



Fakultät für Informatik
Facoltà di Scienze e Tecnologie informatiche
Faculty of Computer Science

PhD in

Computer Science

2022/23

At a glance

Duration of the programme: 3 years
Courses will be taught in English
Places available: 21 with scholarship +
3 without scholarship
Campus: Bozen-Bolzano
Tuition fees: € 167.50 per year

course description

What makes our PhD graduates ideal candidates to work as researchers both in academia and in the IT sector is their ability to research and understand theoretical and applied research topics, the collaborative approach to work, and their dissemination and writing skills. Moreover, problem solving skills and the ability to work autonomously enable them to become key players in every field of IT, as independent consultants or in management roles.

At the end of our programme, graduates are equipped with a vast knowledge of IT, from the formal and theoretical aspects to the latest developments in methodology and technology.

PhD students can choose any of the three research themes offered by the faculty. They are different not only in the main topics explored, but also in the research methodology applied. In the **Knowledge and Data** area, students investigate the topics of **Intelligent Integration and Access to Data**, **Conceptual and Cognitive Modelling**, and **Process-aware Information Systems Management**. In the **Software and Systems Engineering** area, work follows an empirical approach based on the implementation of prototypes and techniques and the carrying out and analysis of experiments. Finally, the **Information and Database Systems Engineering** area adopts a hybrid approach, with a focus on efficient implementation and user interaction. This large spectrum of topics offers PhD candidates a wide range of options to develop their own research and great flexibility to match their interests.

Programme Structure

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.

The Stages of the PhD

The programme is divided into five stages, respectively ending at months 6, 12, 24, 36, and 48 of the programme.

- **Phase 1** comprises the first six months. During this period, the student identifies with the support of his or her supervisor the area of research, a specific topic within the area, and one or more possible approaches to the topic. The student acquires the necessary foundations for carrying out the research, for instance, by way of attendance of courses or supervised study of literature. The supervisor will introduce the student into relevant research activities at the faculty.
- **Phase 2** comprises the second half of the first year. The student spends time both on the acquisition of skills and on first research steps.
- **Phase 3** comprises the second year, and is to be spent on an in-depth exploration of the research topic.
- **Phase 4** comprises the third year, and is to be spent continuing the exploration of the

research topic.

- **Phase 5** comprises the fourth year. The aim is to complete the research and to document it in a thesis.

Fieldwork abroad

During the four years of the PhD programme, candidates are required to commit full-time to the PhD, and the programme will include both working on the research project and learning activities. Students are also strongly encouraged to carry out part of their research in another university or research center, for a longer period, ranging **from 1 month and up to 18 months**. This is an extremely valuable opportunity for a PhD candidate to study specific aspects of their research in depth under direct supervision of world experts in their chosen research topic. It is also an opportunity to carry out research in highly stimulating and competitive contexts, while exchanging ideas with other scholars and establishing an early network of colleagues in the world of research.

Partner Universities and Research Centres

We have established partnerships with many universities and research institutions in Italy and abroad, such as the Technical University of Dresden, the Universidade Nova of Lisbon and the Technical University of Vienna. In addition, members of our Faculty cooperate on a regular basis with other universities and research institutes, such as Oxford University, Rice University Houston, Zürich University, Sapienza University of Rome, University of Trento, and FBK Trento.

Some of the PhD positions are collaborations supported by external research and industry partners (Fondazione Bruno Kessler FBK, Südtiroler Informatik SIAG, NOI Techpark, Barbieri Electronic snc, University of Umea).

PhD in Computer Science

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Application and Admission

You can find key information to apply and gain admission to this PhD Programme. For detailed information browse the general and specific calls below.

In order to gain admission to the PhD programme, you will need to have obtained 300 ECTS credit points (Master degree) and have some relevant academic experience in Computer Science, Computer Engineering or Electronics or in a related discipline.

