



PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 38th cycle

Research Area n. 3 - Systems and Control

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| Number of scholarship offered | 6 |
| Department | DIPARTIMENTO DI ELETTRONICA, INFORMAZIONE E BIOINGEGNERIA |

Description of the Research Area

The research Area Systems and Control of the PhD Programme in Information Technology at the Department of Electronics, Information and Bioengineering (DEIB) is devoted to Control Systems Science, Systems Theory, Ecology, and Operations Research. Despite the rich variety of topics, both theoretical and application-oriented, a unifying system level viewpoint is generally adopted, which enables the analysis, the management, and the design of complex systems through the powerful theoretical tools of mathematical modeling. A significant part of the basic and applied research activity, together with advanced teaching, is supported by the experimental facilities available in the laboratories. The section's research activities can be grouped in the following lines:

- **Control systems:** focused on Control design, Model identification and data analysis, Automation of vehicles and transportation systems, Automation of energy systems.
- **Dynamics of complex systems:** focused on Nonlinear dynamical systems, Bifurcation analysis, Emerging collective dynamics in networks of systems.
- **Operations research and discrete optimization:** focused on Mathematical programming, Combinatorial optimization, Stochastic programming, Robust optimization, Bi-level programming and Continuous approximation models.
- **Planning and management of environmental systems:** focused on Mathematical models for quantitative analysis, Computer-based decision support tools, Sustainable use of resources.
- **Robotics and industrial automation:** focused on Mechatronics, Robotics, Process modeling, simulation and control, Automation of manufacturing systems and industrial plants.

Further information:

- Research at the DEIB Department: <https://www.deib.polimi.it/eng/>
- PhD Programme in Information Technology (IT PhD): <https://dottoratoit.deib.polimi.it/>
- Systems and Control Section at DEIB: <https://www.deib.polimi.it/eng/systems-and-control>



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Research Area n. 3 - Systems and Control

OPEN SUBJECT Research Field: SYSTEMS AND CONTROL

Monthly net income of PhDscholarship (max 36 months)

€ 1250.0

In case of a change of the welfare rates or of changes of the scholarship minimum amount from the Ministry of University and Research, 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 research in this area is devoted to Control Systems Science, Systems Theory, Ecology, and Operations Research. Despite the rich variety of topics, both theoretical and application-oriented, a unifying system level viewpoint is generally adopted, which enables the analysis, the management, and the design of complex systems through the powerful theoretical tools of mathematical modeling. A significant part of the basic and applied research activity, together with advanced teaching, is supported by the experimental facilities available in the laboratories. The section's research activities can be grouped in the following lines:

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- **Planning and management of environmental**



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| | <p>systems: focused on Mathematical models for quantitative analysis, Computer-based decision support tools, Sustainable use of resources.</p> <ul style="list-style-type: none"> • Robotics and industrial automation: focused on Mechatronics, Robotics, Process modeling, simulation and control, Automation of manufacturing systems and industrial plants. <p><i>More information can be found at</i> https://www.deib.polimi.it/eng/systems-and-control</p> |
| Methods and techniques that will be developed and used to carry out the research | The research is carried out within a group under the guidance of a supervisor. Higher level courses are offered that foster an interdisciplinary approach to the research. Development of advanced models as well as laboratory activity are usually part of the workplan. |
| Educational objectives | The doctoral program offers advanced training in the research topics currently explored by the scientific community in academy and industry. A period of study in worldwide most recognized research institutions is supported by the doctoral school and the supervisor. http://dottoratoit.deib.polimi.it/ |
| Job opportunities | The Ph.D. graduates have opportunities both in academy and industry. The intensive collaboration with industrial partners allowed several past PhD graduates to find a satisfactory job position in private companies. Job opportunities abroad are also frequently offered. |
| Composition of the research group | 17 Full Professors 17 Associated Professors 11 Assistant Professors 56 PhD Students |
| Name of the research directors | Any faculty member can act as research director |

Contacts

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| Additional support - Financial aid per PhD student per year (gross amount) | | | |
|--|-------------------------|-------------------------|-------------------------|
| | 1st year | 2nd year | 3rd year |
| Housing - Foreign Students | 1500.0 € per student | 1000.0 € per student | 1000.0 € per student |
| max number of financial aid available: 2, given in order of merit .. | | | |
| Housing - Out-of-town residents (more than 80Km out of Milano) | -- | | |

| Scholarship Increase for a period abroad | |
|--|---------|
| Amount monthly | 625.0 € |
| By number of months | 6 |

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

EDUCATIONAL ACTIVITIES (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student
 5.095,96 Euro per student

TEACHING ASSISTANTSHIP: availability of funding in recognition of supporting teaching activities by the PhD student
 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.

COMPUTER AVAILABILITY:
 1st year: Yes
 2nd year: Yes
 3rd year: Yes



DESK AVAILABILITY:

1st year: Yes

2nd year: Yes

3rd year: Yes