Open Palaeontology: a new model of diamond open access journal for palaeontology

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Open Palaeontology is a new diamond open access (DOA) journal for publishing academic research on all aspects of palaeontology. *Open Palaeontology*, or *OPal*, is founded on the principles of academic rigour, accessibility, transparency, and innovation. As a diamond open access (DOA) online-only journal, *Open Palaeontology* is free for authors to publish in and free for readers to access. *Open Palaeontology* facilitates a step-wise and flexible approach to scholarly publishing that is intended to increase transparency throughout the academic research process with our *Hypotheticals*, *Research Protocols*, and *Research Articles* formats. We also encourage the submission of multimedia articles where research is presented in audio and/or visual formats. Our commitment to transparency includes an open peer review process, with signed reviewer reports published alongside accepted articles. We hope that *Open Palaeontology* will encourage different thinking about academic publishing, and we intend to continue to incorporate new ideas into our publication model. *Open Palaeontology* is open for submissions and we look forward to receiving your work for consideration for publication.

Introducing *Open Palaeontology*

Open Palaeontology (*OPal*) is a new diamond open access journal for publishing academic

research across all areas of palaeontology. As the founding members of *Open Palaeontology*, we are driven by a shared hope of promoting positive change in our community's publishing landscape, combining evolving good practice in the sector with our own innovations. Some of the areas where we hope to consolidate good practice and drive innovations are the accessibility of academic research, transparency of the academic research process, the role of journals in promoting ethical good behaviour, and the media through which academic research is presented to the world. In bringing *Open Palaeontology* to fruition, we have been inspired by the recent wave of community-driven diamond open access (DOA) geoscience journals (Farquharson and Wadsworth, 2018; Fernández-Blanco, 2021; Rowe *et al.*, 2022; Thomas *et al.*, 2023), as well as by existing DOA journals with a palaeontological focus (e.g., MacLeod and Patterson, 1998). Here we explain the foundations on which *Open Palaeontology* is built, why we think it is important to bring *yet another* journal into the publishing landscape, why we think *Open Palaeontology* is not *just another* journal, and describe how publishing in *Open Palaeontology* works.

Ethos

At *Open Palaeontology* we aim to foster and work within a culture guided by principles of **ethical good practice**, **academic rigour**, **transparency**, **accessibility**, and **innovation**. First and foremost, *Open Palaeontology* is rooted in **ethical good practice**, both in how the journal functions and in the research published here. All research published in *Open Palaeontology* will be accompanied by a declaration and, where appropriate, evidence that work has been conducted in line with current ethical good practice (see below: *What do we mean by 'ethical'?*). We would like to highlight that what is currently considered 'best-practice' may reasonably be expected to be the 'bare minimum' in a few years' time, and *Open Palaeontology*'s ethics policies will be updated as our understanding of ethical good practice evolves.

The principle of **academic rigour** is one that, we hope, most people reading this are familiar with and would expect as standard from an academic journal. We consider that **transparency** is a key bastion of academic rigour and should be used to bolster confidence in all aspects of the academic research process, from the formulation of research ideas and methods to the provision of primary data and ultimately the publication process. At *Open Palaeontology*, our processes are built around helping researchers be transparent about the intellectual development of their research, the methods they employ, the data they generate, and the permutations their arguments go through during review processes (see below: *Publishing in Open Palaeontology*).

Open Palaeontology's **accessibility** starts with our status as a DOA journal which negates financial barriers to publishing and accessing research. 'Diamond open access' means that our articles are free for authors to publish and free for readers to access (see below: *How can we do this for free?*), and is not an innovation of *Open Palaeontology* but rather part of a long tradition (e.g., MacLeod and Patterson, 1998) and growing trend in geoscience publishing (e.g., Farquharson and Wadsworth, 2018; Fernández-Blanco, 2021; Rowe *et al.*, 2022; Thomas *et al.*, 2023). Nevertheless, it is evident that DOA is not the norm in palaeontology publishing (Tennant and Lomax, 2019; Drage and Wong Hearing, 2023) and it is something we would like the community to support.

