How can IUPAC stay relevant and make more impact?

by Leiv K. Sydnes

The world is changing at a speed that many will say is unprecedented. Essential parts of our daily life that used to be solid and unchangeable, are now in play, and throughout the world, this has given citizens, organizations, institutions, and politicians many new challenges. A response to this trend seems to have become to redefine goals, revise strategies, and streamline activities to remain relevant. This has been the case within IUPAC as well and several measures to that effect have been implemented in recent years. For readers of this magazine, some notable developments have become apparent: more early-career chemists are engaged in union activities, an increasing number of projects and conferences focus on issues of societal importance, and new cutting-edge technologies that may enable chemistry to contribute better to solve major problems of global proportions, have been high-lighted.

But for someone, who is not engaged in IUPAC activities and has not even heard about *Chemistry International* (CI) (that is the case for most chemists), the situation is unfortunately very different. Even when I question chemists about IUPAC, the knowledge about the union appears to be very limited. Of course, everybody knows about IUPAC nomenclature and terminology and quite a few are familiar with its role in the naming of new elements. And among chemists involved in research, the conference program is, as expected, well known, but that is about it.

In my opinion, there are two main reasons for this situation. Most importantly, next to nothing is reported about IUPAC activities in chemical and technical magazines published in most of the member countries of the union. Thus, without any IUPAC enthusiasts in these countries, IUPAC remains essentially invisible in the chemical community. Secondly, among the relatively few that have visited iupac.org, the opinion is that the website is not very informative because it is difficult to use and, beyond nomenclature and terminology, contains little material relevant to the global problems we are facing today. Consequently, IUPAC leaves an introvert impression and remains uninteresting.

In my opinion, the key to improve the situation is to pay much more attention to the Union's National Adhering Organizations (NAOs) and enable them to bridge the gap between IUPAC and their national chemical community in ways that make an impact. In order to achieve this, four actions should be taken.

1) Let all NAOs have one National Representative (NR) in all divisions and most committees

This will right away establish an IUPAC-focused group of chemists in every member country. By sending relevant documents to them and allowing them to attend meetings in the relevant division or committee, they will become well informed, be able to contribute, and be noted as candidates for elected positions in the future. This will also give the NAOs the insight they need to communicate fruitfully with IUPAC about both organizational and scientific matters. And what a start for a new member of IUPAC to be asked right away to appoint a dozen or so chemists as NRs in the union!

2) Furnish a steady flow of news pieces that can be used more or less directly by the NAOs in the magazines they publish

It is true that this sort of material is already available in *Chemistry International* and the IUPAC newsletter, but it is also a fact that very little of their contents reach the chemical communities in the member countries. Also, for someone unfamiliar with the structure and operation of IUPAC, some CI news item would need an informative introduction before being published in national magazines. Thus, to make more impact, measures should be taken to facilitate reuse of CI material in national publications. In order to streamline the operation, the Union could establish contact with a media person in every NAO.

3)The quality of the homepage has to be improved to make it attractive for other than IUPAC insiders

The aim must be nothing less than to make iupac.org the preferred resource for chemical information for chemists, interest groups, journalists, politicians, and students. In order to achieve this, two requirements have to be met. Firstly, a much more powerful search engine has to be installed so that material can be found directly from the opening IUPAC web page even when imperfect search words are applied. Such a capability has been asked for since the turn of the millennium, but we are still far from there. Secondly, the contents must be expanded significantly both in scope and quantity. Nomenclature and terminology are two topics taken well care of, but the homepage is no resource when the aim is to find information about chemistry related to major global problems and challenges embedded in the Sustainable Development Goals. But IUPAC has the competence to change that! Whether the topic

is water purification, pharmaceutical products in the environment, photochemical degradation of anthropogenic chemicals, plastic pollution, thorium chemistry …. whatever …, chemists should join forces and work out presentations topic by topic and add them to the new Resource section on the IUPAC website. When high-quality material is already available on the web, there is no reason to duplicate it; include it via link(s) (with comments if required) so that the presentations on iupac.org become excellent gates to high-quality, exhaustive coverage of relevant and urgent topics for people with a wide range of backgrounds and competences in chemistry. These presentations should for instance be perfect to use for educational purposes by teachers who will be able to make their own presentations adjusted to the students' level of competence.

4) Make the NAO Forum a bottom-up meeting arena

This new contact point represents a step in the right direction, but the agenda for the meetings should not consist of items the President wants to discuss. A genuine problem in the relation between the IUPAC leadership and the NAOs has always been the top-down nature of the communication between the parties. Unlike the larger countries in the Union, the NAOs in most of the smaller countries are operated by volunteers that rotate so often that IUPAC remains overwhelming even after years of engagement. A good indicator for the closeness of contact and the ease of communication is the lack of interventions from the members at the biannual Council Meeting; very few asks for the floor, and when important issues are given a time slot of only 5-10 min, even seasoned council-meeting attendees don't feel invited to intervene.

In my opinion, implementation of these four action items will make IUPAC a more interesting organization to join, serve, and be associated with. Another likely consequence is that IUPAC will become better known outside the chemical circles and therefore better positioned to make an impact through the application of the chemical sciences to the betterment of humankind. That will indeed be needed in the years to come.

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Project Place (cont. from p. 26)

at MIT are already utilizing this dataset alongside other openly available thermodynamic data in calculations to determine the energies of ions in water. The resulting set of calculated hydration energies for over 300 ionic solutes will enable further modeling of ions in solution across a range of settings.

Ensuring that scientific data is FAIR for the broadest possible use and benefit of the global society is a community endeavor that involves many stakeholders in the research data ecosystem—chemists measuring and publishing original research data; other chemists working on machine learning projects for compelling use cases; IUPAC expert volunteers evaluating and curating property data; chemical information professionals who can facilitate testing, documenting, depositing and sharing data. IUPAC has a critical role in coordinating with the broader community around FAIR chemical data, providing standards and expertise in robust chemical data reporting and enabling worldwide access and use across disciplines [8-9].

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