

Public Competition
for the admission to the PhD programmes
41st cycle
Academic year 2025/26
Faculty of Engineering
PhD Programme in
Computer Science

Website: <https://www.unibz.it/en/faculties/engineering/phd-computer-science/>

Duration: 3 years

Academic year: 2025/26

Start date: November 1st, 2025

Official language: English

COURSE PROGRAM

The aim of the program is for doctoral students to acquire the ability to carry out independent research in the field of computer science. This includes the ability to communicate ideas effectively both orally and in writing, and the ability to work in a team.

To successfully complete the study program, the doctoral student must independently develop a research topic in such a way as to significantly expand the state of knowledge in the field of Computer Science. In view of the time limitation of the program, it is necessary for the doctoral students to concentrate their efforts on research work. In view of this, doctoral students are supported by the structure of the research program.

This structure is explained in more detail below, together with the measures relating to the appointment of the supervisor, the formulation of the research and study plan and the moments for verification:

- The program is divided into four phases, ending in months 6, 12, 24 and 36 respectively.
- For each doctoral student, the Board of Lecturers appoints a supervisor and at least one co-supervisor. At least one of the supervisors must be a member of the Scientific committee.
- Together with the team of supervisors, the doctoral student draws up a research and study plan, which defines the research objectives and the steps necessary to achieve them. These include the study of topics whose knowledge is necessary for the doctoral candidate's research work. The doctoral student periodically updates his/her research and study plan, considering the progress made and new developments that emerge in the field of research.

Each of the phases ends with a review stage during which the doctoral student presents his/her work, and the Scientific Board assesses the progress made. The updated research and study plan is one of the fundamental results of each follow-up moment.

Art. 1 - POSITIONS

1. A total of 1 position is available for the PhD programme in Computer Science.
2. All information about the PhD programme in general, the schedule and its structure as well as the possible research projects listed below can be found at the following link: <https://www.unibz.it/en/faculties/engineering/phd-computer-science/>

3. Positions with unibz scholarship: 0

Positions without scholarship: 0

Positions tied to subject-related scholarship: 1

Financed by: ESF+ European Social Fund

4.

Title

Supervisor

Fast Numerical Solvers and Machine Learning for Energy and Smart Manufacturing Prof. Carpentieri Bruno

This PhD project explores fast, scalable numerical methods and machine learning techniques for Multiphysics simulations in energy and smart manufacturing. Applications include fusion energy, electromagnetics, and metal additive manufacturing (AM), where complex geometries and physical interactions lead to large-scale computational challenges. The research integrates data-driven modelling, Physics-Informed Neural Networks (PINNs), and real-time digital twins to enable predictive simulations and adaptive control on modern petascale systems. This supports defect detection, process optimization, and AI-enhanced decision-making with minimal trial-and-error. The project aligns with the Smart Specialization Strategy (RIS3), addressing Automation and Digital, Green Technologies, and cross-cutting themes like Digitalization and Sustainability. It contributes to the development of advanced computational tools and machine learning workflows at UniBz, strengthening its role in AI-driven scientific research and fostering collaborations between academia and industry in South Tyrol.

5. The application for admission must state the preference for the position with a subject-related scholarship.

6. Separate rankings will be compiled for positions tied to subject-related scholarship. The positions tied to subject-related scholarships oblige the winners to carry out research activities relevant to the indicated subject. These will be assigned preferentially to applicants who make a specific request in their application.

7. Pursuant to the general part of the present call for applications, the number of positions may be increased as a result of funding provided by other universities, public research bodies or qualified private companies. Notice of such an increase will be given exclusively on the Unibz web page dedicated to PhD programmes. Applicants wishing to obtain eligibility for any additional subject-related scholarships may make an explicit request to the selection committee during the interview, in order to allow it to assess the specific eligibility.

Art. 2 – ADMISSION REQUIREMENTS

1. Application to the present public competition for the admission at the PhD programme in Computer Science may be presented pursuant to art. 4 of the general part of the present call for application, without limitations regarding gender or citizenship, by:

- a) Applicants holding a postgraduate degree as per Ministerial Decree no. 509/1999, a postgraduate degree as per Ministerial Decree no. 270/2004, a degree of the former Italian university system that show a significant presence of content in the field of computer science in the scientific areas of INF-01 and ING-INF/05;
- b) Applicants holding an equivalent degree obtained abroad;
- c) Applicants achieving one of the above-mentioned titles within the enrolment deadline. In the latter case, applicants will be conditionally admitted to the public competition and are

required to present the qualification by the enrolment deadline, under penalty of forfeiting admission to the programme.

