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Dipartimento di Elettronica, Informazione e Bioingegneria

The PhD Program in Information Technology at DEIB

Prof. **Barbara Pernici**
Chair of the PhD Program in Information Technology
May 15th, 2019

Self introduction

Prof. Barbara Pernici, IT PhD Coordinator

Francesca Clemenza, IT PhD Secretariat

Andrea Pimpinella
Fabio Garzetti
IT PhD students representative

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Summary

1. The PhD in IT at DEIB
2. Information on the PhD call
3. Question answering 1
4. Information for students entering their PhD program now
5. Question answering 2

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PhD in Information Technology at Polimi

- First PhD degree in Italy started in 1985
- 2 Nov. 2019: start of XXXV cycle

- PhD School of Politecnico di Milano
    - 19 PhD Programs in Engineering, Architecture, and Design
    - Central coordination and rules
    - Common teaching (transversal skills)

- PhD In IT
    - about 19% of the students of the School

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The PhD in Information Technology (IT) at DEIB

Goals:

- PhD thesis: an original research contribution
- Advanced education: advanced courses, seminars
- Opportunity to develop original research in a rich, international, multidisciplinary environment
- Opportunity of experience abroad, participation in conferences, pubblication on international journals

PhD Candidate status:
- A student (earns a degree)
- An early stage researcher

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## Dipartimento di Elettronica, Informazione e Bioingegneria

- Politecnico di Milano is one of the top ten European Technical Universities in Architecture, Design and Engineering.
- The Dipartimento di Elettronica, Informazione e Bioingegneria is Politecnico's largest Department, very active in research at international level
  - European research projects
  - International research networks
  - Research published in international journals and conferences
  - International and national patents
  - Spin-off companies and consortia

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Research areas in Information Technology
Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB)
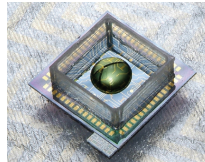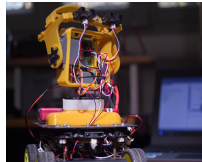
- Computer Science and Engineering
- Electronics
- Systems and Control
- Telecommunications

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Computer Science and Engineering

Chair: Prof. San Pietro
PhD vice Chair: Prof. Silvano

Research Areas
Computer architectures
Advanced software architectures
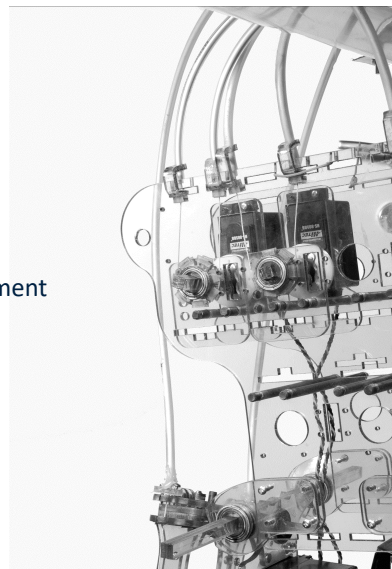Artificial Intelligence and Robotics
Data management systems
Method and Technologies for Web Development
Communication and Multimedia
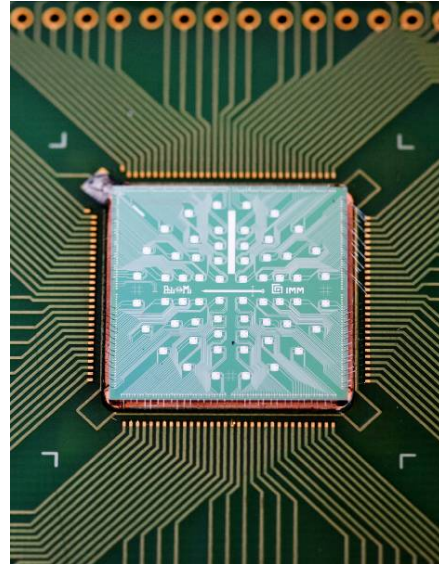Information Systems
Performance Evaluation

