

Generic call for proposals 2025

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STEP 1

CLOSING DATE FOR THE SUBMISSION
OF PRE-PROPOSALS (PRC, PRCE, PRME, JCJC)
AND REGISTRATION (PRCI)

October 15th, 2024 at 5:00 PM (Paris time)

STEP 2

CLOSING DATE FOR THE SUBMISSION OF FULL PROPOSALS

The closing date to submit full proposals is set for the end of March 2025. The exact date and time will be specified if you are invited to submit a full proposal (mid-February 2025).

In case of any difference of interpretation, the French version of the present document shall prevail.

It is important to carefully read this document in full, as well as the 2025 AAPG Guide (which will be available on the ANR's website in September 2024) and the regulations on the conditions of allocation of ANR funding, before submitting a (pre)-proposal for a research project ([ANR: Financial regulations](#)).

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For any questions when preparing your project submission:

- for **administrative and financial question** about your project: aapg.adfi@anr.fr
- for **scientific question** about your project: aapg.science@anr.fr
- in case of a **technical anomaly in IRIS**: aapg.si@anr.fr

A. Context and objectives of the 2025 Generic Call for Proposals (2025 AAPG)

The 2025 Generic Call for Proposals represents the "Research and Innovation" component of the ANR's 2025 Work Programme. It is open to all scientific communities and all public or private stakeholders involved in French research, including enterprises (small and medium-sized companies, and large companies). It is designed to give researchers in various scientific fields access to co-funding in a large number of research themes, targeted research or not, in addition to their allocated recurrent funding. The AAPG applies to all types of research - fundamental and industrial research, and experimental development -.

All types of proposals are possible: proposals with unprecedented objectives or concepts, breakthrough or exploratory proposals, proposals aiming to remove scientific obstacles well known to the community, proposals exploiting data generated by research infrastructures, proposals resulting from previous proposals and intended to consider new objectives. A project submitted to the AAPG can have a duration of 24, 30, 36, 42, 48, 54 or 60 months.

The "*Research and Innovation*" component of the ANR's 2025 Work Programme, covered by the 2025 AAPG, has been structured into **57 research themes** (compared to 56 research themes in 2024 AAPG):

- **38 research themes** are introduced in 7 scientific fields:
 - Environmental Sciences (4 themes)
 - Materials and Engineering Sciences (7 themes; creation of a new "Physics" theme compared to the 2024 AAPG call)
 - Life sciences (11 themes)
 - Humanities and Social sciences (7 themes)
 - Digital sciences (6 themes)
 - Mathematics and its interactions (1 theme)
 - Subatomic Physics, Universe and Earth Sciences (2 themes)
- **19 research themes** corresponding to cross-cutting issues integrating the challenges of several scientific fields, divided into 7 cross-cutting areas:
 - Sustainability Science (1 eponymous theme)
 - Digital transformation (3 themes)
 - One Health (3 themes)
 - Ecological and environmental transition (3 themes)
 - Energy transformation (2 themes)
 - Technological transitions (4 themes)
 - Transformations of socio-technical systems (3 themes)

Each research theme corresponds to a scientific evaluation panel (CES) of the same name.

In step 1, when submitting a pre-proposal (funding instruments PRC/PRCE/JCJC/PRME) or when registering a project (funding instrument PRCI), scientific coordinators must choose the scientific theme and consequently the scientific evaluation panel that is most in line with the scientific objectives of their projects. These themes are detailed by major scientific field or cross-cutting area in [§Erreur ! Source du renvoi introuvable.](#)

Particular attention will be paid to the entire research continuum, in terms of "disciplinarity" (mono-, multi-, inter- and transdisciplinarity), especially within the cross-cutting research

themes covered by several disciplinary fields.

To further improve its evaluation processes and support the entire continuum, the ANR considers the interdisciplinarity or transdisciplinarity in the projects through the composition of its panels and peer review procedures.

The 2025 Work Programme also includes strategic priorities set by the French Government and the implementation of governmental plans such as: Artificial Intelligence; Humanities and Social sciences; Quantum Technologies; Mathematics; Autism in Neurodevelopmental Disorders; Translational research on Rare Diseases, and Scientific exploitation of data generated by OSIs and IRs^{*1}. Each priority is linked to one or more scientific themes, cf. [§Erreur ! Source du renvoi introuvable.](#)

B. Submission, evaluation and funding of projects under the 2025 AAPG

The Generic Call for Proposals is open to all tenured researchers², belonging to a public or private research organisation³.

B.1. Funding instruments

The 2025 AAPG uses a set of instruments to fund:

- either individual research projects coordinated by young researchers (**JCJC**),
- or single-team projects (**PRME**),
- or collaborative research projects between research organisations in a national context (**PRC**) or in an international context (**PRCI**) and between research organisations and enterprises (**PRCE**).

These five funding instruments each have their own specific characteristics in terms of submission modalities, eligibility and evaluation process. The characteristics and expectations of each funding instrument are listed in [Appendix 1](#) and will be detailed in the 2025 AAPG Guide⁴.

In step 1, when submitting a pre-proposal (PRC/PRCE/JCJC/PRME instruments) or when registering a project (PRCI instrument), the scientific coordinators must choose the funding instrument that best suited to the objectives of their project and to their partnership. They define the role of each one in the project: scientific coordinator, partner's scientific manager, or participant.

¹ The list of international scientific organisations (OSIs) and research infrastructures* (IRs*), previously named very large research infrastructures, is provided in [Appendix 4](#).

² Insofar as they are currently under contract (or will be) with the managing authority. The contract may have not started before the agreement. The salary of the coordinator and scientific project managers of each partner team are not eligible for ANR funding.

³ Whatever the funding instrument, the project must include at least one organisation participating in the public research service, i.e. at least one public law partner for research and dissemination of knowledge (such as EPST, university, EPIC research, etc.) established in France or at least one private law partner for research and dissemination of knowledge having an establishment or a branch in France and not being a commercial company. Under this call, Consular Higher Education Schools (EESC) are not considered as commercial companies.

⁴ Document available in September 2024 on the Webpage dedicated to 2025 AAPG. 2025 AAPG Guide is the reference for researchers wishing to submit a proposal, for peer reviewers and panel members, in terms of submission, eligibility, evaluation and selection of projects.

The identity of the scientific coordinator⁵, the funding instrument and the scientific theme defined when the pre-proposal for a PRC, PRCE, PRME or JCJC is submitted or a PRCI is registered with the ANR, or a PRCI is registered with a foreign agency acting as the “Lead Agency” cannot be changed during the evaluation and selection process.

Consequently, before any submission / registration of a project to the AAPG call, scientific coordinators are invited to carefully read the 2025 AAPG Guide, and the scientific content of the themes provided in [§Erreur ! Source du renvoi introuvable.](#) (the outlines of the scientific themes may have evolved since the last edition of the call).

B.2. Rules relating to applicants under the AAPG 2025 call

- **A scientific coordinator of a PRC, PRCE, PRCI (including PRCI in the “Foreign Lead Agency” modality), PRME or JCJC project funded under the 2024 AAPG cannot submit as a scientific coordinator a PRC, PRCE, PRCI (including PRCI in the “Foreign Lead Agency” modality), PRME or JCJC project for the 2025 AAPG.** He / She may act as a partner’s scientific manager or as participant in a PRC, PRCE, PRME, JCJC or PRCI submitted for the 2025 AAPG, in compliance with other rules relating to applicants.
- **An applicant may submit only one PRC, PRCE, PRME, JCJC or PRCI project (including PRCI in the “Foreign Lead Agency” modality) as a scientific coordinator in the 2025 AAPG call and the 2025 FRAL call⁶.** He/She may not be involved as a scientific coordinator or partner’s scientific manager in more than 3 projects submitted to the 2025 AAPG call (whatever the funding instrument, including PRCI in the “Foreign Lead Agency” modality) and the 2025 FRAL call. Consequently, an applicant can be at most: once coordinator and twice partner’s scientific manager OR three times partner’s scientific manager, at 2025 AAPG call and 2025 FRAL call combined.
- **A scientific coordinator of a JCJC project currently funded by the ANR cannot act as a scientific coordinator for another JCJC, PRC, PRCE, PRME or PRCI (whatever the modality of collaboration) project submitted to the 2025 AAPG call over the duration of his/her JCJC project⁷.** However, he/she may be involved in a project submitted to the 2025 AAPG call in respect of the other rules relative to applicants.
- **A scientific coordinator of a JCJC project selected for funding during a previous edition and now closed cannot act as coordinator for a new JCJC project submitted under the 2025 AAPG call.** Coordination of a JCJC project is now limited to once throughout a career.
- **A scientific coordinator of a PRME project currently funded by the ANR cannot act as coordinator of another PRME project over the duration of his/her PRME project.⁸**

⁵ This rule applies except in the event of “force majeure”. A specific authorisation request must be sent to the ANR and explain the *force majeure* requiring a change of project coordinator.

⁶ For the 2025 edition, this exclusion rule does not apply to proposals submitted outside the AAPG and outside the FRAL. However, the scientific objectives of the proposals submitted should not be nearly identical (see the eligibility rule on the “uniqueness of the proposal” in the 2025 AAPG Guide).

⁷ Submission as scientific coordinator is authorised in the final year of a JCJC project, provided that the ongoing project is completed by the date on which the new project is agreed, i.e. no later than 31/12/2025.

⁸ Submission as scientific coordinator is authorised in the final year of a PRME project, provided that the ongoing project is completed by the date on which the new project is agreed, i.e. no later than 31/12/2025.

The rules relative to applicants given above are cumulative.

These rules apply from Step 1 of 2025 AAPG call, including in case of the registration of a PRCI project and the submission of a PRCI project to a foreign funding agency in « Foreign Lead agency” modality, and apply to the 2 steps of the 2025 AAPG combined, whatever the result of the evaluation in step 1. The 2025 FRAL call is also concerned.

Failure to comply with these rules listed above will result in the ineligibility of all projects concerned. Scientific coordinators are therefore required to check with the partner’s scientific managers with whom they are submitting that they are respecting these rules.

In addition to these eligibility criteria relative to applicants, there are also criteria relating to the project. These criteria are described in the 2025 AAPG Guide, which is the reference in terms of eligibility.

B.3. Eligibility

The ANR examines the eligibility of the projects throughout the submission, evaluation, selection and funding process based on the rules for the AAPG 2025 (see [§B.2](#) above, in the 2025 AAPG Guide and in the specific appendices for PRCI, and in the "[Regulation on the allocation of funding](#)").

In the case of a PRCI project, the foreign funding agency also examines the eligibility according to its own eligibility criteria: a PRCI project must therefore meet the eligibility criteria of the AAPG 2025 call and the eligibility criteria of the foreign funding agency.

Applicants are invited to read these documents and the eligibility rules carefully before submitting or registering a project for AAPG 2025 call.

B.4. Submission process

The evaluation and selection process of the 2025 AAPG call takes place in 2 steps (cf. provisional timetable of the 2025 AAPG call in [Appendix 2](#)).

In step 1, the submission of a PRC, PRCE, PRME, JCJC pre-proposal includes the online completion of a project characterization form, an administrative form, the submission of a scientific document (written according to the framework provided, max. 4 pages including the bibliography⁹, diagrams and references) and the online completion of the CVs of the scientific coordinators and the partner’s scientific managers. In the case of a PRME project, a certificate signed by the laboratory director is required.

Specific process: if they are resubmitted in stage 1 of the AAPG 2025, the projects classified in the complementary list to the AAPG 2024 but not selected for funding at the end of the process are automatically invited to stage 2 of the AAPG2025, without evaluation by the CES, subject to eligibility. The projects concerned must have the same scientific coordinator, same funding instrument, same title and comparable consortium (verified by the ANR before the automatic invitation to step 2) and must be complete on the submission Website by the closing date and time of step 1.

In step 2, the submission of a PRC, PRCE, PRME, JCJC full proposal includes the online completion of a project characterization form, an administrative and financial form, the submission of a scientific document (written according to the framework provided, max. 20 pages

⁹ Since the 2019 edition, the CVs of the coordinator and his/her partners can include preprints (<https://fr.wikipedia.org/wiki/E-print>) not yet published in peer-reviewed scientific journals. In addition, the ANR encourages applicants to cite preprints in the bibliography, particularly when referencing preliminary data.

including the bibliography, diagrams and references) and the online completion of the CVs of the scientific coordinators and partner's scientific managers.

For the registration and submission of a PRCI project to the 2025 AAPG, the submission process depends of the collaboration modality, cf. description of the PRCI funding instrument in the [appendix 1 §3.2](#).

The list of the elements expected online and in the scientific document is given in the *2025 AAPG Guide*.

*The submission form, including the administrative and financial part, must be completed online and the scientific documents (pre-proposal in step 1 or full proposal in step 2) and the certificate expected for PRME projects must be submitted on the ANR submission Website, **on the closing date and time of the call.***

Any incomplete project by the closing date and time of the call is ineligible.

B.5. Evaluation and selection of the projects

The project selection conducted by the ANR is based on the peer-review principle. The ANR's selection process includes the organisation of panels and mobilises peer-reviewers beyond these panels.

Scientific Evaluation Panels (CES) consist of highly qualified scientists – working in France or outside of France - from the relevant research communities. They are in charge of evaluating pre-proposals in step 1 and full proposals in step 2, with the help of external peer reviewers, exceptionally in step 1 and systematically in step 2.

Each evaluation panel is chaired by a chair whose mandate is one year, renewable twice¹⁰. He/She has undergone ANR selection process and ethics training. He/She heads the Board of the panel - which includes one or two vice-chairs¹¹ - who helps the chair prepare for and conduct the panel's work.

A scientific project manager assists the panel board, before and during the panel meetings, in the application of the AAPG evaluation and selection process as certified ISO 9001 (certification obtained in 2018 and renewed each edition since).

External reviewers are proposed by panel members, and requested by the scientific project manager after verifying the absence of conflict of interest. External reviewers carry out written evaluations of one or more projects, without participating in panel meetings. They operate independently and confidentially, without exchange with third parties, on the basis of the elements constituting the pre-proposal or the full proposal as completed on the submission Website on the closing date and time of the call.

***The ANR Charter of Ethics and Scientific Integrity* applies to all people involved in the evaluation and selection of projects.**

In step 1, the evaluation process (excluding PRCI projects excluding PRCIs whose submission, evaluation and selection process depend on the modality of collaboration, cf. description of the

¹⁰ The recruitment of the chairs is done through a call for applications, published on the ANR website, ahead of each edition of the call. The 2025 call for applications is already available online.

¹¹ Depending on the size of the panel, the number of vice-chairs is between one and three.

funding instrument in §3.2) consists of the panel members identifying the PRC/PRCE/PRME/JCJC pre-proposals for which drafting a full proposal may be justified by their scientific excellence and ambition (decisive criterion ; see §B.6 and 2025 AAPG Guide).

Note: The 2025 AAPG process includes a “memory effect” between two successive editions of the AAPG call. Thus, if the scientific coordinator makes the explicit request when submitting his/her project to 2025 AAPG call, and if it is actually a re-submission of a pre-proposal which has been evaluated in step 1 of the AAPG 2024 call, the pre-proposal and the final report of step 1 of the previous edition are sent to the panel members. This transmission to the panel members is made after the individual evaluations have been carried out by the panel members, for assessment of the evolution of the project between the two editions of the call. An additional field (max. 3000 characters) is also available to the scientific coordinator in order to explain to panel members the modifications made between the pre-proposal submitted to 2025 AAPG and its previous version submitted to 2024 AAPG.

The ANR checks the eligibility for “memory-effect” before making the documents available to panel members: project evaluated by a panel of the AAPG in step 1 of the 2024 AAPG, same scientific coordinator, same funding instrument and similar scientific objectives.

All scientific coordinators of an eligible pre-proposal are notified by email of their selection or non-selection for step 2. A final evaluation report from the panel is made available to coordinators regardless of the result of the evaluation of their project in stage 1. This final report corresponds to the consensus reached by the evaluation panel outcome in a plenary meeting.

In step 2, the evaluation process (including PRCI projects in « ANR Lead Agency » modality or « Non-Lead Agency » modality) aims to select the best full proposals by evaluating the scientific excellence and ambition of the project, how it is organised and how it will be implemented, and what impacts the project may have - in accordance with international competitive project selection principles - (see §B.6 and 2025 AAPG Guide). In step 2, the evaluation is made by external reviewers and panel members. Step 2 also includes a « right to reply » to external peer reviews aimed at correcting any possible inaccuracy contained in an external review.

Note: The 2025 AAPG process includes a “memory effect” between two successive editions of the AAPG call. Thus, if the scientific coordinator makes the explicit request when submitting his/her project to 2025 AAPG call, and if it is actually a re-submission of a full proposal which has been evaluated in step 2 of the AAPG 2024 call, the full proposal and the final report of step 2 of the previous edition are sent to the panel members. This transmission to the panel members is made after receiving the external peer reviews and after the individual evaluations written by the panel members, for assessment of the evolution of the project between the two editions of the call. An additional field (max. 3000 characters) is also available to the scientific coordinator in order to explain to panel members the modifications made between the full proposal submitted to 2025 AAPG and its previous version submitted to 2024 AAPG.

The ANR checks the eligibility for “memory-effect” before making the documents available to panel members: project evaluated by a panel of the AAPG in step 2 of the 2024 AAPG, same scientific coordinator, same funding instrument and similar scientific objectives.

The scientific evaluation panel is fully responsible for ranking the full proposals. The ranking will be reached by consensus of the panel after a debate on each project reviewed. The ANR does not modify the ranked lists provided by the panels and funds the projects by scientific theme according to the budget allocated to each theme.

After the call has closed, the list of projects selected for funding and the composition of the scientific evaluation panel will be published on the ANR website (publication of the results during panel meetings in June and July). All scientific coordinators of an eligible full proposal are notified by email of their selection or non-selection for funding. A final evaluation report from the panel is made available to coordinators regardless of the result of the evaluation of their project. This final report corresponds to the consensus reached by the evaluation panel outcome in a plenary meeting.

B.6. Evaluation criteria for projects submitted to the 2025 AAPG call

The evaluation of pre-proposals and proposals is conducted based on the criteria used by both panel members and external peer reviewers.

The differentiation of criteria, between the two selection steps and between funding instruments, is carried out using the reading grid of the sub-criteria given below.

Step 1 (evaluation of pre-proposals)¹²

Criterion 1 : Quality and scientific aim

In Step 1, the criterion 1 is decisive: an A rating from the evaluation panel is required to be invited to step 2.

- Clarity of research objectives and hypotheses
- Scientific ambition of the project and position with respect to the state-of-the-art
- Adequacy and relevance of the methods implemented
- Adequacy of the project with the scientific theme selected

Criterion 2 : Organisation and implementation of the project

- Skills, expertise and involvement of the project coordinator
- *For PRC and PRCE* : Quality of the consortium and complementary between the contributions
- *For PRME* : Quality and expertise of the team
- *For JCJC* : Project contribution to the coordinator's empowerment and team development

Step 2 (evaluation of full proposals)

Criterion 1 : Quality and scientific aim

- Clarity of research objectives and hypotheses
- Scientific ambition of the project and position with respect to the state-of-the-art
- Adequacy and relevance of the methods implemented
- *For PRCI only* : Adequacy of the project with the scientific theme selected

Criterion 2 : Organisation and implementation of the project

- Skills, expertise and involvement of the project coordinator
- *For PRC and PRCE* : Quality of the consortium and complementary between the

¹² PRCI projects are not evaluated in step 1.

contributions

- For *PRCI* : Quality of the consortium and complementary between the contributions of each country
- For *PRME* : Quality and expertise of the team
- For *JCJC* : Project contribution to the coordinator's empowerment and team development
- Adequacy of the resources implemented and requested with the objectives of the project

Criterion 3 : Impact and benefits of the project

- Scientific impact and possible impact in economic, social and cultural fields
- For *PRC, JCJC and PRME* : Strategy for the dissemination and exploitation of the results; promotion of scientific, technical and industrial culture
- For *PRCE* : Action to transfer technology and innovation to the socio-economic world; promotion of scientific, technical and industrial culture
- For *PRCI* : Strategy for the dissemination and exploitation of the results; promotion of scientific, technical and industrial culture; added value of a European or international cooperation, contribution to the French scientific community

The sub-criteria related to the main criteria provide a level of detail adapted to the content and size of the scientific document.

The sub-criteria serve as a guide to help the applicant prepare his/her application and for the peer reviewer (panel member or external peer reviewer) to conduct the evaluation. The details of what is expected for each criterion or sub-criterion are specified in the 2025 AAPG Guide.

Projects being evaluated on the basis of information completed online on the closing date and time of each step, scientific coordinators must therefore ensure that the information provided online correctly meets the criteria and sub-criteria applicable to the step and the chosen funding instrument.

B.7. Project funding

Following the evaluation process, the ANR decides on whether or not to select a project based on rankings established by the panels and the budgetary guidelines and priorities approved by MESR. In July 2025, the ANR publishes the list of selected projects for funding for a potential start in October 2025.

The procedures for the allocation of ANR funding are set out in the "*Regulation on the allocation of funding*" (<http://www.anr.fr/RF> in French). Scientific coordinators and partner's scientific managers are invited to carefully read this document to set up their projects in compliance with its provisions, particularly with regard to budgetary aspects.

Depending on the type of consortium, the ANR will fund the selected proposals either after a unilateral funding decision or after that each partner receiving funding signs a funding agreement. This may sometimes require the provision and assessment of additional information (particularly for enterprises: financial statements, certificate of registration, information on capitalistic links). If required, the ANR will contact the relevant partners to check their respective beneficiary categories via the form drafted for this purpose.

Companies facing financial difficulties are not eligible for ANR funding.

Rules relatives to double-funding or funding by other agencies, organisations, local or regional authorities, or foundations

A scientific coordinator cannot simultaneously receive funding under both the JCJC instrument and/or another similar programme such as Inserm ATIP-Avenir, Emergence CNRS, Starting Grant or Consolidator Grant from ERC, funding of local authorities (for example, “Etoile montante”), or the ANR's Tremplin ERC call (Cf. description of the instrument JCJC in [Appendix 1§1](#)).

Public entities, agencies, associations or foundations, other than the ANR, provide project-based funding and coordinate their own calls, such as the French National Cancer Institute ([INCa](#)), French National Agency for Research on AIDS and Viral Hepatitis – Emerging Infectious Diseases ([ANRS I MIE](#)) and French Foundation for Medical Research ([FRM](#)). To ensure efficiency, projects covered by these calls for proposals are not intended to be funded by the ANR¹³. Thus, the eligibility of the projects submitted to the ANR under the 2025 AAPG and falling under themes likely to be supported by these funding agencies, will be jointly verified by the ANR and these organisations, agencies, associations or foundations.

Generally speaking, projects funded by other organisations, agencies, local and regional authorities, foundations or associations under similar instruments and with identical expectations, will not be eligible for double funding. The ANR may check for double-funding (during the evaluation process, the selection or at a later date) and either conclude that the submitted project is ineligible or proceed to the cancellation (total or partial) of the funding.

C. Specific measures

C.1. Research infrastructure (IR) and Very large research infrastructures

Projects relying on resources from research infrastructures (IR) or very large research infrastructures (OSI and IR*, previously TGIR) are invited to declare this information when they submit their pre-proposal in step 1. A procedure independent from the ANR project submission must be carried out to ensure that such resources are available if they are key to the success of the project. This can be justified as part of the submission of a full proposal (especially within the framework of the priority “*Scientific exploitation of data generated by OSI and IR**”).

For instance, requests for resources can be made to GENCI (*Big National Equipment for Intensive Computing*) to access computing and storage resources for digital simulation, massive data processing or artificial intelligence¹⁴.

C.2. Competitiveness clusters

Projects wishing to be awarded a label by one or more competitiveness clusters must mention it

¹³ This rule applies only to PRC and PRME instruments.

¹⁴ GENCI provides free computing and storage resources for digital simulation (HPC), within three French national centres (CINES, IDRIS and TGCC), for academic and industrial researchers contributing to open research. You can apply to two calls for proposals (in January and July) to receive resources allocated over a year. Applications are then reviewed by Thematic Panels, according to their scientific and technical excellence. For more information on national computing centres, procedures, you can download the information booklet for users at <http://www.edari.fr> and <http://www.genci.fr>.

during the first stage of the selection process, when submitting the pre-proposal¹⁵.

