

2021 WORK PROGRAMME

IA-BIODIV CHALLENGE

"RESEARCH IN ARTIFICIAL INTELLIGENCE IN THE FIELD OF BIODIVERSITY"

Call for proposals closing date
31/08/2021 at 5.00 PM (CEST)

Documents et procédures
<http://anr.fr/Challenge-IA-Biodiv>

KEYWORDS

Artificial intelligence: generic programming, heterogeneous data, knowledge representation & reasoning, learning, combined methods, performance evaluation

Biodiversity: models and predictive indicators, functional and dynamic diversity, genetic diversity, species, natural habitats, ecosystems, environment, connectivities, interactions

CALL SECRETARIAT

IA-Biodiv@anr.fr

ANR RESEARCH CHALLENGE CALL FOR PROPOSALS

ANR “research challenges” are thematically targeted programmes. They involve a single call for proposals and aim to explore a range of scientific and/or technological approaches simultaneously. These approaches are proposed by the selected projects in relation to a single set of objectives or research questions defined in the call for proposals.

Over the course of the challenge, the work of the different consortia is reported during annual evaluation campaigns. These consist of a comparative presentation of the results the consortia have obtained, based on a set of metrics defined jointly in advance.

IMPORTANT

The IA-Biodiv Challenge call for proposals is funded jointly by ANR and AFD.

This call is open to two types of consortia:

- French consortia according to the rules defined in the terms of participation for consortia applying for ANR funding¹. Funding of these projects will be provided by ANR. Three consortia will be funded with a maximum grant amount of €500k per project.
- consortia involving at least one of the AFD’s African partner countries according to the rules defined in the document “Terms of participation for international consortia”. Funding of these projects will be provided by Expertise France on behalf of AFD.² Two consortia will be funded with a maximum grant amount of €650k per project.

This call is open to proposals involving at least one French public research body (knowledge spillover and research organisation or facility laboratory eligible for ANR funding)³ (see section 3.2 “Eligibility”) in each consortium.

All candidates are advised to regularly consult the information published on the call for proposals web page.

No additional elements of the proposal will be accepted after the deadline for the call for proposals.

The lead scientific coordinator of each admissible proposal will be interviewed (see section 3 “Review of the proposals ”). These interviews will take place on a date to be announced when the call closes.

¹ See document: “Modalités de participation pour les consortiums français sollicitant une aide de l’ANR”

² The international consortiums selected in the frame of the ANR’s call for proposals will be contracted and financed by Expertise France.

³ This includes public law entities established in France engaged in research and knowledge transmission activities and private law entities engaged in research and/or teaching activities that have an establishment or branch in France, excluding commercial companies.

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1. CONTEXT AND OBJECTIVES OF THE CHALLENGE

1.1. CONTEXT

To close the “AI for Humanity”⁴ day of debates held in Paris on 29 March 2018, the President of the French Republic presented France's vision and strategy for Artificial Intelligence. A national programme to make France a leading country for Artificial Intelligence (AI) was then launched, with a major research component⁵.

The Villani report “Donner un sens à l’Intelligence Artificielle : pour une stratégie nationale et européenne”⁶ (“For a meaningful artificial Intelligence: towards a French and European strategy”) identifies four priority sectors posing major public-interest challenges: health; transport and mobility; defence and security; and the environment. With regard to the environment in particular, “France must take the lead in AI and the environment” to develop solutions that will serve the ecological transition (ecosystems, climate change, biodiversity etc.).

France’s National Biodiversity Plan published on 4 July 2018 has the overall objective of “Reconquering biodiversity, a question of survival for our societies”. One of the plan’s actions is to develop research and knowledge about biodiversity, with goals including defining integrative indicators to quantify and map the state of biodiversity. At international level, important milestones are approaching, including COP15, the Conference of the Parties to the United Nations Convention on Biological Diversity (CBD), which was initially scheduled for 2020 and should now take place in China in 2021. The COP will include discussions about each state’s biodiversity commitments over the coming decade.

Knowledge about biodiversity and its evolution is both a stimulating field for applying AI research and a major scientific and societal challenge. AI can make significant contributions with new dedicated solutions involving complex systems that incorporate heterogeneous elements and information. Faced with this heterogeneity of data, data sources and their characterisations, although the conventional statistical or stochastic approaches used in biodiversity studies propose probable trends for the evolution of systems, they offer no way of detailing the underlying mechanisms or understanding or predicting the effectiveness of suggested avenues of management or public intervention. Finding a solution to this limitation is especially urgent in order to respond to the unprecedented biodiversity decline now threatening environmental and societal balance at a global level⁷.

⁴ <https://www.aiforhumanity.fr/>

⁵ <https://www.enseignementsup-recherche.gouv.fr/cid136649/la-strategie-nationale-de-recherche-en-intelligence-artificielle.html>

⁶ <https://www.enseignementsup-recherche.gouv.fr/cid128577/rapport-de-cedric-villani-donner-un-sens-a-l-intelligence-artificielle-ia.html> English version: https://www.aiforhumanity.fr/pdfs/MissionVillani_Report_ENG-VF.pdf

⁷ <https://ipbes.net/news/Media-Release-Global-Assessment-Fr>

Among the measures in the French National Artificial Intelligence Research Strategy⁸ presented on 28 November 2018, the Ministry of Higher Education, Research and Innovation and the Secretary of State for Digital Technology announced the launch of an artificial intelligence challenge focused on sustainable development by the French National Research Agency (ANR) in partnership with the French Development Agency (AFD), with a donation from Facebook AI Research. The overall investment will amount to €4.8 million.

The challenge, titled IA-Biodiv, aims to support artificial intelligence research in the field of a common asset to be protected and reconquered: biodiversity.

As stated in the National Biodiversity Plan, France, with its presence in five oceans, has a particular responsibility for preserving biodiversity in the marine environment. The actions planned in this area include creating new protected marine areas, protecting coral reefs and extending protected natural spaces on coasts. In line with these ambitions, the IA-Biodiv challenge will focus on funding biodiversity research projects in coastal marine environments in the Mediterranean and Pacific regions.

The IA-Biodiv challenge is intended for scientific communities in AI and biodiversity in France and AFD's partner countries in Africa. The international consortia will be funded by Expertise France (mandated by AFD) under the terms of participation for international consortia (available on the call for proposals web page).

