UNIVERSITÀ DI PISA

The University of Pisa announces public selection procedures for the award of 1 **research assignment** in accordance with Article 22 ter of Law 240/2010 as set out in Annex A) to this call, in which the information sheets indicating the reference structure, the specific responsibility within the assignment (tutor) and the functions to be performed, as well as the scientific disciplinary area and information on the interview, are provided.

Deadline for submitting the application: 5th november 2026 at 1.00 p.m.

Contract duration: 12 months

All-inclusive annual administrative gross amount: € 30.000

Admission requirements:

• Master's Degree obtained no more than six years prior to the application deadline (pursuant to Ministerial Decree no. 270/2004, or specialist degrees awarded pursuant to Ministerial Decree no. 509/1999, and degree diplomas awarded under the regulations in force prior to Ministerial Decree no. 509/1999, deemed equivalent to the above-mentioned Master's Degrees pursuant to the Interministerial Decree of 9 July 2009). Only candidates holding a master's degree obtained no more than six years prior to the application deadline are eligible to apply. Candidates who fail to meet this requirement will lose the right to be awarded the research assignment.

Documents to be attached:

The application must include:

a) A comprehensive scientific-professional curriculum containing all the necessary elements for assessing prior activities and any relevant work experiences, in connection with the content of the assignment under consideration (specifically indicating: date/duration, place of completion, etc.);

b) A Master's Degree. Candidates holding a foreign master degree must submit the documents and elements useful for the assessment of equivalence to be carried out by the selection board; Documents issued in a foreign language other than French, English, German and Spanish, must be accompanied by a certified Italian translation that conforms with the original text, drawn up by the competent diplomatic or consular representation, or by an official translator.

c) Additional documents that the candidate deems useful for the selection purposes;

d) Publications that the candidate considers relevant for the selection, considering the maximum number set for the selection, as indicated in Annex A), with a list signed by the candidate;

e) Photocopies of the tax code and a current valid identification document.

Candidates must submit the publications they intend to present exclusively in PDF format through the dedicated section of the online procedure.

Each publication shall not exceed 30 megabytes.

Publications not enclosed with the application will not be considered by the Selection Board. Lists with links to texts are not allowed as a replacement for publications.

Applications

Applications must be submitted online only, using the following link: https://pica.cineca.it/unipi/ or shall be invalid. An e-mail inbox is required to login and complete the application.

Candidates can login into PICA platform using the digital identifier SPID (Sistema Pubblico d'Identità Digitale - Public Digital Identity System) or Carta d'Identità Elettronica (CIE), selecting the University of Pisa among the available Institutions.

If candidates do not have SPID/CIE, they can request it in accordance with the procedures set forth on the website www.spid.gov.it or www.cartaidentita.interno.gov.it.

Candidates can also login with the credentials issued directly by PICA platform (please note: in order to apply online, the system requires an e-mail inbox for self-registration), with their LOGINMIUR, REPRISE or REFEREES account.

Applicants must provide all the required data and upload all documents in PDF format.

The system allows saving an application draft within the application deadline, recording the online application's date and sending a receipt with an automatic reply. After the deadline, the system will not allow login nor application submission.

Each application will be assigned a unique identification number to be referred to in all subsequent communications, along with the selection code provided by the application form.

Under penalty of exclusion, the application shall be valid only if including all the required data, the copy of a valid ID and:

– if submitted by accessing the system without the SPID/CIE digital identifier, the applicant's signature is mandatory;

- If submitted by accessing with the SPID/CIE digital identifier, the application will be automatically processed by the system and the applicant's signature is not required.

Applicants undertake to promptly communicate in writing any variations of what declared in the application form.

The communication must be edited in PDF format, signed and forwarded to the Rector of the University of Pisa by the Italian certified e-mail system address (P.E.C. Posta Elettronica Certificata): protocollo@pec.unipi.it or emailed to concorsi_incarichi@unipi.it , within the application's submission deadline.

An applicant's valid identification document must be attached.

For further information on application submission, please refer to concorsi_incarichi@unipi.it .

For technical problems support only, please click on the bottom link available at https://pica.cineca.it/unipi.

Selection procedure:

For the selection under Annex A) the Director of the Department appoints a Selection Board consisting of the head of the assignment and two other members.

Candidates are assessed comparatively on the basis of the following elements:

a) Relevance and significance of the activities previously carried out, as well as any work experience, in relation to the contents of the assignment to the selection, in addition to documented qualifications (such as, for example, degree grade, postgraduate diplomas, any contracts, scholarships, conference presentations, and other documented qualifications);

b) Quality, originality and innovativeness of the attached publications, as well as their relevance to the assignment under consideration;

c) An interview aimed at assessing the knowledge of the basic subjects of the scientific disciplinary sector to which the subject of the assignment belongs, the suitability for carrying out the research activity under the assignment , as well as the evaluation of knowledge of the English language and/or other languages relevant to the research (as reported in Annex A). During the interview, the Selection Board also assesses the knowledge of the Italian language for foreign candidates.

The Selection Board has 100 points available for the comparative evaluation of the candidates: 60 points can be allocated for the criteria mentioned above under a) and b), and 40 points for the interview.

