COLLABORATIVE DOCTORAL PARTNERSHIP (CDP)

CALL FOR EXPRESSION OF INTEREST

IN

ONE Ph.D. POSITION

Topic:

"Statistical clustering with applications to Knowledge Graphs"

Application deadline:

July 1st, 2025 - 11.59 pm (CEST)

ACADEMIC YEAR 2025/2026

The Alma Mater Studiorum – Università di Bologna (hereinafter referred to as University of Bologna) - Department of Statistical Sciences "Paolo Fortunati" and the Joint Research Centre of the European Commission (JRC) are inviting applications for **one PhD position through the Collaborative Doctoral Partnerships (CDP) scheme** – Topic: "**Statistical clustering with applications to Knowledge Graphs**" (Agreement n. 36084). This topic contributes to the overarching scope of this agreement on the thematic field "**Robustness in complex data analysis and statistical modelling**".

Art. 1 - PhD PROGRAMME

The candidate will be enrolled in the XLI cycle of the Ph.D. Programme in **"Statistical Sciences".**

The University of Bologna will award a Ph.D. Degree at the end of the three-year Programme after successfully completing all Ph.D. requirements, including the successful defense of the Thesis as provided by the **University Regulations on Doctoral Programs** available on the University website at the page **PhD Programmes.**

Art. 2 - Ph.D. RESEARCH TOPIC - PROJECT OBJECTIVES AND DESCRIPTION

The Ph.D. research activities will focus on: "**Statistical clustering with applications to Knowledge Graphs**" addressing therefore the objective of the agreement in the field "**Robustness in complex data analysis and statistical modelling**". The topic is coherent with the research lines included in the Ph.D. Programme in Statistical Sciences and with the JRC mission.

Short Description of the project and main objectives:

The Department of Statistical Sciences of the University of Bologna and the JRC will collaborate in the frame of the CDP Agreement, on joint research projects concerning the broad area of statistical modelling, with particular focus on the development of techniques able to deal with complex and high dimensional data.

The goal of the current PhD joint position is investigating theoretical aspects of statistical clustering with applications to embedding models, large language models and knowledge graphs.

In particular, the PhD project aims to address mainly the following themes: 1) properties of the vectorial representations of documents (the embeddings); 2) study of distinct clustering techniques, including robust ones, suitable to high dimensional vectors typical of the embeddings; 3) effects on clustering of distinct embedding approaches and vector spaces; 4) how can these techniques influence construction and use of knowledge graphs.

RESPONSABILE DEL PROCEDIMENTO: ROSSELLA TABARONI
AFORM SETTORE DOTTORATO DI RICERCA
Via Irnerio 49 | 40126 Bologna | Italia | Tel. + 39 051 2094620 | aform.udottricerca@unibo.it

The student will apply the research to data extracted from the JRC European Media Monitoring System (EMM), a service that automatically aggregates and analyzes approximately 300,000 news articles daily from news portals worldwide in up to 70 languages. Other textual data sources may come from customs declaration fields used by the JRC in support to Customs anti-fraud enforcement and international trade analysis.

Art. 3 - JOB LOCATIONS

European Commission – Joint Research Centre

Unit T.5 Text and data mining, Via Enrico Fermi, 2749 - 21027 Ispra (VA) – Italy

University of Bologna

Department of Statistical Sciences "Paolo Fortunati" - STAT

Via Belle Arti, 41 40126 Bologna (BO)

Art. 4 - PROFILE OF THE PHD CANDIDATE

▪ Master's degree (MSc) or equivalent within a relevant scientific area of the Ph.D. Programme in "Statistical Sciences" (Statistics, Mathematics, Probability)

▪ Knowledge/experience in Multivarate statistical methods, Fundamentals of Statistical inference

▪ Languages: excellent working knowledge (written and oral) of English.

Art. 5 - DURATION OF THE DOCTORAL PROGRAMME, RESEARCH CONTRACT AND SALARY

The PhD candidate will spend 24 months at the Joint Research Centre in Ispra (Varese), Italy and 12 months at the Department of Statistical Sciences "Paolo Fortunati" - STAT of the University of Bologna.

