The PhD Course in Bioengineering
Andrea Aliverti, chairman
andrea.aliverti@polimi.it
19 Programmes
1100+ PhD students
>300 new PhD students per year
(>90% of them earn grants or research contracts)

~ 30% International students
150-200 third-level courses, held by Italian and International Experts
PhD Programmes

**Engineering**
- Aerospace Engineering
- **Bioengineering**
- Data analytics and Decision systems
- Electrical Engineering
- Energy and Nuclear Science and Technology (STEN)
- Environmental and Infrastructure Engineering
- Industrial Chemistry and Chemical Engineering
- Information Technology
- Management, Economics and Industrial Engineering (DRIG)
- Materials Engineering
- Mathematical Models and Methods in Engineering
- Mechanical Engineering
- Physics
- Structural Seismic and Geotechnical Engineering

**Architecture & Design**
- Architecture, Built Environment and Construction Engineering (ABC)
- Architectural, Urban and Interior Design (PAUI)
- Design
- Preservation of Architectural Heritage
- Urban Planning, Design, and Policy
PhD Course in Bioengineering

The Doctoral (PhD) Programme in Bioengineering trains graduate students through the development of a research project developing engineering methodologies and/or innovative technology which involve biological or physiological systems and health sciences.

Methods, devices, and systems are developed with a multidisciplinary approach, considering problems at different possible scales (from the molecular and cellular level to complex living organisms and systems), with the objective of improving diagnosis, therapy or health structures and services.

These competences prepare PhD candidates to work in research, either in private or public context as well as in industry or academia.
WELCOM MEETING - PHD BIO XXXV Cycle

Welcome Day - PhD BIO
35° Cycle
11 November
h. 09.30 - 11.00 am
Alario Room
Ed 21 - 2nd Floor

The Chairman of the Doctoral Program in Bioengineering, Prof. Andrea Aliverti, is holding a yearly meeting to welcome the new PhD students. The purpose of the meeting is to provide useful information, also regarding administration issues.

The day of the meeting is November 11, 2019 and program will be announced by e-mail.

http://www.phdbioengineering.polimi.it/
The **PhD Program in Bioengineering** is organized with an inter-departmental structure.

Faculty members of the PhD Board belong to two Departments:

- **DEIB** (Department of Electronics, Information and Bioengineering)
- **CMIC** (Department of Chemistry, Materials and Chemical Engineering “G. Natta”)

[PhD School in Bioengineering](http://www.phdbioengineering.polimi.it/)
Board of Professors

Aliverti Andrea – DEIB (Chair)
Bianchi Anna Maria - DEIB
Candiani Gabriele - CMIC
Cerveri Pietro - DEIB
Cimolin Veronica - DEIB
Costantino Maria Laura - CMIC
Dellacà Raffaele - DEIB
De Momi Elena - DEIB
Draghi Lorenza - CMIC
Farè Silvia - CMIC
Ferrante Simona - DEIB
Fiore Gianfranco B. - DEIB
Gastaldi Dario - CMIC
Guazzoni Chiara - DEIB
Mainardi Luca T. - DEIB
Mantero Sara – CMIC (vice-Chair)
Pattini Linda - DEIB
Pennati Giancarlo - CMIC
Pozzi Giuseppe - DEIB
Raimondi Manuela T. - CMIC
Ravazzani Paolo – CNR (vice-Chair)
Redaelli Alberto C. - DEIB
Rodriguez-Mata Josè - CMIC
Signorini Maria G. - DEIB
Soncini Monica - DEIB
Villa Tomaso - CMIC
PhD development – Workload distribution

PhD candidate workload: ≥ 30 CFU
(5 CFU ~ 25h)
≥ 10 CFU: soft and transferable skills
≥ 15 CFU: disciplinary skills

study  thesis

1\textsuperscript{st} year  □ □ □ □ □□
2\textsuperscript{nd} year  □ □ □ □ □ □ □
3\textsuperscript{rd} year  □ □ □ □ □ □ □
PhD curriculum

