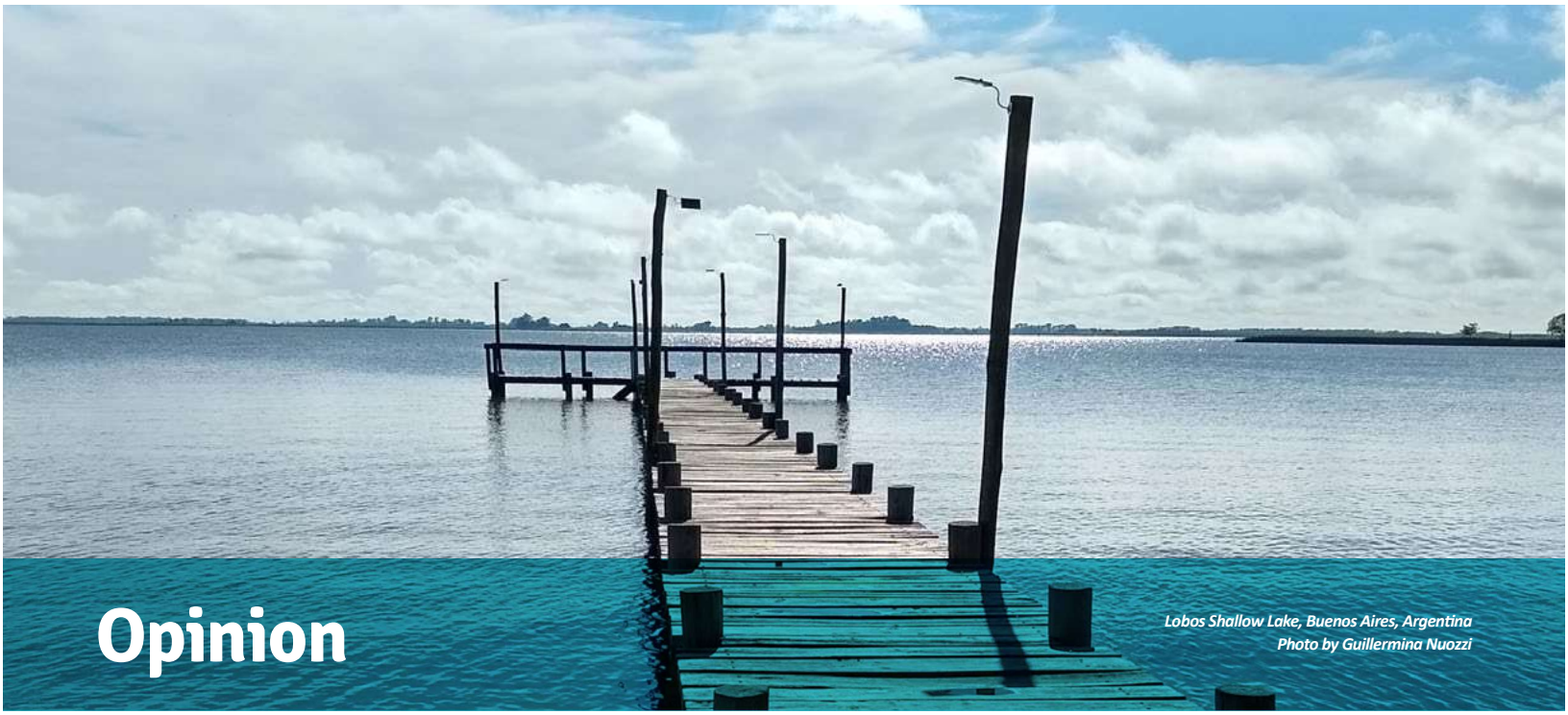

Opinion

Lobos Shallow Lake, Buenos Aires, Argentina
Photo by Guillermina Nuozzi

Inequality In Academic Publishing: Latin American Researchers Against the Odds

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(*) Researchers supporting this letter are detailed in the **Annex**

Researchers from Latin America have been facing many obstacles in science, ranging from limited research funding to language barriers, and in recent years the increase in pay-to-publish journals. Journals use a variety of models to meet their income needs and publishing service costs, and Article Processing Charges (APCs) is one of them. APCs are charged to authors of articles during the publication process and used by open-access journals in place of subscription fees that libraries and readers have traditionally paid to obtain access to research articles. Thus, APCs shift the burden of journal production costs (e.g., editing, peer review, archiving) directly to authors or their funders or institutions. APCs applied to academic research are usually quite high (ranging from around 350 to 3600 USD), effectively limiting the publishing opportunities for researchers from developing countries.