The starting date of the Ph.D. Programme is provided for November 1st, 2025, the Programme will end on October 31st, 2028; the defense of the thesis will be held before October 31st, 2029.

At the University of Bologna, the position is funded by a scholarship according to the University of Bologna regulations, while at the Joint Research Centre in Ispra the candidate will sign a contract as a Grantholder Cat. 20 for a maximum duration of 24 months in accordance with Grantholder rules and the applicable Vademecum (**GH Rules**).

Art. 6 - WHO CAN APPLY

▪ Italian and foreign citizen's holder of *laurea Specialistica/Magistrale, laurea Vecchio Ordinamento* conferred by an Italian University by the 31st of October 2025 may apply.

▪ Italian and foreign citizen's holder of *master's degree* conferred by a foreign University by the 31st of October 2025 may apply for the selection, enclosing the official transcripts of the academic degree, accompanied by an Italian or English translation, also made by the applicant's and under their own responsibility.

Applicants holder of Degrees (EQF Level 7 or II cycle Degree) conferred by a foreign University are conditionally admitted to the selection and will be excluded from it, if the academic title does not comply with the requirements for access to the Ph.D. level, as stated in this announcement.

They must attest the authenticity and the comparability of the qualification awarded (e. g. Diploma Supplement, Declaration of Value - Dichiarazione di Valore in loco - of the second-cycle degree issued by the Italian Diplomatic authorities located in the country in which the qualification was awarded, recognition of foreign qualifications carried out by agencies like the ones of ENIC-NARIC network).

Candidates should, prior to the start of the employment contract with the JRC:

– have the nationality of a Member State of the EU or a country associated to the Research Framework Programme (AC) or being resident in an EU Member State since at least five years.

– be enrolled in a Ph.D. Programme with the HEI.

The selected candidate will have no more than 6 months from the request for confirmation of interest in the position, to produce proof of enrolment in the doctoral study program.

For candidates with third-countries nationality (i.e. who are neither from Member States of the EU nor from countries associated with the Research Framework Programs - Horizon 2020), the recruitment is subject to a security clearance and to the issuance of a residence and work permit in Italy for the period of the stay at JRC.

Art. 7 - HOW TO APPLY

Applicants must send their expression of interest via email aform.udottricerca@unibo.it, with the following Ref. [*Name_Surname_expression of interest JRC-CDP_PhD Programme in Statistical Sciences*]. **Deadline** to submit the application, including all documents required for the selection (listed below): **July 1st, 2025 - 11.59 pm (CEST)**

Documents required for the selection:

- **Identity document** with photo;
- **CV** (written using the **mandatory format** below)
- **One Reference letter** (written using the **mandatory format** below)
- **publications**, other qualifications
- For candidates with degrees awarded in **Italy**: (**bachelor's and master's** degrees or combined-cycle degree), a **self-certification** dated and signed attesting the completion and awarding of the degree, containing a list of exams taken and the corresponding grade, the title of the thesis and grade.
  For candidates with degrees awarded **abroad**: (**bachelor's and master's** degrees or combined cycle degree) documents attesting the completion and awarding of second-cycle degrees. The documents must include name of the awarding institution, type of degree, name of the degree programme, date in which the degree has been awarded, final mark, academic transcript of records, including the full list of the exams taken and the related marks. Please also indicate the related CFU or ECTS (if provided by the education system in which the degree has been awarded).

The JRC reserves the right to request additional documents in order to ensure the compliance with all requirements and specific rules applicable to JRC sites. The selected candidate must also be recognized as medically fit to carry out the work activities foreseen. To this end, the candidate must undergo, in advance and independently, the medical checks specified by the JRC.

Art. 8 - SELECTION PROCEDURE

Candidates will be selected on the basis of their qualifications, CV, reference letter, as well by means of an interview (in English) for the assessment of their aptitude to carry out research as well as the assessment of their knowledge on the specific field of the research project to which the CDP position is referred, according to the following procedure:

▪ pre-selection by University of Bologna (evaluation on qualification documents and interview);

▪ final selection by JRC in agreement with the University of Bologna Admission Board.