Deadlines

Application deadline: 1 July 2022, 12:00 midday (CEST)

Admission interviews: online by 27 July 2022

Communication of interview details: within 19 July 2022

Publication of ranking lists: by 5 August 2022

Available Places

Total positions: 24

Positions with university grants: 8

Positions with other types of grants: 13

Positions without grant: 3

8 positions financed by unibz

- A1-The Mathematics of Large Scale Scientific Computation (prof. Carpentieri)
- A2-Smart Knitted SpaceSuit (prof. De Angeli)
- A3-Explaining Artificial Cognition with Experimental Psychology (prof. De Angeli)
- A4-Multi-task Learning in Deep Neural Networks (prof. Di Fatta)
- A5-Decentralized Consensus for Extreme-scale Blockchain (prof. Di Fatta)
- A6-CHRISpredict: privacy preserving AI platform for personalized risk prediction (prof. Gamper)
- A7-IoT Design and Development with End Users for a Sustainable Future (dr. Gennari)
- A8-Deep Learning for Image and Video Understanding (prof. Lanz)
- A9-Sparse Artificial Neural Networks for Intelligent Internet of Things (prof. Liotta)
- A10-Explanations for a Human-centric AI (prof. Zanker)
- B1-SQL-Based Declarative Process Mining (prof. Maggi)

- B2-Strategy and Explainability for Knowledge Bases (dr. Kutz)
- B3-Graph Data Management with Linear Algebra (prof. Nutt)
- C1-Assessment Methods for Decision-making in Servicebased Architectures (prof. Wang)
- C2-Agile training for scaling agile and agile transformation (prof. Wang)

2 positions financed by FKB Fondazione Bruno Kessler

(bound reaserach topic, to be chosen from among these three)

- D1-Virtual Digital Assistants for Healthcare (dr. Ghidini)
- D2-Emotions in Multilingual Texts (dr. Strapparava)
- D3-Neural models of collaborative behaviors in conversational agents (dr. Magnini)

3 positions according to MD 351/2022 under PNRR

(minimum 6 months abroad mandatory)

- E1-Human Creativity and Machine Learning for public awareness of AI (prof. De Angeli)
- E2-Ethical Artificial Intelligence for Public Administration Data and Social Policies (prof. Liotta)
- E3-Teaching Physical Design and Computing (dr. Gennari)

8 positions according MD 352/2022 under PNRR

(minimum 6 months abroad and 6 months in the company)

- F1-CHRIS2People: a framework to increase population health based on the analysis of large data collections (prof. Gamper - in collaboration with Eurac)
- F2-Dynamic association graph inference for applications in biomedicine (prof. Gamper - in collaboration with Eurac)
- F3-Data quality assessment and control in complex processing chains for earth observation and climate data analysis (prof. Liotta - in collaboration with Eurac)
- F4-Multi model multi sensor data fusion for integration of spatial temporal information in the context of earth observation and climate data analysis (prof. Liotta - in collaboration with Eurac)
- F5-How to bring the Metaverse into the vehicles for a novel video conferencing experience (prof. Haller e prof. De Angeli - in collaboration with BMW Group)
- F6-Entertainment in the car by using a cognitive seat with tactile feedback (prof. Haller e prof. De Angeli - in collaboration with BMW Group)
- F7-I_C&C: Interfacing Creativity and Computation (prof. De Angeli e prof. Montali - in collaboration with Sineglossa)
- F8-Predictive maintenance for industrial equipment (prof. Gamper - in collaboration with Durst)

For positions without a grant, you are asked to choose from the project proposals listed above.

Research projects - details

You can find here the detailed descriptions (project description + required skills) of all Research Projects.

Please read carefully the document, consider that you have to select three project proposals

from the list!

Entry Requirements

Regardless of age and citizenship status, applicants can be admitted to the selection procedure if they have been awarded at least one of the following degrees:

- a **Master's degree** independent from the degree classes (ex D.M. 270/04 or ex D.M. 509/99) or a degree according to the former legislation or an equivalent qualification
- a **non-Italian Second Cycle Degree** (foreign Master's degree) awarded by an academic institution, equivalent to the above-mentioned degrees (letters a), valid for admission to Doctoral studies in the Country it has been issued (except for substantial differences).

Applicants who are yet to obtain their Master's degree or their Second Cycle Degree are admitted to the selection procedure on condition that they obtain their degree no later than the enrolment deadline, and before the PhD program's start date.

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 programme 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.

Language Requirements

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

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

Online Application

Your application must be submitted online through the Application Portal. The deadlines are indicated in the "Deadlines" section.

