of a vertical axis micro wind turbine in Italy: energy, environmental and economic numerical assessment, by Rosato A., Perrotta A., Maffei L.
- AIGE-IIETA-24-133 IBIS ECO PLATFORM: a Decision Support System for monitoring & managing the energy performance and comfort of existing buildings, by Cardinale N., Pagliuca A., Selicati V., Caggiano R., Vennera A., Siciliano C., Renda A., De Buono M.
- AIGE-IIETA-24-144 Thermal Energy Storage characterization of environmental-friendly cementitious composites made with PCM Recycled WOOD Aggregates, by Salhab H., Zanjani M., Nardini S., Sam M., Rocha Ferreira S., Caggiano A.
- AIGE-IIETA-24-147 A 3D model of a photovoltaic thermal panel with the heat transfer fluid tube embedded in a layer of phase change material and metal foam, by Buonomo B., Golia M. R., Manca O., Nardini S.
- AIGE-IIETA-24-156 Analyses of the effectiveness of power optimizers in heterogeneous PV plants, by Aneli S., Tina G. M., Gagliano A.
- AIGE-IIETA-24-191 Transient Analysis of a Flat-Plate Direct Absorption Solar Collector with Nanofluids, by Buonomo B., Hernández López L., Manca O., Sarli G.
- AIGE-IIETA-24-157 The exploitation of multiple simultaneous caloric effects in a solid-state active regenerator, by Cirillo L., Gargiulo S., Greco A., Masselli C., Orabona V.
- AIGE-IIETA-24-200 Cooling Efficiency: Modeling Caloric Effect for Residential Heat Pump Systems, by Cirillo L., Greco A., Masselli C.
- AIGE-IIETA-24-204 Design and construction of a test rig for the qualification of a rotating magnetic refrigerator prototype, by Misale L. D., Bocanegra J. A., Petrarulo D., Marchitto A., Scarpa F., Tagliafico L. A.
- AIGE-IIETA-24-185 The acoustic characteristics of green metamaterials, Iannace G.

14:00-15:30

## Aula A1 - Session E2: Heat transfer and energy systems

- AIGE-IIETA-24-186 The role of the objective function in heat transfer genetic algorithm optimization of foam-based heat sinks, by Andreozzi A., Bianco N., Iasiello M., Mauro G. M.

- AIGE-IIETA-24-149 Utilizing Phase Change Materials for Sun-Powered Refrigerators: Experimental Validation in Outdoor Environments, by Cilenti C., Petruzziello F., Grilletto A., Aprea C., Maiorino A.
- AIGE-IIETA-24-148 Sun-Powered Refrigerator: Design, Testing, and Limitations, by Petruzziello F., Cilenti C., Grilletto A., Aprea C., Maiorino A.
- AIGE-IIETA-24-150 Experimental Investigation of the Impacts of Laminar and Turbulent Impinging Jet Flows on the Convective Heat Transfer in a Metal Plate, by Khoso A. Q., Fareedi A. R., Khan H., Buonomo B., Manca O., Nardini S., Molina J. M., Maiorano L. P.
- AIGE-IIETA-24-182 Investigating Thermal control methods for Lithium-based batteries utilizing metal foams saturated with air, by Arumugam A., Buonomo, B., Mahabaleshwar U. S., Manca O.
- AIGE-IIETA-24-222 Experimental Investigation of Phase Change Material (PCM) Thermal Energy Storages with and without Metal Foam at Different Temperatures, by Fareedi A. R., Khoso A. Q., Khan H., Buonomo B., Manca O., Nardini S.

Aula A2 - Session F2: Energy analysis and security

- AIGE-IIETA-24-189 Energy recovering in dc railway systems, by Delle Femine A., Gallo D., Iodice C., Landi C., Luiso M.
- AIGE-IIETA-24-193 Aggregated Load Modelling Approach to study Impact of Heat Pumps Harmonic Distortions on the Low Voltage Distribution Network, by Ishaq M., Langella R.
- AIGE-IIETA-24-213 Effects of climatic conditions on performance of innovative prefabricated movable buildings for smart/co-working in small villages of southern Italy, by Ciervo A., Masullo M., Boucherit S., Maffei L., Rosato A.
- AIGE-IIETA-24-164 Climatic Adaptability and Energy Efficiency in European Container Houses, by Bianco V., Carotenuto A., Cascetta F., Laudiero D. M., Mauro A.
- AIGE-IIETA-24-176 Waste heat recovery technologies on optimized CHP-BESS plant: a performance comparison between organic Rankine cycle and H<sub>2</sub>O-NH<sub>3</sub> absorption plant, by Iossa R., Gimelli A., Karimi A., Muccillo M.

15:30-16:00 AULA "A1"  
Closing Ceremony