In particular, Latin American countries mostly lie in the lower bounds of the income-based categories of the World Bank, but even more importantly, they invest a low percentage of their gross domestic products (GDP) in research and development, even when compared to equivalent economies.

In the last years, the number of **APC journals** has grown rapidly (Chiodelli, 2021), including many top-ranking and highly cited journals (Walters *et al.,* 2011). APCs contribute to inequality between the global North and South. Authors from low- and middle-income countries (LMICs) often face greater financial constraints than those from high-income countries (HICs). Even in the case where research funds awarded by the National Academies of Sciences include publishing fees, in most cases the cost of journal fees represents a very significant amount of the grant, or in some cases the entire amount. This means that APCs represent a real barrier for authors from LMICs, as they usually do not have access to funding to cover these fees. As a result, they may be less likely to publish their research in high-impact journals that charge APCs, which can lead to a situation where important research is only accessible to those who can afford to pay for it, or is not published at all, perpetuating inequalities within the scientific community.

This situation is particularly concerning when it comes to decolonizing science (*e.g.,* Trisos *et al.,* 2021), as it can mean that research from marginalized communities is overlooked or excluded. Furthermore, the APC model is often biased towards research produced in HICs. For example, APCs are typically set in US dollars or euros, which can be prohibitively expensive for researchers in LMICs, where currencies may be weaker. In addition, journals that charge APCs may be more likely to receive research from HICs, which can perpetuate existing power imbalances in the scientific community and not favor the decolonization of science (Nakamura *et al.,* 2023).

APCs can also have a significant impact on young researchers who are in early stages of their careers and do not yet have access to funding or institutional support, particularly those working in LMICs. Young researchers may be particularly vulnerable to the financial burden of APCs, as they may have limited resources and face enormous pressure to publish in high-impact journals. In some cases, young researchers may be forced to choose between paying APCs and pursuing other professional development opportunities, such as attending conferences or undertaking additional training. This can limit their ability to establish themselves in their field and can exacerbate existing inequalities between early-career researchers and more experienced academics.

Publication in prestigious journals with global recognition has a very strong influence on the reputation and success of researchers' careers regardless of the field of specialty. Opportunities for researchers heavily depend on the articles they have been able to publish, which underlines the popular adage "publish or perish", but also on the perceived 'quality' of the journal in which they publish, as determined by impact factor (Solomon & Björk, 2012). Unfortunately, many authors from

developing countries, such as those in Latin America, struggle to publish their scientific articles, not due to poor research quality, but because of the financial limitations that place pay-to-publish journals beyond their reach. This idea is supported by a 2021 study that has concluded that APCs may be a barrier to publishing, especially for "less affluent institutions, scholars, and students" (Jain *et al.,* 2021).

Journals with publication fees push aside and fail to give equal opportunities to authors from developing Latin American countries and LMICs (Williams *et al.,* 2023). This model deepens the inequality between researchers from HICs and LMICs and puts at risk the ability to publish scientific research from LMICs in top-ranking and highly cited journals.

Here, we examined a dataset of papers related to aquatic science for the five-year period from January 2017 to January 2022 using the Web of Science. Two subsets of journals were selected: 1) journals with author publication fees (hereafter named fee or **APC journals**) and 2) journals with no author publication fee (hereafter named free or **non-APC journals**), to evaluate the percentage of articles published by Latin American authors (**LA**) in each subset (considering at least one Latin American author with Latin American affiliation in the list of authors) and no-Latin American authors (**No-LA**). We also compared the percentage of a monthly salary from a Latin American Researcher needed to pay an average APC (2784 USD).

