



UNIVERSITÀ  
DI PISA



**INDUSTRIAL PhD PROGRAMME IN HIGH PERFORMANCE SCIENTIFIC COMPUTING**  
ACADEMIC YEAR 2026/2027 (42<sup>ND</sup> CYCLE)  
in agreement with S.I.T. - Sordina IORT Technologies S.p.A.

**Coordinator** professor *Luca Heltai*

**Administrative headquarters:** Department of Mathematics  
(<https://www.dm.unipi.it/>)

**SELECTION PROCEDURES**

**Total no. of positions with grant 5**

HPSC01_A	<b>Type of selection procedure</b> subject-specific PhD grants with separate ranking lists: no. of ranking lists 4		
	<b>No. of available positions with grant: 5</b> of which		
	<b>No.</b>	<b>Funding organisation / Partner institution</b>	<b>Subject</b>
	<b>Positions with grant</b>		
2	S.I.T. – Sordina IORT Technologies S.p.A.	HPSS – Applications to Flash Radiotherapy <i>Brief description:</i> Computational Methods and Models for FLASH Radiotherapy or for Radiobiological Investigations of the Flash Effect.	
1	Department of Mathematics of the University of Pisa	High Performance Scientific Computing for quantitative large deviations in deep learning: simulation, optimization and numerical validation <i>Brief Description:</i> PhD within OTODDLE applied research line: initialization and training of deep neural networks, quantitative estimates, HPC-oriented algorithms and simulations, in close interaction with research group.	
1	Department of Mathematics of the University of Pisa	Open Frameworks for Advanced Finite Element Analysis in Multiphysics and Multiscale Systems <i>Brief Description:</i> The research focuses on developing open-source frameworks for advanced finite element analysis in multiphysics and multiscale problems, aiming to integrate advanced mathematical models, efficient algorithms and scalable implementations, and to	

		validate them on realistic applications.
1	Department of Information Engineering of the University of Pisa	Development and use of HPC codes for the design and analysis of electronic devices based on advanced and innovative materials, also leveraging AI/ML techniques <i>Brief Description:</i> the activity focuses on the development, implementation and use of high-performance computing (HPC) codes for the design, simulation and analysis of electronic devices based on advanced and innovative materials. In particular, complex physical and mathematical models are addressed to describe charge transport phenomena, multiphysics couplings and nonlinear behaviors typical of next-generation devices. The use of parallel computing architectures enables large-scale simulations with high accuracy and reduced computational time. To support these activities, artificial intelligence and machine learning techniques are integrated for parameter identification, model order reduction, design optimization and analysis of simulation data, thereby improving both the efficiency and predictive capability of computational tools.
<p><b>NB: For the above-mentioned selection procedures, candidates who, on the closing date of the Call for applications, are employed under a subordinate employment contract with a public body, for a duration at least equal to that of the PhD programme, <u>may choose whether to:</u></b></p> <ol style="list-style-type: none"> <li>1. <u>participate in the selection as a public employee, thereby automatically waiving the doctoral grant;</u></li> <li>2. <u>participate in the selection for a position with grant, without declaring their status as a public employee at the application stage.</u></li> </ol> <p>Applicants who are public employees, in the case referred to under point 1, must declare their status during the above-mentioned online application procedure by selecting the corresponding option in the dedicated field available on the “Alice” platform <a href="https://www.studenti.unipi.it">https://www.studenti.unipi.it</a>. Such candidates must also submit a self-declaration certifying their employment with the relevant public body, in accordance with Annex 1 to the Call for applications. Any applicant who, when submitting the online application, declares that they wish to participate as a public employee shall automatically waive the grant, and the provisions governing the ranking list set out in Article 5 of the Call shall apply. This choice is irrevocable and <u>may not be changed at a later stage.</u></p>		

**The information below applies to all the selection procedures indicated above**

**ADMISSION REQUIREMENTS** (*Article 3 of the Call for applications*)

Master’s Degree (LM) /Second Degree (Specialistica-LS) (or Old system University Degree): **ALL**  
*or*

equivalent academic qualification in accordance with *Ministerial Decree of 9 July 2009* **to be obtained by 31 October 2026.**

**In the event that the degree has not yet been awarded by the deadline of the Call for applications, the candidate must attach a list of the examinations taken, including the corresponding marks.**

**Important:** In this regard, during the online application procedure for the selection, the candidate must attach a self-declaration concerning the degree already obtained, or to be obtained, drawn up in accordance with Presidential Decree no. 445/2000, as per Annex 2 to the Call for applications.

