



**POLITECNICO**  
MILANO 1863

Dipartimento di Elettronica,  
Informazione e Bioingegneria

# The PhD Program in Information Technology at DEIB

Prof. **Andrea Bonarini**

Chair of the PhD Program in Information Technology

May 3<sup>rd</sup>, 2017

# Summary

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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)



**POLITECNICO MILANO 1863**

# Computer Science and Engineering

Chair: Prof. San Pietro

PhD vice Chair: Prof. Bolchini

## Research Areas

Computer architectures

Advanced software architectures

Artificial Intelligence and Robotics

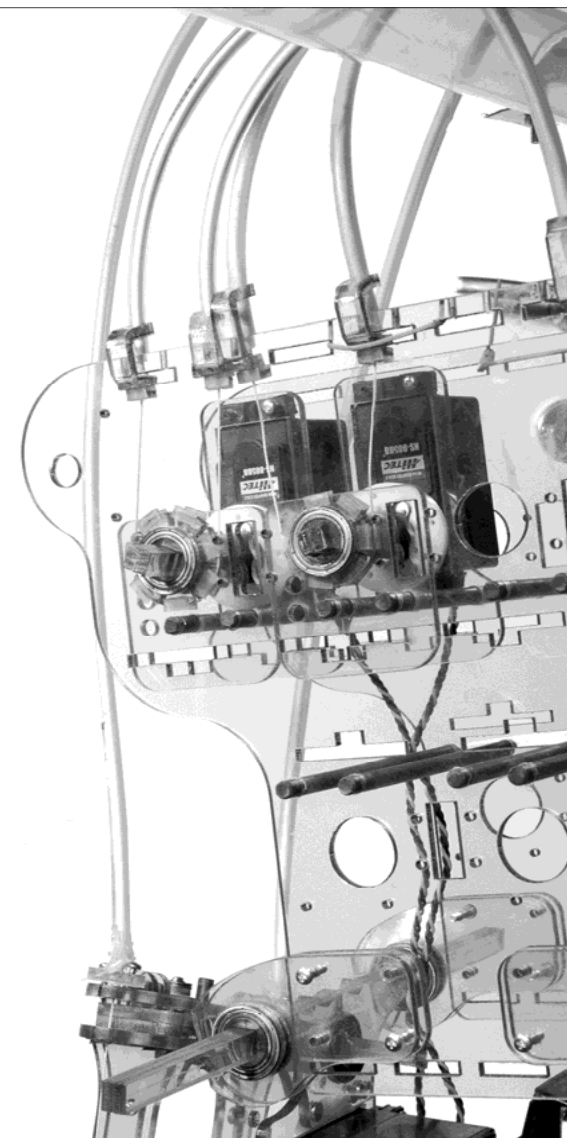
Data management systems

Method and Technologies for Web Development

Communication and Multimedia

Information Systems

Performance Evaluation





# Electronics

Chair: Prof. Lacaíta  
PhD vice Chair: Prof. Geraci

## Research Areas

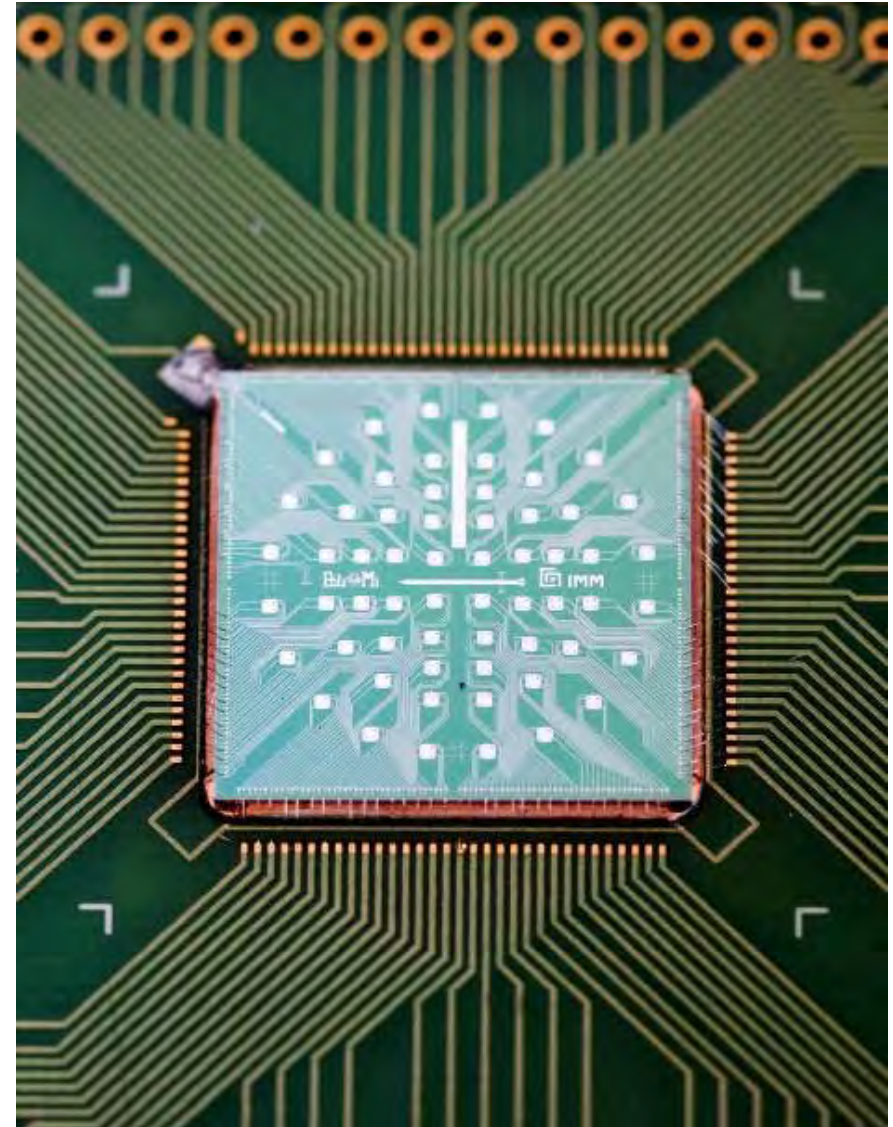
Circuits and Systems: theory and applications

