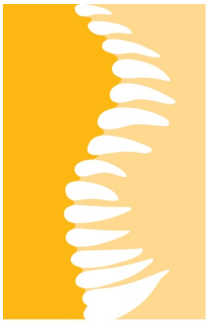
ICP MANUAL OF BEST PRACTICES IN INTELLECTUAL PROPERTY AND SCIENTIFIC AUTHORSHIP



ICP

Institut Català de Paleontologia
Miquel Crusafont

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Centres de Recerca de Catalunya

HR EXCELLENCE IN RESEARCH

ICP MANUAL OF BEST PRACTICES IN INTELLECTUAL PROPERTY AND SCIENTIFIC AUTHORSHIP

INSTITUT CATALÀ DE PALEONTOLOGIA MIQUEL CRUSAFONT

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INTRODUCTION

The ICP. The Institut Català de Paleontologia Miquel Crusafont (ICP) is a non-profit institution devoted to research in vertebrate paleontology as well as the conservation and dissemination of paleontological heritage at the highest international level. The ICP is established as a public foundation whose Board of Trustees is composed by the Generalitat de Catalunya and the Universitat Autònoma de Barcelona (UAB). The ICP is also part of i-CERCA (Institució CERCA – Centres de Recerca de Catalunya, Generalitat de Catalunya), and linked to the UAB as a university research center.

ICP research. Research may be defined as "the quest for knowledge obtained through systematic study and thinking, observation and experimentation" (ALLEA, 2017, p. 3). Other possible definitions seek to expand this concept by further including development, i.e., research and experimental development (R&D), which can be defined as "creative and systematic work undertaken in order to increase the stock of knowledge [...] and to devise new applications of available knowledge" (OECD, 2015: p. 44). In turn, researchers are defined as "professionals engaged in the conception or creation of new knowledge" by means of conducting research (including data collection and analysis, hypothesis testing, and publishing papers), whereas technicians are defined as "persons whose main tasks require technical knowledge and experience" and who "participate in R&D by performing scientific and technical tasks involving the application of concepts and operational methods and the use of research equipment, normally under the supervision of researchers" (OECD, 2015: pp. 162-164).

The research performed at the ICP is organized around various formally-established research groups, as well as several technical areas of research support and service provision, which are coordinated with one another by the director of the ICP. Research groups include researchers at different career stages, and sometimes also technicians, which have common scientific aims and lines of research. Each research group is led, from both intellectual and managerial viewpoints, by a senior researcher (the head or leader of the research group). The scientific aims of each research group are defined by its group leader and the director of the ICP. In particular, the director of the ICP dictates the scientific policy of the institution, whereas each group leader executes such a policy by planning, leading and performing research within the framework of the aims and research lines of the group. Although some ICP technicians may be directly integrated to a particular research group, most of them are linked to a particular area of research support. The director of the ICP is the ultimate responsible

to ensure the coordination between the various research groups and research support areas.

Aims and scope. As a CERCA research center linked to the UAB, the ICP adheres to the general principles stipulated in the CERCA Code of Conduct (approved in November 2018), as well as to the UAB Code of Good Practices in Research (January 2013). Furthermore, since December 2016 the ICP adheres to the general principles and requirements of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers of the Human Resources Strategy for Researchers of the European Union (European Commission, 2005; see also Cameron et al., 2015). To implement their application during 2017-2020, the ICP has devised an HRS4R Action Plan (http://www.icp.cat/attachments/transparencia/HRS4R_ICP_Action_Plan.pdf) that, among other actions, includes writing the present manual of best practices in intellectual property and scientific authorship, which is compulsory for ICP personnel. The manual is aimed to (a) specify the ethical principles and legal regulations specific to paleontology and the ICP protocols to comply with them; (b) explain the rights and obligations of the ICP and its personnel regarding intellectual property, industrial property, and scientific authorship; (c) state the researchers' obligation to ensure the safeguard of their data by means of standard protocols; (d) provide with a specific protocol that explains how and when should the ICP Communication & Outreach Department be contacted by researchers to ensure that their research activities are adequately publicized to the society; (e) encourage researchers to disseminate their research results as well as to explore its possible applications, by means of including a protocol on knowledge transfer; (f) actively promote the principle of professional recognition; (g) detail the rights and obligations of both researchers and the ICP with regard to intellectual property, with explicit guidelines for researchers; and (h) clearly state the rights and obligations of both researchers and the ICP with regard to scientific authorship.

In agreement with the above, the present manual summarizes the information provided in the aforementioned CERCA and UAB codes regarding intellectual property and scientific authorship, complements such information by referring to other relevant sources regarding research integrity, publishing ethics, and other related manners. In particular, the ICP manual provides more detailed guidelines with the aim to clarify the rights and obligations of the ICP staff and associates regarding these matters, in order to reach a full implementation of the European Charter & Code's principles in this regard. Ultimately, the manual aims to promote best practices in research, with emphasis on intellectual property and scientific authorship, among ICP researchers and technicians, between them and the ICP, and between them and third

parties (such as publishers and other researchers). To do so, this manual clarifies the rights and obligations of both the ICP personnel and the institution on these matters. The manual should be of interest to all ICP researchers independently of their career stage, as well as to ICP personnel devoted to research support activities (i.e., field technicians, preparators, other lab technicians, collection managers, etc.). With regard to ICP researchers, the rights and obligations stipulated on this manual generally apply to staff researchers as well as research associates, i.e., irrespective of whether there is (or there has been) an employer/employee relationship or any other kind of monetary exchange between the two parts. This fact notwithstanding, there might be differences in the particular rights and obligations of the two parts, depending on the type of position (technician, staff researchers, associate researchers), career stage (early-stage vs. experienced researchers), and/or contractual situation (hired with ICP funds or with competitive external funds).

The manual is divided into four main sections: the Introduction, which provides the necessary background about how research is performed at the ICP, and clarifies the aims and scope of the present manual; a second section on general concepts, which clarifies the several relevant concepts (such as intellectual property, open access, and authorship in relation to publishing ethics); a third section that basically summarizes and reproduces information provided by relevant codes of conduct and other sources with guidelines (in particular those related with intellectual property and/or authorship and publishing); and, finally, a fourth section devoted to the specific guidelines that apply to ICP personnel and the institution as a whole in relation to research freedom and integrity, taxonomic practice, publishing policy, open access publications and open data, custody of research data and materials, copyright of research data, knowledge transfer and dissemination, authorship, and affiliation, among others. While the fourth section is the most relevant for the specificities that apply to ICP personnel, the general guidelines provided in the third section are also very significant, as they further apply.

GENERAL CONCEPTS

Intellectual property. The discoveries made though scientific research can have a great value, not only for the intrinsic advancement of knowledge, but also for governmental policymaking and the industrial development of new products (COSEPUP, 2009). As noted by the latter publication, it is therefore important that researchers and research institutions are aware of the potential value of the research they perform, as well as familiar with intellectual property rules in order to protect their own interests.

The Word Intellectual Property Organization (a United Nations agency aimed to protect the rights of creators and owners of intellectual property) defines 'intellectual property' as "creations of the mind", including inventions, literary and artistic works, and symbols, names and images used in commerce (WIPO, 2003: p. 2). Two categories of intellectual property are customarily distinguished (WIPO, 2003, 2004; COSEPUP, 2009): industrial property (including patents, trademarks, industrial designs, and geographical indications), which is the legal right to control the application of an idea in a specific context; and copyright and related rights, which apply respectively to literary and artistic works as well as to those of performing artists, producers and broadcasters, and which consist in the legal right to control the expression or presentation of an idea (but does not protect the idea in itself).

The intellectual property system is regulated by both national and international laws, which purportedly seek a balance between public interest and the particular interests of creators, in order to boost creativity and invention for the benefit of all (WIPO, 2003). Most national laws and several international treatises regulate intellectual property rights (WIPO, 2004), which are intended to provide the creators (or owners) of industrial property or copyrighted material with "the right to benefit from the protection and material interests resulting from authorship of scientific, literary or artistic productions" (WIPO, 2003: p. 3). This is in agreement with the Universal Declaration of Human Rights (adopted by the United Nations General Assembly in 1948; see UN, 1949), which in its Article 27.2 refers to 'intellectual property rights' as follows: "Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he [or she] is the author."

Copyright laws stipulate exclusive rights to the 'right holders' of an original work, which include its creator(s) and/or their heirs and successors, usually for a limited time (WIPO, 2016). Copyright applies to a wide range of creative, intellectual and artistic works (WIPO, 2016), but it is not extensive to ideas or information, but only to the

form in which they are expressed. For example, while copyright protects the words and images of a publication, the ideas expressed can be used by others as long as this is done with proper attribution (COSEPUP, 2009). Many works protected by copyright laws require mass distribution, communication and investment for their successful dissemination, so that creators often transfer these rights to companies, usually (but not necessarily) in exchange of some kind of monetary compensation (WIPO, 2003, 2004). Copyright and related rights are not limited to, but include moral rights (i.e., the right to claim authorship of a work, see below), and their protection is automatic (i.e., they do not require for registration or other formalities). Violations of intellectual rights (such as patent and copyright infringements, the latter usually termed 'piracy' when it is willful; Panethiere, 2005) are prosecuted by civil or criminal law.

Open access and piracy. Over the years, the concept of intellectual property has been justified and criticized from several viewpoints (from philosophical to practical), and is currently being challenged by the so-called Open Access movement, which advocates for the online distribution of research outputs free of cost or any other access barriers. As defined in the original manifesto of the Budapest Open Access Initiative (Chan et al., 2002), open access in a strict sense refers to "free and unrestricted online availability" of research outputs on the public internet, permitting any users to "read, download, copy, distribute, print, search, or link the full texts of these articles", among others, so that the "only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited". While open access is mostly focused to peer-reviewed journal articles, it can also apply to other research outputs, including non-peer-reviewed articles, conference papers, theses and dissertations, monographs, book chapters, and books. Two different types of open access may be distinguished, stemming from the ambiguous definition of the term 'free' in English (either 'gratis', i.e., without payment, or 'without restrictions'): 'gratis' open access merely implies online access free of charge, whereas 'libre' open access refers to online access free of charge with some additional reuse rights (Suber, 2008; Wikipedia contributors, 2019).

Libre open access can be attained by means of open copyright licenses (such as Creative Commons licenses), which to various degrees reduce or remove barriers to copying and reuse. Creative Commons (CC) in a non-profit organization that has released a series of copyright licenses that are freely available and enable creators to communicate which rights they waive and which ones they reserve. One of the most widely used licenses is the CC BY license, which only requires attribution to allow for the use of the material, but other more restrictive licenses are also available (CC,

2019). Four conditions may be chosen by creators to apply to their work (CC, 2019): Attribution (by), ShareAlike (sa), NonCommercial (nc), and NonDerivatives (nd). Based on different combinations of such conditions, a total of six copyright license types are distinguished (CC, 2019), from less to more restrictive:

- Attribution (CC BY).
- Attribution ShareAlike (CC BY-SA).
- Attribution-NoDerivs (CC BY-ND).
- Attribution NonCommercial (CC BY-NC).
- Attribution NonCommercial-ShareAlike (CC BY-NC-SA).
- Attribution NonCommercial-NoDerivs (CC BY-NC-ND).

CC also provides a Public Domain Marc (CC0, 'no rights reserved'), to waive all rights in order to place a work in the public domain. Each one of these license types may have different versions (e.g. 1.0, 2.0, etc.) according to the launch dates (December 2012 to November 2013).

There are a number of variants of open access publishing, usually described by a color naming system (Wikipedia contributors, 2019):

- Gold OA: The publisher makes the content available for free immediately on the journal's website and articles are licensed with CC or similar copyright licenses that allow sharing and reuse (libre open access). Authors must pay a fee to cover publication expenses.
- Green OA: The publisher allows self-archiving of the postprint of the paper (i.e., the accepted manuscript after peer-review) on an institutional or open-access digital repository after some embargo period after publication. This is allowed by most subscription-based journals and does not qualify as open access sensu stricto (i.e., gratis but not libre open access).
- Hybrid OA: The journal is partially funded on the basis of subscriptions, but the paywall is waived for particular papers if the authors pay a publication fee, in which case the paper is licensed with CC or similar licenses as in gold open access journals ('libre' open access).
- Bronze OA: Initially the publisher makes the content available on a subscription basis, but after an embargo period the content is released as free to read (albeit without possibility to share or reuse)—so not open access sensu stricto (gratis but not libre open access).
- Diamond/platinum OA: This works like gold or bronze OA except that authors do not have to pay any fee, because publication expenses are sponsored by external sources (academic institutions or societies, public grants, etc.). Depending on the

copyright license or transfer agreement this may qualify as open access sensu stricto (libre) or not (gratis).

- Black OA: This is illegal, as it is based on large-scale copyright infringement by means of digital piracy that enables free access to paywalled literature. It is discussed in greater detail below.

