



**UNIVERSITÀ  
DEGLI STUDI  
DI BERGAMO**

Scuola  
di alta formazione  
dottorale

Attachment A to Announcement PhD XXXVII round

<b>PhD in BUSINESS AND LAW.....</b>	<b>pag. 2</b>
<b>PhD in ENGINEERING AND APPLIED SCIENCES .....</b>	<b>pag. 13</b>
<b>PhD in TRANSCULTURAL STUDIES IN HUMANITIES .....</b>	<b>pag. 24</b>
<b>PhD in TECHNOLOGY, INNOVATION AND MANAGEMENT (TIM).....</b>	<b>pag. 26</b>
<b>PhD in HUMAN SCIENCES AND WELFARE INNOVATION.....</b>	<b>pag. 37</b>



## PhD in BUSINESS AND LAW

**Coordinator:** Prof.ssa Stefania Servalli

**Scientific Area: 12 - Law studies**

**13 - Economics and statistics**

Duration	Positions	Positions covered by scholarships
3 years	8	8

### Scholarships:

No. 8 financed by new ESF REACT-EU resources for the following Green research topics:

- "The role of the B-corp company certification in sustainable development"
- "Circular economy and sustainability in chemical sector"
- "Sustainable strategies and sustainable communication in B2B"
- "The role of the *Fabric Intelligence* in the achievement of SDGs"
- "The sustainability in the airport sector"
- "Energy transition and business activity. ESG implication criteria in the management of the company and problems of harmonization with the liberal conception of the social interest"
- "Taxation and Environmental Transition: The Case of the Plastic Tax"
- "Sustainability in water distribution"

### Prerequisites

- It is required a Master degree diploma (or equivalent diploma) which has been obtained within the last 5 years from the application date. The final dissertation mark should be 105/110 or above. For the students who are not graduated yet, the average exams mark should be 100/110 or above.
- International students are required to have a qualification equivalent to B2 for the Italian Language.
- International students who have graduated abroad, and who do not have the Supplement Diploma (this option is valid only for the students who have studied in the EU Universities), are required to submit a Declaration of Equivalence, which must be issued by the Italian diplomatic authority in the State where the degree was awarded.

### Modality of selection

type B - assessment of qualifications and interview

### Type of estimable qualifications

*Qualification assessments (up to 60 marks):*

- *curriculum studiorum*: up to 20 marks;
- research project: up to 40 marks.

*Interview (up to 30 marks):*

- discussion of the research project (assessment of the candidate's capacity to convincingly discuss project preconditions and goals): up to 15 marks;
- relevance of demonstrated knowledge in the field of Innovation or green: up to 15 marks.

**Linguistic competence:** knowledge of the English language.



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**Interview date:**

16 November 2021 at 09:00 hours (Italian time) eventually continuing on 17 November, depending on the number of candidates participating to the interview.

The interview may be held in English language and may take place by videoconference. Candidates are required to communicate their email address at the time of application, to be contacted by the commission in the event of admission to the interview and in of its conduct in telematic mode.



<b>Topic:</b> Green
<b>PhD Program:</b> Economia e diritto dell'impresa (Business & Law)
<b>Title:</b> The role of the b-corp company certification in sustainable development
<b>Affiliated Company:</b> Back Label Sbarl Vicolo San Giovanni 16 24121 Bergamo
<b>Short description of the research project:</b> <p>Sustainable ventures have emerged as an influential, yet controversial, concept for more traditional, established businesses and policy makers. Increasingly, society demands a shift in how we consume natural resources and create products that have minimal environmental impact. The fashion sector is one of those characterized by production processes that are characterized by high environmental degradation and are unethically exploiting labour (e.g., in sweatshops) in an effort to minimize production costs. In a context characterized by high pressures to be "sustainable" the risk is to have companies that engage in greenwashing their activities. Sustainability, therefore, becomes a marketing tool more than an internalization of environmental and social impact in a company's routines.</p> <p>Research shows that more and more consumers and suppliers are no more accepting brand's social and environmental claims at face value (Stammer, 2016). Companies need to engage in processes that demonstrate an authentic commitment to social and environmental impact. The B-corp certification is a voluntary, international, company-level (rather than a product) certification that serve as a legitimating tool for those organizations that work in an environmental and social safeguarding way. The B-corp certification is awarded to those organizations that meet the highest standards of environmental and social impact, satisfying the pressures by consumers and other stakeholders to obtain otherwise hidden information about the positive social and environmental impacts that firms create, as well as the harm that they might do to people and the planet. Obtaining the B-corp certification requires a proactive action by the certifying firm regarding actions and strategies directed towards the implementation of productive processes and creation of outcomes both at an environmental and social level.</p> <p>The research project seeks to implement an in-depth case study analysis (Yin, 2004) of Back Label, the only Bcorp company active in the Bergamo area. Back Label - the Wellnesswear - is a 100% Made in Italy, slow fashion and carryover brand, certified ICEA/GOTS since the very beginning of its operations and certified B-Corp since January 2021 (Back Label, 2021). Sustainability has always been at the core of Back Label and one of the pillars of its mission. Back Label challenges the assumptions underlying the fast-fashion sector which generates about 15million of waste every year. Back label relies on natural textiles for its products and its creations are fully made in Bergamo relying on a diverse workforce that, among other aspects, gives employment opportunities to marginalized individuals. Its clients range from spa and luxury resorts to private customers who seek natural fibers to cover their skin.</p> <p>Back label proactively selects its textile providers who have to undergo a tight selection process as to make sure raw materials are safe to be worn on direct contact with the skin, produced in a certified sustainable way while, simultaneously, ensuring the fair and ethical treatment of farmers and workers. Back Label adopts a fully sustainable business model based on intelligent stock that avoids unnecessary waste, young (and female) management, importance of flexibility in M.O and diversity in workforce.</p> <p>Through a combination of interviews, archival data, and ethnographic observations, the project will shed light on how sustainable ventures internalize environmental and social values, the role of the Bcorp certification in this process, and how values and certification are then used to attract external resources.</p>



#### **Target of the research project:**

The key objectives of the research project will be set out in collaboration with the selected company, i.e., Back Label. We seek to develop a research project that will:

- Explain how entrepreneurial action can be the conduit for sustainable products and processes (Hall, Daneke, and Lenox, 2010)
- Discuss how entrepreneurial action fosters sustainable solutions for social and environmental problems (Sheperd and McMullen, 2007)
- Evaluate how certification acts as a legitimating tool for sustainable companies within business and policy circles but also among the larger set of stakeholders the certified firm relates to
- Assess the relative importance of opportunity, identity metamorphosis and sedimentation/superseding work (Moroz et al., 2020)
- Develop an enhanced framework for understanding and categorizing the business models of sustainable Bcorps through a focus on adaptive tensions (Moroz and Gamble, 2021).



<b>Topic:</b> Green
<b>PhD Program:</b> Business and Law
<b>Title:</b> Circular economy and sustainability in chemical sector
<b>Affiliated Company:</b> Chimiver Spa
<b>Short description of the research project:</b> <p>The PHD project, in a perspective of transition towards circular economy, aims to develop a research activity in the manufacturing context, with reference to the chemical sector. In this sector, the relationship between enterprises and sustainability is particularly important and impacts not only the specific sector, but also the entire supply chain.</p> <p>In this context, the research has the objective to explore the contribute of the chemical sector in driving towards the transition to circular economy. From this point of view, the research project will be developed through three phases: an analysis of the existing literature on the topic of business strategies and models oriented towards circular economy; a study of best practices available at national and international level; a business case study.</p> <p>The first phase will involve a systematic literature review aiming to analyze the scientific studies that consider both chemical industrial sector and the circular economy to identify common strategies of different nature (for example, raw materials, processes, regulations, new businesses), specific practices (for example, bio-based products or methods) and criticalities to be overcome (for example, the interdisciplinarity of the research).</p> <p>The second phase of the project will involve the study of best practices in the chemical sector available at national and international level. This will be performed by the means of surveys aiming to understand the motivations, advantages and criticalities that could be found during the adoption of circularity/sustainability logic.</p> <p>The third phase will deepen the specific business case study (Chimiver spa), which will involve the presence of the PHD student in the company for a period of 6 months. In collaboration with the company, the PHD student will study the economic, environmental, and social aspects deriving from the adoption of principles of circular economy within the company, and their measurement. This phase of the project, in a logic of synergic collaboration between the University and the company, will permit the PHD student to import the knowledge obtained during the previous phases of the research in the company and get benefits from the expertise matured within the company; a company that for a long time is involved in the topic of circularity and sustainability.</p>
<b>Target of the research project:</b> <p>The project aims to realize, during its different phases, objectives that involve: the identification of eventual common strategies of different nature in the context of existing scientific studies related to chemical sector referring to circular economy; specific practices and criticalities to be overcome; the exploration and comprehension of motivations, advantages and criticalities that could be found during the adoption of circularity/sustainability logics in the chemical sector; the understanding, during the period of presence in the company, of economic, environmental and social aspects deriving from the adoption of principles of circular economy within the company, and the possible implementation of ways of measurement.</p>



<b>Topic:</b> Green
<b>PhD Program:</b> Business & Law
<b>Title:</b> Sustainable strategies and sustainable communication in B2B
<b>Affiliated Company:</b> CNH Industrial S.p.A. Via Plava 80 10135, Torino (TO)
<b>Short description of the research project:</b> <p>Despite boasting an undisputed leadership position in the production of industrial vehicles such as tractors, trucks, buses, on-road and off-road military vehicles, but also complementary equipment for the agricultural and construction sector, CNH Industrial is also widely known for the central role that the company attributes to sustainability, as a central value of the overall business strategy. On sustainability CNH has been recognized and confirmed Industry Leader for the tenth consecutive year in the Dow Jones Sustainability Indices, World and Europe. Given the importance that CNH attributes to sustainability, it is paramount to investigate and assess not only how sustainability can become a cornerstone of the business strategy, but also - and above all - how sustainability is and should be communicated (sustainable communication).</p> <p>An adequate and effective communication strategy is in fact necessary to make the multiple corporate audiences aware of the sustainable initiatives undertaken and the sustainable results achieved.</p> <p>The research project is therefore aimed at investigating and understanding what are the elements that make it possible to design and subsequently implement a sustainable business strategy in B2B and, to investigate and understand which are the most important communication channels (or a combination thereof), that a company like CNH - or others that are similar in terms of business pursued, market targeted or product range - should use to strategically communicate their sustainable behaviors.</p>
<b>Target of the research project:</b> <p>The general aim of the project is to develop a strategic roadmap that can guide CNH Industrial and similar companies to design and develop a sustainable business strategy, and to communicate the sustainable results achieved in an appropriate and impactful manner.</p> <p>The specific objective of the project is the preparation of a set of reliable indicators which are suited to verify whether effective sustainable communication is also positively correlated with better environmental, financial and social performances.</p> <p>The work output will be the creation of a 'B2B sustainable communication score' which will result from an in-depth analysis of the optimal mix of communication tools that B2B companies can use in their respective markets.</p>