When applying for a label, the scientific coordinator must first have the approval of the other partners (including, if required, foreign partners) involved in the pre-proposal. The scientific coordinator is invited to contact the competitiveness cluster.s concerned before submitting the project and to find out about the commitments in the event of support from these clusters (in particular possible membership of the cluster, transmission of intermediate and final project reports). If a proposal labelled by a competitiveness cluster is successful, the information on the monitoring of the project will be provided to the competitiveness cluster.

C.3. French co-funding

The ANR establishes partnerships with other funding agencies. Generally, this does not constitute additional funding, but a contribution to the funding requested from the ANR for the project, except when a specific request can be made to the co-funding partner. Co-funding means that the grant allocated to the project includes a financial contribution from the ANR and a co-funding partner with an interest in the research it supports. A project coordinator selected may decline the co-funding of his / her project. The scientific coordinators must express their interest online to benefit from co-funding from step 1, when submitting their pre-proposal.

C.4. PRIMA labelling

France is member of the international [PRIMA](#) program (*Partnership for Research and Innovation in the Mediterranean Area*, cf. the ANR 2025 Work Program). As part of the activities developed with the 19 countries involved in this program, projects funded by the AAPG 2025 with a link to the themes described in PRIMA's [agenda de recherche et innovation stratégique](#) are likely to be included in the contributions made by France to Section 3 of PRIMA (Participating States Initiated Activities, PSIA). As such, the coordinators of the projects concerned will be invited to indicate their inclusion in the PRIMA program in any communication made in connection with the valorisation of their results.

D. Regulatory requirements for applicants

Scientific coordinators, partner's scientific manager and participants included in submitted projects under the 2025 AAPG call undertake to abide by the ANR's values and commitments listed in this section (and included in the submission Website dedicated to 2025 AAPG)

Added to this list is the formal commitment of each scientific coordinator and each partner's scientific manager, **the primary obligation to have obtained the agreement of their hierarchy** (in particular the unit director, administrative services and competent financiers and the persons authorized to legally represent the institution managing the grant, or its representatives) concerning its current submission and to have communicated the information relating to the submission. The list of deposits recorded by the ANR can thus be sent to laboratory directors and administrative managers of the managing establishments for the projects concerning them.

D.1. Ethic, scientific integrity and deontology

One of the Agency's main concerns is contributing to the dissemination of ethical, scientific integrity, and social science responsibility culture, and it must be a priority for its recipients.

¹⁵ Applying for labelling is not mandatory to submit a proposal to the 2025 Generic Call for Proposals. If a labelling is requested, it must be declared online in step 1 and cannot be declared in step 2. PRCI projects are excluded from this procedure.

Maintaining society's trust in research stakeholders is contingent upon observance of the rules and values, which should govern research to ensure its honest and scientifically rigorous nature.

The ANR, who signed the French National Charter for Research Integrity, also adopted an Ethics Charter, which was amended in 2018 to include scientific integrity. For greater visibility of its coherent principles, the Agency formalise its ethics, scientific integrity and professional conduct policy [in a single document](#) including all principles and operational schemes to ensure their proper application. This policy is backed by the appointment of an ethics and scientific integrity representative who ensures compliance with fundamental principles, the prevention and proper management of conflicts of interest and the training of collaborators internal and external to the agency.

In this context, the scientific coordinator of a project submitted under the 2025 AAPG call undertakes to ensure that all project participants (seeking funding or not) comply with the principles reflected in the French National Charter for Scientific Integrity ¹⁶ and the ANR's Ethics and Scientific Integrity Charter ¹⁷.

The ANR encourages the research teams involved in a project to include, in their research approach, a reflection on ethical challenges that may arise from the objectives, methodology or the results expected of their project and their applications.

The ANR reiterates that when conducting research, each researcher is responsible for leaning the best practices recognised in his/her scientific discipline, and for rigorously applying them in his/her efforts and when publishing his/her results, in order to submit them for a review by the scientific community and allow everyone to use them.

D.2. Gender equality

The ANR is committed to address gender inequalities in higher education and research (ESR), and therefore added the principle of equality in its Ethics and Scientific Integrity Charter, and rolled out an equality action plan resulting in the awarding of the "equality label" in 2023¹⁸. The goals pursued include ensuring equal treatment between projects, whether these projects are coordinated by women or men. To this end, the ANR undertakes to train reviewers on the issue of potential gender biases in the selection process, and to regularly provide submission and selection data assessments.

The ANR is also committed to promoting women in science who received ANR funding, or were involved in scientific evaluation panels as chairwoman or panel member, to give them greater exposure and address an overly masculine representation of science, and encourage young women pursue carriers in fields where they are either absent or in a minority.

In this context, the scientific coordinator of an ANR-funded project undertakes to provide equal visibility to all research work produced, whether it is conducted by women or men.

Moreover, the scientific coordinator undertakes, where relevant, to consider the sex and/or gender aspect in his / her research regardless of the field, set aside gender biases in the production of knowledge and anticipate the potential impacts of their applications.

¹⁶ https://www.cnrs.fr/comets/IMG/pdf/charte_nationale_deontologie_signee_janvier2015.pdf.

¹⁷ <https://anr.fr/fr/lanr-et-la-recherche/engagements-et-valeurs/lintegrite-scientifique/>

¹⁸ For more information, see our web page dedicated to our "Gender" commitment: <https://anr.fr/fr/lanr/engagements/le-genre/>

D.3. Scientific publications and research data

As part of the ANR's contribution to the promotion and implementation of Open Science, and in line with the French National Plan for Open Science (PNSO) and International Plan S, ANR recipients undertake to¹⁹ :

Ensure immediate open access to peer-reviewed scientific publications

Thus, all scientific publications stemming from ANR-funded projects under the 2025 AAPG call will be made available in open access under the *Creative Commons CC-BY* license or equivalent, by using one of the three following approaches:

- publication in a natively open access journal;
- publication in a subscription journal that is part of a transformative agreement or transformative journal²⁰ ;
- publication in a subscription journal. The publisher's version or the manuscript accepted for publication will be deposited in the Open archive HAL under a *CC-BY* license, implementing the Rights retention Strategy (RRS)²¹, according to the terms specified in the special conditions of the funding decision or agreement.

When submitting a proposal, the author will use the following wording in the article and/or letter addressed to the publisher:

"This research has been funded, either in full or in part, by the French National Research Agency (ANR) under project ANR-nn-XXXX-nnnn. With a view to its publication in open access, the author has applied for an open access CC-BY licence for any manuscript accepted for publication (AAM) resulting from this submission".

The authors can use the Journal Checker Tool to check whether their selected journal or review complies with Plan S and which channel is open to them.²²

Furthermore, the project coordinator undertakes to ensure that **the full text** of these scientific publications (version approved for publication of publisher's version) is **deposited in the national Open archive HAL**, no later than the time of publication, and to mention the ANR research project reference (e.g., ANR-25-CE64-0001) from which they result, by associating a permanent identifier (DOI Crossref).

The ANR also recommends that peer-reviewed book chapters and scientific publications from ANR projects, be made available in open access under the Creative Commons license or equivalent (the *CC-BY* license is recommended). The ANR encourages submitting the full scientific text or publication in the national Open archive HAL (version approved for publication of publisher's version) and mention the ANR research project reference (e.g., ANR-25-CE64-0001) by associating a permanent identifier (DOI Crossref).

The ANR also encourages the submission of preprints in open platforms or archives.

¹⁹ For more information, see our Webpage dedicated to our « Open science » commitment:

<https://anr.fr/fr/lanr/engagements/la-science-ouverte/>

²⁰ Definition of « [accord dit transformant](#) » or « [journal transformatif](#) » : <https://www.coalition-s.org/transformative-journals-faq/>

²¹ <https://www.ouvrirlascience.fr/mettre-en-oeuvre-la-strategie-de-non-cession-des-droits-sur-les-publications-scientifiques/>

²² <https://journalcheckertool.org/>

Facilitate research data sharing and re-use, particularly for publication data,

Particularly for publication data **by adopting a FAIR approach** (*Findability, Accessibility, Interoperability, Reusability*) in line with the “*as open as possible and as closed as necessary*” principle, and provide, within 6 months after the start of the project, a first version of the Data Management Plan (DMP), under the terms set out in the special conditions²³.

In addition, recipients undertake to submit the data they seek to publish in a thematic repository of reference, or in recherche.data.gouv.fr, by mentioning the ANR project reference from which they result (e.g., ANR-25-CE64-0001).²⁴

Finally, pursuant to the 2nd National plan for Open Science, the ANR recommends that any software developed during the project be made available under a free license, and that source codes be stored in the Software Heritage archive and described in HAL by indicating the ANR project reference (e.g., ANR-25-CE64-0001).

D.4. Promoting scientific, technical and industrial knowledge

The ANR encourages its funding beneficiaries to carry out and/or participate in actions to transfer knowledge to citizens and decision-makers, such as publication of articles in the press, media interviews, public decision-making support, involvement in science festivals, organising public debates, scientific outreach efforts, writing articles in a free online encyclopaedia, etc.

The Research Programming Law (LPR) for 2021-2030 introduces a new approach to relationships between science, research and society. The ANR launched a call for expressions of interest, in line with MESR, entitled “Science with and for Society (AMI-SAPS)”, which resulted in the planning of several calls for proposals under the National “Science with and for Society” Plan to:

- 1) support scientific mediation and communication research;
- 2) encourage the development of scientific, technical and industrial culture in research and knowledge dissemination organisations and institutions;
- 3) develop and structure participatory research ;
- 4) increase the expertise to support public policies, with a view to meeting major societal challenges.

The ANR has developed a multi-year program of calls for specific SAPS projects (2021-2025), divided into two parts. The first part consists of “*mobilizing researchers for the CSTI*” by providing AAPG winning projects with additional funding dedicated to the societal valorization of scientific knowledge. The second part, thematic, aims to develop other aspects and dimensions of the dialogue between science and society (participatory research, social innovation, etc.)

Four calls are planned in 2024 and 2025, cf. ANR 2025 Work programme (available on the ANR website).

²³ In a logic of simplification, and to promote the FAIR principles, the ANR recommends the adoption of the ‘[plan de gestion des données structuré](#)’, available on DMP OPIDoR, which will notably allow self-completion of the administrative data of the ANR project.

<https://opidor.fr/lanr-publie-un-modele-de-pgd-structure-dans-dmp-opidor/>

²⁴ To help you in your choice, please consult <https://recherche.data.gouv.fr/fr/logigram/ou-publier-vos-donnees>

The Open Science Committee has also established a list of selection criteria for a trustworthy repository:

https://www.ouvrirlascience.fr/wp-content/uploads/2023/11/Donnees_EntrepotConfiance_NoteMethodologique.pdf

D.5. Accessing genetic resources and traditional knowledge associated with genetic resources

The Nagoya Protocol on the Access to Genetic Resources and the traditional knowledge associated with genetic resources, and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity was adopted on 29 October 2010. It contributes to the conservation of biological diversity, sustainable use of its components, and increasing the contribution of biological diversity to sustainable development and human well-being. The Nagoya Protocol significantly pushes forward the third objective of the Convention by ensuring greater legal certainty and transparency for genetic resources suppliers and users. The European Regulation No. 511/2014 and French Act No. 2016-1087 determined the terms of implementation for this protocol²⁵. Therefore, two check points are defined: i) during the funding stage for research efforts under the supervision of the French Ministry of Higher Education, Research and Innovation (MESRI), and ii) during the final product development stage, under the supervision of the French Ministry of Ecological Transition (MTE).

In this context, the ANR must obtain “Due Diligence” Declaration receipts (DDD) for all research projects funded since 2019. Applicants of the 2025 Generic Call for Proposals will be asked to report any possible use of genetic resources throughout their projects.

As part of research, DDDs can be registered online through the dedicated application on the MESRI website. Credentials to access the application can be obtained from the director of the hosting institution. For more information, please visit: <http://www.enseignementsup-recherche.gouv.fr/pid37627/utilisation-ressources-genetiques-associees.html>.

D.6. Scheme to protect the nation's scientific and technical potential (PPST)

The competitiveness, reputation or the excellence of an establishment are based primarily on its capacity for innovation as well as the development and maintenance of knowledge and know-how. Each year, an increasing number of companies and research laboratories fall victim to attempts to capture strategic or sensitive information that may be used for malicious purposes.

The scheme to protect the nation’s scientific and technical potential (PPST) aims to protect the access, within public and private institutions, to the strategic knowledge and know-how, and sensitive technologies that contribute to the nation’s sovereign interests whose misappropriation or capture could:

- harm the nation's economic interests,
- boost foreign military arsenals or weaken the nation's capacity to defend itself,
- contribute to the proliferation of weapons of mass destruction and their vectors,
- be used for terrorist purposes nationally or abroad.

This inter-ministerial programme led by the French General Secretariat for Defence and National Security (SGDSN), which contributes to the economic safety of all public or private entities, has been implemented since 2012. It involves many ministries including the French Ministry of Higher Education, Research and Innovation (CIR No. 3415/SGDSN/AIST/PST of 7 November 2012). It provides:

²⁵ Act for the recovery of biodiversity, nature and landscapes (Act No. 2016-1087 of 8 August 2016) and its implementation Decree on the « accès aux ressources génétiques » and on the « partage des avantages découlant de leur utilisation » (Implementation Decree No. 2017-848 of 9 May 2017).

- legal protection against malicious acts with consequences on the competitiveness of the entity (fraudulent use of information, theft or capture of sensitive data, anti-competitive practices, intrusion into information systems, etc.);
- the opportunity to build a trustworthy working team;
- government support in an approach to raise the entity's security level;
- the ability to belong to a community of trust approving of industrial partnerships.

As recommended by MESR's Department of Defence and Security High Official (SHFDS), the ANR will implement the PPST as part of the 2025 AAPG for projects invited for step 2 that include within their consortia at least one enterprise and / or at least one foreign partner outside European Union. These projects are subject to the opinion of the SHFDS/MESR considering the national guidelines established by the SGDSN.

The project will not be selected following the AAPG evaluation process if SHFDS/MESRI provides a negative opinion. SHFDS/MESRI is not required to justify its opinion to the applicant.

Before submitting a project to the 2025 AAPG (all funding instruments), applicants are invited to contact the departments in charge of the PPST application within their institution, to check the eligibility of their project.

E. Provisions on GDPR and the dissemination of results

E.1. Personal data

The ANR uses data processing for the selection, project monitoring and impact studies to carry out its tasks²⁶. Personal data²⁷ is collected and processed in accordance with Article 6.1 (e) and (c) of the GDPR²⁸. This data undergoes processing necessary for the performance of a task carried out in the public interest and/or to comply with a legal obligation.

The ANR keeps personal data regarding non-selected projects for the duration required to evaluate the projects, after all appeal procedures have expired. The retention period for data relating to selected and funded projects runs for the duration required for the project to be monitored and controls to be carried out by authorised bodies²⁹.

The data collected for this purpose can only be disclosed to the relevant departments of the ANR, peer reviewers, and evaluation panel members, for projects they are involved in, and, where relevant, to regulators, departments within the ANR and administrations.

The applicants – scientific coordinators, partner's manager and participants - have the right to access, rectify and delete any information that concerns them. They are entitled to exercise their rights by contacting the ANR Data Protection representative at : dpd@agencerecherche.fr

For more information, please refer to your rights on the [CNIL](https://www.cnil.fr/) (French National Commission for Data Protection and Liberties) website at <https://www.cnil.fr/>.

²⁶ Defined in Decree No.2006-963 of 01 August 2006 on the organisation and operation of the ANR.

²⁷ Last name, first name of the researchers, date of birth, personal details, degree(s), position (current and previous), areas of work, organisation, address(es), curriculum vitae, ORCID number, project name and reference, pre-proposals, project proposals (scientific document, administrative and financial appendix).

²⁸ General regulation (EU) No. 2016/679 on the protection of personal data.

²⁹ 10 years from the date when the grant was awarded for controls by the European Commission

Details regarding the safeguards taken by the ANR to protect the personal data it collects and processes are notified to data subjects when entering said data in the corresponding data processing systems³⁰.

E.2. Disclosure of documents

The ANR may be required to communicate a number of data and documents to constituents, other French or foreign funding agencies, other administrations (including its supervising authorities), regulators, under collaboration agreements, open public data, access to administrative documents³¹, exchanges between administrations and the re-use of public sector information³². Such communication can include, for example, project characterisation data, expertise, the evaluation panel's summary report, project proposals, contract documents, scientific documents, administrative and financial appendices.

The dissemination and communication of such administrative data and documents are carried out in compliance with applicable regulations, and are subject to the protection of personal data, intellectual property and trade secrets. Indeed, a number of documents or data collected must not be disclosed or may only be done so in a restricted manner. In the case of collaborations with other funding agencies, or co-funding especially, document disclosure and confidentiality are regulated by contracts. The disclosure of documents will be limited to the area of collaboration between the ANR and project coordinating institutions.

F. Scientific themes of the 2025 Generic Call for Proposals

Each scientific theme corresponds to one scientific evaluation panel (CES) of the same name. Selecting the scientific theme most in line with the scientific objectives of your project therefore amounts to selecting the scientific evaluation panel in charge of evaluating your project.

The outlines of the scientific themes may have evolved in comparison with the AAPG 2024 call. The scientific coordinators are invited to carefully read the description of the scientific themes of the 2025 AAPG below before making their choice in the submission and registration Website.

As a reminder of the section. [SB](#) « *Submission, evaluation and funding of projects under the 2025 AAPG* », the scientific theme selected when submitting or registering a project in step 1 cannot be modified during the call evaluation and selection process.

Mobilising science to implement the 2030 Agenda³³ of the United Nations Sustainable Development Goals presents a major challenge for research and innovation for the next decade, particularly in terms of driving coherent digital, energy, social and ecological transitions, without leaving anyone out. In this context, the main "Sustainable Development Goals (SDGs)" concerned will be listed for each scientific theme.

³⁰ IRIS and SIM website, processing for project monitoring, project portfolios and data analyzes.

³¹ French Act No. 78-753 of 17 July 1978 on the communication of administrative documents, Act No. 79-587 of 11 July 1979 on the motivation of administrative acts, Act No. 2000-321 of 12 April 2000 on the rights of citizens in their dealings with administrations.

³² Order No. 2016-307 of 17 March 2016 codifying the provisions on the re-use of public information in the French Code of Relationships between the public and the administration, and its implementing Decree No. 2016-308 of 17 March 2016.

³³ <https://www.agenda-2030.fr/>

« Environmental sciences » field

Theme A.01 : Solid Earth and fluid envelopes

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This research theme focuses on projects that seek to gain fundamental knowledge on the functioning of all abiotic and biotic compartments (geosphere, hydrosphere including oceans, atmosphere, critical zone and related biosphere, etc.) of the Earth and its major cycles. The processes in question are couplings, interactions, interfaces and continuums between these compartments and their impact on the major cycles. Its scientific scope includes in particular the following topics:

- atmospheric chemistry (transformation, outcome and dissemination of chemical species, micro-contaminants, aerosols and bioaerosols);
- atmospheric dynamics from the boundary layer to the upper atmosphere, and interactions with the continental and oceanic surface;
- the land-coast-ocean continuum including continental and marine processes in the interface domains (coast, estuaries/deltas);
- the functioning and evolution of climate and major cycles (water, carbon, nitrogen and other substances, nutrients);
- cryosphere climate interactions;
- the interfaces and links between the major compartments, the different dynamics (different functional, spatial and temporal scales, etc.);
- the use of "Earth archives" to understand the crises and changes in a continuum in the long/short term linked to the problems of the Anthropocene;
- knowledge of hazards and extreme hydro meteorological phenomena (linked with climate change in particular) and telluric (microflora);
- knowledge of geological media interacting directly or indirectly with the atmosphere and hydrosphere, including ecosystems and environmental impacts associated with deposits of mineral resources.

Related key words:

Research objects: Earth system and scale interactions ; atmosphere ; oceans ; humid zones ; cryosphere ; snowpacks ; continental surfaces ; interfaces ; visible and invisible biosphere for its impact on major cycles ; greenhouse gases ; aerosols ; biogeochemical cycles (nitrogen, carbon, iron, phosphorus, rare earth elements, silicon, etc.) ; soils ; Earth-sea continuum (coast, estuary/delta); erosion process and assessment; lithosphere; time series (incl. proxies) and retro-analyses ; coupling and coupled approaches (multi-sensor approaches/spatial and temporal multi-scales including remote sensing) ; modelling ; experimentation ; observation ; climate models ; carbon sequestration in the soils ; mechanisms and process of erosion ; response by the critical zone to global changes ; paleoenvironments similar to those of the Anthropocene ; glacial cycles ; environmental impacts of mineral resources ; optimization of the exploitation of deposits, underground, the mining environment ; fluid-rock interaction ; cloud cover ; water mass interactions (surface, groundwater, sea) ; natural hazards.

Research approaches: environmental chemistry ; isotopic chemistry ; geochemistry ; geology ; geophysics ; sedimentology ; stratigraphy ; pedogenesis ; geodesy ; meteorology ; geomorphology ; oceanography ; hydrology ; hydrogeology ; glaciology ; climatology ; remote sensing ; petrology ; mineralogy ; microbiology.

Related ERC code: PE04, PE10, LS08

Related SDG: 6, 13, 14 et 15

Theme A.02 : Living earth

Contacts : dimitri.neaux@agencerecherche.fr ; anne-helene.prieur-richard@agencerecherche.fr

This research theme concerns projects that seek to gain fundamental knowledge on biodiversity and the (spatial and temporal) dynamics of continental, marine, atmospheric and mixed ecosystems (coast, lagoons, etc.) with little if any anthropised systems, past or present. Its scientific scope covers :

- global description of biodiversity ;
- knowledge of functional and population ecology, conservation or restoration ecology ;
- the dynamic functioning and resilience of ecosystems, identification of tipping points ;
- the origin, characterisation, evolution and dynamics of species, populations and communities and their interactions ;
- the responses (morphological, physiological, behavioural and evolutionary) of organisms, populations, communities (for all species), ecosystems (terrestrial, aquatic, marine, atmospheric, mixed) to variations in biotic and abiotic environments ;
- all clades in these ecosystems ;
- the different levels of organisation, from molecules to ecosystems ;
- models and scenarios for the future of biodiversity.

Related key words:

Research object: acclimatisation ; adaptation ; protected areas ; biodiversity ; connectivity ; conservation ; freshwater and marine environments (including coastal and lagoon) ; invasive species ; rare species ; experiments and system modelling ; forest ; systems integration ; migration ; terrestrial environments ; modelling ; observation ; trophic networks ; resilience ; restoration ; rhizosphere ; soils.

Research approaches: biogeochemistry ; evolutionary biology ; functional ecology ; ecology ; ecophysiology ; ethology ; population genetics ; genomics ; metagenomics ; metatranscriptomics ; microbiology ; phylogeny ; phylo-geography ; systematics.

Related ERC code: PE01, PE06, PE10, LS02, LS03, LS06, LS08, LS09

Related SDG: 13, 14 et 15

Theme A.03 : Biology of animals, photosynthetic organisms and micro-organisms

Contacts : jannatul.mia@agencerecherche.fr ; isabelle.hippolyte@agencerecherche.fr

This research theme concerns fundamental plant and animal biology with a cognitive approach towards long or very long-term practical applications on living species and applied plant and

animal biology projects for livestock, food-producing animals, all photosynthetic organisms of interest, their dedicated models and associated organisms (micro-organisms, microbiota, pests, beneficial insects, etc.) and the interactions between these organisms.

All levels of regulation (genomic, transcriptomic, epigenetic, translational, metabolic, physiological, developmental, etc.) are concerned. Proposals are part of a continuum of scale from the gene and/or the molecule, to the cell, the individual and the population.

Related key words:

Studied organisms: algae ; animal ; pests ; crop ; fungi ; pollinators ; holobiont ; microorganism ; model species ; photosynthetic organism ; plant ; weeds.