Research

Courses

Personal development

PhD is a full time activity, usually over three (or four) years
PhD curriculum: research

**Specific areas** include but are not limited to:
- molecular and cellular engineering,
- biomaterials,
- tissue engineering,
- bio-artificial interfaces and devices,
- neuro-prostheses,
- movement analysis,
- cardiovascular and respiratory system bioengineering,
- central nervous system signal and image processing for rehabilitation,
- biomechanics,
- computational fluid-dynamics,
- computer assisted surgery and radiotherapy,
- artificial organs,
- implantable devices,
- biomedical signal and image processing,
- e-health,
- bioinformatics,
- robotics and functional genomics.

Research focuses on theoretical models, methods, and technologies to support design of applications, software and hardware systems, together with tools and prototype devices.

The involvement of **industrial and clinical partners** reinforces the mix between theory and application, which is the strength of PhD in Bioengineering.
PhD Research - Laboratories

- Biocompatibility and Cell culture Lab (BioCell) - CMIC, Polimi
- Biomaterials laboratory (BioMatLab) - CMIC, Polimi
- Biomedical Technology Lab (TBMLab) - DEIB, Polimi
- Bioreactors and Mechanical Testing Laboratory - CMIC, Polimi
- Biosignals, Bioimaging and Bioinformatics (B3 lab) - DEIB, Polimi
- Computational Biomechanics Lab (CB Lab) - DEIB, Polimi
- Experimental Micro and Biofluid dynamics (μBS Lab) - DEIB, Polimi
- Engineering for Health and Wellbeing Group - IIEIT, CNR
- Laboratory of Biological Structure Mechanics (LaBS) - CMIC, Polimi
- Laboratory of movement analysis “Luigi Divieti” - DEIB, Polimi
- Materials for Biomedical Application and Biomimetic Treatments (CMIC, Polimi)
- Medical Informatics laboratory (e-Health Lab) – DEIB, Polimi
- Neuroengineering and medical robotics Laboratory (NearLab) - DEIB, Polimi

→ + EXTERNAL FACILITIES, LABS, HOSPITALS
Dote: Euro 3.068,66 → complessivi per i 3 anni

Missioni: Utilizzando la dote → fondo di dottorato
                                   → segreteria dottorato
                                   (phd-bio@polimi.it)
                                   tel 02.2399.3632
                                   contact person: Marco Simonini
                                   marco.simonini@polimi.it

Missioni: Utilizzando fondo Docente
                                   → fondo docente
                                   → amministrazione
                                   tel (022399)3630

contact person: Dora Ivanof
elizabet.ivanof@polimi.it
Courses (not the main focus of your studies, to complement your preparation)

- A minimum number of **30 ECTS credits** is required to earn,
- at least **10 credits (min 10, max 25)** (corresponding to 2 PhD School courses) shall be obtained through soft and transferable skills courses organized by the PhD School (requirement established for candidates of the 33+ cycle, entering Nov 2018 or later)
- at least **15 credits (min 15, max 20)** shall be obtained through courses yearly offered by the PhD Programme in Bioengineering, which are specific of the Bioengineering area (‘characterizing courses’). A *minimum of one Annual Bioengineering School (Bressanone), providing 5 credits, is required*
<table>
<thead>
<tr>
<th>Courses</th>
<th>Possible details or reference to following tables</th>
<th>Number of credits (min-max)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD School Courses</td>
<td></td>
<td>10 – 15</td>
<td></td>
</tr>
<tr>
<td>Courses characterising the PhD Programme</td>
<td></td>
<td>15 – 20</td>
<td>Minimum 1 Annual Bioengineering School (Bressanone)</td>
</tr>
<tr>
<td>Other PhD courses</td>
<td>[specify]</td>
<td>0 - 5</td>
<td></td>
</tr>
</tbody>
</table>
PhD School courses → focused on soft and transferable skills