<b>Topic:</b> Green
<b>PhD Program:</b> Business and Law
<b>Title:</b> The role of the <i>Fabric Intelligence</i> in the achievement of SDGs
<b>Affiliated Company:</b> Iterchimica Spa
<b>Short description of the research project:</b> <p>The transformation of industrial production represents one of the challenges in the perspective of sustainable development. Despite the importance of relationship between the transformation of industrial processes and the sustainability, the studies on this topic remain poor. In the context of this literature gap, the Project has the objective to analyze the role of Fabric Intelligence with respect to the achievement of Sustainable Development Goals (SDGs), by considering that the aspects of sustainability represent an integral part of so called "Industry 4.0".</p> <p>In this perspective, the Project will develop a critical review of the literature aiming to suggest a more deepened comprehension of the concept of "Industry 4.0" and on its alignment with SDGs, and more particularly, with the SDG 9 – "Industry, innovation and infrastructure" and the SDG 12 "Responsible consumption and production" and the respective targets and indicators.</p> <p>The results of this phase of the research will allow to understand in which measure the dimensions of sustainability are reflected in the context of the literature on "Industry 4.0" and to formulate observations with regard to the effective contribution to the sustainable development in perspective of involved social, environmental, and technological inter-connections.</p> <p>An empirical part, to be performed in the company, will complete the previous phases. In particular, the PHD student will take part in the working group entitled "Intelligent factory project" of the affiliated company (Iterchimica) for a six-month period. The company develops this project in a time perspective of 2/3 years. In this context, the productive processes will be object of analysis in a logic of adjustment towards a more sustainable dimension which will involve: a native integration with founding systems of the 4.0 production management (MES) and logistic management (WMS); an integrated management under the ERP perspective (from commercial offers to the production planning; from logistics to purchase planning, etc); capacity of analysis/native Business Intelligence; the possibility to make "paperless" the process by digital management of documentation; native integration with the actual corporate CRM.</p>
<b>Target of the research project:</b> <p>The project aims to realize, in its different phases, a number of objectives. During the phases of theory analysis, the project has the target to comprehend: the role of Fabric Intelligence with respect to the achievement of Sustainable Development Goals (SDGs); the alignment or lack of alignment of the "Industry 4.0" concept with the SDGs, and more specifically, with SDG 9 – "Industry, innovation and infrastructure" and the SDG 12 "Responsible consumption and production" and the respective targets and indicators; the role of informative and production management systems in terms of contribute to the sustainability. During the phase of presence of the PHD in the company, the Project aims to offer a contribute within the working group entitled "Intelligent factory project" through the analysis of productive processes and in a logic of adjustment towards a more sustainable dimension, with reference to integrated management systems.</p>





<b>Topic:</b> Green
<b>PhD Program:</b> Business & Law
<b>Title:</b> The sustainability in the airport sector
<b>Affiliated Company:</b> SACBO SpA
<b>Short description of the research project:</b> <p>The project pursues the objective to develop a research activity related to the Sustainable Development Goals (SDGs) in the context of airports.</p> <p>The study will analyze the 17 SDGs, introduced with the Agenda of the United Nations in 2015, by explore which accounting and reporting practices, if any, are adopted to achieve sustainable performances.</p> <p>The research activity will be developed according to a qualitative approach which involves, in its first part, a literature review on the topic of SDGs to enable an overview of the topic and to outline its state of art.</p> <p>The second phase will involve a content analysis of sustainability reports of principle Italian and European airports with the scope to highlight the principle initiatives adopted to reach the SDGs and to detect possible similarities and/or differences between national and European contexts.</p> <p>The third part will be linked to the presence of the PHD student at SACBO SpA, the entity managing the airport services of Orio al Serio, for a 6-months period. During this time span the PHD student will explore accounting and reporting processes on sustainability by the means of interviews and data collection. Moreover, with reference to one or more SDG, identified in concert with the entity, will analyze and study the possible indicators aiming to measure the achievement/improvement of entity's sustainability performance.</p>
<b>Target of the research project:</b> <p>The project aims to realize, in its different phases, the following objectives: 1) a review of literature on the topic of SDGs to identify the state of art of the topic and the dimensions worth deepening with reference to airport sector; 2) an understanding - by the means of analysis of sustainability report of principle Italian and European airports - of the sustainability practices adopted in national and European contexts (and the related differences/similarities); 3) an understanding, through presence at the entity (SACBO SpA), of the motivations and/or criticalities behind the accounting and reporting processes and a support to the entity in the analysis and study of possible indicators aiming to measure the achievement/improvement of sustainability performance.</p>



<b>Topic:</b> Green
<b>PhD Program:</b> Business and Law
<b>Title:</b> Energy transition and business activity. ESG implication criteria in the management of the company and problems of harmonization with the liberal conception of the social interest
<b>Affiliated Company:</b> Saipem S.p.A.
<b>Short description of the research project:</b>  The research will have to investigate the impact of the recent enhancement - both in the context of EU legislation, both in the comparative context, and also on the part of private autonomy - of the so-called perspective ESG as a parameter to be taken into consideration in the choices of corporate bodies, having regard to the general conduct of the business or its key moments (eg, in defense against any hostile takeovers). In this direction, it is required that the study should focus primarily on a mapping of the Italian and European legislation on the subject, verifying the state of implementation of the so-called EU sustainability package, and then proceed to an analysis of the Italian and foreign literature on the subject of the relationship between the interest of the shareholders and the interest of the stakeholders, among other things by evaluating if the so-called shareholder's primacy still exists. In addition to the above, the research must try to draw the border line between the phenomenon of the pursuit of a social interest that is "enlightened" in the sense specified above, and the case in point of formalizing a constraint to the pursuit of social objectives, as is typical for benefit companies in Italy or b-companies at an international level. Finally, in defining the contents of the social interest in question, it will be necessary to assess whether it is possible to draw a distinction between the rules intended to insert ESG values within the same interest and those that can be considered careful to ensure the effective compatibility of the methods of realization of the social activity with the external interests of the stakeholders.
<b>Target of the research project: (Circa 10 righe / 1000 caratteri)</b>  The aim of the research is to clarify the terms of the modern case the interest of the Corporation, which includes the ESG perspective and therefore a relevant parameter for judging the compliance with the law of the shareholders 'resolutions and the correspondence of the directors' work to the mandate received. Having clarified the terms of the case, it will be necessary to verify which spaces the company board of directors actually has both in pursuing ESG objectives and in detaching from them, also in correlation with the contents of any non-financial information disclosed by the company. Correlatively, it must be clarified whether and in what sense the directors can be considered responsible, both internally and towards the stakeholders.



<b>Topic:</b> Green
<b>PhD Program:</b> Business and Law
<b>Title:</b> Taxation and Environmental Transition: The Case of the Plastic Tax
<b>Affiliated Company:</b> Serioplas Global Services S.p.A.
<b>Short description of the research project:</b> <p>The research project aims at investigating the specific goal of taxation, with particular attention to the case of the environment.</p> <p>For years the distinction between taxes with environmental purposes and environmental taxes in the proper sense has been discussed; the acceleration towards the so-called ecological transition has remained extremely topical and, above all, extremely practical.</p> <p>There are two lines of research.</p> <p>On the one hand, the project aims to systematize the issue of environmental taxes and, above all, to contextualise the existing regulations about the so-called plastic tax and regulatory proposals, also at the level of the European Union.</p> <p>On the other hand, the research activity analyzes the possibility of establishing a European tax on environmental matters, with specific reference to the so-called plastic tax. In this sense, the activity is part of the reform of the European Union's own resources and, specifically, the institution of a genuinely European tax.</p>
<b>Target of the research project:</b> <p>Firstly, the project aims to systematically place the so-called plastic tax within the Italian tax system. In particular, it will be necessary to verify whether it remains within the scope of taxes that affect an economic fact in the strict sense or not. This objective is part of the traditional studies of tax law, in accordance with the exegetical and systematic method.</p> <p>Secondly, it will be necessary to investigate the relevance of the tax for the purposes of the reform of the European Union's own resources, in order to ascertain the existence of its own competence in tax matters (this also in the context of the NextGen project).</p>



<b>Topic:</b> Green
<b>PhD Program:</b> Business and Law
<b>Title:</b> Sustainability in water distribution
<b>Affiliated Company:</b> Uniacque Spa
<p><b>Short description of the research project:</b></p> <p>The networks of potable water distribution, even if assume a fundamental role in our everyday life both in civil and industrial contexts, have recently recognized a constant increase of water loss by reaching to a situation where only the 58% (2018) of water injected in aqueducts reaches the final consumer.</p> <p>This situation and the challenges imposed by the SDGs, and, in particular, the SDG 6 “Clean water and sanitation”, require in-depth exploration of the topic on sustainability with relation to water and its management. So, the Research project is allocated in this context and has the target to investigate the topic of sustainability in companies performing water distribution.</p> <p>After a preliminary analysis of the sector and its characteristics, the research will study, through content analysis, the sustainability reports of main companies of water distribution sector and will pursue the objective to highlight the main initiatives adopted to achieve the SDGs and to detect eventual similarities and/or differences among different companies.</p> <p>The next phase of the Project will consist of a case study linked to the presence of the PHD student in the UNIACQUE SpA for a six-month period. During this phase, the PHD will explore, through data and information collected in the company, the sustainable dimensions pursued by the latter, and will collaborate to identify new possible dimensions to be implemented and with regard to the analysis and the study of possible indicators aiming to measure the sustainable performance.</p> <p>The PHD Student will also investigate, by the means of interviews, the eventual presence of forms of sustainability accounting and reporting, to the scope to understand the managerial motivations, processes, and eventual criticalities.</p>
<p><b>Target of the research project:</b></p> <p>The project aims to realize, in its different phases, objectives that involve: 1) the acquisition of knowledge on the water distribution and on its characteristics, under the perspective of SDGs and with specific reference to SDG 6 “Clean water and sanitation”; 2) the understanding, through the analysis of sustainable reports, of sustainable practices adopted by main companies of the water distribution sector, and of the differences/similarities among them; 3) the understanding, during the period of presence in the company (Uniacque SpA), of sustainable dimensions pursued by the affiliated company, as well as the interaction with the latter to identify new sustainable dimensions to be pursued and to study the eventual indicators.</p>



