Job description	**Selection code: 328_CRI_BIOALPEC**
Position type and number of positions available	**We are offering n. 7 (seven) non-permanent positions for 4th level Researchers (R4) a for a maximum of 24 months* (or the duration of the project, depending on the start date)* within the BIOALPEC Project ('*Biodiversity of Alpine ecosystems in a changing world*') which includes the following subprojects:** - Project 1 (24 months): The quali-quantitative input of bioaerosol on high altitude environments in the Alpine region: implications for ecosystem functioning, health and biodiversity; - Project 2 (24 months): Uncovering the taxonomic and functional biodiversity across the Alpine hydrographic network affected by climate change and anthropogenic pressures; - Project 3 (18 months): Elucidating alpine flora biodiversity evolution and adaptation to climate changes through comparative genomic approaches; - Project 4 (24 months): Exploring the connection between biodiversity, ecosystems services, zoonotic disease risk in natural and managed forest ecosystem in the Alpine region; - Project 5 (24 months): Population genomics for long-term conservation and management of native alpine animal taxa; - Project 6: (24 months): Trophic relationships underpinning alpine biodiversity resilience to ecosystem and climate change; - Project 7 (12 months): Using metagenomics to investigate microbial communities in alpine ecosystems. The selection process aims to generate short lists for each subproject to hire candidates on a non-permanent (contractual) basis.
Job location with the Fondazione and general manager of the position	Centre for Research and Innovation (CRI). Director: Prof. Mario Pezzotti. * The duration of the contract is limited to the completion of activities pertinent to the specific research project and in any case to the research project itself. Therefore, the start date is negotiable, but the contracts cannot extend beyond the end of the research project.
Minimum requirements for submitting an application	- Master's degree or equivalent in (alphabetical order): agriculture, biology, computational and quantitative biology, evolutionary biology, molecular biology, bioinformatics, biotechnology, botany, ecology, genetics, engineering, mathematics, environmental sciences, telecommunications sciences, forestry sciences, medical and veterinary sciences, natural sciences, or equivalent; - Knowledge of written and spoken English to at least level B2, evaluated during the interview.
Reasons for automatic exclusion from the selection process	There are no exclusions from the selection in relation to the variability of the duration of the contracts. Laws relating to the duration of a fixed-term contract at the same level with the same employer (with some exceptions provided for at the level of collective bargaining) require that a job offer will only be proposed to candidates who have seniority at FEM compatible with the duration of the proposed contract (ie. sum of previous to current fixed-term contracts at the same level of the current contract equal to or less than 36 months).
Background information and description of research projects	These positions are offered within Piano Nazionale di Ripresa e Resilienza (PNRR) initiative, National Biodiversity Future Centre (NBFC, Spoke 3) within which FEM has proposed the project **BIOALPEC**: *Biodiversity of Alpine ecosystems in a changing world.*

BIOALPEC will focus on understanding the evolution, distribution and ecological function of alpine biodiversity from genes to ecosystems, both terrestrial and aquatic, for flora, fauna and microorganisms (including invasive species, pathogens and organismal/soil microbiota). Data will be generated from field studies (eg. biologging, bioaerosols), remote sensing, and innovative 'omics approaches (ie. genomics, metagenomics and metatranscriptomics) applied to minimally-invasive and environmental samples. Models integrating proximal and remote sensing with field and laboratory data, will be used to spatially investigate patterns of biodiversity at different scales, and predict future changes in these patterns, identify species, communities and populations at risk, and estimate the impact of these changes on zoonotic disease emergence under the One Health umbrella, in light of changing alpine abiotic and biotic conditions. These datasets and integrated tools aim to provide mid- to long-term monitoring of alpine biodiversity.

BIOALPEC includes 7 subprojects as specified in section 1 (listing the type and number of vacant positions).

Under the PI's supervision, successful candidates will provide the following expertise:

Project 1: Study of the temporal variations of the types and quantities of airborne biological particulates with particular health and ecological relevance, in high altitude Alpine sites. Field activities will be combined with laboratory analyses aimed at evaluating the diversity and composition of bioaerosol; analytical approaches based on the micro-morphological characteristics of biological particles, and genomic techniques for environmental DNA analysis (eDNA) will be adopted. Data management and processing will also take place in synergy with Project 7.

