**Coordinator**  
Professor Vincenzo Parenti Castelli – Department of Industrial Engineering - Viale Risorgimento, 2 – Bologna - vincenzo.parenti@unibo.it

**Website**  
http://www.ingegneriaindustriale.unibo.it/it/attivita-didattica/dottorati-di-ricerca-1/dottorati-di-ricerca

**Duration**  
3 years

**Academic year**  
2013/2014

**Programme start date**  
01/01/2014

**Main Department**  
Department of Industrial Engineering

**Research Topics**

1. **Curriculum: Drawing and Methods of Industrial Engineering, and Aerospace Sciences**
   - Augmented virtual reality
   - Reverse engineering and rapid prototyping
   - Materials and aerospace advanced technologies
   - Plants and aerospace systems
   - Aerodynamics and Fluidodynamics
   - Mechanics of flight.

2. **Curriculum: Energy Conversion Systems and Internal Combustion Engines**
   - Modeling, control and diagnosis of internal combustion engines
   - Fluidodynamics applied to internal combustion engines
   - Energy systems

3. **Curriculum: Mechanics of Machines**
   - Theory of Mechanisms
   - Robotics
   - Mechanics of vibrations
   - Diagnosis of mechanical systems
   - Biomechanics of human articulations

4. **Mechanics of Materials and Processes Technology**
   - Mechanics of innovative materials
   - Material advanced technologies
   - Nuclear technologic applications and plasma applications

**Partner Institutions**

- Università di Firenze - Dipartimento di Energetica "Sergio Stecco"
- Istituti Ortopedici Rizzoli Bologna
- Smaltiflex S.p.A. San Felice sul Panaro (MO)
- Tekna Plasma Systems Inc., Sherbrooke, Quebec, Canada
- CEBORA SpA, Cadriano di Granarolo (BO)
- CENTRO PROTESI INAIL - Vigorso (Bologna)
- Magneti Marelli, Bologna
- Ducati Meccanica, Bologna
- Ferrari, Maranello
- Alcatel Alenia Spazio, Torino
- ENAV, Forlì
- Sotema Pack, Bologna
- Rainer, Bologna
- Associazione temporanea di scopo LITCAR-ENVIREN - Laboratorio a rete regione Emilia Romagna
- Centro ceramico Bologna
- ESSE.A. Sasso Marconi (Bo)
- Istituto Jozef Stefan
- Fraunhofer IWU, Chemnitz, Germany
- Département de Génie Mécanique - Ecole Nationaled'Ingénieurs de Monastir
- University Paris 6 - Robotics Lab. of Paris
- Università di Zurigo - Swiss Federal Institute of Technology
- Mercator University of Duisburg - Department of Mechanical Engineering
- Ohio State University - Department of Mechanical Engineering
- Standford University - Department of Mechanical Engineering
- Massachusetts Institute of Technology, Boston - Department of Mechanical Engineering
- Hannover University - Department of Mechanical Engineering
- University of Minnesota, Minneapolis - Department of Mechanical Engineering
- IMA
- AVIO
- GD
- Marchesini
- Alma Automotive
requirements and admission procedures

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Admission procedures</th>
<th>Notes on admission</th>
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<tbody>
<tr>
<td>An Italian university degree (laurea specialistica/magistrale - 3+2 years) or pre-reform degree (vecchio ordinamento - 4 years) or an equivalent degree obtained abroad. Also applicants whose degree will be awarded no later than December 31th, 2013 can participate to the selection procedures.</td>
<td></td>
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<tr>
<td>Evaluation of qualifications and research project</td>
<td>The results of the evaluation of qualifications and research project will be available by 15/10/2013</td>
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<tr>
<td>Oral examination</td>
<td>Dipartimento di Ingegneria Industriale - Viale Risorgimento, Sala riunioni DIN, 3 piano, Scuola di Ingegneria ed Architettura, Viale del Risorgimento, 2, Bologna</td>
<td>9 a.m.</td>
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</table>

For applicants residing abroad, the oral examination can be done remotely through video-conference based on the IP protocol (such as through Skype with webcam). In this case, at the time of application for admission, applicants should indicate the choice of this mode for the oral examination and indicate a valid address/contact.

The request must be authorized by the Admission Board upon verification of the conditions needed to ensure the proper conduct of the test (via a trustee, who will verify the applicant's identity and will be staying on the applicant's site during the exam).

The applicant should contact the Admission Board at the Skype contact PHD_DIN_UNIBO and agree a timetable to carry out the oral examination, on days specified for the oral examination.

In case the applicant does not reply within 2 calls by members of the Admission Board, he/she will be considered as definitely not registered to the oral exam.

