



EUROPEAN COMMISSION
DIRECTORATE-GENERAL
HUMAN RESOURCES AND SECURITY
HR for Specific Sites & Services
HR for JRC

March 2025 – Call for expression of interest – scientific trainees

As the science and knowledge service of the Commission, the mission of the Joint Research Centre (JRC) is to provide independent, evidence-based knowledge and science, supporting EU policies to positively impact society. The JRC is located in 5 Member States (Belgium, Germany, Italy, the Netherlands and Spain).

Further information about the JRC activities is available at <https://ec.europa.eu/jrc/en>

The place of traineeship will be one of the following JRC sites: Geel (Belgium), Ispra (Italy), Karlsruhe (Germany), Petten (the Netherlands) or Seville (Spain).

The JRC cultivates a workplace based on respect for other people and the environment and embraces non-discriminatory practices and equality of opportunity.

Thematic areas

The JRC science and knowledge activities cover a variety of areas, including agriculture and food security, health, industry and space, energy, natural resources, mobility, creativity and an inclusive society, civil security for society, environment and climate change, nuclear safety and security, crisis management, population dynamics and migration, digital transformation and data, cybersecurity, artificial intelligence as well as innovation and growth.

For the March 2025 call, the JRC seeks to recruit a number of scientific trainees, in different thematic areas relevant for the organisation. The thematic areas are clustered in 21 fields as listed below. More detailed information, project descriptions, as well as relevant candidate profiles are available in [Annex I](#).

If the candidate's profile fits in more than one field, the applicant is encouraged to choose the one for which they are more specialised.

The scheme focuses on candidates having a strong scientific background. However, some fields also give the opportunity for candidates with a more generalist profile to apply. Depending on the project, the trainee will be expected to perform desktop work and/or laboratory tasks.

Fields for the March 2025 call (projects details in [Annex I](#))

Field number	Title	Laboratory experience
<u>1</u>	Knowledge management, visual communication & data visualisation.	No
<u>2</u>	Science communication, sociology & deliberative democracy.	No
<u>3</u>	Modelling, data & quantitative data for spatial analysis.	No
<u>4</u>	Demography & migration.	No
<u>5</u>	Macro-Micro Economic modelling; Applied statistics; Composite Indicators and Scoreboards.	No
<u>6</u>	Analysis of the digital transformation and its impacts on society, economy and the environment.	No
<u>7</u>	Data science, data processing and analysis.	No
<u>8</u>	Artificial Intelligence – general approach, evaluation, AI safety, cybersecurity and earth observation.	No
<u>9</u>	Technology - monitoring & assessment.	No
<u>10</u>	Public Health.	Yes (specific projects)
<u>11</u>	Regulatory Science - food and feed safety; analytical chemistry; medical devices.	Yes (specific projects)
<u>12</u>	Nuclear Science and Technology.	Yes (specific projects)
<u>13</u>	Biodiversity, Ecosystem services and Natural Resources.	No
<u>14</u>	Climate Change, sustainable transport & air pollution.	Yes (specific projects)
<u>15</u>	Circular Economy, Life Cycle Assessment & Sustainable Development Goals.	No
<u>16</u>	Security, Cyber-security and Hybrid Threats.	No
<u>17</u>	Renewable Energy Sources; Energy efficiency of buildings and renovation; Industrial decarbonisation.	Yes (specific projects)
<u>18</u>	Security in the digital age: forensic investigation techniques, drones, counter drone systems.	Yes (specific projects)
<u>19</u>	Radiochemistry and radioprotection.	Yes (specific projects)
<u>20</u>	Space, security and defence: Next-generation wireless communications, satellite radio navigation & quantum technologies.	Yes (specific projects)
<u>21</u>	Geopolitics, security threats & societal resilience.	No

Requirements of the Call

Specific eligibility requirements for this call:

- **Nationality:** open to nationals of Member States of the European Union and of countries associated to the [Research Framework Programmes](#).

The recruitment of candidates from non-Member States (under Research Framework Programmes), may require additional compulsory administrative procedures imposed by the national authority of the country hosting the JRC site.

- **Degree:** the call is open to recent university graduates who have completed at least a standard 3-year higher education degree (180 ECTS¹ credits), corresponding to a complete Bachelor's cycle (or equivalent) at the closing date of the present call.

The last degree must have been awarded no later than five years before the closing date of the present call for applications. This including candidates who are currently enrolled in a Master's degree or Ph.D. programme (or its equivalent) and are preparing a thesis.

- **Languages:** To fully benefit from the traineeship and to participate effectively in meetings and activities, candidates from EU Member States must have a thorough knowledge of at least two Community languages, one of which should be English (minimum C1 level, according to the Common European Framework for Languages - CEFR).

Candidates from non-Member States must have a thorough knowledge of at least English (minimum C1 level, according to the CEFR).

- **Previous experiences:** The JRC wishes to offer the opportunity of a traineeship to as many people as possible.

Therefore, applications are **not** considered eligible from those candidates who for more than six weeks:

- have already benefited or benefit from any kind of traineeship (formal or informal, paid or unpaid) within a European institution or body;

or

- who have had or have any kind of employment within a European institution or body, including anyone who is or has been an assistant to a Member of the European Parliament, a consultant or researcher, a temporary staff member, a contract staff member, an auxiliary contract staff member, an auxiliary agent or an interim staff member of any EU institution or body.

More information on general eligibility requirements in [Annex II](#).

¹ European Credit Transfer and Accumulation System: [European Credit Transfer and Accumulation System \(ECTS\) - European Education Area \(europa.eu\)](#)

Selection criteria

Candidates are evaluated anonymously on the basis of the following criteria:

- Level of education: minimum bachelors' degree;
- Level of knowledge of English;
- Level of knowledge of any other official language of the EU, as well as other non-EU languages, if any;
- Relevant field-related work experience, if any;
- Field-related methodologies and technologies, IT skills, if any;
- International experience (education, work, volunteering abroad and aptitude to work in an international environment atmosphere), if any;
- Papers, publications, participation in conferences/summer schools, if any;
- Motivation and suitability for the field(s).

