

MS49-02 The 10 two-dimensional crystallographic point groups - an interactive PowerPoint exercise. Eugen Libowitzky, *Institute of Mineralogy and Crystallography, University of Vienna, Austria*
E-mail: eugen.libowitzky@univie.ac.at

During the curriculum “Biology and Environmental Sciences”, students at the University of Vienna, Austria, get some basic education in mineralogy, crystallography and issues of mineral resources. As these students will be future highschool teachers from their profession (with crucial impact on the acceptance and distribution of science in the classroom), they should get acquainted with didactic media that are appealing, provide good training results, and promise some kind of “fun factor”. As symmetry is an inherent feature of the crystalline state, students need a basic understanding of this topic, starting from the 10 two-dimensional crystallographic point groups and proceeding via plane patterns and three-dimensional point groups to the space group concept. To provide a good training platform and to improve the true understanding of basic symmetry, an interactive software on the 10 two-dimensional crystallographic point groups has been developed. The program is based on a PowerPoint platform, and thus can be easily extended and changed according to personal needs. The first part consists of a set of 14 tutorial pages that explain the basics such as symmetry elements, operations, abbreviations and symbols, give an overview on the 10 point groups and explain the Hermann-Mauguin symbols, and finally give five examples of common pitfalls. The second part consists of 71 interactive pages in random order, each consisting of a large motif in the center and the 10 point group symbols at the side rims. The motifs consist of flags (quite easy), traffic signs, company logos, political and religious symbols, Celtic signs (rather difficult), and other pictures. A mouse click on one of the point group symbols shows all symmetry elements of the chosen group superimposed on the motif, as well as a green “” with a bright chimes sound or a red “” with a dark buzz sound, thus indicating the right or false solution, respectively. A mouse click on the background moves to the next page. This interactive exercise is available in English and German from the university website <http://www.univie.ac.at/Mineralogie> for free. Beyond the target group described above, the software may be fun in all courses touching basic concepts of crystallography and symmetry, e.g. in the Earth sciences, chemistry, physics, and material sciences, ranging from school to university level. After a test period of one year, it should be emphasized that both motivation and results of exams in crystallography have improved considerably.

Keywords: teaching; crystallography; symmetry

MS49-03 The European Crystallographic School (ECS): a permanent initiative to celebrate the IYCr. Carlo Mealli,^a Roberta Oberti,^b Michele Saviano.^c ^a*CNR-ICCOM, Sesto Fiorentino*, ^c*CNR-IGG, Pavia*, ^c*CNR-IC Bari, Italy*.
E mail: carlo.mealli@iccom.cnr.it

The ECA celebrates in 2012 its 15th anniversary, but coordinated European crystallographic activities date back to 1973, *i.e.*, the first ECM in Bordeaux. Even earlier, the IUCr was founded in 1946 (perhaps one of the few cases where worldwide coordination started at the very beginning of a science) and contributed to the development of crystallography through the exchange of notions and expertise. The rapid development and the fundamental role of crystallography in many different branches of science, as well as the awareness that Europe has a common cultural (and hopefully soon political) house became increasingly evident at all the ECMs, which regularly alternated with the IUCr congresses. There were also opportunities for educational targets as testified by many satellite meetings and workshops, aimed to point out frontier topics. At the beginning, the background concepts and techniques in crystallography were entrusted to the national academic institutions. However, following the giant developments of the methodology, especially through efficient and easy-to-handle software packages, crystallography is no longer perceived as a science deserving academic courses. Hence, the strictly crystallographic community has the duty to preserve knowledge of the foundations, which allows critical usage of the procedures, attainment of well established targets and further progresses in the methodologies. The Italian community has a long tradition in the organization of national schools of crystallography, which in the last years have also developed undeniable international character relatively to both teachers and participants. One year ago, the AIC proposed to validate this trend and launched the idea of annual European schools devoted to the principles and applications of crystallography. All the countries, adhering to the ECA, shall alternate in the task of planning and organizing an educational event under the control and sponsorship of the ECA itself. The goal is not only that of increasing the number of crystallography users but also forming conscious scientists. Attendants with different curricula will eventually learn how to exploit the crystallographic tools in a well designed strategy, also aimed to the interpretation of the results to reach specific goals. Participation of teachers and students from different countries will favor contacts and collaborations, which will act as potential seeds for joint European research projects. Each school shall illustrate different aspects of the discipline, at least within the time scale of a three year PhD curriculum, so that the multi-disciplinary character of crystallography will fully emerge. The relevance of each ECS proposal shall be validated by the ECA council by examining and comparing the bids prepared by national or associated communities. High educational contents, opportune infra-structures and fund raising strategies must be illustrated to support a truly adequate international audience. Cooperation with EU programs such as Erasmus IP must be pursued and, in the long run, the initiative may be associated to an European Master in Crystallography. The topics of the school must be timely and involve suitable balance of basic crystallographic concepts and farsighted illustrations of the potential improvements in different branches of science.

Keywords: European Crystallographic School, ECS, Educational Offer