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



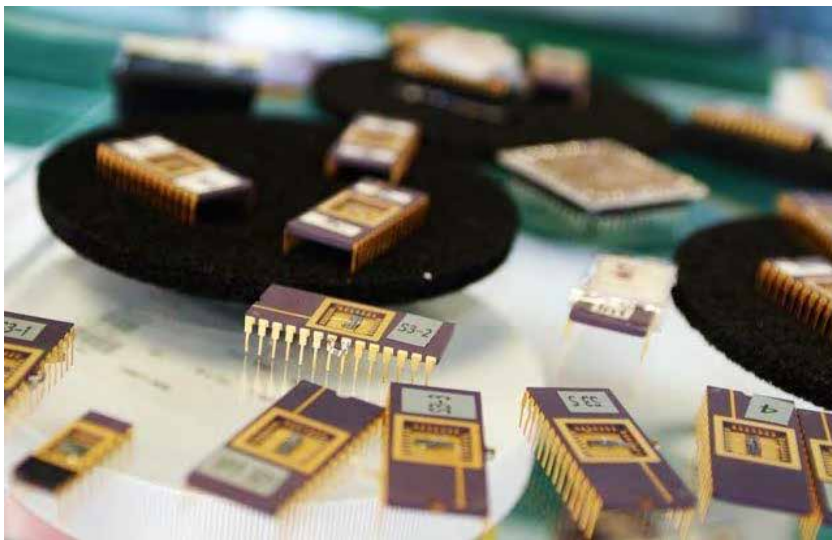
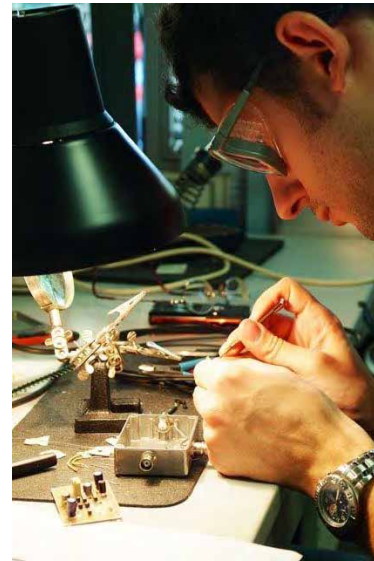
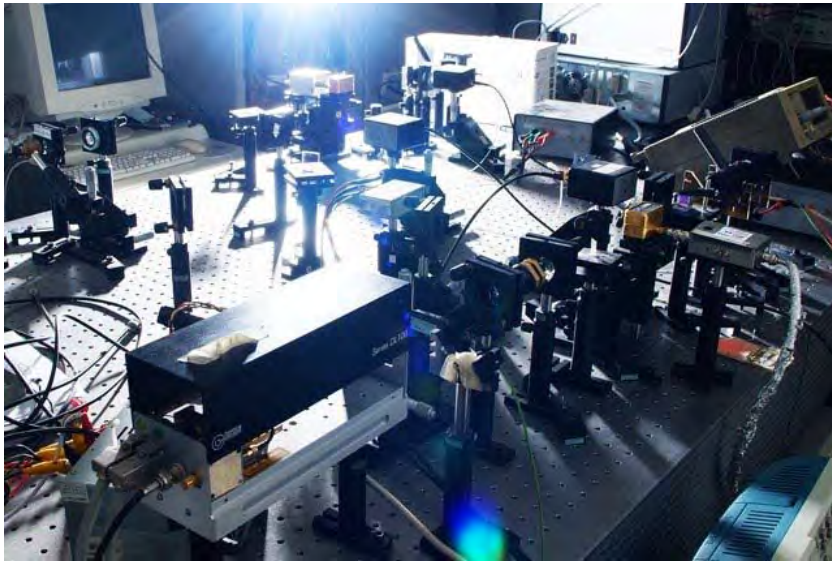
Lecco Campus



