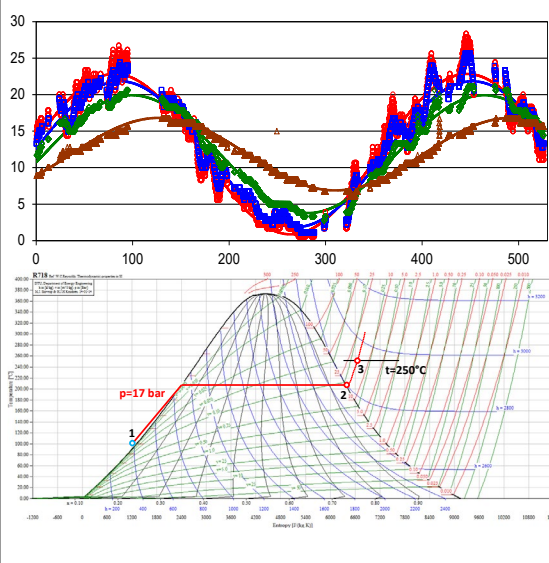


## INSTRUMENTAL ANALYSIS

### Contact details

Name	Instrumental Analysis	
Acronym	IA	
Logo		
Site	<a href="http://research.utcluj.ro/tl_files/research/Research%20Domain/Mechanical%20Engineering/5_CBalan.pdf">http://research.utcluj.ro/tl_files/research/Research%20Domain/Mechanical%20Engineering/5_CBalan.pdf</a>	
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Faculty Department	<b>Faculty of Automotives, Mechatronics and Mechanical Engineering</b> <b>Faculty of Materials and Environmental Engineering</b>	
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### Areas of expertise

**Fundamental research fields:** Chemistry, Environment and materials science; Biology, Genetics and medicine; Physics and Technological physics; Fields at frontier

**Applied research fields:** Theoretic computer science; Advanced informatics systems; Sustainable energy systems; Energy security; Pollution reduction; Alimentary safety and security; Biotechnology

### Team

**Prof. Dr. Eng. Mugur Ciprian Balan**, Prof. Dr. Lorentz Jantschi, Assoc. Prof. Dr. Eng. Paula Veronica Ungureșan, As. Dr. Eng. Ancuta Magurean

### Representative projects

**SUNHORIZON** - Sun coupled innovative heat pumps (2022 - 2023)

<https://sunhorizon-project.eu/>

**PN-III-P2-2.1-PED-2021-0544 (PED 706)** Hybrid microgrid with renewable energy sources and optimized operating cost, which integrates energy management methods based on solar power prediction (2022-2024)

**STRATEGY** The local district strategy of the thermal energy supply service for consumers in the municipality of Cluj-Napoca in the period 2021 – 2031 and the 2050 perspective (2021)

**SIRCLES** - Replicable large impact Symbiotic value chains for cross sectoral optimization of resource efficiency and circularity in Energy Intensive Industries (2020)

<http://mugurbalan.eu/doc/SIRCLES.pdf>

**PVEFF** - Increased energy efficiency in municipal buildings through the use of photovoltaic panels (2019)

[http://www.mugurbalan.eu/doc/pv\\_utcn.pdf](http://www.mugurbalan.eu/doc/pv_utcn.pdf)

**REMSIS** - Renewable energy management system for small isolated communities (2014-2017)

<http://remsis.utcluj.ro/>

### Significant results

#### The most representative publications of the past 5 years:

1. Pop, O.G., Dobrovicescu, A., Serban, A., Ciocan, M., Zaaoumi, A., Hiris, P.D., Balan, M.C. - *Analytical modelling of food storage cooling with solar ammonia-water absorption system, powered by parabolic trough collectors. Method, MethodsX* 10C (2023) 102013, ISSN: 2215-0161 (JCI: 0.43 / 2021)  
<https://doi.org/10.1016/j.mex.2023.102013>
2. Hiris, P.D., Pop, O.G., Balan, M.C. - *Analytical modeling and validation of the thermal behavior of seasonal storage tanks for solar district heating*, Energy Reports 8 (2022) 741-755, ISSN: 2352-4847 (IF: 4.937 / 2021)  
<https://doi.org/10.1016/j.egy.2022.07.113>
3. Hiris, P.D., Pop, O.G., Balan, M.C. - *Preliminary sizing of solar district heating systems with seasonal water thermal storage*, Heliyon 8 (2022) e08932, ISSN: 2405-8440 (IF: 3.776 / 2021)  
<https://www.cell.com/action/showPdf?pii=S2405-8440%2822%2900220-1>  
<https://doi.org/10.1016/j.heliyon.2022.e08932>
4. Bucsa, S., Serban, A., Balan, M.C., Ionita, C., Nastase, G., Dobre, C., Dobrovicescu, A. - *Energetic Analysis of a Cryogenic Air Separation Unit*, Entropy (2022), 24, 272, ISSN: 1099-4300 (IF: 2.524 / 2021)  
<https://doi.org/10.3390/e24020272>

5. Pop,O.G., Balan,M.C. - *A numerical analysis on the performance of DHW storage tanks with immersed PCM cylinders*, Applied Thermal Engineering, 197 (2021), 117386 ISSN: 1359-4311 (IF: 5.295 / 2020)  
<https://doi.org/10.1016/j.applthermaleng.2021.117386>
6. Zaaoumi,A., Bah,A., Ciocan,M., Sebastian,P., Balan,M.C., Mechaqrane,A., Alaoui,A. - *Estimation of the energy production of a parabolic trough solar thermal power plant using analytical and artificial neural networks models*, Renewable Energies, 170 (2021), pp. 620-638, ISSN: 0960-1481 (IF: 8.001 / 2020)  
<https://doi.org/10.1016/j.renene.2021.01.129>
7. Abrudan,A.C., Pop,O.G., Serban,A., Balan,M.C. - *New Perspective on Performances and Limits of Solar Fresh Air Cooling in Different Climatic Conditions*, Energies, 12(11) (2019), pp. 1-21, ISSN: 1996-1073 (IF: 2.707 / 2018)  
<https://www.mdpi.com/1996-1073/12/11/2113>
8. Pop,O.G., Fechete Tutunaru,L., Bode,F., Abrudan,A.C., Balan,M.C. - *Energy efficiency of PCM integrated in fresh air cooling systems in different climatic conditions*, Applied Energy, 212 (2018) pp. 976-996, ISSN: 0306-2619 (IF: 7.900 / 2017)  
<https://doi.org/10.1016/j.apenergy.2017.12.122>

**Patents:**

M. C. Bălan, et al. : RO126148B1: Heat pump to provide heating temperature at two different levels. Owner: SC Convergo SRL

**The offer addressed to the economic environment**

Research & development	R&D in the fields of: Energy efficiency, Renewable energies, Chemistry; Computer science; Mathematics; Physics; Horticulture; Biotechnologies; Experimental design; Data acquisition, Computational fluid dynamics, Cogeneration
Consulting	Consulting in the fields of: Energy efficiency, Renewable energies, Chemistry; Computer science; Mathematics; Physics; Horticulture; Biotechnologies; Experimental design; Data acquisition, Computational fluid dynamics, Cogeneration
Training	Training in the fields of: Energy efficiency, Renewable energies, Chemistry; Computer science; Mathematics; Physics; Horticulture; Biotechnologies; Experimental design; Data acquisition, Computational fluid dynamics, Cogeneration

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