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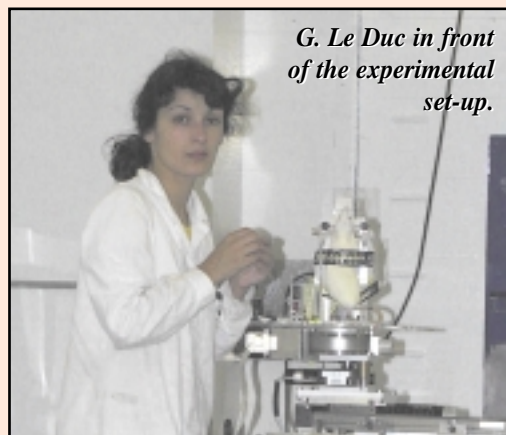
*Photography by:*

*C. Argoud,*

*B. Denis (Art Photos).*

## PRIZE GIVEN FOR SR COMPUTED TOMOGRAPHY PERFORMED ON ANIMALS

At the 6th Conference "Biophysics & Synchrotron Radiation", from 4 to 8 August 1998 at Argonne in the USA, a prize was given for the poster presented by G. Le Duc, A.-M. Charvet, H. Elleaume and F. Esteve, from the Jeune Equipe RSRM (Univ. Joseph Fourier in Grenoble) and the ESRF Medical Beamline. This Jeune Equipe were the first to perform brain tomography on an anesthetized animal (a rat).



*G. Le Duc in front of the experimental set-up.*



## 29TH COUNCIL MEETING

**At its 29th meeting on 9 and 10 June 1998 in Grenoble, the ESRF Council took several decisions which will have an impact on the medium-term future of the institute.**

### ISRAEL AS NEW SCIENTIFIC ASSOCIATE

The Council agreed to, and authorized its Chairman to sign for the ESRF on its behalf, an «Arrangement between the Government of the State of Israel and the European Synchrotron Radiation Facility concerning the long-term scientific use of synchrotron radiation for non-proprietary research» very similar to the one concluded last year with Portugal (cf. ESRF Newsletter n° 29, p. 3).

Since the Foundation Phase of the ESRF, contacts have been made with the Israel Academy of Sciences and Humanities concerning an involvement of Israel in the ESRF. In February 1987, the then Israeli Minister of Science and Development, Gideon Patt, considered in a letter to the Chairman of the provisional ESRF Council, Pierre Agrain, an application for Israel to become a full Member of the ESRF. In the outcome, however, Israel was not among the founding Members of the ESRF. Nevertheless, regular visits by Israeli scientists over the last ten years have marked the continuous interest of the Israeli scientific community. However, it was obvious that its size would not match the 4% threshold required for full ESRF Membership.

Discussions with the Israeli partners intensified after the Council had clarified the conditions for long-term arrangements in accordance with Article 8 of the ESRF Convention. The arrangement agreed by the Council is due to be signed in November in Jerusalem and will make Israel the second Scientific Associate of the ESRF. Thus scientists from Israel will have the same rights of access to the ESRF beamlines as those from the twelve Contracting Party countries. For the time being, the level of the Israeli contribution to the ESRF operating costs has been set at 1% of the contributions of the Members.

### MEMBERSHIP BELOW 4%?

During the discussion with potential Scientific Associates, the question was raised whether a reduction of the threshold for full Membership to less than 4% could be considered in the long term. Following an exchange of views on this issue, the Council noted that almost all delegations wished to maintain the 4% threshold for Membership as provided for by the ESRF Convention and Statutes, and to encourage the participation at lower rates in the form of consortia.

### RE-ADJUSTMENT OF CONTRIBUTION RATES

The ESRF Convention determines the contribution rates of the different Contracting Parties. In the event of a lasting and significant imbalance between scientific use and contributions, it also provides for the option of a re-adjustment of these contribution rates.

With a view to the end of the ESRF construction period and some experience on the use made of the facility since 1994, the Council adopted «Guidelines for the readjustment of contribution rates» which in particular

- clarify the quantitative assessment of the scientific use (taking into account the activity of Collaborating Research Groups and of the GRAAL experiment using  $\gamma$ -rays produced by Compton back-scattering of laser light),
- give a precise meaning to the terms «lasting» and «significant» used in the Convention and
- indicate the procedure to be followed for the implementation of a re-adjustment.

