



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

**Purpose: Public comparative procedure for the recruitment of 10 researchers with a full-time fixed-terms employment contract for three years, pursuant to art. 24 paragraph 3 letter a) (junior) of Law no. 240/2010, as part of the National Recovery and Resilience Plan (PNRR), Mission 4 "Education and Research" - Component 2 "From Research to Business".**

## THE DIRECTOR

- WITH REFERENCE TO** the Regolamento UE of February 12th, 2021, no. 2021/241, which established the PNRR, "Piano Nazionale per la Ripresa e la Resilienza";
- WITH REFERENCE TO** the National Recovery and Resilience Plan (PNRR), presented to the European Commission on April 30<sup>th</sup> 2021 pursuant to art. 18 of Regulation (EU) no. 2021/241 and approved by decision of the ECOFIN Council of July 13<sup>th</sup> 2021 notified to Italy by the General Secretariat of the Council with note LT161 / 21 of July 14<sup>th</sup> 2021, which plan consists of 6 missions and 16 components, and in particular considering the Mission 4 Component 2 (M4C2) "From Research to Business" which aims to support investments in research and development, to promote innovation and the diffusion of technologies, to strengthen skills by promoting the transition to a knowledge-based economy, covering the entire supply chain of the research and innovation process, from basic research to technology transfer;
- WITH REFERENCE TO** the Projects approved under the PNRR and related to the following notices:
- «Public notice for the presentation of intervention proposals for the creation and strengthening of innovation ecosystems», announced with Directorial Decree no. 3277 of 30<sup>th</sup> December 2021 (so-called Innovation Ecosystems Call), with particular reference to art. 7, comma 2;
  - «Public notice for the presentation of intervention proposals for the Strengthening of research structures and creation of "national samples" of R&D on some Key Enabling Technologies to be financed under the National Recovery and Resilience Plan», announced with Directorial Decree n.3138 of 16<sup>th</sup> December 2021 (so-called National Championships Announcement);
  - «Public notice for the presentation of intervention proposals for the creation of "Partnerships extended to universities, research centers, companies for the financing of basic research

projects"», announced with Directorial Decree no. 341 of 15th March 2022, (so-called Extended Partnership Call);

- WITH REFERENCE TO** the notice published in the Official Gazette - 4th special series of 14<sup>th</sup> march 2023 with which the University of Bologna has published a selection notice for the assignment of fixed-term research contracts of type a), pursuant to law no. 240, art. 24, paragraph 3, letter a) (RTDA) to be applied to PNRR resources;
- WITH REFERENCE TO** the rules referred to in Article 13 of the present call for application;
- WITH REFERENCE TO** the resolutions of the Departments for which the positions are activated, adopted pursuant to art. 17 of Reg. no. 344 of 29<sup>th</sup> March 2011;
- WITH REFERENCE TO** the resolution of Board of Governors of 24<sup>th</sup> October 2022

## ORDERS

### Art. 1 – Purpose

Procedures of comparative evaluation by qualifications and public discussion are called for the recruitment of 10 researchers with a full-time fixed-term employment contract for three-year pursuant to art. 24 paragraph 3 letter a) (junior) of Law no. 240/2010.

An annual gross salary equal to € 36.840,00 will be corresponded. The annual increase in this amount will be calculated according to the existing procedure for non-contracted personnel.

The contracts are activated with resources from the National Recovery and Resilience Plan (PNRR).

The specific elements of each position are defined in the relative attachment. In the case of procedures for the selection of multiple positions, the specific elements of each of them will be specified in the relative attachment.

In the following articles, where there are specific elements of each selection, reference is made to the attachments.

### Art. 2 – Activities to be performed

The researchers will have to carry out 350 hours of supplementary teaching and assistance to students, for each academic year covered by the contract.

The hours of frontal teaching on annual basis are indicated in each attachment.

Concerning the provisions of art. 10 of the Reg. regarding fixed term researchers, issued by Rectoral Decree no. 344 of March 29<sup>th</sup> 2011 and amendments, the project that each winner will have to develop and the scientific productivity objectives are explained in the relative attachment.

### **Art. 3 – Admission requirements**

The selection is open to those who come from non-EU countries. Each attachment specifies the necessary requirement to be able to participate in the relative selection.

In particular, either the possession of the PhD or, for the sectors concerned, of a medical specialization diploma may be required.

In any case, applicants must be in possession of qualification at the date of the deadline for the submission of applications to the present selection.

In case of PhD obtained abroad, please include a statement of equipollence with the Italian PhD title pursuant to art. 74 of D.P.R. 382/1980 or the statement of equivalence with the Italian PhD title pursuant to art. 38 of Legislative Decree. N. 165/2001.

In case of High School of Specialization obtained abroad, please include a statement of equivalence with the Italian title pursuant to art. 38 of Legislative Decree. N. 165/2001, or art. 74 of D.P.R. 382/1980.

In both cases, pending the release of the only result of equivalence by the designated offices, it is possible to produce the delivery receipt of the request instance of the same (for the release procedure, see page:

<http://www.cimea.it/it/servizi/procedure-di-riconoscimento-dei-titoli/riconoscimento-non-accademico.aspx>).