Small-scale copyright infringements related to the distribution among researchers of publications authored by other researchers has been ongoing since the advent of photocopies (subsequently replaced by PDFs). While such practices would technically qualify as piracy when they involve a deliberate copyright infringement, they do not seriously threaten the publishers' revenues. In contrast, during the last decade these practices have become much more widespread due to their technical implementation at a large scale. In particular, platforms such as SciHub (which advocates for free and universal access to science) provide en masse free access to subscription articles by illegally bypassing the publishers' paywalls (Schiermeier, 2015; Bohannon, 2016). This situation represents a most serious and fully willful copyright violation that gravely undermines the rights of the copyright holder. From a moral viewpoint such practices differ from the piracy that affects literary authors and musicians, in the sense that authors (in this case, researchers, who naturally seek the maximum dissemination of their work) usually suffer no economic harm (as unlike musicians and literary authors the former transfer the copyright of their works to the publisher for free). Nevertheless, by violating copyright the SciHub initiative does not seem a credible solution for the current problems of the academic publishing industry in order to attain universal access to research outputs on the long term; it rather seems failure symptom of the open access movement initiated more than a decade ago (Priego, 2016), coupled with the crisis that undoubtedly affects the traditional subscription-based publishing system. It is currently uncertain whether, on the long term, the current situation will stabilize in a hybrid system similar to the one that we currently have, or whether it will ultimately transition into a truly open-access publishing system. In the meantime, the ICP aims to promote open access by making use of all the legitimate alternatives that are currently available to researchers.

Authorship and publication ethics. Scientific publishing is not only subject to the copyright laws mentioned above, but also to ethical principles and guidelines that, with minor variations, are of common applicability irrespective of the peculiarities of each scientific discipline. One of the most difficult (and potentially controversial) topics related to publishing ethics is academic authorship. Authorship may generally be defined as the state or fact of being the writer of a publication or unpublished

document, or the creator of a work of art. However, in research it more specifically refers to the state of being listed on the authors' list of a publication (journal paper, book, abstract, etc.) or a patent. For academics, authorship is most important because it indicates who should receive credit for discoveries or advances in research, with the recognition associated with authorship being absolutely essential for the development of a successful researcher's professional career.

There is ample agreement that 'honorary' (also termed 'guest' or 'gift') authorship (i.e., including in the list of authors someone that does not meet authorship criteria) is unethical because it hampers proper credit attribution to the actual authors and artifactually increases the credentials of the added authors, while 'ghost' authorship (the omission of a person who qualifies for authorship from the list of authors) is similarly unacceptable (e.g., COSEPUP, 2009). On the other hand, author conventions may differ greatly among disciplines or even research groups, and hence it is important that researchers have clear-cut guidelines for making decisions about authorship (COSEPUP, 2009). Some flexibility is allowed regarding the criteria used to decide the order of authors of a given publication, depending not only on their differential contributions but also the guidelines and traditions that apply to particular research fields, institutions and groups. Nevertheless, it is widely accepted that, to be listed as an author of a given publication, researchers must meet a set of criteria that, only with minor variations, are universally accepted. This manual explains the authorship criteria that must be met at the ICP and further provides additional guidelines as to how the order of authors should be determined. This document further examines other relevant ethical aspects related to publishing, with emphasis on research misconduct and other unacceptable practices, such as plagiarism, text recycling, and redundant publication. The problems related to acceptable but problematic practices (such as posting preprints) are also discussed.

APPLICABLE PRINCIPLES

UAB Code of Good Practices in Research. As a university research center linked to the UAB, the ICP adheres to the three basic principles stated in the Code of Good Practices in Research of this university (UAB, 2013). They are the following:

- **Freedom.** The principle of research freedom applies to both choosing and developing research. Such freedom is restricted by ethical principles as well as the international agreements and declarations to refer to them, as well as to the applicable legal provisions applicable.
- **Integrity.** The principle of research integrity means that researchers must be honest in their research activities as well as relative to those of other researchers and their own institution. Such a requirement applies to all the stages of research, including hypothesis formulation, methodological design, data analysis, publication of results, recognition of other researchers' contributions, and review and evaluation activities of the latter. Researchers must clearly, unambiguously and explicitly acknowledge both direct and indirect collaborations and contributions from other colleagues. Researchers must also respect industrial or intellectual property rights, avoid plagiarism and self-plagiarism, and refrain from manipulating the results of their research. Two different aspects are of particular relevance regarding research integrity: rigor and conflicts of interest.

  Research integrity implicitly includes rigor when conducting research. In particular, researchers must perform an accurate process of discovery and interpretation. This requires a detailed review of the results before publishing them, and in case of detecting important errors after publication, making a public and explicit correction as soon as possible. In turn, conflicts of interest arise when the criterion applied to a primary interest (e.g., knowledge on a particular subject) may be inadequately influenced by a secondary interest (e.g., financial gain). To a large extent conflicts of interest are unavoidable. Therefore, researchers must be vigilant to recognize when they encounter such situations, in order to either avoid them or disclose them, so as to adequately confront them in agreement with relevant policies and ethical guidelines of hiring entities, evaluating agencies, or publishing companies, depending on the case.
- **Responsibility.** The principle of responsibility implies that researchers must guarantee that research is performed in compliance with relevant ethical principles as well as the terms and conditions defined by (or agreed with) the funding agency. This includes the need to ensure: that research is performed in agreement with economic and environmental sustainability criteria, as well as in

accordance with the original project proposal approved by the funding agency (unless amendments have subsequently been agreed upon); that funding is used only for the aims originally planned, except when an alternative use has been authorized; that reports reflect exactly the work performed and are submitted in due time; that conditions relative to publication, authorship, and intellectual property are fulfilled. Researchers have the obligation to denounce any bad praxis against these principles as soon as they are aware of them in a responsible and appropriate manner.

The ICP also adheres to the main guidelines provided by the UAB Code of Good Practices in Research regarding materials and data acquisition and stewardship. However, some peculiarities apply, due to the fact that the materials subject to paleontological research in Catalonia are considered cultural heritage according to current laws, as well as to some minor modifications related to the more strict guidelines provided by the CERCA Code of Conduct (e.g., 10 instead of 5 years of mandatory data custody after publication; see below). Regarding these aspects, only some guidelines about data ownership are summarized below, as they are the most relevant for the purposes of this manual.

- **Ownership of data.** All the primary documentation (notebooks, databases, etc.) and material obtained during research are owned by the center to which the person in charge of the project is affiliated. When a researcher moves to another institution, if necessary, the person in charge of the project may provide the former with a photocopy or digital copy of part or all of the relevant documentation. When it is the person in charge of research who moves to another institution, this process must be made under the supervision of the director of the center or department.

Finally, the ICP further adheres to the main guidelines provided by the UAB Code of Good Practices in Research regarding the dissemination of research outputs, with only minor differences due to the ICP status as a CERCA research center as well as its own publication policies. Two main aspects may be distinguished (dissemination policy and authorship), as further developed below.

- **Dissemination policy.** The dissemination of research outputs is an ethical obligation of researchers in order to contribute to the general improvement and accumulation of human knowledge, and constitutes an essential aspect of accountability regarding the use of public funds and infrastructures in research. Therefore, an excessive delay in the publication of the results, their exaggeration, or the failure to publish them are ethically reprovable. The ICP further concurs with the UAB that initiatives of open access to knowledge, which advocate

publishing models that enable free access to scientific production (in agreement with the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities; see below for further details), must be promoted while fulfilling the same criteria of research integrity and rigor that are generally applied to other dissemination means. Affiliations of all authors must be clearly stated, and people and institutions that have collaborated in the research but do not qualify for authorship (including research support technicians) must be stated in the acknowledgments, together with funding sources. The presentation of research outputs to the general public by means of the mass media must be aimed for a non-specialized audience and refer to the names of the authors and their institutions. It is not acceptable to communicate and disseminate research results to the mass media before peer review, and prospects for future research should not be exaggerated.

- **Authorship.** In agreement with current legislation of intellectual and industrial property, to be considered (co)author of a publication or inventor of a patent, the following criteria must be met:

1. Having contributed substantially to the development of the project and the creative process, i.e., to the design of the project and/or to the analysis and interpretation of the data.
2. Having contributed to the preparation of the resulting communications, reports, or publications.
3. Being able to present in a detailed way the personal contribution to the research as well as to discuss the main aspects of the whole research.

All the authors listed in a given publications must therefore be aware of the text, must accept in written form the final result, and are hence jointly corresponsible of its content. The mere participation in fundraising, data acquisition, sample collection, or the provision of experimental subjects does not necessarily justify the condition of coauthor, even though such contributions must be recognized in the acknowledgments. Any person linked to a research group that, on the basis of his or her rank, status, or working relationships asks to be included as an author ex officio is violating academic freedom and acting unfairly, if not committing an abuse of authority. Conversely, the deliberate omission of any person that has made proven contributions in accordance to the aforementioned criteria means that the remaining authors are perpetrating a misappropriation of intellectual property. Determining the order of authors may vary depending on the different traditions and customs of each research field. In cases of equal contribution it is frequent to rely on alphabetical order. When there is a differential contribution depending on the authors, the

following criteria are generally followed: (a) the first authors is the person that has made the greatest contribution to research and has drafted the article; (b) the last author is the senior person that leads the research or has the ultimate responsibility in the research protocol; (c) the remaining coauthors may appear in order of decreasing contribution or, in some cases, in alphabetical order.

When two or more authors have devoted the same effort in research and have shared the main task of preparing the manuscript, they have the same consideration of first authors and such a condition should be made explicit in the publication. The same criteria may also be applied to intermediate or senior authors. The corresponding author has the main responsibility in the editorial process and future interactions that derive from the publication of the work.

CERCA Code of Conduct. Among the ten general principles of the CERCA Code of Conduct (CERCA, 2018), the following are directly or indirectly related to intellectual property and scientific authorship:

- **Principle 1: Honesty and transparency.** The management of CERCA centers must encourage a culture of scientific integrity, by committing to always act in good faith and in compliance with current legislation. The achieved scientific results must be public and accessible in scientific publications, the center's website or its own publications (provided this does not contravene confidentiality rules established by current legislation).
- **Principle 2: Open access to research data.** CERCA centers must apply an open science strategy, implementing a research data management plan that addresses issues such as which data can be made public. Researchers and managers in CERCA centers must manage scientific data in accordance with the FAIR principles (findable, accessible, interoperable and reusable).
- **Principle 3: Custody of research data, materials and substances.** All raw data, records relating to substances (biological, chemical or any other type), informed consent forms, questionnaires, research results and documentation on technological activities that may be necessary to ensure results are traceable and reproducible must be securely organized and stored so they can be recovered or consulted within a set period, with a recommended minimum of 10 years from the publication date of the results or from the date the industrial property was licensed. At the same time, researchers must be encouraged to use laboratory notebooks or other storage media to record their own original experimentation work in order to support their published results and the licensing of intellectual property in disciplines where this is a key practice. These notebooks or documents are the property of the CERCA center where the work is performed. The

application of this principle does not contradict the duty of confidentiality affecting data or information subject to contractual secrecy or in accordance with the Spanish Data Protection Law (LOPD) or other current legislation or regulations.

- **Principle 4: Handling industrial property in CERCA centers**. The intangible assets of the CERCA centers increase the institution's net asset value and, thus, generate additional responsibility for managing them. In order to conserve the intangible assets and industrial property generated by research or technological activities, or under agreements in the case of scientific partnerships, CERCA centers must ensure they measure their technologies are measured at fair value, taking into account basic market criteria in each measurement, negotiation or transaction involving these assets and, where applicable, the criteria governing assets established by the competent managing body of the Government of Catalonia.
- **Principle 5: Individual commitment to good scientific practice and ethical standards.** All the scientific and technical staff of each CERCA center (including affiliated researchers) agree to comply with good scientific practice by signing a document when they begin working at the center in which they state their commitment to striving for excellence in their scientific or management work, helping to advance knowledge in their discipline and, if applicable, facilitating the transfer of technology and the efficient management of resources. CERCA center employees must also be aware of and comply with current legislation applicable to their work.
- **Principle 6: Commitment and responsibility for research activities and scientific publications.** All CERCA center researchers must agree to comply with the applicable standards on scientific integrity in line with usual practice in each discipline, e.g. those of the International Committee of Medical Journal Editors (ICMJE). The European Code of Conduct for Research Integrity must be respected by default, i.e., researchers must not engage in scientific falsification, they must acknowledge the real authors of original results and must participate in and oversee any publications or results they author. It is also recommended that all articles include a statement of responsibility specifying the contribution of each author, as required by the main international scientific journals. CERCA researchers must actively ensure they do not engage in scientific falsification when drafting proposals, implementing projects or being evaluated, and in their reports and scientific publications. Scientific falsification is defined as manipulating scientific information or documentation in order to fabricate without justification, falsify or plagiarize.
- **Principle 7: Coordination with the CERCA Institute and the CERCA ombudsperson.** CERCA centers, through their director or any other person

performing this function, are required to inform the CERCA Institute of any material breach of scientific integrity as soon as it occurs and, at the same time, bring it to the attention of the CERCA ombudsperson, applying the strictest principles of confidentiality and respect for the persons allegedly involved. Such material cases may involve the revision or retraction of published articles and may lead to disciplinary measures, or alternatively they may involve at a certain extent the directors or management of the center. A CERCA ombudsperson must be appointed for this purpose. This person must be independent and neutral, with powers to propose non-binding solutions that must be discussed and approved by the governing body of the CERCA center involved. The CERCA Institute and the ombudsperson may also act ex officio. The ombudsperson may set up ad hoc consultative committees and ask for advice and coordination from the Government of Catalonia body responsible for resolving issues of scientific integrity. In the case of international partnerships, the cooperation of the national bodies involved must be sought in order to resolve the issue, applying the principles of the Montreal Statement on Research Integrity in Cross-Boundary Research Collaborations.