List of courses offered by the PhD School - 2019/2020

<table>
<thead>
<tr>
<th>Course</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADVANCED INTERACTION SKILLS FOR ACADEMIC PROFESSIONALS</td>
<td>Arnaboldi Michela, De Bruijn Johan Adam</td>
</tr>
<tr>
<td>APPROACHES TO RESILIENCE: SOCIAL, ECONOMIC, ENVIRONMENTAL AND TECHNOLOGICAL CHALLENGES OF CONTEMPORARY HUMAN SETTLEMENTS</td>
<td>Balducci Alessandro</td>
</tr>
<tr>
<td>COMMUNICATION STRATEGIES THAT SCORE IN WORLDWIDE ACADEMIA</td>
<td>Raimondi Manuela Teresa, Kilian Susanne Christine</td>
</tr>
<tr>
<td>DISSEMINARE LA RICERCA</td>
<td>Paganoni Anna Maria</td>
</tr>
<tr>
<td>ENGLISH FOR ACADEMIC COMMUNICATION</td>
<td>Paolo Biscari Paolo, Cristina Mariotti</td>
</tr>
<tr>
<td>EPISTEMOLOGY OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH</td>
<td>Chiodo Simona, Campioli Andrea, Zanelli Alessandra</td>
</tr>
<tr>
<td>ETHICAL ASPECTS OF RESEARCH ON DUAL-USE PRODUCTS</td>
<td>Masarati Pierangelo</td>
</tr>
<tr>
<td>ETHICS AND TECHNOLOGY</td>
<td>Tanca Letizia, Schiaffonati Viola, Tamburrini Guglielmo, Sabine Ammon</td>
</tr>
<tr>
<td>ETHICS IN RESEARCH</td>
<td>Aliverti Andrea, Hughes Jonathan</td>
</tr>
<tr>
<td>EUROPEAN CULTURE</td>
<td>Chiodo Simona, Cardilli Lorenzo</td>
</tr>
<tr>
<td>EXPLORING PUBLIC DEBATES SURROUNDING ACADEMIC TOPICS THROUGH DATA DRIVEN APPROACHES</td>
<td>Mauri Michele, Colombo Gabriele</td>
</tr>
<tr>
<td>INDUSTRIAL SKILLS</td>
<td>Biscari Paolo</td>
</tr>
<tr>
<td>INNOVATIVE TEACHING SKILLS</td>
<td>Magli Giulio</td>
</tr>
<tr>
<td>NEW DEMOGRAPHICS. SCIENCE, TECHNOLOGY AND DESIGN FACING THE &quot;GRAND CHALLENGE&quot; OF AGEING</td>
<td>Ranci Ortigosa Costanzo</td>
</tr>
<tr>
<td>PROFESSIONAL COMMUNICATION</td>
<td>Di Blas Nicoletta</td>
</tr>
<tr>
<td>PROJECT MANAGEMENT (IN ACTION)</td>
<td>Mancini Mauro</td>
</tr>
<tr>
<td>PROJECT MANAGEMENT BASICS</td>
<td>Beffani Armando, Fuggetta Alfonso, Grilli Colombo Sara</td>
</tr>
<tr>
<td>RESEARCH SKILLS</td>
<td>Sciuto Donatella</td>
</tr>
<tr>
<td>RESOURCE PLANNING AND MANAGEMENT WITHIN SUSTAINABLE DEVELOPMENT</td>
<td>Casagrandi Renato, Castelletti Andrea Francesco, Colombo Emanuela, Morello Eugenio, Rulli Maria Cristina</td>
</tr>
<tr>
<td>RISK, RESILIENCE, AND SUSTAINABILITY IN SCIENCE AND ENGINEERING</td>
<td>De Michele Carlo</td>
</tr>
<tr>
<td>SCIENCE, TECHNOLOGY, SOCIETY AND WIKIPEDIA</td>
<td>Castiglioni Chiara, Raos Guido, Mabbett Andrew John</td>
</tr>
<tr>
<td>SCIENTIFIC COMMUNICATION IN ENGLISH</td>
<td>Biscari Paolo, Sluckin Timothy Jan</td>
</tr>
<tr>
<td>SCIENTIFIC REASONING: PHILOSOPHY, LOGIE AND APPLICATIONS</td>
<td>Valente Giovanni, Chiffi Daniele</td>
</tr>
<tr>
<td>STRATEGIC DECISION MAKING</td>
<td>Ferretti Valentina</td>
</tr>
<tr>
<td>SULLA RESPONSABILITÀ DELLA TECNICA</td>
<td>Ossi Paolo Maria</td>
</tr>
<tr>
<td>SUSTAINABILITY METRICS, LIFE CYCLE ASSESSMENT AND ENVIRONMENTAL FOOTPRINT</td>
<td>Dotelli Giovanni, Lavagna Monica, Melia' Paco Vasco Aldo, Rigamonti Lucia</td>
</tr>
<tr>
<td>TECHNOLOGY &amp; SOCIETY</td>
<td>Crabu Stefano</td>
</tr>
<tr>
<td>THE PROCESS OF RESEARCH</td>
<td>Volonte' Paolo Gaetano</td>
</tr>
<tr>
<td>USER CENTRED INNOVATION</td>
<td>Rizzo Francesca</td>
</tr>
</tbody>
</table>
### Table A: PHD COURSES CHARACTERISING THE PHD PROGRAMME

