

HERCULES

CELEBRATES ITS 10TH ANNIVERSARY

The H.E.R.C.U.L.E.S. (Higher European Research Course for Users of Large Experimental Systems) course has been running now for ten years. Since the beginning of the project in 1991, more than 1200 applications were received, from which over 700 participants were selected. The participants were either Ph.D students or post-doctoral scientists who use large-scale neutron or synchrotron radiation facilities in their research. The high number of applicants demonstrates that this training programme answers a need expressed Europe-wide. The participants actually came from 18 European countries (Figure 1). The opportunity to participate in the course has been given to non-European candidates since 1998 for the Biological session and from this year for the Physics and Chemistry session. This enabled the participation of students from China, the United States, Brazil and Argentina.

participants, of whom over 80% followed the training full-time, while the remainder attended only the lectures and classwork (Figure 2). In 2000, there were 65 full-time participants, 44 in Physics-Chemistry and 21 in Biology, and there were also 12 part-time participants.

Each year the lectures were given by about 60 European speakers, who are leading specialists in their respective fields. An additional 100 research scientists and teachers took charge of the practical sessions and classwork. Most of the teachers came from the local scientific community and represented a wide range of nationalities, since several of the large-scale facilities or host laboratories, such as the ESRF, ILL and EMBL, are multinational (Figure 3). In groups of 4, the participants received 50 hours of personalised training. It was an excellent opportunity for participants to establish contact with the scientists at the large-scale facilities, and hence to become familiar with the potential existing there.

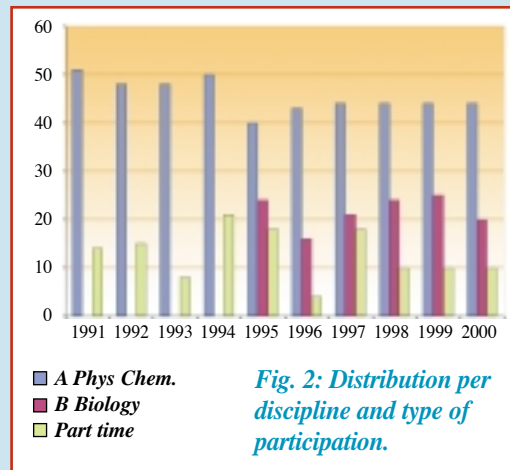


Fig. 2: Distribution per discipline and type of participation.

both past and present, participated in the conference. By bringing together these young scientists with carefully selected key-note lecturers and local researchers from the large European facilities (ESRF and ILL), the conference provided a unique training environment emphasising the latest developments and applications in the various fields, some of which are not yet covered by the course.

EUROCONFERENCE PROGRAMME

The programme of the conference was structured to highlight the impact of fundamental and technological breakthroughs in research centred at large scale facilities using synchrotron radiation and neutrons. Internationally reputed scientists gave plenary lectures presenting the state of the art and recent developments. There were five major themes: Macromolecular biology, Magnetism, Imaging and Coherence, New Techniques, New Instrumentation and Industrial Applications. All of the oral sessions were well balanced with contributions from both senior scientists and former HERCULES students. This was a very good way of gathering together confirmed and new experts. The plenary lectures were complemented by poster contributions covering a wide range of research topics including: Materials Science, Environmental Science, Surfaces and



Fig. 1: Number of participants per country.

- Germany
- Spain
- Great Britain
- Italy
- France
- Other EU countries
- Eastern countries
- Others

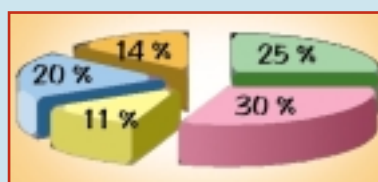


Fig. 3: Origin of the lecturers.

- ILL-ESRF
- France
- Germany
- Great Britain
- Others

The success of the six-week course comes from the careful balance between lectures from internationally renowned experts, practical work at the large-scale facilities (about 40% of the programme), tutorials with local scientists, a poster session and visits to the installations. Since 1991 each session has welcomed an average of 70

On the tenth anniversary of the HERCULES course, the associated HERCULES X Euroconference took place at the ATRIA World Trade Center in Grenoble and at the ESRF/ILL site, between 6 and 9 April 2000. Special thanks go to I. Anderson (ILL) and V. Guerard (CNRS) for their precious help in the organisation of this event. More than 200 HERCULES students,



**HERCULES X
Euroconference
attendees take
advantage of the
poster sessions to
renew or create
contacts and
collaborations.**

Interfaces, Soft Condensed Matter, Disordered systems. Each poster session was introduced by parallel "clip sessions" in which participants briefly presented their contribution.

The conference started with a short welcoming address by C. Feuerstein, President of Grenoble Scientific University, in the presence of several personalities such as H. Curien, past French Minister of Research, an EU representative, the Mayor of Grenoble, and representatives from various sponsoring scientific institutions. Then a short history of HERCULES was presented from both the inside, by J.R. Regnard, Director of the course and Chairman of the HERCULES X EuroConference, and the outside, by Y. Petroff, Director General of the ESRF.