In any case, the proof of the equivalence of the foreign qualification must be produced to the administration prior to beginning service and, anyhow, within 180 days from the publication of the approval decree of the procedure on the official university bulletin, otherwise the exclusion from the position of winning candidate occurs.

Applications from professors, associate professors, or researchers with tenure will not be accepted, even if the applicant is not in service.

The selection is not open to any persons who are related by blood up to the fourth degree, to a professor working in the Department that proposed the activation of the single contract, or to the Rector, Director General or a member of the Board of Governors of the University. Furthermore, the selection is not open to anyone who has had research fellowship or fixed-term researcher contracts at the University of Bologna or any other state-funded, private-funded or distance-learning Italian university pursuant to articles 22 and 24 of Italian Law 240/2010, or with any other body listed in paragraph 1 of Art. 22 of Italian Law 240/2010 for a period which, summed to the foreseen duration of this contract, exceeds a total of 12 years, even if not consecutive. For the purposes of the duration of the above-described periods, in compliance with the laws in force any periods of maternity or sick leave shall not be calculated.

State employees may on unpaid leave for the entire duration of the contract, thus occupying a non-tenure position without pay or social security contributions, in cases where such a position is allowed by the structure of origin, likewise without pay or social security contributions.

#### **Art. 4 – Application procedure**

The submission of the applications for participation in the selections must be made exclusively via electronic procedure by accessing the following link:

<https://personale.unibo.it>

**Regarding all procedures, the deadline is the following: 31<sup>st</sup> March 2023 at 12:00 (noon, Italian Time).**

The application must be submitted at the same time with the insertion of all the attached documentation required.

The following documents shall be enclosed to the electronic application form (preferably files: PDF, other supported files: JPG, BMP, PNG):

1. identification document scanned (10MB max);
2. curriculum vitae with indication of the scientific-professional activity (10MB max);
3. reference letters, if any. Letters can be submitted directly by the candidate uploading it during the application, in case of possession (10MB max), or can be submitted by the referee. In this case candidates should provide the referee e-mail address. When the application is closed, the system will send an automatic request to the referee, referring to the candidate and the procedure. The referee must submit his letter through the link into the e-mail. At this address he/she will upload his/her letter by the application deadline in order to be considered as part of the candidate's application.
4. scientific publications (other supported files are TIFF and PS, 20MB max each document) which are already printed at the date of the call of application deadline, or scientific publications accepted for printed, together with the editor acceptance letter. While uploading each document will be asked to indicate the title, the authors' names, the editor, the year of publication. Optional information are the month, the ISBN code, the DOI code, the booklet number.

Pursuant to Ministerial Decree 243/11, the PhD thesis is considered a publication, and thus if presented by the candidate it shall be included in the maximum number of publications indicated in each attachment.

While applying, applicants shall declare under their own responsibility:

1. surname and name;
2. place and date of birth;
3. citizenship;
4. residence address;
5. (if Italian citizens) registration to electoral rolls. If any, the reasons why he/she is not registered or cancelled from them;
6. that there have not been any criminal proceeding against them or current criminal proceedings; otherwise, applicants shall specify the proceedings against them (the date of the measure and the judicial authority that issued it) and pending penal proceedings. The existence of a previous criminal conviction is not in itself an impediment to hiring, unless it is a conviction for a crime that prevents the

establishment of the employment relationship with the public administration as it derives from the interdiction from public office, or the inability to contract with the public administration, or the termination of the employment relationship (articles 28, 29, 32-ter, 32-quater, 32-quinquies of the Criminal Code, articles 3,4, 5, L. 97 of March 27, 2001). In other cases, the Administration will ascertain the gravity of the criminally relevant facts committed by the person concerned, for the purposes of access to public employment. This check is carried out with the aim of ascertaining the existence of the fiduciary element which constitutes the fundamental prerequisite of the relationship between employer and worker, as well as for the purpose of assessing the existence of the requisites of moral suitability and aptitude to carry out activities as a public employee;

7. to have or not to have benefited of non-voluntary leave periods due to maternity/paternity compulsory abstention or for serious health reasons, indicating the periods in case
8. possession of the qualification required pursuant to Art. 3 of this call for application and the mark obtained, if any;
9. to be fit to the employment the selection refers to;
10. that they are not, nor have been, professors, associate professors or researchers with tenure, even if not in service;
11. that they are not related by blood up to the fourth degree, to any professor working in the Department that proposed the activation of the single contract, or to the Rector, Director General or a member of the Board of Governors of the University of Bologna;
12. elected e-mail address for the purpose of the participation in this contest;
13. Foreign citizens shall also declare to have a proper knowledge of Italian and to enjoy civil and political rights also in their origin countries or the reasons for loss of enjoyment.

Any modification shall be timely communicated to the Ufficio Ricercatori a tempo determinato.

In case of technical problems, contact the support: [assistenza.cesia@unibo.it](mailto:assistenza.cesia@unibo.it).