<table>
<thead>
<tr>
<th>Codice</th>
<th>Denominazione Insegnamento</th>
<th>Periodo di svolgimento</th>
<th>Docenti</th>
</tr>
</thead>
<tbody>
<tr>
<td>055106</td>
<td>ADVANCED MODELLING IN SIGNAL IMAGE AND DATA ANALYSIS</td>
<td>12 feb 2020 - 21 feb 2020</td>
<td>Signorini Maria Gabriella, Barbieri Riccardo, Bianchi Anna Maria, Ferrario Manuela, Pattini Linda</td>
</tr>
<tr>
<td>055107</td>
<td>ANNUAL SCHOOL OF BIOENGINEERING - BRESSANONE 2020</td>
<td>07 set 2020 - 10 set 2020</td>
<td>Aliverti Andrea</td>
</tr>
<tr>
<td>055108</td>
<td>BIOSTATISTICS AND EXPERIMENTAL DESIGN</td>
<td>11 mag 2020 - 20 mag 2020</td>
<td>Caiani Enrico Gianluca, Mainardi Luca, Pattini Linda</td>
</tr>
<tr>
<td>055109</td>
<td>EXPERIMENTAL BIOMECHANICS</td>
<td>19 feb 2020 - 28 fe 2020</td>
<td>Villa Tomaso Maria Tobia, Boschetti Federica, Pennati Giancarlo</td>
</tr>
<tr>
<td>051060</td>
<td>EXTERNAL COURSE BIO</td>
<td>--</td>
<td>Aliverti Andrea</td>
</tr>
<tr>
<td>055110</td>
<td>PERSPECTIVES IN BIOMEDICAL ENGINEERING TECHNOLOGIES: DIGITAL HEALTHCARE TO ENGAGE AND ENHANCE HUMAN BEINGS</td>
<td>30 gen 2020 - 11 feb 2020</td>
<td>Caiani Enrico Gianluca, Gorini Alessandra, Van Gemert-Pijnen Julia</td>
</tr>
<tr>
<td>055111</td>
<td>SEMINARS IN BIOMEDICAL ENGINEERING</td>
<td>01 nov 2019 - 31 ott 2022</td>
<td>Soncini Monica, Barbieri Riccardo, Dellaca' Raffaele, Mantero Sara, Villa Tomaso Maria Tobia</td>
</tr>
</tbody>
</table>

