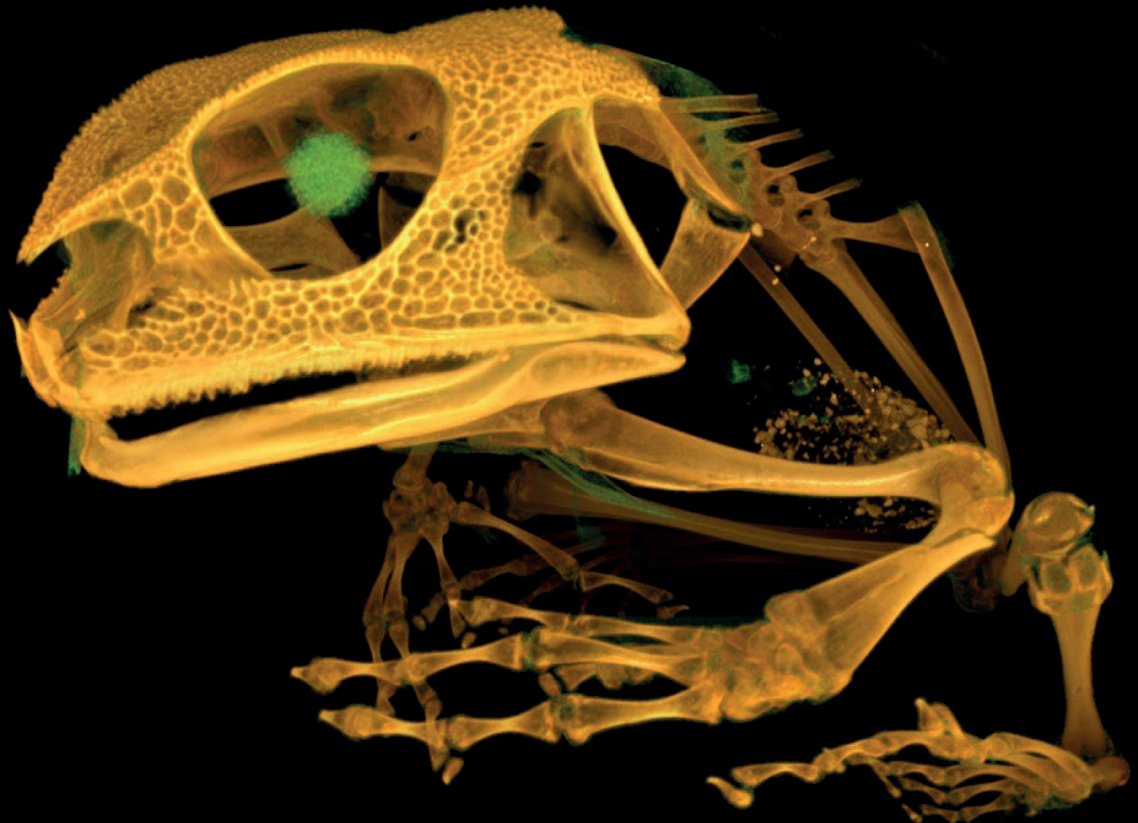


Consortium of European Taxonomic Facilities

FRAMEWORK

FOR RESPONSIBLE RESEARCH AND INNOVATION

5 principles to guide 5 domains





CETAF

CETAF Framework **Responsible Research and Innovation**

RRI is “the ongoing process of aligning research and innovation to the values, needs and expectations of society”

(Rome declaration on RRI, 2014)

Responsible Research and Innovation (RRI) is an approach to ensure that scientific advances and innovation meet the expectations of society, while taking into account their implications. As an ever-growing part of the European research landscape, this multi-actor framework brings researchers, citizens, policy-makers,

and businesses together to better align the research process, and its outcomes, with the values and needs of society as well as to jointly contribute to tackling urgent global challenges. The aim of this framework is to provide a valuable incentive for all societal actors to work together and produce integrative, inclusive and sustainable solutions.