1.2. OBJECTIVES AND SCIENTIFIC AND TECHNICAL SCOPE OF THE IA-BIODIV CHALLENGE

The challenge aims to develop AI research for better exploration and exploitation of biodiversity data. Nowadays, biodiversity monitoring and management is based on indicators constructed mainly on field data without always being able to transcribe the complexity of ecosystems, interactions and feedbacks that play out, non-linear trajectories, threshold effects or even magnitude of the effects. These indicators are also mobilized within the framework of international initiatives such as Ipbes and the CBD in order to assess the state of biodiversity and ecosystem services or progress in the conservation and sustainable use of biodiversity. The complexity of ecosystems, their interactions and the feedback loops at play is very difficult to address with indicators that often struggle to incorporate more than two influencing factors at a time. Moreover, the heterogeneity of the field data available leads to pragmatic choices of simplified indicators (often based by default on single occurrences or calculations of mean species abundance (MSA), species richness or phylogenetic diversity).

This question is central to the concerns of the scientific community in ecology:

“Since the 1990s, several international conventions and many public policies have called for the production of ecological indicators. As it is not possible to characterise all the dimensions of an issue such as biodiversity or the functioning of an ecosystem, indicators are limited to a few aspects of reality and proceed through approximation based on the data available. Ecological indicators have a pragmatic goal: they reduce the environment’s complexity to a simple form that is easy to monitor routinely and can be used to guide action. They are management tools for exploring reality, but they also incorporate a normative viewpoint. As public decision-makers now give indicators a

⁸ http://cache.media.enseignementsup-recherche.gouv.fr/file/strategie_IA/60/7/mesri_IA_dep_A4_09_1040607.pdf

role in evaluating the performance of public action, it is important to analyse the framing they introduce. This involves questioning their foundations and the processes that led to their creation. But it is often difficult to challenge indicators that are well-established in practical use. The professionals who use them on a routine basis hesitate to call their working methods into question. Conversely, anyone who considers that these indicators do not do justice to reality struggles to construct a supporting argument, because they do not have enough data to challenge the existence of these indicators. In other cases, the indicator that would demonstrate the condition of a situation or problem does not exist.” (Bouleau and Deuffic, 2016) ⁹

The research of the selected consortia should thus cover the design of new AI methods that will firstly improve the reliability and precision of current indicators and models (integrating all the available data), and secondly introduce new indicators and instruments for predicting the evolution of biodiversity, based on AI.

One of the challenge’s priorities is to bring the AI and biodiversity communities together in a dynamic of collective thought where multiple disciplines of knowledge meet. The challenge will be coordinated by a third-party assessor, the Operational Consortium (COpé, see section 1.3 “Organisation and process of the IA-Biodiv challenge”) through annual meetings that aim to characterise and share the AI solutions being considered and encourage inter-project sharing.

SCIENTIFIC OBJECTIVES

The IA-Biodiv challenge is fully aligned with the French AI Plan, and thus aims primarily to address current AI research bottlenecks. The research effort must also focus on research issues in biodiversity and, more concretely, the following question:

“What predictive models can be constructed and how can more powerful indicators be developed to predict and evaluate the evolution of biodiversity under the constraints of climate change and/or anthropic activity?”

This global question is divided into three broad categories of scientific objectives applied to the field of biodiversity: adaptation and optimisation of existing AI methods to the specificity of biodiversity data, design of new AI models and the hybridisation of different AI models.

The funded research will concern the coastal marine environment, first in the Mediterranean and then in the Pacific. This focus on two geographical areas studied successively, potentially with different types of data, will enable the teams to test how far the solutions explored can be generalised (see section 1.3 “Data sets in the IA-BiodivNet virtual research environment”).

Objective 1: designing AI methods optimised for biodiversity research

The AI research objective is to design:

- explainable methods (e.g. by considering approaches based on reasoning about structured data and knowledge representation) or at least interpretable methods by experts in the field (ecologists, biologists etc.), for example by visualising the input data that led to the final decision (LIME, Grad-CAM, Deconvolution etc.),

⁹ Translation of the original text : <https://doi.org/10.4000/vertigo.17581>

- methods requiring as few costly annotations as possible, possibly considering (inter)active learning approaches, transfer learning, domain adaptation and optimal transport, budget learning and all the variants of zero-shot/one-shot learning, self-learning etc.
- incremental methods enabling the expert in the field to be kept at the heart of the decision-making process. To achieve this, the incremental methods must be able to adapt to dynamic changes in the input data (spatial, temporal or functional evolution or changes through interactions with the user), accounting for simultaneously different levels of analysis (for instance using game theory methods).

Objective 2: designing models and predictive indicators for biodiversity research

The goal is to help advance knowledge in the field of biodiversity, including the predictive or functional modelling of systems and ecosystems and the possibility of producing predictive indicators by exploring AI solutions.

From an operational viewpoint, the indicators studied should be useful for decision-making in the management of biodiversity and the factors that influence it. From a functional viewpoint, they must account correctly for the complexity of the biological world considered in isolation and in its interactions and feedback with climate change and human activity. Within the same practical objective, they must remain simple and comprehensible (user transparency, limiting the black box effect), robust and reproducible (transposable between different ecosystems and ecological contexts). It is important that they include a “state of biodiversity” component of biodiversity (e.g. most *Essential Biodiversity Variables*, EBV, based on inventories and counts) and can offer a predictive view of the effects of an intervention, whether it is deliberate (e.g. environmental policy) or not (e.g. anthropic activity), identify the positive or negative impacts and highlight the traces.

The models underlying the production of these indicators arise from the scientific challenges specific to the field of biodiversity. AI solutions should enable considerable progress by focusing specifically on (see Figure 1 – Representation of objectives 1 and 2 of the IA-Biodiv challenge from the biodiversity viewpoint):

1. predictive models and indicators (dynamic approaches, inclusion of exogenous and endogenous influencing factors, pathways to extinction, regeneration etc.),
2. assembly models (including models of interaction, competition, cooperation and feedback),
3. network analyses (including geographical and ecological connectivities, links to predictive models),
4. predictions of the ecological state of ecosystems and/or genetic diversity.