Research object: aquaculture ; biocontrol ; animal behavior ; determinism of animal welfare ; development ; farming ; embryogenesis ; organogenesis ; parasitism ; animal nutrition ; plant nutrition ; reproduction ; biological networks ; plant health ; animal health ; symbiosis ; allelopathy ; stress ; adaptation ; regulation.

Discipline: biochemistry ; bioinformatics ; biostatistics ; ecophysiology ; epigenetics ; genetics ; genetic engineering ; metabolomics ; metagenomics ; microbiology ; modelling and predictive approaches ; physiology ; proteomics ; transcriptomics ; signal transduction ; virology.

Related ERC code: LS01, LS02, LS03, LS05, LS06, LS08, LS09

Related SDG: 2, 12, 14, 15

Theme A.04 : Food and food systems

Contacts : florence.helft@agencerecherche.fr ; marie-josephe.amiotcarlin@agencerecherche.fr

This research theme is open to fundamental or applied research proposals on food, food systems and sectors that ensure food security, improve nutrition and contribute to healthy and sustainable diets for all. These proposals may address the following themes:

- human nutrition biology, in particular sensitive groups (infants, children, pregnant women, the elderly), provided that the projects do not focus on diseases ;
- the evolution of food technologies and processing, the traceability processes (heterogeneity of raw materials, authenticity, labelling, etc.), the development of low energy and low water processes, robustness, optimal use of resources and waste reduction ;
- food safety, (benefit risk analysis of food systems in transition, pathogen dynamics and contaminant flows, etc.) ;
- the determinants and impact of diet transition and changes in consumption behaviour ;
- the social and economic organization of food system actors, from producers to consumers ;
- systemic approaches to food and diet quality (from farm to table), including microbial flows along food chains ;
- innovations: product, technological, numeric and organizational innovations to support transitions toward healthy and sustainable diets.

The general goal is to propose a food offer that meets the objectives of sustainable development (<https://www.un.org/sustainabledevelopment/fr/>) and the needs of consumers, respecting their well-being and health. This offer should be accessible to all, favorable to the environment and promotes the economic and social development of territories.

Related key words: access to food ; food; food supply; cultural and biologic anthropology ; multi-actor approaches ; biochemistry; food biotechnology ; food chemistry ; "clean label" ; competitiveness ; preservation ; food contaminant ; decontamination ; supply chain ; packaging ; economics ; epidemiology; fermentation ; food sectors ; formulation ; taste and sensoriality; governance ; ingredient ; microbiota-host-food interaction ; markets; contact material ; food microbiology ; predictive microbiology ; nutrition; pathogens ; physical chemistry ; physiology ; health prevention ; food and nutritional security ; specific populations ; consumption practices ; processes ; participative research ; regulations ; food and nutritional security ; sociology ; food toxin

Related ERC code: LS09, PE04, PE05, PE08, LS06, LS07, LS08, SH01, SH02, SH03

Related SDG: 1, 2, 3, 8, 10, 12

“Materials Science and Engineering” field

Including seven complementary scientific themes, this field aims to support basic research in the disciplines of material sciences: two themes in materials science, one theme in engineering and process sciences, two themes in chemistry and two themes dedicated to physics. The main evolution of this field compared to the previous AAPG call is the reconfiguration of the field of “physics”, which is now the subject of two themes (B.06 and B.07) instead of a single one previously. **This modification results in a renumbering of the themes in the “Materials Science and Engineering” field.** Theoretical physics that was previously in theme G.02 has been integrated into the new theme “[Theme B.06 Physics of fundamental concepts and physics of dilute matter](#)”.

These disciplines are also involved in other scientific themes included in other fields of the call, particularly in themes aimed to support research in a specific application (energy, micro and nanotechnologies for information and communication, health technologies, biomedical innovation and ecotechnologies, etc.) or themes dedicated to a cross-disciplinary sub-field with several applications (sensors, imagers and instrumentation or nanomaterials, for example).

Theme B.01 : Polymers, composites, chemical physics of soft matter

Contact : nela.roy@agencerecherche.fr

The scope of this research theme covers:

- the design and use of new, non-toxic monomers, oligomers and polymers, the functionalisation of natural and synthetic polymers and precision macromolecular chemistry as well as the development of synthesis pathways of polymer materials resistant to extreme conditions, resins for composite materials with polymerisations controllable at moderate temperatures, or systems for additive manufacturing. Proposals for material synthesis chemistries allowing for effective recycling of polymers will also be appreciated.
- the physical chemistry and engineering of soft matter. Proposals are expected relating to the production of synthons that, through their self-assembling or self-organization properties, enable the construction of supramolecular organisations,
- the study and understanding of structure-property relations and multi-scale modelling of soft matter, polymer and composite materials with the goal of predicting their properties, including ageing,

- the development of polymer-based materials with special properties (thermomechanical, self-healing, etc.) for specific applications (sensors, membranes, smart textiles, etc.),
- organic matrix composite materials concerning various industrial sectors (aviation, automotive, construction, energy, health, etc.) and work aimed at improving their thermal and mechanical properties, improving their recyclability or introducing functional properties.

This community involved will link chemists, physical chemists and physicists. Proposals will be placed under one of four topics:

- chemistry and synthesis of polymers,
- supramolecular chemistry and physical chemistry and molecular assembly,
- functional polymeric and composite materials,
- polymer surfaces and interfaces,
- processes and development of new technologies for synthesis and shaping.

The projects will aim to take into account the challenges of sustainable development.

Projects using or shaping bio-sourced materials must be covered in [Theme H.07 : Bio-economy, from biomass to uses: chemistry, materials, systematic approaches and processes.](#)

This theme also complements the [Theme B.03 : Engineering and process sciences](#): if the project is aimed primarily at the study of the mechanical behaviour of composite structures (behaviour, damage, etc.), it must be submitted under theme B.03.

Related key words: supramolecular chemistry and physics; synthesis of supramolecular and macromolecular objects; self-assembly; properties of supramolecular and macromolecular objects; sustainability and life cycle of supra- and macromolecular systems; containment; encapsulation; polymer chemistry; polymerisation processes; photochemistry; additive manufacturing; polymer shaping processes; properties of function polymeric materials (composites, hybrids, biomaterials, membranes. etc.); functionalisation; organic matrix composites; structural and mechanical properties of organic biomaterials; structural characterisation; impregnation resins; molecular and hybrid materials; thin films; bio-inspired systems; soft matter; complex fluids; oligomers; liquid polymers; surfactants; liquid crystals; micelles; vesicles; colloids; gels and hydrogels; molecular machines; stimuable systems; molecular recognition; surfaces and interfaces; microreactors; miniaturisation; waste reduction

Related ERC code: PE03_13 (Structure and dynamics of disordered systems, e.g. soft matter, granular matter, liquids, glasses, defects), PE04, PE05, PE11

Related SDG: 9 et 12

Theme B.02 : Metallic and inorganic materials

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This theme aims to support research projects in the field of metallic and inorganic material science, relying on the disciplines of solid chemistry and condensed matter, solid state physics, metallurgy and the mechanics of solids.

The scope of this research theme covers:

- metal or ionocovalent type materials (metals and alloys, ceramics and glasses, inorganic compounds, hybrids, natural materials, etc.) and surfaces and interfaces that are associated with them:
- the development of new materials and innovative approaches both in terms of the implementation processes and the desired properties,
- surface treatments or thin film coatings conferring new characteristics or functionalities to the solid material,
- recycling and strategic element substitution aspects (scarcity, chemical risk, costs, etc.),
- new materials for use under severe energy, mechanical or chemical stresses.

Proposals will therefore come under the following five topics:

- inorganic functional materials,
- metallurgical science and engineering,
- surface and interface: functionalisation, surface treatment,
- assemblies,
- fabrication of materials.

This theme also complements the [Theme B.03 : Engineering and process sciences](#) with regard to the development and production of materials: projects aimed primarily at studying and understanding the (mechanical) properties of a material obtained by using a specific development process (not necessarily innovative) must be submitted under this theme. However if the main innovation proposed concerns the development or production process, it must be submitted under [Theme B.03 : Engineering and process sciences](#).

The projects will aim to take into account the challenges of sustainable development.

Related key words: functional properties; multi-scale approaches to characterisation and simulation; multi-physical couplings; metallurgical thermodynamics; preparation and shaping processes (by machining and treatment, additive manufacturing, innovative synthesis, etc.); microstructures; solid-state chemistry; tribology; surfaces; interfaces; damage; fatigue; corrosion; coatings; thin films; recycling; structural materials; structural and mechanical properties of inorganic biomaterials

Related ERC code: PE03, PE04, PE05, PE07, PE08, PE11

Related SDG: 9 et 12

Theme B.03 : Engineering and process sciences

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This research theme aims to support basic research in the following fields covering engineering sciences and process sciences, to improve the state of the art and knowledge, and to develop innovative methods, tools and technologies in these fields:

- processes and technologies for the development and manufacturing of materials, components, microsystems and structures (plasma processes, deposition, additive manufacturing, extrusion, laminating, assembly, etc.),

- chemical process engineering, bioprocesses, intensified and multifunctional processes, mechanical or thermal processes, eco-efficient methods,
- control and optimisation of processes, flows and transfers, mixtures,
- fluid mechanics (dynamic, fluid/structure interactions, fluid/material reactive interface, etc.), aerodynamics,
- acoustics, aero-acoustics,
- electrical engineering, provided that the project does not have an energy purpose (for example in microelectronics or in the field of health or sensors). On the other hand, if the project aims to contribute to the transformation, distribution or use of electricity (electrical machines, electrical transformers, power electronics, electrical networks, etc.), it must be submitted in the most relevant themes of the energy domain (i.e. [Theme H.08 : Basic energy science](#) or [Theme H.09 : Sustainable, clean, safe and efficient energy](#)),
- mechanics, structural engineering, geotechnical engineering,
- biomechanics and bio-engineering mechanics,
- bio-inspiration for engineering, biomimetic engineering,
- systems engineering.

This theme is open to a broad spectrum of scientific approaches: modelling and simulation, experiments, etc. and coupled approaches in particular.

This scientific theme does not target specific applications. It is complementary to themes dedicated to a specific application, which may also include projects mobilising engineering sciences from this perspective (for example, energy for [Theme H.08 : Basic energy science](#) and [Theme H.09 : Sustainable, clean, safe and efficient energy](#) or the medical field for theme [Theme H.13 : Healthcare technologies](#)).

It is also complementary to the themes focused on materials science and which mainly mobilise physics and chemistry but which also target questions of mechanics and behaviour/resistance at the materials level ([Theme B.01 : Polymers, composites, chemical physics of soft matter](#) and [Theme B.02 : Metallic and inorganic materials](#)).

Lastly, it is complementary to [Theme H.19 : Industry and factory of the future: People, organisations, technologies](#), which covers manufacturing issues on a more integrative scale (organisation based on process, automation, production chain, product industrialisation, etc.) than here.

Related key words: development and manufacturing processes and technologies; additive manufacturing; process engineering; chemical engineering; bioprocesses; eco-efficient methods; thermodynamics; fluid mechanics; acoustics; electrical engineering; structural mechanics; structural engineering; geotechnical engineering; biomechanics; mechanics for bioengineering; bio-inspired engineering; systems engineering

Related ERC code: PE07_03, PE07_04, PE08 (except PE08_06 Energy processes engineering), PE11

Related SDG: 9

Theme B.04 : Molecular chemistry

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This scientific theme is dedicated to supporting research in molecular chemistry. Any fundamental advance or ground-breaking concept in chemical synthesis, the choice of raw materials used, molecules and compounds obtained, processes implemented, etc., for which innovations can subsequently be developed, has a significant potential application for the chemical industry and, more broadly, numerous industrial sectors that use chemical products.

The projects will aim to take into account the challenges of sustainable development.

This theme covers three additional subjects:

- the development of new reaction schemes or new molecules. Proposals on more environmentally friendly synthesis pathways as well as the synthesis of molecules of interest are expected,
- catalysis in general (enzymatic, heterogeneous, homogeneous or multiple, assisted). The stability and recycling of catalysts and the use of non-toxic metals or ligands will be targeted. Combination with activation processes may also be dealt with,
- eco-efficient processes and new reaction media.

The projects submitted under this theme can be experimental, theoretical technological or industrial. They may cover all manufacturing phases, from the selection of raw materials to the development of the reaction pathway.

Projects whose main problem or scientific or technological hurdle concerns chemical process engineering must be submitted under [Theme B.03 : Engineering and process sciences](#).

Projects at the chemistry-biology interface whose object and/or scientific challenge essentially concern synthetic chemistry must be submitted in this present axis. On the other hand, interface projects oriented towards an application, an object or a scientific challenge mainly related to biology must be submitted under [Theme C.01 : Biochemistry and chemistry of living organisms](#).

Projects addressing bio-sourced chemistry must be submitted under [Theme H.07 : Bio-economy, from biomass to uses: chemistry, materials, systematic approaches and processes](#).

Projects aimed at the construction of supramolecular or macromolecular objects with a view to their use in the field of polymers and/or materials must be submitted under the [Theme B.01 : Polymers, composites, chemical physics of soft matter](#). However, supramolecular chemistry projects not aimed at this type of application must be submitted under this theme.

Related key words: new families of molecules; synthesis methodology; design of new ligands; structure-property relationship; chirality and asymmetric synthesis; bond activation and reaction processes; heterocyclics; hetero-element chemistry; organometallic catalysis; electrocatalysis; photocatalysis; multicatalysis (dual, hybrid, tandem); supported catalysts; redox catalysis; bio-mimetic catalysis; enzymatic catalysis; artificial enzymes; total synthesis; mechanistic studies; physical methods of activation (ultrasound, microwave, high pressure, mechanochemistry...); cascade reactions; tandem reactions; one-pot reactions; flow synthesis; extraction and separation; innovative reaction media; eco-compatible and sustainable synthesis (solvent-free, waste reduction, catalyst recycling, alternatives to rare and/or toxic metals...)

Related ERC code: PE04, PE05

Related SDG: 9 et 12

Theme B.05 : Analytical chemistry, theoretical chemistry and modelling

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This theme welcomes proposals where the core research mainly targeted fundamental science and techniques in the following chemistry disciplines:

- theoretical chemistry/modelling,
- analytical chemistry,
- spectroscopy and spectrometric techniques,
- innovative instrumentation for chemistry.

It also covers methodological and instrumental developments for spectroscopies and theory.

Related key words: theoretical chemistry; modelling/simulation (molecular dynamics, ab initio methods, Monte-Carlo, etc.); physical chemistry (photochemistry, electrochemistry, thermodynamics, etc.); chromatography; NMR; EPR; spectroscopies (UV-visible, IR, Raman, X-rays, etc.); electron spectroscopy; mass spectrometry; miniaturisation; imaging; trace detection; structural properties

Related ERC code: PE04

Related SDG: 9

Theme B.06 : Physics of fundamental concepts and physics of dilute matter

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The scope of this research area mainly covers fundamental physics themes, corresponding essentially to the ERC PE02 disciplines (except for sub-disciplines PE02_02, 03, 04, 06 et 07) "Fundamental Constituents of Matter: particle, nuclear, atomic, molecular, gas, plasma, and optical physics".

This theme concerns all innovative developments in theory and models, instrumentation, measurements, data processing and exploitation in atomic, molecular, gas, plasma, or optical physics.

This theme also supports theories and models that contribute to the understanding of the foundation of physics, including mathematical physics and algorithmic studies. Exceptions are made for those in connection with phenomenology in subatomic physics, nuclear physics, astrophysics, and cosmology which must be submitted under [Theme G.02. : Sub-atomic physics and astrophysics](#), and those relating to condensed matter physics, soft matter, or biophysics which fall under the [Theme B.07 : Condensed matter physics](#).

However, theoretical questions related to condensed matter physics and applied to experiments with quantum gases, as well as fundamental models associated with physics beyond the standard model in the context of optical, atomic, or molecular physics, fall within the scope of [Theme B.06 : Physics of fundamental concepts and physics of dilute matter](#)

Finally, projects that fall under the generic topic "Quantum Technologies" are to be addressed in [Theme E.06 : Quantum technologies](#)

Experimental, numerical, or theoretical projects are equally eligible.

Related key words: theoretical physics; fundamental models of classical and quantum gravity; mathematical physics (including integrable systems); field theory; string theory; tests of fundamental laws using low-energy experiments; fundamental aspects of equilibrium and non-equilibrium statistical mechanics; classical and quantum dynamical systems; physics of fundamental quantum processes; quantum fluids and gases; quantum information; atomic and molecular physics; atomic and molecular ions; ultra-cold atoms and molecules; trapped ions; atomic and molecular collisions; optics (nano-optics, non-linear optics, quantum optics, ultra-fast optics...); optomechanics; laser physics; radiation-matter interaction; electromagnetism; control and characterisation of waves in complex media; gas and plasma physics; laser-plasma interaction; confinement fusion; aggregates; non-linear physics; atomic and molecular spectroscopy; instrumental developments; metrology

Related ERC code: PE02_01, PE02_05, PE02_08 à PE02_18

Related SDG: 9

Theme B.07 : Condensed matter physics

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The scope of this theme covers a broad field of physics, mainly fundamental, corresponding essentially to the ERC PE03 disciplines “Physics of condensed matter: structure, electronic properties, fluids, nanosciences, biophysics”.

Soft matter physics, traditionally part of the physics of condensed matter, is covered by this theme. However, proposals concerned with the physical chemistry of soft matter must be submitted under the [Theme B.01 : Polymers, composites, chemical physics of soft matter](#).

Projects concerning the physics of biological systems, from the sub-cellular scale to that of tissues and/or organs are also considered in the case of innovative physics projects backed by a sufficiently detailed biological question. Similarly, the projects in this field focused on innovations in biology with implications for both cell biology and embryonic development as well as underlying molecular and genetic mechanisms, are to be addressed in Theme C.04 : Cellular biology, developmental biology and evolution

This theme also includes the interaction between radiation and condensed matter, as well as all the theory of condensed matter except for research related to quantum gases (which are in the Theme B.06 : Physics of fundamental concepts and physics of dilute matter). It also includes theoretical statistical physics in its aspects relating to soft matter, or to fluid mechanics or biophysical systems, the more fundamental or mathematical part being in theme B.06.

As for the B.06 theme, projects that fall under the generic topic “Quantum Technologies” are to be addressed in [Theme E.06 : Quantum technologies](#).

Experimental, numerical, or theoretical projects are equally eligible.

Related key words: quantum materials; topological materials; materials for optics (laser materials, non-linear materials,...); macroscopic quantum phenomena; strongly correlated fermions; superfluidity; superconductivity; magnetism and spin electronics; heterostructures and nano-objects; growth; molecular electronics; mesoscopic physics; plasmonics; photonic and electronic interactions; solid state spectroscopy; nanophotonics; frequency conversion; condensed matter theory; structure of solids and liquids; physics of mechanical behaviour; surfaces; structure and

dynamics of disordered systems; transport phenomena in condensed matter; ultra-fast dynamics in materials and nanostructures; self-organisation; fluid physics; physical hydrodynamics; turbulence; instabilities; non-equilibrium phenomena; physics of biological systems; complex and active systems; granular materials; morphogenesis; instrumental developments; metrology

Related ERC code: PE03

Related SDG: 9

« Life Sciences » field

The 11 themes of the “Life Sciences” domain and the cross-cutting themes H.03 and H.13 aim to cover the entire “Biology Health” domain. Translational research projects (PRT-S) submitted to all of these themes as well as to the cross-cutting themes H.02, H.03, H.04, H.13 and H.14 can request co-financing from the DGOS if one partner in the project is a health care establishment. In this case, the coordinators must consult the specific annex to the PRT-S (available in September on the web page dedicated to 2025 AAPG). The priority “Autism within neurodevelopmental disorders” concerns projects submitted in themes C.03, C.04, C.07, C.08, C.09, C.10, D.04, H. 13 and H.14. The priority “Translational research on rare diseases” concerns all 11 axes of the “Life sciences” domain and the cross-cutting themes H.03 and H.13.

Theme C.01 : Biochemistry and chemistry of living organisms

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This research theme seeks to characterise, modulate and model the chemical and biochemical transformations made by the cell. Its scope, at the interface between biology and chemistry, covers the following topics:

- enzymology, pharmacology, toxicology, medicinal chemistry, chemobiology, bioorganic chemistry, bioinorganic chemistry
- studies on metabolism and bioenergetics,
- signalling pathways and post-translational changes,
- chemical changes to biomolecules, natural or not (nucleic acids, proteins, glycans, etc.) and their potential applications,
- analytical and “omics” approaches, including quantitative proteomic, lipidomic, glycomic, metabolomic and multi-omic quantitative analyses, including in single cells
- Approaches to understand and act on living organisms and their applications to the detailed analysis of mechanisms in functional biology (including functional studies of the Human proteome) and in health and environment (synthesis, screening and molecular engineering, probes, modulators, chemical proximity inducers, ligands, molecules for diagnostic or therapeutic purposes),
- the design of new biological systems (synthetic biology) and the controlled alteration of metabolic and biological macromolecular production pathways, in an attempt to understand the fundamental mechanisms of living organisms or to develop their biotechnological applications.

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for translational research projects that include a partner health care facility.

Related key words: biochemistry; chemobiology; bio-organic chemistry; bio-inorganic chemistry; metals and living organisms; enzymology; pharmacology; toxicology; medicinal chemistry; bio-energetics; glycobiology; proteomics; lipidomics; glycomics; metabolomics; synthetic biology; molecular engineering; screening; biotechnologies

Related ERC code: LS01, LS02, LS04, LS07, LS08, LS09, PE04_11 (Physical chemistry of biological systems), PE5_11 (Biological chemistry and chemical biology), PE5_18 (Medicinal chemistry)

Related SDG: 3, 9, 14 et 15

Theme C.02 : Characterization of structures and structure-function relationships of biological macromolecules

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This research theme aims at studying the molecular mechanisms of living functions through structural biology, advanced imaging, physico-chemistry and biophysics approaches. It covers the following topics:

- the study of biological mechanisms both in vitro (isolated, reconstituted or native multimolecular architectures) and in their natural environment, at the sub-cellular and cellular scales (isolated cells, multicellular systems up to the organ);
- structural biology approaches aimed at predicting and solving the structures of biological macromolecules and their complexes (including endogenous native complexes) and deciphering their structure-function relationships;
- biophysical approaches for the study of macromolecules, their functions, interactions and dynamics, in isolation and in the cellular context;
- the association of the most efficient cellular imaging techniques with data acquired through omics techniques;
- the characterization, modelling and reconstruction of networks of interactions involving supramolecular complexes and their disruption, for example during a pathological process;
- technological or methodological developments: in structural biology (NMR, crystallography, cryo-electron microscopy, cryo-electron tomography, etc.); in structural spectroscopy (IR, EPR, etc.); in imaging (super-resolution microscopy, correlative microscopies,...); in signal processing, including multi-modal data integration and artificial intelligence approaches; in molecular dynamics.

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for translational research projects that include a partner health care facility.

Related key words: structural biology; cell structural biology; integrative structural biology; correlative approaches; structure-function relationships of biological macromolecules and their complexes; structure-function relationships of membranes; compartments without membranes; biophysics; single molecules; methodological developments; systems biology; modelling; interaction networks; artificial intelligence

Related ERC code: LS01, LS02, LS09, PE03

Related SDG: 3, 9, 14 et 15

Theme C.03 : Genetics, genomics and RNA

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This research theme covers the following topics:

- the deciphering of general mechanisms and regulations responsible for the 3D organization of genomes and chromatin and its epigenetic changes (role of gene genetic entities, non-coding DNA, transposable elements, non-coding RNA and RNA-protein interactions, etc.), including links with environmental conditions (exposome);
- the detailed studies of replication processes, repair, transcription, recombination, maturation, translation and transport of RNA, as well as transcriptional, post-transcriptional and translational regulations/deregulations, including by non-coding RNAs,
- the analysis of mechanisms required to maintain genome integrity and the faithful transmission of genetic information, as well as the mechanisms and major basic principles of genome organisation, variability and evolution,
- the transgenerational heredity of epigenetic changes;
- characterisation of the genotype-phenotype relationship, including the study of genetic diseases and complexes, and the role of the exposome in this relationship.