### BEAM TIME ALLOCATION FOR MACROMOLECULAR CRYSTALLOGRAPHY

In his report to the Council, the Director General mentioned the strongly increasing numbers of proposals for macromolecular crystallographic studies (some 240 for the second half of 1998) which put a heavy burden on the review committee for life sciences. With the extension of the experimental possibilities at the Quadriga beamline (ID14A+B) a further increase can be expected. Since relatively few groups

account for a considerable proportion of the projects that are awarded beam time, Management suggested testing another system: a number of groups within Europe will be identified to whom blocks of beam time will be awarded without prior evaluation of the individual experiment proposals. The *a posteriori* assessed performance record per group will then be essential for whether in the future the block allocation of the group will be continued, changed or removed completely.

The Council noted that such a system (together with several accompanying measures) will be implemented on a trial basis for the next proposal round (concerning the first half of 1999).

### BUILDING CONSTRUCTION

There is a lack of laboratories and offices at the ESRF due to:

- the increase of personnel (staff, externally funded collaborators, visitors),
- the closure of buildings provisionally acquired for the construction period and,
- the increasing needs of Collaborating Research Groups, etc.

There is still some potential to further extend the Experimental Hall, both at the outer and inner circumferences, or to add further satellite buildings around the Hall.

The Council took note of the planned construction, starting this year, of further laboratories and offices to satisfy the most urgent needs.

### BUDGET FOR 1999

The decision on the budgets is usually taken at the autumn meeting of the Council. With a view to the tight national budget situation in some of the Contracting Parties countries, the Council so far adopted a ceiling figure of 400 million French Francs for new contributions from Members to the budget of 1999 (which is 1.0% more than the amount of Members' contributions to the current budget of 1998).

### REDUCTION OF WORKING TIME

The Council

- noted that the French legislation on working time will change but that the corresponding application texts were not yet available, and



### ... 29TH COUNCIL MEETING

• asked Management to prepare, as soon as possible, information about both the regulatory and the financial consequences of these changes for the ESRF.

This item was also raised by the representatives of the ESRF in their meeting with the Council.

#### DIRECTOR OF ADMINISTRATION

Prior to its meeting, the Council decided by written procedure to extend the appointment of the present Director of Administration, Dr. W.E.A. Davies, up to 31 January 2002.

#### GUIDELINES FOR SELECTING AND APPOINTING ESRF DIRECTORS

The Council had a second reading of new guidelines for selecting and appointing ESRF Directors. Much consideration was given to this document due to the fact that during the period of 15 months between January 2001 and March 2002 the contracts of all five ESRF Directors will end and the selection and appointment procedures should begin well beforehand. The Council decided to resume the discussion at its next meeting based on a new draft incorporating the amendments proposed.

#### SCIENCE ADVISORY COMMITTEE

The membership of the present Science Advisory Committee will come to an end on 31 December 1998. Due to the appointment procedure (eleven scientists directly nominated by the Members of the ESRF, a further ten appointed by the Council) the renewal of membership has to be prepared in several phases.

The Council took note of the schedule which shall lead to the appointment of a new Science Advisory Committee at the next meeting of the Council.

**K. Witte**

## HERCULES 1998

The seventh session of the HERCULES course (Higher European Research Course for Users of Large Experimental Systems) took place at the Maison des Magistères, CNRS Grenoble, from 22 February to 3 April 1998. The 79 participants (mostly European or registered in European Universities) were divided in two sessions :

- session A: Neutron and synchrotron radiation for physics and chemistry of condensed matter with 44 full-time participants and 11 part-time participants.

- session B: Neutron and synchrotron radiation for biomolecular structure and dynamics with 24 full-time participants. A special effort has been made towards the community of biologists by opening the course to non-European countries (USA, Brazil...)

The course included lectures, practicals and tutorials as in previous years. As last year, session A was particularly centered on recent developments of neutron and X-ray spectroscopy. New lectures devoted to structural molecular biology have been included in the program of session B: «Medical imaging with synchrotron radiation», «X-ray microscopy», «Nuclear spin contrast variation studies». The publication of the volume IV of the HERCULES series entitled «Structure and dynamics of

biomolecules» by Oxford University Press is now in progress. For both sessions, a specific seminar on industrial applications was introduced and appreciated by the participants.

In Grenoble most of the practicals were performed on ESRF beamlines (including the French, Italian and Swiss-Norwegian CRG beamlines) and at the ILL. The collaboration of EMBL, IBS as well as CNRS and CEA-Grenoble was also greatly appreciated.

Participants from the two sessions carried out practicals at LURE (Orsay) and the Laboratoire Léon Brillouin (Saclay).

The poster session at the Maison des Magistères (55 posters displayed) was one of the highlights of the course and allowed fruitful exchanges between participants and Grenoble scientists.