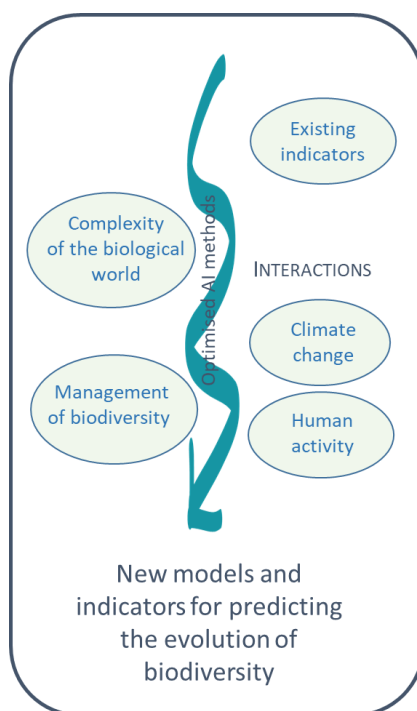


Figure 1 – Representation of objectives 1 and 2 of the IA-Biodiv challenge from the biodiversity viewpoint

Objective 3: designing hybrid AI models

The aim here is to concentrate on reasoning-based approaches using structured data (a knowledge representation) and machine learning approaches using unstructured data. The AI research questions in this context go beyond meta-learning or relational machine learning. All three dimensions of AI research should be considered: symbolic approaches (knowledge driven), subsymbolic approaches (data driven) and combined methods. The consortia must therefore take all three types of AI research approaches into account in their proposals and consist of teams with expertise in all three approaches (see Figure 2 – The three types of AI research approach in the IA-Biodiv challenge).

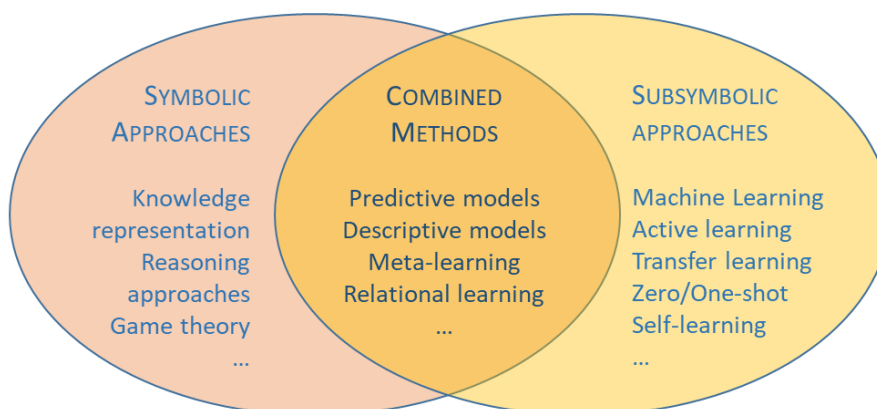


Figure 2 – The three types of AI research approach in the IA-Biodiv challenge

The consortia are expected to present how they see the three AI research approaches working together from both theoretical and operational viewpoints.

The consortia are also expected to describe in their proposal how scientific communities in AI and biodiversity can respond together to the three objectives described above and to the major priority of the challenge: developing predictive or functional models of systems and ecosystems and producing synthetic predictive indicators.

Finally, consortia are expected to document the carbon footprint of the AI technologies and methods they will develop.

CONSTITUTING LONG-TERM DATA SETS

One of the main priorities of the IA-Biodiv challenge is to constitute long-term data sets that can serve as a reference for current and future AI research in the field of biodiversity. The challenge thus aims to share the data and the technological progress that will be developed. With this in mind, a virtual research environment, “IA-BiodivNet”, will be set up (see Figure 3 – IA-BiodivNet research environment).

The IA-BiodivNet virtual research environment will host data sets, the AI modules developed by the consortia and the evaluation modules (knowledge bases, test data produced and methodologies developed) put in place by the COPé. The consortia will have to take part in the joint construction of this working environment.

As far as possible, the contents of IA-BiodivNet (the data, modules and tools developed) must satisfy the FAIR principles¹⁰ (they must be Findable, Accessible, Interoperable and Reusable). The contributions to the challenge from the consortia (data sets and technology components) will be covered by open access licence (see section 5.1 “Licences”) and made available on IA-BiodivNet.

IA-BiodivNet will constitute the collaborative workspace for all the teams taking part in the challenge throughout its duration (four years). It will be set up in the first year of the challenge and will ultimately be shared with all interested communities. Integrated into the French National Biodiversity Data Centre (Pôle National des Données de Biodiversité - PNDB)¹¹, it aims to contribute to international information systems, in particular the Global Biodiversity Information Facility (GBIF)¹².