#### **Art. 5 – Applicants' obligations**

The penalty of exclusion from the selection shall apply in the following cases:

- Non compliance with the terms and procedures for submitting the application form indicated in article 4 of this call for applications;
- Lack of the qualification required to participate in the selection indicated in each attachment.

All applicants shall be admitted to the contest and the Administration reserves the right to check that they actually are in possession of the requirements necessary to apply for the selections; the Administration may, at any time and even after the exams, order the exclusion from the selection hereto.

## **Art. 6 – Selection Board**

With regard to each procedure, the Selection Board will be appointed upon administration resolution and is composed of three full or associate professors belonging to the competition Scientific sector or, alternatively, to the same competition macro-sector for which the procedure is announced or of equivalent role in the case of components not coming from national universities, identified by the Department that proposed the activation of the contract.

Two of the members, external to the University, are drawn with the methods provided by the art. 8-bis of the "Regolamento per la disciplina delle chiamate dei Professori di Prima e Seconda fascia" in application of articles 18 and 24 of the Law 240/2010 issued with DR 977/2013 and s.m. A third component is identified by the Department Council among the professors inside or outside the University. As envisaged by art. 57 of Legislative Decree 165/2001, in order to guarantee equal opportunities between men and women for the access to work and work treatment, generally, at least one member is female.

The Commission appoints a president and a recording secretary between their members. Notice of the appointment of each Commission will be published on Alma Mater Studiorum - University of Bologna website.

## **Art. 7 – Selection procedure**

With regard to each procedure, the selection procedure is carried out by the Board after a preliminary evaluation of each candidate's qualifications, curriculum and scientific production, including the doctoral thesis, according to the criterion identified by the MIUR in D.M. 243/2011.

The candidates chosen in the preliminary evaluation based on their comparative merits - between 10 and 20% of the number of applicants and not less than 6 - will then be called for interview. The interview will consist of a discussion of the candidate's qualifications and scientific production and may take the form of a seminar open to the public. If the total number of candidates is 6 or less all candidates will be interviewed.

Any reference letters produced by the candidates will also be considered.

The discussion will take place in the language indicated in each attachment.

With regard to each procedure, the discussion with the Commission will take place starting from 13<sup>th</sup> April 2023, and it will be carried out in public form and electronically using the audio and video teleconferencing tool via the Teams platform (the workstation from which candidates will take do the interview must be equipped with a webcam - essential for the recognition of the candidate - microphone and headphones and/or audio speakers).

With reference to each procedure, the notice of the day and time in which the public discussion will take place will be announced together with the publication of the list of admitted candidates on the University website at: <https://bandi.unibo.it/docenti/rtd>.

The publication on the University website will constitute official notification to all applicants, without any obligation for any further communication.

The publication will be communicated by e-mail to the address indicated by the candidates in the application.

The Alma Mater Studiorum - University of Bologna does not assume any responsibility for the non-receipt or the not-read of the e-mail.

It is up to candidates to keep themselves informed by consulting the University website page to find necessary information about selection.

Candidates attending the interview must bring a valid identification document with them.

EU citizens shall bring their passport or an identity document issued by their country of origin. Non-EU citizens shall bring their passport.

### **Art. 8 – Individuation of the winner and recruitment**

With regard to each procedure, after the exams, the Board proceeds to identify the winner. On equal merits, priority will be defined according to the date of birth and the youngest one shall precede.

In case of the winner's withdrawal, the candidate who obtained the highest overall score after the winner will be called.

The procedure's acts are approved pursuant to an administration resolution and will be published in Alma Mater Studiorum – University of Bologna Official Bulletin.

The terms to raise any appeal shall start from the date of publication of the forementioned notice, in case the resolution has not been otherwise disclosed.

The Department that activated the single position will propose recruitment by a majority vote of the professors and associate professors of the Department and approved by the Board of Governors. The Department will also propose the start date of the employment relationship.

### **Art. 9 – Employment procedures**

Following the conclusion of the recruitment procedure referred to in art. 9, the candidates will be asked to sign a fixed-term contract of full-time or defined-time employment.

The employment relationship is governed by a personal contract, statutory laws and EC regulations.

In the event that the research project is in the medical field and provides for the performance of medical activity, the latter is governed by the national collective agreement for medical staff and by the specific appointment conferred by the hospital facility where the researcher will carry out the activity.

The personal contract shall specify any reasons for which it might be terminated, as well as the relevant periods of notice. In any case the contract will be terminated immediately and without notice in the event of the cancellation of the recruitment procedure to which it is inalienably linked.

The trial period shall last three months. At the end of the period, unless the employment relationship has been terminated by either of the parties, the employee is confirmed for service and the whole period worked from the beginning of the contract shall be calculated for seniority purposes.

### **Art. 10 – Documentation required for the participation in the public selection and for hiring purposes**

For the purposes of participation in the public selection, documents and qualifications in English, French, German and Spanish can be produced in the language of origin. Documents and qualifications written in other languages must be presented in the original language with an Italian or English translation attached. The translation must be true and correct, written by an Italian consular, a qualified diplomatic representative, or an official translator.