Not all candidates in the database will be contacted. Candidates might be contacted for informal interviews directly by the interested JRC Unit/Service. Inclusion in the database does not, in itself, constitute a job offer. An offer is not considered final until the contract has been signed.

Supporting documents will be verified in the recruitment phase. Originals may be requested at any stage of the process.

Conditions of Traineeship

The conditions of the Traineeship Programme are governed by the [Rules Governing the Traineeship Scheme of the Joint Research Centre](#). The next traineeship session will start in March 2025 and will run for a fixed period of 5 months. Under exceptional circumstances, a postponement of the start date may be possible. The duration of the traineeship may not be less than three months. Candidates should be aware that any postponement of the start date might have an impact upon candidates' eligibility for other career opportunities at the European Commission.

The amount of the basic monthly allowance in 2024, adjusted by the applicable correction coefficient of the site, is between € 1.306,16 and € 1.581,29².

A trainee whose place of recruitment is less than 50km from the JRC site where the traineeship will take place is awarded half of the basic allowance. Trainees who receive a scholarship, salary, lump sum or any other form of payment can benefit from a monthly allowance that brings their total income up to the standard JRC level.

No tax or social security contributions will be withheld or paid by the European Commission with respect to the above stated allowances.

² The trainee is awarded a monthly allowance in the amount of 25% of the basic remuneration for an official at grade 5/1, adjusted by the correction coefficient applied to the JRC site where the traineeship takes place, per month of in-service training actually carried out.

Further opportunities

Candidates interested in further opportunities at the European Commission can find information on the website of the European Personnel Selection Office (EPSO): <https://epso.europa.eu>

Access to the talent management programme “[JPP](#)” (Junior Professionals Programme) is open also to JRC scientific trainees. The admission is subject to specific eligibility requirements and further boundary conditions.

Data Protection

For further information on how the JRC processes your personal data, please consult our page for “[Data protection in the selection and/or recruitment process](#)”.

The Commission ensures that candidates’ personal data are protected as required by Regulation (EU) 2018/1725 on the processing of personal data by EU institutions and bodies. This safeguards the confidentiality and security of such data.

JRC contact details

For any technical problems with your application, please contact:

HR-JRC-RECRUITMENT-TOOLS-SUPPORT@ec.europa.eu

For questions related to this call, please contact:

HR-JRC-ISPRA-TRAINEES@ec.europa.eu

ANNEX I

FIELD	PROJECTS DESCRIPTION
<p>FIELD 1 - Knowledge management, visual communication and data visualisation (including knowledge management for nuclear safety, security, safeguards and decommissioning).</p>	<p>Examples of relevant projects include (but are not limited to): Knowledge management, citizen engagement, science communication and networking, including event management, in a multi-disciplinary environment at the interface between science-policy-society. Visual communication (including graphic design, photo and video editing), data visualisation, digital communication and content management.</p> <p>Relevant for applicants with a background in humanities and/or communications, as well as those with experience in digitalisation and management of scientific publications.</p>
<p>FIELD 2 - Science communication and scientific networking in a multi-disciplinary environment at the triangle of science-policy-society. Foresight & knowledge management (identification of emerging disruptors and evaluation of policy gaps). Participatory and deliberative democracy; science and technology studies; humanities and arts; future of democracy; indigenous and traditional knowledge; standardisation; innovation. Political economy; environmental and development sociology.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Contribute to the work of the Knowledge Centre on Migration and Demography (KCMD) by carrying out data and statistical analyses of existing knowledge, policy analysis, literature reviews and synthesis, contributing and producing knowledge on migration and demography, tailored to the needs of the Commission Directorates-General. This knowledge may include also narratives and forward-looking scenarios based on emerging issues current trends and developments. • Elaborate reports describing nuclear science results and their societal relevance in non-scientific language. • Provide support for and participate in activities related to: citizen engagement in different policy fields; future of democracy; deliberative democracy; ethics of science and technology; indigenous knowledge, in particular in the Arctic, to inform policymaking. <p>Relevant for applications with sociology, communications, political science, anthropology, social sciences, humanities, innovation, science and technology studies backgrounds.</p>
<p>FIELD 3 - Modelling, data and quantitative data for spatial analysis (statistics, GIS, spatial modelling, new data, integrated assessments).</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • The collection, elaboration of geographical and statistical data at various spatial and temporal scale for the analysis of the status and trends of cities and regions within and outside the European Union. Data and subjects of study might cover specific themes (e.g.: urbanisation, economy, transport, tourism etc.) or a combination of themes for integrated assessment. • Smart Infrastructures Analysis, Modelling and Integration. • Spatial assessments and planning of our energy infrastructure and energy system of the future (potential and siting of renewables, gas, power hydrogen and CCU/S infrastructure). • The collection, elaboration of geographical and statistical data at various spatial and temporal scale for the analysis of various hazards (floods, droughts, wildfires, earthquakes, tropical