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

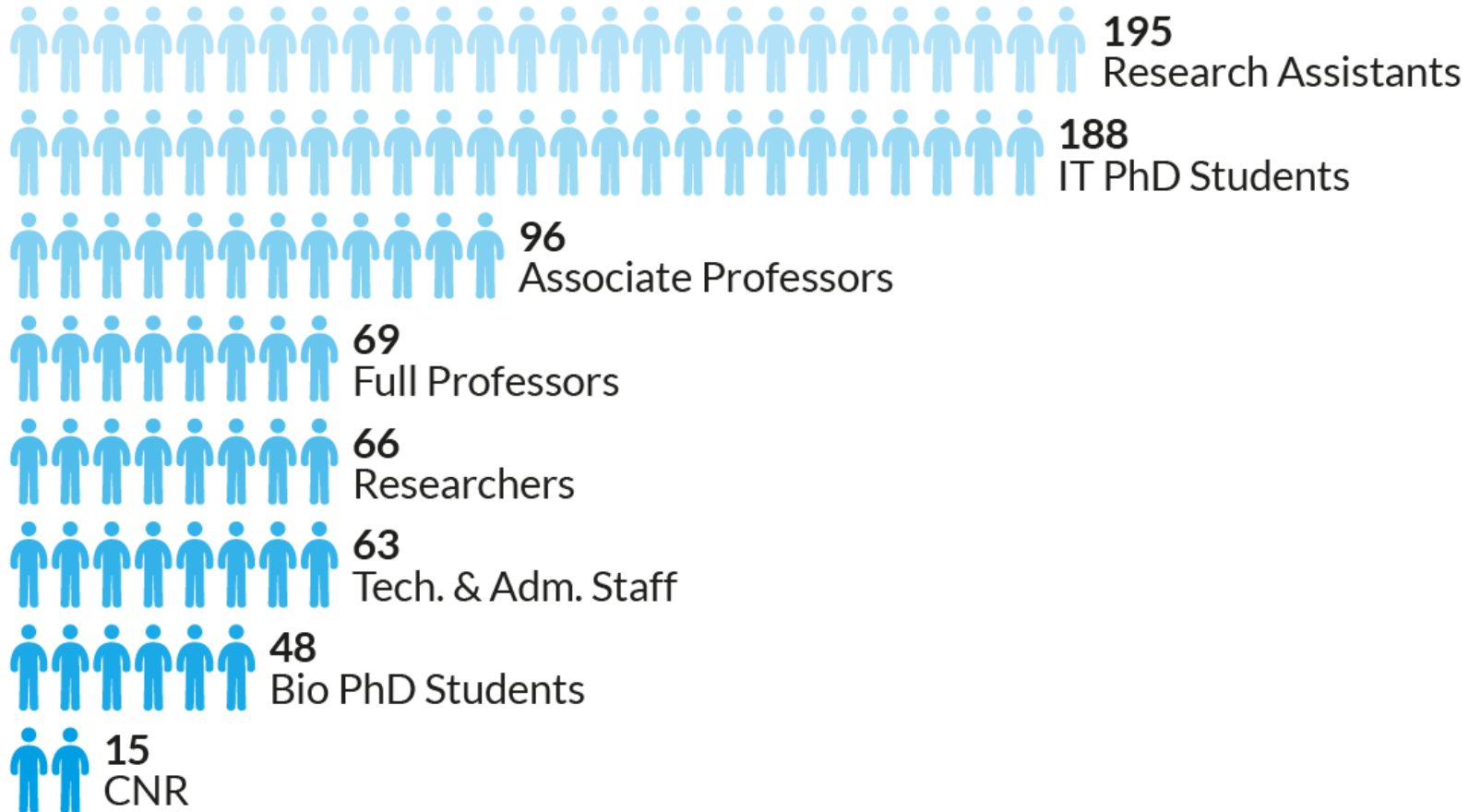




# DEIB People: staff by role

14

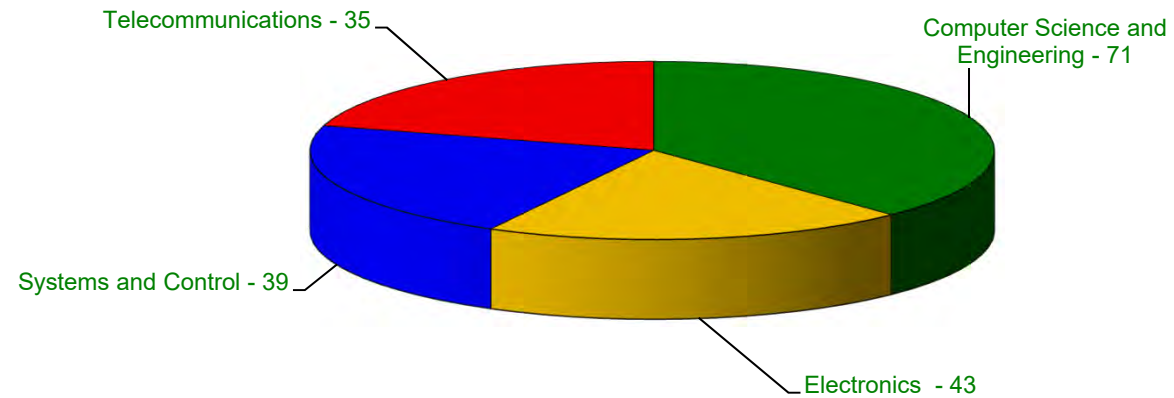
**740 people**



# PhD students at DEIB

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