The pre-selection is carried out by a specialized Admission Board appointed by the University of Bologna and chosen among professors and researchers with experience on the topics subject of the Call, guaranteeing an adequate gender representation.

At the end of the pre-selection process, the resulting shortlist consisting of a minimum of 2 and a maximum of 5 candidates, will be sent to the JRC host Unit F.2 (together with the candidates' applications), for the final selection; the JRC Grantholders Human Resources Unit will organize an evaluation panel with the pre-selected candidates.

At the end of the selection procedure, the JRC will contact each pre-selected candidate to inform about the outcome of their application, the successful candidate will then be contacted by the University of Bologna for the enrolment procedure.

All relevant information and name of successful candidate will be published on the **University of Bologna website.**

Art. 9 - INTERVIEW

The interview will be held in English Language remotely by videocall **on 11th July 2025 at 11:00 am** (CEST). The Board will send the selected candidates the link to participate in the interviews to the email address indicated in their application.

The Interview is aimed at evaluating the candidate's scientific background, knowledge, and skills in relation to the research topic of the CDP Call.

Candidates must ensure to have a webcam at their disposal in order to allow the Admission Board to identify and have a full view of the candidate during the interview.

The candidates are required to identify themselves before the interview by showing a valid identification document.

Failure to show up, failure to connect, unavailability of the candidate on the day or time set, or failure to provide a valid identification document, are grounds for exclusion from the selection procedure.

Where technical problems of connection arise during the videoconference interview, if the problem concerns one or more Board members, the interview shall be postponed by default to another date, if the problem concerns the candidate, the Board may, on grounds of good reason, postpone to another date, respecting the principles of non-discrimination and equal treatment between candidates.

Art. 10 - ENROLMENT

The successful candidate will be contacted by the Ph.D. Office of the University of Bologna for the enrolment procedure.

PhD candidates must pay the enrolment charges for each academic year, including insurance premium (of € 1,04), stamp duty (of € 16,00) and the regional tax (of € 140,00) for the right to higher education. The current amount of the enrolment charges is €157.04. Such amount could vary, due to the decision of the competent bodies.

The amount of tuition fees is established by the Board of Governors of the University of Bologna. In the academic year 2025/2026, no tuition fees are envisaged for attending PhD programmes.

The enrolment charges cannot be reimbursed under any circumstances.

Art. 11 - INTELLECTUAL PROPERTY ON RESEARCH RESULTS AND PUBLICATIONS

Intellectual and industrial property rights to any findings of the Ph.D. student are governed in accordance with current legislation (Copyright Law - Legislative Decree 633/1941 - and Industrial Property Code - Legislative Decree 30/2005), to the **Regulations for the management of industrial and intellectual property rights with reference to research activities carried out by university personnel** and, if necessary, according to what is established in individual agreements with universities, companies or entities involved.

Ph.D. Students are required to sign appropriate confidentiality undertakings in relation to information, data and documents of a confidential nature of which they may become aware in the course of their work at and/or on behalf of the University.

The Ph.D. Student is, in any case, guaranteed the opportunity to carry out the normal publication activities envisaged by the programme, which must be scheduled in a manner compatible with the protection of any results.

Art. 12 - PROCESSING OF PERSONAL DATA

Personal data pertaining to this procedure are collected and processed for the University's institutional purposes in accordance with Articles 13 and 14 of EU Regulation 2016/679 - General Data Protection Regulation (GDPR).

For more details, follow the University of Bologna webpage of the **Data Protection.**

Art. 13 - PUBLICITY

The Call is published - in its entirety, on the University of Bologna **website**. It is also advertised on the Ministry of Education's website and on the European website Euraxess.

Art. 14 - THE PROCEDURE MANAGER

For all purposes pertaining to this call, the Unit in charge is the Educational Services Area - "Unit Ph.D. Office" – Via Irnerio, 49 - 40126 Bologna.

Information and clarifications on application submission can be addressed to e-mail **aform.udottricerca@unibo.it .**

The procedure manager is Ms. Francesca Cottone.

