Research options available for topic A

Research topics a) and b) offered by every Doctoral Course involved in UNIPhD are frameworks within which every applicant has to present an original research project in collaboration with a Supervisor at the University of Padua.

Potential Supervisors at Unipd have proposed the following detailed research options, which are related to the research topic. They are offered as a guideline and should facilitate your contact with potential Supervisors. Supervisors' e-mail is specified in every research option table. You are welcome to contact them directly.

Note that this research option list is not at all exhaustive and, within the topic you have chosen, you are free to propose a different research project.

Doctoral Course	**MECHATRONIC AND PRODUCT INNOVATION ENGINEERING**
Macro-area	Physical Sciences and Engineering
Department name	Department of Management and Engineering
Webpage	*http://www.gest.unipd.it/en/research/phd-programmes/mechatronics-and-product-innovation-engineering?set_language=en*
Research topic A	**Innovative materials in future design of lightweight and sustainable products** Sustainable mobility is a strategic topic, in which a relevant role is played by innovative metallic alloys and improved shaping processes, coupled with light-weight design concepts. In this frame, the capability of developing an integrated view of the design and manufacturing chain (materials – processes – microstructure – properties – mechanical design – in-service performance) is the challenge faced by this research. The shaping process targeted is foundry, which can lead to light-weight components, produced using innovative and tailored Aluminium alloys. Optimisation of alloys composition, monitoring and control of casting processes, design of microstructure, evaluation of mechanical behaviour of castings are the main tasks addressed by the research.
Link to the UNIPhD Call (Academic Year 2022/2023)	*https://www.unipd.it/en/uniphd*
Latest Update	*12.01.2022*
#Number of available Research Options	*1* *Scroll down to see all the Research Options*

#1 Research Option Description

Doctoral Course	**Mechatronic and product innovation engineering**
Department name	Department of Management and Engineering (DTG)
Research topic A	Innovative materials in future design of lightweight and sustainable products
Research option	Development of innovative foundry alloys and products for sustainable mobility
Supervisor	Prof. Franco BONOLLO, franco.bonollo@unipd.it other members of Research Group: professors Paolo Ferro, Giulio Timelli, Alberto Fabrizi
Webpage	http://www.gest.unipd.it/it/ricerca/aree-di-ricerca/metallurgia
Context of the research activity and objectives	Sustainable mobility is a strategic topic, in which a relevant role is played by innovative metallic alloys and improved shaping processes, coupled with light-weight design concepts. In this frame, the capability of developing an integrated view of the design and manufacturing chain (materials – processes – microstructure – properties – mechanical design – in-service performance) is the challenge faced by this research. The shaping process targeted is foundry, which can lead to light-weight components, produced using innovative and tailored Aluminium alloys. Optimisation of alloys composition, monitoring and control of casting processes, design of microstructure, evaluation of mechanical behaviour of castings are the main tasks addressed by the research.
Infrastructures	Labs for microstructural investigations (SEM, EDS, TEM, EBSD, XRD, X-Radiography, DSC) and for mechanical testing; software for thermodynamic and metallurgical processes simulation
Skills and competencies for the development of the activity	A background in Materials Science/Engineering or in Mechanical Engineering is required; specific experience on foundry materials and processes is highly relevant.
Training offer	Several courses related to Metallurgy and Materials selection topics are managed by the PhD School. The annual Summer School of Metallurgy for PhD students is also highly recommended, as well as other specific initiatives organised by the Italian Association of Metallurgy, including High Tech Die Casting Conference (2024, chaired by the supervisor of the Project.
Possible Secondments	To be defined