Project 2: Taxonomic and functional analyses will be conducted along an altitudinal and seasonal gradient in different types of alpine water bodies including deep and high altitude perialpine lakes. In addition to metabarcoding, metagenomic approaches will be used for the determination of metagenome-assembled genomes (MAGs) from bulk and eDNA samples; specific taxa of health and ecological relevance will be studied using a combination of metagenomics and metabolomics (toxigenic cyanobacteria); selected sampling will also be carried out for the early identification of non-indigenous species (NIS).

Project 3: State-of-the-art, large-scale study of Alpine plant biodiversity with whole genome sequencing approaches aimed at: (1) the development and dissemination of bioinformatics tools for the identification of wild plant species based on genomic sequencing data last generation and; (2) computational analysis by means of comparative genomics and molecular evolution methods of organellar genomes of a large and representative taxonomic sample of alpine bryophytes.

Project 4: Study of vertebrate communities (rodents, ungulates, birds) and vector arthropods (including alien species) which represent the main reservoirs of zoonotic pathogens in the forest environment, comparing forest ecosystems with

	a high degree of naturalness with highly anthropized and manipulated systems. By combining field studies with laboratory analyses aimed at evaluating the diversity and composition of the microbiome and pathobiome of vertebrates and arthropods using innovative genomic and metagenomic approaches, innovative risk models will be produced. These analyses will also be conducted in collaboration with the project 7. Project 5: Genetic and genomic studies on species of conservation interest in native alpine fauna, with particular emphasis on ichthyofauna. DNA analyzes will be completed from samples collected in the field or available in our biobanks, including individuals and populations from different areas to decipher their evolutionary history, interpret neutral and adaptive variation and evaluate the implications in terms of risk and for conservation purposes. The results will be transferred to stakeholders in support of conservation and management of native biodiversity, focused on the protection and restoration of local populations, and preserving genetic diversity and evolutionary processes on a microgeographical scale. Project 6: Analysis of space-time trends, and their determinants, relating to the distribution, abundance and movement of populations of terrestrial mammals in alpine ecosystems, obtained from a combination of data deriving from latest generation sensors applied to animals (Bio-logging, Internet of Things, Camera Trap) and historical data. Predictive models of the horizontal and vertical functional relationships of the Alpine terrestrial mammal community exposed to climate and ecosystem change, with particular reference to trophic interactions and competition, parameterized with behavioral, molecular, and isotopic data. Development of summary indices or indicators of the economic value of the complexity of Alpine ecosystems. Project 7: Design and implementation of a metagenomics data management system according to the FAIR (Findable, Accessible, Interoperable, Reusable) protocol. Implementation and management of scalable computational tools for metagenomics data analysis capable of processing and integrating data from various sequencing technologies, including targeted sequencing of marker genes and complete shotgun sequencing with both Illumina and Oxford technology Nanopore.
Duties/tasks	Project 1: The researcher, under the supervision of the PI, will collaborate in the experimental planning, installation of the aerobiological sampling sites, collection and management of samples, preparation and analysis of samples with optical microscopy and eDNA metabarcoding techniques, data management and statistical analyses. Project 2: The researcher, under the supervision of the PI, will collaborate in the experimental design, sampling operations and formalization and consolidation of protocols for the collection of eDNA from different biological matrices in the Alpine hydrographic network. It will also deal with the application of metabarcoding pipelines using specific gene markers (eg. 16S and 18S rRNA, rbcL, COI). The research is also expected to contribute to the analysis of metagenomic data for the determination of metagenome-assembled genomes (MAGs) from bulk and eDNA

samples, and to the statistical analysis of environmental and hydrogenomic data.

Project 3: The researcher, under the supervision of the PI, will collaborate in the conceptual design and implementation of computational pipelines for the identification of species based on genomic data obtained through next generation sequencing, manage and organize large genomic data sets and corresponding metadata, pre-process sequencing data, perform assembly and annotation of organelle genomes, participate in comparative genomics and molecular evolution analyses of large sets of genomic data, upload sequences and corresponding metadata into public databases / repositories, and elaborate and present summaries, reports, graphs and figures of the results.

