

FINAL PROGRAM

"Alternative Energy Sources, Materials & Technologies (AESMT'23)", Sofia, Bulgaria

MONDAY (May 15, 2023):

1. Sightseeing of Sofia, Bulgaria: 14:00 - 18:00 h (on your own).

2. Registration and Welcome party: 19:00 - 21:00 h (venue in the hotel "Dom na uchenia"/ Hotel of Bulgarian Academy of Sciences, BAS - Address: 50 "Shipchenski prohod" blvd, 1113 Sofia): <http://www.domnaucheniya.com>.

TUESDAY (May 16, 2023):

1. Registration (Large hall, hotel BAS): 8:00 - 8:25 h

2. Plenary sessions (Large hall, hotel BAS):

2.1. **Opening:** 8:25 - 8:30 h.

2.2. **Plenary session 1:** 8:30 - 10:00 h (**Chair: Aleksandar Georgiev**)

8:30 - 9:00 h; Aleksandar Georgiev (Sofia, Bulgaria): G. Karaca-Dolgun, A. G. Georgiev, A. Keçebas, E. C. Dolgun. Theoretical investigation of the heating and cooling of a detached house with a hybrid system (**VIDEO**).

9:00 - 9:30 h; Bin Zhao (Hefei, China): Bin Zhao, Chengfeng Xu, Mingke Hu, Qingdong Xuan, Gang Pei. Self-adaptive integration of photothermal and radiative cooling for continuous energy harvesting from the sun and outer space.

9:30 - 10:00 h; André Thess (Stuttgart, Germany): André Thess. The German Carnot-Battery Initiative (**VIDEO**).

2.3. **Coffee break:** 10:00 - 10:30 h (in hotel BAS);

2.4. **Plenary session 2:** 10:30 - 12:30 h (**Chair: Aleksandar Georgiev**)

10:30 - 11:00 h; Daniel Cotfas (Brasov, Romania): D. T. Cotfas, P. A. Cotfas, A. Enesca. Enhancing the performance of the solar thermoelectric generator in low and medium concentrated solar light.

11:00 - 11:30 h; Yong Hao (Beijing, China): Yong Hao, Bin Wang. Complementary Solar-Natural Gas Conversion for Distributed Energy Supply (**VIDEO**).

11:30 - 12:00 h; Bin Xu (Hefei, China): Bin Xu, Xing-ni Chen, Gang Pei. Parameter optimization analysis and performance deterioration prediction of thermal insulation coating with radiation characteristics.

12:00 - 12:30 h; Mingke Hu (Singapore, Singapore): Mingke Hu, Poh Seng Lee. Radiative Sky Cooling: A Solution Against Global Warming (**VIDEO**).

3. Poster session 1 (Large hall, hotel BAS): 12:30 - 13:00 h (**Chair: Daniel Cotfas**)

Dimitar Kolev (Sofia, Bulgaria): D. N. Kolev. Use of feedstock waste to generate heat and power through gasification.

Petru Cotfas (Brasov, Romania): P. A. Cotfas, D. T. Cotfas, A. Enesca, B. Y. León Ávila. Studying the PV-TEG Multi-Layer Hybrid Systems in Concentrated Light.

Mohamed Issa (Bucharest, Romania): Mohamed Belaid Issa, Loretta Batali. Behavior of geothermal structures – literature review.

4. Lunch: 13:00 - 14:00 h (on your own).

5. Afternoon session 1 (Large hall): 14:00 - 16:20 h; Phase Change Materials (PCM) Applications, Geothermal Energy Applications, Low-Carbon Technologies (**Chair: Petru Cotfas**)

14:00 - 14:20 h; Weixin Liu (Hefei, China): Weixin Liu, Jingyu Cao, Gang Pei. Experimental study on the performance of an energy storage and temperature control system based on controllable separate heat pipe (**VIDEO**).

14:20 - 14:40 h; Mikhail Sheremet (Tomsk, Russia). N. S. Bondareva, M. A. Sheremet. Numerical simulation of heat transfer performance in an enclosure filled with a metal foam and nano-enhanced phase change material.

14:40 - 15:00 h; Yali Liu (Kunming, China): Yali Liu, Ming Li, Ying Zhang, Yunfeng Wang, Runsheng Tang. Shape-stable glycine water-based phase change material by modified expanded graphite for cold energy storage (**VIDEO**).