### Table B: SUGGESTED COURSES OF THE PHD SCHOOL

<table>
<thead>
<tr>
<th>Codice</th>
<th>Denominazione Insegnamento</th>
<th>Periodo di svolgimento</th>
<th>Docenti</th>
</tr>
</thead>
<tbody>
<tr>
<td>055106</td>
<td>ETHICS in RESEARCH</td>
<td>13 gen 2020 - 17 gen 2020</td>
<td>Aliverti Andrea, Jonathan Hughes, Viola Schaffonati</td>
</tr>
<tr>
<td>Date</td>
<td>Morning (9:30 -12:30)</td>
<td>Afternoon (13:30 -16:30)</td>
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</tr>
<tr>
<td>Monday, 13 Jan 2020</td>
<td>Course introduction – A. Aliverti</td>
<td>Case studies: locating ethics in research – J. Hughes</td>
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<tr>
<td></td>
<td>Locating ethics in research – J. Hughes</td>
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</tr>
<tr>
<td>Tuesday, 14 Jan 2020</td>
<td>Balancing harms and benefits in research – J. Hughes</td>
<td>Case studies: Balancing harms and benefits in research - J. Hughes</td>
<td></td>
</tr>
<tr>
<td>Wednesday, 15 Jan 2020</td>
<td>Information Ethics – V. Schiaffonati</td>
<td>Case studies: Information Ethics – V. Schiaffonati</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Management of sensitive data/information - personal and private information, confidential scientific/industrial information, sensitive information in the digital world)</td>
<td></td>
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</tr>
<tr>
<td>Thursday, 16 Jan 2020</td>
<td>Ethical Institutions: research ethics Committees/Institutional Review Boards - C. Ghezzi</td>
<td>Publication ethics: ‘good practice’ in scientific communication - A. Aliverti</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Case study: how to submit a proposal to a Research Ethics Committee - 3R’s principles</td>
<td>Case studies: publication ethics</td>
<td></td>
</tr>
<tr>
<td>Friday, 17 Jan 2020</td>
<td>Publication ethics: ‘good practice’ in scientific communication - A. Aliverti</td>
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</tr>
<tr>
<td></td>
<td>Case studies: publication ethics</td>
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</tbody>
</table>
PhD Education - the National School of the Italian Bioengineering Group (GNB)

Among the **PhD courses**, the GNB School is held every year for one week on themes of advanced research in bioengineering through the participation of highly qualified teachers.

The School is held in Brixen (near Bolzano) and offers also the unique opportunity to put together students from different Doctoral programs in Bioengineering and neighbouring field in Italy.

1 session of the School is mandatory in the study plan
GRUPPO NAZIONALE DI BIOINGEGNERIA

UNIVERSITÀ DEGLI STUDI DI PADOVA
Cicli di conferenze in Bressanone
Dipartimento di Ingegneria dell’Informazione

DOTTORATI DI RICERCA IN BIOINGEGNERIA
Università di Ancona, Bologna, Firenze, Genova, Napoli, Padova, Pavia, Pisa, Roma "La Sapienza", Roma Tre, Roma Campus Bio-Medico, Trieste, Politecnici di Milano e Torino
Istituto Italiano di Tecnologia - Genova
Scuola Superiore Sant’Anna - Pisa
Istituto Universitario di Scienze Motorie - Roma

XXXVIII Annual School

“Advanced bioengineering methods, technologies and tools in surgery and therapy”

Brixen, September 9 – 12, 2019

PROGRAM

Monday, Sept 9th, 2019

INTRODUCTION

14:00 School opening (E. De Moni, A. Mencasti, A. Redaelli)
14:10 Surgical planning based on computational models (A. Redaelli, L. Antiga)
14:50 Images/ patient/ robot registration and surgical navigation (E. De Moni, S. Mecchia)
15:30 Micro-actuation and micro-sensing for surgical and therapeutic interventions (A. Mencasti, V. Iasevoli)
16:10 COFFEE BREAK
16:30 New Technologies and surgery: an ongoing revolution (M. Montorsi)
17:00 Student project activities presentation and start-up pitches

Tuesday, Sept 10th, 2019

PATIENT MODELLING AND SURGICAL SIMULATION ON VIRTUAL PATIENTS

9:00 Structural modeling tools for the design and the optimization of surgical procedures and devices (E. L. Carniel)
10:00 How and why to build a patient-specific cardiovascular model (F. Migliavacca)
10:45 COFFEE BREAK
11:00 Credibility of virtual patients (M. Viceconti)
11:45 Image-based mechanical assessment of cardiac function (G. Fedrizziotti)
12:30 LUNCH BREAK