Project 4: The researcher, under the supervision of the PI, will collaborate in the study of population dynamics of hosts and vectors in the natural environment, contribute to the sampling and data analysis; carry out laboratory analyses (especially of delicate and degraded samples), use different methods of extraction and purification of nucleic acids (DNA and RNA) for vertebrate or invertebrate animals, collaborate in the development of PCR and real-time analytical protocols, collaborate on sequencing analysis, management and analysis of data obtained through Next Generation Sequencing using different approaches; analyse phylogeny and evolutionary inference through the use of different software; collaborate in bioinformatics analyses as applied to population genetics and in the development of risk models.

Project 5: The researcher, under the supervision of the PI, will collaborate in developing the experimental design, obtaining, organizing and managing genomic data (mainly WGS and GBS), producing computational pipelines for bioinformatics analyses, from raw data to interpretation of results. Researchers will also collaborate in the integration of genomic data with morphological, environmental and ecological data, and evaluate the effects of anthropogenic impacts on populations, with particular reference to the processes of introgression with exotic and invasive taxa. Collaboration in the transfer of results to stakeholders will be essential.

Project 6: The researcher, under the supervision of the PI, will collaborate in the management and validation of space-time data, with particular reference to those deriving from latest generation sensors applied to animals. Researchers will also perform statistical analysis of space-time series of individual observations and animal population parameters, in relation to geographic (high resolution remote sensing, eg Sentinel 1 and 2), climatic and economic covariates. As well as stochastic and deterministic modeling of ecological processes of animal communities, the researcher will also contribute to the management and analysis of genomic data obtained through Next Generation Sequencing, to the collection and sampling of empirical data deriving from latest generation animal sensors, and to laboratory analysis of biological samples (DNA metabarcoding), and isotope profiles.

Project 7: The researcher, under the supervision of the PI, will collaborate in the design, implementation and management of a metagenomic data management

	system that meets the requirements of the FAIR framework. They will contribute to the design, implementation and management of computational tools for the analysis of metagenomic data, analyze large metagenomic datasets and report the results. For all researchers, collaboration in the creation of project reports, writing scientific articles, organization of technical-scientific meetings and participation in national and international conferences is expected.
Keywords	Project 1: aerobiology; bioaerosol; environmental botany; land-water-atmosphere interactions; Project 2: ecology, microbiology, metabarcoding, inland waters; Project 3: assembly and annotation of plant organelle genomes; comparative genomics; analysis of next generation sequencing data; Project 4: One Health, biodiversity and dilution effect, zoonoses transmitted by arthropods and vertebrates, including alien species; Project 5: populations at risk, ichthyofauna, hybridization, anthropogenic impacts, conservation units; Project 6: movement ecology, trophic cascades, bio-logging, animal population models, ecosystem services; Project 7: metagenomics, genomics, bioinformatics, data management, data integration.
Selection process	A maximum of **30 points** will be allocated for qualifications while the interview will be worth up to **70 points**. The recruitment process will be based on the total points obtained through qualifications and performance at the interview, the results of which will be used to generate **a short list for each subproject**. The candidate should indicate which project(s) they are applying to as they will be evaluated for inclusion in the relevant ranking(s) of these. At the discretion of the Foundation, (see "*Procedura per la selezione delle risorse umane presso la Fondazione Edmund Mach*"), candidates may be drawn from one subproject short list for another short list if there are no suitable candidates or no suitable candidate accepts the job offer for that subproject.
Topics to be covered during the interview and evaluation process	During the interview, which will be held **in English,** which will begin with a short (10-minute) presentation by each candidate of their education, work experience and aspirations, knowledge in the following fields will be verified (**maximum 70 points**): - Project 1: Principles and techniques of aerobiological sampling. Airborne biological particulate analysis techniques, with particular emphasis on optical microscopy and molecular biology approaches through eDNA analysis. Recognition of the main anemophilous plants and related pollen. Statistical analysis of environmental and ecological data. - Project 2: Methods for the analysis of eDNA in water and sediment samples. Main approaches used for the analysis of metabarcoding data using specific genetic markers; microbial communities (bacteria / cyanobacteria and protists / phytoplankton); macroinvertebrates. Statistical analysis of environmental and ecological data, and of data obtained from the high throughput sequencing analysis.

