

## Report on the 6<sup>th</sup> European Crystallographic School

The 6<sup>th</sup> European Crystallographic School (ECS6) was planned to take place between 5-11 July 2020 in Budapest, Hungary. Unfortunately, first it has to be postponed with a year to take place between 4-10 July 2021, and then it has to be decided to hold it on-line because of the COVID-SARS2-19 pandemic.

No ECS was organised as an on-line school before the ECS6. Having no prior experience, financial planning was more unforeseeable than usual. For comparison number of participants:

ECS4 Warsaw	students: 75	teachers 50	total: 125
ECS5 Stellenbosch	students: 64	teachers 22	total: 86
ECS6 Budapest	students: 90	teachers 35	total: 125

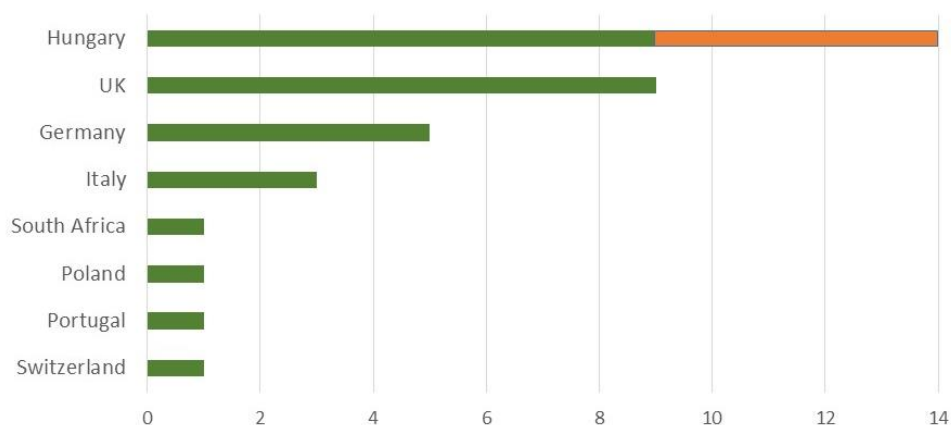
On-line organisation made participation possible for more students than an in-person event by these numbers. It proves cost sensitivity. The lower costs attracted even more students to register, but finally several of them did not pay the registration fee, did not participate. There were 132 student registrations to ECS6, finally 90 students participated either receiving bursary or paying the registration fee.

The five full busy days were extended with a preparation day before and with an excursion day after the teaching period. There were excellent lectures of eminent scientists, vivid discussions, a hands-on-tutorial and four laboratory practices. An overview of the very broad field of crystallography was provided.

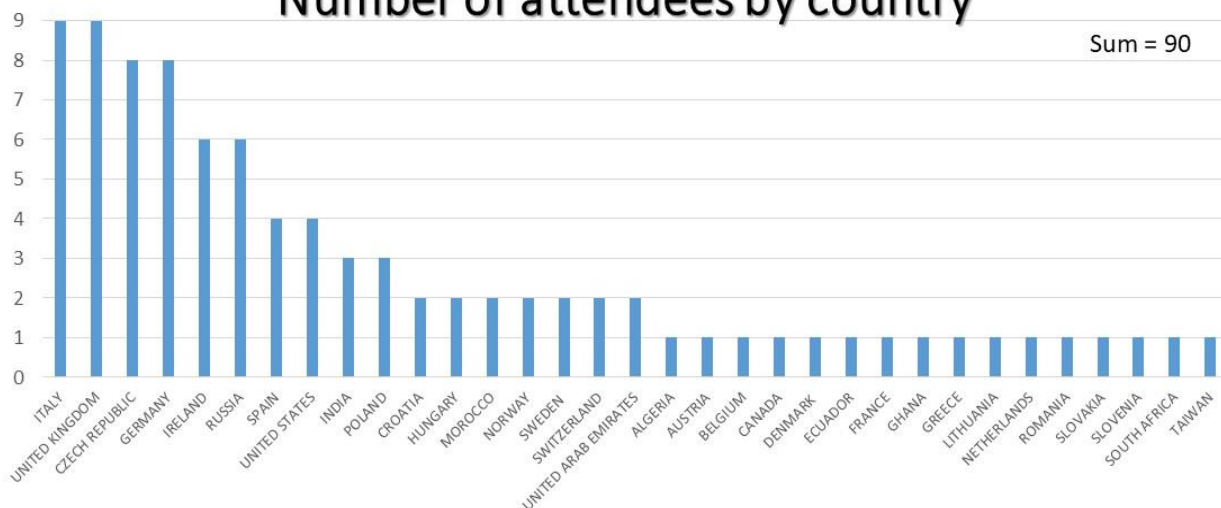
It was about diffraction physics, symmetry, reciprocal space, instrumentation and experimental techniques, structural chemistry, non-ambient conditions, structural biology, data validation and quality, and so on. The lectures covered emerging techniques, like XFEL and electron diffraction, as well as the role of the databases CSD and PDB. Extra information on solution chemistry, on how to publish and also on structural aspects of COVID were also given.