## Distribution according to Dept. areas

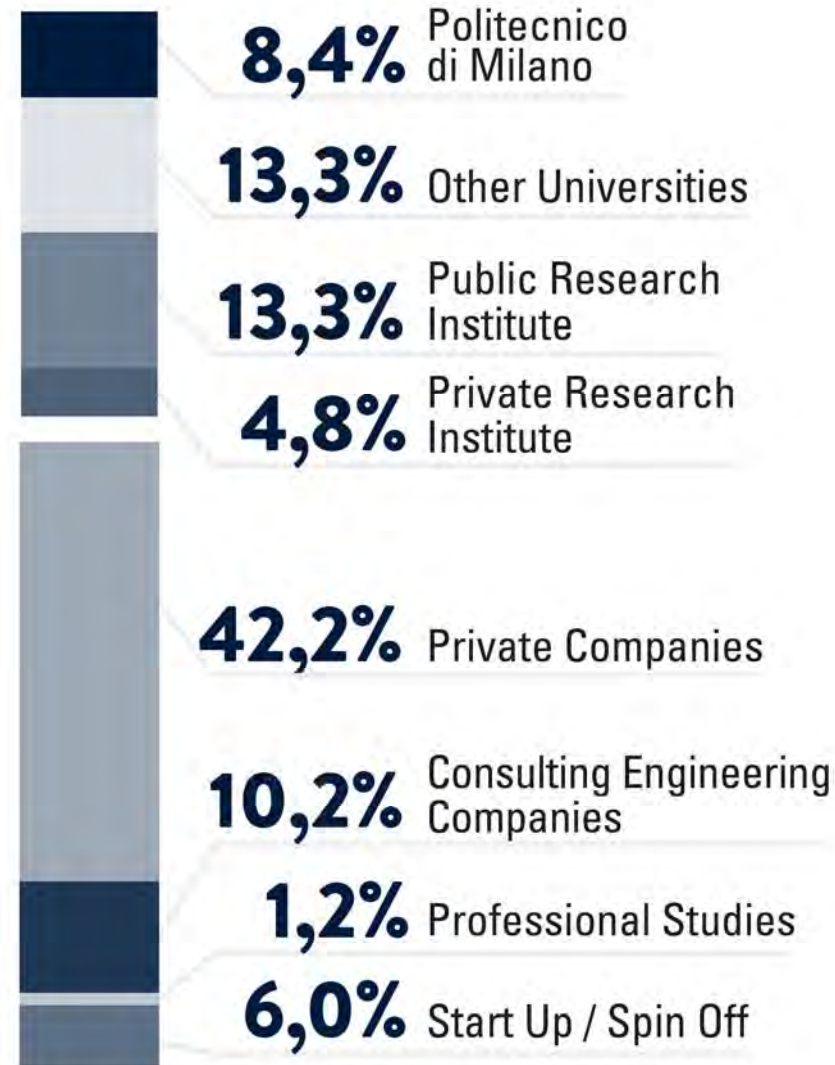


# Enrollment and scholarships in 2016

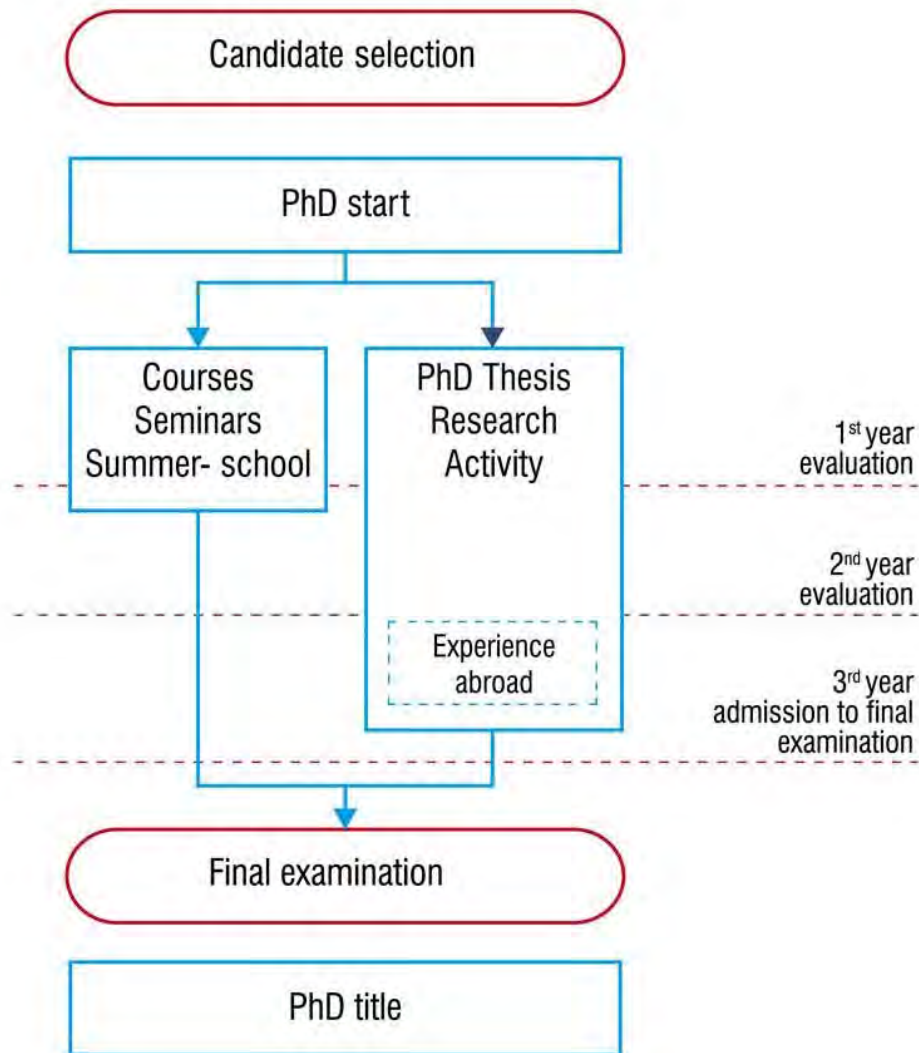
- final number of enrolled students for the XXXII Cycle: 58 (46 + 12 II call)
- number of scholarships assigned: **51**
  - 9 by research agreements
  - 27 from the department
  - 15 from the Ministry
- enrolled without scholarship: **6**
  - 4 covered by a supervisor's grant (equivalent to scholarship)
- enrolled through special international agreements: **1** (with grant)