## PhD in ENGINEERING AND APPLIED SCIENCES

**Coordinator:** Prof. Valerio Re

**Scientific Area: 01 - Mathematics and informatics**

**02 - Physical sciences**

**03 - Chemistry**

**08 - Civil engineering and architecture**

**09 - Industrial and information engineering**

**13 - Economics and statistics**

### Curricula:

- **Technologies for Energy and Environment**
- **Technologies for the conservation, protection, restoration and environmental sustainability**
- **Technologies for computer science, automation and electronics**
- **Applied mathematics and statistics**

Duration	Positions	Positions covered by scholarships
3 years	8	8

### Scholarships:

- No. 8 financed by new ESF REACT-EU resources for the following Green research topics:
  - The role of gas turbines in the energy transition, between renewable energies and carbon-neutral fuels
  - Study of green fluids and lubricants for industry: electrochemical synthesis of hydrocarbons from renewable sources
  - Improving the energetic performance of industrial ovens by means of Economic Model Predictive Control
  - Analysis of innovative solutions based on the use of hydrogen in hard-to-abate sectors
  - Robotic systems for the primary packaging in the agri-food field at the aim to get a clean, climate neutral, sustainable and responsible production
  - Study of chemical coatings with low environmental impact for the development of functionalized, smart and recyclable high-performance textiles
  - PVC upcycling to be used in composite materials for electromagnetic shielding in a Circular economy perspective
  - Development of innovative sensors for low-power, low-environmental impact IoT platforms

### Modality of selection

type B - assessment of qualifications and interview

### Type of estimable qualifications:

*Qualification assessments (up to 60 marks):*

- academic career: up to 30 marks;
- research project: up to 20 marks;
- other qualifications, publications, letters of reference from Italian or foreign academics: up to 10 marks.



*Interview* (up to 30 marks):

The interview entails the discussion of the research project presented by the candidate to the purpose of assessing his capacity to convincingly discuss project preconditions and goals (up to 15 marks). The interview will also aim at assessing the candidate's attitude towards scientific research and his explanatory mastery in dealing with the themes of Innovation field or the themes related to the Green field (up to 15 marks).

**Linguistic competence:** English language; the knowledge of the Italian language shall be evaluated for foreign candidates.

**Interview date:**

16 november 2021 at 09:00 hours (Italian time) eventually continuing on 17 November, depending on the number of candidates participating to the interview. The interview may be held in the English language and may take place by videoconference. Candidates are required to communicate their email address at the time of application, to be contacted by the commission in the event of admission to the interview and in of its conduct in telematic mode.



<b>Topic:</b> Green
<b>PhD Program:</b> Engineering and applied sciences
<b>Title:</b> The role of gas turbines in the energy transition, between renewable energies and carbon-neutral fuels
<b>Affiliated Company:</b> Ansaldo Energia
<b>Short description of the research project:</b> <p>At the heart of the energy transition scenario is the need to reduce energy-related CO2 emissions to limit climate change: renewable energies have been becoming competitive with fossil fuels for electricity generation, where their share is expected to further increase in the upcoming decade. In the short terms the gas turbine engines will be the partner of renewables playing a vital role in the pathway toward transformation of the global energy sector from fossil-based to zero-carbon energy sources. Gas turbines can be used to absorb energy fluctuations of renewables in the grid, as well as provide immediate emission reductions using carbon-neutral fuels like ammonia, hydrogen, or bio-jet fuel. To stay competitive in the market, the new generation turbines shall be designed to quickly ramp up and down, start-up and shutdown promptly, and tolerate turndown to low output while complying with emissions regulations. Moreover, gas turbine engines are being pushed to the limits of thermal efficiency with a very high operating pressure ratio, consequently, there is a high demand for cooling and sealing to assure safe and sound operation throughout the operational envelope. Although transient regimes might represent a significant portion of the working time of industrial gas turbine in the next coming energy production scenario, the knowledge of the behavior at the minimum load condition of typical secondary air system components, and their interactions with main flow path, is nowadays limited. On the other end, the shift of gas turbine engine operation towards carbon-neutral fuels might require a modification in the combustor design, with consequences on the hot gas distribution entering the HP turbine stage. The design of first nozzle vane cascade thus should be reconsidered considering the swirling content of incoming gases, in order to control the generation of aerodynamic loss across the passage and a proper thermal protection of the exposed surfaces.</p>
<b>Target of the research project:</b> <p>The project develops experimental and numerical investigations on the area between the combustor and the first stator and the interface between rotor and stator components including the impact of characteristic turbine inlet velocity, temperature profiles and leakages (non-uniformities) on front stage components. Operating conditions including the minimum load will be considered with particular attention to the interaction between cavity and main flows and ingestion. Different flow conditions at the inlet of the first stator will be studied, in order to simulate realistic hot gas distributions downstream of a combustor fed by synthetic fuel. The goal is to increase the knowledge of the impact of minimum load conditions and possible modifications of the combustor on the behavior of the gas turbine, to extend its operational flexibility towards zero emission power generation. It is therefore a project aimed at reducing the impacts of climate change and promoting sustainable development.</p>



<b>Topic:</b> Green
<b>PhD Program:</b> Engineering and Applied Sciences
<b>Title:</b> Study of green fluids and lubricants for industry: electrochemical synthesis of hydrocarbons from renewable sources
<b>Affiliated Company:</b> Bellini S.P.A. with registered office in Zanica (BG)
<p><b>Short description of the research project:</b></p> <p>If the current annual oil consumption remained unchanged, it is estimated that the known reserves of crude oil would be sufficient to cover world needs no later than the next fifty years (ref. BP Statistical Review of World Energy 2016). For this reason, oil should not be used as a source of thermal energy, but as a raw material for the chemical industry in the production of synthetic materials.</p> <p>Vegetable oils and animal fats can replace petroleum as renewable and "green" sources of hydrocarbons. This project seeks technological solutions to convert fatty acid salts from renewable sources through the industrial use of Kolbe's electrochemical process.</p> <p>The Kolbe reaction is a long-known electrochemical reaction, which is based on the electrolysis of concentrated solutions of salts of carboxylic acids. The <math>R-COO^-</math> anions present in solution are oxidized at the anode with decarboxylation and formation of alkanes by union of intermediate radicals: <math>2R-COO^- \rightarrow R-R + 2CO_2</math>. Depending on the experimental parameters and the chemical structure of the transformed species, the reaction leads to the dimerization of these radicals, giving rise to hydrocarbon chains with a number of carbon atoms up to <math>(2n-2)</math> if the starting carboxylic acid has <math>n</math> carbon atoms. In practice, mixtures containing also alkanes and/or shorter alkenes due to fragmentation of radicals are obtained.</p> <p>In this framework, innovative electrodes will be studied in order to reduce anodic passivation from accumulation of solid hydrocarbon products on the electrode, this being an important obstacle to the industrial application of this process.</p> <p>For the manufacture of the anodes will be selected those materials free of noble metals that, depending on the composition, microstructure and electrical conductivity, will show the best resistance to passivation of the electrodes.</p> <p>The performance of the electrodes will be evaluated in an electrolysis cell suitable for the Kolbe reaction.</p> <p>The best operating conditions will therefore be sought for the productivity and efficiency of the conversion of fatty acid salts into long-chain hydrocarbons and their mixtures, to achieve the reaction yield of 80%.</p> <p>The company participating in the project is Bellini S.P.A. which is specialized in lubrication technologies. The PhD student will spend six months of the doctoral project at the laboratories of Bellini S.P.A., where the performance of the products obtained will be characterized.</p>
<p><b>Target of the research project:</b></p> <p>The project, of an interdisciplinary nature, aims to develop "green" technological solutions that starting from biomass allow the production of hydrocarbons through Kolbe electrolysis. The main objectives are the characterization and development of innovative electrodes for Kolbe electrolytic cells and the identification of the best process conditions.</p> <p>The first objective involves the development of metal electrodes, possibly not belonging to the platinum chemical group (e.g. nickel), and/or non-metallic electrodes equally effective in the production of long-chain hydrocarbons.</p> <p>The second objective is to determine the influence of some physical and chemical parameters (solubility of fatty acids, operating temperature, pH, etc.) on the productivity and selectivity of the process, on the achievement of the 80% yield and on the separability of the reaction products.</p>