The research will be conducted at the molecular and cellular scale, on bacterial, archaeobacterial, single-cell and multi-cell eukaryotes, animal or plant models, or on cohorts of patients and control populations, using molecular, cellular, genetic, transcriptomic, proteomic and multidisciplinary approaches including structural biology, biophysics, computer science and/or mathematics. However, the development of one of the last 4 approaches should not be the only objective of the project.

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for projects that include a partner health care facility.

Related key words: replication; repair; recombination; structure and dynamics of chromatin and bacterial nucleoid; epigenetics; gene expression; transcriptomics; non-coding RNAs; RNA maturation; ribosomes; genome translation-evolution; genetic diversity; genetic diseases; genotype-phenotype relationships; exposome; genetic tool developments; epitranscriptome

Related ERC code: LS02, LS01, LS08, LS09

Related SDG: 3, 9, 14 et 15

Theme C.04 : Cellular biology, developmental biology and evolution

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This research theme covers the following topics:

- an understanding of the basic biochemical and biophysical mechanisms associated with living cells: cell cycle, biogenesis and dynamics of intracellular organelles and the plasma membrane, molecular mechanisms of senescence, ageing and cell death, signal reception and transduction, homeostasis and differentiation of different cell types, maintenance and differentiation of stem cells, cell adhesion, cell movement and migration,

- an understanding of these mechanisms at the tissue level in the organism or in multicellular systems reconstituted in vitro (organoids, tissue engineering) to decipher the basic principles of cell homeostasis, morphogenesis, the embryonic and post-embryonic development of animal and plant tissues, the ageing of eukaryotic tissues and multi-cellular organisms as well as the organisation of prokaryotic cell colonies,
- an understanding of these mechanisms in the context of the evolution of species and the adaptation to environmental conditions.

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for translational research projects that include a partner health care facility.

Related key words: intracellular trafficking; cell cycle; senescence; apoptosis; cellular homeostasis; cell differentiation and function; adherence-cell movement and migration; tissue homeostasis; morphogenesis; stem cells; developmental biology; signalling; evolutionary biology; cell physics; gametogenesis

Related ERC code: LS03, LS08

Related SDG: 3, 9, 14 et 15

Theme C.05 : Physiology and pathophysiology

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This research theme covers the following topics:

- an understanding of the hierarchical assembly of molecular and cellular components of tissues and organs as well as of the underlying signalling pathways (including metabolic), their interactions and the physiological properties generated by these interactions,
- an understanding of these interactions and properties within organisms as a whole, including microbiota and at the interface with the environment and inter-organ dialogue;
- an understanding of the mechanisms of alteration in pathological processes including the use of organoids.

Multidisciplinary proposals dealing with all biological, nutritional, behavioral, psychological and social determinants underlying physiological and/or pathological functioning may be evaluated in this theme. Projects that mainly address a neural aspect of these determinants should be submitted in the Theme C.07 : Molecular and cellular neuroscience – Developmental neurobiology or in the [Theme C.08 : Integrative and cognitive neuroscience](#).

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for translational research projects that include a partner health care facility.

Related key words: physiology; pathophysiology; systemic and comparative physiology/pathology; multifactorial chronic diseases; diseases and ageing; metabolism and nutrition; microbiome; reproductive biology

Related ERC code: LS04, LS07

Related SDG: 3, 9, 14 et 15

Theme C.06 : Immunology, infectiology and inflammation

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This theme covers the following topics:

- characterization of the molecular and cellular mechanisms involved in the immune system of organisms and inflammatory reactions during adaptive and innate immune responses, in order to establish an integrated analysis of the immune system in normal and pathological situations, including immunodeficiency, hypersensitivity, auto-immunity, auto-inflammation and transplantation. This includes mechanistic studies of the effect of hyperactivation of the systemic immune and inflammatory system,
- the mechanisms used by human and animal pathogens to take advantage of host cellular factors for their survival, dissemination and transmission throughout the body;
- the identification of infection restriction factors in humans and animals;
- the study of the molecular and cellular mechanisms allowing the development and homeostasis of the different components of the immune system, in normal or pathological conditions, including inflammation, allergy, autoimmunity and host-microbial relationships at all scales (cell, organ, organism, microbiome) and at all ages of life, including faeto-maternal. This includes the development of new models and mathematical and bioinformatics approaches to better understand these processes;
- the long-term evolution of infectious diseases and the impact of infectious diseases on chronic diseases.

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for translational research projects that include a partner health care facility.

Related key words: immune defenses; infectious diseases; host-pathogen interactions; pathogenicity of bacteria, viruses and parasites; inflammation; homeostasis and deregulation of the immune system; microbiology; microbiota; symbiosis/dysbiosis; immune deficiencies; allergies; autoimmunity; inflammatory process; modelling; graft response; immunotherapy approaches; biomarkers

Related ERC code: LS06

Related SDG: 3, 9, 14 et 15

Theme C.07 : Molecular and cellular neuroscience – Developmental neurobiology

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This research theme covers the following topics:

- all studies at the molecular and cellular scale designed to understand the mechanisms governing the establishment, functioning, dynamics and plasticity of the nervous system and sensory organs under normal or pathological conditions (including neurovascular and neuroinflammatory components),
- the logic of the hierarchical structure of the molecular, cellular and tissue components of the nervous system and sensory organs, the relationships between their dynamics and their plasticity and the nervous system's functional properties,
- understanding the mechanisms and identifying the molecular and cellular determinants involved in psychiatric diseases, addiction, neurodevelopmental diseases and autism spectrum disorders, neurodegenerative diseases and rare diseases affecting the nervous system and

sensory organs. The neurovascular and neuroinflammatory components of these pathologies are also included, except for non-neuronal aspects, which are evaluated by the [Theme C.05: Physiology and pathophysiology](#).

All invertebrate and vertebrate animal models are considered under this theme, together with experimental and technological approaches and their development (imaging, computation and models, artificial intelligence, behavior, electrophysiology, pharmacology, optogenetics, etc.) relating to these studies.

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for translational projects that include a partner health care facility.

Related key words: neurogenetics; cellular neurobiology; biophysics; neuropharmacology and neurophysiology; neurodevelopment; sensory organs; neurodegenerative diseases; addictions; psychiatry; mental health

Related ERC code: LS05, LS03, LS07

Related SDG: 3, 9, 14 et 15

Theme C.08 : Integrative and cognitive neuroscience

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This research theme covers the following topics:

- all integrative studies intended to understand high-level brain properties and functions,
- the different levels of organization, hierarchy and interactions specific to the functioning of the brain, e.g. those involved in multi-sensory integration, object and action recognition, decision-making, memory, behaviour, cognition and the state of consciousness, the specific aspects of the human brain including its social - e.g. self-awareness, language, relationships with others - and pathological dimensions,
- the mechanisms and biological and social determinants of behaviour and learning, of mental health disorders, neurodevelopmental diseases and autism spectrum disorders, neurodegenerative diseases, addictions and rare diseases affecting the nervous system to prevent and treat them with the objective of promoting complementary aspects and synergies between basic research and preclinical and clinical research in the field of mental health, psychiatry and addictions,
- nervous system pathologies including cerebrovascular diseases and pathologies of the sensory organs except for non-neural aspects that are covered by the “Physiology and Physiopathology” theme.

Experimental approaches include in-vivo functional and multi-modal imaging (MRI, fMRI, PET, photonics, ultrasound NIRS, MEG, EEG, surface/intracranial/mobile EEG et neurostimulation (tACS, tDCS, (r)TMS)), electrophysiology, computational analysis, brain-machine interface, artificial intelligence, behaviour, optogenetics and psychophysics, etc...

An epidemiological approach to health inequalities in the mental health area is covered by the Theme H.04 : Public health, health and societies and related technology approaches fall under the [Theme H.13 : Healthcare technologies](#).

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for translational projects that include a partner health care facility.

Related key words: cognition; behavior; computational neurosciences; psychiatry; mental health; neurodegenerative diseases; addictions; physiopathology and clinical approaches; cross-sectional studies; diseases affecting sensory organs

Related ERC code: LS05, LS07, SH04

Related SDG: 3 et 9

Theme C.09 : Translational health research

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The goal of this research theme is aimed at funding studies positioned downstream from exploratory research projects carried out in research laboratories and upstream of clinical projects supported by the Hospital Clinical Research Programme (PHRC), managed by the Directorate-General for Healthcare Provision (DGOS).

Proposals, which aim at the formulation of new hypotheses, that can subsequently be tested in a clinical research framework and are therefore located at the interface between basic and clinical research, are reviewed in this research theme.

Tissue engineering and regenerative medicine projects are supported under the [Theme C.11 : Regenerative medicine](#).

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for translational research projects that include a partner health care facility.

Related key words: new therapeutic approaches; new diagnostic approaches; physiology; pathophysiology; personalized medicine; biomarkers; epidemiology; cohorts

Related ERC code: LS07, LS04

Related SDG: 3

Theme C.10 : Biomedical innovation

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This research theme covers the following topics:

- the study and validation of new therapeutic targets,
- the design and development of chemical or biological therapeutic products (including vaccines and nanomedicine),
- the new biomedicine formats optimised for production processes not related to regenerative medicine,
- relevant animal models for the biological and/or pre-clinical assessment of products of therapeutic interest,
- vaccine prevention methods;
- diagnostic and prevention tools and products,
- biomarkers.

PRCE projects are especially well suited for this theme to take into account the applications of the proposed research and their possible development (cf. description of the PRCE instrument in [appendix 1](#))

Projects concerning medical devices, imaging and health technologies in general, fall under the specific [Theme H.13 : Healthcare technologies](#).

Tissue engineering and regenerative medicine projects fall under the specific Theme C.11 : Regenerative medicine.

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for translational research projects that include a partner health care facility.

Related key words: new therapeutic targets; drug-design; nano-medicine; vaccines; biotechnologies; biomarkers; pharmacology; medicinal chemistry; adjuvants; vectors; antibodies; biodrugs; bioproduction

Related ERC code: LS07

Related SDG: 3 et 9

Theme C.11 : Regenerative medicine

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Regenerative medicine covers all therapeutic strategies aimed at replacing, repairing or regenerating damaged tissues or organs in situ. This multi-disciplinary and translational research theme covers the following topics:

- innovative biomaterials: their characteristics and interactions with the living world and their use in tissue engineering therapeutic approaches; pure materials engineering projects are thus excluded;
- medical devices interacting with the biological environment (active devices) to offset or replace dysfunctional tissues or organs;
- research in cell and cell-free therapy for application in regenerative medicine. Immunotherapy and onco-haematology projects are excluded;
- stem cells (embryonic or induced): the study of the mechanisms of trans-differentiation/differentiation and proliferation of stem cells for their use in regenerative medicine. Basic research projects (cell biology, developmental physiology or biology) are excluded;
- in vitro physiological and/or pathological cell models (organoids, organ-on-a-chip, spheroids, etc.), including for therapeutic target identification and screening;
- research on molecular components contributing to the mechanisms of cell and/or tissue regeneration. Basic research projects (cell biology, developmental physiology or biology) are excluded;
- artificial tissues or organs: all projects aimed at developing artificial organs for therapeutic purposes and their integration into the organ. Research on the preservation and/or reconditioning of explanted human organs, transplantation of new organs or tissues, tools to help monitor tissue regeneration. Projects aimed at creating purely technological artificial organs without any biological component are excluded;

- gene therapy research to regenerate tissue or organ functionality;
- research on new tools for the clinical grade production of advanced therapy products and demonstration of proof of concept.

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for translational research projects that include a partner health care facility.

Related key words: biomaterials; medical devices; cell therapy; gene therapy; stem cells; tissue engineering; extracellular vesicles; trophic factors for tissue regeneration; organoids; organ-on-a-chip; pharmacological approaches; innovations in organ and tissue transplantation; transplantation; personalised medicine; biomanufacturing processes; proof of concept; monitoring of tissue regeneration; preclinical models; in vivo feasibility and tolerability

Related ERC code: LS07, LS09, LS3, PE05_7 Biomaterials, biomaterials synthesis, PE8_8 Materials engineering (biomaterials, metals, ceramics, polymers, composites, ...)

Related SDG: 3 et 9

« Humanities and Social sciences » field

The seven themes of the “Humanities and Social sciences” field aim to cover the entire domain. This exhaustive approach has led to the adoption of themed or disciplinary titles, depending on the case. The items selected within each theme are guidelines, not excluding other topics or issues.

Mono- or multidisciplinary projects are expected within “Humanities and Social Sciences”, whatever their approach (comparative, multi-scale, systemic, etc.) or purpose (basic or applied research, academic, economic or societal exploitation).

Collaboration with researchers or teams outside the “Humanities and Social Sciences” field fall under cross-cutting themes, with the exception(s) mentioned below in the presentation of themes.

Theme D.01 : Individuals, companies, markets, finance, management

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This theme, which covers markets, finance, management, individuals and households, is intended to welcome projects dealing with the transformation of the economic and financial sphere and of productive systems.

The projects will come under the following topics (non-exhaustive list):

- individual and collective preferences and behaviour (households, consumers),
- company behaviour and strategies, HR management, marketing,
- industrial organisation, sector dynamics, networks,
- strategic interactions, networks, innovations and new technological trajectories, R&D,
- competition, regulation, financial institutions, financial markets,
- investment decisions, market fluctuations,
- historical and diachronic approaches to the economy, companies and markets,
- RSE, taxation, measurement indicators: performance, productivity, well-being, inequalities,

- international economics, development economics, international trade and commerce, trade policies, international distribution of value chains,
- transitions, indicators, impact measurement and sustainable growth.

Related key words: banks; well-being; social choice; trade; behaviours; accounting; competition; growth; econometrics; decarbonised economies and finance; sustainability; employment; companies; equilibrium(s); finance; taxation; fluctuations; individuals; inflation; innovation; interactions; investment; macroeconomics; management; markets; households; microeconomics; organisations; preferences; regulations; networks; human resources; pensions; risks; RSE; strategy; digital transformation

Related ERC code: SH1

Related SDG: 1, 2, 3, 7, 8, 9, 10 et 13

Theme D.02 : Institutions and organisations, legal frameworks and standards, governance, international relations

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This theme welcomes projects relating to the joint transformation of societies and institutions, organisations, legal, normative and political systems, at all scales. It covers the field of public policies, government, infra- and supranational stakeholders and public-private interactions. It encompasses an understanding of political organisations, modes of government and governance, contemporary regulatory and administrative systems and international relations.

The projects will come under the following topics (non-exhaustive list):

- changes in law, legal and normative systems; repertoires of action; applications and socio-political impacts of these transformations; standards; economic approaches to law, law and ethics,
- social and legal regulations pertaining to violence, judicial rules and organisations, public freedoms and security, challenges to the legal order,
- political theory, transformation of political systems (changes in democracies, new forms of collective mobilisation and protest), transformation of modes of government and governance at all levels,
- analysis of public action and policies at international, European, national and territorial levels,
- analysis of national and international state policies,
- globalisation, international relations, global governance, non-government stakeholders, geopolitics and geostrategy, contemporary war and peace processes;
- knowledge, expertise, data (including digital); political, social and legal data issues and protection thereof (e-health, big data, etc.).

Related key words: non-state stakeholders; public action; economic approach to law; big data; constitution; decentralisation; diplomacy; data; law; comparative law; human rights; states; ethics; expertise; federalism; governance; global and transnational governance; government; wars and peace; legal history; institutions; justice; legislation; freedoms and security; transnational logics; measurement; administrative change; norms; philosophy of law; local authorities; control; practices; regulations; international relations; conflict resolution; knowledge; political science; judicial system; legal theory

Related ERC code: SH2

Related SDG: 5, 10, 13, 16

Theme D.03 : Contemporary societies: state of, dynamics and transformations

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This theme welcomes projects relating to social transformations and dynamics, populations and settlements, integration and differentiation processes, education and training, health, work, sport, information and communication.

The projects will come under the following topics (non-exhaustive list):

- demography, families, life pathway, ageing, social trajectories, transformations of social groups,
- human and social health, public health and health care systems, disability, quality of life, health and human sciences,
- social approaches to work, public employment policies, working conditions,
- education, training, educational policies, school organisation, educational innovations and experiments, lifelong learning,
- inequalities, social, economic and environmental, discrimination, inclusion and exclusion logics, access to rights,
- contemporary developments in religion, secularisation and secularism, beliefs and practices, radicalisation,
- citizenship, mobilisation, participation, individual and collective action, social cohesion, conflict, delinquency,
- organisational communication, documentation, communication techniques, information management,
- media and social networks, infodemic, information and big data,
- food: food supply, food practices, food safety,
- sport(s), sport practices, sporting events, sport and health,
- tourism(s), tourist mobility, leisure.

Related key words: age; food; learning; social approaches to work; citizenship; communication; conflict; consumption; delinquency; demography; discrimination; education; employment; exclusion; religion; family; training; gender; disability; inclusion; inequalities; infodemic; information; secularism; media; life pathway; participation; poverty; pedagogy; social protection; health; solidarity; sport; care systems; tourism

Related ERC code: SH3

Related SDG: 2,3, 4, 5, 10, 11, 2, 16

Theme D.04 : Cognition, behavior, language

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This theme welcomes projects allowing a better understanding of human cognition and thought (brain aptitudes and capacities; psychology) and their relationship with social, individual or

collective behaviour. It encompasses studies on language, considered in its relations with other cognitive functions and through various approaches, if possible crossed (pragmatics, sociolinguistics, linguistic anthropology, etc.).

The projects will come under the following topics (non-exhaustive list):

- social cognition and social interactions, theory of mind, comparative cognition,
- individual behaviours, practices and decision-making; interactions between individual behaviours and collective entities or phenomena (institutions, social influences, public and private policies, etc.) ,
- social perception, social categorisation, non-verbal behaviour,
- cognitive and emotional development throughout life; influence of the environment (emotional, family, social, etc.) ,
- developmental, cognitive, sensory-motor disorders, disabilities,
- decision making, memory, cognition and consciousness, specific aspects of the human brain including its social dimensions,
- the interactions between language (creativity, use, behaviour), other cognitive functions (perception, attention, awareness, emotion, reasoning, memory, motor skills...) and the brain, acquisition and learning processes,
- and socio-linguistics, linguistic anthropology; theoretical linguistics, computational linguistics,
- human-machine interaction, artificial intelligence, verbal and non-verbal communication.

Related key words: discourse analysis; linguistic anthropology; cognition; verbal and non-verbal communication; behaviours; decisions; experiments; uncertainties; information; artificial intelligence; language; linguistics; human thought; social perception; pragmatics; psychology; human-computer relations; risks; cognitive sciences; socio-linguistics; theory of mind; developmental and cognitive disorders

Related ERC code: SH4

Related SDG: 2, 3, 4

Theme D.05 : Arts, languages, literatures, philosophies

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This theme welcomes projects relating to texts and writing, literatures, languages, representations and artistic expression, the production, dissemination and reception of works, whatever their nature and medium; it also encompasses everything relating to theoretical and critical thought.

The projects will come under the following topics (non-exhaustive list):

- literature(s): history, theory, criticism; comparative approaches, poetics, genetics of texts; literature and humanities,
- creative processes and theories; economics, law, politics of creation,
- arts, live performances, images, music,
- architecture, design, fashion, contemporary decorative arts,
- aesthetics, metaphysics, logic, ethics,

- religious texts and traditions, new corpora, exegesis, receptions,
- diachronic and synchronic, descriptive and analytical approaches to languages; language(s), script(s), writing(s); rare languages, new languages; historical and cultural contexts of languages; multilingualism and interculturality,
- constitution and analysis of digital corpora (texts, images, sounds, etc.), digital philology, digital creations.

Related key words: architecture; arts; decorative arts; performing arts; visual arts; digital corpora; material and immaterial creations; literary criticism; epistemology; aesthetics; ethics; design; law and economics of creation; exegesis; textual genetics; history of the arts; literary history; humanities; creative and cultural industries; languages; languages and cultures; rare languages; historical linguistics; literature; comparative literature; literatures and languages; musicology; music; philology; philosophy; poetics; linguistic systems

Related ERC code: SH5 et SH8_5, SH8_6, SH8_7, SH8_8, SH8_9

Related SDG: 4, 8

Theme D.06 : Studies of the past, heritage, cultures

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This theme welcomes projects relating to past societies, their history and archaeology. The challenge is to understand the diachronic structuring and organisation of societies, their relationship with their environment and their cultures. This theme also encompasses heritage in all its forms, and heritage issues.

The projects will come under the following topics (non-exhaustive list):

- forms of organisation and structuring of societies; comparative, cross-cutting, connected and global history; anthropology of social and cultural practices (body, food, sexuality, education, medicine, etc.) ,
- political and institutional history (powers, dominations, imperialisms and imperialities); history of conflicts and international relations, colonial and post-colonial history; laws, justice and penal practices,
- environments of the past, environments and landscapes, interactions between human societies and their environment, especially in the face of global change, history of environmental awareness. This topic could be the subject of interdisciplinary projects outside Social Sciences and Humanities;
- cultural, economic, political, legal and technological contexts of material production; history and archaeology of gestures and techniques, skills and trades, exchanges and networks, objects and texts;
- expressions of symbolic thought: arts, value systems, ideas and representations, dynamics of religions, cults, rites, myths and beliefs; creation of identities;
- intellectual history, history of science, technology and literary knowledge;
- databases, documentary corpus, convergence of sources and cross-approach of the sciences of erudition;

- heritage (natural, cultural, tangible, intangible): study, restoration, conservation, legal protection, enhancement, process of patrimonialisation, at the national and international levels.

Related key words: archaeology; archaeomaterials; codicology; documentary corpus; beliefs and religions; territorial dynamics; exchanges; epigraphy; creation of identities; geo-archaeology; ancient history; contemporary history; history of conflicts and international relations; history of sciences; environmental history; intellectual history; medieval history; modern history; political and institutional history; social history and anthropology; museography; numismatics; paleoenvironments; palaeography; papyrology; landscapes; symbolic thought; philology; memory practices and policies; prehistory; material production; protohistory; safeguarding, protection and conservation of cultural goods; sciences of scholarship; heritage sciences; techniques and technologies; heritage enhancement; vulnerabilities

Related ERC code: SH5, SH6, SH8_1, SH8_2, SH8_3, SH8_4, PE10_6

Related SDG: 4, 8, 15

Theme D.07 : Societies and territories in transition

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This theme welcomes all projects with a geographical or spatial dimension and likely to enrich the understanding of territories (urbanised, urban, peri-urban, rural, productive, etc.) in all their dimensions, dynamics and interactions. A link is expected between spatial and temporal scales as well as levels of socio-political organisation.

The projects will come under the following topics (non-exhaustive list):

- socio-spatial systems, territorial transitions;
- places and non-places, spatial and territorial identities, relationship between societies and territories (including seas and oceans, air and outer space);
- mobilities and migrations, identities, belonging, models and forms of integration;
- rebuilding relations between centres and peripheries; borders, margins, integration, segregation, fragmentation, crime; city policies; housing markets, social, spatial and environmental justice;
- development and urban planning, land use, land, housing market, local taxation, property prices, regulation of real estate platforms;
- territorialisation of public policies, territorialisation of rights, extraterritoriality, law and territory, sovereignty;
- adaptation of socio-ecological systems to global environmental change; development and protection of resources and landscapes; social and territorial vulnerability and resilience; ecological, climate and energy transitions of territories; environmental empowerment, capabilities and agency; environmental conflicts and mobilisations;
- digital revolution and its consequences, smart cities, cyberspace;
- geomatics, geo-referenced data and corpora, databases and interoperability, cartography and critical approaches to maps.