## Occupation in 2015 (PhD Alumni ending in 2013/2014)



# 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  
( $\leq 40$  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 26<sup>th</sup>, 2017 at 14.00**)
- 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 31<sup>st</sup> 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, 2<sup>nd</sup> 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

| TITLE OF PHD COURSE                      | POSITIONS | OF WHICH             |                    |
|--|-----------|----------------------|--------------------|
|  |           | general scholarships | topic scholarships |
| <b>INFORMATION TECHNOLOGY</b>            |           |                      |                    |
| Area 1. Computer Science and Engineering | <b>21</b> | <b>6</b>             | <b>10</b>          |
| Area 2. Electronics                      | <b>13</b> | <b>5</b>             | <b>5</b>           |
| Area 3. Systems and Control              | <b>6</b>  | <b>4</b>             | <b>-</b>           |
| Area 4. Telecommunications               | <b>10</b> | <b>4</b>             | <b>4</b>           |



## Topic scholarships from DEIB research funds

| Advisor                        | Area | Topic   |
|--------------------------------|------|---|
| Stefano Ceri                   | 1    | Data Driven Genomic Computing<br>(2 scholarships)   |
| Letizia Tanca                  | 1    | Forecasting out-of-the-ordinary financial events  |
| Daniele Ielmini                | 2    | Characterization of resistive switches for in-memory computing  |
| Daniele Ielmini                | 2    | Design of neural networks for logic gates with memristive switches  |
| Antonio Capone                 | 4    | Innovative Application Models and Data Plane Abstractions for Software Defined Networks                                   |
| Marco Marcon<br>Federica Villa | 4    | Data Fusion and Analysis from SPAD and Traditional Cameras for Effective Health Monitoring in a Dependable Automotive CPS |





## Topic scholarships from Industry

| <b>Advisor</b>              | <b>Area</b> | <b>Topic</b>  |
|-----------------------------|-------------|---|
| Paolo Cremonesi             | 1           | Intelligent Systems and Technologies for E-Learning   |
| Matteo Matteucci            | 1           | Machine Learning and Data Mining for Satellite radar Images   |
| Giuseppe Bertuccio          | 2           | Low-Noise Low-Power Mixed-Signals Integrated Circuits For High Resolution X-Ray Semiconductor Detectors |
| Christian Monzio Compagnoni | 2           | Electrical Characterization and Modeling of Instabilities in 3D Flash NAND                              |
| Dario Natali                | 2           | Biocompatible Electronics   |
| Antonio Capone              | 4           | Communications Systems for Electrical System Monitoring Devices   |
| Marco Marcon                | 4           | Food Contaminants Detection by Hyperspectral X-Ray Imaging and Machine Learning                         |



