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The contribution of the IUCr to the development of scientific education, research and infrastructure in Africa

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The International Union of Crystallography (IUCr) is a scientific union adhering to the International Council for Science (ICSU). Its objectives are to promote international cooperation in crystallography and to contribute to all aspects of crystallography, to promote international publication of crystallographic research, to facilitate standardization of methods, units, nomenclatures and symbols, and to form a focus for the relations of crystallography to other sciences. The IUCr fulfils these objectives by publishing primary scientific journals, the series of reference volumes International Tables for Crystallography, distributing the quarterly IUCr Newsletter, maintaining the online World Directory of Crystallographers, awarding the Ewald Prize and organising the triennial Congress and General Assembly. In addition to all this, the IUCr carries out a wide program of outreach activities aimed at improving public awareness of the field, boost access to instrumentation and high-level research, nurture "home-grown" crystallographers in developing nations, and increase international collaborations for the benefit of future generations.

In January 2014, the IUCr and UNESCO launched a year of activities to support the UN Resolution A/RES/66/284 proclaiming the International Year of Crystallography (IYCr2014). With this resolution, the UN recognized that humankind's understanding of the material nature of our world is grounded, in particular, in our knowledge of crystallography, and stressed that education about and the application of crystallography are critical in addressing fundamental challenges. At a time when scientific endeavour is critical for societal benefit, the importance of crystallography is greater than ever, yet it remains a science that still has lower visibility than it should. Understanding the structure of matter and relating this to the properties and functionality of any kind of compound has given a new path to scientific research, has transformed industries and created new frontiers, from the design of new medicines and materials to assessing the mineral content of Mars. The future global economy will be determined by progress in cutting-edge fields. However, the playing field is not level in crystallography and fundamental courses on crystallography are disappearing from most academic chemistry degree curricula and are almost absent in the developing countries.

Several activities conducted by the IUCr to promote crystallography and science in general in the developing regions will be presented in this talk, with particular emphasis to Africa. Among these:
- the IUCr "Crystallography in Africa" initiative, launched in 1999 and thanks to which crystallographic equipments have been or are being installed in some sub-Saharan African countries;
- the IUCr-UNESCO OpenLab initiative, a network of operational crystallographic laboratories, organized in partnership with industry, which are enabling students in far-flung lands to have hands-on training in modern techniques and expose them to cutting-edge research in the field;
- the IUCr-ICSU "Building Science Capacity in Africa via Crystallography" initiative, a project prepared as a follow-up to the IYCr Pan African Summit meeting (Bloemfontein, October 2014), which will support the 1st Pan African Crystallographic Conference (Dschang, October 2016), the 2nd North African Crystallographic Conference (to be announced) and several other additional actions.

Possible future collaborations with other scientific and international institutions will be also discussed, as well as the role that the IUCr and similar institutions could play to facilitate the discussion about the need and possible implementation of an African Light Source.

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