Art. 15 - FINAL PROVISIONS

Competition documents are public, to which access is permitted in the manner established by Law No. 241 of August 7, 1990.

For anything not expressly provided for in this announcement, please refer to **University Regulations on Doctoral Programs** available at the page **PhD Programmes** and to the statutory, regulatory and ministerial provisions cited in the decree announcing the Call for Applications.

The University reserves the right to exclude at any time candidates who participate in the exams provided for in this call, for failure to comply with the provisions given therein or the deadlines specified therein, or for failure to meet the requirements.

RESPONSIBLE FOR THE PRESENT ADMINISTRATIVE PROCEDURE

Dott.ssa Rossella Tabaroni – AFORM – Education and PhD Administrative Division (e-mail: aform.udottricerca@unibo.it; PEC: scriviunibo@pec.unibo.it).

CURRICULUM FOR APPLICATION TO THE PHD COURSE IN STATISTICS
UNIVERSITY OF BOLOGNA – A.Y. 2025/26

NAME:

_____   _____
Surname   *Name*

---

1. IDENTIFY YOUR CURRENT POSITION

Write the position which best describes the activity in which you are currently involved.

_____

_____

---

2. LIST EDUCATIONAL INSTITUTIONS ATTENDED, IN REVERSE CHRONOLOGICAL ORDER, INCLUDING THE ONE(S) WHERE YOU ARE CURRENTLY ENROLLED.

INSTITUTION AND LOCATION *(List in reverse order. Write name in full. Do not abbreviate)*	MAIN FIELD(S) OF STUDY	DATES (Monthly/Year) From	To	NAME OF QUALIFICATION, TITLE CONFERRED and GRADE	DATE OF ATTAINMENT (or expected date if not attained yet)

Instructions for foreign students:
Do not try a conversion of your university grading scale. Indicate the grades as granted by your school and give us a brief explanation of your school's grading system. Please describe the grading system(s) used at all colleges and universities you have attended. Explain the specific meaning of any numeric values, letter grades, and rankings.

3. RECORD OF COURSES TAKEN IN PREPARATION FOR GRADUATE STUDY

*Based on your transcript(s), please complete the following summary of your college and university classes. In particular, you are required to list the **five courses** that you consider most relevant to certify basic knowledge in Mathematics, Probability and Statistics.*

Instructions for foreign students:
Do not try a conversion of your university grading scale or GPA. Indicate the grades/GPA as granted by your school and give us a brief explanation of your school's grading system. Please describe the grading system(s) used at all colleges and universities you have attended. Explain the specific meaning of any numeric values, letter grades, and rankings.

Course name (and number, if available)	Principal teaching material used (if any book indicate author and title)	Year taken	Credits	Official course grade (if applicable)

4. LIST ANY PUBLICATIONS AUTHORED BY YOU, ESPECIALLY IN YOUR PROPOSED FIELD OF STUDY

Give title, place, date, and all authors of publication (Only publications with ISSN or ISBN relevant for the PhD course will be evaluated).

5. LIST SCHOLARSHIPS OR FELLOWSHIPS HELD AT PRESENT OR IN THE PAST FOR STUDY

Give source or sponsor, amount, place and duration, for instance: ERASMUS Scholarship, 6 months, University of Aarhus.

6. TEACHING OR TUTORING EXPERIENCE

Indicate any teaching qualification, teaching or tutor position you have hold or you are currently holding.

7. RESEARCH ASSISTANTSHIPS OR INTERNSHIP AT SCIENTIFIC INSTITUTIONS

Indicate place, duration and a brief description of the research activity developed during the internship.

8. RESEARCH GRANTS OR SCHOLARSHIPS FOR RESEARCH

Indicate any grants, scholarships for research you have completed or in which you are currently involved. Give source or sponsor, amount, place and duration.

9. WORK EXPERIENCE

List the positions held, beginning with the most recent employment.

NAME AND ADDRESS OF THE EMPLOYER	TITLE/TYPE OF WORK	DATES (Month/Year)	
		From	To

10. INDICATE ANY ACADEMIC HONOR OR PRIZE WHICH YOU HAVE RECEIVED, WITH TITLES AND DATES

11. LANGUAGE SKILLS

Rate yourself Excellent, Good, Fair or Poor. Include all languages in which you have some competence.

