

Faculty of Computer Science

PhD programme in COMPUTER SCIENCE

Duration: 4 years

Academic year: 2021/2022

Start date: 01/11/2021

Official programme language: English

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

PROGRAMME CONTENTS

The aim of the PhD programme is to allow students to acquire the abilities and skills to carry out independent research in the area of computer science. This also involves the ability to communicate ideas clearly and efficiently orally and in writing and the ability to work in groups.

In order to conclude the programme successfully, the PhD student has to elaborate a research topic independently and this research must contribute significantly to current knowledge in the area of computer science. Due to the time limits of the programme, PhD students will focus on their research work. To achieve this, they are supported by a structured PhD programme.

In the following, this structure is described in detail together with the procedures for the nomination of the supervisor, the definition of the research and study plan, and the examinations:

- The programme is divided into five phases, which end at months 6, 12, 24, 36, and 48 respectively.
- For each PhD student, the PhD Course Committee nominates a supervisor, who is preferably chosen among its members. It can also nominate a co-supervisor who can provide additional support.
- Together with their supervisor, each student sets up a *Research and Study Plan*, which defines the research goal and the steps to achieve it. The latter include subjects where the student needs to deepen their expertise. The Research and Study Plan is updated continuously, taking into account both the progress that has been made and new developments that arise in the area of research during the course of the PhD work.
- There are five milestones at the end of the five phases at which students report on their work and at which the PhD Committee assesses their progress. The updated Research and Study Plan is one of the deliverables for each milestone.

DEADLINES

Application: from date of publication of the call to 30 June 2021

The admission interviews will take place online on 19 July 2021 (if needed also on 20 July 2021, based on the number of candidates)

The precise date and time of the interview will be communicated per email by July 16, 2021.

The ranking list will be published on the website of unibz by August 6, 2021.

AVAILABLE PLACES

Positions with grants: **12 places**

Industrial PhD position: **1 place**

Positions without grant: **2 places**

5 Grants are associated to specific research topics

<i>Topic related to the grants</i>	<i>Positions</i>	<i>Funding body</i>
Data Integration through Virtual Knowledge Graphs	1	Foundation Wallenberg Referent: Prof. Diego Calvanese
<ul style="list-style-type: none">• Symbolic and sub-symbolic AI techniques for Process Mining• Explainable and verifiable AI	1	FBK - Fondazione Bruno Kessler (TN) Referent: Dr. Chiara Ghidini
<ul style="list-style-type: none">• Ontology-mediated transformation of knowledge structures for efficient migration• Reasoning with weighted information to handle context and exceptions	1	FBK - Fondazione Bruno Kessler (TN) Referent: Dr. Loris Bozzato
<ul style="list-style-type: none">• Conversational AI for the medical domain• Explanatory dialogues for explainable AI	1	FBK - Fondazione Bruno Kessler (TN) Referent: Dr. Bernardo Magnini
Applied Artificial Intelligence	1	SIAG – Informatica Alto Adige S.p.A. Referent: Stefan Gasslitter

The Industrial PhD position is associated to following specific research topic

<i>Topic related to the grants</i>	<i>Positions</i>	<i>Funding body</i>
Computer Vision and Deep Learning	1	Barbieri electronic snc Referent: Prof. Oswald Lanz

For grants funded by external parties, the candidate, if interested in, **must indicate this in the PRESENTATION LETTER**, by mentioning the specific topics and motivating why they are interested in the topic associated to the grant.

ENTRY REQUIREMENTS

Italian degrees

Degree from the old Italian system: all

Master (*laurea specialistica/magistrale*): all

Foreign degrees

Applicants who have obtained their degrees abroad must have a university education of at least five years duration and fulfil the prerequisites listed below.

Other requirements:

In order to apply for the PhD programme in **COMPUTER SCIENCE** applicants must have sufficient knowledge of English.

The prerequisites for admission to doctoral programmes include having acquired an appropriate educational degree, and/or have worked in the PhD course fields, in particular being able to demonstrate a deep knowledge of the fundamental techniques and methods used in computer science. Preference is given to qualifications in Computer Science, Computer Engineering, Information or Electronic Engineering.

LANGUAGE REQUIREMENTS

The official language of the PhD programme is English. Therefore applicants must have very good knowledge of English.

The competency in English will also be assessed during the interviews.

DOCUMENTS REQUIRED

To apply to the PhD programme, applicants must include the following documentation, otherwise excluded:

- **Master degree certificate and transcript of records:** in the case of a master's degree awarded at an Italian university, certificates **need to** be replaced by a self-declaration or diploma supplement: see art. 3 of the "Call General Part".
- **Curriculum vitae (CV)** (in English and possibly following the EU format that can be downloaded here <https://europass.cedefop.europa.eu/en/documents/curriculum-vitae>). If available, please indicate your ranking within your graduating cohort. ATTENTION: include in the contact information also your skype id;
- **Presentation letter** (in English in PDF format, max. 1 page A4 size, computer edited). Describe your reasons for taking a PhD, why you chose Unibz (in particular the Faculty of Computer Science) and your career perspectives after completing your PhD. Indicate which of the research topics proposed by the researchers in the faculty you are interested in, and if so, specify clearly whether you are interested in one of the research topics proposed by our external partner;
- **Research proposal** (in English in PDF format, max. 1 page A4 size, computer edited) A key element of this document is the presentation of a research activity that may be current or recent (e.g. master's thesis) or that you plan to carry out during your PhD. It is recommended to develop this document around three key points: (a) state of the art and problem definition; (b) research questions, objectives and possible hypotheses; (c) methodology.

