

Experiment Report Form

The double page inside this form is to be filled in by all users or groups of users who have had access to beam time for measurements at the ESRF.

Once completed, the report should be submitted electronically to the User Office using the **Electronic Report Submission Application**:

<http://193.49.43.2:8080/smis/servlet/UserUtils?start>

Reports supporting requests for additional beam time

Reports can now be submitted independently of new proposals – it is necessary simply to indicate the number of the report(s) supporting a new proposal on the proposal form.

The Review Committees reserve the right to reject new proposals from groups who have not reported on the use of beam time allocated previously.

Reports on experiments relating to long term projects

Proposers awarded beam time for a long term project are required to submit an interim report at the end of each year, irrespective of the number of shifts of beam time they have used.

Published papers

All users must give proper credit to ESRF staff members and proper mention to ESRF facilities which were essential for the results described in any ensuing publication. Further, they are obliged to send to the Joint ESRF/ ILL library the complete reference and the abstract of all papers appearing in print, and resulting from the use of the ESRF.

Should you wish to make more general comments on the experiment, please note them on the User Evaluation Form, and send both the Report and the Evaluation Form to the User Office.

Deadlines for submission of Experimental Reports

- 1st March for experiments carried out up until June of the previous year;
- 1st September for experiments carried out up until January of the same year.

Instructions for preparing your Report

- fill in a separate form for each project or series of measurements.
- type your report, in English.
- include the reference number of the proposal to which the report refers.
- make sure that the text, tables and figures fit into the space available.
- if your work is published or is in press, you may prefer to paste in the abstract, and add full reference details. If the abstract is in a language other than English, please include an English translation.



	Experiment title: Integration of the cornea and sclera in the human cornea	Experiment number: SC 1438
Beamline:	Date of experiment: from:13/7/04 to:16/7/04	Date of report: 27/8/04
Shifts:	Local contact(s): M. BURGHAMMER	<i>Received at ESRF:</i>
Names and affiliations of applicants (* indicates experimentalists): K. M. Meek, Cardiff University* C. Boote, Cardiff University*		

Report:

We were allocated 9 shifts to carry out two studies of the cornea. The first study was to radially scan from cornea to sclera at 45 degree angles (8 scans) and the second was to examine strips of cornea edge-on to study collagen orientation as a function of depth within the cornea. The aim was to build up a three-dimensional model of collagen orientation to understand how the change of curvature is maintained at the limbus, where the cornea and sclera join.

The time allocated was quite late in the year when Dr. Riekkel was in Manchester. As a consequence, he had to ask Dr. Burghammer to take his place as our contact, because it was not possible for us to reschedule. Unfortunately, there were a number of problems setting the camera length to clearly resolve the required collagen reflection from our corneas. These problems meant that it was not until the fifth shift that we started to get useable data. The problems were both technical and also were related to our test specimens, which were slightly swollen. However, Dr. Burghammer worked incredibly hard, including most of the night, to make sure we got what we needed, and once we got going, we obtained excellent data.

Because of these problems, we only managed to complete the first experiment. However, the data we have obtained should be unique, because they have come from two eyes from the same donor. The normal procedures at the Eye Bank mean that it is very rare to obtain two corneas from the same person, and even rarer to get these corneas tagged so that their orientation is known when positioned in the x-ray beam. At Daresbury, we mapped these corneas at low resolution and found that the corneal structure is not circularly symmetrical. However, there are interesting symmetries between the left and right corneas. At ESRF we used 1mm steps radially from the centre for 3mm, then 25 micron steps across the sclera into the limbus. We managed to complete the data collection for both eyes (16 radial scans). We have started to analyse the huge amount of data, but it will be several months before the analysis is complete. To use the short time whilst Dr. Boote was sleeping, we took a two-dimensional raster scan across a mouse cornea and limbus. (The mouse cornea is not yet characterised structurally, but is the model used in a great number of studies. Because of its small size, the microfocus beam is ideal for this work, and we intend to put in a separate proposal to examine the mouse cornea in more detail).