	<p>cyclones) and disaster risk inside and outside the European Union. Exploring the use of artificial intelligence for better understanding of current and future risk.</p> <ul style="list-style-type: none"> • Scientific support to the Common Fisheries Policy. The trainee will assist in analysing and visualizing fishery dependent data to: 1. better understand and analyse fisheries data, 2. facilitate JRC data checks to improve data quality, and 3. disseminate data for end-users to explore them as maps. This will support EU Member States in better comprehending data collected for the Common Fisheries Policy. • DEP Interoperability. The trainee will participate in the project supporting the JRC work on the Digital Europe Programme Interoperability, which focuses on environmental systems and data seamless communication, contributing to Agricultural Data Spaces. The project intends to put in place a systemic approach towards interoperable agricultural data, enriched by available data flows coming from forest, water, soil, biodiversity amongst others. The primary focus lies on data from EU level systems, but during the second phase, MS will also be involved to ensure the sharing of good practices and interoperability endeavours between the EU and MS. • How the Earth Observation (EO) uncertainties can help for EU policies implementation? Uncertainty is key to assessing whether Earth Observations (EO) have reached the maturity level necessary for monitoring EU policies. The project aims to analyse the benefits (economic) of using uncertainties to assess whether an EO product is suitable for monitoring specific policies. Geospatial data analysis with Python is required. Geophysical sciences background is an advantage. The result will be a publication helping to accelerate the adoption of EO in policy monitoring. • Assessing the consistency of the Copernicus Land Monitoring Service (CLMS) related datasets - Comparison of Land Productivity Dynamics with and without Phenology in Europe. This proposed activity will provide valuable insights into land productivity dynamics across Europe and arid regions globally supporting SDG 15.3.1 and UNCCD (Convention to Combat Desertification). Objective is to assess the impact of phenological data on Land Productivity Dynamics (LPD) calculations across Europe. This will help determine the significance of phenological factors in understanding land productivity trends. The outcome will be a report/paper on the Europe LPD comparison with and without phenology, including maps, analysis, and findings. <p>Relevant for various profiles and thematic areas, all candidates with modelling knowledge, various modelling tools and techniques welcome. GIS and/or statistical skills would be assets.</p>
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FIELD	PROJECTS DESCRIPTION
<p>FIELD 4 - Demography and Migration: data science, data and evidence processing, analysis and visualisation; development of foresight scenarios and knowledge management; support to policy.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Analysing dynamic risk drivers of humanitarian crisis and contributing to country analysis reports. • Contribute to the work of the Knowledge Centre on Migration and Demography (KCMD) by carrying out data and statistical analyses of existing knowledge, policy analysis, literature reviews and synthesis, contributing and producing knowledge on migration and demography, tailored to the needs of the Commission Directorates-General. This knowledge may include also narratives and forward-looking scenarios based on emerging issues, current trends and developments. <p>Relevant to all candidates specialised in data analytics and data science, in various thematic areas, including the development of data analysis tools and interfaces to large Earth Observation datasets.</p>
<p>FIELD 5 - Macro- and Micro-Economic modelling; Nowcasting; Macro- and Micro-econometrics; Applied statistics; Composite Indicators and Scoreboards; Skills and employment; Fiscal policy analysis; Financial markets and corporate finance; Sustainable finance; Research and Innovation; Resilience; Decision Analysis, Counterfactual impact evaluation.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Macro-modelling and macro-econometric nowcast models for scientific support to the broad area of macroeconomic and fiscal surveillance, with emphasis on the European Semester and Recover and Resilience Facility implementation. • Development of empirical analyses in the field of sustainable economy and finance, including financial risks from climate change and the socioeconomic aspects of the European Green Deal. • Perform empirical analysis in the field of foreign investments in Europe and contribute to the mapping of industrial ecosystems. • Perform empirical analyses in the field of inequality (income, consumption, wealth) and contribute to research activities related to the middle class. • Provide support for and participate in activities related to the Commission’s work on resilience and sustainable and inclusive wellbeing frameworks (“beyond GDP”). • Scientific support to European Commission policy process and decision-making in relation to macroeconomic and fiscal surveillance, with particular emphasis on the European Semester and Recovery and Resilience Facility (RRF) implementation. Also, support to the EC agenda to ensure fair twin transitions and fostering a resilient and innovative society. This is achieved by developing and using a wide range of macro- and micro-econometric models and microsimulation models (GAP, GM, QUEST EUROMOD, EUROLAB, CORTAX, EDGE-M3) as well as nowcasting models. • Characterising the production function used in an input-output macroeconomic model with microeconomic foundations. Characterising firms' foreign input adoption. <p>Relevant for candidates with scientific background, expertise in economics/Bayesian econometrics, DSGE and financial modelling disaggregated analysis, input-output modelling, microsimulation techniques, data science and/or data visualisation. Research and</p>

	<p>policy interests in: development of macro- and micro-econometric models and relevant quantitative methodologies (DSGE models in particular) to be used for economic financial, environmental and social policy analysis and support, as well as for macro-economic policy analysis and for supporting macro-economic projections and forecasting; development and use of micro-economic models to be used for analyses microeconomic impacts of policies, in particular fiscal policies; developments of links between macro and micro models for richer analyses of policy impacts. Strong analytical and communication skills and data handling are essential.</p>
FIELD	PROJECTS DESCRIPTION
<p>FIELD 6 - Digital Transformation and its impacts on society, economy and the environment. Education and skills for the digital, social and green transition.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Mapping the digital industrial ecosystem (actors, activities, relationships,). • Analysing impacts of policies and investments on digital transformation. • Analysing socio-economic impacts of the digital transformation. • Analysis of technical and organisational enablers for European data spaces. • Economic Analysis of the data and platform economy. • Analysis of the role of digital innovation. • Innovation of public governance, digital public services, and modernisation of public administration. <p>Research combining technology and social and economic aspects to understand the impacts and strategic role of digital technologies, data and digital platforms for the economy and society, and to support the modernisation of public sector.</p> <p>Research on education and training (E&T) practices, skills and competences in a life-long learning perspective as well as on automation implications of labour markets and re-skilling needs. Analysis and visualisation of publications, metadata, and metrics with specialised software. Integration with other datasets e.g. policy events.</p>
<p>FIELD 7 - Data science, data processing and analysis (including big data and support to policy), knowledge representation and data interoperability.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Quantum computing and Quantum Machine Learning for analysis of big datasets in the field of Mental health. • Data science for skills intelligence analysis: using data from online job vacancies for analysing emerging skills demands and the task content of jobs in Europe, in collaboration with CEDEFOP. Skills in data science and experience in R, Python, Stata sought. • Algorithmic management of work: studying how the use of algorithms for the coordination of work by companies' impact on work organisation and job quality, and also how could policies increase the transparency and fairness of algorithms at work. Social Sciences background and knowledge/skills on digital technologies, which could assist in the analysis of qualitative data and literature review. • Definition of a shared ontology for Disaster Risk and Crisis Management to support enhanced interoperability across early