¹⁰ <https://www.ouvrirelascience.fr/fair-principles/>

¹¹ <https://www.pndb.fr/pages/en/>

¹² <https://www.gbif.org/>

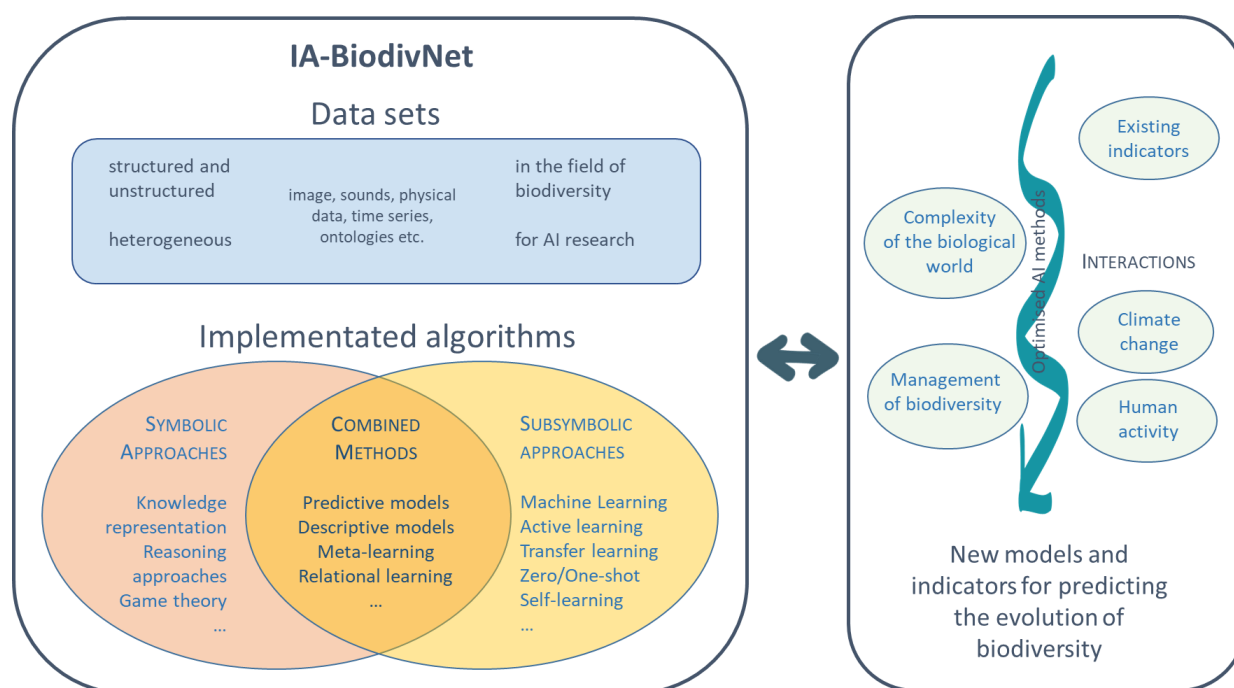


Figure 3 – IA-BiodivNet research environment

The consortia are expected to describe their contributions to the IA-BiodivNet virtual research environment (providing source data, enriching the data sets made available, developing tools and operational modules, enriching the content based on operational modules etc.).

1.3. ORGANISATION AND PROCESS OF THE IA-BIODIV CHALLENGE

The IA-Biodiv challenge is based on three pillars: scientific coordination, evaluation of AI systems and the IA-BiodivNet virtual research environment. As the central player, the Operational Consortium (COpé) manages the organisation and process of the challenge.

Its activity is dedicated to scientific coordination in collaboration with the selected consortia, preparing the evaluation campaigns, constituting data sets and developing and maintaining the IA-BiodivNet environment. It will take care of making the IA-BiodivNet virtual research environment and the associated testing instruments available. As a trusted third party, the COpé will also assist ANR in the task of supervising the challenge.

Collaboration will be maintained throughout the IA-Biodiv challenge between the consortia, the COpé and the IA-Biodiv challenge steering committee¹³ to establish and adjust the conditions for evaluating the approaches and monitoring the work and the actions taken.

STRONG COORDINATION TO ENCOURAGE JOINT CONSTRUCTION

The Challenge will create opportunities to compare and share ideas, approaches and work between the consortia. One of its priorities is to encourage the establishment of common frames

¹³ The IA-Biodiv challenge steering committee is made up of funding partners from participating consortia and scientific experts in the field of research.

of reference between the scientific communities in AI and biodiversity, facilitating collective thinking. The COpé will be responsible for organising meetings and interactions between the consortia.

Annual collective inter-consortium meetings will be organised during the challenge to establish cooperation between the participating consortia and enable a comparative characterisation of their work. Organised by the COpé, these meetings will bring together the selected research consortia and the organisers (funding bodies and COpé). At least the project coordinators from each consortium will be required to attend, and the presence of the people responsible for specific work package is recommended. Depending on developments and evolution within the programme, these events may also involve other consortium participants. Each meeting will serve as a preparatory workshop for the following cycle, in which the consortia will have a lot of work to do. A list of consortium meetings is presented below in section 1.3 “Provisional schedule of regular events”.

For better interaction between the consortia, a confidentiality agreement will be put in place. Its purpose will be to establish and facilitate the sharing of results and encourage a climate of cooperation between all the parties involved in the IA-Biodiv challenge.

The consortia are expected to set out in their proposals how they intend to incorporate this interdisciplinary inter-consortium and intra-project coordination function, emphasising the added value it represents for the progress of the proposed solutions.

CYCLICAL EVALUATION

The progress of the work is measured throughout the challenge and during meetings. Evaluation periods are scheduled when the consortia will have to carry out certain precise tasks, taking care to ensure the experiments carried out are repeatable and reproducible. The IA-Biodiv challenge is organised into four successive annual evaluation cycles (see Figure 4 – Graphical representation the cyclical organisation of the IA-Biodiv challenge and types of data).

IA-Biodiv challenge			
Cycle 1 “preparation”	Cycle 2	Cycle 3	Cycle 4
Coastal marine environments			
Mediterranean		Pacific	
12 months	12 months	12 months	12 months
T0			T0+48

Figure 4 – Graphical representation the cyclical organisation of the IA-Biodiv challenge and types of data

Cycle 1, which corresponds to the first year of the challenge, will be devoted to defining the evaluation process that will be implemented during the remaining cycles. This first preparatory cycle, also known as the dry run, begins on the date when the participating consortia receive their funding. Cycle 1 is based on a joint construction approach. It will draw on collective thinking and mutual encouragement to ensure that the evaluation mechanisms and metrics are suited to the

constraints and objectives of the challenge. These mechanisms must take into account the need to compare and evaluate appropriately the performance of the different AI approaches and solutions proposed. The initial preparatory cycle will be highly reflective, and will be supported and coordinated by the COpé. The evaluation tasks will be defined in collaboration with the consortia during the first phase and/or the annual meetings.

A significant result of cycle 1 is the COpé's publication of detailed protocols for interaction, evaluation and self-evaluation that will be applied in the following cycles of the challenge. This will result in collegiate, interactive working methods, in place by the end of the first year, that will encourage the exchange, sharing and comparability of work. This mechanism for interaction and coordination between projects is an integral part of the challenge's objectives, and must be taken into account in the proposals submitted.

Cycles 2, 3 and 4 will mark the beginning of the collective work devoted to the comparative production of AI solutions for predictive models and simplified indicators. Each successive annual cycle will be informed by collective meetings of preparation and of reporting, individual work period and evaluation/testing campaigns.

The COpé will be responsible for the technical specifications of the challenge, which will be established jointly with the research consortia. They will be described in a document setting out general terms during the first year and updated throughout the programme.

DATA SETS IN THE IA-BIODIVNET VIRTUAL RESEARCH ENVIRONMENT

The IA-BiodivNet virtual research environment will host data sets provided by the COpé and the evaluation modules (knowledge bases, test data produced and methodologies developed) put in place by the COpé, the third-party assessor.

The Challenge data sets will be integrated into the IA-BiodivNet virtual environment:

- Structured, unstructured and heterogeneous data (images, sounds, physical data, time series, ontologies etc.);
- Data from various sources (sensors, *in situ*) that are sufficiently documented (qualification to be planned based on existing standards);
- Occurrence, trait and interaction data;
- Context and impact data (physical and human geography, environmental conditions, climate factors, anthropic or other disturbances etc.).