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Electronics

Chair: Prof. Fiorini
PhD vice Chair: Prof. Geraci

Research Areas
Circuits and Systems: theory and applications
Single-Photon Detectors and Applications
Radiation Detectors and Low Noise Electronics
Electronic Circuit Design
Electron Devices

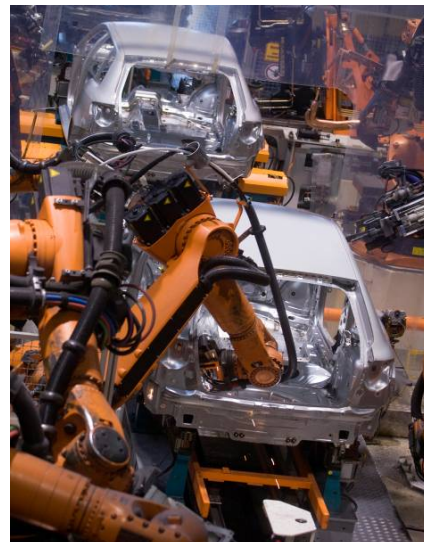POLITECNICO MILANO 1863

Systems and Control

Chair: Prof. Savaresi
PhD vice Chair: Prof. Piroddi

Research Areas
Analysis and Management of Environmental systems and Land Use
Automation and Control of Plants, Machines and Networks
Vehicle Control
Nonlinear Dynamics
Optimization in the Design and Management of Networks
Advanced Techniques for Identification and Control

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Telecommunications

Chair: Prof. Martinelli
PhD vice Chair: Prof. Cesana

Research Areas
Networking
Applied Electromagnetics
Information Transmission and Radio Communications
Optical Communications
Wireless and Space Communications
Remote Sensing
Signal Processing for Multimedia and Telecommunications

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How to get further information

Research areas at DEIB
- https://www.deib.polimi.it/eng/research-areas

Professors offering PhD positions
- The official call (topic scholarships)
- https://dottoratoit.deib.polimi.it/?m=3&id=5

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DEIB facilities

Piazza Leonardo Da Vinci (Milan)

Via Golgi, 39 (Milan)

Via Ponzio 34/5 (Milan)

Via Golgi, 40 (Milan)

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DEIB facilities
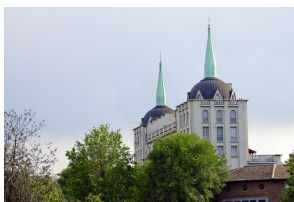
Via Colombo, 81 (Milan)

Via Golgi, 42 (Milan)

Spino d'Adda
Stazione Satellite

Lecco Campus

Cremona Campus

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Laboratories
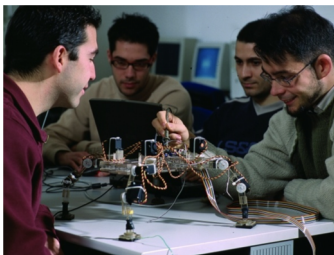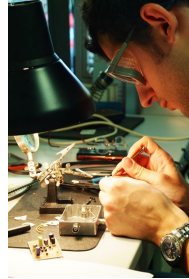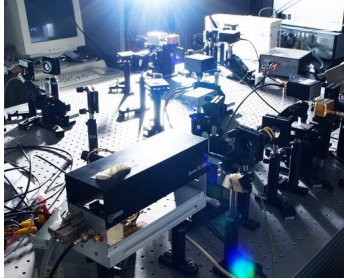
9	Bioengineering Labs
14	Computer Science and Engineering Labs
3	System and Control Labs
5	Electrical Engineering Labs
7	Electronics Labs
10	Telecommunications Labs