- You need to create an account and upload a valid ID card or passport (front/back). Please note: if your document is invalid, incomplete or unreadable, you will be excluded from the admission procedure;
- Fill in the online form and upload the attachments listed under "Admission procedure";
- Complete and submit the online application by the deadline. Documents sent per email will not be taken into consideration. Once the application has been sent, it cannot be modified, unless a change/addition request is received from the faculty secretariat.

Please note: False declarations will lead to automatic exclusion from the competition.

Documents Required

To apply to the PhD programme, applicants must include the documentation listed below. Incomplete applications will be excluded from the competition.

Attention: text exceeding the maximum allowed length (if clearly indicated for a document) will not be taken into account! Please respect the format/length indicated.

- **Diploma supplement or the Master degree diploma together with the transcript of records of all passed exams** (=certificate with exams list of Master degree):
 - **if graduated in Italy**: diploma supplement or self-declaration (following the Italian D.P.R. no. 445/2000) of the degree awarded with the exams passed (if graduated) or just with the exams passed (if not graduated yet);
 - **if graduated abroad**: diploma supplement or final degree certificate with exams passed (if graduated) or transcript of records (if not graduated yet) in Italian, German or English related to a second level university qualification;
- **Curriculum vitae (CV)** in English (possibly following the EU format that can be downloaded here). The CV must be updated with all data and information of the current year 2022.
- **Presentation letter - Attachment A** (In English, PDF format: it is mandatory to use the relative template in section "Attachments"): Highlight your reasons for applying to the doctoral programme in Computer Science, your motivations for choosing unibz (in particular the Faculty of Computer Science) and your career perspective after completing your PhD. Include a brief discussion of your general research interests, of questions and objectives you are interested in, and add a summary of the skill set you already acquired (for instance in your master level research) as well as techniques and methodologies you are interested in to learn and apply in your PhD research;
- **Research proposal – Attachment B** (In English, PDF format: it is mandatory to use the relative template in section "Attachments"). In this document, the applicant should indicate **up to three** preferences selected from the list of Research Projects presented in the call (see section "Research projects- details"). Briefly motivate your choices, and develop only the first choice into a more detailed proposal. Your proposal should therefore include:
 - the titles of your selected top choices for a PhD research project, together with an outline of a research project based **on Topic 1**, i.e. your first choice. In the sketched research project, include a) a discussion of the state of the art of your chosen Topic 1; b) Aims and Objectives of your envisaged research; c) a discussion of research methodology.

Other documents (facultative) to be included in the application if available:

- The PDF of **up to three** of your best publications (excluding theses);
- up to a maximum of 2 academic reference letters written in English provided by an university professor or by a researcher of research institutions, describing the work carried out and the quality of the same (the letters must be signed). The letters can be sent per email directly by the referees to the email address PhD_CS@unibz.it (please indicate in the subject of the email: "Reference for NAME and SURNAME" of the candidate)

For the grants funded by external partners (FBK and Ministry), 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.

Attachments

Please download the two Word files. Fill them in and upload them in the portal as PDF files. Please do not exceed the maximum number of characters indicated in each document!

- Attachment A – Presentation Letter
- Attachment B – Research Proposal

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**,
- **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.

Tuition Fees

Fees amount to € 167.50.

Applicants admitted in the PhD programme must confirm the study place according to the following deadlines:

- **applicants with grant:** starting from 5 August 2022 until 23 August 2022;
- **applicants without grant:** starting from 24 August 2022 until 1 September 2022.

In order to confirm your study place, you need to log on to the application portal and pay the tuition fees (€ 167.50) by one of the methods indicated on the portal by the deadline indicated above.

If you do not respect this deadline, you will automatically lose your study place. If, by paying the instalment you have confirmed the study place, there will be no refund of the tuition fees unless you are a non-EU applicant resident abroad and you do not receive the necessary documents from the Italian authorities in your country.

CALL GENERAL PART (PDF): EN – IT – DE

Contact us by phone at +39 0471 012800 or send us an e-mail: phd@unibz.it.

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Opening Hours

Mo, Tue, Wed: 10:00-12:00
Thu: 14:00-16:00

Alternatively, you may call us
throughout the week or book an
online appointment