"Everyone has interests": A red herring

system was conducted in the laboratory. However, it is not limited to this, as the scaling of such systems is inherent in control and automation. The limits are easily adjustable by an optimal controller, which translates into proper operation of the actuators. As a result, system sizing becomes less of a priority, since achieving this objective could involve modifying the operational equipment of the existing system.

It is important to note that scaling is achieved through the knowledge acquired about the plant. Once deep knowledge is acquired at the process level, it is possible to determine the behavior of the plant through the rules established for the control variables. Considering that the actuators execute these variables, a critical aspect in scaling these systems is the ability to manage large actuators, such as high-power pumps. Thus, Programmable Logic Controllers offer significant advantages over microcontrollers and embedded cards, providing excellent reliability and robustness in industrial environments. Ultimately, this ensures deterministic real-time execution and greater input/output capability. This strategy is effective for laboratory projects that are scaled to industrial environments. Intelligent control techniques, such as the presented fuzzy control, offer an innovative solution for this efficient transition.

AUTHOR CONTRIBUTION

J. Daniel Velducea-Ruíz: Data curation; formal analysis; investigation; writing—review and editing. **Leonel E. Amabilis-Sosa:** Conceptualization; formal analysis; methodology; project administration; supervision; writing—review and editing. **Guillermo J. Rubio-Astorga:** Data curation; methodology; validation. **Julio C. Picos-Ponce:** Methodology; software; validation; visualization.

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"Everyone has interests": A red herring

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Our recent paper in *Environmental Science & Technology*, "Conflicts of interest *in the assessment of chemicals, waste, and pollution*" (Schäffer et al., 2023), has received considerable attention. That's good. Wise management of chemicals and waste is a topic that needs serious and thoughtful debate.

Feedback from readers of our paper suggests that the term conflict-of-interest (COI) comes with negative connotations. This is unfortunate. It's apparently a common impression that the mere existence of a COI indicates wrongdoing. It doesn't. As expert advisors, our primary interest should be to serve the interests of the organization that we are advising. What a COI does indicate is that it is inappropriate to participate in certain decisions because we have *a competing interest that risks influencing our ability to provide advice that aligns with the interests of the organization we are to advise* (Moore et al., 2005). Conflict-of-Interest policies help us stay on course because we commonly underestimate when our interests unduly impact our judgment, overestimate our ability to be neutral, and tend to ignore all the gray zones that are challenging to navigate (Chugh et al., 2005). This is why COI policies need to be carefully carved out and regularly reviewed—in light of the organization's mission and values. If COIs are improperly defined or managed, there is a

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serious risk that the reputation of the people involved and the organization will be called into question. Rigorous COI policies are necessary to protect not only the decisions to be made but also the integrity of the organization. They are essential when it comes to policies that impact the health and well-being of many people. This is why it is crucial that a rigorous COI policy is developed for the proposed Intergovernmental Science–Policy Panel on Chemicals, Waste, and Pollution Prevention (SPP) (UN Environment Programme, 2024), as discussed in our previous paper (Schäffer et al., 2023).

A common response to COI debates is "… but everyone has interests." This is, however, a red herring. Everyone, indeed, has interests. Interests and values are innate to every person (Douglas, 2021; Elliott, 2017). We need to be clear over our values and engage in discussions about whether or not our values and research align with societal goals. Notably, an interest does not automatically lead to a COI, and it is crucial to recognize what's what (Bero & Grundy, 2016). Craving a reputation, for example, doesn't automatically lead to a COI: It only does so if the reputation that one craves stands in conflict with the interest of the organization that one is to advise. The goal of the SPP is to *contribute further to the sound management of chemicals and waste and to prevent pollution* (UN Environment Programme, 2024). A common argument is that researchers who are fond of the limelight have a COI, because—the argument goes—this interest incentivizes them to design their studies such that the results show adverse effects of chemicals of concern, as alarmist results give headlines. This is undeniably an example of bad research and it would be unwise to have a person who conducts research of poor quality provide advice to the panel. But it is not an example of COI. Their interest is to be in the limelight, and it is not a given that wanting to be in the limelight conflicts with the interest of the panel. If the research is of high quality, it will likely be of value to the panel, in spite of the person seeking the limelight.

The claim that "we all have interests" stems from a conflation of COIs with the fact that we all have different interests, values, and preferences. It is increasingly recognized that diverse research teams reduce the risk of biased studies as they fester in homogeneous communities (Hofstra et al., 2020; Nielsen et al., 2017). Notably, scientific controversies born out of diverging nonfinancial interests are legitimate and a strength as they help us sort out important valueladen questions such as: What should we study? Why this and not that? What kind of data are relevant? How does the method impact the outcome? Who might benefit from this type of study? Might our research lead to unequal distribution of harm? Importantly, having a vested interest in a particular theory or method does not lead to a COI for an expert advisor. When it comes to chemical risk, there are plenty of scientific controversies, not least because it is a highly complex field, and there is no lack of scientists who are married to a particular theory or method. So, if the expert advisors are too homogeneous, there is a risk that relevant perspectives are excluded. It is essential to remember that this is not because the experts have COIs. It's because of not having sufficiently thought through which factors matter to ensure that the panel has adequate diversity regarding relevant epistemic perspectives.

Let's move from having a vested interest in a particular theory or method to having a financial conflict of interest. It goes without saying that a CEO for a company whose bottom line depends on a chemical should not be involved in regulatory decisions regarding that chemical as said CEO has the responsibility to tend to the financial bottom line and see to the interests of shareholders and employees. These are clearly competing interests. Even high-quality research produced by this company will fall under COI because the CEO, the board alongside managers, and others in the company with power to decide what is shared and how *have a legal obligation to care for their employees and shareholders*. It also seems reasonable that a researcher whose research depends on funding from said company should be required to recuse themselves, as this also is a clear competing interest. But the gray zones are large. For example, should an expert be allowed to have many shares in said company? What about a scientist working in a consulting laboratory with this company as their primary client? This is challenging terrain to navigate, and it requires thoughtful and careful deliberation, clear rules, and transparent communication.

We have heard through the scuttlebutt that some feel that our paper is an *ad hominem* attack on industry scientists, absolving academics. However, the paper's central claim is not that academics are more virtuous or have higher moral standards than scientists working in the private sector. There are people with questionable moral compasses in all sectors. The core claim is that the effectiveness of the proposed panel depends on the trust that it enjoys. In the case of the SPP, this is important not least because of the tarred reputation of the chemical industry caused by the scandalous behavior of certain individuals and industries (Michaels, 2008; Oreskes & Conway, 2010). To demonstrate good intentions and alignment with the SPP's goals, it lies in the industry's interest to support clear COI rules and transparent communication, as these are key to retaining public trust not only in the advice coming out of the SPP but also in the industry.

Notably, an increasing number of companies explicitly align their mission and vision with that of the panel as they strive to utilize green(er) principles, provide safer alternatives for essential products containing chemicals of concern, and prevent waste generation. This is very promising. To support this commendable work, we need a strong SPP, which requires clear and strict COI policies, transparency, and regular audits (Ågerstrand et al., 2023), as well as a clear understanding of the difference between

legitimate interests and COIs. Pollution caused by synthetic substances has exceeded the planetary boundaries (Richardson et al., 2023), and we need to find ways to manage these sustainably. We cannot afford a toothless SPP, which it will be if it's not widely seen as rigorous and free from manipulation.

AUTHOR CONTRIBUTION

Gunilla Öberg: Conceptualization; investigation; writing—original draft. **Martin Scheringer:** Writing—review and editing.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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