The European Code of Conduct for Research Integrity. For the various aspects related to research integrity other than authorship (see above), the CERCA Code of Conduct refers to the guidelines provided by The European Code of Conduct for Research Integrity (ALLEA, 2017). According to this code, good research practices are based on the four principles of research integrity: reliability, honesty, respect, and accountability. These principles, which must guide researchers in their work as well as in their engagement with the practical, ethical and intellectual challenges of research, may be explained as follows (ALLEA, 2017):

1. **Reliability** in ensuring the quality of research, reflected in the design, the methodology, the analysis and the use of resources.
2. **Honesty** in developing, undertaking, reviewing, reporting and communicating research in a transparent, fair, full and unbiased way.
3. **Respect** for colleagues, research participants, society, ecosystems, cultural heritage and the environment.
4. **Accountability** for the research from idea to publication, for its management and organization, for training, supervision and mentoring, and for its wider impacts.

As this manual is mostly devoted to intellectual property and authorship, we only reproduce below those portions of the European Code of Conduct for Research Integrity more directly related to these aspects (namely, data practices and management, as well as publication and dissemination). However, ICP personnel is

referred to other portions of the code for further details on other aspects, such as: research environment; training, supervision and mentoring; research procedures; safeguards; collaborative working; and reviewing, evaluating and editing.

- **Data practices and management.** The guidelines provided by the code in this regard are the following:

a. Researchers, research institutions and organizations ensure appropriate stewardship and curation of all data and research materials, including unpublished ones, with secure preservation for a reasonable period.
b. Researchers, research institutions and organizations ensure access to data is as open as possible, as closed as necessary, and where appropriate in line with the FAIR Principles (Findable, Accessible, Interoperable and Reusable) for data management.
c. Researchers, research institutions and organizations provide transparency about how to access or make use of their data and research materials.
d. Researchers, research institutions and organizations acknowledge data as legitimate and citable products of research.
e. Researchers, research institutions and organizations ensure that any contracts or agreements relating to research outputs include equitable and fair provision for the management of their use, ownership, and/or their protection under intellectual property rights.

- **Publication and dissemination.** The guidelines provided in this regard by the code are the following:

a. All authors are fully responsible for the content of a publication, unless otherwise specified.
b. All authors agree on the sequence of authorship, acknowledging that authorship itself is based on a significant contribution to the design of the research, relevant data collection, or the analysis or interpretation of the results.
c. Authors ensure that their work is made available to colleagues in a timely, open, transparent, and accurate manner, unless otherwise agreed, and are honest in their communication to the general public and in traditional and social media.
d. Authors acknowledge important work and intellectual contributions of others, including collaborators, assistants, and funders, who have influenced the reported research in appropriate form, and cite related work correctly.
e. All authors disclose any conflicts of interest and financial or other types of support for the research or for the publication of its results.
f. Authors and publishers issue corrections or retract work if necessary, the processes for which are clear, the reasons are stated, and authors are given credit for issuing prompt corrections post publication.

g. Authors and publishers consider negative results to be as valid as positive findings for publication and dissemination.
h. Researchers adhere to the same criteria as those detailed above whether they publish in a subscription journal, an open access journal or in any other alternative form.

As noted by The European Code of Conduct for Research Integrity (ALLEA, 2017), failure to follow good research practices violates professional responsibilities by damaging the research processes, degrading relationships among researchers, undermining trust in and the credibility of research, and wasting resources, and may expose research subjects, users, society or the environment to unnecessary harm. It is therefore advisable to explain below the three different categories of research misconduct (FFP: fabrication, falsification, and plagiarism) that have been traditionally distinguished (ALLEA, 2017), which are particularly serious because they distort the research record:

1. **Fabrication** is making up results and recording them as if they were real.
2. **Falsification** is manipulating research materials, equipment or processes or changing, omitting or suppressing data or results without justification.
3. **Plagiarism** is using other people's work and ideas without giving proper credit to the original source, thus violating the rights of the original author(s) to their intellectual outputs.

There are other unacceptable practices that should be prevented and discouraged, and which in their most serious forms are sanctionable (ICP researchers are referred to the general guidelines provided by the code for dealing with allegations of misconduct based on the principles of integrity and fairness). Such unacceptable practices include the direct violations of the good research practices included in The European Code of Conduct for Research Integrity, as well as other types of unacceptable behavior; some examples related to publishing practices are the following (ALLEA, 2017):

a. Manipulating authorship or denigrating the role of other researchers in publications.
b. Republishing substantive parts of one's own earlier publications, including translations, without duly acknowledging or citing the original ('self-plagiarism').
c. Citing selectively to enhance own findings or to please editors, reviewers or colleagues.
d. Withholding research results.
e. Expanding unnecessarily the bibliography of a study.
f. Misrepresenting research achievements.

g. Exaggerating the importance and practical applicability of findings.
h. Establishing or supporting journals that undermine the quality control of research ('predatory journals').

European Charter for Researchers. Since late 2016, the ICP adheres to the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers (European Commission, 2005; Cameron *et al.*, 2015) in the framework of the EU Human Resources Strategy for Researchers (HRS4R). In order to reach full implementation of the 40 principles included in the Charter & Code (31 in the Charter and 9 in the Code), in 2017 the ICP performed a gap analysis and, on its basis, elaborated an HRS4R Action Plan (http://www.icp.cat/attachments/transparencia/HRS4R_ICP_Action_Plan.pdf) that includes multiple actions (such as the present manual on intellectual property and authorship). These 40 principles are grouped into four different categories (Cameron *et al.*, 2015, numeration follows their gap analysis overview template): (a) Ethical and professional aspects (1-11, Charter); (b) Recruitment and selection (12-21, Code except for #12); (c) Working conditions and social security (22-35, Charter); and (d) Training and development (36-40, Charter). Several of the principles from the Charter, being applicable to either researchers or to employers and funders, are relevant with regard to intellectual property and/or scientific authorship. They are partially quoted below (European Commission, 2005; numeration after Cameron et al., 2015):

1. **Research freedom**. Researchers should focus their research for the good of mankind and for expanding the frontiers of scientific knowledge, while enjoying the freedom of thought and expression, and the freedom to identify methods by which problems are solved, according to recognized ethical principles and practices. Researchers should, however, recognize the limitations to this freedom that could arise as a result of particular research circumstances (including supervision/guidance/management) or operational constraints, e.g. for budgetary or infrastructural reasons or, especially in the industrial sector, for reasons of intellectual property protection. Such limitations should not, however, contravene recognized ethical principles and practices, to which researchers have to adhere.
2. **Ethical principles.** Researchers should adhere to the recognised ethical practices and fundamental ethical principles appropriate to their discipline(s) as well as to ethical standards as documented in the different national, sectoral or institutional Codes of Ethics.
3. **Professional responsibility.** Researchers should make every effort to ensure that their research is relevant to society and does not duplicate research previously carried out elsewhere. They must avoid plagiarism of any kind and abide by the

principle of intellectual property and joint data ownership in the case of research carried out in collaboration with a supervisor(s) and/or other researchers. The need to validate new observations by showing that experiments are reproducible should not be interpreted as plagiarism, provided that the data to be confirmed are explicitly quoted. Researchers should ensure, if any aspect of their work is delegated, that the person to whom it is delegated has the competence to carry it out.

5. **Contractual and legal obligations.** Researchers at all levels must be familiar with the national, sectoral or institutional regulations governing training and/or working conditions. This includes Intellectual Property Rights regulations, and the requirements and conditions of any sponsor or funders, independently of the nature of their contract. Researchers should adhere to such regulations by delivering the required results (e.g. thesis, publications, patents, reports, new products development, etc.) as set out in the terms and conditions of the contract or equivalent document.
6. **Accountability.** Researchers need to be aware that they are accountable towards their employers, funders or other related public or private bodies as well as, on more ethical grounds, towards society as a whole. In particular, researchers funded by public funds are also accountable for the efficient use of taxpayers' money. Consequently, they should adhere to the principles of sound, transparent and efficient financial management and cooperate with any authorized audits of their research, whether undertaken by their employers/funders or by ethics committees. Methods of collection and analysis, the outputs and, where applicable, details of the data should be open to internal and external scrutiny, whenever necessary and as requested by the appropriate authorities.
7. **Good practice in research.** Researchers should at all times adopt safe working practices, in line with national legislation, including taking the necessary precautions for health and safety and for recovery from information technology disasters, e.g. by preparing proper back-up strategies. They should also be familiar with the current national legal requirements regarding data protection and confidentiality protection requirements, and undertake the necessary steps to fulfill them at all times.
8. **Dissemination, exploitation of results.** All researchers should ensure, in compliance with their contractual arrangements, that the results of their research are disseminated and exploited, e.g. communicated, transferred into other research settings or, if appropriate, commercialized. Senior researchers, in particular, are expected to take a lead in ensuring that research is fruitful and that results are

either exploited commercially or made accessible to the public (or both) whenever the opportunity arises.

9. **Public engagement.** Researchers should ensure that their research activities are made known to society at large in such a way that they can be understood by non-specialists, thereby improving the public's understanding of science. Direct engagement with the public will help researchers to better understand public interest in priorities for science and technology and also the public's concerns.

22. **Recognition of the profession.** All researchers engaged in a research career should be recognized as professionals and be treated accordingly. This should commence at the beginning of their careers, namely at postgraduate level, and should include all levels, regardless of their classification at national level (e.g. employee, postgraduate student, doctoral candidate, postdoctoral fellow, civil servants).

31. **Intellectual property rights.** Employers and/or funders should ensure that researchers at all career stages reap the benefits of the exploitation (if any) of their R&D results through legal protection and, in particular, through appropriate protection of Intellectual Property Rights, including copyrights. Policies and practices should specify what rights belong to researchers and/or, where applicable, to their employers or other parties, including external commercial or industrial organizations, as possibly provided for under specific collaboration agreements or other types of agreement.

32. **Coauthorship.** Coauthorship should be viewed positively by institutions when evaluating staff, as evidence of a constructive approach to the conduct of research. Employers and/or funders should therefore develop strategies, practices and procedures to provide researchers, including those at the beginning of their research careers, with the necessary framework conditions so that they can enjoy the right to be recognized and listed and/or quoted, in the context of their actual contributions, as coauthors of papers, patents, etc., or to publish their own research results independently from their supervisor(s).

34. **Complaints/appeals.** Employers and/or funders of researchers should establish, in compliance with national rules and regulations, appropriate procedures, possibly in the form of an impartial (ombudsman-type) person to deal with complaints/appeals of researchers, including those concerning conflicts between supervisor(s) and early-stage researchers. Such procedures should provide all research staff with confidential and informal assistance in resolving work-related conflicts, disputes and grievances, with the aim of promoting fair and equitable treatment within the institution and improving the overall quality of the working environment.

36. **Relation with supervisors.** Researchers in their training phase should establish a structured and regular relationship with their supervisor(s) and faculty/departmental representative(s) so as to take full advantage of their relationship with them. This includes keeping records of all work progress and research findings, obtaining feedback by means of reports and seminars, applying such feedback and working in accordance with agreed schedules, milestones, deliverables and/or research outputs.
37. **Supervision and managerial duties.** Senior researchers should devote particular attention to their multi-faceted role as supervisors, mentors, career advisors, leaders, project coordinators, managers or science communicators. They should perform these tasks to the highest professional standards. With regard to their role as supervisors or mentors of researchers, senior researchers should build up a constructive and positive relationship with the early-stage researchers, in order to set the conditions for efficient transfer of knowledge and for the further successful development of the researchers' careers.

SVP Guidelines for Professional Conduct in Paleontology. Without prejudice of other ethical principles and research integrity guidelines mentioned in this manual, the ICP aims to abide to the Best Practices Regarding Research, Publication, and Museum Work of the Society of Vertebrate Paleontology, as stated on their website (SVP, 2008). These guidelines, together with additional ones regarding the collecting, documenting and curating of fossils (SVP, 2019), are quoted almost literally below.

- **Research and publication.** Information on the latest research in paleontology should be reliable and generated by the most rigorous practices of scientific inquiry. These practices entail:

1. Publishing original work. Although science is a progressive process and ideas and evidence will always build on each other, including the work of other researchers, plagiarism or other misuse of the intellectual property of others is unethical and may constitute a copyright violation under international law. Plagiarism includes copying of text, data, or ideas without proper attribution; such actions work against scientific honesty. Moreover, individuals should endeavor to avoid the appearance of plagiarism by thoroughly researching and citing all relevant literature.
2. Seeking independent review. Reviews of published work should be sought from individuals who have no current or past associations with the author(s) that might bias their review. This sort of thorough editorial review shall be scrupulously practiced.

3. Avoiding conflicts of interest. Researchers should not let personal interests or monetary compensation bias the results of their research or their reviews of others' research. Any conflicts of interest should be avoided, and if this is not possible, should be explicitly stated.
4. Substantial contribution for authorship. Individuals should appear as an author only on those publications in which the individual has contributed substantially to the design, data retrieval, analysis, interpretation or writing of the published work.
5. Approving publications. All authors should approve the final version of publications on which he or she appears as an author.
6. Publishing work in a timely manner. Long delays to publication are at odds with active dissemination of results, especially when this practice is associated with restricted access to fossil or other specimens for study by others.