Related key words: spatial analysis; databases; cartography; centre/periphery; city living; cyberspace; territorial dynamics and trajectories; spatial economy; low-density spaces; maritime

and air spaces; extraterritorialities; land; geomatics; geo-referencing; globalisation; housing; metropolisation; modelling; globalization; multiculturalism; nuisances; landscapes; peri-urban; pollution; region; regionalisation; resilience; resources; digital revolution; risks; rurality; segregation; smart cities; societies and territories; territories and productive systems; territorialities; ecological, climatic and environmental transition; urbanity; vulnerability

Related ERC code: SH7

Related SDG: 7, 8, 9, 11, 13

“Digital Sciences” field

Theme E.01 : Foundations of digital sciences: computer science, automatic control, signal and image processing

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This theme concerns fundamental research striving for excellence and breakthroughs in the fields of computer science, automatic control, and signal and image processing.

Multidisciplinary projects oriented towards specific application domains and aiming for mutual scientific benefits between disciplines can also be submitted in the following axes:

- [Theme H.14 : Interfaces: mathematics, digital sciences – biology, health](#)
- Theme H.15 : Interfaces: mathematics, digital sciences – Humanities and social sciences
- [Theme H.16 : Interfaces: mathematics, digital sciences – Earth system and environmental sciences](#)

These axes are more suitable to interdisciplinary projects whose consortium includes researchers from the different concerned disciplines.

Related key words: algorithmics; signal analysis and representation; computer arithmetic; symbolic computation; calculability and decidability; correction codes; combinatorics; automation and control; control and observation; complexity; compression; cryptography; cybersecurity; detection-estimation; estimation and identification; fundamentals of databases; algorithmic geometry; theoretical computer science; languages and semantics; logic; formal methods; computational models; competition models; optimisation; operational research; software science; dynamic systems; graph theory; information theory; game theory; proof theory; systems theory and modelling; geometrical data processing; signal processing; image processing

Related ERC code: PE01, PE06, PE07

Related SDG: 9

Theme E.02 : Artificial intelligence and data science

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"This research theme expects research in artificial intelligence covering, in a broad sense, machine learning and its mathematical foundations, as well as symbolic approaches, massive data processing and data science, and knowledge management.

The following themes are given as a guide:

- methods and models to manage and exploit large volumes of data, whatever are their variety, mode of production and quality;
- machine learning: learning theory, optimisation, new paradigms, constitution, annotation and corpus evaluation;
- methods and models for knowledge extraction and management: representation and reasoning about knowledge, data and knowledge mining, ontology engineering and its use in data enrichment and information retrieval, knowledge graphs, decision theory, multi-agent systems and the semantic web;
- research activities based on data and AI methods aiming at advancing the state of the art in order to complete complex tasks (computer vision, automatic language and speech processing, automatic translation, etc.), autonomous decision-making systems or systems enabling high-level interactions with human users.
- methods and models integrating, in a transverse way on its various themes, the scientific stakes linked to the deployment of artificial intelligence in particular in terms of trust and frugality, making it possible to ensure transparency, safety, trust, explanation of learning, decision and reasoning models, preservation of private life, equity;

Work contributing to research in Human-Machine Interaction and Robotics is to be addressed in the [Theme E.04 : Interaction, robotics](#). Work combining digital sciences with other disciplines falls under this theme as multidisciplinary proposals, with the exception of work pertaining to the fields of health, transport and safety, or at the interface between AI and Social Sciences and Humanities and AI and environmental sciences. These should be addressed, respectively, in the transversal themes [Theme H.14 : Interfaces: mathematics, digital sciences – biology, health, Theme H.18 : Cities, buildings and construction, transport and mobility: transition to sustainability](#) and [Theme H.17 : Global security, resilience and crisis management, cybersecurity, Theme H.15 : Interfaces: mathematics, digital sciences – Humanities and social sciences](#) or [Theme H.16 : Interfaces: mathematics, digital sciences – Earth system and environmental sciences](#).

Related key words: decision support; scene analysis and interpretation; machine learning (supervised, unsupervised, reinforcement, federative, distributed, decentralized, continuous, real-time ...); representation learning and domain transfer; learning from unstructured data; neuro-symbolic approaches; causality; certification; computational social choice; confidentiality; consensus and synchronisation; massive data; rare data; ethics; explicability; text and data mining (TDM); knowledge mining; data mining; data frugality; fusion; uncertainty management; imprecision; content indexing; distributed artificial intelligence; embedded artificial intelligence; hybrid artificial intelligence; responsible artificial intelligence; computational models; large-scale distributed computational models on data; dynamic models; statistical models; ontologies; optimization; planning; privacy; experimental protocol; validation protocol; data quality; reasoning; heuristic search; information retrieval; operational research; pattern recognition; knowledge representation; reproducibility; robustness; constraint satisfaction; stability; trust systems; consensus systems; multi-agent systems; hybrid systems; model compression technics; game theory; automatic language and speech processing; multimodal data processing; transparency; validation; computer vision; data visualization; semantic web; scientific workflows

Related ERC code: PE01, PE06, PE07

Related SDG: 9 et 14

Theme E.03 : Software sciences and engineering - Multi-purpose communication networks, digital infrastructure

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This research theme deals with proposals aimed at overcoming fundamental or applied research challenges in three main fields, sometimes combined or not:

- Communication networks as an object of study covering all its components and facets, taking into account their multiple topologies (ad hoc, peer-to-peer, mesh, edge, core networks, wireless and cellular networks, etc.), speeds (high-speed communications versus networks of objects) and usages. All the links go from the physical layer, including antennas and their interactions with the network, to the exploration of differentiated and mobile usage conditions, justifying analyses in terms of security, availability and reliability, and authorising context-sensitive services. This field of research also relies on progress in terms of standardisation (5G, 5G+, 6G), virtualisation and networks of the future (air-ground, satellite, etc.);
- High performance computing and communication infrastructures allowing the development of computing models, algorithms and the exploitation of massive parallelism, optimisation and dynamic management of resources based on quantitative properties and measurements (performance, robustness, memory, energy efficiency), programming environments and algorithms for the exascale. This field also targets the study of the distribution of computation on various topologies and network architectures ("edge cloud", fog, cloud, cache, etc.) connecting computation resources as well as the various aspects of virtualisation of applications, servers, networks (SDN), etc. without omitting the security aspects;
- Software development, as an object of study on the entire software life-cycle, covering new programming languages, requirements engineering, design and production software engineering, including model-driven engineering, variability and adaptability management across all layers, program analysis, testing, validation, verification and software certification, etc. This area also aims at taking into account resources, safety, security and trust in software: eco-responsible software, compilation and optimization of, for example, AI-Embedded models, identification and correction of vulnerabilities in cybersecurity, dynamic adaptation and self-adaptive systems, ... This area also concerns the study of software production processes: infrastructure and integration into cyber-physical systems. Finally, the set up approaches are formal and/or empirical approaches, they support analysis of software and production practices. It also targets the design of software technologies for embedded systems integrating their various aspects and constraints (real-time, mixed criticalities, predominant software, cyber-physics, non-functional constraints, etc.).

Related key words: hardware accelerators; programme and production practice analysis; active antenna; model-driven approaches; software architectures; heterogeneous hardware architectures; architecture and programmability of communication systems; cloud computing; optical communications; radio communication; optimised compilation to centralised or parallel (multi-core) architectures; service composition; design and development of languages and models; formal development of software and systems; energy efficiency: from measures to solutions; elasticity; reliability and availability; digital frugality; management of shared infrastructures; interference management; vulnerability identification and remediation; service-infrastructure interface; middleware; internet of things; programming languages; anti-malware; testing and debugging methods; metrology; mobility; computational models for parallelism;

distributed computing models; channel model; modulation; connected objects; network optimisation; orchestration of protocols and services; orchestration and optimisation of communication/execution/storage resources; real-time OS; massive parallelism; scaling; software stack; control, management and information plans; service platforms; proof of safety and security properties; software development process; cryptographic protocols; programming and web security; data privacy; virtual prototyping; QoS; security; end-to-end security; security of hardware systems; sciences and software engineering; context-sensitive services; trust solutions; self-adaptive systems; distributed systems and algorithms; embedded systems; Operating systems; supervision; access techniques; blockchain technology; traceability; verification and validation; virtualisation

Related ERC code: PE06, PE07

Related SDG: 8 et 9

Theme E.04 : Interaction, robotics

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The projects expected in this research theme concern, on the one hand, Human-Machine interaction in all its dimensions, including natural dialogue, the creation of multimedia content and the various cognitive processes from perception to cognition and, on the other hand, autonomous and interactive robotics in all its components (service robotics, medical robotics, industrial robotics, robotics for the environment, multi-robot cooperative systems).

This research area also supports interdisciplinary research actions.

If projects raise ethical issues, these should be addressed in the proposal.

Manufacturing robotics projects aiming at industrial performance rather than the development of robotics per se, are to be submitted in the Theme H.19 : Industry and factory of the future: People, organisations, technologies. Projects on Robotics for health that do not include robotics development should be submitted under the Theme H.13 : Healthcare technologies. Projects with applications in Interaction or Robotics but whose field of study is artificial intelligence should be submitted under the [Theme E.02 : Artificial intelligence and data science](#).

Related key words: conversational agents; 3D animation; cognitive architectures; decision-making autonomy; sensors; physiological sensors; robotic mapping; cobots; human-robot collaboration; non-verbal communication; practice-centered design; user-centered design; participatory design; co-design; multimedia content creation; immersive environments; dialogue; multi-source data; interface ergonomics; exoskeletons; field robotics; computer-assisted medical-surgical gestures; humanoids; affective computing; collaborative interaction; device-technique interaction; human-system interaction; human-data interaction; instrument-organ interaction; multimodal interaction; adaptable interfaces; multi-sensory interfaces (gesture, touch, face, sound, speech, ...); brain-machine interface; mobility; planning; audio perception; cognitive psychology; augmented reality; mixed reality; virtual reality; rendering; haptic feedback; affective robotics; collaborative robotics and multimodal rendering; surgical robotics; handling robotics; manufacturing robotics; social robotics; agricultural robots; aerial robots; companion robots; soft robotics; underwater robots; terrestrial robots; simulation; adaptable systems; multi-robot systems; ultrasound; touch-pressure; processing of particular image modalities (infrared); autonomous vehicles; interactive data visualisation; computer vision; wearable computing

Related ERC code: PE06, PE07, SH04

Related SDG: 2, 3, 4, 5, 8, 9, 10, 11 et 12

Theme E.05 : High-performance computing, digital models, simulation, applications

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Multidisciplinary proposals bringing together probabilistic experts, analysts, statisticians, data scientists, experts in experimental modelling, system identification, numerical methods, algorithms and high-performance computing (HPC), and experts in application domains are encouraged in order to promote disciplinary breakthroughs that will make it possible to develop new models, to substantially improve performance, cost, time, quality, volume, etc.

The obstacles to be overcome include:

- in programming environments in particular linked to future exascale architectures: execution supports, management of architecture heterogeneity and energy consumption, etc.), new models (complex workflows);
- in situ visualisation, fault tolerance ... (Post Moore era framework), new programming languages and paradigms. Particular attention will be paid to the maturity and sustainability of the chosen tools;
- in algorithms and numerical methods by demonstrating, if possible, the potential of supercomputing to advance knowledge and facilitate applications to exploit complex, heterogeneous and massively parallel architectures: the construction and exploitation of surrogate models, time/space parallelism, variable precision algorithms, adaptive discretisations;
- the specific challenges of stochastic simulation, energy consumption, the use of NVM memories, efficient random number generation, high-performance data analysis and the deployment of data processing chains to take advantage of exascale computer architectures, the development of numerical libraries and new numerical methods that scale up, etc.,
- for the modelling of complex problems: assimilation problems - possibly mixing with "data models" - or even AI, probabilistic, multi-scale and multidisciplinary analyses, optimisation methods (robust, stochastic, etc.), machine learning/deep learning, exploitation of massive data, construction of pipelines for complex models, validation and certification of results by quantification of uncertainties or by confrontation with test data (eyeball metric), estimation of impacts (financial, societal, environmental, etc. .), estimation of impacts (financial, societal, environmental);
- The construction of hybrid data-driven models, taking advantage of the performance of heterogeneous data learning and optimisation techniques and integrating physical and symbolic knowledge (ordinary differential equations, partial differential equations, reduced models). The development of explainable models for business experts or post-hoc analysis methods to aid applicability is also expected.
- development of models and their optimisation for coupling and interaction between newly accessible hardware and computer systems, virtual representations, simulations and the cyber-physical world: real-time simulations and interactivity (including control), combination of various computational architectures, design of models that evolve according to the exploitation of data, partitioning of calculations between elements of heterogeneous computers, etc.

Particular attention will be paid to the setting up of ambitious, structuring projects by communities combining supercomputing and mastery of an application domain (energy, climate, environment, cosmology, smart cities, industry 4.0, etc.) to take their scientific models to a new scale or dimension, requiring a supercomputer of the exaflopian order. The team will have to highlight the requirements to implement their scientific project in terms of adaptation or even development of all or part of the existing algorithm as well as the implementation of complex work flows.

Related key words: linear algebra; heterogeneous architectures, hybrid, CPU, GPU, FPGA, multi-core; data assimilation and inversion; scientific computation library; supercomputing; Computer cluster; co-design (software, hardware, application); control and observation; coupling of hardware and computer systems; domain decomposition; energy efficiency; exascale; computational frugality; management of large amounts of scientific data; HPC; digital twins; modelling languages; meshing; data-driven models; modelling and simulation; optimisation; massive, hierarchical and heterogeneous parallelism; scalability; performance; quantification of multi-scale, multi-physics uncertainties; model reduction; spatial and temporal data representations and structures; resilience/fault tolerance; scalability; heterogeneous and/or hybrid dynamic systems; operating systems; hardware abstraction techniques; validation and verification; scientific visualisation; workflows

Related ERC code: PE01, PE06, PE07, PE08

Related SDG: 9

Theme E.06 : Quantum technologies

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This research theme supports research activities related to the fields of "Materials Science and Engineering" and "Digital Sciences".

It covers the technological and scientific projects exploiting quantum mechanical concepts such as superposition and entanglement, in the following areas:

- Quantum communications targeting, e.g. cryptographic applications and the development of quantum networks as well as other usages of entanglement and quantum information distribution;
- Quantum computing: quantum devices, processors and architectures based on "qubits" or "qudits" or other quantum resources for massively parallel computing, quantum algorithms, programming models and environment, applications and use cases of quantum computing and simulation, certification and verification tools, quantum error correction tools, noisy intermediate-scale quantum (NISQ) integration, architectures;
- Quantum simulation: quantum devices made specifically for simulating materials, chemical compounds, or other physical phenomena, and for solving problems in other fields (high energy physics, astrophysics, biology, etc.);
- Quantum sensors and metrology (imaging - especially medical -, atomic clocks, accelerometers, gyrometers, gravimeters, gradiometers, Lidars, magnetometers, electrometers, imaging – in particular biological and medical, etc.)

- Fundamental research and development of new concepts using quantum mechanics to compute, measure, process or transmit information more efficiently than with classical technologies,

Projects with a multidisciplinary dimension and bringing together complementary skills are encouraged.

Projects related to quantum sensors and metrology with high disruptive potential (ultra-cold atom quantum gases, impurities in crystals, opto-mechanical resonators, quantum materials, etc.) are encouraged as a priority.

Related key words: accelerometers; amplifiers at the quantum limit; Rydberg atoms; quantum dots; quantum computation and algorithms; hybrid quantum-classical computing; sensors; quantum circuits; multipartite communication; quantum communication; optimal quantum control; quantum error correction; quantum cryptography; decoherence; defects in solids; estimation; quantum feedback; quantum gas; graphene; gravimeters; gyrometers; atomic clocks; quantum imaging; integration; entanglement; rare earth ions; standard quantum limit; magnetometers; 2D materials; memories; control and verification methods; quantum metrology; non-destructive quantum measurements; models and programming environment for quantum computation; NISQ; non-locality; quantum optics; quantum computer; photonics; platforms; protocols; quantum logic gates and processors; component independent processes; qubits; qudits; reconstruction of quantum states; repeaters; quantum networks; opto-mechanical resonators; quantum information science; quantum simulation; sources of quantum light; electron and nuclear spins; squeezing; superposition; superconductors; quantum systems: trapped atoms and ions; hybrid quantum systems; topological systems; quantum tomography

Related ERC code: PE02, PE03, PE06

Related SDG: 9 et 16

“Mathematics and its Interactions” field

Theme F.01 : Mathematics

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Projects in this theme are expected to contribute the advance of research and knowledge in mathematics. It covers the whole field, from the most fundamental to the most applied aspects.

Projects in effective interaction with other disciplines can be submitted in other scientific themes ([Theme E.01 : Foundations of digital sciences: computer science, automatic control, signal and image processing](#), [Theme E.02 : Artificial intelligence and data science](#)). The cross-cutting theme are focused on multidisciplinary projects oriented towards certain specific applications and aiming at mutual scientific cooperation between the disciplines:

- [Theme H.14 : Interfaces: mathematics, digital sciences – biology, health](#)
- Theme H.15 : Interfaces: mathematics, digital sciences – Humanities and social sciences
- Theme H.16 : Interfaces: mathematics, digital sciences – Earth system and environmental sciences

These axes are more suitable for interdisciplinary projects whose consortium includes researchers from the different disciplines involved.

Related key words: commutative and non-commutative algebra; analysis; functional analysis; harmonic analysis; numerical analysis; real and complex analysis; statistical learning; astrophysics; scientific computing; control theory; cryptography; partial differential equations (deterministic and stochastic); ordinary differential equations (deterministic or stochastic); algebraic geometry; arithmetic geometry; differential geometry; history of mathematics; homogenisation; logic; discrete mathematics and combinatorial; mathematics for astrophysics; mathematics for biology and health; mathematics for economy and society; mathematics for the environment, earth-sciences and earth-system; mathematics for fluid and solid mechanics; mathematics for signal and image processing; mathematics for quantum mechanics; statistical mechanics; modelling; optimisation; mathematical physics; probability; inverse problems; stochastic processes; simulation; statistics; classical and quantum dynamic systems; category theory; ergodic theory; game theory; number theory; operator theory; representations theory; topology; data processing

Related ERC code: PE01, PE06

Related SDG: 9

“Sub-atomic Physics, Sciences of the universe, and Earth sciences” field

This field includes two scientific themes, one dedicated to Earth sciences, the other to subatomic physics and astrophysics. Note that the part of theoretical physics which was attached to theme G.02 in the previous call has been integrated into the new physics [Theme B.06 : Physics of fundamental concepts and physics of dilute matter](#)

Theme G.01 : Planetary science, structure and history of the Earth

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This theme corresponds to research work aimed at acquiring fundamental knowledge and highly innovative developments in instrumentation, networking, data processing and exploitation, to study and resolve cutting-edge scientific problems in the field of planetology, planets of the solar system and exoplanets, exobiology, the structure and history and dynamics of the Earth (including distant palaeo-environments not linked to problems of the Anthropocene).

Related key words: hazards (telluric hazards, space meteorology and near-Earth objects); chemistry and physics of planetary atmospheres ; cosmochemistry ; instrumental development ; exobiology ; exoplanets ; planetary formation ; small celestial bodies ; planetology ; sun-Earth relations ; natural mineral resource formation ; geochemistry ; geochronology ; geodesy ; geodynamics ; geology ; geomagnetism ; geomorphology ; geophysics ; mineralogy ; paleoclimatology ; pre-anthropocene palaeoenvironments ; palaeomagnetism ; palaeontology ; petrology ; petrophysics ; sedimentology ; seismology ; tectonics ; early Earth ; deep Earth ; volcanology

Related ERC code: PE09_1, PE09_2, PE09_3, PE09_4, PE09_13, PE10

Related SDG: 9

Theme G.02. : Sub-atomic physics and astrophysics

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This theme aims to support research work to develop fundamental knowledge, models and their phenomenological aspects, and to contribute to innovative developments in instrumentation, measurement, data processing and valorization in the fields of subatomic physics, nuclear physics, astrophysics and cosmology.

It should be noted that theories and models contributing to the understanding of fundamental physics, including mathematical physics, field theory and string theory, fall within the scope of the [Theme B.06 : Physics of fundamental concepts and physics of dilute matter](#). Are also related to the theme B.06 the works aimed at testing the fundamental models associated with physics beyond the Standard Model in the context of low-energy experiments in optics, atomic or molecular physics

Related key words: physics of fundamental interactions; particle physics; subatomic physics; accelerator physics; nuclear physics; space-time reference systems; astrophysics; astrochemistry; astronomy; high-energy astronomy; astroparticles; multi-messenger astrophysics; formation and evolution of galaxies; interstellar medium; formation of stars and planetary systems; stellar physics; solar physics; cosmology, dark matter and dark energy; gravitational waves; classical and quantum gravitation; physics beyond the Standard Model; simulation, calculation and data exploitation; instrumental developments

Related ERC code: PE02_02 à PE02_07, PE09_05 à PE09_13

Related SDG: 9

Cross-cutting themes

Each cross-cutting area or transition/ transformation area may be defined by an introductory text explaining the transdisciplinarity of the themes included and the expectations in relation to the themes of the disciplinary scientific areas (see above).

These cross-cutting areas or transitions / transformation area also correspond to specific programming steering committees bringing together members of several disciplinary programming steering committees.

Theme H.01 : The Science of sustainability

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The science of sustainability is concerned with the complex interactions between natural, socio-economic and political systems, and how these interactions affect, over time and space, the planet's life support system (biodiversity as a whole), socio-economic development and human well-being. Its ambition is to provide science-based solutions to the major global environmental and societal challenges and to accompany the major transitions in society including the associated risks. In an integrated approach, the science of sustainability favours - at different scales of time and space - the study of the functioning and dynamics of eco- and anthro-po-systems, their interactions and retroactions through their multiple dimensions: environmental, ecological, climatic, physico-chemical, cultural, historical, legal, political or socio-economic, but also how societies are and are becoming stakeholders of their sustainability. It allows to break down research around a common object and, in particular, stimulate taking into consideration interactions between the 17 SDGs.

According to the definition of sustainability science, projects are considered to fall under this theme if they include the following components:

- to be focused on the dynamics of transformation and transition towards greater sustainability in a context of environmental, climatic and societal changes ;
- to present systematic inter- or trans-disciplinarity.

Where appropriate, the research project and its implementation may be co-constructed with stakeholders (participatory research). Implemented by the research consortium, the project should produce new knowledge and lead to the production of decision-making tools and the deployment of sustainable solutions, and then meet the SDGs.

The theme will support projects addressing at least two of the following three aspects:

- situation analysis (conflicts of uses and management, tensions over resources, antagonisms, risks linked to hazards and extreme events, stakeholder strategies, targets to be reached, obstacles to be overcome, resource finiteness and impacts, etc.) ;
- solutions (remediation, adaptation, mitigation, trajectories towards the target, organisational solutions, warning systems, etc.) ;
- deployment modalities (governance, socio-economic models, new relationships with living beings and the environment, technological and social innovations, public policies, etc.).

Research questions supported can be of three kinds:

- focused on the science of sustainability as a research object (concepts, practices, collectives and methods) ;
- focused on transformation as a research object ;
- built around major nexuses (including biodiversity, climate, water, resources, energy, food, oceans, health, technologies, digital, society) at different scales of time and space (including the city, Southern and Northern countries, etc.).

Projects concerning the study of paleoenvironments are expected to fall under [Theme D.06 : Studies of the past, heritage, cultures](#), including interdisciplinary aspects and/or aspects that shed light on current and future global changes linked to human action.

Related key words:

Research topics: adaptation and mitigation in the face of climate change ; multi-actor approaches ; stakeholder networks ; conflicts of uses and management for common goods ; land and/or natural resources ; sustainability ; SD&RS ; development of impact pathways ; resilience ; study impacts on natural resources and socio-ecosystems ; finiteness of resources ; economy/society/environment interaction ; links between ecosystem functioning and epidemiological risks ; mediation ; methods of studying transitions ; risks and disasters ; reference environment ; food/water/energy ; health/biodiversity/agro-ecology nexus, etc. ; dynamic and protection of ecosystems and biodiversity in the face of anthropic pressures or global changes ; risk-uncertainty and adaptive management of transitions ; nature-based solutions ; role of technological or social innovations in territories in transition ; transition trajectories in territories ; dynamic scenarios coupling socio-economy - resources and ecosystem services ; transitions ; vulnerabilities and inequalities ; ecological vulnerability - social vulnerability.