INTRA-OPERATIVE INFORMATION AUGMENTATION AND TARGETED THERAPIES

14:00 Augmented reality minimally invasive surgery (L.T. De Paolis)
14:45 Surgical simulators and training (V. Ferrari)
15:30 COFFEE BREAK
15:45 Technologies for monitoring the effects of minimally invasive thermal therapies (E. Schena)
16:30 Multifunctional hybrid nanovectors (G. Clefani)
17:00 Student project activities

Wednesday, Sept 11th, 2019

COMPUTER ASSISTED AND ROBOTIC SURGERY

9:00 Robotic radiotherapy and radiosurgery (G. Baroni and R. Orecchia)
10:10 Interventional radiology (M. Venditelli and A. Guidotti)
11:20 COFFEE BREAK
11:40 Tele-operated and safe surgical systems (P. Fiorini)
12:30 LUNCH BREAK
14:15 Digital fabrication technologies for surgical micro-devices (C. Stefanini)
15:00 Soft robots in surgery (M. Gianchetti)
15:45 COFFEE BREAK
16:00 AMICI DELL’UNIVERSITÀ DI PADOVA, BRESSANONE FREUNDE DER UNIVERSITÄT PADOVA, BRIXEN Award ceremony
17:00 LECTIO MAGISTRALIS (G.Z. Yang) Robot-assisted micro-manipulation: from ex-vivo tasks to in-vivo microsurgery
18:00 Student project activities

Thursday, Sept 12th, 2019

START-UP pitches (R. Pietrabissa)
10:15 Project Idea presentation (I session)
11:00 COFFEE BREAK
11:15 Project Idea presentation (II session)
12:30 LUNCH BREAK

DEVICE CERTIFICATION AND CLINICAL ASSESSMENT

14:00 Medical devices regulation and assessment: new challenges for biomedical engineers (L. Pecchi)
14:45 Assessment in maxillofacial surgery (C. Sforza)
15:30 Robot-assisted post-surgery rehabilitation (L. Zollo)
16:15 Closing and Idea contest award ceremony (E. De Moni, A. Mencasti, A. Redaelli)
16:30 School ends.

GNB General assembly is on Thursday 12th 2019 5pm - 8pm.
Brixen 2020

Topic of the School:
AI-enabled health care: from decision support to autonomous robots

→ In 2020 econ. support (registration fee)
Brixen 2020: preliminary program

Monday, 7 Sept 2020
INTRODUCTION AND BASICS
14.00 School opening (R. Bellazzi, C. Laschi, S. Quaglini)
14:15 AI: past, present and future (C. Combi, Univr)
15:00 The old guys: Knowledge representation and reasoning (F. Chesani, Unibo)
16:00 COFFEE BREAK
16:20 Learning … (L. Sacchi, Unipv)
17:00 … and such deep things (G. Lisanti, Unibo)

Tuesday, 8 Sept 2020
BUILDING AI MEDICAL SYSTEMS
9.00 Applications: images (TBD)
9:45 Applications: text mining (N. Viani, King's college)
10:15 Applications: -omics (B. Zupan, Unibj)
10:45 COFFEE BREAK
11:00 Building cognitive systems (B. Alexander, IBM)
11:45 A new AI winter? (A. Tucker, Brunel University)
12:30 LUNCH BREAK

SUPPORTING DECISIONS
14:00 Decision-making, values, utilities and games (Enea Panimbelli, Unipv)
14:45 Reinforcement learning (Giovanni Pezzulo, CNR Roma)
15:30 COFFEE BREAK
15:45 Agent-based systems and distributed intelligence (Marco Dorigo)
SHOWCASES
16:30 AI in Diabetes management (M. Vettoretti, Unipd)
17:00 AI powered chatbots for mental health (M. Ottaviano, UPM Madrid)

