



ICEM2024 – Torino, Italy, 1-4 September, 2024

Special Session on

## **Innovative magnetic materials for 3D printing and sustainability of electromagnetic devices**

Organized and co-chaired by:

Luca Ferraris, Politecnico di Torino, Italy, [luca.ferraris@polito.it](mailto:luca.ferraris@polito.it)

Carole Henaux, University of Montpellier, France, [henaux@umontpellier.fr](mailto:henaux@umontpellier.fr)

### **Call for Papers**

Over recent years the electromagnetic devices design has been deeply influenced by the availability and always more frequent adoption of new magnetic materials and new manufacturing thanks to the 3D printing. In the scope of the sustainability and life cycle calculation, we have now to consider the economic and environmental cost of the manufacturing process and the recyclability. Consequently research efforts are carried out on new alloys which permit for example to avoid or limit the rare earths adoption in electromagnetics devices. Innovations are nowadays at disposal on both soft and hard magnetic materials and 3D printing to replace traditional laminated steels and realize new magnetic shapes. A lot of research is being carried on to develop the cited innovative materials, to provide specific methodologies for their characterization and to adopt them in the realization of electric machines prototypes. Moreover the 3D printing technologies are now well adapted to use new materials and permit to extend the field of innovative structures of machines by manufacturing more complex geometrical pieces. Coils, permanent magnet and specific alloys are now available by the 3D printing. The characteristics of those materials can be adapted to the specific requirements of the applications by varying the composition, also considering sustainability and life cycle. This Special Session welcomes research papers showing studies on innovative magnetic materials and 3D printing, their characterization, adoption in the realization of electromagnetic devices and methods to evaluate the sustainability and life cycle.

Topics of interest include, but are not limited to:

- Innovative magnetic materials with and without rare earths
- Magnetic devices sustainability and life cycle calculation
- Soft Magnetic Composites (SMC)
- Magnetic losses identification and separation
- Bonded magnets
- Magnets characterization
- Novel electrical machine topologies adopting innovative material
- Prototypes realization and testing
- Magnetic materials for 3D printing applications

**Submission of papers:** all the instructions for paper submission are included in the conference website: <http://www.icem.cc/2024>