HERCULES 99 will follow next year with the same two parallel sessions from 21 February to 1 April 1999.

## HERCULES 1999

### HIGHER EUROPEAN RESEARCH COURSE FOR USERS OF LARGE EXPERIMENTAL SYSTEMS

**Grenoble, 21 February - 1 April 1999**

#### Session A:

«Neutron and synchrotron radiation for physics and chemistry of condensed matter»

#### Session B:

«Neutron and synchrotron radiation for biomolecular structure and dynamics»

#### Information:

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**Deadline for application: 16 October 1998**



## LIFE SCIENCES LEAD NEW REQUESTS FOR BEAM TIME

Users requesting beam time between August 1998 and January 1999 sent in a record number of 799 new proposals for the 1 March application deadline. This was a 37% increase over the previous period, due mainly to the very large increase in Life Sciences applications, up 242 from 128, an increase of almost 90%. Requests from this community of users reflect a recognition of the exciting results which are increasingly being achieved with the use of synchrotron radiation (see in this Newsletter the article on the nucleosome, on page 9), and the progressive opening of the Quadriga beamline, ID14, with its four independent experimental stations. This beamline is one of the 28 ESRF and 7 CRG beamlines which are expected to be scheduling user experiments during the next period.

Following the meetings of the Review Committees at ESRF on 27 and 28 April 1998, 359 proposals were selected and allocated beam time totalling 4341 shifts. Of these, seven new long term programs were accepted for a period of two years. Details of the requests and allocations, per committee, are summarized in [Table 1](#).

Numbers of shifts of beam time requested and allocated per scheduling period since the beginning of user operation in September 1994 are shown in [Figure 1](#). It should be

noted that the second scheduling period each year to date has been slightly shorter than the first, so that in general fewer shifts have been

allocated and scheduled during the second half of each year.

R. Mason

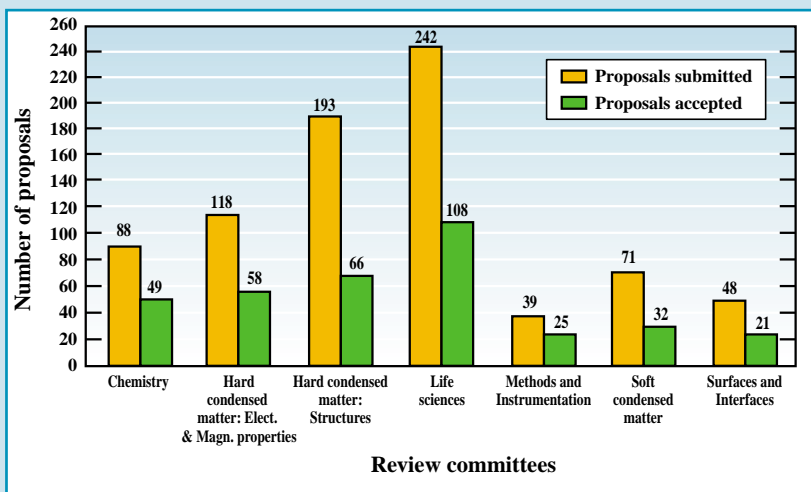


Table 1: Number of proposals per review committee.

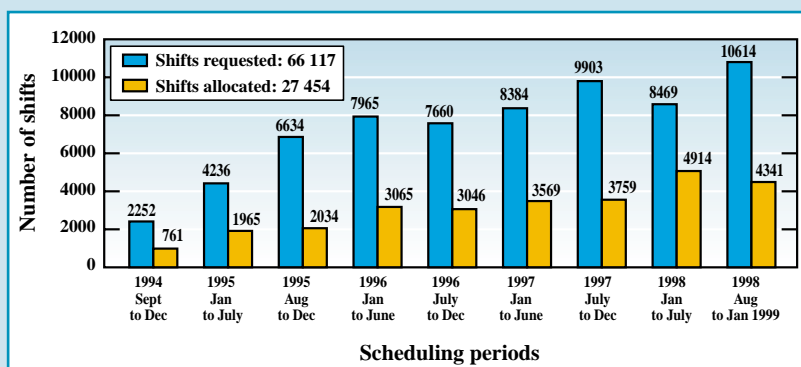


Fig. 1: Total number of shifts of beam time requested and allocated, per scheduling period, 1994 to 1998/II.

