
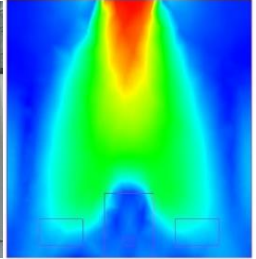


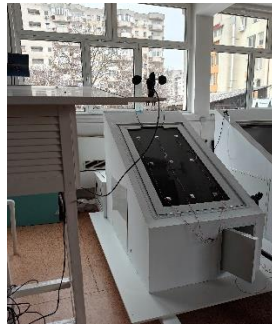


SYSTEMS FOR PROVIDING INDOOR COMFORT IN ENERGY EFFICIENT BUILDINGS RESEARCH GROUP

Contact details

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Areas of expertise

Heating ventilation and air conditioning (HVAC): Thermal analysis on heating and cooling units; Air distribution in ventilation systems; Systems for providing indoor air quality; HVAC systems for passive houses, near zero energy buildings (nZEB) and Positive Energy Building (PEB).

Indoor Environmental Quality: Indoor Air Quality (IAQ) air cleanness, indoor air movement; Thermal comfort, indoor environmental parameters, outdoor-indoor heat exchange; Lighting quality; Acoustics; finite element thermal analysis.

Energy efficient building systems: air to air heat recovery; ground to air and water to air heat exchangers; heat pumps.

Renewable energies: Photovoltaic (PV) panels with crystalline and amorphous layers; Vacuum tube and thermal solar collector; geothermal energy sources; wind turbines.

Thermal storage: Latent heat thermal energy storage; phase change materials; cold storage for free cooling; thermal storage in hot and cold-water tanks.

Life Cycle Assessment (LCA), Carbon Footprint analysis.

Team

Assoc.Prof.Dr.Eng. Tania RUS, Prof.Dr.Eng. Dorin BEU, Assoc.Prof.Dr.Eng. Florin DOMNIȚA, Assoc.Prof.Dr.Eng. Carmen MĂRZA, Assoc.Prof.Dr.Eng. Ciprian BACOȚIU, Assoc.Prof.Dr.Eng. Ancuța ABRUDAN, Assoc.Prof.Dr.Eng. Eugen VITAN, Assoc.Prof.Dr.Eng. Călin CIUGUDEANU, Lect.Dr.Eng. Gelu CHISĂLIȚĂ, Lect.Dr.Eng. Teodor CHIRA, Lect.Dr.Eng. Raluca MOLDOVAN, Lect.Dr.Eng. Georgiana CORSIUC, Lect.Dr.Eng. Roxana MARE, Lect.Dr.Eng. Octavian POP, Lect.Dr.Eng. Constantin CILIBIU, Lect.Dr.Eng. Horațiu ALBU, Assist.Dr.Eng. Ana-Maria MOLDOVAN, Lab.Eng. Liviu DODEA, Lab.Eng. Angel CĂMPIANU.