<b>Topic:</b> Green
<b>PhD Program:</b> Engineering and applied sciences
<b>Title:</b> Improving the energetic performance of industrial ovens by means of Economic Model Predictive Control
<b>Affiliated Company:</b> SMITEC
<p><b>Short description of the research project:</b></p> <p>Industrial ovens are used in a wide variety of industrial applications, ranging from chemical to food-related production lines, to perform different kinds of heat treatments. They are equipped with one or multiple temperature sensors to monitor the heat inside them. In practice, their respective measurements are often used by feedback controllers to regulate the temperature(s) inside the chamber(s). The main objective of these algorithms is to handle the heat source in such a way as to follow a temperature reference signal. A properly designed control algorithm needs to maximize the temperature reference tracking performances while also minimizing the heat source consumption. This latter point is extremely important given that, often, industrial ovens are designed to operate for extended periods of times. Fundamentally, there is a trade-off between response time of the controller and heat source consumption. These control objectives, as well as the fact that industrial ovens are often Multiple Input Multiple Output (MIMO) systems, motivate the usage of Economic Model Predictive Model (EMPC). This algorithm explicitly penalizes control actions that result in a higher heat source consumption, while also keeping in mind the reference tracking performances. The expected results will be clearly measurable in terms of reduced energy consumption (kWh saving). Finally, this project allows an opportunity of different knowledge contamination between thermal energy management systems and electronic control systems with potential very high impact on the reduction of the energy consumption and consequently the environmental impact of so energy-intensive systems.</p> <p>The Work Breakdown Structure (WBS) of the project is the following:</p> <p><b>1. Work Package 1: State of the art analysis.</b> The main objective of this work package is to get the knowledge about the major theoretical topics involved in the project. Basic MPC theory, and Economic MPC formulations must be studied, as well as the process to be controlled itself, that is industrial oven.</p> <p><b>2. Work Package 2: Algorithms design and development.</b> The aim of the second work package is to exploit the knowledge gained by analysing the state of the art to incrementally design and develop algorithms that cover part of the requirements, until an algorithm that reaches all the goals is obtained. Particular attentions will be given to the formulation of a specific Economic MPC formulation that optimize energy consumption and allows to reduce emissions.</p> <p><b>3. Work Package 3: Algorithms application to real systems.</b> The goal of this work package is to exploit the obtained Economic MPC algorithm in a real industrial application. Specific method for MPC implementation in industrial environments will be studied.</p> <p><b>4. Work Package 4: Documentation writing.</b> The goals of this work package are the production of detailed documentation about the conducted research, including scientific articles, and the writing of the doctoral dissertation.</p> <p><b>Target of the research project</b></p> <p>The main objective of the project is to design, develop and test a computationally-friendly Economic MPC for industrial ovens, with the following features:</p> <ul style="list-style-type: none"> <li>• It should ensure that high production standards are maintained (quantitative measurable in terms of transient time and tracking accuracy),</li> <li>• It should minimize energy consumption and emissions, thus reducing operative costs (quantitative measurable in terms of saved kWh in comparison with the state-of-the-art software algorithms).</li> </ul>



- It should be easy to be implemented in an industrial environment.

In order to attain this main objective, many sub-goals have to be reached, that can be divided into theoretical and methodological goals, and application oriented goals.

From an academic point of view, the main expectation is the design of a working and mathematically elegant Economic MPC algorithm whose development can lead to the submission of one or more papers to sectorial conferences and international journals.

From an industrial perspective, the algorithm that will result from the completion of the project could attract the attention of companies that are interested in Economic MPC oriented to energy consumption minimization and emission cutting. However, real daily usage of such algorithm in an industrial context will strongly depend on its effectiveness and ease of implementation.



<b>Topic:</b> Green
<b>PhD Program:</b> Engineering and Applied Sciences
<b>Title:</b> Analysis of innovative solutions based on the use of hydrogen in hard-to-abate sectors
<b>Affiliated Company:</b> Tenaris
<b>Short description of the research project:</b> <p>This research project aims to assess the real potential of hydrogen for decarbonising hard-to abate sectors, beyond subsidies. The contribution of renewable energies to electricity generation is strictly related to the local availability of the various sources (solar, wind energy...) so that the energy mix may show different configurations depending on the specific application. The optimal storage configuration should consider the trade-off between cost-effectiveness and renewables penetration: storage systems, despite being expensive, can guarantee higher renewable fractions than stand-alone generation plants. As a result, component sizing in a power-to-gas system is crucial to promote the sustainability of the whole system. Nowadays, batteries are primarily used in power-to-gas systems for short-term storage to minimize electrolyzer cycling while compensating for transients and power peaks. Competition between hydrogen storage system and battery is open. In addition, most of the studies in the published literature deals with micro-grid applications, but new solutions that include hydrogen as an energy carrier should be designed on a larger size, with the goal of achieving the benefits of economies of scale.</p> <p>In the case of energy-intensive sectors that are difficult to decarbonize (such as steel/cement/glass production...) a combination of several renewable generators is devoted to the production of green hydrogen, which is then compressed and stored. Electrolyzer capacity and storage features should be defined in order to reduce investment costs and minimize the fossil fuel consumption of the whole production process, while meeting the constraints imposed by the end user.</p>
<b>Target of the research project:</b> <p>Given the different technological solutions that are emerging in the hydrogen supply chain, a parametric investigation is necessary to define the best configuration according to the application considered, adopting a system approach. The primary objective of this project is the performance improvement of each component operating in transient regime, in order to satisfy the hydrogen demand of the final user. With the help of dedicated software, the system composed by renewable generators, electrolyzer, compression station and storage will be simulated and optimized, according to different technical and economic scenarios. Multi-variable optimizations will be implemented with user-defined objective functions to obtain the best component sizing, under different constraints. Cost estimation, in terms of LCOE, is another expected outcome of this project.</p>



<b>Topic:</b> Green
<b>PhD Program:</b> Engineering and Applied Sciences
<b>Title:</b> Robotic systems for the primary packaging in the agri-food field at the aim to get a clean, climate neutral, sustainable and responsible production.
<b>Affiliated Company:</b> Mechatronics and Dynamic Devices srl
<b>Short description of the research project:</b>  The packaging of food products, fruit and vegetables is a fundamental process for the marketing of fresh products like the ones produced by lines dedicated to the production of gourmet products (fresh stuffed pasta, desserts, etc.) or by lines for the packaging of fruits and vegetables like apples, pears, apricots, etc. This kind of agri-food products is one of the strong points of the Italian production. About 10% of the Italian GDP is based on export of agri-food field. The production capacity of this kind of products strongly depends on the potential and on the characteristics of the packaging systems too. The packaging systems nowadays used in the agri-food field, especially for primary packaging, are mainly manual; operator works in hard conditions. Automation level is very poor and characterized by very low energy efficiency. The research project aims to identify robotic solutions for the agri-food field with high energy efficiency (so giving a contribution to the decrease of the CO2 footprint), high flexibility and adaptability with respect to the different needs of the Italian supply chains. Moreover, these solutions have also to contribute to the creation of an inclusive working environment where operator is lightened from the repetitious work nowadays needed mainly in the primary packaging phase. Moreover, in these kind of systems, special attention is needed for the manipulation of fruits and vegetables before the one-by-one packaging operation. Hence, it is quite evident that, besides the mechanical solutions related to the robotic system, there is the need to develop algorithms that give rise to an Artificial Intelligence system able to control both the whole packaging system and the single handling operations. Due to the nature of the products to be handled, those algorithms are also based on vision systems that allow a continuous modification of the actions exerted by the robotic arms, according to the position and the orientation of the product to be packaged. In conclusion, the topics of the project are well suited to the National Research Program 2011-2027 (PNR) and in the National Strategy of Intelligent Specialization (SNSI), being consistent with the relevant technological trends, subject areas, and intervention areas defined.
<b>Target of the research project:</b>  Target of the project is the identification of robotic systems for the primary packaging in the agri-food field at the aim to get a clean, climate neutral, sustainable, and responsible production. The main general target can be described in more details as follows: <ul style="list-style-type: none"><li>• Identification of very high energy efficiency for the decrease of CO2 footprint due to the primary packaging process.</li><li>• Identification of robotic systems and Artificial Intelligence for the primary packaging in the agri-food field.</li><li>• Reduction of the operators' working load on a production line for the packaging of Italian agri-food products, at the aim to make the packaging process socially inclusive.</li><li>• Digitalization of the packaging process for a higher production flexibility and traceability of the produced packages.</li></ul>



<b>Topic:</b> Green
<b>PhD Program:</b> Engineering and applied sciences
<b>Title:</b> Study of chemical coatings with low environmental impact for the development of functionalized, smart and recyclable high-performance textiles.
<b>Affiliated Company:</b> Centro Tessile Cotoniero e Abbigliamento SpA, Piazza S. Anna 2, Busto Arsizio (VA)
<b>Short description of the research project:</b>  The project proposes the study and development of chemical treatments with low environmental impact, in response to the demand for industrial production with high performance, able to fight climate change. In particular, the proposal aims to develop ceramic coatings, obtained via sol-gel, to functionalize textile materials, replacing the current high environmental impact treatments. Hybrid compositions deriving from alkoxysilanes in combination with organic compounds (from biological or renewable sources) will be investigated and characterized. The organic-inorganic combination will be applied to textiles to develop flame-retardant, water-repellent, antibacterial or stimuli-responsive properties for applications in emerging sectors. Properties of coatings will be studied by their thickness, structure and chemical composition. The project also includes the study of the removal of applied coatings to recover post-consumer materials, creating high value-added output. Moreover, thanks to the collaboration with the partner company, future PhDs will be allowed to: <ul style="list-style-type: none"><li>- enhance technological innovation in response to the changing needs of businesses;</li><li>- acquire transversal skills aimed at entering the labour market.</li></ul> The research will allow the students to acquire in-depth knowledge about green alternatives to current chemical treatments. Furthermore, thanks to the obtained results, it will be possible to make both the production chain and consumers aware of possible solutions with a low environmental impact. It will also be possible to investigate post-consumer material recycling. In the mid to long term, the dissemination of research results and cooperation with companies will lead to new production strategies. This will be in response to the principles of sustainable development and the demands of consumers who are increasingly aware of sustainability issues.
<b>Target of the research project:</b>  The goals of the project are to encourage young graduates to be engaged in a PhD program about topics oriented towards green chemistry and the promotion of sustainable development. The objectives are in line with the National Strategy for Intelligent Specialization (SNSI), to encourage the spread of an open approach to innovation and significant interchange between both research and manufacturing. The activities are also consistent with (a) the European Green Deal, the Circular Economy Action Plan and the new industrial strategy for Europe that have identified textiles as a priority sector; (b) the framework for research and innovation 2021-2027 (Horizon Europe), which identifies, among other things, sustainable-by-design advanced materials and technologies enabling the switch to decarbonisation in all major emitting industrial sectors; (c) the national program for research (PNR 2021-2027); (d) the program of the Cluster "MINIT Made-in-Italy".