# Topic scholarships from Politecnico

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

| <b>Data Science</b> |             |   |
|---------------------|-------------|---|
| <b>Advisor</b>      | <b>Area</b> | <b>Topic</b>  |
| Marco Brambilla     | 1           | Big Data Analysis Solutions for Heterogeneous Sources in Data Science |
| Donatella Sciuto    | 1           | Hardware and Software Infrastructure Research for Data Analytics      |



# 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](mailto:francesca.clemenza@polimi.it)
- Choose courses and insert them in your study plan on Poliself
- Thesis title and abstract (**August 30<sup>th</sup>**)
- Annual report (**March 15<sup>th</sup>**)
- 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)

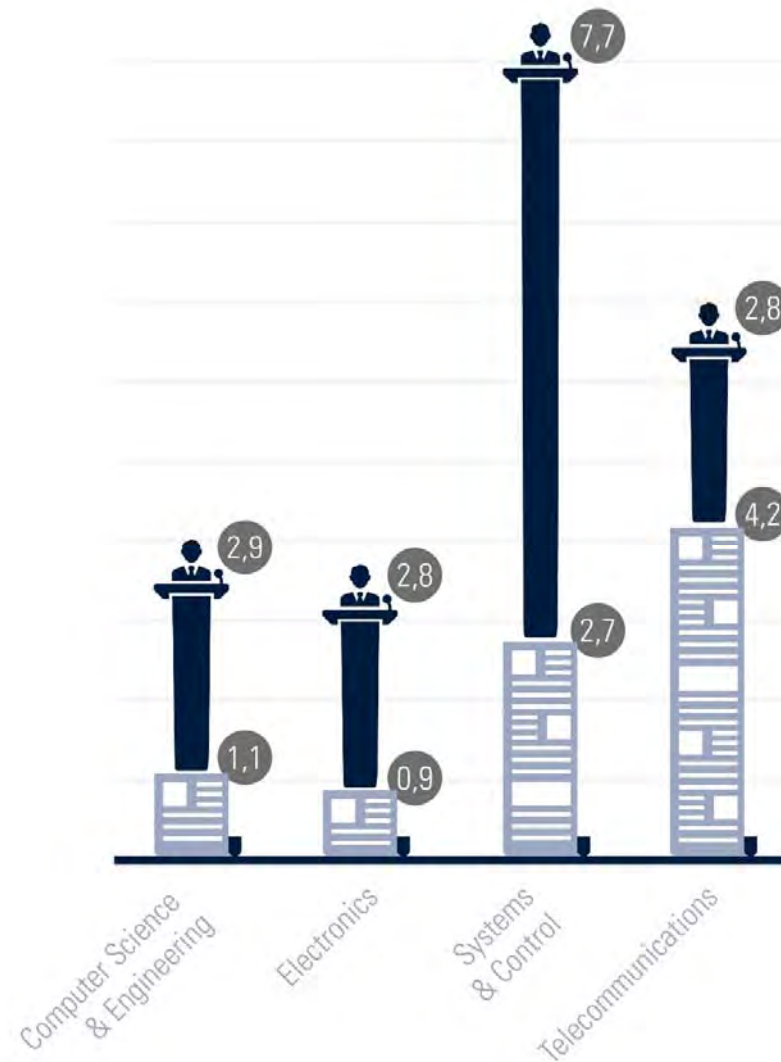


# Budget, PhD duration

- 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](mailto:fernanda.prada@polimi.it) )



# Other administration procedures

## Purchases

Person in charge:

**Virgilio Testa** and **Marco Zuin** (tel. 3754 – [acquisti@polimi.it](mailto: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](mailto:welcome-deib@polimi.it) )

You have to update the Department website with your information, **sending** to [redazione-deib@polimi.it](mailto:redazione-deib@polimi.it):

o

- 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 hesitate 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?