15:00 - 15:20 h; Silvia Cesari (Ferrara, Italy): E. Baccega, M. Bottarelli, S. Cesari, G. Emmi. Radiant floor enhanced with two PCMs for space heating and cooling: A large-scale experimental investigation.

15:20 - 15:40 h; Peng Pei (Guiyang, China): F. Deng, P. Pei, L. Wang, Y. Ren. Study on design and calculation method of borehole heat exchangers based on seasonal patterns of groundwater (**VIDEO**).

15:40 - 16:00 h; Marjan Delipetrev (Stip, Macedonia): Marjan Delipetrev, Gorgi Dimov, Blagica Doneva, Maja Lazarova. Potential for construction of a geothermal power plant in the Republic of North Macedonia.

16:00 - 16:20 h; Vitor Miguel Ribeiro (Porto, Portugal): Rui Gonçalves, Vitor Miguel Ribeiro. Convolutional attention with causal padding: Classifying PM2.5 concentration levels in the city of Beijing (**VIDEO**).

6. Coffee break: 16:20 - 16:50 h (in hotel BAS)

7. Afternoon session 2 (Large hall): 16:50 - 19:10 h; Energy Efficiency (**Chair: Bin Zhao**)

16:50 - 17:10 h; G. Karaca-Dolgun (Mugla, Turkey): A. Keçebas, A. G. Georgiev, G. Karaca-Dolgun. Environmental impact assessment of additively manufactured plate heat exchangers: A novel method (**VIDEO**).

17:10 - 17:30 h; Dimitar N. Kolev (Sofia, Bulgaria): D. N. Kolev. Increasing the energy efficiency of combustion processes using contact economizer systems and finned tube heat exchanger.

17:30 - 17:50 h; Bianfeng Yang (Kunming, China): Bianfeng Yang, Cong Wang, Xu Ji, Junneng Nie, Guanchao Lv, Yinxu Chen. Experimental study of multifunctional dehumidification-evaporative refrigeration system with dehumidification heat exchanger (**VIDEO**).

17:50 - 18:10 h; Carlos A. García Vázquez (Brasov, Romania): C. A. García Vázquez, D. T. Cotfas, A. I. González Santos, P. A. Cotfas, B. Y. León Ávila. Minimization of the energy consumed by an air handling unit through proper tuning of PID controllers and an economic model predictive control strategy.

18:10 - 18:30 h; Guanchao Lv (Kunming, China): Guanchao Lv, Xu Ji, Bianfeng Yang, Haiyang Xu, Yingxu Chen. Multi-mode evaporative cooling air conditioning system with internal cooling desiccant bed dehumidification (VIDEO).

18:30 - 18:50 h; Sultan Ybray (Astana, Kazakhstan): Bayandy Dikhanbaev, Arystan Dikhanbaev, Marat Koshumbayev, Almagul Mergalimova, Sultan Ybray, Aleksandar Georgiev. On the issue of decarbonization of waste gases from boilers of power plants (VIDEO).

18:50 - 19:10 h; Bachirou Guene Lougou (Harbin, China): Danni Ma, Bachirou Guene Lougou, Yong Shuai. Modeling and Performance Optimization of High Thermal Conductive Porous media Packed Bed Reactors for Medium-High Temperature Thermochemical Energy Storage (VIDEO).

8. Official dinner: 19:30 - 22:30 h (in restaurant BAS)

WEDNESDAY (May 17, 2023):

1. Morning session 1 (Large hall): 8:30 - 10:30 h; Solar and Hybrid Thermal Systems (Chair: Mikhail Sheremet)

8:30 - 8:50 h; Barbara Król (Cracow, Poland): Barbara Król. Analysis of the system operation: solar collector-heat storage-active thermal insulation (VIDEO).

8:50 - 9:10 h; Agris Auce (Riga, Latvia): A. Auce, A. Rucins, A. Jermuss, I. Auce, I. A. Horns, A. Pundurs, N. Reips. Solar and heat pump hybrid heated greenhouse in Latvia: energy storage and CO₂ reduction.

9:10 - 9:30 h; Tianxiang Hu (Hefei, China): Tianxiang Hu, Han Zhang, Haoyv Si, Gang Pei. Thermal performance analysis of eccentric double-selective-coated parabolic trough receivers with flat upper surface (VIDEO).

9:30 - 9:50 h; Giuseppe Emmi (Ferrara, Italy): G. Emmi, S. Cesari, E. Baccega, E. Mainardi, M. Bottarelli. An application of multi-source heat pump system.