The metadata will ensure that the uncertainty of results can be evaluated accurately at every stage of analysis (and transferred down the chain).

The data will come from coastal marine environments (limited to a 200 nautical mile strip), incorporating possible interactions with the adjacent deep-sea environments and land areas. The data sets will come from the Mediterranean and then the Pacific. This change of geographical zone and data type will enable the teams to test how far the solutions explored can be generalised.

The call for proposals web page will be updated regularly as additional data sets are made available through the Challenge.

All the data sets used by the consortia during the challenge to improve the processing modules must be shared with the other consortia and made available via IA-BiodivNet. IA-BiodivNet will also host the data sets proposed by the consortia and the AI modules developed as part of the Challenge. The consortia will thus help to co-construct the working environment. These contributions to the challenge (data sets, metadata and technology components) will be under open access licensing and made available on IA-BiodivNet by the consortia themselves (see section 5.1 “**Erreur ! Source du renvoi introuvable.**”). Training will be provided by the COpé to supervise the practical aspects and present rules for sharing and integration in the virtual research environment.

The virtual research environment will enable the consortia to access the computing resources of the GENCI (see section 2.2 “French Very large research infrastructure (TGIR)”) with technical support from the COpé.

PROVISIONAL SCHEDULE OF REGULAR EVENTS

Regular events will be organised and scheduled on a cyclical basis. At least the lead scientific coordinators of each project and the people responsible for the tasks described in the proposals must attend. The events will take place in France, in Paris or Montpellier, and potentially remotely.

A precise schedule of challenge events will be announced by the challenge launch date at the latest. In each cycle (and thus each year), the events to which the consortia are invited are:

- The two-day cycle launch meeting, held in Paris in the second month of the cycle. This collective inter-consortium launch meeting will be organised and facilitated by the COpé.
- One day bilateral consortium–COpé events, held in Paris at the COpé’s premises. During cycle 1, there will be two of these events, one in month 4 and one in month 9 of the cycle. During cycles 2, 3 and 4, a single event will be organised in month 6 of each cycle. These meetings with each consortium will be organised and facilitated by the COpé.
- The evaluation period, lasting approximately a week, facilitated within each consortium by its coordinator. The timing of the evaluation period will be set by the COpé between months 9 and 10 of each cycle, but each consortium will be able to choose its own evaluation week.
- Each cycle’s one-day closing meeting, followed by a two-day seminar. This collective inter-consortium closing meeting will be organised and facilitated by the COpé in Montpellier in month 12 of each cycle.

The following table (see Figure 5 – Summary table showing the requirements of the funded consortia) summarises the meetings and the requirement periods of the consortia in each cycle:

		Cycle 1	Cycle 2	Cycle 3	Cycle 4
Launch meeting (2d/Paris)		Month 2	Month 2	Month 2	Month 2
Bilateral consortium–COpé meetings (1d/Paris)		Month 4 and Month 9	Month 6	Month 6	Month 6
Closing meeting + Seminar (3d/Montpellier)	Closing meeting (1d/Montpellier)	Month 12	Month 12	Month 12	Month 12
	Seminar (2d/Montpellier)				

Figure 5 – Summary table showing the requirements of the funded consortia

N.B. For all these meetings organised by the COpé, each consortium's team is responsible for the expenses (travel, accommodation, catering) of each participant. These costs are eligible for the funding allocated to the consortium. They should thus be provided for in the budget request in response to the call for proposals.

2. PROJECT PROPOSAL SUBMISSION PROCESS

2.1. WHO CAN SUBMIT A PROJECT PROPOSAL?

Project proposals are submitted by the **lead scientific coordinator**¹⁴ by agreement with the project partners who constitute the consortium. However, when a project is selected for funding, the grant is allocated to the institution (legal person), which will be subject to a number of obligations. **The scientific coordinators of each partner must therefore approve the project proposal that commits their institution** (research organisation) before it is submitted for potential funding.

2.2. CONTENTS OF THE PROPOSAL

The project proposal includes:

- the submission of an online form providing administrative and financial information, to be completed online on the ANR submission platform;
- the scientific document describing the proposal, with any appendices required (in accordance with the terms of participation for funders).

The proposal will be considered complete if both these elements are presented and uploaded to the submission site by the closing date and time given on page 1.

¹⁴ The lead scientific coordinator is the natural person who submits the proposal and undertakes to fulfil the role of scientific coordinator for the coordinating partner.

Project participants are invited to enter their ORCID ID¹⁵ online.

The lead scientific coordinators of the proposals will receive acknowledgement of the submission by electronic mail after the closure of the call for proposals, as long as the scientific document has been uploaded via the submission platform and the grant requested is non-zero. The submission acknowledgement sent by the ANR submission platform does not constitute a contractual document certifying eligibility.

ONLINE REGISTRATION

The following non-exhaustive information must be provided online (the link to the submission platform can be found on the call for proposals publication page on the ANR website, at the address given on page 1):

- Project identification (acronym, French and English title, duration etc.);
- Identification of the partners (full name, abbreviation, category of each partner and basis for calculating grant amounts; type and unit number, managing and hosting authorities for public or similar research organisations etc.);
- Identification of scientific coordinators and address of the work location;
- Financial data (broken down by expenditure heading and partner);
- Scientific abstracts (at least 4000 characters per field): non-confidential summary of the project in French and English, overall objectives, scientific/technical obstacles, work programme and scientific, technical and economic impact.
- Experts not required to evaluate the proposal (optional).

The information may be modified until the call for proposals closes.

It is strongly advisable:

- to start entering the administrative and financial data at least a week before the closure of the call for proposals;
- to save the information entered at the submission site before leaving each page;
- not to wait for the closing date of the call for proposals before finalising the project proposal submission procedure.

SCIENTIFIC DOCUMENT

The scientific document must be uploaded to the ANR's submission platform in unprotected **PDF format** with a **maximum of 20 pages** (generated with text processing software, not scanned). **Any document that does not meet these requirements will automatically be rejected.** A template for the scientific document is available to download from the call for proposals web page.

An appendix document containing only the CVs of the participants must be uploaded to the ANR's submission platform in unprotected PDF format with a **maximum of 20 pages**.