   In addition, free and open communication among scientists, and between advisors and students, concerning their research must be encouraged. In the case of collaborative research, it is recommendable that the order of authorship be established and agreed upon in the early stages of the collaboration. It is especially incumbent upon more senior scientists to uphold the highest standards for professional conduct, as they serve as role models for younger scientists and graduate students.

   Charges of plagiarism or other misconduct in publishing should be brought to the attention of the journal in which the article was published and the institution that employs the accused individual. These institutions should perform a fair and unbiased investigation of the accusations and determine what punitive actions, if any, are necessary.

- **Museum research.** Vertebrate fossils are the foundation of the science of vertebrate paleontology. Because of this, repositories that curate and conserve vertebrate fossils and their contextual data are essential to conducting vertebrate paleontological research. It is therefore critical that researchers and repositories communicate clearly and effectively about research being conducted. In the interests of advancing vertebrate paleontological science, museums and other professional repositories housing vertebrate fossil remains should provide access to those fossils for qualified researchers with legitimate research programs. Access may also be warranted in many cases for educational and artistic endeavors. However, we emphasize that repositories are primarily responsible for maintaining and conserving the integrity of the fossil remains and data under their care. In all cases, repositories must evaluate whether the proposed activities may impact the integrity of the fossils and the potential data that the fossils provide, and determine rights of access accordingly. Visiting researchers should understand

that some fossils might be too delicate to be studied intensively, too rare to be sampled destructively, or currently inaccessible because of legitimate study by other researchers. Below we recommend best practices for museums and their visiting researchers.

1. When making arrangements to study material in a museum's collection, visiting researchers should make sure that the museum they are visiting is aware of what they are studying and why, and what they intend to do with the observations made at the museum. In general, permission to study material in a museum's collection resides with either the collections manager or the curator in charge, but this is not always specified. It is most effective to copy all relevant curatorial personnel on the correspondence.
2. All museums and repositories should have policies regarding access to material in collections for research purposes, although these policies may not be written or stated explicitly. Museum and repository curatorial staff are responsible for ensuring, preferably in writing, that visiting researchers are fully cognizant of all pertinent institutional collections-care policies, procedures, and restrictions. Visiting researchers are encouraged to request a copy of the repository's collections-management and collections-access policies in advance, in order to familiarize themselves with the appropriate collections care policies. Permission to observe material is not necessarily equivalent to permission to publish on it, so researchers should be sure that they have express permission to publish on material before doing so.
3. It is understood that researchers working in museums and other professional repositories may be actively studying the fossils and data under their direct care. In these cases, it is acceptable to withdraw such specimens from more general research access for a reasonable period of time, until the repository researchers have completed and published the results of their investigations. However, it is also incumbent upon the repositories in these cases to clearly inform visiting researchers of the status of these fossils, so that conflicts do not arise. We emphasize that repository personnel should endeavor to make the fossils under study available following publication of their results. Science is based upon verification and repeatability, and these often require that access be provided for outside researchers. Where multiple curatorial and collections personnel at a given repository are actively conducting research on fossils under their care, we recommend open and frequent communication among these scientists about their research programs.
4. Visiting researchers should inform the museum of the results of their work based on the museum's collections. Museums benefit in many ways from having

researchers work on their collections. In some cases, the results of research can lead to news articles that will increase the profile of the museum in the local, national, or international community. In others cases, the information can be presented through exhibits and public programs. Thus the museum will want to know what visiting scientists have done with results of the observations on their specimens, and especially what abstracts or papers are published that include reference to material in their collections. Published papers, published abstracts, dissertations, and theses should be provided to the repository in a timely fashion.

- **Collecting, documenting and curating fossils.** Vertebrate paleontologists have the responsibility to uphold professional standards in the collection, documentation and curation of vertebrate fossils.

  Professional standards in collection of fossils include obtaining the proper permits and permissions to conduct fieldwork on public or private lands, whether domestic or foreign. The collection of fossils from field localities includes not only retrieving fossils with care but also documenting their provenance in terms of stratigraphic, geographic, taphonomic and paleoenvironmental information. This approach is important for both professional and amateur paleontologists to follow in collecting scientifically significant fossils, even if the fossils legally remain in private collections for some time. The scientific and educational value of the fossils depends on their contextual information as well as their morphology.

  Field data, whether in the form of notebooks, electronic files or any other format, should accompany the fossils collected from public lands (and from private lands if so stipulated) to their deposition in a qualified, publicly accessible repository. This means that original field data (or a legible copy of it) must become part of the deposited fossil collection. Fossils and their contextual data must be accessioned and curated in an institution, the mission of which is scientific study and education in perpetuity. Fossils should be accessioned in a timely manner.

  Curation entails the proper housing and labeling of fossils, as well as maintaining the association between the fossils and field data about their provenance. This information must be made available to the scientific community and the interested public within a reasonable period of time.

Code of Ethics of the International Code of Zoological Nomenclature. The International Code on Zoological Nomenclature (ICZN, 1999) has the aim “to provide the maximum universality and continuity in the scientific names of animals compatible with the freedom of scientists to classify animals according to taxonomic judgments”. To this end, the Code consists of Articles and Recommendations (of which only the former are mandatory), which appropriately interpreted and applied must allow one

to determine the valid name for a taxon to which an animal belongs at any taxonomic rank between subspecies and family-group ranks. The Code further includes a “Code of Ethics” (ICZN, 1999: Appendix A), which is integrally reproduced below:

1. Authors proposing new names should observe the following principles, which together constitute a "Code of Ethics".
2. A zoologist should not publish a new name if he or she has reason to believe that another person has already recognized the same taxon and intends to establish a name for it (or that the taxon is to be named in a posthumous work). A zoologist in such a position should communicate with the other person (or their representatives) and only feel free to establish a new name if that person has failed to do so in a reasonable period (not less than a year).
3. A zoologist should not publish a new replacement name (a nomen novum) or other substitute name for a junior homonym when the author of the latter is alive; that author should be informed of the homonymy and be allowed a reasonable time (at least a year) in which to establish a substitute name.
4. No author should propose a name that, to his or her knowledge or reasonable belief, would be likely to give offence on any grounds.
5. Intemperate language should not be used in any discussion or writing which involves zoological nomenclature, and all debates should be conducted in a courteous and friendly manner.
6. Editors and others responsible for the publication of zoological papers should avoid publishing any material which appears to them to contain a breach of the above principles.
7. The observation of these principles is a matter for the proper feelings and conscience of individual zoologists, and the Commission is not empowered to investigate or rule upon alleged breaches of them.

International Committee of Medical Journal Editors. Regarding the conditions that qualify for academic authorship, the CERCA Code of Conduct refers to the guidelines provided by the International Committee of Medical Journal Editors (ICMJE, 2019). The latter states that, while authorship confers credit and has important academic, social, and financial implications, it also implies responsibility and accountability for published work. Some journals request and publish information about the contributions of each person named as having participated in a submitted study, which removes much of the ambiguity surrounding contributions, but leaves unresolved the question of the quantity and quality of contribution that qualify an individual for authorship. The criteria developed by the International Committee of Medical Journal Editors (ICMJE, 2019) has developed a series of recommendations

intended to ensure that contributors who have made substantive intellectual contributions to a paper are given credit as authors, but also that contributors credited as authors understand their role in taking responsibility and being accountable for what is published. They are summarized in the following four criteria, which must be simultaneously met by all coauthors of a publication:

1. Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work.
2. Drafting the work or revising it critically for important intellectual content.
3. Final approval of the version to be published.
4. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

In addition to being accountable for the parts of the work he or she has done, an author should be able to identify which coauthors are responsible for specific other parts of the work. In addition, authors should have confidence in the integrity of the contributions of their coauthors. The aforementioned four criteria are intended to reserve the status of authorship for those who deserve credit and can take responsibility for the work, not to disqualify colleagues who otherwise meet authorship criteria from authorship by denying them the opportunity to fulfill such criteria. Therefore, all individuals who meet the first criterion should have the opportunity to participate in the review, drafting, and final approval of the manuscript. The individuals who conduct the work are responsible for identifying who meets these criteria and ideally should do so when planning the work, making modifications as appropriate as the work progresses. It is the collective responsibility of the authors, not the journal to which the work is submitted, to determine that all people named as authors meet all four criteria; it is not the role of journal editors to determine who qualifies or does not qualify for authorship or to arbitrate authorship conflicts. If agreement cannot be reached about who qualifies as author, the institution(s) where the work was performed, not the journal editor, should be asked to investigate. If authors request removal or addition of an author after manuscript submission or publication, journal editors should seek an explanation and signed statement of agreement for the requested change from all listed authors and from the author to be removed or added.

The corresponding author is the one individual who takes primary responsibility for communication with the journal during the manuscript submission, peer review, and publication process, and typically ensures that all the journal's administrative requirements, such as providing details of authorship, ethics committee approval,

clinical trial registration documentation, and gathering conflict of interest forms and statements, are properly completed, although these duties may be delegated to one or more coauthors. The corresponding author should be available throughout the submission and peer review process to respond to editorial queries in a timely way, and should be available after publication to respond to critiques of the work and cooperate with any requests from the journal for data or additional information should questions about the paper arise after publication.

All those who meet the four authorship criteria above should be identified as authors, while those who only fulfill some of them should be acknowledged but not listed as authors. Some activities that, on its own grounds alone, do not qualify a contributor for authorship are the following: acquisition of funding; general supervision of a research group or general administrative support; and writing assistance, technical editing, language editing, and proofreading. Those whose contributions do not justify authorship may be acknowledged individually or together as a group, and their contributions should be specified. It is advisable that the corresponding author obtains written permission by all acknowledged individuals.

Core Practices of the Committee on Publication Ethics The Committee on Publication Ethics (COPE, https://publicationethics.org/) is committed to educate and support editors, publishers and those involved in publication ethics with the aim of moving the culture of publishing towards one where ethical practices becomes a normal part of the publishing culture. The first meeting of COPE took place in 1997, in 1999 it issued its Guidelines on Good Publication Practice, and in 2004 a Code of Conduct for editors was published on the COPE website. Both documents were most recently replaced in 2017 by their so-called Core Practices (COPE, 2019a). The latter include the policies and practices that journals and publishers need in order to reach the highest standards in publication ethics, regarding allegations of misconduct, authorship and contributorship, complaints and appeals, conflicts of interest/competing interests, data and reproducibility, ethical oversight, intellectual property, journal management, peer review process, and post-publication discussions and corrections. While these guidelines are mostly intended for editors and publishers, they also constitute a very valuable resource for researchers as regards to publication ethics. Only the COPE guidelines regarding authorship/contributorship as well as intellectual property are reproduced below in greater detail, but ICP researchers are referred to the Core Practices (COPE, 2019a) for other ethical aspects mentioned above.

- **Authorship and contributorship.** The term ‘authorship’ can refer to the creator(s) of an idea or to the individual(s) that generate a product that disseminates

intellectual/creative works (such a scholarly article), and conveys privileges, responsibilities, and legal rights (COPE, 2019b). At the very least, authors must have participated in creating the work without violating the copyright of other authors, but there are additional guidelines and rules to determine authorship that may vary depending on the discipline (COPE, 2019b). Therefore, clear policies that allow to determine who contributed to the work and in what capacity are required for authorship and contributorship. The most widely known authorship guidelines (especially in biomedical journals) are those of the International Committee of Medical Journal Editors (ICMJE, 2019), which have been described in previous pages; however, minimum requirements for all definitions include substantial contribution to the work and accountability for the work done and its presentation in the publication (COPE, 2019b). Acknowledgments may be used to denote other contributions that do not meet authorship criteria. There are no universally accepted guidelines about how to determine the order of authorship, and this can easily lead to disputes among authors. Therefore, it is generally advisable to start negotiations about authorship early in the process, even if changes in the order and composition of the authors' list may happen during the process of performing research and writing the paper (COPE, 2019b). Additional details on the COPE policies for authorship and how to resolve disputes on this regard are available from COPE (2019b) and Albert & Wagner (2003).

Some key concepts on authorship and related matters (summarized from Albert & Wagner, 2003) are also briefly explained below:

a. Number of authors: There is no limit to the number of authors, so the best practice is probably agreeing on advance about who will qualify as an author, and finally include those who do.
b. Order of authors: It is generally considered that the order of authors should be agreed by the authors themselves and that they should be able to explain the rationale behind; however, in practice there are not widely recognized guidelines to do so (except for the first author).
c. First and last authors: The preferred position for authors is generally the first one, who is considered to have contributed most to the research. Sometimes significance is given to being the last author, who is frequently the most senior team member that played a supervisory role, although views about this vary. This last author role is suitable as long as the last authors fulfill authorship criteria instead of being a guest author.
d. Corresponding author: It is the person who receives the reviewer comments, the proofs, etc., and whose contact details are included in the article so readers can contact him or her if needed. Editors see this as an administrative role, but some

authors equate it with seniority, so it should ideally be agreed by coauthors in advance.

e. Contributorship: It is recommendable that authors state their respective contributions, because this helps editors to confirm that authorship criteria are met. Some journals include this information in the published papers.
f. Guarantor: This term refers to one or more coauthors that can take responsibility for the integrity of the work as a whole, as it is often unreasonable to ask all coauthors to be responsible for every aspect of the research, particularly when there are many authors and group authorships.
g. Acknowledgments: Most journals permit (or even encourage) acknowledgement of contributions to a research project that do not merit authorship.
h. Ghost authors: This term may refer to someone that qualifies as an author but has been unethically excluded from the list, or to professional writers whose role is not recognized in the acknowledgments.
i. Gift authors: This term may refer to individuals (normally senior individuals, such as heads of department) that are listed as authors but who do not fulfill authorship criteria (and which are listed as a favor or because it is expected); it may also refer to another colleague that neither qualifies as an author but that is expected to return the favor by doing the same in the future, in order to inflate their respective curricula. Both practices are unethical.
j. Group authors: Some journals allow for the use of group names, even if frequently the contributors of each group must be listed. Group authorships are frequently miscoded on literature databases and require a guarantor.