Regarding the documentation necessary for hiring purposes, all the documents written in any foreign language shall be accompanied by a true and correct translation into Italian, written by an Italian consular, a qualified diplomatic representative, or an official translator.

### **Art. 11 – Rights and duties of a researcher with a fixed-term contract of employment**

In accordance with the rights and duties of public employees prescribed by the Italian civil code, on signing the contract the researcher will be expected to perform all those activities mentioned for each position in the relative attachment as well as to carry out the research periods in the company and abroad (the latter only where applicable).

In the event that medical assistance services are provided, the researcher will also assume rights and duties related to this activity.

These activities will be carried out in respect of the existing hierarchy and in coordination with existing programmes and research projects.

The researchers will perform the requested activities in person, substitution is not permitted. Existing Italian laws concerning maternity, injury and illness will be applied.

The researcher undertakes to fulfill the obligations of conduct prescribed by the code of conduct, issued by DPR 62/2013.

### **Art. 12 – Processing of personal data and person in charge for the contest**

Information about the processing of personal data (provided during the application process) are available at the link: [www.unibo.it/privacy](http://www.unibo.it/privacy) (Notice for participants in contests and selections published by the University).

The person in charge of the contest is Mr. Gianfranco Raffaelli, Responsabile dell'Ufficio Ricercatori a tempo determinato - Piazza Verdi n. 3 - 40126 Bologna.

For further information, please contact: Ufficio Ricercatori a tempo determinato dell'Alma Mater Studiorum - Università di Bologna – Piazza Verdi n. 3 - Tel. +39 051 2099980 – 2098958 - 2098972, Fax 051 2086163; e-mail: [apos.ricercatoritempodeterminato@unibo.it](mailto:apos.ricercatoritempodeterminato@unibo.it).

### **Art. 13 – Reference Regulations**

The present notice is issued based on the following regulations:

- Art. 24 of Law no. 240 dated December 30th, 2010;
- D.P.R. (Decree of the President of the Republic) no. 445 dated December 28th, 2000;
- Leg. Decree no. 165 dated March 30th, 2001;
- Law 241/1990;



- Regulation for fixed-term researchers of Alma Mater Studiorum – University of Bologna, (link: [http://www.normateneo.unibo.it/NormAteneo/Regolamento\\_ricercatori\\_a\\_tempo\\_determinato.htm](http://www.normateneo.unibo.it/NormAteneo/Regolamento_ricercatori_a_tempo_determinato.htm)).

For the Director of Area del Personale  
f.to digitalmente Giovanni Longo

**Attached documents:**

- Summary table of activated positions;
- Attachments:
  1. Academic Discipline BIO/01 - General Botany, 1 position, Department Of Agricultural and Food Sciences - DISTAL
  2. Academic Discipline FIS/01 - Experimental Physics, 1 position, Department Of Physics and Astronomy "Augusto Righi" - DIFA
  3. Academic Discipline ICAR/04 - Roads, Railways and Airports, 1 position, Department Of Civil, Chemical, Environmental, and Materials Engineering - DICAM
  4. Academic Discipline INF/01 - Informatics, 1 position, Department Of the Arts - DAR
  5. Academic Discipline ING-IND/21 - Metallurgy, 1 position, Department Of Industrial Engineering - DIN
  6. Academic Discipline ING-IND/25 - Chemical Plants, 1 position, Department Of Civil, Chemical, Environmental, and Materials Engineering - DICAM
  7. Academic Discipline ING-IND/26 - Analysis, Design and Control of Chemical Processes, 1 position, Department Of Civil, Chemical, Environmental, and Materials Engineering - DICAM
  8. Academic Discipline ING-IND/31 - Electrical Engineering, 1 position, Department Of Electrical, Electronic and Information Engineering "Guglielmo Marconi" - DEI
  9. Academic Discipline ING-INF/03 - Telecommunications, 1 position, Department Of Electrical, Electronic and Information Engineering "Guglielmo Marconi" - DEI
  10. Academic Discipline IUS/01 - Private Law, 1 position, Department Of Legal Studies – DSG.