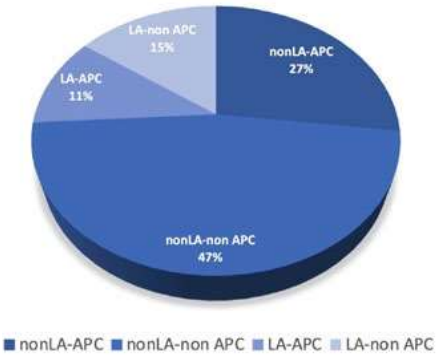

Fig. 1 Percentage of publications related to aquatic sciences from 2017 to 2022 found in the Web of Science: LA-APC - Latin American articles published in APC (Article Processing Charges) journals; LA-nonAPC - Latin American articles published in non-APC journals; nonLA-APC – articles from other high and upper middle-income countries published in APC journals; nonLA-nonAPC – articles from other high and upper middle-income countries published in nonAPC journals. The data is normalized/standardized by the number of countries in each subset: 20 LA countries, 99 non-LA high and upper middle-income countries (World Bank, 2022).

Overall, in aquatic science-related topics, we found more articles published in **non-APC journals** (62%) than in **APC journals** (38%) over the last five years (Fig. 1). Of the total publications analyzed, 11% were published in **APC journals** and included at least one Latin American author, while 15% were published in **non-APC journals** and included at least one Latin American author (Fig. 1). Furthermore, 27% of the articles were published in **APC journals** and 47% of articles were published in **non-APC journals**, both including non-Latin American authors (Fig. 1). But in particular, of the total publications analyzed, 26% were published by at least one Latin American author, while 74% of the articles were written exclusively by researchers from developed countries (Fig. 1). These results highlight that over a fourth (26%) of aquatic science articles are from Latin American authors, notwithstanding economic drawbacks.

Moreover, comparatively more than 100% of the monthly salary of Latin American researchers from upper middle-income countries (Word Bank, 2022) like Argentina, Brazil, Colombia, Mexico, and even the HIC Uruguay would be required to meet the mean cost of an APC (2784 USD), whereas 87 and 46% of a monthly salary of researchers from the HICs Chile and Puerto Rico, respectively, would be necessary to pay this fee (Fig. 2). Therefore, Latin American researchers are at a clear disadvantage.

All global researchers and scholars deserve worldwide recognition for quality research. In the twenty-first century, as the decolonizing science debate is in the spotlight as never before, it is unthinkable that so many scientists cannot publish their findings in high-quality, open-access, peer-reviewed journals due to individual financial barriers. We call for worldwide attention to these obstacles faced by researchers and scholars from Latin American and LMICs. We hope that curiosity, science, knowledge, and scientific communication will prevail over the publishing industry's interests and that academia promotes and defends fair and equitable dissemination spaces for all.

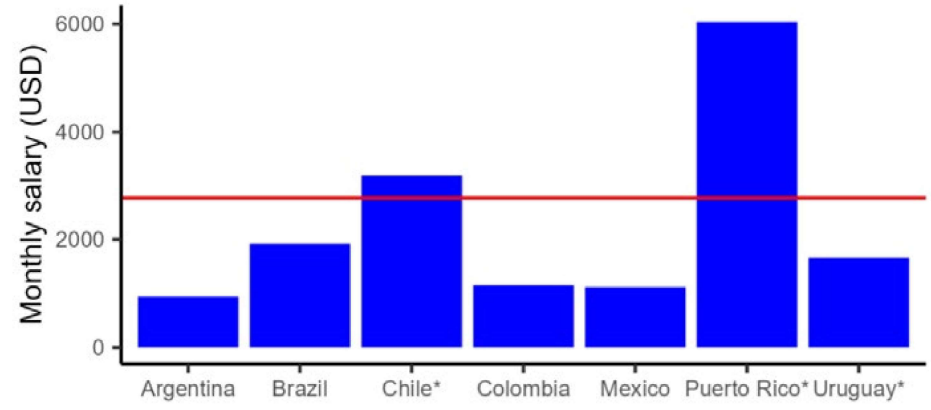

Fig. 2 Bars show average monthly salaries of researchers (in USD) from different Latin American countries. Database obtained from Glassdoor (research for University Professor, Assistant Professor, Professor and Researcher in May 2022). Uruguay data was retrieved here. Average monthly salaries were calculated using the following data: Argentina n=151, Brasil n=1578, Colombia n=23, Chile n=12, Puerto Rico n=67, México n=185, Uruguay= UdelaR. The red horizontal line represents an APC mean cost value (2784 USD).

*High Income countries; other countries: upper-middle income (World Bank, 2022).

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