9:50 - 10:10 h; Yingxu Chen (Kunming, China): Yingxu Chena, Xu Ji, Guanchao Lv, Yicong Jia, Bianfeng Yang, Jingyang Han. Study on the influence of structural parameters on the desalination performance of spray-evaporating solar still (VIDEO).

10:10 - 10:30 h; Ioannis Keroglou (Chania, Greece): I. Keroglou, T. Tsoutsos. Sustainable siting areas for solar desalination plants in Crete, Greece (VIDEO).

2. Coffee break: 10:30 - 11:00 h (in hotel BAS)

3. Morning session 2 (Large hall): 11:00 - 13:00 h; Energy Materials Science (Chair: Silvia Cesari)

11:00 - 11:20 h; Yuan Yang (Kunming, China): Yuan Yang, Xu Ji, Le Zhang, Yue Yang, Shengjie Wei. Study on adsorption characteristics of dye wastewater by surface activator modified activated carbon (VIDEO).

11:20 - 11:40 h; Mengqi Wang (Kunming, China): Mengqi Wang, Xu Ji, Sixia Yang, Xirong Yue, Bianfeng Yang, Yingxu Chen. Microbial demineralized fuel cell based on ion exchange membrane modification (VIDEO).

11:40 - 12:00 h; Ángel Berenguer (Alicante, Spain): J. Chávez-Caiza, J. Fernández-Catalá, M. Navlani-García, A. Berenguer-Murcia, D. Cazorla-Amorós. Particle size effects in Cu_xO-doped TiO₂ materials for CO₂ photoreduction in a thin film flow reactor (VIDEO).

12:00 - 12:20 h; Samuel Mompó (Alicante, Spain): S. Calabuig-Mompó, E. Morallón, D. Cazorla-Amorós. Design of an electrochemical synthesis method for graphene oxide buckypapers (VIDEO).

12:20 - 12:40 h; Marek Baraniak (Poznan, Poland): R. Plowens, M. Baraniak, K. Lota, J. Baraniak, M. Bajsert, G. Lota. Carbon materials used as additives to active mass of semi-traction lead-acid batteries (VIDEO).

12:40 - 13:00 h; Marek Baraniak (Poznan, Poland): Marek Baraniak S. Walkowiak, M. Baraniak, M. Wachsmann, G. Lota. Effect of absorptive glass mat soaking method on electrical properties of VRLA batteries (VIDEO).

4. Lunch: 13:00 - 14:00 h (on your own).

5. Poster session 2 (https://aesmt.lima-city.de/Poster_session'23.html): 14:00 - 15:00 h
(Chair: Bin Xu)

Gady Golan (Ariel, Israel): A. Brusov, M. Azoulay, G. Golan. The effect of pulsed weak magnetic field on the recovery and recrystallization in pure aluminum.

Yong Zhang (Nottingham, UK): Yong Zhang, Mingke Hu, Ziwei Chen, Yuehong Su, Saffa Riffat. Modelling analysis of a novel tubular modular reactor for solar-driven thermochemical energy storage system.

Ziwei Chen (Nottingham, UK): Yong Zhang, Ziwei Chen, Yanan Zhang, Yuehong Su, Saffa Riffat. Parameter Control in Synthesis of Vermiculite-based Composite Materials for Thermochemical Adsorption Heat Storage.

Jingyu Cao (Changsha, China): Wanfang Zhao, Jiaming Song, Jinqing Peng, Jingyu Cao, Rongxin Yin, Zhengyi Luo, Bin Zou. Evaluation and Control of Global Temperature Adjustment Strategy for Fan-coil Air Conditioning System Based on Model Prediction.

Mirela Dragan (Ilfov, Romania): M. Dragan, N. Vitan, R. R. Piticescu. Effect of the synthesis route on the structure of $\text{La}_{1-x}\text{Sr}_x\text{CoO}_3$.

Aizhana Nugymanova (Almaty, Kazakhstan): A. S. Askarova, A. G. Georgiev, S. A. Bolegenova, V. Yu. Maximov, S. A. Bolegenova, A. O. Nugymanova, Adilbayev N. A. Staged supply of fuel and air to the combustion chamber to reduce emissions of harmful substances.

Kamar Aljundi (Lisbon, Portugal): K. Aljundi, A. Figueiredo, A. Vieira, J. Lapa, R. Cardoso. Geothermal energy system applications: from basic performance standard to optimized parameters.