The Selection Board may stipulate a minimum score below which eligibility cannot be awarded.

Candidates are summoned for the interview on the day and time specified in the Annex A) for the procedure.

Failure to attend an interview by a candidate is considered an explicit indication of their intention to withdraw from the selection process.

Applicants for this selection are required to consult the University website at https://bandi.unipi.it/public/Bandi?type=IRIC **(on the selection procedure page) during the two days preceding the date set for the interview.**

On the University website (https://bandi.unipi.it/public/Bandi?type=IRIC), **in the section dedicated to the procedure, the following will be published:**

- **Assessment scores for criteria a) and b);**
- **The list of candidates admitted to the interview;**
- **Practical instructions for carrying out the interview and/or any details should the interview be rescheduled;**
- **The procedure approval decree and the merit ranking that takes into account the scores achieved by the candidates.**

Please note that the English version is provided for courtesy and information purposes only. It cannot be legally used in the event of a dispute or a claim arising from the interpretation of this translation and concerning the contents, a possible uncertainty, contradiction, or discrepancy. Should this occur, the Italian version of the call should prevail as the sole legally binding text. For the full Italian version see: https://bandi.unipi.it/public/Bandi?type=IRIC (on the selection procedure page).

ANNEX A

Selection code – inc-ric_inginf2026_15

Department of Engineering Information

GSD 09/IBIO-01 "Bioengineering"
SSD IBIO-01/A "Bioengineering"

Project EPSILON
CUP I53C25001890001

Supervisor of the appointee's activities (tutor):
Prof. Gaetano Valenza

Title of the activities covered by the appointment:

Computational Modeling of Deterministic and Stochastic Neural Components for Predicting Cardiovascular Dynamics

Activities to be carried out (covered by the appointment):

The research activity will focus on the development, application, and validation of computational models, including machine-learning methods, for predicting cardiac and cardiovascular dynamics from multimodal brain signals, such as, but not limited to, EEG, MEG, fMRI, and invasive neurophysiological recordings. Particular attention will be devoted to predicting the timing of ECG R peaks and interbeat intervals, ECG dynamics, and the values and timing of systolic and diastolic blood-pressure events.
Physiological noise will not be treated exclusively as a nuisance component to be removed, but also as a potentially informative feature of brain–heart dynamics. Methods will therefore be developed to quantify its temporal, spectral, spatial, and multivariate structure and to evaluate its predictive contribution to cardiac and hemodynamic events.
The research will involve the implementation and comparison of different modeling paradigms, including probabilistic and state-space models, system-identification methods, Gaussian processes, nonlinear dynamical models, and machine- and deep-learning techniques. Sequential, generative, and multimodal models capable of representing temporal dependencies, nonlinear interactions, time-varying dynamics, and predictive uncertainty may also be investigated.
The temporal directionality of brain–heart interactions, their dependence on physiological state, and the generalizability of the models across individuals, experimental conditions, and clinical populations will also be investigated.
The overall objective will be to establish a rigorous and generalizable methodological framework for predicting cardiovascular dynamics from brain activity, thereby advancing the quantitative understanding of the neural control of the cardiovascular system and enabling the identification of novel multimodal biomarkers of autonomic regulation and brain–heart interaction.

Specific responsibility relating to the activities of the appointment and functions to be performed:

The researcher will be responsible for designing, implementing, and validating computational pipelines for the synchronized analysis of multimodal brain, cardiac, and hemodynamic signals. The activities will include data preprocessing and quality control, temporal synchronization across acquisition modalities, extraction of relevant cardiovascular events, and the definition of quantitative representations of deterministic and stochastic neural components.
The researcher will develop models for predicting heartbeat timing, interbeat intervals, selected ECG features, and the values and timing of systolic and diastolic blood pressure from brain signals. The proposed models will be compared with appropriate physiological and statistical baselines and evaluated using rigorous within-subject, across-subject, and, whenever feasible, cross-dataset and cross-population validation strategies.
A central responsibility will be the quantification of the information associated with physiological noise and the evaluation of its incremental predictive contribution beyond the deterministic components of brain signals. To
this end, the researcher will define appropriate models, surrogate-data procedures, and information-theoretic metrics, ensuring that the observed performance cannot be explained by artifacts, physiological confounders, or spurious correlations.

The researcher will also characterize predictive uncertainty and model calibration and assess model robustness to signal quality, individual variability, physiological state, and acquisition modality. The physiological interpretation of the findings will be developed with particular attention to autonomic regulation, brain–heart interactions, and the distinction between temporal association, predictive capability, and potential causal relationships.
The activities will be conducted within an interdisciplinary framework integrating bioengineering, neuroscience, cardiovascular physiology, mathematical modeling, and data science. The researcher will also contribute to scientific publications, reproducible software and analytical pipelines, methodological documentation, and scientific presentations, in accordance with best practices in data management, transparency, ethics, and reproducible research.

Maximum number of publications that candidates may submit, including the doctoral thesis, if submitted: 2

Language skills:
English language

Date, time and mode of the interview:

november 26, 2026 at 2 pm in presence at the Department of Engineering Information – second floor – meeting room – Via Caruso, 16 – Pisa.