## USERS' MEETING

11-12 February 1999

The next Users' Meeting will start on Thursday 11 February 1999, with the usual «plenary format», plus posters, plus exhibitors at the Atria conference centre. The change of date from pre- to post-Christmas is for at least two good reasons. Firstly it is in response to requests from users to meet ESRF staff in the «run up» to a submission date in order to benefit from their informal views of project proposals. Secondly it avoids a period

when the User Office staff, who help tremendously with the administration of these meetings, are very busy processing the recommendations of the Review Committees. For many users there is also the matter of a few hours on the slopes which was precluded in the pre-Christmas slot! The meeting will continue with workshops on the Friday, and possibly Saturday, based on the ESRF site, plus adjacent venues if we have

more than three viable suggestions. All beamline scientists have been emailed to ask for their suggestions, and just a few have responded. M. Cooper and other members of the Users' Committee need to know NOW if you want to run a workshop. Please contact [csmc@spec.warwick.ac.uk](mailto:csmc@spec.warwick.ac.uk) or ring M. Cooper in the UK (+44 1203 523379) to discuss the options and put the dates in your diary!



## WORKSHOP FOR INDUSTRY «CHEMISTRY AND SURFACES»

HELD ON 4 JUNE 1998

The ESRF welcomed about twenty industrialists on 4 June 1998 for the workshop dedicated to chemistry and surfaces.

Participants came from different fields of activities such as chemicals, pulps, metallurgy, cosmetics, polymers, cements, detergents and electronics (l'Oréal, Philips Analytical, Sagem, Rhône Poulenc, Lafarge, Ocas NV, Dow Corning, Rhodia, Arjo Wiggins, BASF, Unilever, Italcementi).

After an introduction by the Director General Y. Petroff, A. Fitch gave a talk entitled «Identification and characterization of crystalline powders by x-ray diffraction». The different uses of powder diffraction were presented as the advantages of synchrotron radiation for this technique. Some examples were given: characterization of ancient Egyptian cosmetics, research on Li-ion plastic electrolyte battery, the structure determination from powders (ex: fluorescein diacetate). This technique is of special interest for industrialists working in polymers and metallurgy.

S. Pascarelli spoke about the perspectives for industrial research using x-ray absorption fine structure spectroscopy at the ESRF. She described the various EXAFS techniques dedicated to bulk

materials (transmission), diluted systems (fluorescence), surfaces (reflection), and real-time analysis (dispersive EXAFS). She gave research examples of industrial applications: Er-doped Si for opto-electronics, rare earth-doped glasses for optical fibers, structure of reaction intermediates in solution (alkene oligomerisation), monitoring of chemical oscillations during CO oxidation on Pt supported catalysts. She underlined that the ESRF is much more efficient than the second generation synchrotron sources for the study of ultra-dilute systems (down to a few ppm) and for the study of fast processes (down to the ms resolution).

S. Ferrer gave an overview of surface, interface and thin layer characterization using synchrotron radiation. Three techniques were presented: surface x-ray diffraction, circular magnetic dichroism and total reflection fluorescence analysis. They were illustrated by the microscopy of magnetic domains in ultra-thin films, surface atomic structure of KPD crystals (KH<sub>2</sub> PO<sub>4</sub>) in aqueous solution, and trace element analysis on Si wafers for which a beamline dedicated to industry is under construction at the ESRF (see this Newsletter, page 28).

J. Baruchel presented x-ray imaging at the micrometer scale and

its place at the ESRF. Different techniques were described with their applications: microtomography with images of human vertebra samples and PVC foam sample, phase contrast imaging of a polymer sphere with two layers and of a AlSiC composite material, as well as the chemical mapping of fly-ash particles by fluorescence analysis. Several chemical companies already benefit from these new imaging techniques at the ESRF.

Finally, J. Doucet, ESRF Coordinator for Industry, explained the reasons for industrial companies to use synchrotron beamlines and presented the different types of collaboration: isolated short characterization, long-term collaboration, pure beam time purchase, full service (data collection + analysis), PhD or post-doc funding, long-term visitors, and even beamline construction and operation.

The afternoon was devoted to the visit of several experimental stations: ID2 (small-angle scattering), ID11 (diffraction), ID13 (microdiffraction and microfluorescence), ID16 (high-resolution powder diffraction) and ID22 (micro-analysis and phase contrast imaging).