Misrepresenting the list of authors of a paper is unethical and generally considered a form of research misconduct. However, the pressure to publish ('publish or perish'), coupled with customs and traditions, often mislead authors about acceptable authorship practices that are widely accepted by journal editors (Albert & Wagner, 2003). Authorship disputes are relatively frequent among researchers, and not always represent research misconduct, particularly when relate to disagreements about the order of authors. The following measures may be taken to minimize such problems (Albert & Wagner, 2003): (a) encourage a culture of ethical authorship; (b) start discussing authorship when research is being planned; and (c) decide authorship before start writing the article. Journal editors have guidelines to handle pre- and postpublication disputes about authorship (COPE, 2019b), but it is not their responsibility to determine the order of authors, even if they must be vigilant to prevent research misconduct regarding authorship. Plagiarism most seriously put into question the authorship of a manuscript because the author listed is not the actual author of the original idea or text; this

behavior is unacceptable, when detected on time generally leads to rejection (or retraction, if the article was already published), and it is for the editor to decide whether the institution of the plagiarizing author must be informed, as it is more frequently done in the case of stolen, fabricated or falsified data (COPE, 2019b). Nevertheless, editors should focus on preserving the integrity of the published record, while punishing the authors for misconduct is the responsibility and prerogative of the institutions that employ them.

- **Intellectual property.** All policies on intellectual property, including copyright and publishing licenses, should be clearly described. In addition, any costs associated with publishing should be obvious to authors and readers. Policies should be clear on what counts as prepublication that will preclude consideration. What constitutes plagiarism and redundant/overlapping publication should be specified. One of the currently unresolved problems of academic publishing is related to preprints, i.e., manuscripts posted by the authors on digital repositories or other online platforms (e.g., BioRxiv) before or in parallel with the peer-review process (COPE, 2018). While preprints boost the rapid dissemination of research, allow authors to take precedence, and promote receiving feedback from other researchers, it is not devoid of problems, such as copyright licensing conflicts between the preprint platform and the journal where the manuscript is finally submitted, or the potential lack of research rigor and quality due to the lack of peer-review (COPE, 2018). Preprints are not normally considered publications, in the sense that posting them do not preclude publication in most journals after the peer-review process; however, the fact that they are frequently assigned a DOI makes them citable and indexable (which is problematic when the updated version of the paper if published in a journal, especially since preprints can be uploaded to multiple platforms, and also because it compromises the double-blind review policies of some journals). Given these problems, before submitting preprints authors should carefully inspect the copyright policies of both preprint platforms and the journal where they plan to submit their work, so as to ensure that they do not conflict and, in particular, that the journal allows submissions of manuscripts already available in preprint form.

  Another common problem faced by editors is ‘text recycling’ (or ‘self-plagiarism’), which occurs when text portions appear repeated in various publications of the same author (usually without attribution). This might be appropriate in some particular circumstances, but not in most others, and differs from true plagiarism (which occurs when an author uses the ideas or words of another without attribution). Text recycling should not be confused with redundant (or duplicate) publication, which involves the recurrent publication of the same ideas. More

detailed guidelines about text recycling, developed by Biology and Medical Editors at BioMed Central in collaboration with COPE, are available online (BioMed Central, 2019).

Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities.

Since 2012 the UAB (and hence, indirectly, the ICP as well) adhere to the Berlin Declaration of Open Access to Knowledge in the Sciences and Humanities (Bullinger et al., 2003), which is considered a milestone in the Open Access movement. This manifesto is quoted below in its entirety.

Preface. The Internet has fundamentally changed the practical and economic realities of distributing scientific knowledge and cultural heritage. For the first time ever, the Internet now offers the chance to constitute a global and interactive representation of human knowledge, including cultural heritage and the guarantee of worldwide access.

We, the undersigned, feel obliged to address the challenges of the Internet as an emerging functional medium for distributing knowledge. Obviously, these developments will be able to significantly modify the nature of scientific publishing as well as the existing system of quality assurance.

In accordance with the spirit of the Declaration of the Budapest Open Access Initiative, the ECHO Charter and the Bethesda Statement on Open Access Publishing, we have drafted the Berlin Declaration to promote the Internet as a functional instrument for a global scientific knowledge base and human reflection and to specify measures which research policy makers, research institutions, funding agencies, libraries, archives and museums need to consider.

Goals. Our mission of disseminating knowledge is only half complete if the information is not made widely and readily available to society. New possibilities of knowledge dissemination not only through the classical form but also and increasingly through the open access paradigm via the Internet have to be supported. We define open access as a comprehensive source of human knowledge and cultural heritage that has been approved by the scientific community.

In order to realize the vision of a global and accessible representation of knowledge, the future Web has to be sustainable, interactive, and transparent. Content and software tools must be openly accessible and compatible.

Definition of an Open Access Contribution. Establishing open access as a worthwhile procedure ideally requires the active commitment of each and every individual producer of scientific knowledge and holder of cultural heritage. Open access contributions include original scientific research results, raw data and

metadata, source materials, digital representations of pictorial and graphical materials and scholarly multimedia material.

1. Open access contributions must satisfy two conditions: The author(s) and right holder(s) of such contributions grant(s) to all users a free, irrevocable, worldwide, right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship (community standards, will continue to provide the mechanism for enforcement of proper attribution and responsible use of the published work, as they do now), as well as the right to make small numbers of printed copies for their personal use.
2. A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in an appropriate standard electronic format is deposited (and thus published) in at least one online repository using suitable technical standards (such as the Open Archive definitions) that is supported and maintained by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, inter operability, and long-term archiving.

Supporting the Transition to the Electronic Open Access Paradigm. Our organizations are interested in the further promotion of the new open access paradigm to gain the most benefit for science and society. Therefore, we intend to make progress by

- encouraging our researchers/grant recipients to publish their work according to the principles of the open access paradigm.
- encouraging the holders of cultural heritage to support open access by providing their resources on the Internet.
- developing means and ways to evaluate open access contributions and online-journals in order to maintain the standards of quality assurance and good scientific practice.
- advocating that open access publication be recognized in promotion and tenure evaluation.
- advocating the intrinsic merit of contributions to an open access infrastructure by software tool development, content provision, metadata creation, or the publication of individual articles.

We realize that the process of moving to open access changes the dissemination of knowledge with respect to legal and financial aspects. Our organizations aim to find

solutions that support further development of the existing legal and financial frameworks in order to facilitate optimal use and access.

FAIR principles. The term FAIR (Findable, Accessible, Interoperable, and Reusable) was launched in a workshop in 2014, leading to an open movement called Data FAIRPort initiative (Data FAIRPort, 2019). The associated 15 principles were published soon thereafter (Wilkinson et al, 2016). These principles are a set of guidelines that stem from the need to improve the infrastructures supporting the use of scholarly data by improving the ability of machines to automatically find and use the data, as well as supporting its reuse by individuals. These principles, which refer to three types of entities (data, or any digital object; metadata, i.e., information about that digital object; and infrastructure) are summarized below; further details can be found online at Go-Fair (2019).

- **Findable.** The first step in (re)using data is to find them. Metadata and data should be easy to find for both humans and computers. Machine-readable metadata are essential for automatic discovery of datasets and services.

1. F1. (Meta)data are assigned a globally unique and persistent identifier.
2. F2. Data are described with rich metadata (defined by R1 below).
3. F3. Metadata clearly and explicitly include the identifier of the data they describe.
4. F4. (Meta)data are registered or indexed in a searchable resource.

- **Accessible.** Once the required data have been found, the user needs to know how can they be accessed, possibly including authentication and authorization.

5. A1. (Meta)data are retrievable by their identifier using a standardized communications protocol.
6. A1.1 The protocol is open, free, and universally implementable.
7. A1.2 The protocol allows for an authentication and authorization procedure, where necessary.
8. A2. Metadata are accessible, even when the data are no longer available.

- **Interoperable.** The data usually need to be integrated with other data. In addition, the data need to interoperate with applications or workflows for analysis, storage, and processing.

9. I1. (Meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
10. I2. (Meta)data use vocabularies that follow FAIR principles.
11. I3. (Meta)data include qualified references to other (meta)data.

- **Reusable.** The ultimate goal of FAIR is to optimize the reuse of data. To achieve this, metadata and data should be well-described so that they can be replicated and/or combined in different settings.

12. R1. Meta(data) are richly described with a plurality of accurate and relevant attributes.
13. R1.1. (Meta)data are released with a clear and accessible data usage license.
14. R1.2. (Meta)data are associated with detailed provenance.
15. R1.3. (Meta)data meet domain-relevant community standards.

ICP GUIDELINES

In agreement with the principles exposed above concerning good practices in research, intellectual property, and scientific authorship, the ICP establishes the following guidelines for its personnel.

Professional recognition. In agreement with principle 22 of the European Charter for Researchers, in its Organization Chart (see last version at http://www.icp.cat/attachments/transparencia/ICP_Organization_Chart.pdf), the ICP recognizes four main categories of researchers (R1 to R4) that include all stages of the professional career, in agreement with the profiles distinguished by the European Framework for Research Careers (European Commission, 2011): R1 – First Stage Researchers (up to the PhD completion); R2 – Recognized Researchers (doctors that are not yet fully independent); R3 – Established Researchers (those who have developed certain level of independence); and R4 – Leading Researchers (those leading their research area or field). At the ICP, these categories are termed as follows: predoctoral researchers (R1, including undergraduate students and PhD candidates); postdoctoral researchers (R2, with a fixed-termed contract); researchers (R3, with a permanent position or a tenure-track contract); and senior researchers (R4). R1 and R2 categories are considered early-stage researchers, whereas R3 and R4 are considered experienced researchers. Early-stage researchers must have at least one supervisor from their same research group (which might not necessarily be the group leader), whereas experienced researchers only depend on their group leader and the director of the institution.

Research freedom and integrity. In agreement with principle 1 of the European Charter for Researchers and one of the basic principles included in the UAB Code of Good Practices in Research, the ICP gives its researchers the freedom to decide the research questions the wish to devote, as long as they are in agreement with the mission of the ICP as defined on its statutes (research in vertebrate paleontology as well as conservation and dissemination of paleontological heritage), and also with relevant ethical principles and current laws (see below). Regarding the former aspect, research freedom is further constrained by the need to comply with the scientific policies implemented by the ICP Director to fulfill the center's mission, as well the specific research lines determined by research group leaders, principal investigators, and PhD or postdoc supervisors, in agreement with the general aims and scope of each research group and its current research projects and grants.

In agreement with the principles of research integrity and responsibility, as well as principle 5 of the CERCA Code of Conduct, ICP researchers must be extremely rigorous in all their research activities, recognize and avoid or disclose conflicts of interests, guarantee that their research is performed in agreement with all relevant good practices in research, ethical principles in publishing, and current legislation, and denounce misconduct or unacceptable practices by their peers. With these aims in mind, ICP staff and research associates have to sign a document in which they adhere to the principles and guidelines stated in the present manual of best practices—in compliance with the CERCA Code of Conduct and the European Charter for Researchers, and further including all the protocols and guidelines developed by the ICP.

With regard to paleontological fieldwork and other activities related to fossils, ICP personnel will have to ensure that all the paleontological interventions and other activities related to fossils are performed by scrupulously abiding to current applicable heritage laws as well as additional relevant ethical principles (as promoted by the most important paleontological societies worldwide, such as the SVP). With regard to authorship and other issues related to academic publishing, in agreement with the principle of research integrity included in the UAB Code of Good Practices in Research as well as the principle 6 of the CERCA Code of Conduct, ICP researchers will have to be honest in their research activities, with particular emphasis on the recognition of other colleagues when publishing their results, respecting authorship criteria as specified in the present manual (see below), and respecting intellectual property as well as avoiding plagiarism (and other similarly dishonest practices). The director and research group leaders of the ICP will be vigilant to ensure that ICP researchers are compromised with scientific integrity and abide to the publication ethics guidelines provided in this manual (in compliance with international standards), with emphasis on scientific authorship, so as to be absolutely scrupulous in their respect to the intellectual property of authors. With this aim in mind, the ICP ombudsperson(s) will examine the complaints received about ICP researchers (internally or externally) with regard to publication ethics, with particular emphasis in the case of article retractions and expressions of concern. This information will be transmitted to the Steering Committee, who will take the appropriate corrective measures, and when these cases could potentially compromise the reputation of the ICP they will also be communicated to the CERCA ombudsperson.

