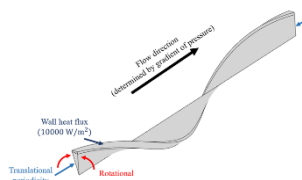
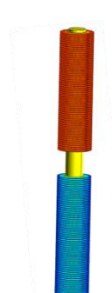
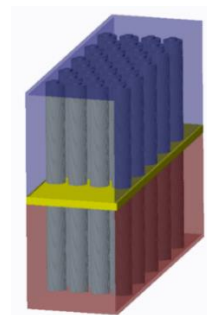




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<p>name of the unit:</p> <p>DIVISION OF HEAT TECHNOLOGY AND REFRIGERATION</p> <p>Institute of Turbomachinery, Lodz University of Technology</p>		<p>symbol:</p> <p>I-12</p> <p>http://www.imp.p.lodz.pl</p>
head of the unit :	potential promoters :	contact person :
<p>Artur Gutkowski, PhD, DSc, TUL Prof.</p>	<p>Artur Gutkowski, PhD, DSc, TUL Prof.</p>	<p>Artur Gutkowski, PhD, DSc, TUL Prof. phone: 48-42-631-23-48 artur.gutkowski@p.lodz.pl</p>
<p>scope of activities:</p> <p>The main areas of interest and research directions are the following problems falling within the general concept of Mechanical Engineering:</p> <ul style="list-style-type: none"> • experimental investigations and modeling of heat transfer processes, • experimental and numerical investigations of heat exchangers, • testing of working components used in heating, refrigeration, air conditioning and heat pump systems, • heat pipe operation tests, • experimental investigations and numerical modeling of micro-scale flame propagation. 		  
<p>present activities:</p> <ul style="list-style-type: none"> • We investigate experimentally and numerically micro-heat exchangers used in the automotive industry as well as in household appliances. • We develop technologies that intensify heat transfer by using flow turbulence devices. • We carry out tests of a household refrigerator at different thermal loads and we model a roll-bond evaporator, being a part of this device. • We conduct research on the efficiency of a linear compressor. • Heat pipes filled with various refrigerants and with various degrees of refrigerant filling are also tested. • We have been working on a cooling system for PVT panels, the results will allow us to assess an influence of the panel temperature on its efficiency. • A CFD model accounting for heat and mass transport is generated and will be used to analyze the paper drying process. • We investigate experimentally and use numerical tools to analyze mechanisms of the laminar flame propagation in narrow channels. 		
<p>future activities:</p> <p>Development of technology related to the intensification of heat transfer in heat exchangers as well as investigations of individual elements of cooling, air conditioning and heat pumps systems in order to optimize their operation.</p>		



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[Publications/patents, awards, projects :](#)

- Jasiński P.B., Kowalczyk M.J., Romaniak A., Warwas B., Obidowski D., Gutkowski A. (2021). Investigation of Thermal-Flow Characteristics of Pipes with Helical Micro-Fins of Variable Height. *Energies*, 14(8), 2048, 1-18,
- Gutkowski A. N., Łęcki M., Jasiński P., Jędrówiak B. (2019). Flame Behavior During Propagation in Small Isothermal Tubes Characterized by Different Degrees of the End Opening, *Combustion Science and Technology*, vol. 191, No. 4, 711-725,
- Górecki G. (2018). Investigation of Two-Phase Thermosiphon Performance Filled with Modern HFC Refrigerants. *Heat and Mass Transfer*, vol. 54, no. 7, p. 2131-2143.
- We have been conducted the following research project: Hybrid Systems for Solar Energy Conversion – project financed by the National Centre for Research and Development, Lodz University of Technology and FLEXIPOWER GROUP, 01.12.2019 – 30.11.2022, co-executor.
- Patent: Górecki G., Łęcki M. Banasiak A. Two-phase thermosiphon heat exchanger, PAT. 230688.

[keywords:](#)

refrigeration, refrigeration compressors, heat transfer, heat exchangers, two-phase flows, heat pipes, micro-scale gas combustion

[List of internship proposal in this research team :](#)

- Investigation of an influence of geometric parameters of the microchannel evaporator in refrigeration systems on its thermal efficiency.