Accessibility is not exclusively financial. *Open Palaeontology* is primarily an English-language journal but, as many other journals now do, we support multilingual abstracts and captions accompanying English-language submissions. We would like to go further than this and develop the capacity to handle submissions in languages other than English. Please contact us if you would be interested in helping to support this endeavour. All members of the Steering Committee and Editorial Team commit to providing English-language editorial support for one submission per year from researchers who do not have English as their first language and where the quality of English has been flagged as hindering the clarity of communication of the science. Furthermore, we will work with authors to make sure that figures and images are checked for accessibility and supplied with alt text, and that video submissions are provided with transcripts and, where necessary, audio descriptions.

Innovation is a key part of our ethos, and we intend to continue to develop our working practices and publishing pathways as new ideas emerge and as our understanding of good practice evolves. From the outset, we have tried to embed novel publishing routes into *Open Palaeontology*, including the ability to publish peer-reviewed research at different stages of development (see below: *Article types*) and in diverse media formats (see below: *Publication formats*), including audiovisual submissions. What is considered 'novel' now will likely be 'normal' in five years' time and, as noted above, current best-practice will hopefully be superseded as better practices are developed. We explicitly want *Open Palaeontology* to take onboard and develop new ideas. We will keep our policies and working practices under active review and adopt an evolving approach to the development of the journal.

What do we mean by 'ethical'?

Science and ethics go hand in hand. Science helps us understand the world through observation and experimentation, while ethics ensure we acquire this knowledge

responsibly. Science is guided by ethics, but science can also challenge and reshape our ethical perspectives. As a journal, we hold some of the responsibility for ensuring good ethical practice is followed in the research process, but what does this mean? We identify three main areas of ethical considerations in which scientific publishing holds some responsibility: how research is conducted, how research is presented, and how research is reviewed.

We first consider the ethics of how the research is conducted. Palaeontology is an interdisciplinary field bridging research areas including biology, geology and ecology. As such it carries the ethical responsibilities of these disciplines while also facing unique ethical challenges specific to the study of fossil and geological samples. Our approach is informed by current best practices in related fields: for example, we will only accept publications involving animal research that abide by the '3R's': Replacement, Reduction and Revision (Burden *et al.*, 2015). Much palaeontological research is collection-based and we have thought carefully about the ethics and best practices of working with fossil and geological collections. Some of these topics remain controversial, for example, the ethics of researching Cretaceous amber from Myanmar (Dunne *et al.*, 2022). In response to concerns surrounding Myanmar amber, the Society of Vertebrate Palaeontology (SVP) implemented a moratorium on publishing work involving specimens purchased after June 2017. This date marks the beginning of a military campaign to control amber mining, which has been linked to exploitation, hazardous working conditions, and funding conflict (Rayfield *et al.*, 2020; Theodor *et al.*, 2021). While we recognise that this position has sparked debate within the palaeontological community (Haug *et al.*, 2020; Poinar and Ellenberger, 2020; Szwedo *et al.*, 2020), we currently follow the SVP's moratorium on publishing Burmese amber obtained after this date. However, as noted above, good practice evolves over time and we keep this and other policies under review to maintain high ethical standards. On this note, we welcome submissions that consider the intricate ethical and practical aspects of palaeontological research.

The second ethical consideration is how research is presented. We have a responsibility to ensure the originality and authenticity of work published in *Open Palaeontology*, and that all contributors are fairly recognised and accredited. We require authors to apply the Contributor Roles Taxonomy (CRediT) to ensure that authorship is designated fairly and appropriately (Allen *et al.*, 2014, 2019; Brand *et al.*, 2015). We ask that all persons that have contributed to the manuscript, but do not fall within one of the specific roles identified by CRediT, are acknowledged and their contributions clearly stated.