	<p>warning systems and knowledge discovery. This effort would contribute to the Epidemic Intelligence from Open Sources (EIOS) system for WHO, DG HERA and ECDC, the Global Situation System for DG ECHO and the Global Disaster Alert and Coordination System (GDACS). It would imply tasks such as ontology modelling using semantic web standards (e.g. OWL, SKOS, XKOS), reviewing and linking to existing ontologies/thesauri and/or developing proofs of concepts for knowledge graphs with labelled-property graph databases (e.g. Neo4j) and the experimentation of large language models (LLMs).</p> <ul style="list-style-type: none"> • Annotation of content from the Daily Flash reports of the Emergency Response Coordination Centre for training of AI event extraction algorithms to systematically track damage and loss. • Digital transformation and the future of European social protection systems: studying how the digital transformation is affecting European social protection systems, and how can European policies respond. Social Sciences background and knowledge/skills on digital technologies could assist in the analysis of qualitative data and literature review. <p>Support to the Project Portfolio INDUTRANS that provides policy support to strengthen the sustainability and competitiveness of EU industrial base helping to bring about the twin green/digital transition and to achieve Open Strategic Autonomy through technological sovereignty in various sectors of society, i.a., energy, space, security, etc. Example of activities: monitoring and analysis of news/information related to: (i) changing dynamics and drivers of key global value chains to help reduce undesired dependencies of the EU on global competitors or third countries, (ii) key players identification and analysis of selected key technologies, (iii) analysis of supply chain disruption types (i.a., natural hazards, industrial hazards, etc.), and (iv) contribution to methodology development related to the above activities.</p> <ul style="list-style-type: none"> • Implementation of Encrypted computing for ML model for pathogens detection. Data breaches have remained relentless, and the data sets leaked have steadily grown. The core reason is that attackers break into servers where confidential data is available. The notion of secure computation promises to keep data always encrypted and protected on servers, even during data processing, so that it is not available to attackers who break in. JRC will be working on pre-existing models of processed genomic data of bacteria (Pathogens detection) for the implementation an end-to-end homomorphic encryption model. • Tracking virus genomic sequences in wastewater would improve community prevalence estimates and detect emerging variants. Recently several advances helped to make this detection easier and with fewer errors. There is a further need to analyze and benchmark the proposed detection methods and validate results. • Genomic fingerprinting for pathogen identification. Microorganisms are the most pervasive life form on the planet. Some of them are beneficial for humans and some are harmful,
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	<p>and it is very important to correctly identify them once encountered in the wild. The current classification methods are based on the analysis of several well-conserved genes. However, sometimes those few genes are unable to provide a clear differentiation signal, and this can cause dangerous misclassifications with associated poisoning and outbreaks. It is needed to provide estimation on how reliable genetic databases are and suggest possible ways to complete them, using a variety of bioinformatics tools, worldwide genomic databases and machine learning methods.</p> <ul style="list-style-type: none"> • Text and Data Mining. Focus on Web Text Mining and unconventional data sources like on-line media and social media. Information retrieval and extraction, multilingual models, framing and persuasion techniques, sources discovery. Media monitoring and analysis in support to policy. Trend analysis and weak signals from news. • Monitoring of energy security in the EU via periodic downloading of energy data from public platforms, and use of these data to produce energy security indicators and their graphical representation, including spatial representations. <p>Relevant to all candidates specialised in data analytics, data science and natural language processing, in various thematic areas, as described (but not limited to) in the projects above.</p>
FIELD	PROJECTS DESCRIPTION
<p>FIELD 8 - Artificial Intelligence.</p> <p>A. General approach.</p> <p>B. AI audit and evaluation, AI risks, Generative AI, Trustworthy AI, AI ethics, AI safety, Human-AI Interaction, fairness, transparency and accountability in AI, EU AI Act and Digital Services Act, including recommender systems and content moderation systems used by very large online platforms and search engines. Evaluation, robustness, cybersecurity and safety of Generative AI.</p> <p>C. Cybersecurity applications of AI,</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Human-AI interaction and social impact of AI. • Evaluation of AI systems, including recommender systems. • Trustworthy AI, including transparency, fairness and accountability of machine learning and recommender systems. • Algorithm-supported decision making. • Data-driven policy making. • Responsible and proportionate adaption of AI in the public sector. • Diversity in AI. <p>Support to the Project Portfolio INDUTRANS that provides policy support to strengthen the sustainability and competitiveness of EU industrial base helping to bring about the twin green/digital transition and to achieve Open Strategic Autonomy through technological sovereignty in various sectors of society, i.a., energy, space, security, etc. Example of activities: monitoring and analysis of news/information related to: (i) changing dynamics and drivers of key global value chains to help reduce undesired dependencies of the EU on global competitors or third countries, (ii) key players identification and analysis of selected key technologies, (iii) analysis of supply chain disruption types (i.a., natural hazards, industrial hazards, etc.), and (iv) contribution to methodology development related to the above activities.</p> <ul style="list-style-type: none"> • Malicious Learning [Backdoors attacks in the wild]. • Use of advanced AI tools for the analysis of multimodal health