SUMMARY TABLE OF ACTIVATED POSITIONS								
Department	Call	CUP	Project	Project Code	Academic Recruitment Field	Academic Discipline	nr. Positions	Campus
Agricultural and Food Sciences - DISTAL	Campioni Nazionali	J33C22001190001	BIODIV	CN00000033	05/A1 - Botany	BIO/01 - General Botany	1	Bologna
Physics and Astronomy "Augusto Righi" - DIFA	Partenariati Estesi	J33C22002830006	PE1 - FAIR	PE0000013	02/A1 - Experimental Physics of Fundamental Interactions	FIS/01 - Experimental Physics	1	Bologna
Civil, Chemical, Environmental, and Materials Engineering - DICAM	Campioni Nazionali	J33C22001120001	MOBILITY	CN00000023	08/A3 - Infrastructural and Transportation Engineering, Real Estate Appraisal and Investment Valuation	ICAR/04 - Roads, Railways and Airports	1	Bologna
the Arts -DAR	Partenariati Estesi	J33C22002950001	PE11 - 3A-ITALY	PE0000004	01/B1 - Informatics	INF/01 - Informatics	1	Rimini
Industrial Engineering - DIN	Partenariati Estesi	J33C22002860001	PE10 - ONFOOD	PE0000003	09/A3 - Industrial Design, Machine Construction and Metallurgy	ING-IND/21 - Metallurgy	1	Bologna
Civil, Chemical, Environmental, and Materials Engineering - DICAM	Partenariati Estesi	J33C22002890007	PE2 - NEST	PE0000021	09/D3 - Chemical Plants and Technologies	ING-IND/25 - Chemical Plants	1	Bologna
Civil, Chemical, Environmental, and Materials Engineering - DICAM	Partenariati Estesi	J33C22002810001	PE7 - SERICS	PE0000014	09/D2 - Systems, Methods and Technologies of Chemical and Process Engineering	ING-IND/26 - Analysis, Design and Control of Chemical Processes	1	Ravenna
Electrical, Electronic and Information Engineering "Guglielmo Marconi" - DEI	Campioni Nazionali	J33C22001120001	MOBILITY	CN00000023	09/E1 - Electrical Engineering	ING-IND/31 - Electrical Engineering	1	Bologna
Electrical, Electronic and Information Engineering "Guglielmo Marconi" - DEI	Partenariati Estesi	J33C22002880001	PE14 - RESTART	PE0000001	09/F2 - Telecommunications	ING-INF/03 - Telecommunications	1	Bologna
Legal Studies - DSG	Partenariati Estesi	J33C22002830006	PE1 - FAIR	PE0000013	12/A1 - Private Law	IUS/01 - Private Law	1	Bologna

## ATTACHMENT 1

The specific elements of this procedure are as follows:

- **Department:** Department of Agricultural and Food Sciences - DISTAL
- **SC:** 05/A1 – Botany
- **SSD:** BIO/01 – General Botany
- **Number of positions:** 1
- **Main place of employment:** Bologna
- **Number of hours of frontal teaching per year:** 0
- **Medical assistance services, if required:** Not required
- **Costs indication:** 36.840,00 gross euros per year
- **Financial coverage:** PNRR funds – Call CN – Project BIODIV, “National Biodiversity Future Center” – Code CN00000033
- **CUP:** J33C22001190001
- **Project manager:** Alessandra Zambonelli
- **Project title:** Analysis of fungal biodiversity and impact on C fixation in soil using innovative analytical methodologies.
- **Duration of contract:** 36 months
- **Brief description of the project:** The activities include the analysis of the fungal communities of forest soils with particular reference to ectomycorrhizal symbionts and lignivorous saprobic species. The analysis of fungal communities will be carried out both by traditional laboratory techniques, collection and identification of sporomas, collection of mycorrhizae and their molecular identification using direct PCR using ITS primers and by using a metagenomic approach. Furthermore, mycorrhizal and lignivorous fungi will be isolated and their role in soil carbon fixation will be investigated in microcosm, using conventional (micro ATR FTIR, FT-Raman) and non conventional (Raman SERS) spectroscopic analytical techniques. The objectives are to increase the knowledge on composition, role and dynamic of fungal communities focusing on mycorrhizal species, to implement upscaling methodologies for monitoring fungal biodiversity and C fixation in the forest ecosystem.
- **Objective of the research project:** The productive purposes are to write at least two scientific papers in high impact journals, to participate to project meetings and international mycological, forest or chemistry conferences presenting the results of the project.
- **Admission requirement:** PhD
- **Maximum number of publications:** 12
- **Language in which the interview will take place:** Italian
- **Foreign language:** English

## ATTACHMENT 2

The specific elements of this procedure are as follows:

- **Department:** Department of Physics and Astronomy "Augusto Righi" - DIFA
- **SC:** 02/A1 – Experimental Physics of Fundamental Interactions
- **SSD:** FIS/01 – Experimental Physics
- **Number of positions:** 1
- **Main place of employment:** Bologna
- **Number of hours of frontal teaching per year:** 60
- **Medical assistance services, if required:** Not required
- **Costs indication:** 36.840,00 gross euros per year
- **Financial coverage:** PNRR funds – Call PE – Project PE1 – FAIR, “Future Artificial Intelligence Research” – Code PE0000013
- **CUP:** J33C22002830006
- **Project manager:** Daniele Bonacorsi
- **Project title:** Pervasive Artificial Intelligence (AI) in connection to fundamental research in Physics: application and founding principles of Machine Learning techniques for innovative, performing, controllable and explainable AI methods for Fundamental Physics
- **Duration of contract:** 36 months
- **Brief description of the project:** The research activity will be conducted in the Spoke 8 of the “Enlarged Partnership” PE1 within the NRRP, named “Future Artificial Intelligence Research (FAIR)”. The spoke will investigate multi-disciplinary challenges derived by “Pervasive AI” systems, with focus on the introduction of intelligent models/algorithms into solutions needed for data handling, data selection and data analysis in research challenges in Fundamental Physics. The work aims at advancing the state of the art in modeling and algorithmic techniques, in theoretical grounding principles, in architectural and implementation solutions. The work also aims at developing rigorous methods at the intersection of mathematics, physics, statistics and computer science, to understand how, why and to what extent modern ML models work, with the purpose to contribute towards next-generation AI tools that are robust, effective and explainable and that can boost AI ubiquitous diffusion and uptake in Fundamental Physics.
- **Objective of the research project:** The objectives of scientific productivity will be finalized, over the three-year period, to the presentation of the research results to at least two conferences of recognized prestige inherent in the themes of high-energy physics or computing, and publication (as co-author) of three paper/year in international indexed journals (Scopus/WOS).