We must also address other ethical aspects of research presentation. One of the most complex ethical challenges in modern publishing is the use of generative Artificial Intelligence (AI), particularly Large Language Models (LLMs) and AI-based image generation tools. LLMs can be powerful tools for quality-checking manuscripts and the generic text generated by such models can be easier to understand than the equivalent human-written text (Abreu *et al.*, 2024; Rashid *et al.*, 2024). When applied carefully, LLMs can increase accessibility of the English language for researchers. However, these same models can cause serious issues within academic publishing, including the intentional fabrication of data and the generation of nonsensical, erroneous, or incomplete text. Some journals have taken the hard stance of prohibiting any use of LLMs in manuscript preparation. This is problematic given the potential levelling effects, and for the difficulty in detecting LLM-generated text. *Open Palaeontology*'s approach to LLM use is more pragmatic; we require authors to declare AI use as part of their 'Ethics and AI use' declaration accompanying their submission. This approach allows for consideration of whether AI use is appropriate on a case-by-case basis. We rely on author transparency and honesty, which may be viewed as a limitation, but one that is consistent with other aspects of scientific integrity. The use of AI-generated imagery presents a more straightforward ethical issue, as it is built on the mass scraping of images without permission and without attribution. In most cases, there is little justification for incorporating AI-generated images into research publications unless the imagery is directly related to the study itself. We therefore prohibit the use of AI-generated imagery where it is not an integral part of the research being presented.

The third consideration is how the peer review process is conducted, and the roles that reviewers and journals play as gatekeepers of academic research. As a journal, we have a moral and ethical responsibility to ensure that all participants in the peer review process (including authors, editors, and reviewers) are treated with collegial respect. We aim to promote this ethos via an accountable and ultimately transparent peer review process (see below), and include an enforceable code of conduct that sets out expectations for authors, editors, and reviewers.

How can we do this for free?

The diamond open access (DOA) publishing model ensures financial accessibility for both authors and readers. This does not mean that running a journal is free, but that journal costs are met by donations (of money, working time, or other sources of support) rather than readers' (or institutions') subscriptions or authors' 'article-processing charges' (APCs). However, most, if not all, journals rely on expert unpaid or underpaid volunteer work from

authors, editors, and reviewers throughout the publication process. At *Open Palaeontology*, as at many other journals, the core work of journal management, handling submissions, liaising with authors and reviewers, and conducting reviews is done by volunteers. A core part of the ethos behind DOA journals is that it is preferable to donate time to non-profit outlets that make academic research more accessible and transparent rather than donating time to perform these same roles for companies that have the resources to pay for the services they are profiting from.

We are able to publish *Open Palaeontology* diamond open access thanks to the *Shared Open Access Publishing Platform* (*SOAP2*) framework (*SOAP2*, 2024). *SOAP2* is a DOA journal hosting platform formed by a collaboration of Swiss universities and sponsored by the organisation *swissuniversities*. The *SOAP2* platform is based on the open source *Open Journal Systems* (*OJS*) (Public Knowledge Project, 2024) software. *SOAP2* journals are hosted at 4Science (4Science, 2024) and their long-term preservation is secured by the archive *Portico* (*Portico*, 2024). Publications will be indexed in the most common indexing services.

Management structure

Open Palaeontology's organisational structure comprises a Steering Committee and three operational teams: the Editorial Team, the Equity, Diversity, and Inclusion Team, and the Communications Team. The Steering Committee is responsible for managing the journal while the operational teams are responsible for executing the journal's day-to-day tasks. All teams adhere to the journal's foundational ethos and are intended to be, as much as possible, non-hierarchically structured, both within and between teams. Their main roles are as follows:

1. The **Steering Committee** has overall responsibility for managing the development and growth of Open Palaeontology. To ensure efficient working practices, the Steering Committee will not exceed six people at any one time.
2. The **Editorial Team** is responsible for handling manuscripts and maintaining the submission system. This includes editorial decision-making and managing peer review processes, and developing journal editorial policies. Given the journal's DOA model, the team also ensures typesetting quality.
3. The **Equity, Diversity, and Inclusion Team** is responsible for ensuring that the journal keeps pace with developing best practices for equity, diversity, and inclusion. The group has representation on each of the other teams (including the Steering Committee) to ensure development across the journal.

4. The **Communications Team** is responsible for developing an online visibility of the journal and ensuring promotion of the published work through the website and selected social media.

