# THERMAL AND FLUIDS ENGINEERING RESEARCH GROUP FROM THE PUBLIC UNIVERSITY OF NAVARRE (SPAIN): focused on thermoelectric applications

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The Thermal and Fluids Engineering Research Group from the Public University of Navarre (Spain) counts with more than 25 years of experience on thermoelectricity. Due to their knowledge on thermal exchange, this group mainly focuses on the development of thermoelectric applications, looking for new and interesting applications that can benefit from the advantages of thermoelectricity (reliability, compactness, noiseless, low maintenance requirements, possibility of avoiding moving parts…), and optimizing heat transfer thanks to their expertise on heat exchangers, especially those based on phase change.

Nowadays, the Thermal and Fluid Engineering Research Group, led by professor David Astrain, is working on 7 public projects and 2 contracts, with a budget close to 1 million €. This research can basically be divided in the following lines:

* Geothermal thermoelectric generation: this line focuses on transforming the internal heat of the Earth directly into electricity for two different applications: volcano surveillance (generate enough energy to power the sensors required for volcanic vigilance) and medium-scale generation (maximizing generation on field). The Canary Islands and Antarctica have been the on-field laboratories that have made possible the advances of this line.
* Commercial refrigeration: thanks to the reversibility of thermoelectric modules, the group also studies the application of thermoelectric cooling in order to improve the efficiency of commercial refrigeration systems. In this sense, the purpose is not to compete with traditional vapour compression systems, but to integrate thermoelectric cooling on traditional cycles, leading to a merged solution that becomes competitive and facilitates the integration of new refrigerant fluids.
* Thermal Storage: due to the expansion of renewable sources, energy storage will become of utmost importance in the upcoming years. Thus, the group also studies the possibilities of thermal storage within the “power to heat to power” approach, incorporating thermoelectricity for improving the efficiency.
* Heating and Air Conditioning: finally, the last main line of the group is developing a thermoelectric heat pump for its implementation in the heating and air conditioning of passive houses, overcoming the cooling, heating, air renovation, and domestic heat water demands.

In the talk, the lines of the group will be exposed with the ultimate objective of seeking for collaboration opportunities between CRISMAT/ENSICAEN/UNICAEN and the Thermal and Fluids Engineering Research Group from the Public University of Navarre.