Through its five dimensions, RRI stands as a key action for the EU Horizon 2020 objective of “Science with and for Society” (SwafS) and thus becomes a relevant tool to attain

excellence in science, and involve society in its future development. These five dimensions are:

- ▶ Open science
- ▶ Science education
- ▶ Public engagement
- ▶ Gender
- ▶ Ethics

Natural science institutions are already engaged in these domains as the five RRI principles naturally underpin their numerous and varied activities, from exhibitions and educational programmes, to collection curation and scientific research. In the light of such an exemplary status, the community of **CETAF is positioned at the forefront of RRI implementation** across all its member institutions via the scientists involved in collections based research. To establish common understanding and provide guidance on implementing and deepening our engagement in the RRI concept, CETAF has defined a set of five basic principles in each of the five RRI domains. Those values are inherent in the everyday activities of our research performing organisations and anchor their pursuit of excellent science whilst upholding high standards for conducting responsible research.

DOMAIN 1

Open science

Open science includes research outcomes and data being made accessible to all levels of society. It represents a valuable tool to empower the collective and collaborative work of scientists, pushing efforts beyond frontiers that may constrain both the research subject and the researcher. It encompasses the conducting of the scientific process transparently, from start to end, by using practices such as publishing research without access restrictions (with any being thoroughly explained, if necessary), campaigning for open access, encouraging scientists to practice open notebook science, and generally making it easier to publish and communicate scientific knowledge.

1. Natural History collections-based research is generally made publicly available, thus facilitating and promoting the **circulation of knowledge** to achieve a globalized concept of science.
2. Natural History collections-based researchers diffuse their **research outcomes** and data via open access for the benefit of society whenever possible and provided their intellectual property rights are respected.
3. Natural History collections-based institutions commit themselves to seeking solutions to the potential conflict between their **non-profit objectives**, and the **commercial interests** of others.
4. Natural History collections-based research follows internationally recognised **standards and common protocols** that facilitate the interoperability of data so that it can be shared and gathered from diverse sources.
5. Natural History collections-based researchers and their institutions integrate the **principles of FAIR data**.

FIGURES

The Open Access Pilot – A Success Story

Horizon 2020, the Work Programme with a budget of €77 Billion over seven years (2014-2020), supports knowledge circulation and innovation through open science. This publishing standard reached 67% in 2014. And now that it applies throughout H2020, open access to scientific knowledge will soon be fully achieved.

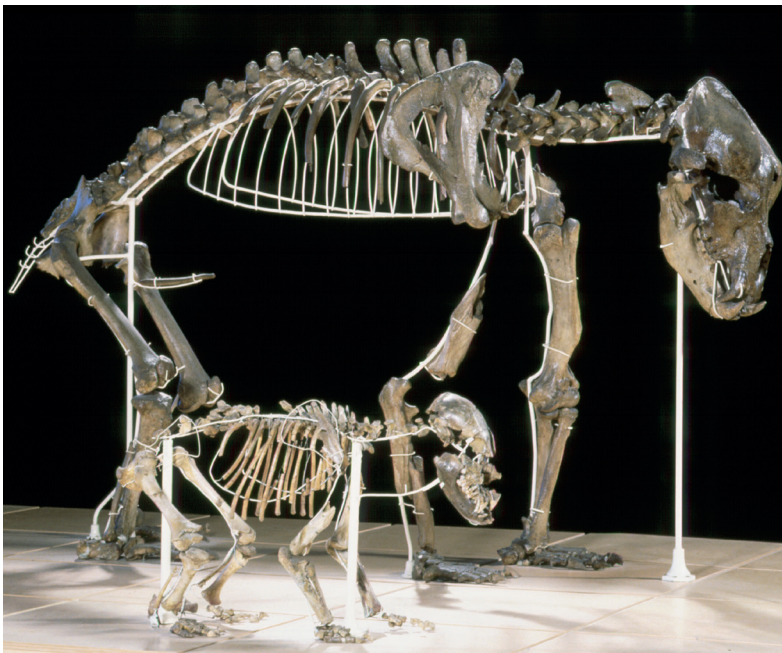




DOMAIN 2

Science education

Inclusive, innovative and reflective societies are anchored in curiosity, a critical understanding, and the development of knowledge that can then be collectively applied to finding innovative solutions to problems. New generations of young scientists should be encouraged to analyse and evaluate information, while improving their creative and critical thinking. These capacities (intellectual, critical and creative) facilitate the creation of a society of thinkers and problem-solvers that contribute to its development.