## **SELECTION METHODS AND CRITERIA** (*Article 4 of the Call for applications*)

### **Curriculum vitae**

The CV, duly signed and accompanied by a photocopy of a valid identity document, must be uploaded exclusively during the online application procedure for the selection, and must outline the candidate's educational background, as well as their professional and research experience. **Candidates are advised to submit any documentation deemed useful for the purposes of assessing the CV**, in particular they should include:

- a) *curriculum vitae*;
- b) a copy of any publication;
- c) a research project (max 5000 types).

### **Interview**

The interview shall assess the candidate's knowledge, aptitude for research, willingness to undertake training pathways in Italy and abroad, and interest in further scientific study, as well as the ability to develop and discuss a research project. During the interview, the candidate's knowledge of the English language will also be assessed, and the proposed research project will be presented.

**Videoconferencing  Interviews will only take position remotely.**

### **Research Project:**

**to be assessed together with the CV and to be presented at the interview**

The research project must be uploaded **during the online application procedure for registration**.

With a maximum length of 2 pages (excluding references), the research project should be written clearly and concisely and include at least the following elements: description of the scientific problem, research objectives, proposed methodology and expected results. Applicants must include a brief list of references, which does not count toward the page limit.

The research project, assessed together with the CV, is intended to highlight the candidate's ability to design a research proposal and to verify the consistency of its content with the PhD programme themes.

The research project, which will be discussed during the interview, must be presented by the candidate in order to demonstrate its feasibility sustainability and scientific coherence.

The project submitted for the purposes of the selection does not constitute a constraint on future research activity and may be revised or redefined in agreement with the supervisors and the PhD Board.

	<b>Minimum score</b>	<b>Maximum score</b>
<b><i>Curriculum Vitae</i></b>	24	40
<b>Candidates who have obtained a score of at least 24 out of 40 points shall be admitted to the written test.</b>		
<b><i>Interview</i></b>	36	60
<b>Eligibility is achieved with a minimum score of 60 out of 100 points</b>		

## **SCHEDULE OF THE TESTS**

The tests may take place in the period **between 22 June and 6 July 2026**.

The schedule of the tests, for each of the selections below, will be published **by 25 May 2026** at <https://www.unipi.it/bando-dottorato>, including the indication of the venue where they will be held.

## **RANKING LIST AND ENROLMENT**

Article 5 of the Call for applications sets out:

- the procedures for drawing up the ranking list
- the date of publication of the ranking list
- the procedures and deadlines for enrolment
- the procedures and deadlines for subsequent admissions from the ranking list.

**Important:** Subsequent admissions from the ranking lists, after 17 September and until 31 December 2026, are permitted only for “open” grants (i.e. those without a specific research topic).

In the other selection procedures, as they involve subject-based grants, any unassigned positions at the end of the third round of admissions from the ranking list will be made available by means of a specific notice, to be issued by Rector’s Decree in November. Such notice will be reserved for eligible candidates suitably placed in the ranking lists of the selection procedures already completed and will be published at <https://www.unipi.it/didattica/corsi/dottorati/>.

With regard to the publication of the notice and the procedures for the reallocation of the grants, **no individual email communication will be sent to eligible candidates**, as all relevant information will be provided upon publication of the ranking lists.

## INFORMATION ON THE TEACHING ACTIVITIES OF THE PROGRAMME

### **Educational project and objectives of the programme:**

<https://www.unipi.it/didattica/corsi/dottorati/scienze-fisiche-chimiche-matematiche-e-biologiche/high-performance-scientific-computing/>

### **PhD programme website:**

<https://www.dm.unipi.it/phd-hpsc/>

### **PhD programme regulations:**

*Pending issuance*