¹⁵ ORCID is a non-profit organisation supported by a global community of institutional members, including research organisations, publishers, funders, professional associations and other stakeholders in the research ecosystem. For more information: <https://orcid.org>

For international consortia, **an appendix zip file** containing all the annexes as stipulated in the document “Terms of participation for international consortia”. Consult this document for the complete list of documents to be appended to the proposal.

FRENCH VERY LARGE RESEARCH INFRASTRUCTURE (TGIR)

Projects relying on the resources of French very large research infrastructure (“Très Grande Infrastructure de Recherche”, TGIR) are asked to make this clear at the time they submit their proposal. An approach independent of the submission of the proposal to the ANR must be undertaken with the TGIR to ensure such resources can be obtained if the smooth running of the project depends on them.

The research consortia will have access to the supercomputing resources of GENCI, the French national supercomputing group.¹⁶ International research consortia will have access to the GENCI supercomputing resources via their French partner, which will take responsibility for this access and do the calculations.

2.3. APPLICANTS’ COMMITMENT AND LEGAL REQUIREMENTS

ETHICS AND SCIENTIFIC INTEGRITY

The funding of a project does not exempt its participants from meeting the obligations linked to the regulations, ethical rules and code of ethics applicable in their field of activity. All the administrative and legal formalities required for the project to run smoothly will be explained and undertaken at the right time.

Each scientific coordinator of every French and international partner seeking funding from ANR or AFD (does not apply to unfunded partners) formally declares (by ticking a box in the online form) that their superiors, and particularly the appropriate administrative and financial departments and the persons authorised to act on behalf of the institution managing the funding, or their representatives, have consented to the submission procedure and that information relating to the proposal has been communicated to them.

The lead scientific coordinator agrees that all project participants - whether or not requesting funding - comply with the French national charter of ethics for research professions¹⁷ and the charter of scientific integrity and ethics of the ANR.¹⁸

¹⁶ GENCI (Grand équipement national de calcul intensif) can provide computing and storage resources free of charge for use in digital simulation (HPC) and Artificial Intelligence (AI) at three centres in France (CINES, IDRIS and TGCC) for academic and industrial researchers contributing to open research. Regular calls for proposals are open to applications for resources allocated for a twelve-month period. Applications are then reviewed by specialist panels to determine their level of scientific and technical excellence. More information on the national computing centres, access terms and conditions and an information handbook for users can be obtained from: <http://www.edari.fr> and <https://www.genci.fr/en>.

¹⁷ <https://www.hceres.fr/en/FrenchCharterForResearchIntegrity>

¹⁸ <https://anr.fr/en/anrs-role-in-research/values-and-commitments/scientific-integrity/>

GENDER EQUALITY

ANR, keen to contribute to the policy¹⁹ of reducing gender inequality in higher education and research, has added the principle of equality to its Code of Ethics and Scientific Integrity. Its aim is firstly to ensure that scientific communities systematically consider sex and/or gender aspects in their research, regardless of the field, to ensure high-quality knowledge production, and secondly to train peer reviewers in the issue of gender in selection bias to guarantee fair treatment for all projects, whether they are submitted by women or men.

Moreover, in order to address the over-representation of men in science and to encourage young women to pursue careers in fields where they are absent or in a minority, ANR is committed to showcasing women in science who have secured ANR funding or contributed to Scientific Evaluation Panels as chairs or panel members.

Project coordinators undertake to consider sex and/or gender aspects in their research, regardless of the field, to ensure high-quality knowledge production. This commitment is part of ANR policy aiming to contribute to gender equality and to reduce gender bias in the knowledge generation process.

SCIENTIFIC PUBLICATIONS AND RESEARCH DATA

As part of ANR's contribution to the promotion and implementation of open science, and in line with the national plan for open science, if funding is granted the project coordinator and partners must undertake to:

- deposit the scientific publications (full text) resulting from the research, development and innovation project in an open archive, either directly in HAL or via a local institutional archive, in accordance with the conditions in article 30 of the French "For a digital republic" act;^{20 21}
- provide a data management plan (DMP)²² within six months of the project's launch under the terms described in the ANR grant allocation document and the ANR financial regulations, as well as in the France Expertise Agreements.

Furthermore, ANR recommends that priority be given to publication in journals that are natively open access.²³ Finally, as a cOAlition S partner, ANR recommends using the CC-BY licence for publications arising from the projects it funds.

¹⁹ Follow-up to the 9th European Conference on Gender Equality in Higher Education and Research – DGSIP – DGRI.

²⁰ In this first case, in accordance with article 30 of the "For a digital republic" act (article L533-4 of the French Research Code), the authors have exercised their right to make the final version of their manuscript accepted for publication available free of charge in an open digital format by submitting the proposal to ANR.

²¹ The open access deposit of monographs is also encouraged.

²² One data management plan for each project funded.

²³ The DOAJ site (<https://doaj.org/>) lists the scientific journals whose articles are peer-reviewed and open access. The DOAB site (<https://www.doabooks.org/>) provides the same service for monographs

PROMOTING SCIENTIFIC, TECHNICAL AND INDUSTRIAL KNOWLEDGE

ANR encourages the recipients of ANR grants and, where relevant, their partners to lead and/or participate in knowledge transfer programmes targeting the general public and decision-makers: publishing articles in the media, talking to the media, assisting with public decision-making, participating in science festivals, organising debates with the general public, popularising science, drafting articles in open online encyclopaedias...

ACCESS TO GENETIC RESOURCES AND TRADITIONAL KNOWLEDGE ASSOCIATED WITH GENETIC RESOURCES

Where the proposed project uses genetic resources, the coordinator formally declares that all project participants – whether requesting funding or not – abide by the obligations arising from the Nagoya protocol²⁴. In the context of the application of the Nagoya protocol, beneficiaries whose projects are covered by the French regulation on access to genetic resources and associated traditional knowledge and the sharing of benefits arising from their use (APA) must supply the receipt for the Due Diligence Declaration.

DDDs for research work can be submitted online using the special application on the website of the French Ministry of Higher Education, Research and Innovation. Credentials to access the application can be obtained from the director of the host institution. For full details, go to: <http://www.enseignementsup-recherche.gouv.fr/pid37627/utilisation-ressources-genetiques-associees.html>

2.4. RECOMMENDATIONS

The following recommendations provide advice on the preparation of project proposals in the context of this challenge's call for proposals. Any divergences from these recommendations will be assessed against the corresponding evaluation criteria.