Jingyong Cai (Shanghai, China): Jingyong Cai, Chu Weng, Tao Zhang, Zhengrong Shi. Comparative analysis on the dynamic operation performance of PV/T-PEMWE cogeneration system under different connection modes.

Sh Ospanova (Almaty, Kazakhstan): A. S. Askarova, S. A. Bolegenova, Sh. S. Ospanova, S.A.Bolegenova, D. Yerbosynov, N. Ungarova. Direct numerical simulation of single-hole nonisothermal liquid jet injection.

Jasmina Skerlic (Kosovska Mitrovica, Serbia): J. Skerlic, D. Nikolic, J. Radulovic, A. Miškovic. Maximizing performances of a solar domestic hot water system through optimum position of the solar collector in Serbian households.

Tao Zhang (Shanghai, China): M. Q. Peng, T. Zhang. Geometry optimization of a solar micro-channel PV/T (MC-PV/T) evaporator based on regional differentiation in China.

Chengzhi Lang (Beijing, China): Chengzhi Lang, Chengyun Xin, Tuo Zhou, Zhikang Yang, Tairan Fu. Numerical investigation on the flue gas side comprehensive performance of integrally-molded spiral finned tubes with in-line arrangement.

Yuhang Zhang (Beijing, China): Yuhang Zhang, Yang Wang, Yusong Wu, Chengyun Xin, Tairan Fu. Analysis of Coupled Heat Transfer and Thermal Conductivity of Fiber Reinforced Silica Aerogel Composite at High Temperatures.

Biao Li (Harbin, China): V. S Olawoore, C. Lei, B. Li, Y. Shuai. A coupled WRF-PV model to investigate the local thermal environmental impacts of widespread photovoltaic plants deployment.

Hossein Javadi (València, Spain): Javier F. Urchueguia, Borja Badenes, Miguel Angel Mateo, Bruno Armengot, Hossein Javadia. New trilobular geometry based on advanced materials for enhanced heat transfer in shallow geothermal applications.

Meruyert Beketayeva (Almaty, Kazakhstan): Aliya Askarova, Saltanat Bolegenova, Aleksandar Georgiev, Meruyert Beketayeva, Symbat Bolegenova, Valeriy Maximov, N. Adilbayev. Selection of the optimal kinetic scheme for the formation of nitrogenous substances in the simulation of low-quality coal combustion in the furnace chamber of a real heat-power facility.

Ioan Tamasag (Suceava, Romania): I. Tamasag, T. L. Severin, D. Amarandei, I. Be?liu Bancescu, D. Cerlinca. The influence of materials in contact, tool geometry, cutting regime and cutting environment on surface roughness when machining hard materials at high speeds.

Dias Umyshev (Almaty, Kazakhstan): Kibarin A.A., Umyshev D.R., Petukhov Y.V., Osipov E.V., Korobkov M.S., Sabanshiyeva S.S., Khodanova T.V. Analysis of liquid air energy storage systems under conditions of uneven thermal and electrical loads.

Zaiguo Fu (Shanghai, China): Zaiguo Fu1, Mingxing Xue, Zhixiong Shao, Qunzhi Zhu. Performance evaluation of a novel vacuum tube PV/T system with inserted PV and heat pipe.

Yerzhan Belyayev (Almaty, Kazakhstan): A. Seitov, A. Toleukhanov, Ye. Belyayev, A. Kheiri, O. Botella, M. Feidt. Numerical Simulation of Cascade Solar Thermal Energy Storage Efficiency using Phase Change Materials.

Qinghua Lyu (Lisa) (Wuhan, China): Wanjiang Bai, Qinghua Lyu, Zhuoyi Ling, Zhenxing Ming, Xinfang Zhao, Hongyan Shi, Hui Lyu, Saffa Riffat. A control system for daily cumulative light in photovoltaic agriculture based on multiple light sources.

He Zhao (Kunming, China): He Zhao, Xiaoqiao Huang, Yonghang Tai. A solar irradiance prediction method based on TimesNet model.

Shaozhen Xu (Kunming, China): Shaozhen Xu, Xiaoqiao Huang, Yonghang Tai. A solar irradiance forecasting method based on LSTM-Transformer hybrid model.

Liqun Shao (Kunming, China): L. Q. Shao, Q. Li1, S. Gong, W. F. Gao. Optimization of green building based on digital twin and simulation.