Research approaches: co-construction ; modelling and integrated scenarios to design adaptation solutions ; participatory research.

Related ERC code: PE08, PE10, LS07, LS08, LS09, SH01, SH02, SH03, SH07

Related SDG: tous

One Health

Theme H.02 : Contaminants, ecosystems and health

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The scientific scope of this research theme covers in particular multidisciplinary approaches, which contribute to expand knowledge on the characterisation and fate of physical, chemical or biological contaminants contributing to the exposome, as well as their effects on human, animal and plant health, as well as on ecosystems, in line with the "One Health" and "Eco Health" concepts. Projects are expected to particularly include the following :

- characterisation of the exposome (including cocktail of contaminants, individual and collective behaviours and interactions between different kinds of stresses in humans, animals and plants) ;
- contaminants, environmental metrology and biological samples, including bioindicators and biomarkers ;
- the effects and activation mechanisms of contaminants on living organisms, ecosystems and human health ;
- the eco-dynamics of contaminants, their interactions and their trans- and multi-generational impacts ;
- adaptive and evolutionary mechanisms in exposed organisms ;
- the evaluation of new tools for the governance of risks linked to contamination, in taking the populations' perceptions into account.

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for projects that include a partner health care facility.

Related key words: « One Health » ; « Eco Health » ; adaptability ; allergen ; biocides ; biodiversity ; bioindicators ; biomarkers ; legal and regulatory frameworks ; contaminant cocktail ; chemical contaminants ; physical contaminants ; biological contaminants ; controversies ; eco-dynamics ; health ecology ; ecosystems ; ecotoxicology ; environment ; epidemiology ; epigenetics ; exposome ; drugs ; metals ; metrology ; microbiome ; micro- and nanoplastics ; modelling ; nanomaterials ; organometallics ; perception by society ; endocrine disruptors ; pesticides ; mineral pollutants ; persistent organic pollutants ; persistent and mobile pollutants ; animal health (including pollinators) ; human health ; plant health ; strategies of economic actors ; environmental toxicology ; toxins

Related ERC code: LS02, LS04, LS07, LS08, LS09, PE01, PE02, PE03, PE04, PE05, PE07, PE06, PE08, SH01, SH02, SH03, SH06, SH07

Related SDG: 2, 3, 6, 9, 11, 14 et 15

Theme H.03 : Infectious diseases and environment

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This theme concerns pathogens, emerging and re-emerging infectious diseases and/or adaptations and resistance to antimicrobials in relation to the environment. The projects submitted will be based on integrated, multi- and interdisciplinary approaches combining disciplines from the ecological and environmental sciences, biology and health, social sciences and humanities.

This research theme covers the following topics:

- all human, animal and plant pathogens, irrespective of their nature (bacteria, viruses, parasites, fungi, algae and non-conventional agents), considering in particular their biology and ecology.
- the ways in which pathogens spread (including in water, air, soil, etc.); the processes of evolution and adaptation to environmental changes of pathogens and their hosts and vectors; Epidemic consequences of infectious diseases linked to changes in environmental niches; the genetic and non-genetic determinants of transmission; crossing the species barrier;
- the study of the long-term consequences of pathogen transmission on human and animal health;
- the mechanisms of emergence of infectious diseases (human, plant or animal, including zoonoses) in relation to environmental and anthropic factors (behaviour, education, social status, etc.).
- methods of control, surveillance and prevention, identification of populations and areas at risk, limitation of pathogen spread and of preparation for epidemic or even pandemic risk (including standardized sampling and sampling procedures as well as the development of tools for diagnosis, monitoring and management of drug resources, etc...).
- the mechanisms of emergence of infectious diseases (human, plant or animal, including zoonoses) in relation to environmental and anthropic factors (behaviour, education, social status, etc.).
- the modelling of emergence, dissemination, exposure or elimination parameters, retrospective analyses as well as the constitution of databases that can help define indicators for a predictive approach to the evolution of epidemics as part of health monitoring.
- the development and application of massive data analysis methods, including artificial intelligence, in the context of emerging or re-emerging infectious diseases.
- resistance to antimicrobial, antiparasitic, antifungal, insecticide and biocide treatments and their dynamics of emergence and diffusion.
- the analysis of the social and economic characteristics of epidemic management systems.
- the exploration of new diagnostic, preventive and therapeutic strategies (new targets, new molecules, etc.).
- the impact of individual and collective behaviour and practices on transmission.
- the organization and resilience of human and animal health care systems facing the risks of emerging and re-emerging infectious diseases.
- the integration of the health care system and national monitoring and prediction tools with international tools and mechanisms

Basic research on avian influenza and HPAI (Avian Influenza viruses highly pathogenic) are supported in this axis (see recommendations of COVARs of 8 June 2023).

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for translational research projects that include a partner health care facility.

Related key words: One Health or "Eco-Health" approaches; database; conditions for prevention and management of emerging diseases; determinants of infectious diseases (biological, medical, environmental, social, etc.); epidemics; exposure/infections; wildlife; modelling; niches; pandemics; emerging and re-emerging pathogens; persistence; prediction; management; reservoirs; antimicrobial resistance; risks; global health; transfer and species barrier; vectors; virulence; zoonoses; climate

Related ERC code: LS01, LS02, LS06, LS07, LS08, PE06, PE10, SH02, SH03

Related SDG: 1, 3, 4, 9, 10, 13, 14, 15, 16 et 17

Theme H.04 : Public health, health and societies

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This theme relates to research in public health. The aim is to:

- describe, analyse and understand the various factors and determinants affecting the health of populations and health inequalities, whether socio-economic, behavioural, environmental, demographic, geographical, organisational, linked to life trajectories or to public policies;
- contribute to the understanding of disease mechanisms through approaches integrating population data and biomarkers;
- propose work relating to the watchfulness, anticipation, prevention and preparation, in ordinary or crisis contexts (epidemic, conflict, etc.),
- encourage cross-disciplinary analysis and approaches with veterinary public health stakeholders regarding prevention (biosecurity, vaccination) and crisis management, particularly in population-based approaches (modelling, surveillance, etc.),
- carry out, propose or validate intervention studies, as well as preventive actions and health promotion, from the neighbourhood level (community health) to the global level;
- carry out health, economic and societal impact studies of preventive measures aimed at improving health or at adapting to, or preventing, societal or environmental threats, such as epidemics or climate change, and in general to evaluate public policies;
- propose work on the organisation of the health system (effectiveness, efficiency, access, equity, balance between prevention and therapy, etc.) and analyses of the consequences of technological and medical innovations on the health system (digital health, genomic, predictive, personalised medicine, etc.),
- analyse the interactions between the various actors, institutions or groups which contribute to the management of public health issues at different levels of the territory;
- analyse the way in which health systems and society integrate the knowledge acquired on the exposome, the issues linked to the idea of global health, climate change and biodiversity loss.

The consideration of multiple health-related determinants and factors, their interactions and their combined effects is encouraged. All dimensions and fields of health, as well as questions regarding quality of life, autonomy and disability, will be considered, throughout life and in the different areas of life (residential, school, professional, leisure activities, etc.). Particular attention will be paid to conceptual and methodological research aiming to analyse the effects of health determinants and factors.

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for projects including a health and care facility.

Related key words: access to care and operation of the health system; big data in health; cohorts; individual and collective behaviour; knowledge of populations at risk; screening, early diagnosis; determinants of social inequalities in health and vulnerability; case-control studies; evaluation of public policies; experiences of users of the health system; exploitation of existing health data; risk management, surveillance, prevention and protection; chronic diseases; epidemiological and biostatistical methodology; health norms; performance and financing of health care provision; policies, organisations, regulations and actors; populations; health practices; health promotion; relationship to risk and perception of risk; relations between professionals and users; health; veterinary public health

Related ERC code: LS02, LS07, SH01, SH02, SH03, SH04, SH06

Related SDG: 1, 3, 4, 5, 10, 12, 16 et 17

Ecological and Environmental Transition

This transversal field is at the interface of environmental sciences, Humanities and social sciences and material sciences, and includes three themes which contribute to the ecological and environmental transition with a stated objective of sustainability. Projects of an inter- and trans-disciplinary nature are mainly expected.

Theme H.05 : Methodologies, instrumentations, sensors and solutions for the ecological transition

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This research area concerns research projects on innovative technologies and methodologies to support ecological transitions and in particular :

- the development of methods, tools and sensors for 1) environmental observation and monitoring (smart monitoring, monitoring of forcing, implementation of participatory science or crowd sourcing), and for 2) operational services for diagnosis, warning and environmental crisis (including natural hazards); the nature of the expected sensors, tools and methods is wide and varied (sentinels, biosensors, biosourcing, etc.) ;
- the development of high-tech/high-precision instruments to document the status and dynamic of various environmental compartments ;
- methods, processes and tools for sustainable remediation, ecological engineering and hybrid approaches (technologies and solutions based on nature), new approaches aimed at reducing environmental impact, the emergence of new services or economic sectors, while preserving the quality of the environment (water, air, soil, subsoil) ;

- the development of technologies for extracting contaminants with a view to genuine remediation of environments (water, air, soil, subsoil) ;
- the characterisation of the ecological footprint, the development of one or more integrative indicators of this footprint ;
- advanced data acquisition and analysis techniques, including sensor metrology.

Projects on the development of autonomous vehicles for sample collection should be submitted under [Theme E.04 : Interaction, robotics](#).

Related key words:

Research object: Natural hazards and cascade effects ; pollution of the atmosphere, water, soil and subsoil; air quality ; pollutant source reduction ; GHG sequestration; measurement of GHGs and air pollutants ; pollutant, effluent and waste treatment.

Research approaches: environmental biotechnology ; sensors/biosensors for the environment ; environmental chemistry ; development of in situ measurements ; nature-based solutions ; civil engineering ; process engineering ; ecological engineering (incl. phytoremediation and bio-remediation) ; ecological engineering ; metrology ; microfluidics ; long-term and/or high-frequency environmental monitoring ; sensor networks ; sustainable remediation technologies.

Related ERC code: LS08, LS09, PE02, PE03, PE04, PE05, PE06, PE07, PE08, PE10

Related SDG: 6, 7, 9, 11, 12, 13, 14 et 15

Theme H.06 : Dynamics of socio-ecosystems and of their components

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This theme concerns fundamental or applied research projects seeking to understand the dynamics of productive socio-ecosystems, to propose innovations for their sustainable management (from an economic, social and environmental point of view), and to contribute to the development of trajectories and scenarios to support ecological and digital transitions. Projects will address the following themes in particular:

- exploration of biodiversity and the adaptation capacities and dynamics of socio-ecosystems ;
- the role of biodiversity and associated ecosystem services in socio-ecosystems (economic, social, environmental services) ;
- the origin, characterisation and changes in exploited species, including their potential to form sub-populations ;
- sustainable and/or integrative livestock practices that promote animal welfare ;
- understanding the functioning and identifying solutions to define adaptive management strategies (restoration, conservation, etc.) for anthropised marine or continental (or mixed) ecosystems, at different scales of space, time and levels of organisation (from the individual to the populations) ;
- the interfaces and interactions between productive or exploited ecosystems and their environment ;
- the impact of agro-ecosystem practices on environmental changes ;

- the redesign, at relevant spatial, temporal and/or organisational scales, of productive ecosystems (agricultural, aquaculture, fisheries or forest ecosystems in particular) on the scientific basis of agroecology ;
- the experimentation with transitions coupled with analysis of the economic, social and environmental dynamics of socio-ecosystems.

Related key words: agriculture ; agronomy ; aquaculture ; animal welfare ; biocontrol ; biodiversity ; biomonitoring ; agricultural policies and/or agricultural systems design ; biogeochemical cycles ; environmental law ; functional ecology ; economics ; ecophysiology ; farming ; forestry ; genetics ; geography ; animal and plant health management ; soil management ; integrated management ; halieutic ; microbiology ; modelling ; landscape ; fisheries ; public policy ; pollination ; resilience and adaptation to global environmental changes ; animal science ; management science ; political science ; plant science ; ecosystem service ; sociology ; territory ; zootechnics

Related ERC code: LS02, LS06, LS08, LS09, PE06, PE08, PE10, SH01, SH02, SH03, SH07

Related SDG: 1, 2, 8, 12, 13, 14 et 15

Theme H.07 : Bio-economy, from biomass to uses: chemistry, materials, systematic approaches and processes

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This research theme deals with fundamental and applied research projects concerning the "bio-economy", in particular the cascading uses of biomass, the closing of cycles and their social, economic and environmental impacts. It is open to cross-disciplinary and/or systemic approaches specific to the challenges of bio-economics, as well as the methods and technologies linked to the transformation of the biomass for various uses via biotechnologies and chemical and/or physical transformation processes. All bioresources (cultivated, harvested, livestock, forestry, waste, etc.) in continental and marine systems are affected.

The scope of the theme covers topics linked to the following amongst others:

- biomass production, land use conflicts, mobilisation and sustainable management of bio-resources, regardless of origin;
- the pre-processing and transformation of bio-resources by different processes and their coupling (biotechnology, chemistry, catalysis, related processes), in particular in an integrated and systemic approach allowing the optimisation of the various flows involved (biorefinery concept);
- the eco-design and shaping of non-energy bio-sourced materials and molecules;
- the modelling and staging of flows (connecting material, water, energy and monetary cycles), at different scales, particularly territorial;
- analysis of value chains depending on environmental, economic and social criteria.

The requested disciplines fall within life, engineering and chemical sciences and social sciences and humanities. Integrative, interdisciplinary approaches are strongly encouraged.

Projects dealing with food issues must be submitted under the theme A.04 "Food and food systems". Projects dealing specifically with the transformation of biomass into energy carriers and

fuels (biofuels, biogas, etc.) must be submitted under the [Theme H.09 : Sustainable, clean, safe and efficient energy](#).

Related key words:

Resources and territories: land use, terrestrial and marine biomass (production, quality, availability, management, sustainability of the sector); waste, co-products - by-products, etc. from biomass or its transformation; identification of new bioresources.

Transformation technologies: biorefineries; biotechnologies; sustainable chemistry; metabolic engineering; micro-organisms; modelling and associated processes; platform molecules; new technologies; bio-sourced polymers; biological, thermochemical and/or catalytic biomass conversion processes; synthetic biology; bio-sourced industrial products (including those related to paper).

Conceptual approaches: life cycle analysis; multi-criteria analysis; risk-benefit approaches; value chain; Life cycle; environmental economics; impact modelling (economic, environmental including GHG, societal); indicators; logistical modelling and optimisation; public policies; representations and social realities; staging; environmental services.

Related ERC code: LS02, LS08, LS09, PE04, PE05, PE08, SH01, SH02, SH03, SH07

Related SDG: 7, 8, 9, 12, 13, 14, 15

Energy transition

The ANR 2025 Work Program and its Generic Call for Proposals include two scientific themes dedicated to supporting research in the field of energy.

These two complementary themes contribute to the National Energy Research Strategy (SNRE) and help meet the challenges of energy transition set by the French Law of 18 August 2015.

These two themes are not specifically linked to the “material sciences” field but are at the interface of all scientific fields, and bioenergies are explicitly integrated into the scope of Theme H.09 : Sustainable, clean, safe and efficient energy (instead of [Theme H.07 : Bio-economy, from biomass to uses: chemistry, materials, systematic approaches and processes](#)).

Theme H.08 : Basic energy science

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The "basic energy science" theme seeks to support upstream research, to explore new ideas and methods and to study breakthrough concepts. With long-term application perspectives, in particular beyond a 15-year horizon, the aim of this theme is to mobilise and transpose fundamental knowledge, methods and tools from the disciplines of matter, engineering and digital sciences to the field of energy, and to encourage research projects bringing together skills from a wide range of scientific communities, some of which do not necessarily focus on energy at present.

The following subjects can be addressed. The list is not exhaustive.

Innovative materials & environments: understanding, development and advanced characterisation:

- innovative materials and processes for energy: understanding of phenomena and behaviours related to microscopic or macroscopic physical, chemical or physico-chemical microscopic or

macroscopic properties of functional materials or surfaces (transport/transfer/storage of heat and/or matter, optics, etc.), substitution of critical materials, activation of chemical reactions, interfacial phenomena, nano-structuring (surface, interface, volume), bio-inspired or geo-inspired processes, complex and reactive assemblies, etc. ,

- advanced characterizations for energy processes: innovative experimental methods and instrumentation (spatial and temporal multi-scales) for complex systems, multi-physical couplings, multi-scale in-operando characterisations, methods for extrapolation of data or measurements over prolonged periods, etc.

Multi-scale and multi-physical modelling and simulations of energy systems:

- modelling/simulation-assisted design: modelling and simulation (including predictive) from the atomic scale to molecules, materials, media, interfaces and processes and devices (quantum, thermodynamic or kinetic methods, up-scaling, machine-learning, data-mining, artificial intelligence, etc.) aimed at discovering new materials, components or devices for energy, multi-scale simulation of functional properties, ageing mechanisms, corrosion, etc. ,
- multi-scale simulations of mechanisms, reactions, processes, devices or systems: multiphase and/or turbulent and/or reactive flows, fluid (reactive) - material interactions, ageing, self-healing systems, modelling of agile or versatile systems and processes, methodological approaches for modelling complex systems, including the assembly of several systems.

Given the upstream and exploratory nature of the expected research, the projects must clearly specify which problems they propose to solve, in relation to an application in the energy field, without it being necessary to provide a quantitative analysis of the impact on the energy field.

Related key words: sustainable materials; nanostructuring; bio-inspiration; geo-inspiration; interfacial processes; self-healing systems; chemical reactivity; catalysts (electrocatalysts, photocatalysts); energy conversion and transfer; thermal; multi-scale approaches (spatial, temporal); in-operando; upscaling; ageing; mathematics and numerical sciences for energy; models of systems; metrology and instrumentation

Related ERC code: LS09, PE01, PE02, PE03, PE04, PE05, PE06, PE07, PE08, PE11

Related SDG: 7, 9, 12 et 13

Theme H.09 : Sustainable, clean, safe and efficient energy

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The objective of this scientific theme is to accelerate research aimed at improving energy technologies (in a medium-term perspective) on the one hand, and, on the other hand, to support research projects involving social sciences and humanities, in the diversity of their disciplines, either in cooperation with other disciplines or in projects specific to social sciences and humanities. The submission of projects with highly interdisciplinary approaches is also encouraged.

Projects on this theme will have to present the extent to which the expected results would increase knowledge, in the perspective of improving performance or of competing with or of complementing existing or developing technologies or processes, while taking into account life cycle issues. They will also have to comply to the SDG goals (resource saving, eco-design, responsible consumption and production, reduction of inequalities, etc.). The presence of these elements will be taken into account when assessing the projects.

The targeted fields are:

- capture of renewable energies (solar, geothermal, wind, marine, etc.),
- energy harvesting, waste energy,
- circular energy, energy recycling: use of biomass (including waste), recycled products as a resource, recycling of heat in processes, recycling of materials that can be used as a base for energy carriers (including CO₂);
- energy storage (mechanical, chemical, electrochemical, thermal, etc.),
- hydrogen energy: production without carbon emissions, storage, transport and distribution in gas or dedicated networks, fuel cells,
- energy grids, including multi-sources, multi-vectors: power electronics, dynamic, smart energy management, grid-storage interactions;
- electrical engineering , power electronics, power transmission, actuators, converters and electrical machines;
- sustainable uses of the underground from an energy perspective, including massive temporary energy storage with low environmental impact, natural hydrogen;
- energy-efficient industrial equipment and processes (including intensified processes, etc.);
- CO₂ capture and storage;
- production of synthetic hydrocarbons (possibly coupled with platform molecules) from CO₂, N₂ (e.g. ammonia production) or recycled products;
- bioenergy (biofuels, biogas, etc.) obtained by biological, enzymatic and/or chemical, thermochemical means from biomass, with the development of (bio)catalysts and related processes;
- energy efficiency and the reduction of emissions from transport vehicles (combustion, hybridisation, electrification, global optimization of energy on board, etc.);
- energy in digital technologies : components for energy efficiency, reduction/optimisation of system and network consumption;
- approaches to energy transition by social sciences and humanities, which may be interdisciplinary or intersectoral: social, economic, technical, territorial and environmental justice issues;
- analysis of individual and collective behaviour, including the challenges of energy sobriety and the dynamics of their implementation
- analysis of the socio-technical and economic conditions for the development of the various energy sectors and the strategic choices employed;
- energy policies and in particular their links with climate mitigation and adaptation objectives (international comparisons, processes for developing low-carbon and carbon-neutral scenarios, new energy representations and practices).

Interdisciplinary approaches to the systemic challenges of energy transition, in relation with other dimensions of global transitions (ecological, health, digital, societal), are strongly encouraged. If appropriate, the meaning of "interdisciplinary focus" should be defined with details of how this

is to be implemented and its expected contributions in scientific terms (new approaches, methodologies, results) or impacts.

PRCE projects are well suited for this theme, to take into account the applications for the research proposed and their possible translation into innovative solutions (cf. description of the PRCE instrument in [appendix 1](#)).

Related key words: circular energy economy; renewable energy; wind energy; marine energy; geothermal energy; hydroelectricity; solar thermal; solar photovoltaic; solar fuels; energy harvesting; hydrogen energy; electrolysis; fuel cells; power-to-X; energy storage; electrochemical storage; batteries; supercapacitors; electrical engineering (power electronics, cables, etc.); smart energy grids; energy efficiency of digital technologies; thermal and thermodynamic systems; energy-efficient industrial processes; turbines; motors; HVAC; heating; refrigeration; energy and greenhouse gas efficient transport vehicles; CO2 capture/transport/storage; bio-energies; bio-fuels; bio-combustibles; synthetic fuels; nuclear energy; underground use for energy; renewable or recovered heat; techno-economic approaches; life-cycle analysis; multi-criteria analysis; energy dependence; cross-border operations; network infrastructure; energy markets; energy forecasting; behaviour; demand management; fuel poverty, energy security and risk; energy sobriety

Related ERC code: LS09, PE01, PE02, PE03, PE04, PE05, PE06, PE07, PE08, PE11, SH01, SH02, SH03, SH04, SH06, SH07

Related SDG: 7, 9, 10, 12 et 13

Technological transformation

This cross-cutting field consists of four themes, their common denominator being to contribute to the development of innovative technologies for various applications, relying in particular on Materials Science and Engineering and on developments in Digital Sciences (simulation/modelling, massive data processing and artificial intelligence, etc.).

Two themes are dedicated to specific applications: for the medical sector ([Theme H.13 : Healthcare technologies](#)) and digital society ([Theme H.12 : Micro and nanotechnologies for information processing and communication](#)).

It also includes a theme dedicated to innovative developments in the field of sensors, imaging and instrumentation, regardless of application (biology, physics, astrophysics, environmental sciences, etc.), as well as a theme aiming to support further generic research in nanoscience and nanomaterials, focusing on the properties of materials or objects induced by the nano dimension, or on specific phenomena related to the nanoscale, for potential future technological developments.

Theme H.10 : Nano-objects and functional nanomaterials, interfaces

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This theme welcomes proposals addressing the contributions of the nanometric dimension in the design and production of materials. The presence of specific nanometric scale objects or phenomena in the final outcome of the project should be the main criterion prompting submission of the proposal on this theme. The simple association of nano-objects with known properties, without new ones emerging, does not fall under this heading.

Proposals will come under the following four topics:

- synthesis, manufacture and characterisation of nano-objects and nano-materials of functional complexes,
- management of interfaces at the nano scale, functionalisation and interactions between interfaces at the nano scale,
- nano-object assemblies and 2D and 3D nanostructuring of the material,
- new properties resulting from the coupling of interactions at the nano scale.

The projects will seek to take into consideration sustainable development issues as well as life cycle and safety issues (for example, safety-by-design).

In the field of sensors, only projects that are mainly dedicated to a nanofabrication or nanostructuring stage should be submitted in H10 theme. Projects concerning the study of the contribution of a nanometric dimension to the field of sensors (to improve performance, for example), as well as instrumentation dedicated to nanomaterials, should be submitted under [Theme H.11 : Sensors, imagers and instrumentation](#).