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DEIB People: staff by role

794 people

14 CNR
66 Tech. & Adm. Staff
59 Assistant professors
72 Full professor
227 IT PhD Students
196 Research Assistants
103 Associate professor
57 BIO PhD Students
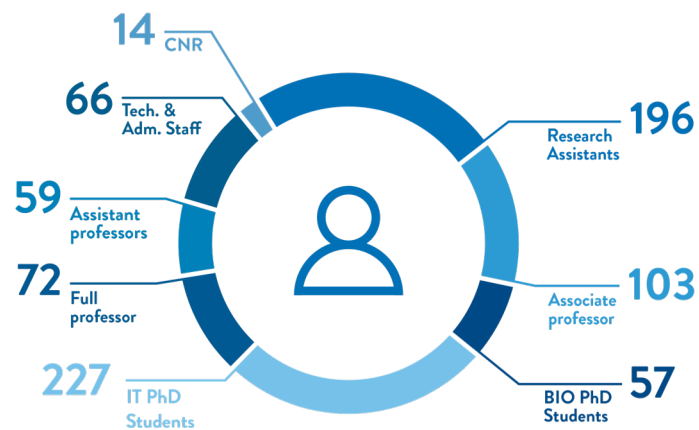
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PhD Programmes at DEIB

- PhD in Information Technology

- PhD in Bioengineering

- PhD in Data Analytics and Decision Sciences
    - Computer Science + Management Engineering + Mathematics
    - Theme scholarships

- PhD in Electrical Engineering

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IT PhD students at DEIB

- **227 enrolled students (48 foreign)**
- **55 titles awarded in 2018**

Distribution according to Dept. areas

Telecommunications - 47
Computer Science and Engineering - 82
Systems and Control - 41
Electronics - 57

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Enrollment and scholarships in 2018
IT PhD

- final number of enrolled students for the XXXIV Cycle: 73 (63 + 10 II call)
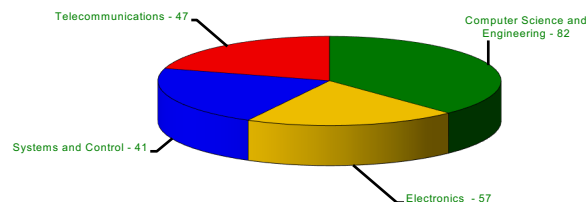
- number of scholarships assigned: **45**
    12 by research agreements
    14 from the Department
    19 from the University

- enrolled without scholarship: **25**
    22 covered by a supervisor's grant (equivalent to scholarship)

- enrolled through special national or international agreements: **4** (with grant)

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Occupation

PhD Alumni ending
in 2015/2016

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2018 EMPLOYMENT DATA FOR PhD IN INFORMATION TECHNOLOGY

The 2018 official employment survey of Politecnico di Milano targeted PhD graduates of 2015 and 2016.
PhD graduates in Information Technology at Politecnico di Milano were 103 in the two years considered.
Total interviews: 80, accounting for 78% of the total number.

PhD graduates

103

Italian **64%**
International **36%**

Were employed 12 months after graduation

100%

Were employed before end of PhD Program

95%

Companies **60%**
Universities **40%**

Employed **92%**
Self-employed **8%**

Permanent contract **89%**
Other **11%**

Net monthly salary

€ 2.318

PhD is required for their job

78%

Would enroll again at Polimi (satisfied!)

83%

The PhD program

CANDIDATE SELECTION

PHD START

PhD Thesis Research Activity
Experience Abroad

Courses
Seminars
Summer-School

1st year evaluation

2nd year evaluation

3rd year admission to final exam

FINAL EXAM

PHD TITLE

PhD program duration: 3 years (with possible extension to a fourth year)

Opportunity of 'PhD Executive' program for people working in industry duration: 4 years

During the PhD program a limited teaching activity (≤ 40 hours/year) is also possible

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PhD Students activities

- **Research**
  - Within Department research areas -> Find your area and a potential advisor
  - Involvement in research projects (basic and applied research)
  - Develop new research ideas -> publish papers, present them at conferences – aiming at excellent research results
  - Write your thesis

- **Courses**
  - All DEIB teaching activities in English
  - 25 credits (CFU), typically: 5 courses x 5 CFU each, among them:
    - at least 10 CFU from DEIB courses
    - at least 10 CFU from courses of the PhD school on soft skills

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The PhD call, selection and enrollment