Shuai Gong (Kunming, China): S. Gong, Q. Li, L. Q. Shao, W. F. Gao. Preparation and performance of low-temperature phase change thermal storage materials for solar air collectors.

Vineeta Vasudevan Nair (Kerala, India): Vineeta Vasudevan Nair, Alex P James. Quantum Hybrid Echo State Networks for efficient energy systems.

6. Afternoon session 1 (Large hall): 15:00 - 17:00 h; Solar Photovoltaic Systems, Solar Radiation Measurement and Sun-tracking (**Chair: Giuseppe Emmi**)

15:00 - 15:20 h; Bernardo Y. León Ávila (Brasov, Romania): B. Y. León Ávila, P. A. Cotfas, L. A. Quintero Domínguez, D. T. Cotfas, C. A. García Vázquez. An Energy Harvesting Solution for Wireless Sensor Networks.

15:20 - 15:40 h; Haiyang Xu (Kunming, China): Haiyang Xu, Xu Ji, Le Zhang, Yue Yang, Shengjie Wei. Performance study on a Photovoltaic-driven Photo-Electrocatalytic Nitrogen Reduction System (**VIDEO**).

15:40 - 16:00 h; *Jing Liu (Nottingham, UK)*: Jing Liu, Yupeng Wu. Assessment of photovoltaic performance models considering irradiance, spectrum, and temperature effect of various photovoltaic technologies.

16:00 - 16:20 h; *Qinghua Lyu (Lisa) (Wuhan, China)*: Wanjiang Bai, Qinghua Lyu, Zhuoyi Ling, Zhenxing Ming, Xinfang Zhao, Hongyan Shi, Hui Lyu, Saffa Riffat. A control system for daily cumulative light in photovoltaic agriculture based on multiple light sources (VIDEO).

16:20 - 16:40 h; *Qais Al Madhlom (Babil, Iraq)*: Q. H. Al-Madhlom, A. Alakam. Feasibility of fixed tilt photovoltaic panels in arid climate-urban conditions with silty clay soil.

16:40 - 17:00 h; *Yuexing Yang (Nottingham, UK)*: Y. Yang, R. Wilson, Y. Wu. Direct & Global solar spectrum modelling in cloudy days with numerical method.

7. Coffee break: 17:00 - 17:30 h (in hotel BAS)

8. Afternoon session 2 (Large hall): 17:30 - 19:50 h; Building Energy Performance, Electrical Engineering, Energy Efficiency (**Chair: Agris Auce**)

17:30 - 17:50 h; *Andreas Athienitis (Montréal, Canada)*: A. K Athienitis, N. Morovat. Implementation of Model Predictive Control to Activate Energy Flexibility in All-Electric School Buildings (VIDEO).

17:50 - 18:10 h; *Yang Ming (Nottingham, UK)*: Yang Ming, Xin Liu, Xiao Liu, Yanyi Sun, Yupeng Wu. Advanced smart fenestration systems for low-energy building.

18:10 - 18:30 h; *Yuting Guo (Nanjing, China)*: Yuting Guo, Ling Yuan, Feng Cheng, Xiuwei Li. Simulation research on regeneration process of an air-conditioning battery system (VIDEO).

18:30 - 18:50 h; *Nikolaos Rogkas (Athens, Greece)*: N. Rogkas, E. Karampasakis, M. Fotopoulou, D. Rakopoulos. Assessment of heat transfer mechanisms of a novel high-frequency inductive power transformer and coupled simulation using FEA.

18:50 - 19:10 h; *Ceyda Oguz (Istanbul, Turkey)*: M. M. Denk, C. Oguz. Impact Of Tax and Subsidy Policy on Energy Decisions of Countries (VIDEO).

19:10 - 19:30 h; *Decheng Kong (Kunming, China)*: D. C. Kong, Y. F. Wang, Ming Li, J. K. Liang. Performance investigation of an indirect solar dryer integrated with photovoltaic/thermal air collector (VIDEO).

19:30 - 19:50 h; *Vineeta Vasudevan Nair (Kerala, India)*: Vineeta Vasudevan Nair, Alex P James. Quantum Hybrid Echo State Networks for efficient energy systems (VIDEO).

19:50 - 20:10 h; *Nikolay Zlatov (Sofia, Bulgaria)*: Nikolay Zlatov, Iliya Iliev, Krastimir Popov. A sustainable approach to 4D printing of City Wind Turbines: Behaviors, applications, and challenges.