There were 90 students, 30 lecturers and 5 additional teachers of laboratory practices who contributed to the success of the school. There were 9-9 scientists from the UK and Hungary, 5 from Germany, 3 from Italy, and 1-1 from Poland, Portugal, South Africa and Switzerland who accepted our invitation to teach at ECS6. The contribution of Christian Lehmann, John Helliwell and Manfred Weiss should be highlighted, who delivered several lectures during the week. The students arrived from four continents: Europe, North- and South-America, Africa and Asia. It means that quite a number of the participants took the challenge to follow the long, busy days from different time zones.

## Number of lecturers by country

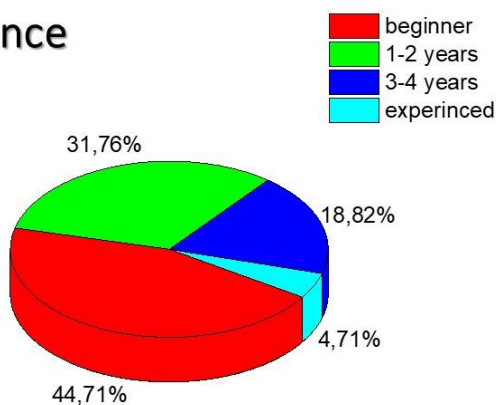


## Number of attendees by country

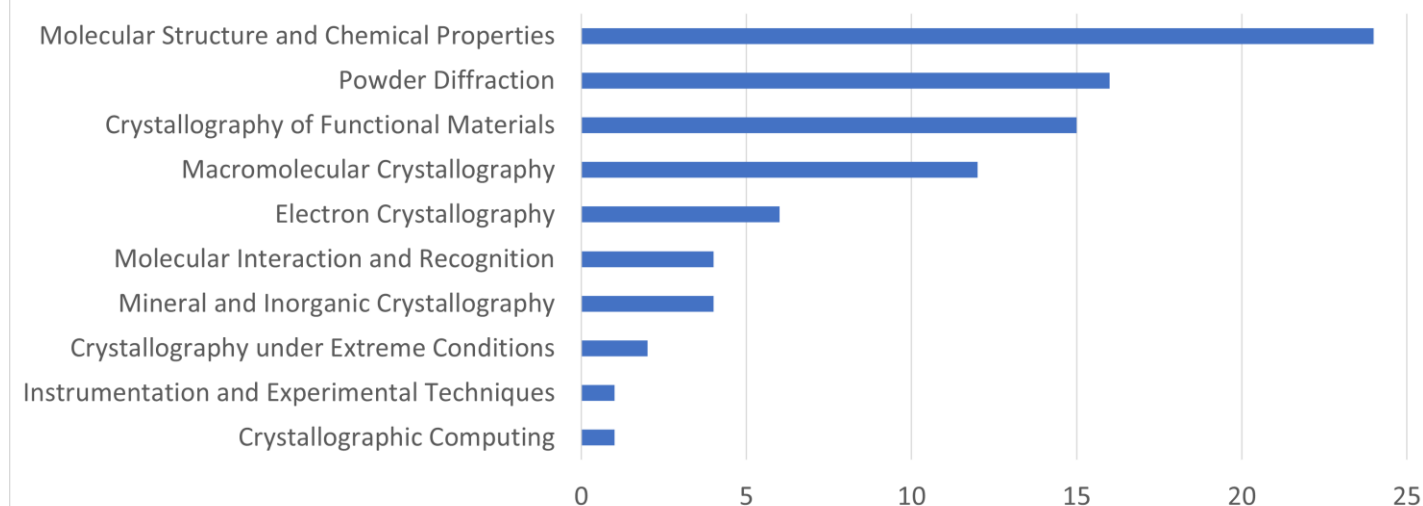


The gender distribution: 40% of the teachers were female, 60% male, while 52 % of the students were female and 48 % male. 45% of the students were beginners in crystallography, 32% had 1 to 2 years of experience, 19% had 3 to 4 years of experience, and 4% were working more than 4 years on the field of crystallography. The most students were interested in molecular structure and chemical properties (28%), powder diffraction (19%), crystallography of functional materials (18%), macromolecular crystallography (14%), electron crystallography (7%), molecular recognition and interaction (5%), and the topics of mineral and inorganic crystallography, crystallography under extreme conditions, instrumentation and experimental techniques, crystallographic computing were also given as research interest. It means that the ECS6 school could offer something for everyone. Students might learn on their own field and could increase their knowledge on the related fields.

## Level of experience



## Research interest by ECA SIG



The ECS6 school was performed using the WHOVA platform. The lectures were completed with extended Question & Answer sessions. The laboratory practices were followed by 30 minutes discussion sessions. All Q&A sessions were well attended. The ECS6 programme was made available for the registered participants two more months: lectures, practices, discussion sessions could be revisited. Teaching materials were also provided by each lecturer to the attendees. Moving to the virtual space was a special challenge to the teachers. At the end of the school all participants might vote on the lecturer who used the chance of teaching her/his subject on-line the paramount way. The best on-line teacher of ECS6 was elected to be Christian Lehmann.

The opportunity to fill a Quiz, prepared based on the questions received from the teachers of the school, was provided for the students in order to measure the efficiency of knowledge transfer. 26 students volunteered to test her/his familiarity in crystallography. The winner, who answered the highest number of questions well was announced at the closing ceremony: Najlaa Hamdi from Sidi Mohamed Ben Abdelah University, Morocco received the certificate and a gift pen with engraving.