Chaired successively by P. Day, H. Curien and D. Raoux, the scientific session of the first day opened with the latest developments on medical synchrotron research by W. Thomlinson (NSLS and ESRF) who also presented the first real experiments performed at the ESRF in collaboration with the Grenoble Hospital. Then applications of synchrotron radiation in magnetism and imaging with coherent X-ray beams were introduced successively by M. Altarelli (Director of ELETTRA-Trieste) and P. Cloetens (former HERCULES scientist and former ESRF Young Scientist Prize Winner).



F. Mezei (HMI-Berlin) also explained why we need neutrons in the 21st Century, and M. Mezouar, a HERCULES scientist, presented the latest results obtained at the ESRF under extreme conditions. On this and the following day, a large poster session made it possible for all former HERCULES participants to present their work. This first day ended with a session dedicated to new instrumentation and techniques which was presented by two former HERCULES participants: P. Høghøj and M. Krisch, who spoke about multilayers for neutrons and inelastic X-ray scattering, respectively.

The morning of the second day was dedicated to industrial applications. An overview of applied and industrial research at neutron and SR facilities was given by J. Doucet (ESRF and LURE), followed by examples of investigations on biological molecules of industrial interest, presented by F. Winkler (Hoffman La Roche and Paul Scherrer Institut). J. Webster (Mat. Eng., Univ of Salford) and J. Pannetier (Corning SA) described applications of neutrons and synchrotron radiation to residual stress measurements and to industrial problems in chemistry. This industrial session, chaired by Y. Petroff, ended with a presentation by F. Comin (ESRF)

Some official attendees at the HERCULES X Euroconference: (from left to right, first row) H. Curien, past French Minister of Research, C. Feuerstein, President of Grenoble's Scientific University, Y. Petroff, Director General of the ESRF, J.R. Regnard, Chairman of the Euroconference, (second row) R. Maynard, Ministry of Education, C. Kunz, Scientific Director of the ESRF, J.X. Boucherle, Grenoble City Council, J. Baruchel, co-Chairman of the Euroconference.





on the first ESRF beamline dedicated to industrial semiconductor applications, and by R. Simon (HERCULES scientist) on a customer oriented SR source: ANKA.

The imaging and coherence session was introduced by two HERCULES scientists: J. Susini and T. Weitkamp, followed by G. Grübel (ESRF) and G. Schneider (Univ. Göttingen and BESSY). It covered scattering with coherent X-ray beams, X-ray microbeams, full-field imaging, tomography and X-ray microscopy. New projects, such as the X-ray free electron laser, were presented by J. Schneider (Director of the XFEL Project, DESY, Hamburg).

On the Saturday, the biology session was introduced with an overview on structural genomics by P. Umbach (Berlin). Several structural biocrystallography contributions were given by HERCULES scientists: A. Royant, J. Perez, C. Branca, as well as a presentation on a molecular rotary motor: ATP synthase, given by A. Leslie (Cambridge). Finally an account of muscle and fibre diffraction was animated by K. Holmes (Heidelberg). The magnetism session opened with a comparison of neutron and synchrotron X-ray results by C. Vettier (co-Director of ILL), followed by neutron results on bulk or magnetic thin films and multilayers presented by H. Zabel (Univ. Bochum) and M.R. Eskildsen (HERCULES Scientist). Example of XMCD analysis was also given by a HERCULES scientist, S. Andrieu.

The final session, focused on the latest instrumentation developments, was presented mainly by HERCULES scientists: T. Ursby, E. Lelièvre-Berna, H. Birkedal and S. Pascarelli, who closed the scientific contributions with a talk entitled "what I have learnt about EXAFS since HERCULES 1st".

The conclusions of the conference, presented by J. Baruchel (ESRF), showed that this international, multidisciplinary assembly of recently trained young researchers and leading scientists from the community generated a cross talk of new ideas on fields of applications, and helped to define the future training



The Wine & Cheese party.

requirements on a European level. Furthermore this conference provided a unique occasion for former HERCULES students to mix together, renew or create contacts and collaborations at an international level. This event also gave the opportunity of launching a WEB based network of HERCULES students, to which a large number of the participants have registered. This network will provide an important means of perpetuating the European links created by HERCULES.

The proceedings of the scientific presentations have been published. The HERCULES X EuroConference was also the opportunity to print a leaflet: '10 years of HERCULES' which gives a condensed report on the activity of the Course from 1991 to 2000. These documents can be obtained on request from the HERCULES organisers.

As for the usual HERCULES courses, the schedule was tight; however, there was time for participants to exchange scientific and non-scientific ideas, and to join in common musical and dancing experiments with the help of a dynamic jazz orchestra "Cameleon". This unscheduled training session took place during the banquet organised on the first day at the "Château de Sassenage" where the participants were treated to a delightful taste of European culture and culinary

expertise: it was a huge success. Finally, to give a delicate French touch to this conference, the concluding session ended with a wine and cheese party offering a large palette of different wines and more than 50 different French cheeses!

Following this highly satisfactory conclusion of this 10 year "Herculean" task, the HERCULES courses will, of course, continue. Please see the announcement below for further details.

J-L. Hodeau

HERCULES 2001

HIGHER EUROPEAN RESEARCH COURSE FOR
USERS OF LARGE EXPERIMENTAL SYSTEMS

Grenoble, 4 March - 11 April 2001

Session A:

"Neutron and synchrotron radiation for physics and chemistry of condensed matter"

Session B:

"Neutron and synchrotron radiation for biomolecular structure and dynamics"

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Deadline for application: 20 October 2000