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Supervisor Expression of Interest MSCA - Marie Skłodowska Curie Action - (PF) Postdoctoral Fellowship 2023

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Department Name: ING-DIG 17

Research topic:

MSCA-PF Research Area Panels:

- ECO_Economic Sciences
- ENG_Information Science and Engineering**
- ENV_Environmental and Geosciences
- LIF_Life Sciences
- MAT_Mathematics
- PHY_Physics
- SOC_Social Sciences and Humanities**
- CHE_Chemistry

Brief description of the Department and Research Group (including URL if applicable):

The Department of Management, Economics, and Industrial Engineering (DIG) of Politecnico di Milano was established in 1990. Its mission is to have a positive impact on society by creating and sharing knowledge at the crossroads between engineering, management, and economics. To this end, it engages in outstanding research, high quality education, and service to the community. Specifically, DIG pursues scientific excellence by adopting a tailored approach which relies on multi-disciplinarity, diverse methodologies, and intense connections with practitioners and policymakers. With approximately 140 professors, DIG is one of the largest departments of Politecnico di Milano.

More information can be found at: <https://www.som.polimi.it/en/>

DIG HumanTech program has been selected and funded by the Ministry of University and Research (MUR) for the period 2023-2027 within “Dipartimenti di Eccellenza” (Law 232/2016), the ministerial initiative aimed at rewarding the departments that stand out for the quality of their research and at financing specific development projects.

In particular, the objective of HumanTech is to redefine the relationship between technology and human beings so as to enable a sustainable digital transition of industrial systems. The project aims to propose new models and processes for the development and adoption of technologies, capable of



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accelerating the transition towards sustainable, inclusive industrial systems that make individual and collective well-being a priority.

Within the HumanTech research project, the “**CORE Cognitive Ergonomics Research Lab**” is implemented from 2023 to 2027 and beyond. Within the Lab, state-of-the-art as well as new analysis and design technologies are applied regarding **human-centered operations processes** in manufacturing and logistics according to the concept “Industry 5.0” by the European Commission (2021). The new CORE Lab will be located within two established and existing research environments: First, the **MADE Lab** is used for a fast start of research activities in 2023 with excellent facilities, EU project and research connections and ample options for industry collaboration (www.made-cc.eu). Second, new facilities are established within the Industry4.0 Lab (www.industry40lab.org), including specific work stations with assembly, quality control and logistics activities. As the HumanTec research cluster is directed at state-of-the-art and innovative research with high-level outcomes like top-level publications and EU grant proposals, this is an excellent environment for a PostDoc researcher in order to advance the experience and capabilities of a candidate. In addition, after a successful completion of the MSCA research grant, there is a dedicated budget and plan to enable a further work position at Polimi SOM directed at an Assistant and subsequent Associate Professor position. This clear tenure track option will further help to motivate high-level researchers to apply for the Polimi MasterClass 2023.

TITLE of the project (24-month EUROPEAN Fellowship):

Human-centered Analysis and Process Design in Logistics Operations (HANDS)

Brief project description Industry 5.0 is the core concept issued by the European Commission aiming at human-centered operations in order to **achieve superior resilience and competitiveness** for European companies and supply chains (2021). This research and fellowship project is applying the concept towards logistics processes like assembly line transportation, quality control, inhouse transport, order picking or AGV and cobot collaboration as a central elements of all supply chains throughout any industry. The analytical concept is strengthened by special and **new analytical technology for human behavioral and stress analysis** (physiology), This is already implemented at the Polimi SOM CORE Lab for i.e. manufacturing and quality control work stations – using for example EEG and ECG measurements or eye tracking and motion capturing technologies in a mobile analysis and design environment. In this way, new research insights beyond the state-of-the-art regarding cognitive ergonomics and the effective design of logistics operations systems are sought. This is important as the future of logistics processes and jobs will be entangled in hybrid work setting with a close **collaboration of human workers and cobots as well as artificial intelligence applications**. Therefore, the scientific analysis and understanding of human perception and physiological workload reactions to such new environments is paramount to designing effective work systems in logistics contexts of the future. Furthermore, the topic and research context provided at Polimi SOM with the CORE Lab embedded in the existing MADE and Industry4.0 environments are uniquely enabling **interdisciplinary and cross-sectoral**



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collaboration between the candidate and further researchers within Polimi, at other research institutions and with industry.

The following **objectives** are connected to the proposed HANDS fellowship project:

- The fellowship candidate is supported in *gaining project experience and independence* within the HumanTech research cluster environment (www.som.polimi.it/humantech).
- A *two-way development and transfer of knowledge* (candidate and institution) is implemented and supported to benefit the candidate and Polimi.
- The active exchange within Polimi SOM as well as other disciplines and industry is highly welcomed and supported.

These research and training **instruments** are implemented within the HANDS fellowship project:

- A research visit at active international partner research groups like at MIT Boston (USA), Rotterdam School of Management (Netherlands) or Technical University of Darmstadt (Germany) will be enabled, planned and implemented.
- Industry transfer workshops will be organized in order to foster academia-industry collaboration, directed at the preparation of joint EU grant proposals. Industry stays will be supported during the fellowship (preferable 24 months).
- The network connections of Polimi SOM and the MADE Lab (www.made-cc.eu) towards EU networks and industry collaboration activities are used for high-level research within the fellowship and to extend it beyond the actual fellowship period.