

Two international schools on crystal growth

International School on Biological Crystallization

International School of Crystallization 2009: Foods, Drugs and Agrochemicals



were held in Granada, Spain in May 2009 under the auspices of the IUCr Commission on Crystal Growth. The first was the second edition of the **International School on Biological Crystallization (ISBC)**, 18-22 May. Then, one week later, the first **International School of Crystallization** was held. Both schools were held at Hotel San Anton in the heart of the beautiful city of Granada.

The schools were designed for postgraduate and post-doctoral students as well as research scientists from industry and academia; all those who deal routinely with crystallization but seek fundamental knowledge of the crystallization phenomenon and the behaviour of crystallizing solutions.

Both schools dealt primarily with crystallization, but they addressed different topics. The ISBC focused on the crystallization of biological macromolecules, biominerals and biomimetic materials, with one full day devoted to case studies on the crystallization of membrane proteins and large macromolecular complexes. The ISC focused on the application of crystallization techniques to the fields of food and drug technology and to the agrochemical industry.

Considerable effort was made to provide financial help to as many students as possible and most of the students who applied were given a support grant. In total, 29 grants were given to ISBC students and 22 to ISC students. Remarkably, 94% of all students who came from outside Spain received some sort of funding.

The first day of the ISBC dealt with the fundamentals of crystallization from solution to protein crystals. Lectures included a wide range of topics from how to purify proteins, to the physicochemical properties of solutions, nucleation and light scattering theories, finishing with crystal growth techniques and handling of protein crystals. The second day was

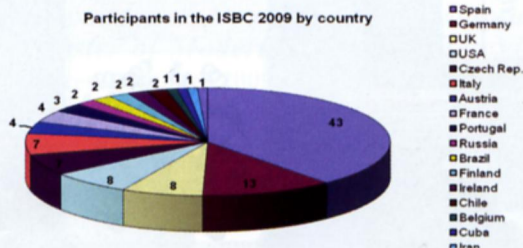


devoted to the crystallization of large crystals, complexes and membrane proteins; the third day to a *Demonstration Fair*, at which 21 experts offered short (20-40 minutes) practical sessions, periodically, at scheduled times. Participants could choose what sessions they wanted to attend and in which order, so that they selected their own learning program *a la carte*. The fair proved to be an excellent teaching tool as it provided students with ample opportunities to interact on a personal basis with tutors and to watch closely how to perform crystallization experiments.

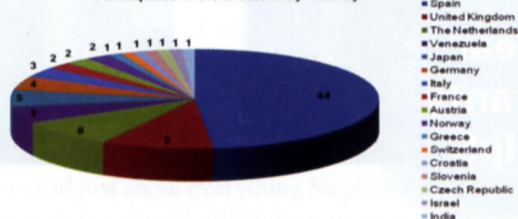
The fourth day's focal point was bio-mineralization, and this was followed in the afternoon with a seminar on publication of crystallization results. The final day went beyond structural biology to challenges such as large scale protein crystallization. The school ended with a round table discussion and the presentation of poster prizes offered by the IUCr and La Factoria. For additional information see www.isbcgranada.org/

The first day of ISC 2009 dealt with the fundamentals of crystallization from solution, nucleation theories, crystal growth kinetics, crystal morphology and analytical techniques. The second day covered classical and novel crystallization techniques such as gel growth, hydrothermal growth or crystallization from melts. Polymorphism occupied the third day, and the fourth day was fully dedicated to a *Demonstration Fair* similar to the fair held in the ISBC school. The last day featured special,

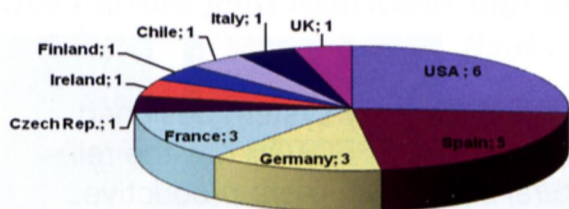
Participants in the ISBC 2009 by country



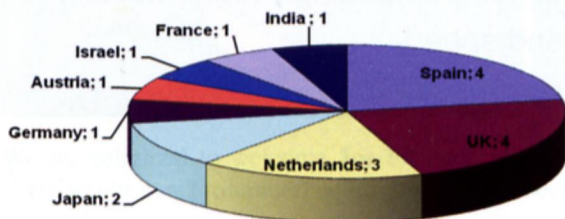
Participants in the ISC 2009 by country



Lecturers in the ISBC 2009 by country

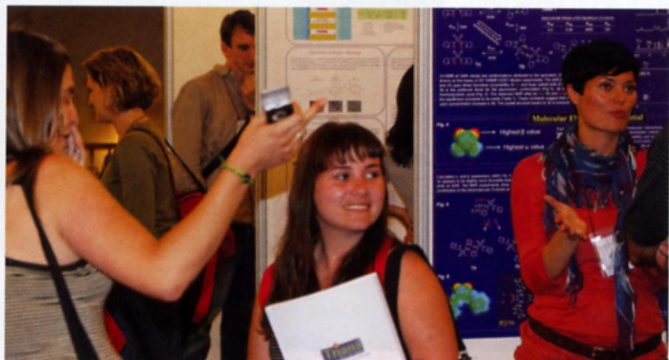


Lecturers in the ISC 2009 by country



At the ISBC 111 participants came from 18 countries; at the ISC there were 91 attendants from 17 countries. Lecturers at both schools were from a variety of countries as well.

hot topics such as chiral crystallization, crystallization in space and the interface between drug substance and drug product. The school closed with the presentation of prizes offered by the IUCr and La Factoria. All the information about ISC 2009, including the list of teachers and the full program, is available at <http://lafactoria.lec.csic.es/iscgranada>.



The ISBC Poster Sessions featured 35 posters; there were 27 in the ISC Poster Session. An international panel of lecturers led by **Howard Einspahr** of the USA honored student teams from Germany, Japan, Cuba, Spain, UK, Slovenia and Norway with prizes. Five poster prizes were awarded in ISBC and four in ISC. Prizes consisted of volumes of *International Tables of Crystallography* provided by the IUCr, and crystallization devices, books on *Fractal Harmony* and shirts offered by La Factoria and Triana S&T.

Both schools started with a welcome cocktail party on Sunday, and participants were entertained later in the week by a night tour of the Moorish palaces of The Alhambra. On the last night everybody headed for the gypsy district of Sacromonte where, in one of its caves, participants were treated to a tapas dinner followed by flamenco music & dancing.

Two CDs, one for each school, that contain all the lectures and demonstrations performed and also posters and pictures, have been sent to the participants.

We are grateful to the Organizing Committee, especially **Luis Gómez Morales** and **José Gavira** for their substantial contributions to the schools, and to our sponsors and exhibitors. We are happy and proud to announce that the next ISC is already scheduled for **24-28 May 2010**. More information is available at www.iscgranada.org/.

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