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1. Natural History collections-based research institutions are committed to **promoting curiosity, creativity and critical thinking via learning opportunities.**

2. Natural History collections-based institutions engage in increasing **the attractiveness of scientific careers.**

3. Natural History collections-based researchers underline the need to integrate the **scientific method and scientific principles within the entire educational curriculum and life-long learning programmes** to achieve science literacy and awareness.

4. Natural History collections-based researchers underline the need to

integrate educational programmes being offered at museums into academic curricula.

5. Natural History collections-based research institutions **actively contribute to the continuous updating of educational resources** by disseminating discoveries and the latest scientific developments among teachers and educators.

NEWS

“Science should be taught like art or music: grab a test tube and have a go”

Science is not just for geeks and nerds. If we can understand football statistics and tactics, we can handle scientific enquiry! Experimental science can amplify curiosity by going beyond a recipe that one could follow. Simply trying things teaches a thoughtful way of looking for answers.

Source: <https://www.theguardian.com/commentisfree/2017/aug/14/science-neglected-everyday-art-experiment-schools>



DOMAIN 3

Public engagement

Public engagement implies the establishment of participatory, multi-actor dialogues and exchanges, to foster mutual understanding, to establish a common language, to learn from each other, to explore controversies, and to contribute to the co-creation of ideas, knowledge and solutions. It entails the creation of a space where scientists, citizens and decision makers can get together to deliberate on matters involving science and technology.

1. Natural History collections-based institutions engage society **in supporting** research goals and endeavours, thus aligning societal values, needs and expectations with scientific progress.
2. Natural History collections-based institutions contribute with their outcomes to increasing **societal scientific literacy**.
3. Natural History collections-based research engages citizens in a **participatory scientific process** that generates a better understanding of science.
4. Natural History collections-based research institutions work towards **creating a space for dialogue where scientists and citizens can discuss issues openly and constructively** to promote the co-creation of knowledge based on collaboration and mutual respect.
5. Natural History collections-based research institutions are recognized as a **hub for documenting scientific needs and achievements** to help policy makers become sound supporters of their research policies and goals.

PROJECT

African Plants – A Photo guide

This successful citizen science project uses photos and knowledge of amateurs to build a database of African tropical plants. A handy guide explains how to encode the plants' characteristics so that truly everybody can get involved!

www.africanplants.senckenberg.de



DOMAIN 4

Gender

The Gender domain integrates a two-faceted issue: firstly, the **equality of women** in relation to men (at all levels and under all circumstances) and secondly, to guarantee a non-discriminative and **balanced participation** of individuals in our community. Neither of these two elements is a reality yet, although the research community has already committed itself to taking the necessary steps to achieve equality and balance. Our community also strives to end any other form of discrimination, such as that based on age, language, ethnic or social origins, disability, sexual orientation or religious belief.

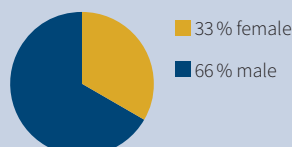
1. Natural History collections-based research institutions guarantee **equal opportunities** and equal **participation of women and men**, at all institutional levels and in all institutional bodies.
2. Natural History collections-based institutions seek **equal representation in panels, assessment committees, juries, councils and/or on boards**.
3. Natural History collections-based institutions strive to prevent any abuse based on gender and strive for ending gender **stereotyping**.
4. Natural History collections-based research institutions work on identifying and, as much as possible, **removing barriers** in relation to the representation of women and to **fill existing gaps in the upper** management levels.
5. Natural History collections-based research institutions support **family friendly measures** to facilitate and contribute to women's and men's active participation in the labour force.