Taxonomic practice. In the case of researchers dealing with taxonomic nomenclature (as it is frequently the case for many paleontologists), research integrity must take into account the specificities of ethical guidelines in this discipline. In

particular, in all of their publications ICP researchers must abide by the articles and recommendations of the International Code of Zoological Nomenclature (ICZN, 1999)—or any other applicable code of taxonomic nomenclature when dealing with organisms other than animals—particularly when describing new taxa. Furthermore, in their taxonomic practice, they should also follow the guidelines of the Code of Ethics included in the aforementioned work, and hence refrain (among others) from describing new taxa if they believe another person is trying to establish a new name for the same taxon, or proposing new taxon names that might be offensive. In line with this Code of Ethics, ICP researchers are requested always use an appropriate (courteous and professional) tone in any taxonomic discussions about taxonomic nomenclature in which they might engage (either in print or otherwise).

Access to fossils curated by the ICP. In their double condition of cultural heritage and research materials, fossils housed at the ICP, together with their associated data, must be publicly available to both researchers and the general public, in agreement with SVP ethical guidelines. However, as recognized by the latter, different restrictions and/or procedures may apply depending on the scientific significance of the fossil, its conservation state, and its publication status (published or unpublished), among others. The best way to make accessible fossils to other researchers is by means of their description in journal papers or other kinds of publications, and when appropriate by posting CT scans and/or 3D virtual models of these fossils in publicly accessible digital repositories. However, it is not always feasible or even recommendable to describe the fossils in detail, or to study particular aspects without accessing the originals. Therefore, researchers should be granted access to directly study the fossil remains if they provide a sufficiently detailed and well-justified request. While this is essential for ensuring the progress and/or reproducibility of paleontological research, the following restrictions will apply at the ICP:

1. Only sufficiently qualified individuals (on the basis of academic background, training, and/or experience) should be allowed to directly study and manipulate the fossils. Under particular circumstances, individuals that do not fulfill these conditions may be allowed to interact with the fossils (e.g., to take pictures) under the strict continuous supervision of ICP personnel. All individuals requesting access to fossils will have to adequately motivate their petition in written form, agree to comply with the ICP protocols and regulations (including the need to acknowledge the curatorial role of the ICP in the acknowledgments of publications based on or including these fossils), and get formal permission before accessing the fossils.
2. Temporary restrictions for accessing unpublished fossil specimens will be enforced when the material is under study by other researchers, either from the ICP or

elsewhere. This particularly applies to the director(s) of the fieldwork campaign in which the unpublished fossils where recovered, which should be given priority as long as they are active researchers and have not waived their rights to study the fossils.

3. Temporary restrictions for studying published fossils will also be enforced when the fossils have only been preliminarily published and are under study by other researchers, or when the fossils (even if described in detailed in the scientific literature) are pending publication of more detailed ongoing analyses. In those cases, the relevant research group leader of the ICP will have to determine what restrictions apply, depending on the aims of the individual requesting access. These restrictions may imply denying access the specimens altogether or, more frequently, denying the possibility to take photographs and/or measurements, or to perform CT scans. Another possibility is to grant access to the fossils without possibility to publish them, which should ideally be arranged by means of a written confidentiality agreement.
4. Temporary or indefinite restrictions may also apply, depending on the state of preservation of the fossils, to ensure their adequate conservation. Irrespective of the preservation, similar restrictions may also apply when the aim is to perform invasive or destructive analyses of the fossils, depending on their scientific importance, rarity, or other singularities.
5. Access to fossils to perform physical casts and/or digital scans (either by means of CTs, surface laser-scans, photogrammetry, or any other means) will only be provided at the discretion of the ICP, which will hold the copyright of the resulting casts, 3D models and/or CT scan data. The ICP will have to keep or be given a copy of these data and, in the case of digital files, posting them in digital repositories or sharing them with other researchers will require the explicit written approval by the ICP. The ICP also reserves the right to use these data for its own research, distribute them to other researchers, or to post them on digital repositories, without prejudice of the appropriate credit to the individuals that collected the data.
6. The general public will not be granted access to study or manipulate original fossils, but should be able to see the most representative ones (either originals, casts, or digital models) by means of the permanent exhibit and other temporary exhibits of the ICP, exhibits organized by other institutions by means of loan agreements with the ICP, photographs, videos or 3D models posted online by the ICP, and the dissemination and outreach activities regularly performed by the ICP.

Publication and dissemination policies. In agreement with the UAB dissemination policy of research outputs (as specified in the UAB Code of Good Practices in Research), principle 1 of the CERCA Code of Conduct, and the principles of Horizon 2020 approach 'Responsible Research and Innovation' (RRI, see https://ec.europa.eu/programmes/horizon2020/en/h2020-section/responsible-research-innovation), the ICP has the responsibility to ensure that its researchers publish their research outputs in a timely and rigorous fashion, as well as to promote as much as possible that such research outputs are published in agreement with open access initiatives, as well as to assess potential implications and societal expectations with regard to their research. With these aims in mind, ICP researchers have the obligation to regularly inform the Director and the Head of the Communication and Outreach Department of all the research outputs and dissemination activities performed by them, with emphasis on publications and contributions to meetings. SCI (Science Citation Index) publications (those indexed by Clarivate Analytics' Journal Citation Reports) will have to be communicated upon acceptance, online publication, and definitive publication. Other publications will have to be communicated upon final publication. The ICP Director will monitor the amount, quality and impact of the scientific production of each researcher, and evaluate it at the end of this year based on the criteria and metrics specified in the ICP Protocol for the Evaluation, Internal Promotion and Recruitment of Researchers (http://www.icp.cat/attachments/transparencia/ICP_Recruitment_Protocol.pdf) approved by its Board of Trustees in 2019.

The Head of the Communication and Outreach Department will decide the most suitable dissemination actions (if any) to be taken with regard to the publications and other activities by ICP researchers. When requested by the Communication and Outreach Department, ICP researches must be actively involved in the elaboration of press releases and web news, as well as participate in actions designed to disseminate their research outputs (including when their presence is required, as in radio and TV interviews). At the same time, ICP researchers can seek advice in the Communication and Outreach Department when designing and executing communication plans included in their research projects. The Head of the Communication and Outreach Department will also be in charge of leading communication actions when an ICP researcher is the lead (generally corresponding) author of a publication, by coordinating with publishers and the communication departments of other coauthors' institutions to ensure the highest possible impact of joint communication actions. While it is not feasible to publish web news pieces for all articles led by ICP researchers, the ICP will regularly publish news on its webpage about the papers published by ICP researchers and, when relevant, will organize press releases and

conferences to boost further their impact and dissemination. In other circumstances, the decision of taking any action will similarly be at the discretion of the Head of the Communication and Outreach Department, but further conditioned by the role of the press office of the leading author's institution. Furthermore, an up-to-date list of ICP publications (updated approximately each month) will be openly available from the ICP website, and the complete list of publications for a given year will be also available from the corresponding ICP annual report. The scientific production of the ICP will also be periodically updated to the Portal de Recerca de Catalunya. Other aspects related to open access policies and guidelines are explained below.

Open access publications, preprints, and open data. The ICP recognizes the individual freedom of its researchers to choose the most suitable venue to publish their research outputs. However, at the institutional level the ICP aims to favor open access policies by encouraging its researchers to publish a large portion of their scientific outputs in open access—either by choosing open access journals or by covering gold open access fees in hybrid journals (i.e., subscription journals that also allow for open access publication on an individual basis). Increasing the percentage of open access publications is a strategic aim of the ICP (as included in the ICP Strategic Plan 2018-2021; http://www.icp.cat/attachments/transparencia/Strategic_plan_2018_2021.pdf). Nevertheless, the usually high cost of publishing in open access (particularly in the case of the most prestigious journals), coupled with budgetary constraints (in particular, the lack of public funds specifically devised to cover such expenses in Spain), seriously hinder the attainment of such a goal. Publishing in diamond open access journals may be an option to ameliorate, but not to solve, this problem, as the highest-ranking journals are either gold open access or subscription-based. Therefore, to solve this problem the ICP encourages its researchers to take advantage of green open access alternatives allowed by most journals (see below).

ICP researchers are further encouraged to disseminate their research outputs among colleagues or the general public, but at the same time they are requested to do so in a responsible way that does not violate copyright laws or the particular provisos of copyright transfer agreements arranged with the publisher. ICP researchers must be careful enough so as to not unintentionally infringe copyright agreements with the publishers, and should be aware that intentionally violating copyright will be considered a reprovable unethical behavior. Some open-access journals (see below) use Creative Commons licenses that allow free reuse and distribution of the work only by acknowledging the source, but subscription journals do not usually allow authors to freely distribute their works in their final published

form, frequently leading to (allegedly unintentional) copyright infringements by the authors who indiscriminately post all their works in academic online platforms or networks, such as ResearchGate or Academia.edu (Van Noorden, 2014). It must be therefore highlighted that the ICP does not allow its researchers to upload to academic social networks the final version of papers published on subscription journals whose copyright transfer agreements do not grant authors the permission to do so.

Responsible ways for authors to legally disseminate their research outputs include (but are not limited to) posting on their social networks the free download links to their papers (when these are provided by the journals), or privately sending copies of their papers to those researchers that request them when this is allowed by copyright transfer agreements. Furthermore, as noted above, ICP researchers are strongly encouraged to post postprints in the case of papers published in subscription-based journals that allow for green open access. In such situations, the embargo period set by the journal on the copyright transfer agreement must be scrupulously respected. To prevent possible mistakes in this regard, and in order to make the papers published by ICP researchers as openly available as possible, the ICP has an agreement to upload its open access publications to the digital repository of the UAB (DDD, Dipòsit Digital de Documents), including not only the final published version of articles published in gold open access, but also postprints after the stipulated embargo period (green open access). To fulfill this aim, ICP researchers are encouraged to send their preprints to the Communication & Outreach Department of the ICP. Otherwise, upon request they will have the obligation to provide all the necessary documents (manuscripts, figures, etc.) required to generate the postprints to be uploaded to the DDD.

In contrast to the above, ICP researchers are discouraged (but not prevented) from posting preprints of their papers online. Although such a practice is ethical and commonly accepted, it originates several problems that are currently unresolved (such as potential copyright license conflicts with journals). Specifically, ICP researchers must not submit preprints of manuscripts where new taxa are described, as this might lead to potential confusions about the validity of such taxa before they are actually published for the purposes of the International Code of Zoological Nomenclature. In other cases, and if there is a strong motivation for posting preprints, ICP researchers should carefully inspect the license agreements of the preprint platform and must ensure that the journal(s) where they plan to submit do accept manuscripts already available in preprint form (as this is a commonly but not universally accepted practice).

With regard to open data, in agreement with principle 2 of the CERCA Code of Conduct, the ICP will help its researchers to comply with FAIR principles. With this aim

in mind, the ICP is working with CERCA to develop and implement an open science strategy that abides by the FAIR principles, and once in force all ICP researchers will be requested to adapt such strategy to their research activities in compliance with the same principles. The ICP will encourage data sharing policies in the case of research data, but with the understanding that irrespective of the authorship of such data the ICP is the copyright holder and, hence, that following the data sharing guidelines determined by the ICP might be mandatory, depending on the type of data. In particular, in the case of virtual 3D models or CT scans of fossils housed at the ICP, the default digital repository is considered to be MorphoSource (www.morphosource.com), and researchers will need written permission by the ICP Director or the person to whom this prerogative has been delegated (currently, the head of the Virtual Paleontology Area of the ICP) in order to publicly post such kind of data. In these cases, ICP researchers are requested to pay particular attention to the copyright license they choose on behalf of the ICP. The default license in MorphoSource and similar repositories should be Attribution NonCommercial-NoDerivs (CC BY-NC-ND), unless written permission has been given to the researcher to waive additional rights.

Copyright of research outputs and data. The ICP is mostly devoted to basic (fundamental) research, so that its research outputs normally have little immediate applicability susceptible of industrial property (patents). Therefore, the guidelines provided below refer to copyright (including moral rights) in relation to research data and scientific publications; however, some guidelines are also provided for patents and other types of industrial property. For the purposes of this manual, intellectual property rights are divided into two types of rights: exploitation rights and moral rights. Exploitation rights are those that can be transferred to third parties and hence susceptible (at least potentially) of monetary compensation, such as copyright in a strict sense, patents, etc. In contrast, moral rights are inalienable (they cannot be transferred); two subtypes of the latter will be distinguished (authorship and affiliation), which are developed further on in greater detail. All these intellectual property rights apply not only to final research outputs, but also to research data. Research outputs include published or publishable written works (such as journal papers, books, book chapters...), communications to scientific meetings (oral communications, posters, conference proceedings abstracts...), audiovisual works, news releases and news reports, and unpublished technical reports in their final form. Research data (including photographs, micrographs, drawings, CT scans, digital 3D models and videos, databases, sculptures, molds and casts, etc.) are susceptible to be part of research outputs but do not qualify as such on their own grounds alone. One

of the main missions of researchers is to disseminate the results of their research in printed form and make available the data on which such outputs are based in order to ensure their reproducibility. This normally requires a copyright transfer agreement with the publisher (in the case of published research outputs) or to online digital repositories and platforms (in the case of research data).