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

- **Admission requirement:** PhD
- **Maximum number of publications:** 12
- **Language in which the interview will take place:** Italian
- **Foreign language:** English

### ATTACHMENT 3

The specific elements of this procedure are as follows:

- **Department:** Department of Civil, Chemical, Environmental, and Materials Engineering - DICAM
- **SC:** 08/A3 – Infrastructural and Transportation Engineering, Real Estate Appraisal and Investment Valuation
- **SSD:** ICAR/04 – Roads, Railways and Airports
- **Number of positions:** 1
- **Main place of employment:** Bologna
- **Number of hours of frontal teaching per year:** 60
- **Medical assistance services, if required:** Not required
- **Costs indication:** 36.840,00 gross euros per year
- **Financial coverage:** PNRR funds – Call CN – Project MOBILITY, “Sustainable Mobility Center (Centro Nazionale per la Mobilità Sostenibile)” – Code CN00000023
- **CUP:** J33C22001120001
- **Project manager:** Andrea Simone
- **Project title:** Sustainable Smart Infrastructure design criteria: validation of new technologies in an automated road environment (and mixed-traffic conditions).
- **Duration of contract:** 36 months
- **Brief description of the project:** Within the National Centre, the main mission of the research is twofold: - to boost the innovation in some main research streams related to CCAM and Smart Infrastructures - to establish new methodologies and innovative testing procedures, tools and facilities. The main research activities during the 3 years will be to develop and demonstrate in experimental environments: 1. methodologies and technological solutions that prepare the transportation networks for the advent of cooperative, connected and automated mobility, with the aim of increasing the level of digital transformation of the transportation networks toward more integrated, smart, safe, secure and sustainable mobility; 2. methodologies and technical solutions for monitoring and controlling the resilience of the infrastructures and of the transportation networks with respect to local and global fragilities due to ageing, degradation, events and other natural and anthropic susceptibility factors.
- **Objective of the research project:** The researcher should publish during the contract period at least 6 scientific publications in the most important journals of the sector or in related fields in the case of multidisciplinary researches. He/She will also participate in conferences and symposia for discussion and verification, at the national and international level, on the research carried out.



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

- **Admission requirement:** PhD
- **Maximum number of publications:** 12
- **Language in which the interview will take place:** Italian
- **Foreign language:** English



## ATTACHMENT 4

The specific elements of this procedure are as follows:

- **Department:** Department of the Arts - DAR
- **SC:** 01/B1 – Informatics
- **SSD:** INF/01 – Informatics
- **Number of positions:** 1
- **Main place of employment:** Rimini
- **Number of hours of frontal teaching per year:** 60
- **Medical assistance services, if required:** Not required
- **Costs indication:** 36.840,00 gross euros per year
- **Financial coverage:** PNRR funds – Call PE – Project PE11 – 3A-ITALY, “Made in Italy Circolare e Sostenibile” – Code PE0000004
- **CUP:** J33C22002950001
- **Project manager:** Gustavo Marfia
- **Project title:** Computer science methods and tools for the support of Made in Italy
- **Duration of contract:** 36 months
- **Brief description of the project:**
  - 1) methodologies for the identification and development of applications and IT platforms to support the various activities of design, construction, distribution and marketing of products that derive from the creativity of operators active in the Made in Italy sector;
  - 2) identification and preparation of digital tools for the support of Made in Italy processes, in order to identify the tools and IT platforms to support the various activities that derive from the creativity of the operators active in the Made in Italy sector;
  - 3) identification of effective and computerized strategies for automatic testing of the identified tools.
- **Objective of the research project:** - two scientific articles published in international scientific journal; - four scientific articles published in proceedings of international conferences.
- **Admission requirement:** PhD
- **Maximum number of publications:** 12
- **Language in which the interview will take place:** Italian
- **Foreign language:** English

## ATTACHMENT 5

The specific elements of this procedure are as follows:

- **Department:** Department of Industrial Engineering - DIN
- **SC:** 09/A3 – Industrial Design, Machine Construction and Metallurgy
- **SSD:** ING-IND/21 – Metallurgy
- **Number of positions:** 1
- **Main place of employment:** Bologna
- **Number of hours of frontal teaching per year:** 60
- **Medical assistance services, if required:** Not required
- **Costs indication:** 36.840,00 gross euros per year
- **Financial coverage:** PNRR funds – Call PE – Project PE10 – ONFOOD, "Research and innovation network on food and nutrition Sustainability, Safety and Security – Working ON Foods", Codice PE0000003
- **CUP:** J33C22002860001
- **Project manager:** Alessandro Morri
- **Project title:** Metals and alloys for developing systems aiming at food and nutrition sustainability
- **Duration of contract:** 36 months
- **Brief description of the project:** • Development and optimization of metallic materials for improving the efficiency of systems aiming at food and nutrition sustainability, safety and security. • Identification of process-microstructure-property relationships for metallic materials and surface engineered metallic materials, aiming at increased mechanical, tribological and/or functional performance. • Characterization by scanning electron microscopy, profilometry, nanoindentation and tribological tests of films and thin coatings for use in the food sector.
- **Objective of the research project:** The requirements of scientific productivity during the 3-year project will be: (i) publication of at least 4 papers on international journals on the topics of the research activity and (ii) presentation of contributions to at least 3 (national or international) conferences.
- **Admission requirement:** PhD
- **Maximum number of publications:** 12
- **Language in which the interview will take place:** Italian
- **Foreign language:** English

## ATTACHMENT 6

The specific elements of this procedure are as follows:

- **Department:** Department of Civil, Chemical, Environmental, and Materials Engineering - DICAM
- **SC:** 09/D3 – Chemical Plants and Technologies
- **SSD:** ING-IND/25 – Chemical Plants
- **Number of positions:** 1
- **Main place of employment:** Bologna
- **Number of hours of frontal teaching per year:** 60
- **Medical assistance services, if required:** Not required
- **Costs indication:** 36.840,00 gross euros per year
- **Financial coverage:** PNRR funds – Call PE – Project PE2 – NEST, “Network 4 energy sustainable transition” – Code PE0000021
- **CUP:** J33C22002890007
- **Project manager:** Valerio Cozzani
- **Project title:** Safety and Risk Assessment of Technologies for Clean Hydrogen Production, Storage and Use.
- **Duration of contract:** 36 months
- **Brief description of the project:** The aim of the project is the development of an innovative framework supporting the governance of risks related to hydrogen infrastructure. The specific objectives of the project include the identification of advanced procedures for the quantitative risk assessment of hydrogen facilities and networks, also addressing uncertainty management, the development of a multi-level approach to the assessment of risk and risk trade-offs of energy networks and technologies, and the sustainability assessment of hydrogen technologies. Both theoretical research addressing risk assessment methodologies, and experimental research, addressing specifically cryogenic hydrogen releases, will be afforded. The developed methodologies will afford the robustness and resilience of the new hydrogen infrastructures in the framework of climate change, also considering the impact of extreme natural events.
- **Objective of the research project:** Over the 3-years period of the contract, the publication of at least 5 papers in peer reviewed scientific journals presenting the results obtained in the project, and the participation in at least to 3 international scientific conferences will be required.
- **Admission requirement:** PhD
- **Maximum number of publications:** 12



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

- **Language in which the interview will take place:** Italian
- **Foreign language:** English

## ATTACHMENT 7

The specific elements of this procedure are as follows:

- **Department:** Department of Civil, Chemical, Environmental, and Materials Engineering - DICAM
- **SC:** 09/D2 – Systems, Methods and Technologies of Chemical and Process Engineering
- **SSD:** ING-IND/26 – Analysis, Design and Control of Chemical Processes
- **Number of positions:** 1
- **Main place of employment:** Ravenna
- **Number of hours of frontal teaching per year:** 60
- **Medical assistance services, if required:** Not required
- **Costs indication:** 36.840,00 gross euros per year
- **Financial coverage:** PNRR funds – Call PE – Project PE7 – SERICS, “SEcurity and Rights in the CyberSpace” – Code PE0000014
- **CUP:** J33C22002810001
- **Project manager:** Giacomo Antonioni
- **Project title:** Cyber-security of systems and infrastructure for green energies and energy vectors.
- **Duration of contract:** 36 months
- **Brief description of the project:** The project aims to develop solutions able to support the identification, the contrast, and the management of cyber threats affecting operational technologies of energy systems and infrastructure, ensuring an adequate level of resilience to the future green energy and energy vector technologies. Multi criteria approaches will be developed to address the safety, reliability, and cost domains. Research activities include the understanding and the modeling of the cyber-physical systems dynamics affected by corrupted control systems, and the response performance of the adopted protection strategies. The key outcomes of the projects are the development of an approach and specific methods for the identification of threat, hazard, and risk scenarios; their prevention, also based on inherent design and add-on countermeasures, and the improvement of attack detection and emergency response, based on model and signature-based techniques.
- **Objective of the research project:** Over the 3-years period of the contract, the publication of at least 5 papers in peer reviewed scientific journals presenting the results obtained in the project, and the participation in at least to 3 international scientific conferences will be required.
- **Admission requirement:** PhD
- **Maximum number of publications:** 12



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

- **Language in which the interview will take place:** Italian
- **Foreign language:** English

## ATTACHMENT 8

The specific elements of this procedure are as follows:

- **Department:** Department of Electrical, Electronic and Information Engineering "Guglielmo Marconi" - DEI
- **SC:** 09/E1 – Electrical Engineering
- **SSD:** ING-IND/31 – Electrical Engineering
- **Number of positions:** 1
- **Main place of employment:** Bologna
- **Number of hours of frontal teaching per year:** 60
- **Medical assistance services, if required:** Not required
- **Costs indication:** 36.840,00 gross euros per year
- **Financial coverage:** PNRR funds – Call CN – Project MOBILITY, “Sustainable Mobility Center” – Code CN00000023
- **CUP:** J33C22001120001
- **Project manager:** Gabriele Grandi
- **Project title:** Development and testing of power electronic converters for battery- and fuel cell-based powertrains and their integration with renewable sources
- **Duration of contract:** 36 months
- **Brief description of the project:** The researcher will be responsible for the implementation of the experimental setup at the constituting Sustainable Mobility Laboratory pertaining to the National Center for Sustainable Mobility (CNMS) at the Forlì Engineering campus. The activities will involve the commissioning and integration of the different equipment for the implementation and testing of powertrain stages based on fuel cells and batteries. The realized setup will be used to carry out the electrical characterization of the main components of interest, primarily electrolyzer and fuel cell in relation to their operational use. The study and development of power electronic converter topologies will then be carried out to manage these elements by meeting the requirements of efficiency, compactness, and reliability. The development and control of converters for managing energy flows in the presence of renewable sources as primary sources for battery charging and hydrogen generation will also be specifically addressed.
- **Objective of the research project:** Implementation, commissioning, and testing of equipment for the Sustainable Mobility laboratory with respect to the activities under the project. Drafting documents for scientific reporting of the project and dissemination of results with at least 3 scientific papers published in national or international journals or conference proceedings.



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

- **Admission requirement:** PhD
- **Maximum number of publications:** 12
- **Language in which the interview will take place:** Italian
- **Foreign language:** English



## ATTACHMENT 9

The specific elements of this procedure are as follows:

- **Department:** Department of Electrical, Electronic and Information Engineering "Guglielmo Marconi" - DEI
- **SC:** 09/F2 – Telecommunications
- **SSD:** ING-INF/03 – Telecommunications
- **Number of positions:** 1
- **Main place of employment:** Bologna
- **Number of hours of frontal teaching per year:** 60
- **Medical assistance services, if required:** Not required
- **Costs indication:** 36.840,00 gross euros per year
- **Financial coverage:** PNRR funds – Call PE – Project PE14 - RESTART “Research and innovation on future Telecommunications system and networks, to make Italy more smRT”, code PE0000001
- **CUP:** J33C22002880001
- **Project manager:** Roberto Verdone
- **Project title:** Analysis and implementation of L1, L2 and L3 layer wireless communication technologies and protocols for Industrial and Vehicular Networks
- **Duration of contract:** 36 months
- **Brief description of the project:** The activity will be in the context of the RESTART IN, WINET and Moveover projects. It will include 1) support to the definition of use cases 2) study of channel models 3) investigation on scenarios including vehicles, drones or industrial machines 4) development of proof-of-concepts.
- **Objective of the research project:** The research project aims to publish the results in indexed international journals and to present them at high-impact international conferences. It is also proposed to identify technology transfer methods with the companies involved in the project and to identify other potentially interested parties. In terms of scientific publications, the project targets acceptance of 3 international journals indexed in Scopus (e.g., IEEE Transactions on Communications, IEEE Transactions on Wireless Communications) and 3 international conferences (e.g., IEEE ICC, IEEE Globecom) in the three years. It is also foreseen the support to the preparation and submission of a European, national, or regional project proposal.
- **Admission requirement:** PhD
- **Maximum number of publications:** 12
- **Language in which the interview will take place:** Italian
- **Foreign language:** English

## ATTACHMENT 10

The specific elements of this procedure are as follows:

- **Department:** Department of Legal Studies - DSG
- **SC:** 12/A1 – Private Law
- **SSD:** IUS/01 – Private Law
- **Number of positions:** 1
- **Main place of employment:** Bologna
- **Number of hours of frontal teaching per year:** 30
- **Medical assistance services, if required:** Not required
- **Costs indication:** 36.840,00 gross euros per year
- **Financial coverage:** PNRR funds – Call PE – Project PE1 – FAIR, “Future Artificial Intelligence Research” – Code PE0000013
- **CUP:** J33C22002830006
- **Project manager:** Giusella Dolores Finocchiaro
- **Project title:** New contracts concerning data utilization in AI applications
- **Duration of contract:** 36 months
- **Brief description of the project:** The candidate will have to carry out research activities on the use of data in artificial intelligence applications. Research activities must be carried out in Italian and English. The activity may consist of bibliographical and scientific research in general, active participation in research groups, assistance and publication of scientific contributions.
- **Objective of the research project:** The researcher's scientific productivity objectives will be to produce 1 monograph or 6 articles, of which at least 4 in class A, on the project topic or related topics over the three-year period.
- **Admission requirement:** PhD
- **Maximum number of publications:** 12
- **Language in which the interview will take place:** Italian
- **Foreign language:** English