Mother Tongue_____

LANGUAGE	READING	WRITING	SPEAKING
English			
Italian			

Language certifications

TOEFL: Date taken: _____ Scores: _____

IELTS: Date taken: _____ Scores: _____

_____ Date taken: _____ Scores: _____

_____ Date taken: _____ Scores: _____

12. FURTHER TITLES OR RESEARCH ACTIVITIES

Include any further significant activity or research stage experience you have completed or in which you are currently involved.

SIGNATURE:_____ DATE: _____

CONFIDENTIAL LETTER OF REFERENCE
FOR APPLICATION TO THE PHD COURSE IN STATISTICS
UNIVERSITY OF BOLOGNA – A.Y. 2025/26

(to be filled either in English or in Italian)

This letter of reference must be written by an instructor under whom the applicant has studied or pursued research in the proposed field of study or by someone who has supervised the applicant in work related to the proposed field of study. This letter must be signed by the referee, and sent via email aform.udottricerca@unibo.it by the applicant.

NAME OF APPLICANT _____

NAME OF REFEREE _____

TITLE _____

INSTITUTION OR COMPANY _____

CITY AND COUNTRY _____

1. HOW LONG HAVE YOU KNOWN THE APPLICANT? _____

2. IN WHAT CAPACITY HAVE YOU KNOWN THE APPLICANT?

   [ ] Instructor or Professor   [ ] Employer or Job Supervisor

   [ ] Research Advisor   [ ] Other (Please specify) _____

3. IN THIS RATING CHART, PLEASE EVALUATE THE APPLICANT COMPARED TO OTHER STUDENTS THAT YOU HAVE KNOWN DURING YOUR PROFESSIONAL CAREER

	Excellent	Very Good	Average	Below Average	Not Applicable
Intellectual ability					
Knowledge of field					
Work habits					
Motivation to pursue graduate study					
Seriousness of study					
Potential for significant future contribution in field					
Resourcefulness and initiative					
Emotional maturity					
Adaptability to new situations					
Leadership qualities					
Teaching potential					

4. HOW DOES THIS APPLICANT COMPARE WITH HIS OR HER PEER GROUP IN ACADEMIC ABILITY?

[ ] Truly exceptional
Equivalent to the very best you have known – a person who, in your experience, appears only every few years

[ ] Outstanding
Comparable to the best student in a current class

[ ] Well above average
Top 25%

[ ] Above average
Demonstrated high ability

[ ] Average
Able to complete work to the PhD

[ ] Below average
Lower 50%

[ ] Inadequate
Opportunity to observe

5. IN YOUR OPINION, HOW WOULD THIS STUDENT COMPARE TO OTHER STUDENTS IN THE GRADUATE PROGRAMME IN STATISTICS?

[ ] Truly exceptional

[ ] Outstanding

[ ] Well above average

[ ] Above average

[ ] Average

[ ] Below average

[ ] Inadequate

6. PERSONAL EVALUATION OF THE APPLICANT. WHAT PARTICULARLY QUALIFIES THIS STUDENT FOR A PHD IN STATISTICS? INFORMATION ABOUT ACCOMPLISHMENTS IN RESEARCH OR INDEPENDENT PROJECTS WILL BE PARTICULARLY HELPFUL. IF YOU KNOW OF OTHER STUDENTS WHO HAVE ENTERED THE BOLOGNA PhD PROGRAMME, A COMPARISON WILL BE ESPECIALLY VALUABLE.

7. EXPERT'S DATA
   We would be most grateful if you could provide us some information on your cv.

   PERSONAL WEB PAGE_____

   EDUCATION _____
   _____
   _____

   CURRENT POSITION _____
   _____
   _____

   FIELD OF EXPERTISE _____
   _____
   _____

   ADVISED PHD STUDENTS (NUMBER OF) _____
   _____
   _____

   RESEARCH PAPERS (MAX 5) IN ISI REFEREED JOURNALS_____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____

SIGNATURE:_____ DATE: _____