<b>Topic:</b> Green
<b>PhD Program:</b> Engineering and applied sciences
<b>Title:</b> PVC upcycling to be used in composite materials for electromagnetic shielding in a Circular economy perspective
<b>Affiliated Company:</b> R.ED.EL. S.r.l. ( <a href="https://www.redel.it/">https://www.redel.it/</a> )
<p><b>Short description of the research project:</b></p> <p>The development of modern technologies has involved, in the last years, an exponential growth of wireless and communication systems with a consequent overexposure to electromagnetic radiations. Nevertheless, construction industry is still lacking effective and convenient solutions to this problem. The most decisive method in order to obtain an optimal shielding is still represented by the use of metal sheets, which overlap on the building envelope and take advantage of the Faraday cage principle. This produces both practical (the realization of these structures is not simple, since they are heavy and need specific skills, etc.) and economical problems.</p> <p>The study, carried out by the Department of Engineering and Applied Science of the University of Bergamo, together with the Department of Electronics and Telecommunications of Politecnico di Torino, after a survey of the state of the art, led to the development of an innovative composite material, with satisfactory and very promising performances.</p> <p>Starting from a cementitious matrix, the introduction of a second carbonaceous phase allowed to obtain interesting results, comparable with the ones of similar and more expensive products.</p> <p>Here it is proposed an improvement of this research, thanks to the contribution of a company that, dealing with the maintenance of power grids, can reuse PVC waste inside the composite material previously studied, keeping unchanged its shielding properties.</p> <p>In this way, environmental sustainability is aimed through a double action: on one side we can obtain a material which is capable of reducing electromagnetic radiations where it is requested; on the other side, we can recycle PVC coming from decommissioned power grids.</p>
<p><b>Target of the research project:</b></p> <p>This project has several purposes. First of all, it promotes the contamination of skills and knowledge, being it a strong multidisciplinary research. It indeed involves the sectors of Materials chemistry, Electromagnetic Fields and Building Production. The interaction between these disciplines is indeed essential in order to design and study new materials to be adopted in Construction industry.</p> <p>Moreover, this project promotes a synergic relationship with construction firms, carrying out a Technology transfer deriving from the ongoing research toward industrial production processes, which allow to promote their diffusion and marketing.</p> <p>This research has also the fundamental scope of the mitigation of polluting anthropic processes, both through the adoption of an electromagnetic shielding material and through the upcycling of PVC waste to be used inside the same shielding composite, in a Circular economy perspective.</p>



<b>Topic:</b> Green
<b>PhD Program:</b> Engineering and Applied Sciences
<b>Title:</b> Development of innovative sensors for low-power, low-environmental impact IoT platforms
<b>Affiliated Company:</b> STMicroelectronics
<b>Short description of the research project:</b> <p>The introduction and the widespread deployment of the IoT (Internet of Things) has led to the dissemination of increasingly smaller sensor nodes and with increasingly reduced power consumption capabilities, allowing a paradigm shift in many fields: from having few expensive and accurate sensors to many inexpensive, intelligent, interconnected sensors. Growth estimates of this sector predict that the number of connected devices in the world will rise from 30 billion in 2020 to 200 billion in 2030. Sustainability will be the driver to increase the spread of these devices. In total, the new technologies will save around 1.8 PWh of electricity in 2030 and an additional 3.5 PWh of fuel (hydrocarbon), with a total saving of 5.3 PWh of energy. In applications such as the environment protection and the green, sensors for the IoT allow, for example, to control air quality, to implement alarm systems that predict the occurrence of fires or some natural disasters. They are used in many areas of the world in intelligent irrigation systems that reduce water consumption by increasing yield and improving crop growth. They are also used to monitor and reduce household water consumption in periods of drought and for the reorganization of food-related supply chains, reducing the waste of food. This research activity aims to study and develop low-power or even self-powered IoT platforms, including hardware, firmware, algorithms/software, able to exploit emerging technologies such as inertial and environmental MEMS sensors, microphones, PMUT (Piezoelectric Micromachined Ultrasonic Transducers) and optical sensors to deal with new applications.</p>
<b>Target of the research project:</b> <p>The research project aims to combine the development of innovative technological solutions with the paradigms of sustainability and environmental protection. Indeed, the project plans to provide technologically advanced solutions in the industrial field, being addressed to the creation of high-performance smart sensors capable of efficiently using environmental energy (harvesting) to allow sustainability and eco-compatibility, both in terms of materials and process technologies. In particular, the activity will focus on the development of MEMS sensors and front-end electronics with very low-power consumption and on the design of systems to harvest energy from the environment in order to make them self-sufficient in terms of energy. Various energy harvesting techniques will be studied, compared and quantified by selecting the most promising solutions for powering IoT devices. The self-powered devices that the project aims to study and to design will be used in many fields of applications with important consequences on the national territory.</p>





**PhD in TRANSCULTURAL STUDIES IN HUMANITIES**

**Coordinator:** Prof. Franco Giudice

**Scientific Area: 10 - Antiquities, philology, literary studies, art history  
11 - History, philosophy, pedagogy and psychology**

Duration	Positions	Positions covered by scholarships
3 years	1	1

**Scholarships:**

- No. 1 financed by new ESF REACT-EU resources for the following Green research topic:
  - The Seas and the Mediterranean on the path to ecological sustainability: between technological innovation and experiential knowledge

**Additional access requirements:**

- For candidates with a qualification obtained abroad, the obligation to submit a certified translation of the degree certificate with the correspondence of the degree mark in cents;
- present a B2 level certification of English, French, Spanish or German or have obtained a degree in Foreign Languages, Literatures and Cultures;
- reference letters presented on headed paper with the autograph signature of the teacher who cannot belong to this PhD college.

**Modality of selection**

type B - assessment of qualifications and interview

**Type of estimable qualifications**

*Qualification assessments (up to 60 marks):*

- curriculum studiorum: up to 20 marks;
- research project: up to 40 marks;

*Interview (up to 30 marks):*

- Discussion of the research project (assessment of the candidate's capacity to convincingly discuss project preconditions and goals) up to 15 marks;
- relevance of demonstrated knowledge in the field of Innovation or green: up to 15 marks.

**Interview date:**

16 November 2020, at 09:30 hours (Italian time) eventually continuing on 17 November, depending on the number of candidates participating to the interview.

The interview may be held also in the English or French language and may take place by videoconference. Candidates are required to communicate their email address at the time of application, to be contacted by the commission in the event of admission to the interview and in of its conduct in telematic mode.





<b>Topic:</b> Green
<b>PhD Program:</b> Transcultural Studies in the Humanities
<b>Title:</b> The Seas and the Mediterranean on the path to ecological sustainability: between technological innovation and experiential knowledge
<b>Affiliated Company:</b> Daureka s.r.l.
<p><b>Short description of the research project:</b></p> <p>The aim of the research project is to read the challenges and uncertainties dictated by climate change "from the sea", in particular from the Mediterranean. The intention is to highlight the peculiarities of this heterogeneous social context, emphasising the specific role and centrality of the marine element in declining the upcoming challenges posed by climate change, and in the creation of practices and discourses functional to an ecological transition. By focusing on the processes of change that animate marine spaces, the project raises the question on how changes in governance policies call into question broad issues related to the management of resources and to the existing production systems.</p> <p>For this purpose, we want to problematise the role of the technological contribution in the pathways towards sustainability in the nautical industries, revealing the interconnections with alternative models of thinking about the sea, able to build a relationship of interdependence in continuity with global economic policies but capable of questioning dominant assumptions and conceptions regarding the quest for sustainability. Investigating the spaces of the nautical industry makes it possible to connect the specificities of the sea to terrestrial dynamics, analysing how the temporality of progress can be differently declined; how the race towards sustainability can be connected to heterogeneous spatial-temporal conceptions.</p> <p>The ethnographic research focuses on the company Daureka s.r.l., an excellence in the Italian nautical industry with a great propensity for innovation, where the renewed ecological sensitivity that animates current entrepreneurial policies influences the company's ethical choices. By connecting ethics and technology, the entrepreneurial dimension encounters a maritime knowledge that penetrates the closed and aseptic spaces of industrial production.</p> <p>The 'culture of the sea' that permeates the subjectivities that run through the enterprise is interconnected with corporate business and the economy of capital. Going beyond static notions, the aim is to focus on the transformative capacities of the different spheres of discourse and the evolution of corporate policies, considering the ecological challenges, the economic needs, the maritime experiential knowledge of the actors that animate the company, towards a green turn.</p>
<p><b>Target of the research project:</b></p> <ol style="list-style-type: none"><li>1. To investigate the specificities of the sea in shaping perceptions and sensitivities, in relation to the ability to rethink a production and economic system that poses a constant threat to the marine and terrestrial environment. To propose a reflection that can connect the peculiar space-time perception dictated by being at sea with the political need to think about alternative models of everyday management in an ecological perspective.</li><li>2. To bring continuity, through ethnographic research within the above-mentioned nautical company, to the relationship between economy and ecology, revealing the generative capacities of the maritime peculiarity in the redefinition of power relations and entrepreneurial directions to follow.</li><li>3. To contribute to the anthropological debate on issues relating to the conceptualisation of the sea. To investigate the capacity of the sea in shaping practices and discourses and how much these can be at the basis of an identity construction of specific subjectivities such as sea workers, navigators, entrepreneurs.</li><li>4. To reflect from an anthropological perspective on the role of the sea in the future in the definition of practices, policies, and spaces of individual and collective action. To highlight the interconnections and relationships with the perception of the present and the past within the challenges launched by the fight against climate change.</li></ol>



**PhD in TECHNOLOGY, INNOVATION AND MANAGEMENT (TIM)**

**Coordinator:** Prof. Renato Redondi

**Scientific Area: 09 - Industrial and information engineering**

Duration	Positions	Positions covered by scholarships
3 years	8	8

**Scholarships:**

- No. 8 financed by new ESF REACT-EU resources for the following Green research topics:
  - Optimization of airport activities and airline networks to minimize environmental impact
  - The integration between innovation and environmental reporting for the achievement of sustainable development goals
  - Competences, resources, and impact of green innovation: development of an advising and assessment model for family businesses
  - Development of techniques and methodologies for the definition of best practices for the green improvement of industrial products and processes in the electrical equipment sector
  - Identification and implementation of innovative telemedicine solutions lead to ecological and digital transaction
  - Digital rehabilitation: innovation of rehabilitative systems for chronic and acute patients driven by sustainable development in terms of social, environmental, and economic impacts
  - Product-service systems (PSS) engineering and operations for circular economy
  - Environmental Total Cost of ownership (eTCO)

**Contracted structures:** University of Naples "Federico II"

**Modality of selection**

type B - assessment of qualifications and interview

**Type of estimable qualifications:**

*Qualification assessments* (up to 60 marks):

- *curriculum studiorum*: up to 20 marks;
- research project, with assessment of its relevance to the reference topics of the doctoral program: up to 40 marks;

*Interview* (up to 30 marks):

- discussion of the research project (assessment of the candidate's capacity to convincingly discuss project preconditions and goals, assessment of the candidate's attitude towards scientific research and his/her explanatory mastery in dealing with doctorate topics), including its relevance for the fields of green: up to 30 marks.