RECOMMENDATION FOR ENTERPRISE PARTNERS

All the project partners must follow the ambitions of the challenge in terms of the data sharing objective. A consortium agreement must be signed within consortia that include at least one Research Organisation and one Enterprise (in the European sense²⁵).

RECOMMENDATION FOR NON-FUNDED FOREIGN PARTNERS

The proposal must be submitted by the project's lead scientific coordinator. It must clearly state the identities of the partners, both French and foreign, and the scientific coordinator of each

²⁴ In this context, beneficiaries of ANR funding whose projects are covered by the French regulation on access to genetic resources and associated traditional knowledge and the sharing of benefits arising from their use (APA) are informed that they must demonstrate that they have respected their obligations by the date of the last grant payment at the latest.

<http://www.agence-nationale-recherche.fr/fileadmin/documents/2016/ANR-Reglementation-APA.pdf>

²⁵ For the definitions of the terms "Enterprise" and "Research Organisation", see point 2 of the Regulations concerning the conditions of allocation of ANR funding.

partner. Foreign partners not eligible for Expertise France funding will not be eligible for funding from ANR. These ineligible foreign partners will be referred to as non-funded partners.

If a foreign partner is necessary for the project to succeed, and can provide its own funding, it can be included in the consortium. The scientific document must include a summary of the contributions from funded and non-funded partners. For each partner, the scientific document must also state:

- if its activities are carried out with its own funding,
- if it is already receiving funding for its contribution to the project (amount, grant payment schedule, nature of the funder), or
- if it has applied for national funding for its contribution to the project by submitting the same project proposal to a funding body in its own country. In this case, the document must provide full details of the funding body together with the name, job function, email address and telephone number of the programme manager in its country.

Non-funded partners must complete the information enabling them to be identified on the online submission platform, but as they are not eligible for funding they are not required to complete the detailed budget information or to submit signed administrative and financial documents.

3. REVIEW OF THE PROPOSALS

3.1. GENERAL PRINCIPLES

The scientific assessment of the projects is carried out by ANR on behalf of the two project funding bodies. Project selection at ANR is based on the principle of peer review. The project proposals will be assessed by the scientific evaluation panel, which consists of members with expertise covering all the research fields and disciplines involved in this call for proposals. The scientific evaluation panel may occasionally call on external experts to give an opinion on specific points. The people involved in reviewing the proposals undertake to respect the provisions of the ANR code of ethics and scientific integrity, including the provisions on confidentiality and conflicts of interest²⁶. The composition of the evaluation panel will be displayed on the ANR website after the list of selected projects is published.

Proposals are selected for funding by the steering committee (consisting of representatives of the bodies funding the challenge, and possibly institutional representatives and qualified figures) based on the ranking produced by the evaluation panel, following the interviews and depending on the budgets available.

The main stages of the evaluation and selection procedure are as follows:

Assessment of the proposals' **eligibility** by ANR throughout the submission, evaluation, selection and funding process, based on the specified criteria (see section 3.2 "Eligibility of

²⁶ A conflict of interest arises from a situation in which a person's connections are likely, by their nature or their intensity, to call their impartiality or independence into question in the fulfilment of the task entrusted to them in view of the issue in hand.

proposals"). **Evaluation** and ranking of the proposals submitted to the call for proposals by the scientific evaluation panel based on the specified criteria (see section 0 "

- Evaluation of proposals ").

Preparation of the list of proposals admissible for interview and drafting of **admissibility** notices by the scientific evaluation panel based on the specified criteria (see section 0 "

- Evaluation of proposals "). The admissibility notices are sent to the lead scientific coordinators in the form of an invitation.
- **Interviews** with the lead scientific coordinators of admissible proposals by the joint committee (evaluation and steering)
- **Selection** and preparation of the list of proposals selected by the steering committee and chosen for funding.
- Sending a summary evaluation report to the lead scientific coordinator of each proposal, with the result of the funding decision.
- Publication of the list of selected proposals on the ANR website on the page dedicated to the call for proposals. Publication of the list of members of the scientific evaluation panel.
- Verification and compliance with the ANR and Expertise France funding terms of the financial and administrative arrangements for the selected projects (communication between ANR and the lead scientific coordinators).
- **Signature** of the grant allocation documents.
- First payments to the Beneficiaries under the rules set out in the ANR Financial Regulation or the general terms and conditions applicable to Expertise France grant contracts and the specific provisions (see section 5 "Specific provisions").

3.2. ELIGIBILITY OF PROPOSALS

IMPORTANT

ANR and Expertise France assess proposals for eligibility throughout the process (from submission throughout the review process until funding is issued) based on the applicable rules and regulations and the information available on the online submission site on the closing date of the call for proposals. Proposals deemed ineligible will not be evaluated and will not be eligible for funding.

To be eligible, a proposal must satisfy all the following conditions. It must:

- be complete and in the format specified in section 2;
- fall within the scope of the call for proposals, described in section 1;
- propose a project planned on 48 months, in accordance with the challenge schedule;
- involve at least one French public research body (knowledge spillover and research organisation or facility laboratory eligible for ANR funding)²⁷ ;
- respect the specific provisions of this call, described in section 5;

²⁷ This includes public law entities established in France engaged in research and knowledge transmission activities and private law entities engaged in research and/or teaching activities that have an establishment or branch in France, excluding commercial companies.

- respect the additional eligibility conditions described in the terms of participation: “Terms of participation for international consortia” and “Modalités de participation pour les consortiums sollicitant une aide de l’ANR”.

The project proposal is eligible if it satisfies **all** the conditions above and below.

An individual researcher may only submit one proposal submitted to this call.

A researcher cannot submit a proposal or take part in a project if they are involved in the call as a member of a scientific evaluation panel or the scientific steering committee of this call for proposals.

Proposals are not eligible if they are considered by ANR and Expertise France to be:

- similar²⁸ to proposals for a project already funded through the ANR Work Programme;
- based on non-singular content²⁹.

All proposals or projects that fail to comply with the above rules are ineligible.

3.3. EVALUATION OF PROPOSALS

The scientific evaluation panel operates confidentially, with no communication with third parties. The only elements at its disposal are the materials in the project proposal as submitted online by the lead scientific coordinator by the closing time and date of the call for proposals. It may nonetheless ask ANR to contact an expert for further review.

