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
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

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
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, publication on international journals

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

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
Research areas in Information Technology
Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB)

- Computer Science and Engineering
- Electronics
- Systems and Control
- Telecommunications

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
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

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
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

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
DEIB facilities

- Piazza Leonardo Da Vinci (Milan)
- Via Golgi, 39 (Milan)
- Via Ponzo 34/5 (Milan)
- Via Golgi, 40 (Milan)

DEIB facilities

- Via Colombo, 81 (Milan)
- Via Golgi, 42 (Milan)
- Spino d'Adda Stazione Satellite
- Lecco Campus
- Cremona Campus
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

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
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

IT PhD students at DEIB

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

Distribution according to Dept. areas

- Electronics - 57
- Systems and Control - 41
- Telecommunications - 47
- Computer Science and Engineering - 92
- Electronics and Telecommunications - 47
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)

Occupation
PhD Alumni ending in 2015/2016

2013 EMPLOYMENT DATA FOR PHD IN INFORMATION TECHNOLOGY

- PhD graduates: 103
  - Employed 66%
    - University: 40%
    - Self-employed: 14%
  - Not employed: 34%

- 100% employed 12 months after graduation
- 95% employed at the end of the PhD program

- Average monthly salary: €2,318
- PhD graduates employed in their job: 78%
- Would recommend a PhD to others: 83%
The PhD program

PHD START

CANDIDATE SELECTION

PHD TITLE

FINAL EXAM

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

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
The PhD call, selection and enrollment

• Call (published on April 16th, deadline May 21st, 2019 at 14.00)
• On-line procedure to submit documents
• University Master degree required (≥ 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

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 (to be selected on the on-line procedure before the deadline of the 21st of May and in another moment in June): ask responsible of each topic scholarship for more information
• Net amount: 1250/1400 euros/month (no taxes)
• Support for accommodation 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
Positions, scholarships

<table>
<thead>
<tr>
<th>Area</th>
<th>POSITIONS</th>
<th>of which</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFORMATION TECHNOLOGY</td>
<td></td>
<td>general scholarships</td>
</tr>
<tr>
<td>Area 1. Computer Science and Engineering</td>
<td>13</td>
<td>7+2</td>
</tr>
<tr>
<td>Area 2. Electronics</td>
<td>6</td>
<td>3+1</td>
</tr>
<tr>
<td>Area 3. Systems and Control</td>
<td>5</td>
<td>3+2</td>
</tr>
<tr>
<td>Area 4. Telecommunications</td>
<td>10</td>
<td>4+1</td>
</tr>
</tbody>
</table>

Additional scholarships indicated above are being officially approved.

Topic scholarships from Industry and from Department

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

<table>
<thead>
<tr>
<th>Advisor</th>
<th>PhD Programs</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lorenzo Fagiano</td>
<td>INFO/ISSG</td>
<td>Condition monitoring of the built environment with multicopter networks</td>
</tr>
<tr>
<td>Maria Pina Limongelli</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barbara Pernici</td>
<td>INFO/CiIC</td>
<td>Extracting value from scientific data</td>
</tr>
<tr>
<td>Tiziano Faravelli</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Augusto Sarti</td>
<td>INFO/MEC</td>
<td>Advanced techniques for the mapping of acoustic sources</td>
</tr>
<tr>
<td>Roberto Corradi</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Topic scholarships from Industry and from Department being officially approved

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

- Through the on-line application web site
- Max two areas can be selected
- Provide all required info
  - List all the degrees you have and provide transcripts
  - Write a good motivation statement
  - CV (including passed exams and marks, if not yet graduated)
  - 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

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 journals – 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.

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)
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)

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!
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)

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

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
Support for administration 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, accommodation). 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

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 hesitate to send us comments, suggestions on how to improve the web site.
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)

Support for administration procedures

Traveling

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Support for administration 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.
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

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…)
QUESTIONS?