The PhD Program in Information Technology at DEIB

Prof. Andrea Bonarini
Chair of the PhD Program in Information Technology
May 3rd, 2017
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. 2017: start of XXXIII cycle

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

- PhD In IT
  - 18% 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
Research areas in Information Technology

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

within the Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB)
Computer Science and Engineering

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

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. Lacaita
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. Bolzern

Research Areas
Analysis and Management of Environmental systems and Land Use
Automation and Control of Plants, Machines and Networks
Vehicles 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
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
DEIB facilities

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

...and many others in Milan and other sites in Lombardy
DEIB facilities

Via Colombo, 81 (Milan)
Via Golgi, 42 (Milan)
Spino d’Adda
Stazione Satellite

Como Campus
Lecco Campus
Cremona Campus
Laboratories

7 Bioengineering Labs
13 Computer Science and Engineering, System and Control Labs
5 Electrical Engineering Labs
6 Electronics Labs
11 Telecommunications Labs
DEIB People: staff by role

740 people

- 195 Research Assistants
- 188 IT PhD Students
- 96 Associate Professors
- 69 Full Professors
- 66 Researchers
- 63 Tech. & Adm. Staff
- 48 Bio PhD Students
- 15 CNR
PhD students at DEIB

- 188 enrolled students (55 foreign)
- 52 titles awarded in 2016

**Distribution according to Dept. areas**

- Computer Science and Engineering - 71
- Electronics - 43
- Systems and Control - 39
- Telecommunications - 35
Enrollment and scholarships in 2016

- final number of enrolled students for the XXXII Cycle: 58 (46 + 12 II call)

- number of scholarships assigned: 51
  9 by research agreements
  27 from the department
  15 from the Ministry

- enrolled without scholarship: 6
  4 covered by a supervisor’s grant (equivalent to scholarship)

- enrolled through special international agreements: 1 (with grant)
The PhD program

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
    - 10 credits from courses of the PhD school on transversal skills
The PhD call, selection and enrollment

- Call (published the 26th of April, deadline is **May 26th, 2017 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 2017
  - 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
- Start of the next PhD cycle:
  - November, 2nd 2017
Available positions, scholarships and other grants

Available positions:
• **50** positions available to be filled according to the selection procedure (competitive selection)

Scholarships
• **19** general scholarships in the call
• **19** topic scholarships, industrial, from DEIB research funds and from Politecnico (to be selected on the on-line procedure before the deadline of the 26th of May) (ask responsible of each topic scholarship for more information)
• Net amount: 1200 euros (no taxes)
• Support for accommodation available for foreign students (see call)

Other grants
• most of the students without a scholarship are supported through collaborations to research projects (ask your potential advisor)
### Positions, scholarships

<table>
<thead>
<tr>
<th>INFORMATION TECHNOLOGY</th>
<th>POSITIONS</th>
<th>OF WHICH</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Area 1. Computer Science and Engineering</td>
<td>21</td>
<td>general scholarships</td>
<td>6</td>
</tr>
<tr>
<td>Area 2. Electronics</td>
<td>13</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Area 3. Systems and Control</td>
<td>6</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Area 4. Telecommunications</td>
<td>10</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>
# Topic scholarships from DEIB research funds

<table>
<thead>
<tr>
<th>Advisor</th>
<th>Area</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stefano Ceri</td>
<td>1</td>
<td>Data Driven Genomic Computing (2 scholarships)</td>
</tr>
<tr>
<td>Letizia Tanca</td>
<td>1</td>
<td>Forecasting out-of-the-ordinary financial events</td>
</tr>
<tr>
<td>Daniele Ielmini</td>
<td>2</td>
<td>Characterization of resistive switches for in-memory computing</td>
</tr>
<tr>
<td>Daniele Ielmini</td>
<td>2</td>
<td>Design of neural networks for logic gates with memristive switches</td>
</tr>
<tr>
<td>Antonio Capone</td>
<td>4</td>
<td>Innovative Application Models and Data Plane Abstractions for Software Defined Networks</td>
</tr>
<tr>
<td>Marco Marcon</td>
<td>4</td>
<td>Data Fusion and Analysis from SPAD and Traditional Cameras for Effective Health Monitoring in a Dependable Automotive CPS</td>
</tr>
<tr>
<td>Federica Villa</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Advisor</td>
<td>Area</td>
<td>Topic</td>
</tr>
<tr>
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</tr>
<tr>
<td>Paolo Cremonesi</td>
<td>1</td>
<td>Intelligent Systems and Technologies for E-Learning</td>
</tr>
<tr>
<td>Matteo Matteucci</td>
<td>1</td>
<td>Machine Learning and Data Mining for Satellite radar Images</td>
</tr>
<tr>
<td>Giuseppe Bertuccio</td>
<td>2</td>
<td>Low-Noise Low-Power Mixed-Signals Integrated Circuits For High Resolution X-Ray Semiconductor Detectors</td>
</tr>
<tr>
<td>Christian Monzio Compagnoni</td>
<td>2</td>
<td>Electrical Characterization and Modeling of Instabilities in 3D Flash NAND</td>
</tr>
<tr>
<td>Dario Natali</td>
<td>2</td>
<td>Biocompatible Electronics</td>
</tr>
<tr>
<td>Antonio Capone</td>
<td>4</td>
<td>Communications Systems for Electrical System Monitoring Devices</td>
</tr>
<tr>
<td>Marco Marcon</td>
<td>4</td>
<td>Food Contaminants Detection by Hyperspectral X-Ray Imaging and Machine Learning</td>
</tr>
</tbody>
</table>
# Topic scholarships from Politecnico