- Call (published on April 16th, <u>deadline **May 21st, 2019 at 14.00**</u>)
- On-line procedure to submit documents
- University Master degree required ($\geq$ 95/110 or 86/100 in Italy, or minimum average marks in other countries – see call)
  - Title can be earned by October 31st 2019
  - English certificate (see list in the call)

- Result of selection: ranking of candidates
  - Admitted with scholarship
  - Admitted (could get a scholarship in later replacement phase)
  - Idoneous (could be admitted in later replacement phase)
  - Non idoneous (cannot access the PhD program)
- Acceptance of positions and replacements

- Start of the next PhD cycle:
  - November, 2nd 2019

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Available positions, scholarships and other grants

Available positions:
- **34** positions available to be filled according to the selection procedure (competitive selection)

Scholarships
- **17** + 6 general scholarships in the call
- **10 + 7** topic scholarships, from companies, from DEIB research funds, and from Politecnico (<u>to be selected on the on-line procedure before the deadline of the 21st of May and in another moment in June</u>): ask responsible of each topic scholarship for more information
- Net amount: 1250/1400 euros/month (no taxes)
- Support for accomodation available for some students from abroad (see call)

Other grants
- most of the students without a scholarship are supported through collaborations to research projects (ask your potential advisor)
- other grants may become available in weeks

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Positions, scholarships

Area	POSITIONS	of which	
		general scholarships	topic scholarships
INFORMATION TECHNOLOGY			
Area 1. Computer Science and Engineering	13	7+2	3+2
Area 2. Electronics	6	3+1	2+3
Area 3. Systems and Control	5	3+2	1+1
Area 4. Telecommunications	10	4+1	4+1

Additional scholarships indicated above are being officially approved

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Topic scholarships from Industry and from Department

Advisor	Area	Topic
Giacomo Boracchi, Cesare Alippi	1	Multimodal and reference-based anomaly detection algorithms
Paolo Cremonesi	1	Online evaluation and experimentation of UI personalization
Giuseppe Bertuccio	2	Advanced ASICs for Scientific Instrumentation for Astrophysics
Giuseppe Bertuccio	2	Study and development of application specific integrated circuits (ASICs) for high resolution and high speed x and gamma ray spectroscopy
Umberto Spagnolini	4	Advanced methods for absolute and relative positioning in high-performance vehicles
Maurizio Magarini	4	Energy aware information transfer and coding solutions for green communications
Andrea Melloni	4	Mixed signals generic testing in photonic integration

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Topic scholarships from Politecnico

Interdisciplinary		
Advisors	**PhD Programs**	**Topic**
Lorenzo Fagiano Maria Pina Limongelli	INFO/ISSG	Condition monitoring of the built environment with multicopter networks
Barbara Pernici Tiziano Faravelli	INFO/CIIC	Extracting value from scientific data
Augusto Sarti Roberto Corradi	INFO/MEC	Advanced techniques for the mapping of acoustic sources

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Topic scholarships from Industry and from Department being officially approved

Advisor	Area	Topic
Cesare Alippi Giacomo Boracchi	1	Anomaly Detection in High-Dimensional and Evolving Data Streams
Licia Sbattella	1	Empathetic Conversational Agents
Dario Natali	2	3D Printing of materials of relevance for the microelectronic industry
Daniele Ielmini	2	Design of neuromorphic circuits with resistive memories
Daniele Ielmini	2	Development of crosspoint memory arrays for neuromorphic computing
Lorenzo Fagiano	3	Systems of Tethered Multicopters: theoretical and experimental development
Andrea Melloni	4	Multilayer thin films for UV to LWIR operation

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Application procedure

- Through the on-line application web site
- Max two areas can be selected
- Provide all required info
    - List <u>all</u> the degrees you have and provide transcripts
    - Write a good motivation statement
    - CV (including passed exams and marks, <u>if not yet graduated</u>)
    - Research project
        - A "research" exercise
        - Not necessarily your future research topic, BUT it is suggested to discuss it with your potential advisor
    - Provide references
        - If you are in contact with an advisor you can ask him/her if (s) if you can indicate him/her as reference. In any case you should mention a potential advisor that would agree to advise you
        - Only the names have to be provided, reference letters, skype calls may be asked directly to the contacts
    - Select on-line the thematic scholarships (2 phases)

READ CAREFULLY THE CALL AND FOLLOW THE INSTRUCTIONS

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QUESTIONS?