Publishing in *Open Palaeontology*

Journal scope

In keeping with our evolving, flexible approach to publishing and commitment to transparency of the research process, *Open Palaeontology* is open to a broad range of palaeontology-related disciplines and study focuses. We accept both research on widely applicable advances within the field in knowledge or methodology, and regional case studies of broader interest to the palaeontological community. This includes, but is not limited to, studies focusing on palaeobiology, palaeoecology, taphonomy, palaeontology database creation, biostratigraphy, micropalaeontology, palaeobotany, education in palaeontology, taxonomic descriptions of new fossil taxa, and the societal applications of palaeontological research. In addition to traditional research articles on palaeontological topics, we have several flexible article types that represent key stages of the research process rather than just the end product of a study, and encourage submission of articles that present new palaeontological methods, including new software developments and field research studies. Through this broad scope, we aim to (1) provide a platform for publishing all components of the research workflow (e.g., hypothesis-creation, prospective field work, experimental protocol, etc.), (2) provide a space for publishing dedicated methods articles, (3) facilitate publication of palaeontology data articles reporting (e.g., occurrence) data in a structured and accessible format, and (4) support publishing of null and negative results. Publishing of these aspects of academic research is critically underrepresented in the current palaeontology publishing landscape.

Publication formats

Open Palaeontology supports diverse publication formats. In addition to traditional written manuscripts, the journal accepts accessible non-traditional multimedia submissions, such as video and audio, provided these are accompanied by full written transcripts, detailed methods, and a complete reference list. Furthermore, all associated data and code must be made available in accordance with the standards for written manuscripts. A flexible publication format allows the authors to choose the best medium through which to communicate the full breadth of their research and ensures that valuable contributions are not excluded due to rigid publication systems and guidelines. By enabling researchers to

communicate their work more effectively, flexible formats enhance transparency and reproducibility, while promoting inclusivity by making research accessible to broad audiences.

Article types

Open Palaeontology has a more flexible publishing structure than traditional journals, enabling us to better accommodate a range of palaeontological research. This includes publishing non-standard research papers, such as those focused on methods, as well as other aspects of the scientific process. Our article types include:

1) ***Hypotheticals* – short opinion pieces outlining an idea or hypothesis**; broadly equivalent to the introduction and aims of a traditional research article. *Hypotheticals* represent early-stage thought experiments, testing the water with new ideas, and, at their most constructive, open calls for collaborations.
2) ***Preregistered research protocols* – plans for work to be done.** The plans should include detailed aims, objectives, and any hypotheses to be tested, as well as data collection and analysis strategies. Preregistration of research protocols is common practice in clinical and social sciences (Nosek et al., 2018; ICMJE, 2024), though take-up in other disciplines, including palaeontology, has been limited. These articles are usually published with the anticipation of a follow-up full *Research article* to follow in which the work is carried out.
3) ***Research articles* – full research articles** with, broadly, introduction, methods, results, and discussion sections. A *Research article* can be submitted as a standalone paper, or include related and already published *Hypothetical* (introduction, aims, hypotheses) and *Preregistered research protocols* (materials, methods), with DOI-versioning used to explicitly link these together. *Research articles* also include methods articles, where a new method, field site, or software package are presented and examples of their use given.
4) ***Reviews* – detailed articles synthesising and reviewing previous contributions on a topic.** These may also be used to highlight key research gaps, or provide novel conclusions on previously published works.
5) ***Comments* – short commentaries on key previously published works.** The work/s commented upon do not need to be originally published in *Open Palaeontology*, and the *Comment* can discuss, provide more support for, refute, or reanalyse this work.