Wednesday, 9 Sept 2020
AUTONOMOUS SYSTEMS, (BIO)-ROBOTS AND EMBODIED INTELLIGENCE
9:00 Cognitive Robotics – foundations (Giulio Sandini)
10:00 Cognitive Robotics …tbd (Yoshihiko Nakamura / Yasuo Kuniyoshi)
10:20 COFFEE BREAK
11:40 Neuromorphic computing (Giacomo Indiveri / Chiara Bartolozzi)
12:30 LUNCH BREAK
14:15 Neuro-robotics (Egidio Falotico)
15:00 TBD ()
15:45 COFFEE BREAK
17:30 LECTIO MAGISTRALIS (Intelligenza artificiale in Medicina – la lezione di Mario Stefanelli a dieci anni della sua scomparsa) G. Barosi, L. Magnani, TBD

Thursday, 10 Sept 2020
9:00 Artificial vision and autonomous systems (Rita Cucchiara)
10:15 Learning in Robots (Barbara Caputo)
11:00 COFFEE BREAK
11:15 Robot teams in rescue (Daniele Nardi)
12:30 LUNCH BREAK
14:15 Impact on society and regulations, ethical aspects, risks (Round Table)
Participants: Andrea Bertolini, Barbara Bottalico, A. Santosuosso, TBD
Topics:
Yes, we are replacing physicians
Ethics, Regulations, Impacts on Society
16:15 Closing (R. Bellazzi, C. Laschi, S. Quaglini)
16:30 School ends
Study Plan

Study plan submission

Each PhD candidate must submit his/her study plan online.

Candidates will have the opportunity to review it periodically in order to adapt it to possible changes in the training offer or to needs justified by the development of his/her educational activity.

The study plan is submitted for approval to the Coordinator.
Annual evaluations

Yearly evaluation: based on credits and course grades and on the results achieved with the research performed. It is an exam, a grade is assigned.

Admission to final exam: based on the overall course and research achievements.

Final exam: Evaluation committee mainly external.
Il passaggio dal primo al secondo anno prevede un colloquio d’esame con presentazione da parte del dottorando con il Tutor e in presenza del Relatore.

a) tutor, dottorando e relatore si accordano sulla data del colloquio d’esame, da stabilirsi nell’intervallo di tempo indicato dalla Segreteria di dottorato.

b) alla data del colloquio d’esame, il Relatore dovrà aver già compilato e depositato la sua relazione con relativa valutazione;

c) la presentazione da parte del dottorando ha una durata massima di 15 minuti, a cui seguiranno le domande da parte del Tutor. In tale presentazione, il dottorando espone: 1) stato dell’arte; 2) obiettivo/i del lavoro; 3) metodologie previste; 4) piano del lavoro; 5) possibili criticità; 6) risultati preliminari.

..\ValutazionePrimoAnno\ValutazionePrimoAnno.docx
2° - 3° year

- Presentation of a report (through the online system)
- Oral presentation (15 minutes) and questions
- Commission composed of 4-5 members of the Board of Professors
Annual exam procedures

At \textbf{every yearly evaluation}, the candidate receives an evaluation. Grades are A (excellent), B (very good), C (good), D (fair), E (not sufficient to pass the exam).

In the case of grades from A to D, the candidate is admitted either to the next year (1st and 2nd year evaluation) or to the final exam (3rd year evaluation).

In the case of grade E, the candidate is qualified either as “Repeating” (E-R) or “not able to carry on with the PhD” (E-I).

At the end of the \textbf{last year} the candidate receives an overall evaluation, with the same grading system as described above. On that basis, her/his admission to the final PhD exam is deliberated.

The evaluation takes into account the structure of the thesis, the quality and number of publications, together with an overall evaluation of the PhD research project.