Projects whose aim is to design devices for digital technologies must be submitted under Theme H.12 : Micro and nanotechnologies for information processing and communication.

Applied to the field of health or biology, the projects on synthesis submitted in this H.10 theme must present as a main lock the synthesis and the physico-chemical study of families of innovative and preferably multifunctional nano-objects. Projects interested in the study of therapeutic, pharmacological and/or biological properties, without demonstrating a strong originality at the level of nanostructuring and multifunctionality of the systems, must be submitted to the corresponding axis of the "Life Sciences" domain. In addition, in vivo studies are excluded from this H.10. theme.

Related key words: nanoparticles (nanowires, nanotubes, nanocubes, nanoplatelets, etc.); 2D nanomaterials; 3D nanomaterials; metamaterials; nanoporous materials; thin and/or nanostructured films; formation and stability mechanism; control of properties (mechanical, electronic, optical, thermal, magnetic, etc.); composite-interfaces in composite materials; surface and/or nano-object functionalisation; interaction between surfaces and interfaces; reactivity control; simulation, modelling; assembly; nanofluidics; interactions with the environment; synergy of properties (optoelectronic, photo-magnetic, etc.); near-field properties; synthesis processes and elaboration methods (bottom-up, top-down, self-assembly, growth, additive methods, confined environments, etc.)

Related ERC code: LS07, PE03, PE04, PE05

Related SDG: 3 et 9

Theme H.11 : Sensors, imagers and instrumentation

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This theme is intended to welcome projects whose main objective is the development of new sensors or innovative characterisation instrumentation, at different scales. Projects are expected to address as best as possible the problems of the "instrumentation - measurement - data processing" analysis chain, specifying the instrumental, experimental, numerical or algorithmic aspects required.

The theme comprises three main topics:

- the development of measurement and instrumentation methods for in situ characterisation and on-line operando monitoring, in order to characterise materials, devices or systems;
- characterisation at the nanometric scale and characterisation of nanomaterials: development of instrumentation and protocols dedicated to characterisation at the nanometric scale, meeting the needs of observation and detection metrology, including in complex media, whether fluid or solid, diluted or not;
- innovation, particularly breakthrough innovation, in the field of sensors and detectors in order to improve their performance (sensitivity, resolution, data acquisition and management and optimisation of their processing, etc.). Proposals should extend beyond the simple manufacture of materials and the characterisation of their sensitivity to a parameter (physical, chemical, biological, etc.) and envisage integration for instrumentation purposes.

Projects aiming at applications in the fields of physics, biology, health or the environment can be proposed under this theme provided that they address the problems of the experimental and instrumental analysis chain as a matter of priority.

Projects that primarily fall under the generic topic “Quantum Technologies” are to be submitted under the corresponding [Theme E.06 : Quantum technologies](#).

Similarly, projects dealing more specifically with the application/use rather than the development of the measuring instrument per se should be directed towards the relevant themes.

Related key words: sensors (thermal, mechanical, magnetic, chemical, electrochemical, biochemical, biological, optical, piezoelectric, inertial, acoustic, terahertz, etc.); in situ/in operando characterisation; chemical and biological reactivity monitoring; on-line control; imagers (optical, X-ray, terahertz, spintronics, etc.); wave-matter interactions (nanophotonics, photodetection); microscopies (optical, electronic, acoustic, near-field, terahertz, ionic, correlative, etc.); spectroscopies; measurements of physical properties (mechanical, optical, thermal, electrical, magnetic, etc.); metrology; micro and nanofluidics; advanced data processing techniques; multimodal techniques; tomography; non-destructive testing; development of measurement and characterisation methods

Related ERC code: majeurs PE02, PE03, PE04, PE05, PE07, PE08, autre LS01

Related SDG: 9

Theme H.12 : Micro and nanotechnologies for information processing and communication

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This theme aims to support, for applications in the field of information and communication sciences, key technologies such as electronics and photonics, the integration of devices in systems or the exploration of new paradigms for the next generations of components (more Moore / more than Moore). Depending on the expected degree of breakthrough or the assumed level of risk, the projects should address well-identified scientific and technological hurdles and seek to demonstrate either improvements in quantifiable performances or breakthroughs compared with existing knowledge. Projects will assess their impact on technological transition by referring, for example, to ADEME scenarios, the 2030 Agenda, etc., or on the question of technological sovereignty (France 2030, European Chips Act, etc.).

Projects targeting theoretical or digital approaches (simulation and/or design of components, circuits, materials, processes, complex systems) but also generic methodologies (design, testing, metrology), or the study of reliability, the advanced characterisation of materials or of performances of nano devices / basic components, are fully incorporated under this theme.

At the relevant dimensional scales (micro and nano), from basic materials towards systems on chips, the theme covers the following three areas:

- materials for components and devices: design, development, etc.
- elementary components and devices: characterisation, integration, application, etc.
- circuits, architectures and systems: design, simulation, test, etc.

Projects aiming at the development of devices and components for digital technology based on nano- objects or functional nanomaterials can be submitted under this theme.

Projects concerning quantum technologies whose objective is the development of technological building blocks and/or generic components which are also of interest in classical communication systems can be submitted in this theme provided these systems are clearly identified. The other projects should be submitted under [Theme E.06 : Quantum technologies](#).

Projects concerning the sensors, imaging and instrumentation targeting applications in information processing and communication that are clearly identified and have priority over potential applications in other fields can be submitted in this theme. The other projects should be submitted under [Theme H.11 : Sensors, imagers and instrumentation](#).

Related key words: characterisation; optical near-field; integrated circuits and systems; components (alternative, neuromorphic, computational accelerators, etc.); millimetric components; passive components; components for AI; design; life cycle; electronics (organic, flexible); (micro) displays; optical fibers; imagers and sensors for ICT; 3D integration; heterogeneous integration; dense interconnections; instrumentation; artificial materials; devices for optics; memories; metamaterials; metasurfaces; micro and nanoelectronics; micro and nanophotonics; micro-nano systems; new architecture paradigms; non-linear optics; packaging; photodetectors; plasmonics; technological processes; neural networks; RF; semiconductors; optical sources; simulation (materials, components, circuits); spintronics; System-in-package; chiplet-type modular systems; system-on-chip; resilient/frugal technology; THz

Related ERC code: PE02, PE03, PE05, PE07

Related SDG: 9

Theme H.13 : Healthcare technologies

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This research theme supports interdisciplinary research in the fields of engineering and systems sciences applied to new concepts, tools and health technology methods in the following areas:

- Instrumentation, detection systems and anatomical, functional, cellular and molecular imaging agents of medical interest and their integration in multiple systems;
- technologies associated with devices to improve the efficiency of screening, drug vectorisation, or bioproduction processes;

- the implementation of diagnostic and analytical systems (on-board sensors) and therapy in (or on) living organisms;
- biomaterials not related to regenerative medicine;
- in vitro diagnostic and analytical technologies, their implementation in living organisms;
- surgical technologies including remote surgery, related materials and devices, implantable devices, functional replacement devices and prostheses: advances may target the reliability, biocompatibility and performance of these technologies, miniaturisation, remote operability and increased energy autonomy. The development of these technologies may include modelling, simulation or implementation;
- technologies for e-health and in particular for measuring the exposome;
- disability compensation and autonomy.

PRCE projects taking into account the applications of the proposed research and their possible development are suitable for this theme (cf description of the PRCE instrument in appendix 1).

Tissue engineering and regenerative medicine projects fall under the specific [Theme C.11 : Regenerative medicine](#).

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for translational research projects that include a partner health care facility.

Related key words: medical devices; biosensors and monitoring instruments; medical imaging; stimulation tools; signal and image processing; biomaterials/biomechanics; home automation; home equipment; disability; e-health; medical IT; bioprinting; exposome; bioprocessing

Related ERC code: LS07, PE02, PE03, PE07

Related SDG: 3, 9 10 et 12

Digital Transformation

Theme H.14 : Interfaces: mathematics, digital sciences – biology, health

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This theme supports interdisciplinary research projects between two major scientific fields, namely mathematics and digital sciences on the one hand, and biology and health on the other hand. The aim is to strengthen the cross-fertilisation of these two fields in order to foster the emergence of new concepts, models or methods in mathematics and digital sciences with a view to accelerating research in the fields of life sciences and health. The impact of the projects will be assessed in particular on the proposed methodological innovations and their validation through proof of concept.

The projects submitted may focus on the following:

- methods for the analysis, integration, modelling and visualisation of complex data (multimodal, multiscale, high-content) such as data from omics approaches (genomics, transcriptomics, proteomics, etc.), structural biology, cell and tissue microscopy, imaging or e-health;
- the modelling of biological and physiological processes, enabling the development of predictive approaches to the quantitative and qualitative behaviour of the systems studied, the numerical simulation of these models using scientific and high-performance computing and the related optimisation as well as the methods for comparing them with experimental data, in particular data assimilation and automatic learning approaches;
- medical signal and image processing for the segmentation, extraction and characterization of the information they contain, as well as the fusion of multimodal, multiscale, morpho-functional information with the aim of deepening biological knowledge and/or developing new approaches of medical interest;
- immersive (virtual and augmented) visualisation and simulation of data and models;
- the development of methods for the collection, extraction, management, securing, matching and exploitation - aid in decision-making - of massive or heterogeneous data from a variety of sources ranging from omics biology to medico-administrative health data bases (National Health Data System) and health datawarehouses or any other source of personal health data for preclinical, clinical, population or epidemiological research, or as decision-making aid;

A co-funding request by DGOS (General Directorate for Healthcare Provision) may be made for projects that include a partner health care facility.

Related key words: large-scale machine learning and artificial intelligence for life sciences; assistance in decision-making; algorithmic; predictive analysis; signal and image analysis and processing; big data in biology; biomathematics; bioinformatics; computational biology; bioproduction; e-health; medical information technology; modelling of biological processes; emerging properties of biological systems; simulation in biology

Related ERC code: LS01, LS02, LS03, LS05, LS07, PE01, PE06, PE07

Related SDG: 3 et 9

Theme H.15 : Interfaces: mathematics, digital sciences – Humanities and social sciences

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This theme supports interdisciplinary or transdisciplinary research actions related to the two main fields: "Mathematics and Digital Sciences" and "Humanities and Social Sciences".

This theme concerns both the application of concepts, methods from mathematics, computer sciences and digital technologies in fields relevant for Humanities and Social Sciences (linguistics, culture, education, economics, psychology, sociology, geography, anthropology, history, literature, art, etc.) and, conversely, the study by Humanities and Social Sciences of digital objects (infrastructures, social networks, algorithms, artificial intelligence, software, etc.) insofar as the cross-disciplinary study benefits both fields.

The projects may relate to digital humanities or computational humanities and social sciences as well as reflection on the challenges of digital objects, networks and devices as long as, by bringing

disciplines into close and mutual interaction, they aim to achieve significant scientific spin-offs in both humanities and social sciences and digital sciences or mathematics. The targeted progress may be more significant in one of the two fields (humanities and social sciences or digital sciences or mathematics) provided that the projects mobilise concepts or tools from recent advances in the other field. Research proposals that simply mobilise digital engineering or are limited to impact studies are therefore excluded along with research involving two types of disjointed tasks. On the contrary, the selected projects will have to mobilise an upstream, interdisciplinary approach in terms of research questions asked and research methods employed. The projects will be supported by an interdisciplinary partnership, bringing together researchers in mathematics or digital science and technology, and in humanities and social sciences.

Related key words: acceptability and appropriation of digital technologies; access to information; access to publications and research data; analysis of culture; analysis of discourses and controversies; analysis of digital media; analysis of graphics traces; analysis of public policies through open data; annotations and enrichment of data; cognitive, sociological and anthropological approaches to learning from/through the digital; digital approach to artistic creation; digital approaches to heritage; co-learning; co-teaching; virtual collections; credibility and verification of online information; democracy and citizen debates in the digital context; immersive and nomadic devices; open data and linked data; eco-design of digital technologies and services; digital school and connected territory; economy and digital markets; media literacy; e-learning; digital enterprise; immersive environment (school, classroom, tool); computing environments for human learning; digital exposure; digital technology training; digital/algorithmic governmentality; history of mathematics; digital humanities; cultural and creative industries; pedagogical innovation; serious games and gamification; digital literacy; cultural and digital mediations; knowledge modelling; mathematical modelling of social or socio-economic systems; computer-assisted music; digital ethics; digital and transformation of research and knowledge practices; natively digital heritage; personalisation and adaptation to the learner; content personalisation; self-quantification; use of big data and new analysis capacities; reduction of the digital divide; 3D restitution; educational scripting; behavioural sciences; computational humanities and social sciences; digital society and innovation; digital uses and social practices; uses and regulation of Artificial Intelligence

Related ERC code: PE01, PE06, PE07, SH01, SH02, SH03, SH04, SH05, SH06, SH07

Related SDG: 1, 4, 5, 8, 9, 10, 11, 16 et 17

Theme H.16: Interfaces: mathematics, digital sciences – Earth system and environmental sciences

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This theme aims at supporting innovative interdisciplinary research projects in the scientific context of the Earth system and the environment (in the sense of all the physical, chemical and biological processes taking place on the planet, including the interactions between humans and the environment, and between the different compartments of the Earth - ocean, atmosphere, biosphere, cryosphere, and land). These projects are expected to develop new mathematical, physics and/or numerical based concepts and methods to be implemented on computing and data-based infrastructures. The objective is to enable modelling, theoretical or statistical analysis, and simulation of multi-compartment systems on different spatio-temporal scales; processing and analysing data produced by observational systems, or experiments, or results of numerical

simulations. The expected projects should address the challenges raised by the large volumes and diversity of these data.

The submitted projects may, in particular, address the following topics:

- digital methods and services - conforming to FAIR principles - for managing, curating, securing, accessing, interoperating, and cross-referencing distributed, heterogeneous, and multi-source data (e.g., land, sea, air, space, biodiversity, collection, experimentation, numerical simulations), including scaling and virtualization in the cloud;
- innovative methods, software architectures and workflows for the processing, "intelligent" reduction and statistical analysis of massive data flows and volumes, especially multi-source data, exploiting in particular artificial intelligence and data processing logistics (in-situ and in-transit analyses) based approaches;
- modelling, theoretical analysis and numerical simulation in deterministic or stochastic frameworks, at different time and space scales. In particular, these models would be able to integrate new artificial intelligence approaches (e.g., parametrization, emulation, surrogate models, digital twins) and new high-performance computing capabilities for the understanding and quantification of the evolution of integrated multi-compartment and multi-scale systems (e.g., climate, interactions between solid Earth and fluid envelope, global change impacts, anthropized and urban environments, hazards and risks), and their interactions;
- assimilation, inferences, probabilistic inversions of data, in particular multi-source and multi-resolution data (observation, experimentation, simulation) associated with complex and high-dimensional model spaces for the understanding of the structures, composition and dynamics of Earth system components and of the environment and their interactions, as well as the theoretical analyses allowing to qualify and explain their uses;
- characterization, quantification and predictability of extreme events including associated uncertainties in a probabilistic framework, and their integration through the different sources and scales of time and space involved in the analysis and inference methods, data assimilation, numerical modelling/simulation of complex systems, and/or artificial intelligence approaches;
- innovative methods (together with their theoretical analysis) to improve the monitoring, assessment and predictability of all natural and/or man-made hazards: earthquakes, climate hazards (earth, climate, environmental, pollution) as well as those associated with space weather, all considered in isolation or in interaction;
- design of digital twins for the Earth system and the environment orchestrating digital modelling/simulation, analysis and assimilation of multi-source and multi-type data flows, management of these data relying on a series of digital infrastructures including the major national high-performance computing centres;
- innovative methods for modelling the cross interactions between anthropic or natural changes on the one hand and populations, communities and ecosystems on the other hand, to identify and characterise, in particular, resilience, adaptation or evolution phenomena;
- methods and services to disseminate scientific information under a form that eases their use (decision making) by different stakeholders (e.g. agriculture, risk prevention and management, infrastructure, energy, health).

The foreseen projects must be innovative, interdisciplinary and examine well identified fundamental and methodological questions. The benefits for the different disciplines of the proposed collaboration and cooperation strategy must be clearly explained.

Related key words: adaptation and resilience of populations, communities and ecosystems; decision support; predictive analysis; large-scale machine learning; set-based approaches; probabilistic and stochastic approaches; assimilation and inversion of multi-source data; database; big Data; natural and anthropogenic environmental changes; data crossing and fusion; species and population evolution; FAIR data management, curation and services; infrastructures; digital twins; monitoring and forecasting methods; modelling/theoretical analysis/simulation of coupled, multi-physics and multi-scale systems; data hubs; predictability; numerical forecasting; quantification of uncertainties and extreme events; climate simulation; earth system; statistical data processing and analysis; visualisation and visual exploration of large data sets; workflows and simulation ensembles

Related ERC code: PE01, PE6, PE7, PE10, LS08, LS09, SH6, SH7

Related SDG: 6, 7, 11, 13, 14, 15

Transformation of socio-technical systems

This cross-cutting area is made up of three axes that share several points in common. First of all, each of these axes is focused on a major issue of development of societies and living well together, whether in relation to the global challenge related to security ([Theme H.17 : Global security, resilience and crisis management, cybersecurity](#)), the challenges of sustainable development of cities, buildings and transport ([Theme H.18 : Cities, buildings and construction, transport and mobility: transition to sustainability](#)) or the mutation of productive systems ([Theme H.19 : Industry and factory of the future: People, organisations, technologies](#)).

Another common point is that these axes call on a very wide range of scientific disciplines to address these issues, ranging from material sciences and engineering to human and social sciences, including mathematics, digital sciences, and even environmental or life sciences where appropriate. At the same time, some of the issues identified in these axes call for multidisciplinary, even interdisciplinary and systemic approaches.

Finally, collaborative (or even participatory) research projects involving actors from the different fields treated, including companies but also, depending on the subject, civil society (NGOs, etc.) and public actors (local authorities, law enforcement, public transport service, etc.) are welcome in these areas.

Theme H.17 : Global security, resilience and crisis management, cybersecurity

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Thinking about the "global security" of societies implies embarking on the broadest disciplinary collaboration possible, from the understanding social and environmental phenomena through to prospective reflection on the changes in societies, threats and risks, and new applications via new technological devices (AI, blockchain, virtualisation, cloud computing, IOT, etc.).

In this perspective, this theme concerns research projects whose objectives are to characterize, prevent and respond to new forms of threats and risks, vulnerabilities, potential consequences

on systems and therefore the risks inherent in societies (protection of the nation's vital interests, resilience, logistics, treatment of consequences); working on the prevention and protection of goods and people; developing the protection of infrastructures and networks as well as the protection of objects, data, content and software; managing crises and contributing to resilience; supporting decision-makers and analysing the instruments, including legal and economic instruments, involved in the exercise of people's rights and freedoms.

The theme is open to any fundamental or applied research, uni-disciplinary, multi-disciplinary or inter-disciplinary, leading to social, scientific or technological developments in terms of safety, security and cybersecurity (prevention/ anticipation/ supervision/ detection/ reaction/ remediation).

Participatory research involving users (internal security forces, private security and cybersecurity operators, municipal police, civil security, operators of vital importance or of establishments open to the public, local authorities, NGOs, etc.) is encouraged.

Proposals must be positioned with respect to four topics:

- the resilience of the nation and society, which includes risk identification, crisis management and remediation, regardless of origin: resilience of systems and methods, citizen and territorial resilience, training and educational approach, decision support, etc.
- the fight against terrorism and organised crime: analysis of the logic and mechanisms of action (violent radicalisation for example) and conduct research into new operational resources;
- the security of society and its individuals, in the areas where they live or move, consider public action perspectives to deal with crime and trafficking, respond to the phenomena of urban violence, ensure events are held peacefully and monitor gatherings of a festive or democratic nature, etc.
- security and democracy, against a backdrop of ever-increasing demands for transparency, the reshaping of democratic balances, the need to respect individual and fundamental freedoms, greater protection for personal data, and the development of new uses brought about by the development of new technologies (social networks, artificial intelligence, etc.).
- cybersecurity: freedom and security in cyberspace, coding and cryptography, formal methods for security, privacy protection, security of information systems, software and networks, security and multimedia data, security of hardware systems, secure collaborative work tools, secure digital identity, combating cybercrime (ransomware, malware analysis, etc.), security of cloud computing and its uses, hardware and software security of connected objects, human factors and cybersecurity;
- protection of critical infrastructure and societal resilience against physical and digital threats to sensitive sites, critical equipment and networks and the correct functioning of society; protection of public spaces; surveillance of sovereign spaces.

Related key words: cybersecurity of networks, information systems, data, software and embedded systems; cloud computing security; Internet of Things security; communication security; intrusion detection; detection and mitigation of vulnerabilities; protection against attacks; protection of personal data; system engineering for physical and digital protection; national security; global security; hybrid threats; security forces equipment; evidence management; rescue to people; security of transport, establishments and places open to the public; protection of public spaces; surveillance of maritime, land and air spaces; resilience of systems;

protection of activities of vital importance; fight against the Nuclear-Radiological-Biological-Chemical-Explosive (NRBCE) threat; activity continuation plan (digital physics, logistics flows, information flows, etc.); ethical and legal security by design; exercise of the protection of freedom; disinformation detection; public and international policies; sociology of organisations; social and cultural modelling; secure/non-secure societal transition

Related ERC code: LS07, LS09, PE01, PE02, PE03, PE04, PE05, PE06, PE07, PE08, SH01, SH02, SH03, SH04, SH06, LS2

Related SDG: 9, 16 et 17

Theme H.18 : Cities, buildings and construction, transport and mobility: transition to sustainability

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The research expected in this area must explore the solutions by which urban territories, considered on all scales - from buildings to urban systems - transport, housing, and users, will be able to face environmental challenges through sustainable development.

This research should help to evaluate and improve the performance of buildings, transport and territories, and to develop sustainable alternatives. This research must be conducted with a view to reducing pressures on the environment and adapting to future disruptive or incremental changes, including climate change, but also demographic or territorial transitions, for instance. Particular attention is paid to advances in digital science and technology to support and promote this transition, based on modelling, data exploitation and the development of digital solutions. Questions of governance and the development of public policies, legislation and new economic models, which will be involved in the management and transformation of urban systems, can also be integrated into the projects, by mobilising the relevant expertise in social sciences and humanities.

It will essentially involve participating, through the implementation of integrated multi, inter or transdisciplinary integrated approaches to the development of methodological or technological solutions. It will provide, in particular, the knowledge and understanding needed to analyse, measure, diagnose, help design, build, rehabilitate or renew urban systems, intra- and extra-urban transport systems and the existing built environment. International comparisons are welcome. Particular interest may be shown in systemic approaches, which facilitate the integration of societal, environmental and technical processes and promote understanding in terms of their interactions, complexity and dynamics.

In addition to companies, the participation of stakeholders such as local and regional authorities is encouraged.

The scope of this theme covers the following three areas:

- sustainable urban systems and their components: equipment, infrastructure, uses and practices, access and practices; quality of the urban environment, reasoned and integrated use of the urban soil and subsoil, integrated approach to energy in the city, urban climate (heat island, etc.), nature in the city, urban agriculture, ecosystem services, urban flows and metabolism and the circular economy (the city as a resource), industrial ecology and synergies between urban and industrial territories, access to resources (water, energy, food), mutualisation of energy and material flows, reuse and recycling of waste, reconversion of urban wasteland and fight against artificialisation.

- sustainable construction: buildings (new and old), low-carbon area or districts, healthy and with low environmental impact (use of materials with less impact on natural resources, in particular, and that are easily recyclable), energy renovation, sustainable construction and management of heritage buildings and infrastructures;
- transport and mobility: transport safety and security, mobility and driving aids, autonomous vehicles, smart and interconnected transport systems, multi-modality.

And with interdisciplinary topics:

- networks and services: passenger and freight transport networks and services, digital networks and services, urban (e)services, urban engineering (water, sanitation, waste, energy, etc.);
- vulnerabilities and resilience, change and adaptation to change and to 'shocks' or crises;
- town planning, urban morphologies, in relation to mobility or accessibility to services.