The flexible model of *Open Palaeontology* allows researchers to present their work at all

stages of the scientific process. In principle, a researcher could write a *Hypothetical* piece, outlining a knowledge gap and proposing hypotheses to evaluate. They could choose to follow this up with a *Preregistered research protocol* describing in detail the protocol they will use to test their hypotheses. Finally, the researcher could publish a full *Research article* combining their first two articles with the results and a discussion of their findings. Each article would receive a new DOI version, and these versioned DOIs together show the development of a project. There are strong merits to formally documenting the evolution of a research project, including transparency of the academic process, enhanced academic rigour, and protection of intellectual property (Nosek et al., 2018; Center for Open Science, 2024), but authors would not be required to submit individual stages of a project separately and could instead opt to publish a traditional *Research article* at the end of the process. We view each of these article types as important components of the scientific process that authors progress through in normal practice, in a more or less formal manner, and this publication structure is designed to support and rigorously demonstrate that process.

Preprinting

Open Palaeontology supports preprinting of articles, regardless of their type and contents, and encourages preprinting as the first step of publishing with us. We allow submission of already preprinted articles on other platforms (e.g., OSF, *arXiv, bioRxiv, EarthRxiv*, etc.), and offer preprint hosting at *Open Palaeontology* for submissions not already preprinted elsewhere. To avoid citation dilution, we use versioned DOIs to link these preprints to subsequent peer reviewed articles published in *Open Palaeontology.* Preprinting supports transparency in research by making work immediately available without being hidden for prolonged periods during the cycle of journal submission-peer review-rejection/acceptance, making it available for community interaction and to support open science (Smart, 2022). This also improves prospects for early career researchers, as all undertaken research is citable and visible to hiring committees; preprints reach their audience an average of 14 months earlier (Xie *et al.*, 2021), and this more efficient circulation might be crucial in hiring (Puebla *et al.*, 2021).

Peer review

The peer review process should promote transparency and accountability in academic research. At *Open Palaeontology*, peer review is therefore fully open as standard, meaning that names of both reviewers and authors will be visible during the process. Double-blind reviews, where both reviewers and authors are anonymised, can be requested if: *a)* the manuscript has not been preprinted (see above), and *b)* the submission is in written format.

Manuscripts with double-blind reviews must be properly anonymised by the authors by removal of all identifying information, including, for example, host institutions for analyses. All reviews will be unblinded and published alongside the article following the review process.

Reviews must be collegial, fair, and objective. Reviews containing disrespectful, biased or discriminatory language will not be tolerated and editors have the right to disregard or request edits to reviews that do not meet *Open Palaeontology*'s collegial standard set out in our Code of Conduct. We hope that the open peer review process that we have adopted will help to encourage professional and constructive interactions between authors and reviewers. However, authors and reviewers who repeatedly or egregiously breach our Code of Conduct during the review process will not be allowed to author or review further work for publication in *Open Palaeontology*.

Summary

Open Palaeontology (*OPal*) is a diamond open access journal dedicated to advancing palaeontology through ethical practices, academic rigour, transparency, accessibility, and innovation. The journal ensures all publications adhere to evolving ethical standards, including the responsible use of fossil and geological collections, compliance with regulations for research involving animals, thoughtful integration and declaration of artificial intelligence use, and transparency in authorship and peer review processes. *Open Palaeontology* offers flexible article formats, such as hypotheses, preregistered protocols, and multimedia submissions, to foster a comprehensive and flexible publishing environment. *Open Palaeontology* broadens the palaeontology publishing landscape by accepting submissions of various research elements including negative results and new analytical packages.

Open Palaeontology uses a fully open peer review system, where the identities of authors and reviewers are disclosed. However, authors may request double-blind reviews for any reason. *Open Palaeontology* will ensure professionalism and collegiality throughout the review process, and will publish signed peer reviews alongside articles to enhance transparency. The journal also supports preprinting, enabling early dissemination of research while linking versioned DOIs to peer-reviewed articles. *Open Palaeontology*'s forward-thinking ethos positions the journal as a dynamic platform where early career and established researchers alike can share impactful and responsibly conducted research.

Data availability

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Author contributions

HBD, JNK, MLN, FS, TWWH: Conceptualisation, Funding acquisition, Project administration, Resources, Writing – original draft, Writing – review and editing.

Competing interests

The authors declare no competing interests.

Ethics and AI use

Artificial intelligence powered by a large language model was used to check for grammatical errors in the Summary section of the manuscript.

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