ECS6 gave the possibility to the students to present their own work in two poster sessions. 37 out the 90 students submitted and abstract for poster presentation since poster presentation was not a condition of participation, although poster presentation was a condition of receiving bursary. The presenters needed to upload a poster, might also submit a flash presentation and the authors could also be visited

by the other participants for a chat in the conference platform. Six poster prizes were awarded by different juries:

IUCr Journals Poster Prize in structural biology was awarded to Laura Kind, Norway.

IUCr Journals Poster Prize in structural chemistry was awarded to Marco Vandone, Italy

PDBe poster prize in protein crystallography was awarded to Blanka Hust'áková, Czech Republic

CCDC poster prize for research related to the Databank was awarded to Ekatarina Radiush, Russia

CrystEngComm poster prize for crystal engineering was awarded to Alina A. Sonina, Russia

CrystEngComm poster prizes for supramolecular chemistry was awarded to Samantha Gailene Le Roux,

South Africa.

The active participation of the students was crucial in the success of the school. This school was organised for them, and they have received a huge package of new information. The most eminent scientists were working hard for months with the preparation and recording of their contributions developing also new skills of on-line teaching. The organisers are grateful for all the contribution and support of the ECA and the IUCr both in different arrangements and the bursary offered to the student participants. The school could not be organised without the financial support of our exhibitors: Bruker, Dectris and Rigaku (argentite sponsors), Crystal Impact and MiTeGen (molybdenite sponsors) and CCDC, CrystEngComm, European XFEL, Italian Crystallographic Association, Molecular Dimensions, PDBe and OlexSys (cuprite sponsors). The PCO AKCongress and the IT company Hotel AVS managed the School remarkably well. It is a special pleasure that all members of the Hungarian crystallographic community contributed to the organisation of ECS6 with their whole enthusiasm which improved our cohesion. A special thank has to be addressed to the members of the Chemical Crystallography Research Laboratory, Centre for Structural Science of the Research Centre for Natural Sciences.

We missed the busy lecture halls, the crowded laboratories, the chats during the coffee breaks. Our rooms and corridors were empty, our dreams about the school was different when we got the opportunity to organise it. Anyhow, we had to get over the difficulties caused by the pandemic. In addition to excellent scientific education we offered different opportunities for socializing: networking in the evenings, a concert of Chemical Singers to present extra talent of our colleagues, and two "live" virtual tours, the guide was walking and cycling real time instead of us showing the beauties of Budapest and answering our questions at sunlight and at sunset.

We believe that the 6<sup>th</sup> European Crystallographic School was a great success and keep it in our best memories. We hope that the life will get back soon to its usual pre-pandemic way to meet again in-person and the next school ECS7 in Lisboa 2022 can be an in-person event.