STATISTICS

Gender Equality in Numbers

Percentage of total researchers in EU28:



Source: She-Figures 2015 – European Commission - DG RTD



DOMAIN 5

Ethics

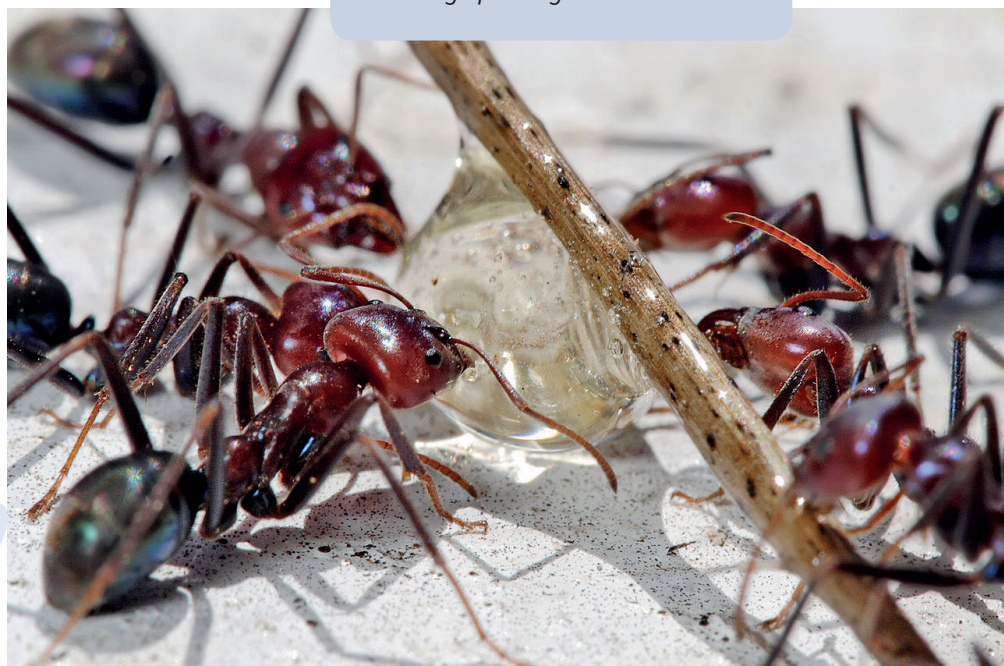
Ethical behaviour goes beyond moral or societal norms. Research is intrinsically anchored in the search for truth as well as in the avoidance of errors. Moreover, in the search for global knowledge, research practices developed at publicly funded institutions strive to be ethical.

1. Natural History collections-based institutions and researchers follow ethical codes in relation to the **utilization of biodiversity resources**.
2. Natural History collections-based institutions commit to providing support to other researchers in all countries with exchanges and **training and capacity building programmes**.
3. Natural History collections-based researchers support the principle of **neutrality in both the recognition and interpretation** of the objects contained in their collections.
4. Natural History collections-based researchers commit to safeguarding **values that are essential for collaborative work**, such as trust, accountability, mutual respect, and fairness.
5. Natural History collections-based research institutions pledge to **uphold European ethics standards** and to not engage in “ethics dumping”. In the same way, institutions endeavour to be vigilant about compliance with ethical standards.

QUOTE

“As our own species is in the process of proving, one cannot have superior science and inferior morals. The combination is unstable and self-destructing.”

– Arthur C. Clarke, British science and science fiction writer, 1967 in *Voices from the Sky: Previews of the Coming Space Age*





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This framework has been developed by the CETAF European Initiatives Advisory Group.

It has been adopted by all members of CETAF at the CETAF 41 General Assembly in Bonn, Germany, 26 April 2017.