**Linguistic competence:** English language; the knowledge of the Italian language shall be evaluated for foreign candidates.

**Interview date:**

17 November 2021 at 08:30 hours (Italian time).



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dottorale

The interview may be held in the English language and may take place by videoconference. Candidates are required to communicate their email address at the time of application, to be contacted by the commission in the event of admission to the interview and in of its conduct in telematic mode.



<b>Topic:</b> Green
<b>PhD Program:</b> Technology, Innovation and Management
<b>Title:</b> Optimization of airport activities and airline networks to minimize environmental impact
<b>Affiliated Company:</b> To70
<b>Short description of the research project:)</b> <p>Improving the environmental impact is a challenging goal for the transport industry, and in particular for the air transport sector. In this context, the production and use of "green" aircraft with electric or hydrogen propulsion that can gradually replace the fleets used by airlines, is only expected from the next decade. In this transitory period, the containment of the environmental impact of air transport can be achieved by optimizing airport and airline activities with current technologies.</p> <p>The first part of the project identifies the actions required to reduce CO2 emissions "on the ground" related to airport activity, for example by optimizing the flows of operations, optimizing the use of taxi ways, and for airport handling operations. This area also includes the assessment of environmental, logistical and economic sustainability linked to the supply of biofuels or synfuel, which will represent an important opportunity to contain the environmental impact in the coming years.</p> <p>The second area of the project concerns the study of how to make the networks offered and the aircraft currently used by the airlines more sustainable. In this context, in particular, the hub &amp; spoke and point-to-point configurations will be analyzed and compared to identify actions to reduce CO2 emissions while meeting the expected demand, using the fleets and technologies currently available by the airlines. That will also consider the quantity of fuel on board (tank) and on the possibility of being able to refuel from biofuels / synfuel in a part of the airports of the network.</p>
<b>Target of the research project:</b> <p>To identify possible environmental impact reduction activities related to the ground operations carried out within the airport and the management of airlines fleets.</p> <p>To contribute to the scientific literature of the field, by publishing the results of the research, and presenting them at specific conferences and seminars.</p> <p>To promote the exchange of knowledge and skills between the University and the company, in order to encourage the development of innovative services to increase the environmental sustainability of air transport.</p>



<b>Topic:</b> Green
<b>PhD Program:</b> Technology, Innovation and Management
<b>Title:</b> The integration between innovation and environmental reporting for the achievement of sustainable development goals
<b>Affiliated Company:</b> Cotonificio Albini Spa
<b>Short description of the research project:</b> <p>The doctoral project proposal will be based on the knowledge creation and implementation of three principles related to the green economy:</p> <ul style="list-style-type: none"><li>• GREEN INNOVATION (Green Innovation - GI): product, process, service and technology innovation that minimizes environmental impacts and maximizes the efficiency and effectiveness of the related product, process, service and technology. The application of this practice allows to reduce the waste of the organization and, at the same time, saves the resources destined to future generations, thus achieving sustainability standards in line with the Sustainable Development Goals (SDGs).</li><li>• REPORTING (Green Innovation Reporting - GIR): applying green innovation in the company should include the inclusion of reporting practices. In this way, the company becomes productive in planning, organization and management to achieve green innovation standards and increases its competitive advantage over its competitors. At the same time, management increases its awareness of environmental challenges.</li><li>• INNOVATION MANAGEMENT SYSTEM (ISO 56002-2021): the certification that helps companies identify risks and opportunities and mitigate the risk associated with innovation. It can be considered an important tool for improving corporate reputation, which highlights the company's ability to innovate, adapt and manage uncertainty to investors. The adoption of the ISO 56002 certification enhances the innovative image of the company, which also acts as a green signal for innovation investors.</li></ul> <p>Albini_next, Innovation Hub of Cotonificio Albini Spa, was created with the aim of bringing green (or sustainable) innovation to the textile sector.</p> <p>What is missing, in this context, is the implementation of specific sustainable innovation management practices and related reporting.</p>
<b>Target of the research project:</b> <p>The PhD project aims to:</p> <ol style="list-style-type: none"><li>1. Identify and implement innovation and sustainability management practices, as well as assess their effects on the main performances, in the textile context, in order to outline best practices useful for the sustainable revolution of the entire supply chain;</li><li>2. Contribute to the scientific literature on sustainable supply chain and operations management;</li><li>3. Promote the creation of shared knowledge between the academic and industrial world;</li><li>4. Develop technology transfer activities from research to business.</li></ol>



<b>Topic:</b> Green
<b>PhD Program:</b> Technology, Innovation and Management
<b>Title:</b> Competences, resources, and impact of green innovation: development of an advising and assessment model for family businesses
<b>Affiliated Company:</b> BIP (Business Integration Partners), <a href="https://www.bipconsulting.com/it/">https://www.bipconsulting.com/it/</a>
<b>Short description of the research project:</b> The project aims to study how small and medium-sized enterprises develop competences in, invest resources for, and evaluate the impact of innovation specifically aimed at environmental sustainability. The object of analysis is the comparison between family and non-family businesses: in fact, the limited availability of resources, on the one hand, and the far-sightedness and strength of relationships, on the other, which distinguish family businesses (especially small and medium-sized), challenge investments in innovation aimed at environmental sustainability. The PhD program focuses on the analysis of technologies, development of new products, services or business models and their effect on the reduction of environmental impact (e.g. CO <sub>2</sub> emissions, eco-friendly materials, reduction of raw material waste, etc.), also investigating what competences and resources are specifically deployed by small and medium-sized enterprises (family and non-family) for environmental sustainability. The expected output consists in the creation of a model of advising and assessment for green innovation which considers governance (and in particular the "family" dimension of the shareholder structure) as a key element, and which will be developed, tested and generalized with the support of the affiliated company.
<b>Target of the research project:</b> The project's main objective is to generate knowledge on the subject of environmental sustainability in small and medium-sized enterprises, with particular attention to green innovation with a comparison between family and non-family businesses. The PhD student will have the opportunity to study the impact of innovation on environmental sustainability using rigorous research methodologies in order to contribute with new knowledge and innovative models aimed at supporting sustainable entrepreneurial paths. The interest in these issues in the context of family businesses plays a pivotal role for the research team, which considers this PhD project an opportunity to consolidate knowledge of the phenomenon and return best practices and innovative models of sustainable entrepreneurial dynamism to the territory, as well as to contribute to the international debate through top-ranked scientific publications.



<b>Topic:</b> Green
<b>PhD Program:</b> Technology, Innovation and Management
<b>Title:</b> Development of techniques and methodologies for the definition of best practices for the green improvement of industrial products and processes in the electrical equipment sector.
<b>Affiliated Company:</b> ABB Sace (Bergamo)
<b>Short description of the research project:</b> <p>The project consists in the proposal of a formal methodological procedure for the guided and systematic generation of environmental product declarations. The procedure is designed for all those companies having wide product catalogues, numerous production processes and wanting to adopt ISO 14040, 14044 and 14025 standards to apply the LCA methodology.</p> <p>The study of the methodology will be carried out in collaboration with the multinational ABB, world leader in the production of electrical equipment, which will make available the production data of its Italian plants in Bergamo, Frosinone and Dalmine. The entire workflow will be formalized in order to subsequently allow its use within all the other divisions of the group worldwide.</p> <p>More specifically, Life Cycle Inventory (LCI) procedures will be defined to optimize the management of data entry and minimize the possibility of errors introduced during data collection and compilation.</p> <p>Ad hoc tools will also be studied for the presentation and organization of the results obtained from each LCA study, in order to facilitate their analysis and identification of the major critical issues in preparation for the subsequent Eco-design phase. Even for this phase, the adoption of ad hoc procedures for minimizing the environmental impacts is planned in order to stimulate the company to adopt green procedures in the very early stages of new products design.</p>
<b>Target of the research project:</b> <p>The objectives of the doctorate are two. The first objective is to improve the production of environmental product declaration of products and their variants, optimizing or developing from scratch horizontal sharing tools that can be shared between the various functions of the company group. The second objective consists in the development of good eco-design practices dedicated to support the early stages of product development, with a view to a stage gate process. In this case, the designers will be supported in defining more environmentally sustainable products.</p>



<b>Topic:</b> Green
<b>PhD Program:</b> Technology, Innovation and Management
<b>Title:</b> Identification and implementation of innovative telemedicine solutions lead to ecological and digital transaction
<b>Affiliated Company:</b> Mediaclinics S.r.l. - <a href="https://www.mediaclinics.it/en/">https://www.mediaclinics.it/en/</a>
<b>Short description of the research project:</b> <p>The research project studies methods and tools to design sustainable telemedicine solutions to preserve the ecosystem and overcome the crisis created by the COVID-19 pandemic. The solutions will need to consider the guidelines made available by the United Nations (UN) Agenda 2030. The research effort will need to consider environmental, economic, and social sustainability to guide a proper ecological and digital transition of future telemedicine applications.</p> <p>The research project will focus on the analysis of the impact of telemedicine practices aimed at reducing the pressure on hospitals by means of the implementation of remote services, especially for the most peripheral areas. The social impact and the difference between the traditional communication of physicians with patients and the remote monitoring of patients with critical diseases or conditions will be evaluated.</p> <p>The Ph.D. student will investigate how the telemedicine may improve the management of territorial and domestic courses of treatment and ensure the patients' lifestyle in their daily context. An analysis of hospital processes will be conducted to assess the impact of introducing telemedicine using enabling technologies and innovative devices (e.g., wearable sensors, VR, AR, motion capture systems, rehabilitation robots).</p> <p>The developed tools for sustainability will be validated by considering case studies in collaboration with both private and public local hospitals and the company Mediaclinics for the technological part.</p>
<b>Target of the research project:</b> <p>The primary objective of this research project is to design methods and develop tools to assess the sustainability of adoption of telemedicine applications for hospitals.</p> <p>The specific objectives are as follows:</p> <ul style="list-style-type: none"><li>• An assessment of the current telemedicine systems used at the hospitals that will be involved in the project to identify the parameters necessary to evaluate sustainability in its various declinations. A cost-benefit analysis will be performed during the evaluation of telemedicine platforms.</li><li>• Definition of guidelines and ontologies in a digital transition perspective by means of a knowledge-based approach. The defined ontologies will be used to assess the level of sustainability of the telemedicine solution.</li><li>• Implementation of the tools and their evaluation by means of the application to real case studies in collaboration with local involved hospitals and the industrial partner Mediaclinics.</li></ul>





