

## Special Issue

# Thermodynamics in the 21st Century

### Message from the Guest Editors

Thermodynamics started almost 200 years ago with the invention of an engine by Sadi Carnot. Today, it is seen by some as an old science. Yet thermodynamic perspectives, thermodynamic ideas and thermodynamic thinking are at the forefront of scientific and technological development once again. The modern challenge for thermodynamics is its application, both at very small and very large scales, which range from quantum objects, to biological systems, and to stars and galaxies. Thermodynamics has to deal with highly non-equilibrium states, with non-extensivity and complexity. Fundamentally, thermodynamics stands alone among other physical sciences pointing to directional properties of time. Practically, preserving favourable thermodynamic conditions on Earth has become one of the principal issues for our civilisation. The editors invite all researchers who love and believe in the importance of thermodynamics to exchange opinions about the role that thermodynamics will play in our rapidly changing world. General submissions discussing the foundations of thermodynamics and more specific works linked to recent technological advances are welcome.

### Guest Editors

Dr. Alexander Klimenko  
Prof. Dr. Hal Gurgenci  
Prof. Dr. Debra J. Searles

### Deadline for manuscript submissions

closed (28 February 2019)



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