	- Project 3: Computational programs and methods for genome assembly of plant organelles with Illumina data. Computational programs and methods for annotating the genome of plant organelles. - Project 4: Basic knowledge of population ecology; microbiology; molecular analysis methods; computational methods for determining genetic diversity; data analysis methods related to sequence analysis (Sanger and / or NGS) and phylogenetic analysis - Project 5: Principles of conservation genetics and genomics of populations evolutionary biology, wildlife management and conservation practices with particular emphasis on ichthyofauna, bioinformatics techniques, NGS data processing. - Project 6: Behavioral and functional processes of alpine ecosystems, with particular reference to terrestrial mammals. Mathematical and statistical models for animal movement. Demographics and dynamics of animal populations. Spatial-temporal data processing and management. Next-generation animal sensing. - Project 7: Principles and implementations of the FAIR (Findable, Accessible, Interoperable, Reusable) framework for sequencing data. Computational analysis tools and methods for metagenomic data. Bioinformatics techniques for processing NGS data. Evaluation criteria for the interview: Scores will be assigned to candidates by the Commission according to the following criteria: up to a maximum of 20 points will be attributed to the presentation by the candidate of their personal research profile (0-5 points: vague and not very articulated; 5-15 points: informative, well-articulated and effective; 15-20 points: extremely effective presentation); up to 50 points will be attributed to the interview on the subproject(s) selected by the candidates by assessing the candidate's knowledge of the subjects indicated above for each project (0-10: poor knowledge of the relevant topics and limited ability to communicate orally; 10-20: limited knowledge of some topics with sufficient ability to communicate orally; 20-30: knowledge of most topics and moderate ability to communicate orally; 30-40: good overall knowledge of the topics and strong oral communication ability; 40-50: excellent knowledge of the topics with very strong oral communication ability). The evaluation will be expressed in points only and the candidate must reach a minimum evaluation at the interview of 40/70 points to be ranked in the shortlist.
Pre-selection criteria and evaluation of qualifications	On the basis of the information contained in the application form (please use the form available on the web page of this announcement), integrated at the discretion of the Commission contained in the curriculum vitae, candidates with a minimum score of 10 out of **30 points** will be admitted to the interview phase. The evaluation of qualifications will be as follows: - Tertiary education in the topics covered by the subprojects as indicated in the boxes "Keywords" and "Description of the research work" (**up to a total of 16 points, i.e.: up to 10 points for a Master's thesis with topic relating**

	to those of the selected subproject(s); up to 6 points for a PhD in the topic(s) of the selected subproject(s); - Research experience (including years of doctoral work even if the PhD is not completed) in the topics covered by the subprojects as indicated in the boxes "Keywords" and "Description of the research work" (**0.2 points per month of experience, up to a maximum of 6 points**); - Scientific publications in the topics covered by the subprojects as indicated in the boxes "Keywords" and "Description of the research work" (**0.5 points for each publication with IF / peer-reviewed, up to 6 points**); - Oral communications at scientific conferences on the topics covered by the subprojects as indicated in the boxes "Keywords" and "Description of the research work" (**0.5 points for each international conference; 0.25 points for all other types; up to a maximum of 2 points**).
Language assessment according to the Common European Framework of Reference for Languages (CEFR): level of knowledge required	Knowledge of English will be verified at interview on a technical or scientific topic and must be equal to or exceed level B2. Definitions of levels can be found at the following link: https://www.coe.int/en/web/common-european-framework-reference-languages **If during the interview it is ascertained that the candidate does not possess the knowledge of English at the minimum level, they will be excluded from the selection.**
Methods and deadlines for communication of date and place of the interview	Those candidates admitted to the interview phase will be notified of the date and place at least 10 days before the interview takes place using the same e-mail (NO PEC) used by the candidate to send the curriculum and the application (Annex A). The interviews will be held at the Fondazione E. Mach at San Michele all'Adige (TN) or via videoconference. At the interview, each candidate must present a valid photo identification or send a scanned copy in advance if the interviews is to take place via videoconference. If candidates fail to present themselves for the interview in person or via videoconference, or if they are late (without a valid motivation) they will be automatically excluded from the selection process
Gross annual remuneration	Contract type: CCPL Research Foundation Personnel (https://trasparenza.fmach.it/Amministration-Trasparente/Personale/Contrattazione-collettivo/CCPL-Personale-Fondazioni-di-Ricerca): for a fourth level Researcher, the current gross annual remuneration is Euro 34,563.94.
Deadline for presentation of applications and deadline for the conclusion of the recruitment procedure	Applications must be received **no later than 11:59 pm** (the date and time of receipt indicated in the Foundation's e-mail account will be taken as proof) **on September 22, 2022.** The recruitment procedure will be completed by March 22, 2022 at the latest.
How to submit an application	Applications to participate in the selection must be sent in electronic format to the email address (**not certified email address, a.k.a. PEC**) curricula@fmach.it , indicating the recruitment code **(328_CRI_BIOALPEC – R4)** in the subject of the message and **must consist of:** - **the application form (Annex A)**, using the form available on the webpage announcement: this should be saved with the file name and extension: **Surname**