## Multidisciplinary

<table>
<thead>
<tr>
<th>Advisors</th>
<th>Dept.</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barbara Pernici</td>
<td>DEIB/CMIC</td>
<td>Cyberinfrastructures to use big data for scientific model development and validation</td>
</tr>
<tr>
<td>Tiziano Faravelli</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matteo Matteucci</td>
<td>DEIB/DMEC</td>
<td>Human-vehicle interaction in autonomous connected cars</td>
</tr>
<tr>
<td>Federico Cheli</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Franca Garzotto</td>
<td>DEIB/DESIGN</td>
<td>Multisensory multimodal interaction technology and design for people with neurodevelopmental disorder</td>
</tr>
<tr>
<td>Venanzio Arquilla</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Data Science

<table>
<thead>
<tr>
<th>Advisor</th>
<th>Area</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marco Brambilla</td>
<td>1</td>
<td>Big Data Analysis Solutions for Heterogeneous Sources in Data Science</td>
</tr>
<tr>
<td>Donatella Sciuto</td>
<td>1</td>
<td>Hardware and Software Infrastructure Research for Data Analytics</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)
  - Motivation letter
  - 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 as reference people
  - Only the names have to be provided, reference letters, skype calls may be asked directly to the contacts
- Select on-line thematic scholarships

- READ CAREFULLY THE CALL AND FOLLOW THE INSTRUCTIONS
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)
- Approval by tutor
- Enter info in Polimi information system. Available windows:
  - 2017
    - Three windows (see PhD School web site for dates)
    - 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 - 1 (or 2)

- 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 francesca.clemenza@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 (May): admission to the final exam
- Final exam (external examiners): end of 3rd year (June 2020/September 2020)
Budget, PhD duration

- To each student are assigned 2740 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 (2015) – average values per PhD student at the end of the Program
Management

Contacts

Prof. Andrea Bonarini (Coordinator)
Prof. Cristiana Bolchini (Computer Science and Engineering)
Prof. Angelo Geraci (Electronics)
Prof. Paolo Bolzern (Sys.Control)
Prof. Matteo Cesana (Telecommunications)

Standing committee

26 Professors of DEIB

Secretariat

Francesca Clemenza
dottoratoinginfo.deib@polimi.it

PhD students representative in the Department and in the PhD Boards

Luca Bondi
Support for administration procedures

• **Secretariat of PhD Program** *(ground floor)*

  The secretariat is responsible for supporting the students and PhD Board in their teaching, administration activities and formalization of procedures necessary for the unrolling of the course and to obtaining the degree. It is located in the main building of DEIB, ground floor

  *Francesca Clemenza* - secretariat responsible

• **Specific support for international students**

  *Welcome Office* *(ground floor)*
Traveling

Mission in Italy and abroad

Before leaving you have to fill the form online in the (poliself) service page accessible with your credentials to define the fundings supporting the mission. If the mission is abroad, you have also to fill in another form available on your Poliself page to ask to the coordinator authorization and inform the PhD School that you are planning to go abroad.

If you ask for an advanced payment, remember to provide the documents/receipts related to the expenses for which the advanced payment is requested.

The person in charge is:

Nadia Prada (tel. 3537 – fernanda.prada@polimi.it )
Other administration procedures

Purchases
Person in charge:
Virgilio Testa and Marco Zuin (tel. 3754 – acquisti@polimi.it)
procedure: fill the on-line request of order for the purchase:
https://intranet.dei.polimi.it/servizi/acquisti.php

Communication and Welcome Office
Laura Brambilla and Rosa Petrelli (tel. 3427 – welcome-deib@polimi.it)

You have to update the Department website with your information, sending to redazione-deib@polimi.it:

- a short bio in Italian and English or English only
- a photo
- possible link to personal pages, if any
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

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

Computer Science: Laura Caldirola, Alessandra Viale
Electronics: Antonio Scardilli
Systems and Control: Antonella Rinaldi
Telecommunications: Vita Ciesco
Support for administrative 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.
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?