The members of the scientific evaluation panel review the proposals, first individually and then collectively at a meeting where the proposals are assessed against the criteria published in this call for proposals and compared with each other. Following the assessment, the scientific evaluation panel produces a final evaluation report for each proposal, summarising the consensus reached by the panel members, and decides on the proposals’ admissibility for interview.

All the project proposals satisfying the eligibility criteria are assessed by the members of the scientific evaluation panel against the criteria defined below. Each evaluation criterion is scored on a scale of 0 to 5, with a supporting comment for each criterion.

²⁸ Similarity between two proposals is established if the proposals in question (entirely or partially) describe the same main objectives, or are simple adaptations.

A project that is an adaptation of another consists of a reformulation of the description using the same basic elements (similar problem and main objectives). The definition of similarity is derived by analogy with the overall resemblance (as opposed to differences of detail) and similarity criteria expressed in national and European jurisprudence in the area of intellectual property rights.

²⁹ Non-singularity is established when the project proposal borrows or copies, entirely or partially, previous writing whose sources are not cited.

Score	Meaning
0	The criterion is not addressed or cannot be assessed with the information provided
1	Very inadequate: the criterion is addressed superficially and unsatisfactorily.
2	Inadequate: the criterion is addressed relatively satisfactorily but with serious weaknesses.
3	Good: the criterion is addressed well but improvements are needed.
4	Very good: the criterion is addressed very well, and any omissions are minor.
5	Excellent: the criterion is addressed perfectly with no omissions

The evaluation criteria are as follows:

- Relevance and suitability of the proposal in view of the objectives and expectations of this challenge call for proposals
- Quality of the consortium and scientific ambition
 - Competence, expertise and involvement of the lead and partner scientific coordinators
 - Quality and suitability of the partnership for the scientific and technical objectives, complementarity of the consortium in view of the multidisciplinary nature of the challenge
 - Clarity of the proposal's research objectives and hypotheses
 - Positioning relative to the state of the art and relevance of the methodology
- Implementation of the project
 - Appropriateness of the grant amount requested and resources used (permanent and non-permanent staff (interns, doctoral students, post-docs), coordination costs, investment amount, equipment purchases, travel costs, subcontracting, consumables etc.),
 - Expression and coordination of interdisciplinarity within the proposed research consortium (within AI, within biodiversity, between AI and biodiversity)
 - Project leadership and coordination with the overall and inter-consortium management of the challenge
 - Scientific and technical feasibility of the project, risk management
 - Suitability of the resources used for the project objectives
 - Realism of the schedule, compliance with the challenge schedule
- Global impact of the proposal
 - Potential use or integration of the proposal's results by the scientific community
 - Respect for the principle of sharing of intellectual property, an integral part of the call
 - Strategy for disseminating and exploiting the results including the promotion of scientific culture
 - If the proposition involves international cooperation: balance and complementarity between the scientific contributions of the respective partners in

each country and the added value of the international cooperation in the proposition.

3.4. INTERVIEWS

During its final meeting, the scientific evaluation panel discusses the proposals in turn and prepares a comparative evaluation. The scientific evaluation panel decides whether each proposal is admissible for interview.

The interviews will be carried out by a single jury consisting at least of the steering committee, and possibly also the scientific evaluation panel. The purpose of the interviews is to provide additional information about the proposals. Following the interviews, after deliberation, the ANR receives a proposed list of projects for funding. This is a relative ranking of the proposals in three categories, in view of the availability of funds:

- (A) proposals recommended for funding
- (B) proposals that may be recommended for funding, depending on the budget and their ranking
- (C) proposals not recommended for funding

The report summarising the consensus of the scientific evaluation panel, the evaluations and the funding decision will be sent to the lead scientific coordinators of each project proposal.

3.5. SELECTION OF PROPOSALS

The steering committee decides on the selection of proposals to be funded by ANR and Expertise France in line with the work of the scientific evaluation panel and based on the interviews.

The main discussion points on which the steering committee will base its selection are the following:

- Relevance of the scientific evaluation result to the objectives of the challenge;
- The proposal's contribution to the strategy of the programme (cooperation between projects and with the COpé);
- Cooperation and collaboration between the proposed consortium's partner teams, management of the crossover between AI and biodiversity;
- The project's originality and the proposal's cohesion with all the other projects proposed for funding (including the richness of the combined AI approaches of the selected projects).

4. FUNDING TERMS FOR THE SELECTED PROPOSALS

The selected proposals will be funded by ANR and Expertise France after grant allocation documents have been sent to the beneficiaries. The details of the project funding arrangements are described in the terms of participation for funders.

SCIENTIFIC MONITORING OF PROJECTS

Funded projects will be subject to scientific monitoring by ANR throughout the execution period and up to a year after they end. This scientific monitoring includes:

- the attendance of at least the lead scientific coordinator at the project kick-off for this call;
- active participation at meetings and events organised as part of the challenge under the terms already described;
- the delivery of intermediate progress reports and updates to the Data Management Plan;
- the delivery of summaries of the project's objectives, work and results, up to date when communicated, for publication by ANR, Expertise France or AFD in any medium;
- the delivery of an end-of-project report, required for the balance of the ANR grant to be allocated;
- the collection of project impact information up to five years after the end of the project;
- participation at conferences organised by ANR, Expertise France or AFD.

Proposals must take the corresponding workload into account in their work programme.

5. SPECIFIC PROVISIONS

5.1. LICENCES

The data sets used by the research consortia to improve their methods and tools as part of the challenge must be integrated into IA-BiodivNet and shared with all the other challenge participants. The data sets must be shared under the CC-BY licence.

The technology components developed to respond to the challenge evaluation must be integrated into IA-BiodivNet and shared with all the other challenge participants. These developments must be covered by open access licensing (such as "GNU GPL v3", "Apache 2.0", "MIT", etc.).

The IA-BiodivNet research environment and all its content will be open to non-participants in the challenge by the end of the challenge at the latest.

During the challenge, COpé will update consortia on open access licensing and sharing modes of their resources to be deposited in IA-BiodivNet.

5.2. NOTIFICATION OF CHANGES TO THE PROJECT

The institution coordinating the project undertakes to inform ANR and its funder of any changes likely to affect the content, partnership and schedule of the project occurring between the submission of the proposal and the publication of the list of selected projects and for the duration of the project if it is funded.