	First Name _Application.pdf. The application must be completed in full, with no references to other attached documentation and/or information; - the candidate's **curriculum vitae**, saved with the file name and extension: **Surname First Name_CV.doc or .pdf**; - **a copy of a valid identity document with photograph**. Any person encountering difficulty in submitting the application due to disability is invited to contact +39 0461 615542.
Proof of documentation required for hiring and relative deadlines	At least 10 days before the start date of the non-permanent contract, the candidate must provide the following original document, or the offer will be cancelled: • Master of Science (or equivalent) certificate.
Results of the selection process	The results of the selection will be communicated by: - **publication of the shortlist of suitable candidates** on the webpage dedicated to the present recruiting announcement, with the details of rank, surname and name; the publication of the candidate's name in the list of suitable candidates is not subject to confidentiality regulations; therefore, the candidate can not request that their name be removed from this list; - at the end of the selection procedure, **all candidates** will be notified **by individual email** (not certified email, a.k.a. PEC) as to whether they are included in the shortlist of suitable candidates or not; this email will be sent to the contact address used by the candidate to send their curriculum vitae and the application.
Hiring conditions and categories covered by Law 68/99	The Fondazione E. Mach operates in compliance with current legislation concerning fixed-term contracts. Candidates are invited to state whether they belong to the categories referred to in Law 68/99, and to indicate this in the curriculum vita sent in application for recruitment.
Company welfare and benefits at current date	1. *Family Audit* certified company, with flexible working time and human resources management policy, for the wellbeing of the employees and their families; 2. In-house dining hall and coffee shop in San Michele all'Adige, as well as a payment card for meals taken in registered non-company facilities, with the value of Euro 6.00 per meal; 3. Bike-sharing facilities and free car park within the San Michele all'Adige campus and at peripheral locations; 4. Free "Education Roaming (Eduroam)" WiFi on the San Michele all'Adige campus (90% coverage) and in facilities of other entities affiliated with GARR for the Wi-Fi service; 5. Employee discount for the purchase of products from the Edmund Mach Winery sales point; 6. Staff sports club, with discount for members and promotions of sport-recreational activities (on-campus gym); 7. Internal market of agri-food products prepared by FEM highschool students.
Privacy policy	In accordance with Article 13 of the EU General Data Protection Regulation 2016/679 ("GDPR" or "Regulation"), and in general with the principle of transparency set out in this Regulation, the Fondazione E. Mach provides information on the processing of personal data on the webpage "**Privacy Policy**".

	The Foundation reserves the right to request documentary proof of the qualifications listed by the candidate considered suitable for the post offered. The candidate takes full responsibility for all information included in the application form and in their curriculum vitae. The Foundation reserves the right to require that the candidate considered suitable for the post provides documentary proof of the qualifications they have listed.

This Recruiting Announcement is issued in compliance with equal opportunities between men and women for access to employment, under Law no. 198 of 11 April 2006 “Code of equal opportunities between men and women, under Article 6 of Law no. 246 of 28 November 2005”.
The candidate may identify their gender prior to the tests and/or interview.
For any matters not covered by this Recruitment Announcement, reference should be made to “**Procedure for the recruitment of human resources at the Fondazione Edmund Mach**”.

Original signed by
Ing. Mario Del Grosso Destreri
Director General
Fondazione E. Mach