

International Union of Crystallography, IUCr

Activities' Report - Year 2019

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1. Introduction

The International Union of Crystallography spreads the principles of crystallography in the field of molecular sciences and materials. Furthermore, it promotes international cooperation between researchers of different scientific backgrounds, with the common interest of establishing the three-dimensional distribution of atoms in the matter. By defining the important correlations between structure and properties, Crystallography has become an indispensable tool for all the research activities, having acquired a deep multi-disciplinary character. In about a century, amazing results have been achieved for the progress of human knowledge thanks to the knowledge of most of the matter around us. In particular, the excellence of the crystallographic approach is confirmed by the many Nobel prizes awarded to crystallographers. In the most recent decades, many functionalities of the large molecules of life have been understood thanks to their structural determination (e.g., ribosomes). This has had a high impact on the health, since it is possible to fix some arisen defects in these molecule by using for instance ad hoc drugs and maintaining their vital functions.

It is important to remember that in the approximately seven decades of IUCr life, Italy has always played a proactive role. For example, it provided a president (Prof. Mario Nardelli), as well as two presidents of the associated European Crystallographic Association (ECA), such as Carmelo Giacovazzo and Alessia Bacchi. Many Italians have offered their competent contribution to the progress of IUCr and ECA. Two of the IUCr three-year congresses (with up to 3000 participants) have been organized in Italy (Rome 1961 and Florence 2005), while also two European meetings (ECM) have been assigned to Italy (Turin 1985 and the 2024 in Padua). For these and many other reasons, the Italian crystallography continues to be a cornerstone of IUCr. From the instrumentation point of view, Italian workers are well equipped, despite the country's undeniable economic difficulties. Among other things, cutting-edge equipment has recently been acquired or being acquired for the Cryo-crystallography in Milan (Univ.), in Florence (Univ.) and in Naples (CNR).

For all the mentioned reasons, the CNR representatives at the IUCr underlines a solid situation of Italian crystallography. As evidence of this, we can recall the great vitality of the Italian Association of Crystallography (AIC), having Prof. G. Diego Gatta (Univ. Milano) as President. The AIC is very active at all national and international levels with congresses, schools, workshops and more.

In this regard it is appropriate to thank dr. Carlo Mealli who until 2018, as CNR representative, has performed a fundamental function the liaison with one of the most powerful world scientific Unions such as the IUCr.

2. Main activities carried on by (Union name) during 2019 relevant for Italy and for CNR

Over 2019, the most important event for the Italian crystallographic community was the 32nd Conference of the European Union of Crystallography, in Vienna (Austria, 18-23 August), in which several Italian crystallographers served as chairs of micro-symposia or as speakers. In addition, the Italian community has been very active organizing congresses, schools and workshops. Among those: 1) The joint conference of the Italian Crystallographic Association and the Spanish Crystallographic (GE3C) Associations Fifth Meeting of the Italian (AIC) and Spanish Crystallographic (GE3C)

Associations (MISCA V)", in Naples (4-7 September); 2) The International AIC "Crystallographic Information Fiesta" (CIFiesta) in Naples (29 August – 3 September), with a relevant number of European and extra-European participants (51) (from Italy, Albania, Algeria, Belgium, Benin, Brazil, Jordan, Morocco, Peru, Poland, Russia, Switzerland, UK and Uruguay);

Additional activities, organized by AIC members and aimed to promote the diffusion of the crystallographic sciences, have been supported by AIC; a full list is available at: www.cristallografia.org.

It is worth remembering that the General Assembly of the Union of the XXIV IUCr congress of Hyderabad (India, 2017) proceeded to renew its governing bodies such as the Executive Committee (EC) and the members of the 20 scientific commissions (publishing and non-publishing). As many as 20 Italians were nominated including two chairs, seven full members and thirteen consultants. Importantly, the Italian researcher, Dr. Angela Altomare (CNR, Bari), has become co-editor of one of the fundamental newspapers of crystallography, such as *Acta Crystallographica (A)*, underlining the great scientific value of the traction of Italian crystallographic methodologies worldwide.