<p>applications involving large language models and generative AI text.</p> <p>D. Applied to automatic processing of satellite data with e.g. development of early warning systems.</p> <p>E. AI applications to network analysis and characterisation.</p> <p>F. AI applications to cyber-threat Intelligence.</p> <p>G. AI and Digital Twins</p>	<p>datasets. The trainee will be involved in the team working on this area, in activities such as: Explainability on Large Language Models and their evaluation: anchors, graphs and ontologies; RLHF model fine-tuning on health datasets; Multimodality in context benchmarks and capabilities; Graph conditioned transformers; Quantization of Neural Models.</p> <ul style="list-style-type: none"> • Application of advanced fine tuning methods like: Parameter-Efficient Fine-Tuning (PEFT), Low Rank Adapters~(LoRA) and QLoRA, and Reinforcement Learning from Human Feedback with AI Feedback (RLAIF). • Neurosymbolic AI. Next Generation Artificial Intelligence-Assisted Tools for Excelling Regulatory Acceptance, Global Harmonization and Research Evaluation in the Life Sciences ensuring complex Epidemiological and Toxicological Data streams as input for Pragmatic Frameworks for the Application of New Approach Methodologies in One Health Risk Assessment. • Development and implementation of Artificial Intelligence (AI)-based algorithms for processing and analysing Internet of Things (IoT) and sensor data from smart buildings and infrastructures. The goal is to contribute to the development of digital twins of real-world test cases, simulating the behaviour and performance of physical systems. By leveraging machine learning, data analytics, and IoT platforms, this research aims to advance the field of smart infrastructure management, supporting the EU development and deployment of AI through the creation of more efficient, responsive, and sustainable built environments. • AI-based parcel-level crop yield estimation. The objective of the research project is to develop a cutting-edge AI-based crop yield prediction model at parcel level by leveraging a multi-year archive of crop yield data from over 10,000 French farms and the JRC MARS Meteorological database. The trainee will merge high-resolution Sentinel Copernicus imagery with meteorological data to feed an AI-based yield prediction model. Key tasks include data preprocessing, contributing to developing AI models, and model performance evaluation against both classical machine learning approaches and existing JRC MARS Bulletin forecasts. Essential skills encompass AI and machine learning. The outcome will help to refine the granularity and accuracy of the JRC MARS Bulletin towards high-resolution forecasting capabilities. <p>Trustworthy Artificial Intelligence and transparency of algorithms, applied Artificial Intelligence.</p>
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FIELD	PROJECTS DESCRIPTION
<p>FIELD 9 - Technology monitoring & assessment (evolution, trends, emerging and disrupting technologies); technology foresight; technological sovereignty; strategic autonomy; economic security; value/supply chain analysis; dependency risk analysis; gaps analysis; resilient infrastructure.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Check of alignment with Green Deal principles of all CEN (environmental) standards. • Scientific support to European Commission initiatives supporting the European Industrial Strategy such as the European Chips Act, Net-Zero Industry Act, and Critical Raw Materials Act. <p>Example of activities: analysing the EU's position in global value chains of key technologies for the green and digital transition (e.g. chips for the automotive industry); analysing EU's dependencies and vulnerabilities for critical technologies and the resilience of the EU economy.</p> <p>Relevant for candidates with a background in: science, technology and innovation, engineering, economics, modelling, data management.</p>
<p>FIELD 10 - Public Health including non-communicable diseases; Cross-border health threats, diagnostics and detection; Cancer; Quality assurance; Rare diseases; Zero Pollution; One Health; Risk assessment; New approach methodologies (NAMs); Epidemiology and surveillance.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Chemicals causing Germ Cell Mutagenicity: Desk research on evaluation of data collected for REACH registered chemicals to better understand to which extent mutagenicity in somatic cells might be predicting germ cell mutagenicity and lead to classification. • Supporting the Knowledge Centre on Cancer, namely activities on improving cancer prevention and care and measuring the burden of cancer and other non-communicable diseases. • Systematic review of breakthrough technologies for pandemic preparedness, including for detection and diagnosis. • Applications of AI systems in healthcare and medicine. • Characterisation of innovative medical countermeasures, such as nanovaccines, RNA-therapeutics, antibody therapeutics and nanomedicines. • Research and evaluation of non-animal methodologies to identify hazardous chemicals of concern (e.g. carcinogens, endocrine disruptors, developmental neurotoxicants). • Development and application of chemical exposure and risk indicators for human health using available monitoring data from e.g. IPCHEM. • Qualification of new approach methodologies including organoids and organ on the chip technologies for the hazard assessment of nanomaterials. • Supporting the development of guidelines & quality assurance schemes for cancer care within the European Initiatives on Breast, Colorectal and Cervical cancer. The initiatives aim to improve cancer care across all care processes: screening, diagnosis, treatment and end-of-life care. • Mental health. • Wastewater Surveillance for Public Health (Enhancement of the Encyclopaedia Cloacae for Wastewater-Based Surveillance and Risk Management). The trainee will assist in enhancing the "Encyclopaedia Cloacae" of the EU Wastewater Observatory for Public Health, focussing on wastewater-based surveillance in a