Representative projects

- Educational campuses as drivers for Positive Energy Districts - EDUPED**, COFUND-DUT-EDUPED-1, contract no. 115/2025, 2025 – 2027;
- Building skylight with integrated PCM cooling and BIPVT system**, PN-IV-P7-7.1-PED-2024-2264, 2024-2026;
- Clădiri pOzitiv eNergetic în EduCaTie - CONECT, GNaC ARUT 2023**, Contract nr. 22/01.07.2024, 2024-2025;
- Influenta anvelopei vitrate PV cu racire prin PCM asupra sistemelor de climatizare ale cladirilor, GNaC ARUT 2023**, Contract Nr. 21/01-07-2024;
- BIM enabled Digital Twins[®] - BIM2in**, KA220-HED, ID 2024-1-RO01-KA220-HED-000249147, 2024-2027;
- BIM digital competencies to evaluate and improve the energy efficiency of European buildings. A digital way towards positive energy districts (BIM4Energy)**, 2023-1-ES01-KA220-HED-000156652, 2023-2025;
- Support of higher education system in a context of climate change mitigation through regional-level of carbon footprint caused by a product, building and organization - Hi-EduCarbon** - Grant No. 2021-1-SK01-KA220-HED-000023274, 2021-2024;
- An Innovative Circular Economy Training based on BIM and LCA technologies applied to the Construction Industry (BIM-LCA)**, KA220-HED, ID 2022-1-NO01-KA220-HED-000087893, 2022-2024;
- Energy efficiency of air-cooling systems by using phase changer materials**, CICDI 2017, nr.2013/12.07.2017;
- Meeting of Energy Professional Skills (MEoS) - Energy analysis techniques and practices for implementing near zero energy buildings (nZEB)**, Project HORIZON 2020-EE-2014-2015, nr. 649773/30.03.2015; 2015-2017;
- Energy Efficient Technologies for a Green University**; CICDI 2014, nr. 29223/05.12.2014, 2014-2015;
- Optimized system for the production of thermal energy from renewable energy sources using heat pumps**, PNCDI2 OPTHP 22-128, 2010.

Significant results

The most representative publications of the past 5 years:

1. Rus, Tania, Moldovan, Raluca Paula, & Pardo Picazo, Miguel Ángel, LCA analysis of a roof mounted PV system: A Romanian case study. *Frontiers in Environmental Science*, 2024. 12, 1413629, **IF 4.6**;
2. Răzvan Calotă, Octavian Pop, Florin Bode, Cristiana Croitoru, Andrada Serafim, Alina Bărbulescu, Celina Damian and Lucia Tefas, A Novel Concept of Nano-Enhanced Phase Change Material, *Materials* 2024, 17(17), 4268, **IF 3.1**;
3. Sava, C., Iluțiu-Varvara, D. A., Mare, R., Roman, M. D., Rada, S., Pică, E. M., & Jäntschi, L. (2024). Physico-chemical characterization and possible uses of sludge processed from an urban sewage treatment plant. *Heliyon*, 10(8) **IF 3.4**.
4. Milon, A. G., Dragoș, C. M., Vereș, V. A., Baci, L., & Mare, R. (2024). Sports and clean environment: Key drivers of health and longevity in the European Union. *Amfiteatru Economic*, 26(67), 975-990.
5. Albu Horațiu, Beu Dorin, Rus Tania, Moldovan Raluca, Domnița Florin, Vilcekova Silvia - Life cycle assessment of LED luminaire and impact on lighting installation - A case study; *Alexandria Engineering Journal*; Elsevier, vol. 80; pp. 282-293; DOI: 10.1016/j.aej.2023.08.068; ISSN: 1110-0168; WOS; **IF 6,8/ 2023**;
6. Kapalo Peter, Domnița Florin, Bacoțiu Ciprian, Albu Horațiu, Chvatal Martin - How much air is needed to ventilate the gym? - case study; *Journal of Applied Engineering Sciences*; Sciendo; vol. 13/2; pp. 231-236; DOI: 10.2478/jaes-2023-0029; ISSN: 2247-3769; eISSN: 2284-7197; WOS Q4; **IF 1,1/2023**;
7. Tania Rus, Raluca Moldovan, Horatiu Albu, Dorin Beu; Impact of Pandemic Safety Measures on Students' Thermal Comfort-Case Study: Romania; *Buildings*; MDPI; vol. 13; DOI10.3390/buildings13030794; WOS; **IF 3.8/2023**;
8. Roxana Mare, Codruta Mare, Adriana Hadarean, Anca Hotupan, Tania Rus; COVID-19 and Water Variables: Review and Scientometric Analysis; *International Journal of Environmental Research and Public Health*; MDPI, vol. 20, Issue 2; DOI10.3390/ijerph20020957; WOS; **IF 4,799/2023**;
9. Octavian Pop, Alexandru Dobrovicescu, Alexandru Serban, Mihaela Ciocan, Anass Zaaoumi, Mugur Balan, C.Analytical modelling of food storage cooling with solar ammonia-water absorption system, powered by parabolic trough collectors. Method; *Methodsx*, Elsevier, vol.10, DOI10.1016/j.mex.2023.102013, eISSN: 2215-0161, WOS, **IF 2/2023**;
10. Octavian Pop, Charles Berville, Florin Bode, Cristina Croitoru; Numerical investigation of cascaded phase change materials use in transpired solar collectors; *Energy Reports*; Elsevier; vol. 8, pp. 184-193; DOI10.1016/j.egy.2022.06.114; ISSN 2352-4847; WOS; **IF 5,6/2022**;
11. Rus Tania, Cruciat Gheorghe; Nemeti Georgiana; Mare Roxana; Muresan Daniel. Thermal comfort in maternity wards: Summer vs. winter conditions. *Journal Of Building Engineering*. Volume 51. DOI10.1016/j.job.2022.104356. 2022; WOS; **IF 7.144/2022**;
12. Kapalo Peter, Vojtasko Lubos, Vasilisin Daniel, Domnita Florin, Bacotiu Ciprian, Kandrak Robert, Batorova Michaela. Investigation of the influence of the level of physical activity on the air exchange requirements for a gym. *Building And Environment*. Volume 204. DOI 10.1016/j.buildenv.2021.108123. 2021; WOS. **IF 7.093/2021**;
13. Rus Tania, Nemeti Georgiana, Domnita Florin, Goidescu Iulian, Muresan Daniel. Indoor thermal environment evaluation of postpartum patients in a tertiary level maternity in Romania during summer. *Science and Technology for the Built Environment*. Volume 27. Issue7. DOI 10.1080/23744731.2021.1906084. 2021. **IF 1.99/2020**;
14. Kapalo Peter, Vilcekova Silvia, Meciarova Ludmila, Domnita Florin, Adamski Mariusz. Influence of Indoor Climate on Employees in Office Buildings-A Case Study. *Sustainability*. Volume 12. Issue 14. DOI 10.3390/su12145569. 2020. **IF 3.251/2020**;