Further requirements:

Participants must be under 35 years of age, to be considered until the day before their 35th birthday. The requirement must be fulfilled at the time of the deadline for the call of applications.

A good/very good knowledge of English is required, which will be assessed during the interview.

Art. 3 – APPLICATION FOR ADMISSION

1. In addition to the documentation listed in the general part of the present call for applications, the following documents must be uploaded to the application portal:

- a) Presentation letter (Attachment A);
- b) Curriculum vitae in English, including a list of publications (if available).
- c) Up to a maximum of 2 reference letters in Italian, German or English by a university lecturer or researcher from a research institute, in which the work carried out or the quality of the same is described; instead of letters, the names and institutional contacts of up to 2 professional references may be provided.

The template for the presentation letter (Attachment A) is available on the official webpage of the PhD programme.

Art. 4 – SELECTION PROCEDURE

1. The selection procedure consists of three phases:

a) applications will be examined ex officio for completeness and fulfilment of the formal requirements; applicants excluded due to incomplete applications or lack of requirements will be notified on the dedicated unibz web page. The publication will have the nature of a notification to all effects. No individual communications will be made.

b) The selection committee will assess the complete applications in accordance with Article 5, considering the qualifications and attached documentation referred to in Article 3. Applicants who reach the minimum score referred to in Article 5 will be admitted to the interview. Admission to the interview, as well as the relevant dates and times, will be communicated on the unibz dedicated web page. Individual communications will be sent in due time to the e-mail address indicated in the application form to applicants admitted to the interview.

c) Interviews may be held by videoconference at the applicant's request to the selection committee and will be evaluated in accordance with the criteria set out in article 5. Applicants must ensure the use of a webcam to enable them to identify themselves to the selection committee by showing a valid identity document or passport, under penalty of exclusion from the public competition.

2. Absence from the interviews, non-connection, unavailability of the applicant on the appointed day and/or time or non-exhibition of a valid identity document or passport are a cause for exclusion from the public competition.

3. If technical problems occur during the interviews by videoconference, if the problem concerns one or more members of the selection committee, the interview is deferred to another date ex officio; if the problem concerns the applicant, the committee may, subject to the principles of non-discrimination and equal treatment of applicants, postpone the test to another date for justified reasons.

4. Once the examinations have been completed, the relevant selection committees draw up rankings on the basis of the scores obtained by the applicants in the individual tests.

Art. 5 – EVALUATION CRITERIA

1. The selection committee carries out a comparative assessment of the applicants. For applicants who have expressed a preference for positions tied to subject-related scholarships, the committee also ascertains their suitability for the specific subject.

2. The following scores will be awarded during the evaluation of the documents submitted with the application under Article 3:

- Up to a maximum of **50** points for the curriculum vitae, qualifications, and publications, divided as follows:
 - Academic qualifications, other certifications, and work experience (up to 40 points);
 - Experiences abroad, participation in summer schools and conferences, contributions to research projects, scholarships (up to 5 points);
 - Publications (up to 5 points).
- Up to a maximum of **5** points for letters of recommendation;
- Up to a maximum of **15** points for the cover letter (Attachment A) and the research proposal (Attachment B), based on their alignment with the research themes proposed in the call.

3. Applicants who reach the threshold of **45/70** points will be admitted to the interview. Admission to the interview and the relevant dates and times will be communicated on the unibz dedicated web page. Individual communications will be sent in due time to the e-mail address indicated in the application form to applicants admitted to the interview.

4. The following elements will be assessed during the interview: aptitude for research; possession of a language level appropriate to the language of the programme; argumentative capacity in relation to the theoretical and methodological hypotheses of the research project presented. A maximum of 30 points will be awarded. The interview is considered passed if at least **20/30** points are obtained.

5. The final score is determined by the sum of the points awarded during the evaluation of the submitted documentation and the interview. Only candidates who obtain a minimum score of at least **70/100** will be considered eligible. Please note that if a candidate does not reach the minimum threshold of 45 points in the first evaluation, they will not be admitted to the oral interview (second evaluation) and therefore will not be eligible for inclusion in the ranking. In the event of a tie, priority will be given to the younger candidate.

Art. 6 – RANKING

1. Applicants and candidates will be admitted to the programmes in the order of their ranking until the number of positions available is reached. In the event of equal merit, the applicant who is younger in age shall prevail. In the event of successful placement in more than one ranking list, the winner must exercise the option for only one position. Separate rankings will be drawn up for each position tied to a subject-related scholarship.

2. The final rankings will be published on the unibz website on the page dedicated to PhDs. Such publication has the value of an official communication. No individual communications will be made.