Related key words: quality of the urban environment (air, water, soil, subsoil, landscapes, noise, pollution, etc.); rational and integrated use of urban soil and subsoil; integrated approach to energy in the city; fight against artificialization; ecosystem services in the city; urban metabolism; urban climate; vulnerabilities and resilience of socio-technical systems; low-carbon and low environmental impact buildings, blocks, districts, city; energy and environmental renovation; civil engineering; construction; management and rehabilitation of existing heritage; infrastructure; urban engineering; port areas; sustainable mobility; inter- and multi-modality; transport safety and security; driving aids; autonomous vehicle; connected vehicle; passenger transport networks and services; urban logistics, IoT (Internet Of Things); urban services; e-services; urban data; smart cities; smart transport systems

Related ERC code: LS08, LS09, PE01, PE02, PE03, PE06, PE07, PE08, PE10, SH01, SH02, SH03, SH04, SH06, SH07

Related SDG: 1, 3, 4, 6, 7, 9, 10, 11, 12, 13, 14, 15, et 16

Theme H.19 : Industry and factory of the future: People, organisations, technologies

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This theme is open to fundamental research projects and industrial research projects to help design and implement the industrial production systems of the future. The expected projects will have to contribute to lifting scientific and/or organisational barriers in one of the three following areas:

- supporting, understanding and boosting the development of new digital or manufacturing technologies to meet the demand for innovative personalised and optimised products,
- promoting a systemic vision and organisation of the industrial system for a development process that considers the whole product life cycle and value chain dimensions.
- focus the factory on people who should stay at the centre of operations whereas the work organisation becomes more flexible. It is also necessary to address production challenges while reducing the cognitive and physical workloads of operators.

These disruption themes are divided into seven topics:

- people in new productive organisations,

- robotics for industrial performance, human-robot collaboration in production systems (technological, organisational and legal aspects),
- digital production methods and technologies, the connected factory, connected industrial ecosystems,
- the virtual industry and factory,
- flexibility and agility of new management modes and production systems,
- new production and control technologies.
- eco-production, the green and socially responsible factory,

The expected projects must come under these topics; they can mobilise different scientific disciplines, in engineering sciences, information and communication sciences and technologies, systems sciences, humanities, social sciences, epistemology of science and technology, etc.

Cross-disciplinary proposals taking technological and human aspects into account are strongly encouraged, as they are likely to lead to a significant breakthrough in the design of future production systems. Finally, exploratory research proposals for the industrial systems and factory of the future are especially welcome in this panel.

Lastly, the projects are expected to take account of the need for resilience in the face of potential future disruptions (climatic issues, geopolitical uncertainties, pressure on both human and natural resources, etc.), leading in particular to the need to rethink the economic and organisational models (functionality economy, systems approach, Open Source, etc.) of an industry of the future based on the principles of sustainable development.

Related key words: adaptation-resistance and change support; decision aids; operator assistance; logistics chain and networks; cobotics; rapid configuration; diagnostics; eco-design; eco-efficiency; industrial ecology, circular economy, economy of functionality, eco-production; local ecosystem; cognitive ergonomics; fab-lab; cognitive engineering; management and evaluation of the life cycle of product-service systems; industry of the future; systems engineering; frugal innovation; industrial innovations; innovative measurement and control instrumentation; integration of additive manufacturing; human-machine interaction; internet of Things; predictive and anticipatory maintenance; management; optimisation and operational research; work organization; customisation of products and services; sustainable processes and services; energy and resource efficient production; products; augmented reality, virtual reality; recycling; regulation of individual or collective activity; manufacturing robotics; cyber-physical systems; control command learning techniques; innovative manufacturing technologies; theory of industrial innovations; manuel labor

Related ERC code: LS05, LS06, LS07, PE01, PE02, PE06, PE07, PE08, SH01, SH02, SH03, SH04

Related SDG: 8, 9, 10 et 12

Strategic priorities

The strategic priorities defined by the French Government focus on the following themes of the 2025 AAPG:

- Scientific exploitation of data generated by OSIs and IRs^{*34} : all AAPG themes
- Artificial intelligence: mainly theme E.02 and projects in other themes, but including a major AI component
- Mathematics: theme F.01
- Quantum technologies: theme E.06
- Humanities and Social sciences: themes D.01, D.02, D.03, D.04, D.05, D.06, D.07 and cross-cutting themes H.01, H.04, H.15, and H.18
- Autism in neurodevelopmental disorders: themes C.03, C.04, C.07, C.08 C.09, C.10, D.04, H.13, H.14.
- Translational research on rare diseases: tall themes in the domain « Life Sciences », from C.01 to C.11, and cross-cutting themes H.03 and H.13.

³⁴ The list of international scientific organisations (OSI) and research infrastructures* (IR*) is provided in [appendix 4](#).

G. Appendices

Appendix 1 : Summary of the main characteristics of the funding instruments of the 2025 Generic Call for Proposals

This annex does not replace the AAPG 2025 Guide which details the expectations and eligibility criteria specific to the different funding instruments, the main characteristics of which are given below. Before any submission or registration of a project, scientific coordinators are invited to read the 2025 AAPG guide carefully.

1. Instrument dedicated to young researchers (JCJC)

Objectives

The JCJC funding instrument aims to prepare the new generation of talented young researchers by encouraging their empowerment and by encouraging them to tackle scientific or technological obstacles using original approaches.

Therefore, the instrument aims to help young researchers acquire scientific autonomy, develop their own research theme, set up or strengthen their own team around this theme, within and beyond their laboratory, acquire project-based culture and quickly demonstrate their capacity for innovation. It is also a springboard for young researchers who, thanks to initial support from the ANR, will be more willing to consider submitting a proposal in response to the calls launched by the European Research Council (ERC).

This instrument, which focuses on the individual³⁵, provides funding solely for the young researcher's team. This instrument is open only to researchers from research organisations participating in the public research service³⁶. It is not open to non-tenured staff³⁷ and cannot be used to fund the coordinator's salary.

Specific eligibility criteria

To be classified as "Young researcher", applicants must have **defended their doctoral thesis** (or having obtained a degree or qualification equal to the international PhD standard) **less than 10 years ago** (i.e., after 01 January 2014)

In addition, researchers are eligible to the "young researchers" instrument **only for 5 years after taking up a position** in a research and knowledge dissemination organisation (i.e., after 01 January 2019)³⁸.

Funding under the "Young researcher (JCJC)" instrument **can only be allocated once** throughout a career; it is not possible to combine JCJC funding with a similar type of funding.

³⁵ Changing coordinator is not authorized during the implementation of a JCJC project.

³⁶ i.e. one public law partner for research and dissemination of knowledge (such as EPST, university, EPIC research, etc.) established in France or at least one private law partner for research and dissemination of knowledge having an establishment or a branch in France and not being a commercial company. Under this call, Consular Higher Education Schools (EESC) are not considered as commercial companies.

³⁷ Insofar as they are currently under contract or will be with the managing authority. The contract may not have started before contracting the project. See the eligibility criteria in the 2025 AAPG Guide.

³⁸ Exemptions may be granted for these 2 eligibility criteria. The following events may be considered: maternity/paternity leave, parental leave, leave for parental presence, long-term sick leave (more than 90 days), national service, integrated dual degrees. The limit is extended by a period equal to the duration of the event, by 4 years for the integrated dual degree. In addition, for women, the limit is extended by one year per dependent child.

A coordinator of a JCJC project currently being funded by the ANR cannot act as such for a JCJC, PRC, PRCE, PRME or PRCI project submitted under the 2025 AAPG **over the course of his/her JCJC project**³⁹.

Please note that a young researcher eligible for JCJC funding (respecting the deadline for the doctoral thesis defence and the date of first employment) is however not required to submit his/her proposal under this instrument and may submit a proposal as scientific coordinator under the PRC, PRCE, PRME or PRCI instrument if the composition and size of the project justify this (cf. [§B.6](#), sub-criterion dedicated to JCJC instrument « *Project contribution to the coordinator's empowerment and team development* »).

2. Single-team research project (PRME)

Objectives

The “Single-team research project” (PRME) funding instrument is intended to fund a single team⁴⁰ from research organisations participating in the public research service⁴¹. Various types of teams are accepted, provided that they are approved by the laboratory director and can prove their sustainability throughout of the project. To this end, upon submission of its pre-proposal, the coordinator must provide a certificate signed by the laboratory director (according to the model to come on the web page dedicated to 2025 AAPG).

A PRME project corresponds to research directed towards outstandingly ambitious scientific objectives. The scientific coordinator is expected to be heavily involved (at least 40% ETPR - Full Time Research Employment)⁴². The team will also have to provide evidence that all participants identified in a PRME project are involved in at least 1.5 ETPR (see the list of eligible staff in the *2025 AAPG Guide* to be published in September 2024).

Specific eligibility criteria

A scientific coordinator of a PRME project currently funded by the ANR cannot act as coordinator of another PRME project over the duration of his/her PRME project⁴³.

A PRME project must correspond to one of the themes in the ANR's field of intervention which does not overlap with those of other funding agencies, especially INCa and ANRS|MIE. The verification of the eligibility relating to themes supported by these organisations - in particular cancer, AIDS, viral hepatitis and tuberculosis - is jointly conducted by the ANR and the INCa or the ANRS|MIE.

3. Funding instruments dedicated to collaborative research (PRC, PRCE, PRCI)

Collaborative projects aim to achieve scientific or technological objectives by sharing knowledge and resources from various research teams or groups. The funding granted helps fast-track the

³⁹ Submission as scientific coordinator is authorised in the final year of a JCJC project, provided that the ongoing project is completed by the date on which the new project is agreed, i.e. no later than 31/12/2025.

⁴⁰ Only the scientific coordinator's team or laboratory is funded under the single-team research project.

⁴¹ i.e. one public law partner for research and dissemination of knowledge (such as EPST, university, EPIC research, etc.) established in France or at least one private law partner for research and dissemination of knowledge having an establishment or a branch in France and not being a commercial company. Under this call, Consular Higher Education Schools (EESC) are not considered as commercial companies.

⁴² Changing coordinator is not authorized during the implementation of a PRME project.

⁴³ Submission as scientific coordinator is authorised in the final year of a PRME project, provided that the ongoing project is completed by the date on which the new project is agreed, i.e. no later than 31/12/2025.

research proposed through collaborative efforts.

These instruments encourage research team to carry out research for which a collaboration provides a scientific added value, either because research can be conducted or because it makes it possible to consider results of greater ambition or quality. Inter-disciplinary or multidisciplinary research is encouraged as part of these collaborative instruments.

A collaborative project is carried out by a coordinating partner who acts on behalf of all the partners (at least two) constituting the partnership; one partner's scientific manager is designated for each partner. The scientific manager of the coordinating partner is then designated as scientific coordinator.

3.1. Collaborative research project (PRC)

Objectives

The "Collaborative Research Project" (PRC) instrument is the ANR's main funding instrument. It includes all types of multi-partner research projects other than those covered by PRCI and PRCE instruments.

The collaboration involves at least two partners⁴⁴, including at least one laboratory or team from a research organisation participating in the public research service⁴⁵.

Collaborations using own funds are possible, particularly for foreign team(s) from countries that are not eligible for the PRCI instrument, in which case the consortium must include at least one laboratory or team from a research organisation participating in the public research service eligible for ANR funding.

Specific eligibility criteria

A PRC project must correspond to one of the themes in the ANR's field of intervention which does not overlap with those of other funding agencies, especially INCa and ANRS|MIE. The verification of the eligibility relating to themes supported by these organisations - in particular cancer, AIDS, viral hepatitis and tuberculosis - is jointly conducted by the ANR and the INCa or the ANRS|MIE.

3.2. Collaborative research project - International (PRCI)

Objectives

The ANR is working in collaboration with research funding agencies from other countries and provides agreements facilitating collaborations between teams from these various countries to its supervisory ministry. These bilateral agreements, which may cover specific themes or be open to all research themes funded by the ANR, focus on priority objectives or geographical areas for limited periods of time, except for the special case of the Franco-German collaboration (Elysée Treaty, revised in 2019 in Aix-La-Chapelle).

Depending on the case, these agreements aim to:

- accelerate and develop collaborations between French researchers and the best

⁴⁴ A PRC project can involve two teams from the same laboratory, with each being considered as a partner in the collaborative project. In this case, it is not a PRME.

⁴⁵ i.e. one public law partner for research and dissemination of knowledge (such as EPST, university, EPIC research, etc.) established in France or at least one private law partner for research and dissemination of knowledge having an establishment or a branch in France and not being a commercial company. Under this call, Consular Higher Education Schools (EESC) are not considered as commercial companies.

- international teams on key themes,
- promote partnerships with emerging countries based on themes of mutual interest and shared benefits,
 - enable the development of transnational teams of excellence to conduct and share research worldwide.

The “International Collaborative Research Projects” (PRCI) funding instrument is devoted to these bilateral collaborations, which are established between at least a team or laboratory from a French research organisation participating in the public research service⁴⁶ and a foreign partner (eligible for funding from a foreign funding agency, which has signed a bilateral agreement with the ANR).

A strong synergy is expected between the two partners submitting their proposal and must be reflected in the complementarity of each country’s scientific contributions and clear identification of real scientific coordinators for each country, one on the French side **and** one on the foreign side.

Specific submission and evaluation processes

Collaborations open to the “Collaborative Research Project – International” (PRCI) instrument can take 3 submission and evaluation modalities:

- « ANR *Lead Agency* » modality: ANR is responsible for the main submission and evaluation of the projects. **The concerned collaborations require the registration of the project to the ANR in step 1 of the AAPG call**, then the submission of a detailed proposal to the ANR in step 2. The foreign partner may have to submit a copy of the project to the foreign funding agency.
- « Foreign *Lead Agency* » modality: the foreign funding agency is responsible of the main submission and evaluation of the projects. **The concerned collaborations do not require registration of the project in step 1 of the AAPG call.** However, a copy of the project submitted to the foreign agency is required, within a specific schedule.
- « Non- *Lead Agency* » modality: the projects are submitted to the two funding agencies, according to the schedule and specific terms of each agency. The evaluation is carried out by the two funding agencies according to their own evaluation process and schedule. **The concerned collaborations require the registration of the project to the ANR in step 1 of the AAPG call**, then the submission of a detailed proposal to the ANR in step 2.

Whatever the PRCI collaboration targeted, the selection for funding is made by joint agreement of the two financing agencies, and each of the agencies funds the teams in its country, according to its own founding procedures.

The [Appendix 3](#) give a provisional list of the collaborations open in the 2025 AAPG, the relative themes, and the collaboration modality.

Specific eligibility criteria

In addition to the eligibility criteria applicable to any AAPG funding instrument, there are criteria specific to each PRCI collaboration applied by the ANR and specific eligibility criteria

⁴⁶i.e. one public law partner for research and dissemination of knowledge (such as EPST, university, EPIC research, etc.) established in France or at least one private law partner for research and dissemination of knowledge having an establishment or a branch in France and not being a commercial company. Under this call, Consular Higher Education Schools (EESC) are not considered as commercial companies.

applied by foreign funding agencies. A PRCI project must therefore meet the eligibility criteria of the ANR **and** the eligibility criteria of the foreign funding agency⁴⁷.

3.3. Collaborative research project - Entreprises (PRCE)

Objectives

The “Collaborative Research Project - Enterprises” (PRCE) funding instrument is dedicated to collaborations established between at least one team or laboratory from a French research organisation participating in the public research service⁴⁸ **and** at least one company conducting R&D work in France (large, small and medium-sized companies and start-ups). The project may be coordinated by the “research organisation” partner or the “company” partner.

This collaboration aims to jointly achieve research results beneficial to both parties, (1) by allowing research organisations to address new research questions, or to approach them differently, and (2) by allowing companies conducting R&D work to access higher level “academic” research in order to improve their capacity for innovation in different ways. The PRCE collaboration must therefore have a purpose of innovation in a socio-economical context.








Specific eligibility criteria

Any project invited in step 2 of the AAPG call including a “Company” partner and/or a foreign partner outside the European Union is subject to an opinion from the HFDS with regard to the PPST (cf. §D.6). Consequently, PRCE projects invited in step 2 are systematically submitted to the HFDS for opinion. A negative opinion from the HFDS does not allow the project to be funded at the end of the call evaluation process. **Consequently, coordinators of a PRCE project are invited to contact the FSD of their organisation in order to find out in advance about the eligibility of their project with regard to the PPST.**

⁴⁷ Appendices dedicated to confirmed PRCI collaborations will be available on the web page dedicated to 2025 AAPG (one by country/funding agency). Will be included in these appendices: the open themes, the specific submission and evaluation processes, if applicable the specific eligibility criteria. Scientific coordinators must read the specific appendix relative to his / her partnership before any registration / submission of a PRCI project.

⁴⁸ i.e. one public law partner for research and dissemination of knowledge (such as EPST, university, EPIC research, etc.) established in France or at least one private law partner for research and dissemination of knowledge having an establishment or a branch in France and not being a commercial company. Under this call, Consular Higher Education Schools (EESC) are not considered as commercial companies.

Appendix 2: Provisional schedule of the 2025 Generic Call for Proposals (AAPG 2025)

STEP 1	Scientific coordinators submit their pre-proposals (PRC/PRCE/PRME/JCJC) or register their PRCI projects (in « ANR Lead Agency » modality or « Non- Lead Agency » modality)							
2024	July-August	September	October	November	December	January	February	2025
	Publication of the Work Programme and the AAPG call	Publication AAPG guide		Eligibility check of the pre-proposals and registration PRCI			Notification of the results	
Scientific coordinator 		Submission of pre-proposals PRC/PRCE/PRME/JCJC Registration of projects PRCI						
Panel 				Individual evaluation by the panel members	Plenary meetings			
STEP 2	The scientific coordinators selected at the end of Step 1 and the scientific coordinators of PRCI projects registered in Step 1 submit their full proposals							
2025	March	April	May	June	July	-----	December	
		Eligibility check			Publication Notification of the results	Contracting of the selected projects		
Scientific coordinator 	Submission of a full proposal PRC/PRCE/PRCI/PRME/JCJC		Rebuttal					
Panel 		Individual evaluation by panel members		Plenary meetings				
Reviewers 	Individual evaluation by at least 2 external reviewers							

Appendix 3: List of the provisional bilateral collaborations and associated research themes in the 2025 AAPG call: International Collaborative Research Project (PRCI)*

Modality of collaboration**	Country (agence)	Themes for collaboration	Associated scientific themes*
ANR Lead Agency	Germany DFG	All disciplinary fields funded by the ANR and DFG, except Humanities and Social sciences ***	All themes except D1 to D.7 and H.4
	Austria FWF	All disciplinary fields funded by the ANR and FWF	All themes
	Brazil FAPESP Brazil FACEPE	<ul style="list-style-type: none"> • Mathematics and Digital Sciences • Humanities and Social Sciences • Materials • Engineering, chemistry, physics • Environment, ecosystems and biological resources • Biology & Health 	Themes A.1 to A.4 ; Themes B.1 to B.7 ; Themes C.6 to C.8 Themes D.1 to D.7 ; Themes E.1 to E.6 ; Theme F.1 ; Themes G.1 and G.2 ; Themes H.1 to H.7 ; H.11 and H.12, H.14 to H.16 and Theme H.19
	Canada CRSNG	<ul style="list-style-type: none"> • Artificial intelligence 	<i>To be defined</i>
	Canada –Quebec FRQSC	<i>Collaboration to be confirmed</i>	–
	United States NSF	<ul style="list-style-type: none"> • Neurosciences 	Theme B.06, Theme B.07, Theme C.04, Theme C.07, Theme C.08, Theme H.11, Theme H. 14
		<ul style="list-style-type: none"> • Quantum technologies 	<i>To be defined</i>
		<ul style="list-style-type: none"> • Digital sciences • Mathematics and its interactions 	Theme E.1 to E.6 ; Theme F.1 ; Themes H.12 and H.14
	Luxembourg FNR	All disciplinary fields funded by the ANR and FNR	All themes
Switzerland FNS	All disciplinary fields funded by the ANR and FNS	All themes	
Non-Lead Agency	Hong Kong RGC	All disciplinary fields funded by the ANR and RGC	All themes except H.17
	Taiwan NSTC	All disciplinary fields funded by the ANR and NSTC	All themes except H.17
Foreign Lead Agency	United States NSF	<ul style="list-style-type: none"> • Molecular chemistry (precious metal-free catalyst) 	Theme B.4

* Appendices dedicated to confirmed PRCI collaborations will be available on the web page dedicated to AAPG 2025. These appendices will describe the open themes, the particular submission process, the specific eligibility criteria, and must be consulted before any registration and/or submission of a PRCI project to the ANR or to the foreign funding agency.

** The PRCI instrument is available in 3 collaboration modalities: (1) *“ANR Lead Agency”* modality: ANR is responsible of the main submission and evaluation of the projects. The collaborations concerned require registration of the project to the ANR in step 1 of the AAPG call; (2) *“Foreign Lead Agency”* modality: the collaborating funding agency is responsible of the main submission and evaluation of the projects. The collaborations concerned do not require registration of the project in step 1 of the AAPG; (3) *“Non-Lead Agency”* modality: projects are submitted to the two funding agencies, according to the timetable and modalities specific to each agency. The collaborations concerned require registration of the project to the ANR in step 1 of the AAPG call.

For more information : see the description of the funding instrument PRCI in [Appendix 1 §3.2](#)

*** Humanities and Social sciences are subject to a specific ANR-DFG call, beyond the AAPG (FRAL call).

Appendix 4 : List of International scientific organisations (OSI) and Research infrastructures* (IR*) eligible to the “scientific exploitation of data generated by OSIs and IRs*” priority

Scientific field	Acronym	Name of the infrastructure	Type
Astronomy and astrophysics	ESO	European Southern Observatory	OSI
	SKAO	SKA Observatory	OSI
	CFHT	Canada-France-Hawaiï Observatory	IR*
	CTA	Cherenkov Telescope Array	IR*
	IRAM	Institut de radioastronomie millimétrique	IR*
Biology & Health	EMBL	European Molecular Biology Laboratory	OSI
	OEBM	Organisation européenne de biologie moléculaire	OSI
High-energy nuclear physics	CERN	Organisation européenne pour la recherche nucléaire	OSI
	CERN LHC	Large Hadron Collider	IR*
	DUNE PIP-II	Deep Underground Neutrino Experiment	IR*
	EGO-Virgo	European Gravitational Observatory – Virgo	IR*
	FAIR	Facility for Antiproton and Ion Research	IR*
	GANIL-SPIRAL2	Grand Accélérateur National d’Ions Lourds –Système de production d’ions lourds en ligne de 2ème génération	IR*
Humanities and Social Sciences	HUMA NUM	La Très Grande Infrastructure de Recherche des humanités numériques	IR*
	PROGEDO	PROduction et GEstion de DONnées	IR*
Materials and Engineering Sciences	Apollon	Laser Apollon	IR*
	ESRF	European Synchrotron Radiation Facility	IR*
	ESS	European Spallation Source	IR*
	E-XFEL	European X-Ray Free Electron Laser	IR*
	ILL	Institut Max von Laue –Paul Langevin	IR*
	SOLEIL	Synchrotron SOLEIL	IR*
	CRG ILL	Collaboration Research Group – ILL	IR*
	CRG ESRF	Collaboration Resarch Group - ESRF	IR*
Earth System and Environmental Sciences	CEPMMT	Centre Européen pour les prévisions météorologiques à moyen terme	OSI
	CONCORDIA	CONCORDIA Station de recherche antarctique franco-italienne	IR*
	ECORD/IODP	European Consortium for Ocean Research Drilling / International Ocean Discovery Program	IR*
	EURO-ARGO France	European contribution to Argo program / programme international d’observation in situ des océans	IR*
	FOF	Flotte Océanographique Française	IR*
	ICOS France	Système Intégré d’Observation du Carbone	IR*
Digital Services	GENCI	Grand Equipement National de Calcul Intensif	IR*
	RENATER	Groupement d’intérêt public pour le réseau national de communications électroniques pour la technologie, l’enseignement et la recherche	IR*
	IDRIS	Institut du développement et des ressources en informatique scientifique	IR*
	TGCC	Très Grand Centre de Calcul du CEA	IR*