PhD students activities

Advisor: research direction

Tutor: advice and study plan approval

Research

- Within Department research areas -> Find the advisor in your research area
- Involvement in research projects (basic and applied research)
- Develop new research ideas -> publish papers, present them at conferences and in international journas – aiming at excellent research results
- Write your thesis
- Period of activity outside Politecnico (e.g. abroad) is highly encouraged, but not mandatory. Economical support is available.

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Study plan

Study plan presentation:

- Select courses as soon as possible (see list available on Polimi website)
- PhD School course participation must be approved by the School (write to phdschool@polimi.it)
- Approval by tutor
- Enter info in Polimi information system.
- if strictly necessary, you may follow a course and enter it in the study plan afterwards (inform the Tutor, be aware of registration issues)

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Some hints for study plan

- Insert the Courses (from DEIB, School, other PhD Programs) from the PhD courses list accessible from your `PhD Study Plan' page

- Courses change every year

- For any type of external course (including summer schools) select: EXTERNAL COURSES WITH EVALUATION

- Please note that formal approval of the course by the tutor is needed

- All courses should have an evaluation, otherwise a public seminar on the course must be given by the candidate and an evaluation by the advisor is required

- Only the Coordinator can delete courses (send formal request)

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Deadlines

- Formalize choice of advisor and tutor (**May 31st**):
  e-mail to **phd-inf@polimi.it**

- Choose courses and insert them in your study plan on Poliself

- Thesis title and abstract (**August 30th**)

- Annual report (**March 15th**)

- Annual evaluation (**end Mar./beginning Apr.**)
  - 10 min. presentation of research activities and courses. Q&A

Deadlines must be matched!

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Annual evaluation

- Admission to the following year at the end of April

- First year: minimum 15 credits should be taken and research on thesis should have a good start

- Second year: all courses must be completed

- 3rd year (March): evaluation of the 3-year curriculum

- 3rd year (April): Thesis draft to external reviewers

- 3rd year (April): admission to the final exam

- Final exam (external examiners): end of 3rd year
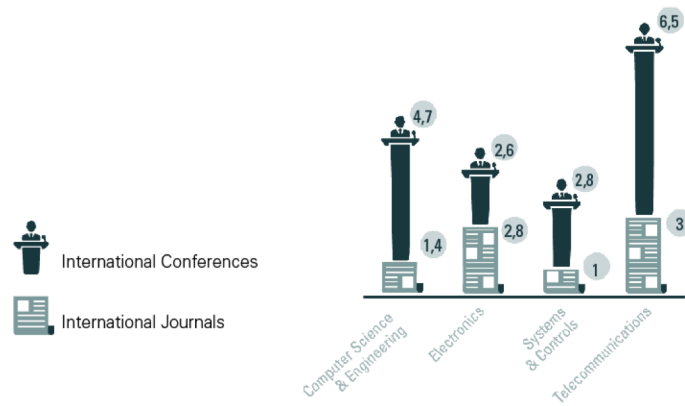 (June 2022/September 2022)

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Budget, PhD duration

- To each student are assigned 3.068 euros in the triennium that can be used for:
  - Travel expenses, conferences
  - Books, computers, instruments that at the end of PhD remain at Polimi
- Long stays abroad are possible (up to 18 months). Scholarships are increased 50% for the first six months. Formal approval by Board of Professors required.

- Other funding may come from the advisor's funds, teaching...