Mandatory documents to be enclosed with the online application (failure to comply with such requirements will result in the exclusion from the competition)

1. CV
2. copy of Bachelor's and Master's degree, list of exams taken with grades and final mark (in Italian or English)
3. only for those who do not hold a Master’s degree when submitting the application: copy of the exams taken with grades

For documents listed at points 2. and 3., please note that:
- for degrees obtained in Italian Universities: upload the degree certificate issued by the relevant University;
- for degrees obtained in non-EU Countries: upload the degree certificate issued by the relevant University, translated in Italian or in English;
- all documents must contain the following information: personal data, name of the University, degree name, final score, transcript (see art. 2 of the call).

4. Research project that the applicant would conduct during the PhD programme (maximum 2 pages – about 4.000 characters); the research project must deal with one of the research topics included in the Programme's curricula. Such a project will not necessarily be the subject of the successful applicant's doctoral studies.

5. Summary of the graduation thesis (max 4.000 characters); for graduands, summary of the graduation thesis' draft approved by the supervisor

Other documents to be enclosed, if available
- Technical and scientific publications
- Any other relevant document (scholarships, awards, attendance at courses and Masters, participation in Erasmus or other exchange programs, etc.)

Agenda

<table>
<thead>
<tr>
<th>Description</th>
<th>When</th>
<th>Where</th>
<th>Time</th>
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<tbody>
<tr>
<td>Evaluation of qualifications and research project</td>
<td>The results of the evaluation of qualifications and research project will be available by 15/10/2013</td>
<td>Dipartimento di Ingegneria Industriale - Viale Risorgimento, Sala riunioni DIN, 3 piano, Scuola di Ingegneria ed Architettura, Viale del Risorgimento, 2, Bologna</td>
<td>9 a.m.</td>
</tr>
<tr>
<td>Oral examination</td>
<td>18/10/2013 and 21/10/2013</td>
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Assessment criteria

Total score: 100/100

1. Evaluation of academic qualifications and research project
   - minimum score required for the admission to the oral exam: 30
   - maximum score: 50
   Score is assigned as follows:
   - evaluation of the degree score (for applicants who have a university degree at the time of submission of the application) or evaluation of the university exams taken with scores (for applicants who still not have a university degree at the time of submission of the application): max 17 points
   - Graduation thesis: max 8 points
   - Research project: max 20 points
   - Publications: max 4 points
   - Other qualifications (working experiences, roles of responsibility in working groups/research projects, etc.): max 1 point

   The results of the assessment of academic qualifications and of the research project will be posted on the bullet board of the Department and on the site http://studenti.unibo.it, restricted access by University credentials (by selecting: sintesi delle richieste in corso → vedi dettaglio → risultati prova) by 15/10/2013

2. Oral examination
   - minimum score required in order to be listed in the final ranking: 30
   - maximum score: 50

   The oral exam will focus on the explanation and discussion of the applicant's research project and will assess the candidate’s scientific research aptitude, as well as her/his general knowledge on the research topics included in the Programme’s curricula and on the presented research project.

   The results of the oral examination will be posted on the bullet board of the Department and on the site http://studenti.unibo.it (by selecting: sintesi delle richieste in corso → vedi dettaglio → risultati prova2).

   The final ranking with details of winners will be published on the site http://studenti.unibo.it, restricted access by University credentials. Any information concerning the publication of the final ranking will be available on www.unibo.it/Dottorati/Bandi29.

The Admission Board will not send any communication to the candidates about the outcome of the tests. It is the responsibility of the candidates to get informed on the outcome (see art. 6 of the call).
**Language requirements**

The documents enclosed with the application can be submitted either in Italian or English, according to the preference of the candidate. During the oral examination the applicant’s skills with the English language will be assessed. For foreign applicants the knowledge of Italian is not compulsory.

**Positions and scholarships**

<table>
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<tr>
<th>Total number of positions: 22, of which:</th>
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<tr>
<td><em>5 positions with scholarship granted by University of Bologna</em> (one scholarship is made available with funds provided in part by the Department of Industrial Engineering and it is committed to research activities within the Curriculum Mechanics of Materials and Processes Technology)</td>
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<tr>
<td><em>2 positions with scholarship granted by private entities (Alma Automotive Srl)</em>, devoted to research activities in the field of Modeling, control and diagnosis of Internal Combustion Engines.</td>
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<tr>
<td><em>4 positions with scholarship “Fondo Giovani 2012” granted by MIUR</em>, committed to:</td>
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<tr>
<td>o Scope of Investigation 3 “Novel applications of biomedical industry” (1 scholarship)</td>
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<tr>
<td>o Scope of Investigation 4 “Advanced manufacturing systems with impact in the machinery industry as well as to “Made in Italy” manufacturing areas as textile, clothing and industrial mechanics” (2 scholarships)</td>
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<tr>
<td>o Scope of Investigation 10 “Energy saving and microdistributed generation” (1 scholarship)</td>
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<td><em>11 positions without scholarship</em></td>
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**Extra-quota positions: 11**