3. Activities carried on by (Italian Delegate name) within the Union during 2019 and impact on the Italian scientific community

It is worth emphasizing that since 2011 Italy no longer has its own representative in the IUCr's Executive Committee. In view of the next IUCr Congress and the related general assembly, the CNR commission for the relations with the IUCr, also in agreement with the AIC, has proposed to nominate Dr. Angela Altomare (CNR, Bari) for Italy, identifying in her an internationally renowned Italian crystallographer who could certainly make a big contribution to crystallography. Furthermore, since the 20 IUCr commissions also have to undergo a renewal, the CNR Commission for relations with the IUCr has sent proposals from the various candidates in the different areas

4. Evaluation of the participation in terms of benefits and membership costs

The IUCr with more than 20,000 members is one of the largest scientific unions in the world and is still growing even for the accession of several new nations after the International Year of Crystallography (IYCr2014), the latest members being Albania, Kosovo, Tunisia, Singapore and Bangladesh. Other nations could be accepted in 2020 such as for instance Columbia and Thailand.

As already mentioned, the IUCr mission is the international dissemination of its basic culture and the international cooperation. Hence, it is essential that Italy continues to be part of such a vast scientific community. The cost incurred by the CNR for membership (approx. 6000 euros per year) appears to be sustainable in light of the great benefits for both from our national crystallographic community but also that of many neighboring scientific sectors, which make abundant use of the crystallographic techniques and their applications.

From the point of view of economic return, it should also be emphasized that almost all the events for crystallography organized in Italy receive some economical support from the Union, often with an advantage with respect to the paid association fees.

5. Evaluation of Italians' attendance and how to improve interest and involvement

Through the activity of the Italian representative and of the CNR-IUCr Commission, as well as of the IUCr outreach officer (the Italian Michele Zema of the University of Pavia), the programs and the IUCr activity are monitored in details. In particular, the 20 Italian colloques, who are part of the 20 scientific committees of the Union receive first-hand information on the up to date research in each

different sector. These persons have therefore the opportunity of reporting these pieces of information thus stimulating frontier initiatives also in our laboratories. From this point of view, the Italian Association of Crystallography (AIC) promotes in its congresses and schools the meeting between the aforementioned Italian IUCr commissioners and the world of researchers, especially the young.

6. Italian experts with important roles within the Union or within related Commissions and Programs (if known)

There are numerous Italian researchers with important roles in the world of crystallography. Prof. Alessia Bacchi (University of Parma) ended her mandate as ECA President, remaining however in the Executive Committee as Past President. Michele Zema (University of Pavia), after various positions held in the IUCr itself, has now the fundamental role of "Outreach Officer" of the IUCr. Andrea Zappettini (CNR-IMEM of Parma) is an ex-officio member of the Executive Committee of the International Organization of Crystal Growth, in which Roberto Fornari (Univ Parma) is Past President. Furthermore, Matteo Leoni (Univ Trento) is past chair of the Board of Directors of the International Center for Diffraction Data (ICDD). As mentioned, there are 20 Italian members of the IUCr commissions, with two of them being chairpersons.

7. If Union with CNR Commission, short summary about the 2019 CNR Commission activities

The CNR can count on the advices of the "Commission for the Participation of the CNR in the IUCr". In 2018, this commission was renewed and has the following composition: Michele Saviano (President), Andrea Ienco (Secretary), Roberta Oberti, Gilberto Artioli, Federico Boscherini, Andrea Ilari, Giuseppe Zanotti, Andrea Zappettini, Michele Zema e G. Diego Gatta, as the AIC President in charge. During 2019, the commission held several teleconferences for the planning of the various activities of crystallographic interest and to propose potential appointments of Italians for the IUCr Commissions and the new EC, which will be submitted to the next General Assembly that, due to the problems of the Covid-19 pandemic, is postponed to 2021, during the IuCr Congress in Praga, also postponed to 2021.

Interactions with Chester's IUCr staff were also frequent, also because the outreach office Michele Zema is always available with new pieces of information and useful links.

8. Conclusions

The IUCr continues to be a vital international body for almost all scientific disciplines, in many cases playing a leading role for the international community. Its mission and aims are well illustrated on the website www.iucr.org. In Italy, most crystallographers are well connected not only to the IUCr's activities but also to those of the European associate ECA (www.ecanews.org), besides the very active national partner AIC (www.crystallography.org). Hence, there are many reasons why I wish recommending to the CNR not only to support the complex network of international contacts already in place, but also to better favor the most active researchers of the Italian crystallography in their efforts gaining international weigh, especially through the channels of the IUCr.

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