



PhD in INGEGNERIA MECCANICA / MECHANICAL ENGINEERING - 39th cycle

**PNRR 118 PA Research Field: ARTIFICIAL INTELLIGENCE FOR PLANNING AND CONTROL
OF SEMI-CONDUCTOR MANUFACTURING SYSTEMS**

Monthly net income of PhDscholarship (max 36 months)
€ 1400.0
In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	The increasing need of semi-conductors is driving rapid changes in the equipment used for production as well as the methods for gaining high efficiency and effectiveness. New machines need to be flexible enough to process large sets of products while keeping high throughput performances. New production planning and control algorithms need to manage in real time non-linear physical flows in very large systems composed of hundreds of machines and transporters distributed in many departments highly connected one each other. The research activity carried out with this scholarship can specifically focus on developing new artificial intelligence based-methods for real time control of manufacturing systems in semi-conductors plants including the use of digital twins for off-line learning.
Methods and techniques that will be developed and used to carry out the research	Rigorous experimental methods, formal models, and numerical simulations will be combined to design, implement, and validate the innovative solutions proposed. Team-working will be stimulated with the aim of providing appropriate solutions to actual challenges, which require multidisciplinary skills.
Educational objectives	Doctoral candidates will acquire competences on design, optimisation, and sensing/controlling of new advanced manufacturing processes and systems.



Job opportunities	<p>Our last survey on MeccPhD Doctorates highlighted a 100% employment rate within the first year and a 35% higher salary, compared to Master of Science holders in the same field.</p> <p>List of Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research: Rutgers University (USA)</p>
Composition of the research group	<p>4 Full Professors 3 Associated Professors 6 Assistant Professors 18 PhD Students</p>
Name of the research directors	Prof. Colosimo, Matta, Moroni, Previtali

Contacts	
Names of research directors: Prof. Bianca Maria Colosimo, prof. Andrea Matta, prof. Giovanni Moroni, prof. Barbara Previtali	
For questions about scholarship/support please contact phd-dmec@polimi.it	

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	700.0 €
By number of months	6

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	Azienda Ospedaliero-Universitaria Policlinico "G. Rodolico - San Marco"
By number of months at the company	6
Institution or company where the candidate will spend the period abroad (name and brief description)	to be defined
By number of months abroad	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Financial aid is available for all PhD candidates (purchase of study books and materials, funding for participation in courses, summer schools, workshops and conferences) for a total amount of euro 5.707,13. Our candidates are strongly encouraged to spend a research period abroad,



joining high-level research groups in the specific PhD research topic, selected in agreement with the Supervisor. An increase in the scholarship will be applied for periods up to 6 months (approx. 700 euro/month- net amount).

Teaching assistantship: availability of funding in recognition of supporting teaching activities by the PhD candidate. There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.