	<p>One Health context. Researching hazards, improving the platform's usability, and collaborating for a broader hazard list are key aspects. The project aims to bolster risk management for reused wastewater in agriculture and urban irrigation, providing a user-friendly and comprehensive resource for informed decision-making in public and environmental health. Contributions will shape sustainable wastewater reuse practices, ensuring safety and well-being.</p>
FIELD	PROJECTS DESCRIPTION
<p>FIELD 11 - Regulatory Science including food and feed safety; Food quality and authenticity; Human nutrition; Analytical chemistry; Medical devices, Advanced materials incl. nanomaterials; Micro(nano)plastics; Novel nicotine products; Chemoinformatics.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • In the field of Allergens: develop a quantitative LC-MS method for the determination of total proteins (milk, egg, gluten) in food samples. • Supporting the revision of the Directive on ceramic food contact materials. The revision foresees the development of test conditions for ceramic bakeware, the extension of the metals analysed (beyond lead and cadmium) and extension to other vitreous materials such as glass and enamel. • Detection methods for agri-food fraud (wine, honey, spices). • FoodOmics. • New Psychoactive Substances. • E-cigarettes. • TOBLAB: laboratory infrastructure to support the fight against illicit tobacco products. • Laboratory based analysis of food, feed and environmental samples: Analytical science covering analytical chemistry including DNA analysis. • Methods for the identification and quantification of nanomaterials in food. • Methods for the identification and quantification of micro(nano)plastics in water or water based media. • Methods for improved characterisation of medical devices. • Case study related to the area of safe and sustainable advanced materials and chemicals. • Knowledge management related to the area of safe and sustainable advanced materials and chemicals. • Support to the development of certified reference materials to monitor chemicals of environmental relevance, residues and contaminants in food, and the origin of animal proteins. Chemicals may include, among others, the classic persistent pollutants (e.g. PFAS), other recognized hazardous chemicals (e.g. endocrine disruptors, pharmaceuticals), micro plastics, but also emerging chemicals. Matrices that may be considered for reference material development are mainly water, soil, food and human samples. The origin of proteins used in feed is a measure against transmissible diseases and certified reference materials containing specific DNA fragments need to be developed to set common and reliable control thresholds.

FIELD	PROJECTS DESCRIPTION
<p>FIELD 12 - Nuclear Science and Technology.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Nuclear fuel cycle (including spent fuel and radioactive waste management); • Nuclear reactor safety - including emergency preparedness and response, security and safeguards security and safeguards; • Structural materials; • Nuclear data; • Decommissioning of nuclear installations and site remediation; • Radiation protection and environmental radioactivity monitoring; • Non-energy applications (in particular nuclear medicine, nuclear for space). • Research and policy support in nuclear science, technology and engineering for energy production and non-energy applications. • Design, construction, operation and maintenance of JRC nuclear installations and infrastructure. <p>Trainees are welcome with background in engineering, physics, chemistry, material science, artificial intelligence, modelling and robotics.</p>
<p>FIELD 13 - Biodiversity, Ecosystem services and Natural Resources.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Biodiversity and Chemicals: Desk research on evaluation impact of chemical pollution on biodiversity, especially due to pesticides use. • Development and application of chemical exposure and risk indicators for ecosystems health using available monitoring data from e.g. IPCHEM. • Project Land, Biomass & Bioeconomy ("PLAN B"). The JRC has implemented a monitoring system to assess the environmental, social and economic sustainability of the EU Bioeconomy. A conceptual framework was developed to assess the sustainability of the EU Bioeconomy. The framework is populated with a set of indicators that were selected to provide information on the condition, performance and trajectory of the bioeconomy as a whole. The trainee will help to develop indicators for the EU Bioeconomy Monitoring System. <p>Relevant for all candidates with scientific background specialised in environmental and agronomic issues, with particular focus on ecosystem services, biodiversity, sustainable resource use as well as food security and agricultural production systems.</p>
<p>FIELD 14 - Climate Change (Adaptation and Mitigation); Sustainable transport (including technologies); Climate neutral cities; Air pollution; Land climate</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Support methodological development concerning i) addressing consumption-based/scope 3 emissions at city level and ii) the role of urban carbon-sinks in addressing residual emissions at city level. • Electro-magnetic Compatibility testing in at JRC Vehicle

measures and carbon farming.	<p>Emissions Laboratory: Laboratory experimental and analytical activities in testing cars and charging infrastructure (wired and inductive charging technology) for Electro-magnetic compatibility.</p> <ul style="list-style-type: none"> • Artisanal small scale gold mining: technology used, source locations, global mercury emissions and implementation of mitigation measures. • Development of statistical models for the estimation of air pollutants and greenhouse gas emissions related to anthropogenic activities at local, regional and global scale. • AI-powered air pollution forecast for Arctic communities: evaluate the socio-economic impacts and support users' engagement. <p>Relevant for candidates with a background in: climate change (adaptation and mitigation), local climate action planning and analysis, sustainable transport (including technologies), climate neutral cities, air pollution, industrial pollution, urban planning, energy efficiency.</p>
FIELD	PROJECTS DESCRIPTION
<p>FIELD 15</p> <p>A. Sustainability characterisation and life cycle assessment of products, facilities, economic activities, and consumption patterns. Economics of the Circular Economy.</p> <p>B. Sustainable Development Goals (SDGs), Territorial Engagement and Sustainable Urban and Rural Development, Sustainable and Resilient Tourism.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Evaluation of patterns of urban and rural development in Europe. It includes both quantitative and qualitative elements to study the sustainability of territorial development in Europe. • Sustainability assessment of economic activities in the frame of the EU taxonomy and of corporate transition plans. • Environmental assessment, environmental economics, use of life cycle assessment for supporting impact assessment of policies. Economic analysis of policies to promote a more circular economy. • Emissions from industry and economic activities. • Sustainable and Resilient Tourism. • Analysis of sector/product circularity and sustainability in support of European Environmental Product Policies. • Mapping of material and product flows in the circular economy • Support to the development of the Raw Materials Information System (RMIS). The traineeship will be focused on Support data collection and analysis needed for the further development of specific RMIS thematic areas and especially in relation to Raw Materials' Profiles and Country Profiles. Support the strengthening of the RMIS knowledge network and in particular the synergies with EU funded projects and other selected stakeholders. <p>Relevant for candidates with a background in: engineering; natural sciences; economics; regional and urban planning; qualitative and quantitative analysis of pollution; environment; sustainability; and/or knowledge of related policies, such as the Sustainable Development Goals (SDGs) including their synergies and trade-offs.</p>