**J. Doucet**

*If you are interested, please send us a fax (+33 (0) 4 76 88 24 60) or an e-mail (recruitm@esrf.fr) with your address, and we will provide you with an application form. You can also print out an application form on the World Wide Web <http://www.esrf.fr>*

### VACANCIES AT THE ESRF ON 7 AUGUST 1998

	Ref	Subject
<b>POST-DOC</b>	PDID10B-1	Troika II beamline (ID10B)
	PDBM29/ID26	EXAFS (two positions)
	PDID22	Phase contrast microtomography (ID22)
	EUPD214	Time-resolved protein crystallography
	EUPD215	Proton pumping in membranes
<b>STUDENTS</b>	CFR239	X-ray gyrotropy and related optical phenomena
	CFR243	High resolution residual strain mapping
	CFR244	Soluble, electrically conducting polymers
	CFR245	Micro-structural characterization of cold and hot forming processes
	CFR246	Phase transitions in colloidal systems
<b>ENGINEER</b>	CDD/DP	Software Engineer - 6-month contract
	2209	Mechanical Engineer



## SOFT MATTER UNDER FLOW AS PROBED BY SMALL-ANGLE SCATTERING - SASFLOW '98

In the last five years a major challenge among the soft-matter community is to elucidate the relationship between rheological properties of complex fluids and their mesoscopic structure as revealed by small-angle scattering (SAS) experiments. On 28-29 May 1998, a common ESRF/ILL workshop was held at the ESRF, organized by O. Diat (ESRF), P. Lindner and J. Zipfel (ILL).

The main objectives of this common workshop were:

- to advance the new opportunities of experiments under shear on large instruments and especially at the ESRF and ILL.

- to provide a summary of recent experiments or projects using SAS techniques.

- to explore users' interest in order to plan long-term projects and to optimize technical developments and analysis.

This workshop was divided into six sub-sessions, on surfactants, polymer solutions, block-copolymers, polymer blends, suspensions under shear and a session on instrumentation plus a visit to the experimental facilities on the site (ILL and ESRF). A poster session was also organized in order to complement the overview of some recent experiments in this field.

As D. Roux recalled in the first contribution, scattering techniques (light, x-ray and neutron) give the most interesting structural information to understand the phenomenological and mechanical results obtained by rheology. Several examples of shear transitions i.e. transitions to metastable phases or orientation not observable at equilibrium were presented (shear stripping of charged vesicles - Gradzielsky *et al*; «onion phases» - Roux *et al*; shear ordering of surfactant system - Penfold *et al*, Richtering *et al*; shear ordering or shear melting in block-copolymer system either in melt or solution - K. Mortensen *et al*, I. Hamley *et al*, Porte *et al*; shear thickening in polymer-clays mixed system,



S. Cocard *et al*). On the other hand, phase transitions under shear or shift of the transition line have also been observed as in vesicle to micelle transition in surfactant mixtures (E. Mendes *et al*), in shear-induced aggregation in polymer solution (I. Morfin *et al*, T. Hashimoto), in shear effects in liquid crystal polymers (L. Noirez *et al*), or in critical polymer mixtures under shear flow (C. Han *et al*), on weakly flocculated dispersions (J. Vermand *et al*) and on diblock copolymer systems with re-entrant phenomenon (H. Leist *et al*). Although we can always present these shear effects as enhancement or decrease of fluctuations along the flow, it is still very difficult to predict them. All these examples are the signature of a large and rich variety of flow behavior completely open to theory [1].

All these groups presented some results using their specific techniques (light or neutron or x-rays). The aim of this common workshop was to find out ways of optimizing the use of the new third generation synchrotron sources (high spatial resolution and time-resolved experiments) as well as high-flux neutron beams (contrast variation) for pertinent experiments. Kinetics studies under continuous or oscillatory shear to describe the out-of-equilibrium transitions have been stressed (Porte *et al*, O. Pelletier *et al*, Mortensen *et al* C. Han *et al*). Moreover, the development of shear

cells with an access to the vorticity-gradient plane seems very important due to the effect of phase separation in the Couette cell gap (stress effect instead of shear effect). This also requires the on-line set-up of a rheometer to correlate directly stress measurement and scattering techniques.

The last point but not the least which has been emphasized, is the development of elongational flow systems (spinning system, stagnation point and stretching devices) which are very relevant in areas like materials processing, development of composites as well as in investigations of polymer dynamics in complex geometries (M. Cloitre *et al*).

Some new contacts have already been established and, in common with the ILL, we shall be able to judge the effectiveness of our development only in a few years' time when we look at what will be achieved. A common WEB page will be implemented in order to inform other large instrument beamlines and users about new instrumental development at the ESRF and the ILL.

P. Lindner, J. Zipfel and myself would like to thank all the people who have made this workshop successful.

**O. Diat**

[1] T. McLeish: *Theoretical Challenges in the Dynamics of Complex Fluids*, edited by T. McLeish, Kluwer Academic Publishers, Netherlands (1997).