

Conference Call

crops should be considered for potential use as value-added products. Additionally, the development of alternative uses for existing phytochemicals could be investigated. Bioassay-guided discovery approaches for product development, together with smart drug delivery systems to enhance the bioavailability of active molecules, could be established using Ayurgenomics (Ayurveda/traditional knowledge). The standardization of post-harvest management practices like drying, sorting, grading, packaging, storage, and transportation are important for the development of phyto-medicines. The development of non-destructive techniques and bar coding for quality control, the framing of regulatory standards and traceability of products from source to supply (supply chain management and quality assurance, QA) are also important.

The Valedictory Function of the conference was Chaired by Dr. C. D. Mayee, Former Chairman, Agricultural Scientists Recruitment Board (ASRB), New Delhi, India, who stressed the importance of close collaboration with participating delegates for future research. He also complimented the organisers for bringing together a group of young and seasoned researchers on one platform and hoped that this will help strengthen future research.

Science: How Close to Open?

by Bruno Vilela

During the Open Science Conference organised by the Dutch Presidency of the Council of the EU, the European Association for Chemical and Molecular Sciences (EuCheMS) held the workshop **Science: How Close to Open?** in Amsterdam on 5 April 2016. This event looked into the present and future of intellectual property boundaries in chemistry research and debated questions such as:

- Which model for peer-review publishing?
- Who owns research data and how to share it?
- Which approach is better for creating innovative products and services?

David Cole-Hamilton, EuCheMS President and Chair of the event, opened the workshop by giving an insightful overview on the history and models of scientific publication, which is now reaching a new stage where openness seems to be taking the central place.

Wolfram Koch, GDCh, presented GDCh's position paper *On the future of scientific publishing*, which

came out of discussions with academics, chemical industry professionals, publishers, libraries, and funding organisations, as well as from GDCh's experience with the gold open access model (where the author or his institution pay to publish) with the publication ChemistryOpen. Koch mentioned that chemists are sceptical about gold open access, and that the green open access model (where an article becomes open after a closed period) would be a preferred option. He also pointed out that non-scientific criteria should not be included in the publication process.

Emma Wilson, Royal Society of Chemistry (RSC), started her presentation by sharing statistics showing that chemistry is a discipline with lower open access publishing, with green open access the preferred model for publishing. RSC journals always have gold open access options, and about 10% of RSC's content is published under this model. Wilson also showed that the landscape around Europe regarding the publication of open access articles varies from country to country.

José Cotta, DG Connect, European Commission, focused on the principles of open science and how to better achieve them via the digital single market, stressing the importance of the flow of data and the reform of intellectual property that can protect authors and publishers, while making science more efficient, transparent, and interdisciplinary and enabling broader societal impact and innovation. He also mentioned that beneficiaries of Horizon 2020 must ensure open access to all peer-reviewed scientific publications relating to its results. Cotta also highlighted the importance of infrastructure in open science and the upcoming European Open Science Cloud, a virtual environment bringing together existing and emerging data infrastructures for all European researchers to store, manage, analyse, and re-use data.

Cristina Todasca, University Politehnica of Bucharest, pointed out the advantages of open science for society and on the challenges that open access presents to young researchers. Open publication makes it easier to use research to influence policy, allows researchers from all around the world to easily access papers, while increasing citation rates, but many questions still have to be answered. Who should fund open access, grant holders or institutions? How to cope with the different fee levels between open access journals that might make elite journals accessible only to researchers from higher GDP Countries? Finally, given the fact that publishing in open access needs to be paid by the researcher or his institute, there must be a fair mechanism to deal with the foreseeable increase in the num-

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scientists are drowning in a flood of papers and data. She presented the increasing numbers of open access articles in Wiley-VCH publications, and provided an answer to the question "why is chemistry below average regarding open access": this can be traced to historical links between academia and industrial research, the complexity of the topics in the field, and a sharing culture where interested researchers always had access (and shared it in turn). Wille also alerted the audience to the need to properly store and structure access to research data in a consistent manner. Standards must be well designed from the beginning. New databases will certainly change the way we do research, through the automatic recognition of patterns and the use of artificial intelligence.

Steffen Pauly, Springer, explained in detail how Springer is dealing with the open science paradigm shift, not only through open access journals and hybrid journals, but also through open books, open peer review (which is not commonly used in chemistry), open data, and other new collaborative tools. Examples presented included Springer Compact pilot agreements and the Springer Nature extended content-sharing initiative. Steffen Pauly highlighted the importance of dialogue as sustainable publishing models are developed in partnership between Springer and other key stakeholders such as authors, librarians, research institutes/funders, and scientific societies.

A fruitful discussion with the audience followed the presentations, allowing the formulation of some conclusions:

Sharing and storing data

There are different levels of development regarding data sharing—chemistry could benefit by looking to disciplines where the use of open data is more widespread, for instance in life sciences. Open Data must go hand-in-hand with the harmonisation of intellectual property rules between countries. The publication of supporting data for published papers should be encouraged. Standards for datasets (and content in general) should be clear from the beginning to assure interoperability, searchability, and reusability.

Peer-review

Open peer-review is not a common practice in chemistry and raised the attention of the audience. In the

ber of unpublished work.

Next, Eva Wille, Wiley-VCH, inquired if sci-

open peer-review model, the reviewers' names are published alongside with their comments, thus allowing the reader to be aware of the discussion preceding the article and also enabling more post-publication debate. It is important to note that the proponents of the blind review model argue that the open model might put reviewers under constraints, such as fear of retribution.

Rethinking the readers of tomorrow

Even though scientific journals are meant to be read by a specialised audience, it is important that citizens in general have a good level of scientific literacy. Digital reading is changing the way researchers consult articles, as they now spend less time on each article, but consult a larger number of articles. Artificial intelligence can find patterns (in both articles and datasets) that humans would not be able to find, a fact that will surely open many new doors to researchers.

Quality vs quantity

Open publishing, where the researcher pays to go open, will certainly create divisions in publishing. Journals that want to publish open articles while maintaining a high level of quality will have to reject proportionally more articles, thus resulting in higher publishing fees. On the other hand, journals with lower fees will allow the publication of cheaper papers, but with a lower overall quality. In between these two possibilities, researchers will have to make choices regarding how much and where to publish. It is also important to note that science advances not only through published research, but also through unpublished research. Moreover, researchers from lower income countries should not be left aside in open publication due to high publication fees.

As this workshop made clear, the path to reach an Open Science is open in itself, with many different possibilities for solutions. Whatever choices are made, they must be beneficial for the progress of science and society.

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The program and all the presentations are available online.

www.euchems.eu/policy-and-communication/policy-workshops/science-close-open/