It is most frequent that scientific authors have to transfer (either explicitly or implicitly) the copyright of their works to the publishers, at least partially, so that they usually retain the use their contribution in other subsequent works authored by them, or to privately distribute copies of their work among colleagues. In the case of research outputs in the form of publications, ICP researchers that hold the moral rights of authorship are considered the copyright holders and hence are allowed to transfer the copyright to publishers—on the understanding that (i) the moral rights of the ICP as the institutional affiliation of ICP researchers will be made explicit on the publication; and that (ii) ICP researchers will subsequently respect the provisos of copyright transfer agreements signed with the publisher, even after the eventual termination of their relationship (contractual or otherwise) with the ICP. Usually, researchers only get royalties or some monetary compensation for authoring or editing books, whereas in contrast, for publishing journal articles scientific authors get nothing or even have to cover the publication costs. Given that ICP researchers that author a work are recognized as the copyright holders, the eventual revenues from the publisher (if any) correspond to them.

In the case of patents or other outputs in the form of industrial property authored by ICP researchers, it is considered that intellectual property is shared by the researcher(s) involved and their respective institutions (including the ICP). In these cases, and in agreement with principle 4 of the CERCA Code of Conduct, the distribution of the monetary revenues that might eventually derive from the industrial property rights will have to be fairly distributed among all the involved parts, in accordance with the criteria established by the Generalitat de Catalunya and the applicable current laws.

With regard to research data, in agreement with principle 3 of the CERCA Code of Conduct, the physical documents and electronic files generated by ICP staff (thereby excluding research associates), with the exception of research outputs and industrial property, are exclusively copyrighted to the ICP, and hence some restrictions or permissions apply to their use without prejudice to the moral intellectual rights (authorship) of the researchers or technicians that produced such research data and other documents or electronic files that do not qualify as such (including photographs, videos, protocols, manuals, reports, etc.).

Thus, while ICP researchers do not require the explicit permission of the ICP to transfer copyright to a publisher when publishing a paper, they do need explicit permission to share some kinds of data (e.g., 3D virtual models and CT scans of fossils housed at the ICP) that are copyrighted to the ICP. When leaving the institution, researchers will have to sign an agreement with the ICP to take a copy of the research data that they generated while working there, and in all circumstances it will be mandatory to leave the tangible items and a copy of the electronic items at the ICP, which will have to custody these data or at least 10 years after publication—even if the contractual relationship with the employee is interrupted. The ICP will retain the copyright of such research data and will be allowed to use them in order to continue ongoing research projects or to perform other activities related to its mission, although it will not be allowed disseminate them without stating the authorship of the data. Former employees of the ICP, after leaving the institution, will be allowed to publish research outputs based on the data that they generated while working at the institution, as long as their former ICP affiliation is stated or written permission is granted.

Custody of research data and materials. In agreement with principle 3 of the CERCA Code of Conduct regarding the custody of research data, the ICP will provide with all the necessary physical and human resources to ensure that research data are preserved beyond 10 years from publication date, irrespective of whether such data are stored in physical form (e.g., field notebooks) or in electronic format (e.g., CT scan files). In particular, the ICP Information Systems Security Committee provides ICP staff with a document that states the policy of acceptable use of information systems, to which all personnel must abide, in order to guarantee the safeguard of electronic files. According to this policy, the ICP will ensure that copies of the files generated by ICP staff are stored in ICP computers or servers that can accessed by technicians (other than the researchers or technicians that originally generated them) in case of necessity, without prejudice of the intellectual rights of the former. To be able to guarantee this, the ICP makes it mandatory for all its staff to have a copy of their digital files in the ICP server (of which regular backups are performed), or else individually implement, authorized by the Information Technology Area of the ICP, other storage methods that enable the recovery of the data in case of computer failure.

The provisions of principle 3 of the CERCA Code of Conduct regarding the custody of research materials generally does not apply to ICP researchers, since the materials studied (fossils) are considered cultural heritage in Catalonia. As such, their collection and storage are regulated by heritage laws, which implies that the ICP responsibility to custody the fossils for at least 10 years is ultimately limited by the powers of the

Administration to grant the permanent deposit of these fossils to the ICP. Nevertheless, the ICP will devote the required material and human resources to ensure the correct conservation of all the fossil materials housed (either temporarily or permanently) at the ICP.

Knowledge transfer. ICP researchers must inform their research group leader as soon as they recognize practical applications of their research outputs of data, irrespective if they are related to technology transfer in the framework of industry or other sectors, or to other forms of knowledge transfer related to cultural aspects linked to paleontological heritage (including paleontological tourism). The knowledge transfer potential of the research should be evaluated further by the researcher, the research group leader, the Head of the Research Support and External Services Department, and the Director, who should devise together a proper strategy to take all the required actions while respecting the moral and exploitation rights of all of the parties involved. In turn, ICP technicians (with emphasis on heads of area) should also continuously seek knowledge transfer opportunities in the form of service provision, fundamentally those related to the activities of research support regularly performed by such technicians. Service provision opportunities should be evaluated by the relevant head of area, the Project Manager, the Head of the Research Support and External Services Department, and the Director, in order to devise the proper strategy to follow in each case. Knowledge transfer activities should be approved by the Steering Committee of the ICP. The knowledge and expertise that ICP researchers and technicians can provide is considered of utmost significance for the provision of services to third parties. Therefore, it is mandatory for them all to collaborate in such activities, and although researchers are not requested to participate in service provision they are expected to help and provide advice to technicians within the framework of their field of expertise (for example, in reviewing reports or identifying fossils, among others).

Publication ethics. ICP researchers will have to abide by the highest ethical standards and best practices in research, as reflected on this manual based on the guidelines provided about intellectual property laws, the UAB Code of Good Practices in Research, the CERCA Code of Conduct, the European Code of Conduct for Research Integrity and European Charter for Researchers, the SVP Guidelines for Professional Conduct in Paleontology, the Code of Ethics of the International Code on Zoological Nomenclature, the authorship criteria of the International Committee of Medical Journal Editors, and COPE Core Practices. Particular zeal will be required regarding publishing ethics, so as to avoid any type of copyright infringement, plagiarism, text

recycling, or redundant publication, while ensuring that all authors listed in their papers do fulfill the required authorship criteria (particularly by avoiding ghost and honorary authors).

In particular, plagiarism (the appropriation of intellectual property of other researchers, either text, data or ideas without proper attribution) not only constitutes a copyright violation, but is considered a most serious form of misconduct. Even though original research always builds on the work of previous scholars, ICP researchers by all means must maintain a honest attitude towards other researchers, and avoid plagiarism by thoroughly reviewing and citing all the relevant literature in their publications. Text recycling (without proper attribution) or redundant (duplicate) publication are also unethical and may similarly represent a copyright violation, even if they are considered a less severe form of misconduct, because the author does not appropriate someone else's ideas or texts. Submitting the same manuscript to various journals simultaneously ('shotgunning'; Rogers, 1999) is also ethically unacceptable because it may lead to duplicate publication and, even if this is not the case, it represents an unnecessary effort by editorial teams and editors.

Failure by ICP researchers to adhere to the ethical standards summarized above, and discussed in greater detail elsewhere in this manual, should be reported by whoever has detected it as soon as possible to the ICP ombudsperson. Such alleged accusations will be investigated by the Steering Committee of the ICP, in consultation with the Researchers Commission, or by another ad hoc committee established by the former to delegate such tasks. ICP researchers found responsible of any of these or other types of misconduct or unacceptable practices will be subject to disciplinary actions after informing the CERCA ombudsperson, as they do not only compromise the reputation of the ICP but further threaten that of the CERCA Institution and the Catalan Research System as a whole.

There is no clear agreement whether 'salami slicing'—which consists in dividing reports of a research project into as many papers as possible (so-called 'least publishable units'; Rogers, 1999), or a single study into different papers (Eva, 2017)—is unethical or not. However, salami slicing is certainly not a recommendable practice, as publishing such outputs together might result in a higher-impact and more widely cited paper. Therefore, the ICP discourages salami slicing but does not consider it a punishable practice, as long as the various related papers are adequately cross-referenced, since the publication strategy implemented by researchers may depend on multiple factors (including timely publication of available results), and it is often difficult to determine objectively what amount of salami slicing is justified and which one is unacceptable.

Authorship. During the last decades, it has become increasingly common that scientific publications are authored by multiple individuals. This is largely a true reflection of modern science—due to the increased specialization by individual scholars as well increasingly common multidisciplinary and/or multigroup approaches—so that collective efforts are required to pursue specific research questions. On the other hand, this situation may easily derive on 'academic parasitism' (Kwok, 2005), by which dishonest (usually senior) scientists take advantage of their position, rank or status to sign papers in which they have not significantly contributed (or contributed at all), or to alter the order of authors to have a more prominent position (first or last/corresponding author) than warranted by their actual contribution to the work. Junior researchers are particularly susceptible to such kind of dishonest behavior, which is a serious violation of research integrity. The ICP does not tolerate such practices and, in order to prevent potential conflicts of authorship, provides the guidelines below. Such guidelines, of mandatory compliance by ICP researchers, are in agreement with principle 6 of the CERCA Code of Conduct (which refers to the four authorship criteria provided by the International Committee of Medical Journal Editors; ICMJE, 2019). These four authorship criteria are the following (note that the UAB Code of Good Practices recognizes only three authorship criteria, because the second and third are fused into a single one, thereby being largely equivalent):

1. Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work.
2. Drafting the work or revising it critically for important intellectual content.
3. Final approval of the version to be published.
4. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

As clearly stated in the documents mentioned above, these criteria must be fulfilled simultaneously by each person listed as coauthor of a particular publication. However, this manual aims to develop further the above-mentioned four criteria in relation to the particularities paleontological research, in order to anticipate possible doubts and resolve some ambiguities.

- Partial fulfillment of the four authorship criteria by researchers: Individuals that fulfill one or more, but not all, of the conditions above must generally be excluded from the authors' list and mentioned only in the acknowledgments. However, researchers that fulfill the first criterion above (because of involvement in research planning/design and/or data acquisition, analysis and/or interpretation) must be

given the opportunity to fulfill the remaining criteria above and cannot be excluded from authorship unless they decline or intentionally fail to do so. For example, if a researcher was involved in taking measurements but refuses to review and approve the manuscript, he or she cannot be included as an author. In contrast, if a researcher fulfills criteria 1, 2, and 4, but is unable to approve the final version for reasons beyond his will (e.g., illness or death), it will be considered that this particular person qualifies for authorship.

- Data collection/analyses by technicians: Unlike in the case of researchers, contributing to data collection and/or analyses (the first authorship criterion above), in the case of technicians hired to perform such kind of work, does not imply that the technician must be given the opportunity to fulfill the remaining authorship criteria. Nevertheless, technicians should be given such opportunity if they make substantial contributions upon request by their immediate supervisor and this has been approved in advance by the researcher leading the study. Similarly, technicians should be given the right to fulfill all criteria for authorship if they have significantly contributed to research design. The latter is however unusual and, as a general rule, technicians will not be expected to habitually fulfill authorship criteria unless they voluntarily accept to perform additional tasks (beyond those expected for their position) in agreement with their immediate supervisor.
- First, last, and corresponding authors: For papers with multiple authors, establishing the order of authors is important as it must reflect the relative contribution(s) of each individual to the publication. Four different (but not mutually exclusive) author roles may be distinguished, with implications for the position in the list of authors:

a. First author(s): The person that has contributed more significantly to all of the three above-mentioned aspects of research (data acquisition, analysis, and interpretation) and usually who has written a first draft of the paper. Two or more co-first authors are exceptionally possible under statements of equal contribution or when they are also co-corresponding authors.
b. Last author(s): Normally reserved to the person that has more significantly contributed to planning and designing the research (usually the PhD supervisor of the first author, or principal investigator of the research project, or the research group leader). Sometimes it is the last author who writes the first draft of the manuscript instead of the first author, but this is not normally expected. Two or more co-last authors are exceptionally possible under statements of equal contribution or when they are also co-corresponding authors.

c. Corresponding author(s): The person(s) in charge of the editorial process and/or whose contact details appear in the publication subsequent correspondence. In the case of multiple corresponding authors (or co-corresponding authors), usually only one fulfills the editorial tasks, but all must be explicitly listed as corresponding authors with contact details.

d. Coauthors: This term may refer to all authors simultaneously, but in a strict sense it would refer to individuals that fulfill the four authorship criteria but have contributed less significantly than the first and last author, and are corresponding author.

Determining who is the 'lead author' of a paper may be a bit ambiguous, as it can be applied to either the first of the last author, and must not necessarily be restricted to a single individual. For example, master students and PhD candidates will normally be the first author of papers devised in the framework of their thesis or dissertation, but it is frequent that the last author has performed a greater contribution to research design and even data interpretation, thereby playing a greater leading role. This is even more evident last author is the supervisor of the first author and/or the corresponding author of the paper. Indeed, the role of corresponding author is usually considered as an indicator of leadership in research, even if it should be reserved for the person actually taking care of editorial tasks (submitting the manuscript, writing cover letters and responses to reviewers, etc.) or, at least (in the case of multiple corresponding authors), also for those authors responsible of subsequent corresponded related to the publication. Enjoying a honorary corresponding author status at the expense of the person who is actually performing the editorial tasks is unethical and should be avoided. Normally, the role of corresponding author is performed by the first or the last author (or both, when multiple corresponding authors are allowed by the journal), although this is not mandatory. The decision about who will act as sole or main corresponding author will normally be negotiated between the first and last author, although all the remaining coauthors must agree as well. Such a negotiation should be ideally based on their respective editorial experience and their willingness to act as such. However, it is perfectly acceptable that another coauthor of the paper performs the corresponding author role, if both the first and last authors agree and are not willing to assume the editorial tasks themselves.