FIELD	PROJECTS DESCRIPTION
<p>FIELD 16 - Security, Cyber-security and Hybrid Threats.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Support to the creation of a Hybrid Threat related incidents database. This may include data collection, incident analysis as well as support to the creation of methodologies for semi-automatic incident classification. • Support the drafting of Hybrid Threat related case studies and analyses. • Support the further conceptualization of Hybrid Threats. Focus is on building resilience against Hybrid Threats and discouraging Hybrid Threat actors from engaging in/escalating Hybrid Threats. • Support the analysis of Hybrid Resilience baselines. • Support the implementation of the directive on the Resilience of Critical Entities, which considerably widens the focus of the current directive on the protection of European critical infrastructure. • Support the protection of Public Spaces by developing tools to assess vulnerability and risk, also applicable for Critical Infrastructure. • Contributing to knowledge management and scientific communication for Disaster Risk Management. • Analysing dynamic risk drivers of humanitarian crisis and contributing to country analysis reports. • Support the Terrorism and Extremism event database. • Cybersecurity applications of Artificial Intelligence (AI) to enhance security, attack detection, and mitigation. • Post-Quantum and Quantum cryptography to ensure secure communication and data protection. • Studies and on field tests concerning Next-Generation Internet infrastructure mapping and resilience. • Studies and on field tests concerning Cyber-threat intelligence gathering and analysis. • Cybersecurity of new-generation digital platforms and virtual worlds. • Studies on new digital computational models and their robustness. • Models for secure and distributed collaborative Edge computing. • Cybersecurity of Industry 5.0, including sector-specific dimensions such as automotive, oil, gas, and health. • Next-Generation attack vectors (hybrid, cyber-physical vectors).
<p>FIELD 17 - Energy: Hydrogen; Natural gas; Biogas and biomethane; E-fuels; Batteries; Digitalisation; Interoperability; Energy efficiency; Renewables; Industrial decarbonisation;</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Hydrogen value chain, to understand hydrogen contribution to the decarbonisation of the energy system. The activities consist in: assessment of the technologies and of their environmental impact (LCA) and/or in experimental activities in JRC hydrogen electrolysers testing laboratory. A strong attention is also given to technology and societal risks, by extracting

<p>Heating and cooling; Innovation and competitiveness; Clean energy supply chains; Energy security and markets; Social aspects; Renovation of buildings; Clean energy infrastructure planning.</p>	<p>lessons learned from JRC hydrogen incident database HIAD.</p> <ul style="list-style-type: none"> • Battery value chain - study of advanced batteries behaviour under real working conditions, to understand the safety and performance behaviour. • Bioenergy and alternative fuels assessment: analysis of different alternative fuel options for transport (road, aviation, waterborne), bioenergy systems providing flexible solutions and intermediate bioenergy carriers (pyrolysis oils, bio-crude, microbial oils, algae oils, etc.). Type: desk top research; data analysis, spatial analysis integrating statistical and geospatial data; Life Cycle Analysis (LCA), and modelling. • Data collection and analysis of decarbonised gases and natural gas. • Foresight studies on future energy demand and supply, and associated infrastructure needs (e.g. hydrogen, CCU/S networks). Spatial assessment of the potential for renewables and optimal RES siting. • Integrated renovation of buildings. • Integrated approach to decarbonise the built environment, including renovation challenges and the new Zero Emission building target through modelling development. • Identify measures to mitigate the emerging growing needs of the ICT sector, including AI. • Applying social and behavioural sciences to Energy Efficiency: behavioural and social implications of energy consumption reduction and the role of shared values in driving sustainable change. • Financing energy efficiency: evaluation of the drivers and barriers towards the EU2030 target. • The use of the Social Climate Fund and other subsidies to support vulnerable citizens in the energy transition. • Security of Supply: we study energy security, resilience and risk preparedness by means of socio-techno-economic models and analyses. • Assessment of Security of Supply via modelling of the EU natural gas transmission network, including its interactions with the electricity transmission network. Clean energy supply chains; EU manufacturing capacities for clean energy value chains. • Digital energy transformation: we test smart grids/homes technologies deployment and interoperability. • Industrial decarbonisation: Contributing to work calculating the CO2 intensities of various industrial products for the Carbon Border Adjustment Mechanism. The trainee will assist work using global industrial data to model the CO2 emissions from products from industrial sectors such steel and chemical production. Specific activities include: i) Identifying input-output relations that drive emission calculation differences, ii) Data analysis and visualisation and iii) contributing to policy-oriented reports. Candidates with knowledge of programming and analysis tools (Excel, Python, etc.) as well as a background in natural sciences/engineering are encouraged to apply. • Photovoltaic Solar Energy Standards and sustainability and characterisation.
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FIELD	PROJECTS DESCRIPTION
<p>FIELD 18 - Security in the digital age: forensic investigation techniques, drones, counter drone systems.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Contribution to the development of multimedia large dataset and the study of multimedia forensic techniques related to image and video analytics, computer vision and signal analysis. Support to the Project Portfolio INDUTRANS that provides policy support to strengthen the sustainability and competitiveness of EU industrial base helping to bring about the twin green/digital transition and to achieve Open Strategic Autonomy through technological sovereignty in various sectors of society, i.a., energy, space, security, etc. Example of activities: monitoring and analysis of news/information related to: (i) changing dynamics and drivers of key global value chains to help reduce undesired dependencies of the EU on global competitors or third countries, (ii) key players identification and analysis of selected key technologies, (iii) analysis of supply chain disruption types (i.a., natural hazards, industrial hazards, etc.), and (iv) contribution to methodology development related to the above activities. • Apply novel techniques of Artificial Intelligence in the field of detection of physical security threats (e.g. drones, robots, visual and audio detection, facial recognition and matching, intelligent perimeter detection, area occupancy, sensor data fusion and decision support systems, chemical/explosives detection, behaviour analysis, etc). <p>Relevant for candidates with a background in one or more of the following areas are strongly encouraged to apply: digital signal processing, computer networks, security, laboratory work, image and video analytics techniques (enhancement, restoration and filtering, segmentation, features and descriptors, etc.), Machine Learning and Deep Learning techniques.</p>
<p>FIELD 19 - Radiochemistry and radioprotection.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Determination of Hard-To-Measure Radionuclides; • Implementation of new automatized analytical techniques for the determination of radionuclides, including MonteCarlo code simulations; • Determination of isotopic ratios for radionuclides environmental impact studies; • Implementation of good radioprotection practices; • Implementation of fast analytical methods for radioprotection purposes.
<p>FIELD 20 - Space, security and defence technologies: Next-generation of wireless communications; systems (e.g. 5G/6G, WiFi); satellite radio navigation (e.g. Galileo and GPS) and communication systems; Quantum technologies.</p>	<p>Examples of relevant projects in this field include, but are not limited to:</p> <ul style="list-style-type: none"> • Simulation and experimental research work on satellite communications (e.g., Starlink, IRIS²); integration of satellite and terrestrial communications systems (3GPP Non-Terrestrial Networks). • Hands-on laboratory work on wireless communications technologies (e.g., 5G, 6G, next-generation WiFi releases,