Significant solutions:

Indoor CO₂ concentration measurements depending on activities, thermal comfort evaluation in public buildings, methods for determining fresh air supply, mathematical model for fresh air flow rate-based on statistics, Life Cycle Assessment (LCA) for products, systems, buildings and organization, energy evaluation of ground air heat exchanger, mathematical model for latent heat thermal energy storage, accurate modelling of thermo-physical properties of PCM, skylight with integrated PCM optimisation of heat pumps with renewable energy sources, mathematical model for hybrid coolers.

Products and technologies:

1. Double-Equal Strength Diffuser for air distribution
2. Efficient hybrid cooler
3. Algorithm for selecting phase change materials based on climatic conditions
4. Adiabatic chamber for thermal analysis of LED luminaires
5. Software for evaluating heat gains through opaque building elements in transient sinusoidal regime
6. Life Cycle Assessment (LCA) for products, buildings and organizations

The offer addressed to the economic environment

Research & development	<p>Research & development in core areas: Fundamental domain Building Services Engineering – technologies for assuring the building's energy efficiency and users' comfort and IAQ.</p> <p>Research & development in applied fields: Positive Energy Districts (PED), Life Cycle Assessment (LCA), Carbon Footprint (CF); nZEB, thermal energy recovery coupled with renewable sources skylight with integrated PCM and BIPVT system, thermal storage.</p> <p>Development strategy: National/International research contracts, contracts with third party, article publishing in Journals (WOS, SCOPUS), National/International conference participations.</p>
Consulting	Design, energy audit, consulting, research, product testing, HVAC systems airflow balancing, sound comfort analysis, thermal infrared analysis, evaluation of thermal comfort parameters.
Training	Courses about Positive Energy Districts, HVAC systems in nZEB, Courses for energy audit, Courses focused on IAQ and renewable energies. Courses about LCA and CF, Courses about PCM.

Last updated: January 2025