<b>Topic (Green/Innovation):</b> Green
<b>PhD Program:</b> Technology, Innovation and Management
<b>Title:</b> "Digital rehabilitation: innovation of rehabilitative systems for chronic and acute patients driven by sustainable development in terms of social, environmental, and economic impacts"
<b>Affiliated Company:</b> Mediaclinics S.r.l. - <a href="https://www.mediaclinics.it/en/">https://www.mediaclinics.it/en/</a>
<b>Short description of the research project:</b> <p>Nowadays, motor and neuro-cognitive rehabilitation processes requires a huge amount of resources to guarantee the direct communication between clinicians and patients. Several aspects make the rehabilitation processes highly impactful, such as the resource consumption and emissions, the need of caregivers and social assistance, and the economic resources needed. Logistics issues are one of the most problematic limitations to perform complete rehabilitation processes by reducing the compliance and thus, the global effectiveness of the patients' recovery. The rehabilitation may be considered as a highly impactful process for both family and community budgets, which may be also in charge to public institutions. The economical resources (e.g., costs for transportation, involved medical personnel and medical devices) are usually the bottle neck that limits the correct duration of a rehabilitation process.</p> <p>In such a context, there is an evident lack of solutions which allow easily performing rehabilitation remotely and guaranteeing the safety requirements of the activity carried out, including innovative and efficient services from an environmental, social, and economic point of view.</p> <p>The project investigates the use of technologies for the remote monitoring of rehabilitation exercises aiming to make more autonomous the patients both at home and in facilities. For example, specific motion capture devices can make available motion data remotely to help patients and clinicians in synchronous and asynchronous way. A digital system will be developed to monitor and optimize the employed resources according to the social sustainability: guaranteeing the best remote rehabilitation service for patient far from the hospitals, making available medical solutions with a high level of usability for both clinicians and patients, guaranteeing decentralized and automated services for rehabilitation.</p> <p>Furthermore, the designed solutions will have a strong impact in terms of economic sustainability by reducing the costs for rehabilitation.</p> <p>Appropriate metrics will be developed for the evaluation and quantification of the impacts generated by the designed solutions by involving public and private hospital entities, local communities, ATS and the contracted company Mediaclinics.</p>
<b>Target of the research project:</b> <p>The aim is the development of IT solutions to perform rehabilitation activities independently for patients with acute or chronic diseases by overcoming the limits of the traditional context. Optimization systems will be designed to analyze how to employ resources to complete an adequate rehabilitation process. The resource optimization will be based on the measurement of parameters useful to quantify the variation of environmental, social and economic impacts.</p> <p>The specific aims are described in the following list:</p> <ul style="list-style-type: none"><li>• Overview of the actual rehabilitation context and analysis of the rehabilitative practices for several illness or injuries</li><li>• Design of methods and digital tools for remote rehabilitation</li><li>• Development of metrics of evaluation to quantify the variation of environmental, social and economical impacts</li></ul>



- Implementation of demonstrators based on the designed solutions by involving public and private hospitals, local and regional public administrations (e.g., ATS) and local communities
- Environmental, social, and economic quantification of the developed models



<b>Topic:</b> Green
<b>PhD Program:</b> Technology, Innovation and Management
<b>Title:</b> Product-service systems (PSS) engineering and operations for circular economy
<b>Affiliated Company:</b> ABB Spa
<b>Short description of the research project:</b> <p>The PhD project is part of the research line of servitisation and, in particular, of industrial product-service systems (PSS), i.e. the integrated system of products, services, supporting infrastructures and networks that constitute a single solution in response to customer needs. In fact, product-service systems are considered a means to foster the circular economy, as they provide services related to the product (i.e. the industrial asset) that optimise its use and extend its life cycle. Nevertheless, the engineering and operational management of PSSs from a circular economy perspective is a topic that has been underdeveloped in the literature, but with high potential thanks to the possibilities offered by new technologies to monitor product performance in real time and to extract useful information to make "data-driven" decisions. This implies, on the one hand, the lack of guidelines for the development and implementation of 'circular' PSS and, on the other hand, the difficulty in understanding and implementing these concepts in industrial contexts. Hence the need to develop new methodologies for the design and engineering of "circular" PSS (how to define and implement the right offer for the customer) and how to manage and monitor it from an operational point of view throughout the life cycle.</p> <p>In this context, the PhD project will focus on the engineering of PSSs for the circular economy and on the definition of a methodology to support decision makers in dynamically assessing the environmental impact of a PSS along its life cycle, thanks to data obtained directly from the field in order to minimise the use of resources during the life cycle of the PSS.</p>
<b>Target of the research project:</b> <p>The engineering and operational management of PSS is subject to uncertainties and complexities and raises new managerial challenges, related to the need to rethink the internal activities of the provider at both strategic and tactical levels, and to the management, throughout the life cycle, of the solution and the relationship between the stakeholders involved in the service delivery. In this context, the PhD project aims to:</p> <ul style="list-style-type: none"><li>- define an engineering approach for the development of PSS for the circular economy</li><li>- identify a methodology and criteria for dynamically assessing the environmental impact of a PSS, mainly in terms of reduction of resource consumption throughout the life cycle</li><li>- develop a data-driven method to support decisions to reduce resource consumption throughout the life cycle of the PSS. This activity may include the development of simulation models (e.g. Life Cycle Simulation) that allow the total lifetime cost (economic and environmental) of a PSS to be assessed, with updates based on current conditions of use.</li><li>- validate and apply research results in an industrial context.</li></ul>



<b>Topic:</b> Green
<b>PhD Program:</b> Technology, Innovation and Management
<b>Title:</b> Environmental Total Cost of ownership (eTCO)
<b>Affiliated Company:</b> SMI Spa
<b>Short description of the research project:</b> <p>The PhD project grounds in the research field of asset life cycle management, considering both product and service perspectives. A more efficient use of assets (i.e. a machine or an industrial plant) and materials, minimizing their resource consumption and maximizing their useful life, allows to implement a green economy, that aims at mitigating the environmental impacts and at ensuring, at the same time, economic prosperity. The adoption of low-impact practices by companies is not widespread yet, not because of technological limitations, but often due to the inability of companies to quantify the economic cost and the environmental impact of the solutions along the entire asset life cycle, i.e. from the design, production, to use and the end of life (disposal or recycling). Therefore, to stimulate the adoption of green practices, companies need easy-to-use tools to (i) define the most appropriate practices for their industrial assets, (ii) measure the environmental impact of these practices along the asset life cycle, (iii) measure the asset cost of ownership throughout the entire life cycle. Indeed, thanks to the implementation of new technologies, the environmental impact and the cost of ownership can be updated based on the actual use data. In this perspective, it is necessary to support companies in defining a method for selecting the most suitable green practices to be implemented along the asset life cycle that represent a trade-off between environmental impact and costs.</p> <p>The PhD research is based on the definition of a dynamic method, based on the data collected in real time from the asset, for the calculation of the total cost of ownership from an environmental point of view (eTCO – environmental Total Cost of ownership). Thanks to the possibility of calculating, simulating and comparing different use scenarios, it is possible to identify practices that allow to maximize the trade-off between ownership costs and environmental impact considering the entire life cycle.</p>
<b>Target of the research project:</b> <p>To foster the spreading of green practices in the manufacturing context, companies need dynamic decision-support methods that, considering a life cycle perspective and leveraging on data collected in real time from the assets, allow them to quantify and find the best trade-off between economic cost and the environmental impact of the proposed solutions.</p> <p>In this context, the PhD project aims to:</p> <ul style="list-style-type: none"><li>• Literature analysis on Total Cost of Ownership, Life Cycle Costing and Life Cycle Assessment</li><li>• Definition of a dynamic eTCO model for application on an industrial asset</li><li>• Definition of the architecture necessary for the application of eTCO in industrial contexts</li><li>• Verification of the model in virtual environments</li><li>• Validation of the model in a business context with real data</li></ul>



## PhD in HUMAN SCIENCES AND WELFARE INNOVATION

**Coordinator:** Professor Giuseppe Bertagna

**Scientific Area:** 11 - History, philosophy, pedagogy and psychology  
14 - Political and social sciences

Duration	Positions	Positions covered by scholarships
3 years	4	4

### Scholarships:

- No. 2 financed by new ESF REACT-EU resources for the following Green research topics:
  - The economy of prevention: new models of circular economy
  - Water communities
- No. 2 financed by new ESF REACT-EU resources for the following Innovation research topics:
  - Human resources training in SMEs - strategies and innovation themes of soft skills development, proactivity, individual responsibility and safety training in the workplace.
  - Digitization and Social Innovation in psycho-pedagogical welfare services in primary care

### Modality of selection

type B - assessment of qualifications and interview

### Type of estimable qualifications

*Qualification assessments (up to 60 marks):*

- up to maximum 20 marks for the assessment of the curriculum;
- up to maximum 40 marks for a submitted research project;

*Interview (up to 30 marks):*

- discussion of the research project (assessing capacity by the candidate to convincingly discuss project preconditions and goals): up to 15 marks;
- General knowledge of the themes of Innovation field or the themes related to the Green field (up to 15 marks):

**Linguistic competence:** English language; the knowledge of the Italian language shall be evaluated for foreign candidates.

### Interview date:

Tuesday 16 November at 11.30 (Italian time) eventually continuing on 17 November, depending on the number of candidates participating to the interview.