	<p>vehicular communications systems, etc.) using state-of-the-art instrumentation equipment and research facilities.</p> <ul style="list-style-type: none"> • Desk research and hands-on laboratory work in the field of Global Navigation Satellite Systems (GNSS), such as the European Galileo. The work includes the support in the definition of innovative Galileo services and the study of signals design and optimisation. In addition, specific activities will focus on the radio frequency interference monitoring, in view of improving the overall security and resilience aspect of GNSS receivers. A third aspect will cover the area of Complementary-Positioning, Navigation, and Timing (C-PNT) technologies, aimed at strengthening and enhancing the overall provision of PNT services in EU. All the activities will include a testing phase which will be supported by the “Testing and Demonstration Hub” located in the JRC Ispra campus (https://publications.jrc.ec.europa.eu/repository/handle/JRC137126). This will allow for the on field tests and performance assessment of Galileo/EGNOS satellite navigation platforms as well as demonstration of specific operational scenarios. Testing and evaluation of quantum communications equipment, with particular emphasis to evaluating performance and testing the security of quantum key distribution devices and related protocols. • Theoretical and simulative assessment of quantum communication performance (e.g., quantum transmission, quantum key distribution algorithms) for satellite and fibre based systems. • Investigation of the potential of quantum computing for optimising radio spectrum usage. <p>Candidates with a background in one or more of the following areas are welcome to apply: telecommunications (e.g., wireless communications, computer networks, satellite communications systems, signal processing), electronic engineering (e.g., laboratory work in electronics or photonics), physics and quantum science and related fields.</p>
FIELD	PROJECTS DESCRIPTION
<p>FIELD 21 - Geopolitics, security threats, emerging technologies, societal resilience and anticipation.</p>	<p>Examples of relevant projects include (but are not limited to):</p> <ul style="list-style-type: none"> • Comprehensive geopolitical analyses of technology trends to assess the strategic impact on EU security and resilience. • Studies on societal resilience against security threats in a geopolitical context. • Development and application of methodologies for the early detection of emerging and disruptive technologies that may pose security threats, have a relevance to security and defence, or offer opportunities for enhancing EU strategic autonomy; and assessment of their potential impacts. • Evaluation of EU's technological sovereignty in critical sectors and proposal of measures to mitigate risks from geopolitical dependencies. • Creation of a geopolitical intelligence framework to monitor, analyse, and respond to threats that stem from global geopolitical

	<p>shifts.</p> <ul style="list-style-type: none">• Formulation of policy recommendations for enhancing societal resilience against security threats, including disinformation campaigns, cyberattacks, and economic coercion.• Customisation and application of AI-based tools to extract information from large data streams.• Foresight studies focussed on security & defence, including technology foresight.
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ANNEX II

1. ELIGIBILITY CRITERIA

The JRC reserves the right to amend the eligibility criteria as and when necessary.

1.1 Nationality

Trainees are selected from nationals of the Member States of the European Union (EU) or of the countries associated to the Research Framework Programmes. A derogation based on nationality from the Director-General is required for every non-EU national.

1.2 Diplomas

Candidates must provide copies of diplomas with the relevant Europass Diploma Supplement³ (or if missing - the relevant university transcripts, certificates), of all university or post-university studies declared in the web application. If the degree course has been completed, but an official degree certificate has not yet been received/awarded, an official statement from the university confirming the degree result has to be provided. For declared on-going studies an official declaration from the relevant university must be provided. If recruited for a traineeship, originals/certified copies of all diplomas declared and, if applicable, official certified translations will be required.

Candidates whose university or post-graduate diplomas are not issued in one of the official EU languages must provide a translation of these documents in any of the official languages of the EU but preferably in one of the three working ones (English, French, German).

1.3 Knowledge of Languages

Knowledge of languages other than the mother tongue declared via the web application must be supported by appropriate documentation (e.g. diplomas, certificates, proof of having studied in the language in question, etc.). The candidate must be in possession of the appropriate document by the closing date of the call.

³ For further information about the Europass Diploma Supplement - <https://europa.eu/europass/en/diploma-supplement>

In order for the trainee to fully profit from the traineeship and to be able to follow meetings and perform adequately:

- Candidates from Member States must have a thorough knowledge of at least two Community languages, one of which should be English. The required level is minimum C1 according to the CEFR (Common European Framework of Reference for Languages: Learning, Teaching Assessment).
- Candidates from non-Member States must have a thorough knowledge of at least English. The required level of English is minimum C1 according to the CEFR (Common European Framework of Reference for Languages: Learning, Teaching Assessment).
- Additional language skills might be required in accordance with the requirements of the profile.

1.4 Other

Candidates shall inform the Human Resources of any change in their situation that might occur at any stage during the selection and recruitment phases.

Trainees may not be assigned to any service where a conflict of interest might occur, irrespective of prior professional experience or nationality.