- Order of coauthors: When multiple individuals fulfill the four authorship criteria, and the first and last authors have been agreed among all of the authors, the order of the remaining coauthors should be determined by the first and last authors and subsequently agreed by the remaining coauthors. This should be determined based on the importance and/or nature of the coauthors' contributions, or else by

means of a random criterion (such as alphabetical order), but not on the basis of seniority, academic position, or personal favors. To prevent conflicts on such a delicate matter, the ICP researchers are strongly encouraged to reach an explicit agreement about the researchers listed as coauthors (and, if possible, their order of authorship) during early stages of the collaboration (ideally before starting to write the manuscript, and definitely before submitting the manuscript for publication). Agreeing on a provisional authors' list at early stages of the study does not exclude subsequent additions and/or exclusions of coauthors, or further changes in the order of authors, as research proceeds. In fact, the definitive list of authors cannot be determined until they have all agreed on the final version to be submitted. Implicit approval (e.g., if the first author tells the remaining coauthors that he or she will assume they agree with the final version if they do not reply before a given date) is acceptable (even if not recommendable), as long as a reasonable timespan is given to them and only if they fulfill the remaining authorship criteria and they have revised and approved previous versions of the manuscript.

- Author contributions: In relation to the above, equal contribution statements by two or more authors are advisable when these authors have equally contributed to the work, especially in the case of co-first or co-last authors. This is usually indicated by means of a footnote and/or in the author contributions section that is currently published by many journals. Although the level of detail may vary depending on the journal, when available, the section on author contributions of a publication should describe as faithfully as possible the contributions of each author, with particular emphasis on the details of the first and second authorship criteria above (e.g., who designed research, who collected data, who analyzed data, who interpreted data, and who wrote the paper), as it is rather implicit that all authors must have revised the paper, agreed on the final version, and be jointly responsible for its content. If disagreements arise about the order of authors, they are encouraged to discuss them with their research group leader or the ICP director for further advice, and if needed to contact the ICP ombudsperson. If the latter occurs, the ombudsperson will act as mediator in compliance with the guidelines provided in this manual, and if disagreements persist they will have to be settled by the ICP Steering Committee in consultation with the ICP director and the relevant research group leader(s).
- Group leaders: Being the head of the research group in which a paper is framed does not by itself qualify for authorship, because the four criteria mentioned above still apply. If such criteria are fulfilled, the research group leader must be listed as an author, but he or she cannot unilaterally decide the composition of the

list of authors as a whole or their order, and under no circumstances should unnecessarily involve other researchers that have not significantly contributed to the work (or are not expected to do so). When the group leader qualifies for authorship, he or she will be expected to be the last author by default, but this should not be the case if he or she is not the person (other than the first author) who has more actively contributed to design research. Group leaders should only be first author when they have most significantly contributed to all of the four authorship criteria listed above. In such cases, the last author position will be reserved by default to the principal investigator of the project (see below) if different, unless another coauthor contributed more significantly to research design. Under such circumstances, the first author will be the main responsible for deciding the order of authors, even though it will have to be eventually agreed upon by all researchers.

- Principal investigators: Participation in fundraising, even if as principal investigator of a research project, does not automatically qualify for authorship, because the four criteria mentioned above still apply. However, depending on the circumstances, it might imply the fulfillment of the first criterion above (due to the role of the principal investigator in research planning and design). Under such circumstances, the principal investigator should be given the possibility to fulfill the remaining authorship criteria, although his or her position on the authors' list will depend on other factors (as explained above for group leaders).
- Supervisors: The same circumstances that apply to principal investigators might be applicable to the supervisors of PhD students or postdoc researchers: merely supervising the work of a researcher in training (either a master thesis, a PhD dissertation, or the research performed by a postdoc) does not automatically qualify the supervisor for authorship, because the four criteria mentioned above still apply. However, it is frequent the supervisor plays a leading role in the design of research, and also in the interpretation of results. If one or more of the conditions included in the first authorship criterion above apply to the supervisor, the latter has to be given the possibility to fulfill the remaining authorship criteria. In contrast, merely revising and/or editing a manuscript drafted by the supervised individual is insufficient to qualify as an author. Revising and/or editing would imply correcting, condensing, formatting and/or otherwise modifying a text without making a significant intellectual contribution to its content (e.g., editing the language without reinterpreting, correcting or refining the interpretation of the results). Note that, while supervisors would not qualify for authorship by merely editing a manuscript, they usually do make intellectual contributions when doing so, and that otherwise they frequently already qualify as authors because of

planning and designing the research, even if they do not provide additional intellectual contributions when revising the final manuscript. Even if the four authorship criteria apply to the supervisor, he or she has no right to decide the list and order of authors unilaterally, and under no circumstances should this person involve other authors that have not contributed (or will not contribute) significantly to the work. Nonetheless, the supervisor has the right to be the last author, unless he or she is not the person (other than the first author) who has been more actively involved in research design and/or writing the paper (alternatively it might be another coauthor, frequently albeit not necessarily, the research group leader or project's principal investigator).

- Directors of fieldwork: Having (co)directed a paleontological fieldwork campaign (survey, sampling, heavy machine surveillance, and/or excavation) does not automatically qualify for authorship of the articles in which the recovered material is first described. However, depending on the circumstances, fieldwork directors might fulfill the first criterion of authorship in relation to data acquisition, given their leading role not only in collecting the material but also in devising and performing the fieldwork. Therefore, the ICP considers that programmed paleontological interventions (i.e., those in the framework of research projects) directed by ICP researchers qualify the latter for this authorship criterion, so that they should be given the possibility to fulfill the remaining criteria. When the material is housed at the ICP, additional rights are granted to the director(s) of fieldwork, consisting in the possibility to study the material until it is published in detail and as long as this person remains professionally active and the material is under study (without prejudice that other researchers may be allowed to study the material for comparative purposes under a confidentiality agreement). As a result, in ultimate term it is the fieldwork director's prerogative to grant or deny to other researchers the possibility to publish the unpublished fossils recovered by him or her. On the other hand, important fossils must be published in a timely fashion, so that fieldwork directors are encouraged to negotiate with other researchers fair agreements to grant access to unpublished fossils, either though confidentiality agreement or by means of collaboration agreements leading to join publication (as long as all the researchers involved, including the directors of fieldwork, meet the four authorship criteria). In contrast, when a rescue paleontological intervention has been performed on emergency grounds by technicians and as a work on hire, the ICP considers that the fieldwork directors lose their rights upon the material once it is reported in the corresponding field memoir and is permanently deposited at the ICP. In such cases, as in others in which there is no researcher that claims similar rights upon the material, the

relevant research group leader will have to determine who is granted access to study and publish the material (in the understanding that ICP researchers will have preference over those from other institutions).

- Honorary authorship: Including researchers as authors in return of personal/academic favors or due to pressures (i.e., honorary authorship), even if they fulfill some of the authorship criteria detailed above (e.g., revising and approving the final manuscript), is unethical and should be avoided under all circumstances. This does not preclude researchers to invite other academics to collaborate in their research, as long as such invitation implies that they will significantly contribute to the publication, ultimately leading to the fulfillment of the four authorship criteria.
- Pressures to include authors: Researchers should never ask or accept to be listed as authors in a paper to which they have not significantly contributed, unless the first criterion of authorship described above applies (in which case they should be given the opportunity to fulfill the remaining ones). Similarly, researchers should not request the inclusion of other researchers as authors in the publication they coauthor, unless they have significantly contributed (or are expected to significantly contribute) to the study. This kind of unethical behavior must be reported as soon as possible to the ICP ombudsperson and, if confirmed after a thorough investigation, would be communicated to the CERCA ombudsperson and may lead to disciplinary measures by the ICP Steering Committee. This misconduct is of particularly grave concern when the pressures to be included as a coauthor are exerted upon a researcher in training by a more senior peer that does not fulfill the first criterion of authorship, since besides being unethical this also constitutes an abuse of authority.
- Omission of authors: In contrast to the preceding point, intentionally omitting from the list of authors a particular person that has significantly contributed to a paper and fulfills the four criteria above, or denying to a researcher that fulfills the first criterion the possibility to fulfill the remaining ones, constitutes an act of intellectual property misappropriation and must be reported to the ICP ombudsperson as soon as possible. If confirmed after a thorough investigation, such cases would be communicated to the CERCA ombudsperson and may lead to disciplinary measures by the ICP Steering Committee.
- Acknowledgments: Individuals that fulfill some but not all of the four authorship criteria above should be included in the acknowledgments, even if they are research technicians from the same institution, together with other persons and institutions that somewhat contributed or facilitated the work and funding agencies. The willful omission of such individuals from the acknowledgments is

unethical, unless they have expressed their will to be omitted, or in the case of editors and reviewers (depending on journal policies).

- Author names: Researchers must try to ensure that their names are always spelled the same way in all of their publications and that all their affiliations are correctly stated. Authors are free to choose in which form they name should appear in print, but they should be consistent with aspects such as the use of one (either first or last) or two of their surnames (when this is the case), the use of middle names or initials, and the use (or lack) of hyphens between their two surnames (when applicable). The authors will also try to ensure that their name and relevant alternate spellings are adequately included in relevant databases such as Scopus, and linked to their current main affiliation as well as to relevant unambiguous author identifiers (such as Researcher ID or ORCID identifier). It is mandatory for ICP researchers to have an ORCID code so as to unambiguously link the ICP scientific production to them in the Portal de Recerca de Catalunya and other relevant databases. The ICP strongly encourages ICP researchers to state their ORCID code in all those publications that allow to do so.

Affiliation. As explained above, both authorship and affiliation are inalienable moral rights that must be respected. All ICP researchers, technicians and other personnel must indicate the affiliation to the ICP in their publications and contributions to meetings. This includes research associates (as stipulated in the written agreements signed between them and the ICP) as well as collaborators, students and volunteers that, irrespective of the existence of any contractual relationship with the ICP, have performed the published research at this institution. Unlike research associates that are hired by (or linked to) other institutions, all ICP staff will generally have to list the ICP as their primary affiliation in their publications, without prejudice to any other affiliations that they might have due to contracts or agreements with other entities (which require the permission by the ICP Director). Only when the research published by ICP staff researchers was previously done in another institution, the ICP may be listed as the secondary affiliation (if part of the research was also performed at the ICP) or merely as current address (if the paper was submitted before joining the ICP and was merely revised once incorporated to the ICP). Former ICP researchers will have to include the ICP affiliation when publishing research data originally generated by them while working at the ICP, without prejudice of their current primary affiliation, unless explicit consent has been obtained from the ICP director not to do so. In contrast, former ICP research affiliates will be exempted from such a requirement, their obligation to list the ICP affiliation no longer applying once their written agreements with the ICP are terminated. In case of doubt

about the number and/or order of affiliations, ICP researchers should consult with the Director, who might further discuss each particular case with the corresponding research group head.

Except for minor modifications due to style and formatting guidelines of each particular journal, affiliations must be provided in the standardized manner determined by the ICP Director (and as stipulated in this manual, unless subsequently modified in written form). Two general provisos apply:

1. Research groups or departments/areas of the ICP are not included in the ICP affiliation.
2. The full name of the UAB (Universitat Autònoma de Barcelona) is included in the affiliation after the full name of the ICP (Institut Català de Paleontologia Miquel Crusafont), in both cases without the corresponding abbreviation within parentheses.
3. When appropriate, the postal address of the relevant ICP heardquarter (either the ICTA-ICP building at the UAB university campus or the ICP Museum in Sabadell) will be included in the affiliation, by taking into account that “Edifici ICTA-ICP” will be used in all instances in detriment of “Edifici Z” unless the publisher considers it mandatory to spell out “ICTA-ICP” (so a to avoid misattribution of the work to the UAB Institut de Ciència i Tecnologia Ambientals).
4. Neither the names of the institutions (ICP/UAB) or any other relevant terms will be translated from Catalan into any other language except for country name at the end (usually in the same language as the paper).
5. CERCA and the Generalitat de Catalunya are not included in the ICP affiliation but it is mandatory for all ICP authors to include it in the acknowledgments using the formula “CERCA Programme (Generalitat de Catalunya)” or similar (in recognition to the fact that the CERCA program defrays the basal budget of the ICP).

Therefore, the following two affiliations are the ones currently available for ICP researchers, depending on their habitual workplace (or, in the case of research associates, that of the research group to which they are linked):

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b) Institut Català de Paleontologia Miquel Crusafont, Universitat Autònoma de Barcelona, c/ Escola Industrial 23, 08201 Sabadell, Barcelona, Spain.

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FINAL NOTE

A first draft of this manual was written by the ICP Director and submitted to consideration by other members of the ICP Steering Committee (Enric Menéndez, Pere Figuerola, and Josep Fortuny) on 5 October 2019. A second draft with amendments and additions was approved by the Steering Committee on 5 November 2019, being subsequently sent to the ICP Researchers Commission for review. The final version, including amendments from the Researchers Commission, was approved by the Steering Committee on 3 December 2019, taking immediate effect and being posted to the ICP Transparency webpage—pending the review, eventual amendments and approval by the ICP Board of Trustees when the next meeting takes place.

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