The interview can be held in English and may take place by videoconference. Candidates are required to communicate their email address at the time of application, to be contacted by the commission in the event of admission to the interview and in of its conduct in telematic mode



<b>Theme:</b> Green
<b>PhD Course:</b> Personal Sciences and New Welfare
<b>Project title:</b> The economy of prevention: new models of circular economy
<b>Affiliated company:</b> Linea Gestioni Via del Commercio, 29 – 26013 Crema (CR)
<b>Short description of the project:</b> <p>The research aims to rethink the processes of production and consumption, develop new models of social investment and experiment with alternative forms of integration, transforming "waste" into a resource with high socio-economic added value. This is done through a cultural approach supported by some specific tools, such as new technologies, processes, services and creative business models able to redefine the economic framework of society in its different aspects. It is very important to start from the new pandemic context and finalize the research on some innovative experiences that could be conceived, created, disseminated on a territorial scale. The reference context, however, cannot be only the local one, it must take into account both global trends and the economic situation. In this global perspective, strategic documents such as the 2030 Agenda for Sustainable Development and PNR will be referenced. In this perspective, scientific research will assume a very important role if crossed with business prospects related to the world of services.</p> <p>Among the experiences there is that of the "reuse counter", started in the province of Brescia and replicable on a large scale. In this perspective, the work aims to improve, expanding it, this experience to a new approach aimed at consolidating the starting data and the reference contexts; standardize new performance indicators useful to measure the real impact of this action; analyze the "narrative" and "qualitative" network of the "bench system"; consolidate the IT technical structure of the reference software; make the model sustainable and reproducible (widening the audience of beneficiaries); create a rigorous monitoring system that can be used by different targets (bodies, associations, businesses, citizens); integrate economic results on a corporate basis with those of a social nature relevant for the development of communities.</p>
<b>Project objectives:</b> <ul style="list-style-type: none"><li>• strengthen the degree of innovation of the host company and the internal modernization processes</li><li>• promote the sense of equity and social inclusion and related (corporate) policies</li><li>• promote and encourage environmental sustainability</li><li>• consolidate public and private research by raising the quality of life, knowledge and the economic and productive system of the territory taken as a reference</li><li>• implement the degree of involvement of public and non-public bodies</li><li>• reduce the fragmentation of interventions addressing related but disjointed objectives</li><li>• structure the "reuse bench" model with a view to greater replicability</li><li>• improve the indicators of success and impact both at the territorial level and at the new strategic "business" level</li><li>• meet the challenge of paradigm shift in the most effective way</li><li>• structuring the lines of intervention by orienting the company's priorities towards sustainability issues"</li><li>• accelerating the transition to economic, social and environmental sustainability</li></ul>



<b>Topic:</b> Green
<b>PhD Program:</b> Human Sciences and Welfare Innovation
<b>Title:</b> Water communities
<b>Affiliated Company:</b> Acque Bresciane s.r.l via Cefalonia 70, Brescia (registered office)
<b>Short description of the research project:</b> <p>During the three-year period, the research project intends to analyse the territory of Brescia through the element of "water" and according to different perspectives: from the historical-cultural to the technological-environmental field. The reference area of the municipalities supplied by the hosting company allows for the creation of a system that collects landscape, cultural, anthropological indicators. These can be converted into "museums" through the construction of a virtual space with exhibiting (i.e., enhancing the peculiarities of individual territories) and prevention functions against the dispersion of this natural heritage which is fundamental for life. In addition, the system would provide mapping of critical water, hydrogeological, urban, and distributional issues. The combination of the historical-cultural and technical themes delivers an exhaustive interpretation of the context with a view to a renewed "care of the territory" through a cross-sectional survey made up of analyses, census, mapping, valorisation, digitalisation and media use. One of the most significant indicators will be the level of cohesion that the bodies involved will be able to establish among themselves, as a result of the interaction between analyses, tools and resources. In this perspective, the "workforce" factor, combined with increased skills, could be interesting from the point of view of redirecting company policies: on the one hand, the deepening of technical issues related to the unique features of the integrated water service; on the other, the expansion of growth prospects in terms of territorial marketing.</p> <p>Finally, the project also aims to strengthen the role of the integrated water service manager not only as a "technical" or "supplying" interlocutor, but also as a "facilitator" with respect to the importance of water as a symbolic, cultural, educational, socio-economic, productive element, etc. and, last but not least, as a precious asset to be safeguarded in all its phases of use (collection, distribution, treatment, disposal, recovery, etc.).</p>
<b>Target of the research project:</b> <p>The research project's main objectives are:</p> <ul style="list-style-type: none"><li>• to increase transversal business skills</li><li>• to consolidate the "public" role of the company in terms of community benefits and innovation</li><li>• to provide stakeholders with new tools for cultural fruition</li><li>• to provide stakeholders with useful tools for a more effective valorisation of the territory</li><li>• to "hybridise" business processes in order to achieve new effects on the territory and its human capital</li><li>• to enhance employment prospects</li><li>• to strengthen the level of cohesion between the bodies involved</li><li>• to convert the cultural, landscape and human heritage into "museums" in an innovative and most accessible way</li><li>• to create new "educational" tools and materials</li><li>• to systematise the "water" heritage of the Province of Brescia</li><li>• to identify criticalities and potentialities of the water system, not only in terms of infrastructures</li><li>• to design new professional figures</li></ul>





<b>Topic:</b> Innovation
<b>PhD Program:</b> Human Sciences and New Welfare
<b>Title:</b> Human resources training in SMEs - strategies and innovation themes of soft skills development, proactivity, individual responsibility and safety training in the workplace.
<b>Affiliated Company:</b> Ved sas di Rota Vittorio & C.
<b>Short description of the research project:</b> <p>The aim of the research project is to map a set of training practices and updates for companies within human resources development, transversal skills training and safety at work. Starting from the knowledge of the main pedagogical theories on the theme of vocational training in company, on lifelong and lifewide learning, the research project aims of observe, experiment, analyse and evaluate the use of innovative strategies like gaming, "Personal Upgrade" method, new technology, social media, for skills training in the human capital of SMEs. The observation and the experimentation of these innovative training strategies realized by Ved Consulting, which are also related with safety at work, will offer the possibility to collect concrete data on the effectiveness and the value of these strategies for professionals. The candidate will have the task during the three-year period of the PhD, not only to design, observe and experiment (under the supervision of the company tutor and the academic tutor) these training strategies, but also to analyse the effects and value of these strategies. For this reason, questionnaires, in-depth qualitative interviews and focus group are planned with the professionals of the different companies that have attended the training courses. In order to have an adequate monitoring, it is previewed a recognizing survey through questionnaires before providing training and, subsequently, interviews and focus groups to assess the benefits, or any limitations, of the training strategies realized. The monitoring processes of the skills acquired by professionals and the benefits in terms of business innovation will be realised, in different forms, in the light of pedagogical, sociological and psychological literature on the topic, immediately after the end of the training courses, after 6 months and after 12 months.</p>
<b>Target of the research project:</b> <p>The main aim of the project is to build good practice for the implementation of a vocational training capable of promoting skills, and, therefore, innovative processes in the human capital of small and medium-sized enterprises. This will be achieved through two parallel strategies that the PhD student will have to accomplish: 1) mapping existing good vocational training practices on national territory through the use of digital tools reconsidered in the light of pedagogical paradigms and literature of the topic; 2) observation and analysis of the effectiveness of practical training carried out in the company by Ved Consulting, in particular in Lombardy region.</p> <p>A further objective is the organisation of public seminars and at least two scientific articles of the topic that will be published in scientific "A" journals in the field of pedagogical dimension for the dissemination and the sharing of the research results (besides, of course, the thesis of the PhD).</p>





<b>Topic:</b> Innovation
<b>PhD Program:</b> Sciences of the person and new Welfare
<b>Title:</b> Digitization and Social Innovation in psycho-pedagogical welfare services in primary care
<b>Affiliated Company:</b> SAN FRANCESCO GROUP Srl
<b>Short description of the research project:</b> <p>The context of the project is the digitalization of psychological services in primary care. The context of Italian primary care, in line with what is already happening in major European countries (Germany, Netherlands, France), is preparing for a significant reorganization and to accommodate the presence of other health professions such as psychologists in a bio-psycho-social perspective of health. The psychologist is asked to act on the individual and the community in an integrated manner with the general practitioner (GP) by intervening on the psychological factors involved in the motivation to adopt healthy lifestyles, adherence to health prescriptions and psychological comorbidity with medical conditions and in particular with chronic ones. In fact, chronic patients often present low levels of adherence to medical prescriptions (30%). The large number of chronic patients has already been surveyed and classified by the National Health Service on the basis of severity and is proceeding to take charge (PIC) of each patient in primary care. This project is in line with the provisions of the PPNR (Community House - mission 6) in the context of digitization of health services and health promotion on the territory (primary care). Social innovation represents a methodological peculiarity of the project: the enabling technologies used in the project will be put at the service of the clinical and organizational needs of operators and patients for the development of digital solutions and services that will be driven by participatory processes of social innovation. The methodology of social innovation is the key aspect through which human capital will be enhanced in the development of research and digital innovation in health.</p> <p>The enabling technologies that will be used in the project will be: artificial intelligence, cloud computing and interoperability in the exchange of information between clinical archives (computerized medical records).</p>
<b>Target of the research project:</b> <p>The company SAN FRANCESCO GROUP srl, engaged in the development of functional services to the activities of territorial general practice that also exploit processes of digital innovation, will host the PhD student within a research and development project that will have the following objectives:</p> <ul style="list-style-type: none"><li>- Test digital tools of collaboration between the psychologist and the general practitioner based on interoperable logic, around aspects inherent to the problem of motivation to adhere to medical prescriptions</li><li>- Test digital tools, based on neural network algorithms, for the analysis of the risk of frailty based on cognitive decline.</li></ul> <p>The measurement indicators of the project will be:</p> <ul style="list-style-type: none"><li>- Degree of use of active participation methodology in a logic of social innovation</li><li>- Number of scientific publications in international journals</li><li>- Number of procedures, protocols and guidelines</li><li>- Doctoral thesis</li></ul> <p>The project foresees the collaboration with international realities: Japan (University of Tokyo), Holland (Leiden University), Canada (University of Toronto/Ottawa).</p>



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**IL RETTORE**  
**(Prof. Remo Morzenti Pellegrini)**  
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