- Max duration of PhD = 6 years (each year can be repeated once)

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Publications (2017) – average values per PhD student at the end of the Program

International Conferences

International Journals

4,7

2,6

2,8

6,5

1,4

2,8

1

3

Computer Science & Engineering

Electronics

Systems & Controls

Telecommunications

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Management

Contacts

Prof. Barbara Pernici (Coordinator)
Prof. Cristina Silvano (Computer Science and Engineering)
Prof. Angelo Geraci (Electronics)
Prof. Luigi Piroddi (Systems and Control)
Prof. Matteo Cesana (Telecommunications)

Standing committee

26 Professors of DEIB

Secretariat

Francesca Clemenza

PhD students representatives in the Department and in the PhD Board

Fabio Garzetti

Andrea Pimpinella

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Support for admnistration procedures

- **Secretariat of PhD Program**

  The secretariat is responsible for supporting the students and PhD Board in their teaching, administration activities, and formalization of procedures to enroll, and to obtain the degree. It is located in building 20 of DEIB, on the ground floor, in the administrative area.

  Francesca Clemenza   - secretariat responsible
  francesca.clemenza@polimi.it - tel. 4209
  phd-inf@polimi.it

- **Specific support for international students: Welcome Office**

  The welcome office is responsible for supporting students coming from abroad in issues not specifically related to PhD (e.g., visa, accomodation). It is located in building 20 of DEIB, on the ground floor, in the administrative area.

  Laura Brambilla – welcome office responsible
  welcome-deib@polimi.it – tel. 3427

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Support for admnistration procedures

PhD Program WEBsite: http://dottoratoit.deib.polimi.it/

The home page suggests all the detailed information about training and deadlines.

You are our most valuable users of the web site, please do not esitate to send us comments, suggestions on how to improve the web site.

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Support for administration procedures

Traveling

If you plan to go abroad for research periods, conferences, summer schools, etc., before leaving you must:

- submit requests exclusively online (at least 10 days before departure) by accessing, through your personal page on the Polimi site (http://www.polimi.it/servizionline/), to the application "Phd students career". Such requests should be explicitly approved by the PhD Program Coordinator.

- after getting approval, fill the form online available on http://www.polimi.it/servizionline/, in the Mission section, to request funding for missions to the Coordinator, if the mission is paid by your PhD funds, or to any other professor that will pay for your mission. Please, check the box stating that your request has already been approved by the Program Coordinator. For insurance matters, you must fill this form even if you don't request any funding.

BOTH authorizations should come to the mission office BEFORE your leaving date.

If the mission is in Italy you have to:

- fill the form online available on http://www.polimi.it/servizionline/, in the Mission section, to request funds for missions to the Coordinator, if the mission is paid by your PhD funds, or to any other professor that will pay for your mission.

The person in charge of this activity is: Nadia Prada (phone 3537 - fernanda.prada@polimi.it)

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Support for admnistration procedures

Purchases

Virgilio Testa, Marco Zuin (tel. 3754 – ufficioacquisti-deib@polimi.it)

Procedure**:** fill the on-line request of order for the purchase available on
https://intranet.dei.polimi.it/servizi/acquisti.php

Communication

Laura Brambilla, Rosa Petrelli (tel. 3427 – redazione-deib@polimi.it)

You have to update before June 1st your page on the Department website, by sending to redazione-deib@polimi.it:

- a short bio in Italian and English, or English only
- a photo of you that will be published there
- link to personal pages, if any

As soon as you define a research line, you should send a short description of it to redazione-deib, to update your personal page.

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Entering the Department

DEIB WEBsite: http://www.deib.polimi.it/

On the DEIB website are listed the procedures to obtain access to rooms and facilities. You will need badge and room keys.

Your reference for these procedures are the secretaries of your respective Sections

Computer Science: Laura Caldirola, Alessandra Viale
Electronics: Marjorie Ballesteros
Systems and Control: Antonella Rinaldi
Telecommunications: Vita Ciesco

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For more information

- http://www.deib.polimi.it
- http://dottoratoit.deib.polimi.it
- http://www.polimi.it/dottorato (PhD School)
- Do not be afraid to ask! (coordinator, PhD vice chairs, professors, PhD students…)

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QUESTIONS?