Industrial Ph.D. (Dottorato Industriale)

For those applying to the Dottorato Industriale position, the following additional document is necessary:

- A copy of the contract of employment at the company or SIGNED self-declaration.

Other documents to be included in the application if available:

- list of publications with related links, if applicable (up to a maximum of 3 publications from the past 5 years);
- up to a maximum of 3 reference letters provided by the applicant's work or research supervisors, describing the work carried out and the quality of the same (*the letters MUST be signed in original and scanned!*).

The candidate interested in topics funded by external parties must clearly indicate such topics in the motivation letter.

For these grants, a separate ranking lists will be established containing candidates who are also eligible according to the general ranking and who in addition have a scientific profile that is particularly suited to the specific topics associated to these grants.

ADMISSION PROCEDURE

The selection is based on:

- the evaluation of each applicant's profile based on their curriculum vitae, qualifications, presentation letter and research proposal;
- the coherence with the research themes identified in the faculty's specific part of the call;
- the evaluation of the reference letters and the publications, and

- an interview.

The following points will be awarded:

- up to a maximum of *50 points* for the curriculum, qualifications and publications:
 - Educational and working curriculum (up to 35 points)
 - Experience abroad, participation at summer schools and conferences, contribution to research projects, scholarships (up to 10 points)
 - Publications (up to 5 points)
- up to a maximum of 5 points for the reference letters;
- up to a maximum of 10 points for the presentation letter and the research proposal on the basis of congruence with the research topics proposed in the call.

The Evaluation Committee will select the best applicants on the basis of a comparative assessment. Candidates that have obtained at **least 45 points** in the evaluation of their application documents will be admitted to the next stage of the selection process. This will consist of **an interview** in which also the knowledge of English of the applicant will be assessed. The interviews will take place in video-call (Skype, MS Teams, etc.). Up to a maximum of 35 points will be awarded for the interview.

The *final score* is the sum of the score for the evaluation of the application documents, and of the score for the interview. The maximum score obtainable is 100.

Applicants that have obtained a final score of **at least 70/100** are considered *eligible*. Eligible applicants will be ranked according to their final score. The top eligible applicants will be admitted according to the number of available places with and without grant, according to their order in the ranking list. The remaining eligible applicants will be put on a waiting list. Applicants in the waiting list will be admitted to the program in case an already admitted applicant is not available or withdraws their application.

RESEARCH KEYWORDS

The Faculty of Computer science covers a range of diverse research interests organized in three main areas. Interested candidates are invited to visit the Faculty's webpages and those of our professors and researchers for more information.

Possible research themes and supervisors

[Research Centre for Information and Database Systems Engineering \(IDSE\)](#)

- Dialogue-based intercation (*contact person: Prof. De Angeli*)
- Graph and data analytics (*contact person: Prof. Carpentieri*)
- Information Systems for Decision Support (*contact persons: Prof. Ricci e Prof. Zanker*)
- Intelligent networks and systems (*contact person: Prof. Liotta*)
- Interaction Design and Education (*contact persons: Prof. De Angeli e Dr. Gennari*)
- Interaction Design and Physical Computing (*contact person: Dr. Gennari*)
- Numerical linear algebra algorithms for high-performance computers (*contact person: Prof. Carpentieri*)
- Participatory Design and artificial intelligence (*contact person: Prof. De Angeli*)
- Recommender Systems (*contact persons: Prof. Ricci e Prof. Zanker*)
- Smart sensing and Internet of Things analytics (*contact person: Prof. Liotta*)
- Time series analytics (*contact person: Prof. Gamper*)
- Temporal database systems (*contact person: Prof. Gamper*)

[Research Centre for Knowledge and Data \(KRDB\)](#)

- Algorithmic Game Theory
- Artificial Intelligence
- Business Process Management
- Conceptual Modeling
- Data Aware Dynamic Systems
- Data Integration
- Data Management through Knowledge Graphs
- Description Logics
- Dynamic Extensions of Description Logics
- Knowledge Representation and Reasoning
- Multi-Agent Systems
- Ontology-Driven Information Systems
- Ontology Engineering
- Process Mining
- Semantic Interoperability
- Temporal Logics

Contact persons: *Prof. Artale, Prof. Calvanese, Prof. Franconi, Prof. Guizzardi, Prof. Maggi, Prof. Montali, Prof. Nutt, Dr. Tessaris, Dr. Felli, Dr. Galliani, Dr. Gigante, Dr. Kacimi El Hassani, Dr. Kutz, Dr. Lanti, Dr. Lecca, Dr. Marengo, Dr. Prince Sales, Dr. Savkovic, Dr. Troquard, Dr. Xiao*

Research Centre for Software and Systems Engineering (SwSE)

- Adaptable Software Systems (*contact person: Dr. Martins Guerra*)
- Agile and Lean Methods (*contact persons: Prof. Wang, Dr. Martins Guerra*)
- Assurance of AI systems (*contact persons: Prof. Russo, Dr. Camilli*)
- Blockchain (*contact person: Dr. El Ioini*)
- Edge Cloud Computing (*contact persons: Prof. Pahl, Dr. El Ioini*)
- End-user software engineering (*contact person: Dr. Fronza*)
- Formal methods (*contact person: Dr. Camilli*)
- ML-driven Software Construction (*contact person: Prof. Pahl*)
- Software Development Analytics (*contact persons: Prof. Russo, Dr. Janes*)
- Software Engineering training and education (*contact person: Dr. Fronza*)
- Software Systems vulnerability and attacks (*contact person: Prof. Russo*)

These research keyword are only indicative: selected candidates can always propose their own research topics for the PhD programme.