In some cases the candidate can obtain an extension of a maximum of 12 months, even if she/he has achieved sufficient results but still needs additional time to finalize the thesis.
Final exam

Schedule of the Day

11.00-11.30
Committee Meeting

11.30-12.30
First Ph.D. presentation and discussion

Dr. Ilaria LIORNI – XXVIII Cycle
“Electromagnetic Fields Exposure Assessment in the Early Life: From Prenatal Stage to Infancy”
Supervisors: Profs. Marta Parazzini, Paolo Giuseppe Ravazzani

12.30-13.30
Second Ph.D. presentation and discussion

Dr. Francesco PICCAGLI – XXVII Cycle
“Percutaneous Transluminal Angioplasty PTA balloon stretch blow molding process: development of a numerical model and optimization for lean design”
Supervisor: Profs. Gabriele Dubini, Roberto Ghidini

Lunch

14.30
Final Committee Meeting

15.00
Proclamation

Committee Members

Graziano CERRI
Professor
Department of Information Engineering
Università Politecnica delle Marche
Ancona, Italy

Markus REITERER
Medtronic Strategy and Scientific Operations
Core Technologies Department
Minneapolis, USA

Theodoros SAMARAS
Professor
Department of Physics
Aristotle University of Thessaloniki
Thessaloniki, Greece

Anna Maria BIANCHI
Professor
Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano
Milano, Italy
Final exam

The **Examination Committee** is usually composed by three or four members: two/three external (typically, one of them chosen among the two reviewers of the thesis) and one chosen among the members of the PhD Board.

The Examination Committee should consider in the evaluation: a) the quality of the thesis; b) the scientific value of the PhD research project; c) the quality of the presentation; and d) the quality and number of publications related to the PhD project.

The Examination Committee, finally, decides about awarding the candidate with the PhD title, eventually by accompanying the award with ‘cum laude’. 
The **Tutor** monitors and reviews the duties, the study plan and the activities of the candidate and acts as the ‘interface’ between the PhD candidate and the PhD Board.

In agreement with the PhD candidate proposal, the PhD Board nominates one or two **Advisor/s** who directly support the PhD candidate in his/her research activity.

→ Supervisors and tutor are to be agreed with your PhD Program Coordinator
Ruolo di Relatori e Tutor

Dal regolamento:

Tutor
Art. 12 c. 3 - All’inizio del corso il Collegio dei Docenti assegna ad ogni dottorando un tutor che lo supervisiona e supporta nel percorso formativo complessivo. Il tutor è un docente del Politecnico di Milano appartenente al Collegio dei Docenti. Il tutor può essere un docente di un altro Ateneo (purché componente del Collegio) nel caso di Dottorato in convenzione con altre Università.

Relatore
Art. 10 c. 4. Il Collegio dei Docenti nomina, con l’assenso dello studente, un relatore della tesi, che supporta il dottorando nell’impostazione e nelle attività di sviluppo della tesi. Il relatore può anche non essere componente del Collegio dei Docenti e non appartenere al Politecnico di Milano. In ogni caso il relatore è responsabile nei confronti del Collegio dei Docenti dello svolgimento del lavoro di tesi dell’allievo, e si impegna a rispettare le indicazioni del Collegio dei Docenti e del Progetto formativo del Dottorato.

“Il Relatore è il referente scientifico e supervisore del lavoro di tesi”.
PhD opportunities: Internationalization

- A period abroad is strongly encouraged
  - suggested at least 3 months,
  - up to 18 months abroad

- If you have a scholarship by Politecnico di Milano there is 50% stipend increase (€ 500 per month)

- Shorter stays (at least 3 months) in Europe qualify for the Doctor Europaeus certification (see regulations)
International agreements offer the candidates the opportunity to develop their PhD career in collaboration with International universities and research centers. Different forms of doctoral co-operation are possible:

- **thesis co-supervision**
  research is co-supervised by advisors belonging to two or more institutions, but with PhD title delivered only by one of them. (Polimi does not require a formal agreement)

- **joint doctoral agreement**
  doctoral path designed by two institutions. The PhD candidate prepares a single PhD thesis, and earns a joint diploma, signed and stamped by both institutions. (min 3 yrs)

- **Double doctoral agreement**
  awards two doctoral degrees. Each involved institution issues the diploma independently, upon completion of the requirements settled in the agreement. (min 4 yrs)
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- TU Delft
- Chalmers
- RWTH Aachen
- Politecnico di Milano