

**The First COSPAR Capacity-building Workshop**  
**held at INPE, Brazil, December 4<sup>th</sup>-13<sup>th</sup>, 2001**

COSPAR is in the process of establishing a new series of capacity-building workshops, and the first in this programme was held at the Instituto Nacional de Pesquisas Espaciais (INPE), Brazil, from December 4<sup>th</sup>-13<sup>th</sup>, 2001. It was co-sponsored by the IAU, together with NASA, ESA and FAPESP, Brazil. Two further workshops are planned for 2003.

These workshops are intended to enhance the scientific capability of developing countries by increasing the knowledge and use of public archives of space data so as both to broaden the scope of research programmes and also to ensure that scientists in these countries have the facilities available to them that are used by their counterparts elsewhere. They provide highly-practical instruction in the use of these archives and the associated publicly-available software so that participants on returning home can readily incorporate them into their research programmes. A strong effort is made to foster personal links between participants and experienced scientists attending the workshops in order to contribute to reducing the isolation often experienced by scientists in developing countries. The workshops will usually be arranged on a regional basis so that there will be a degree of homogeneity in the backgrounds of, and the problems encountered by, participants, which enables the programme to be organised as effectively as possible.

The programme of the INPE workshop was carefully tailored to contribute to achieving these objectives. The scientific topic was X-ray astronomy, based on the Chandra and XMM-Newton missions. These two major space missions are currently producing important new results and also have substantial and growing public archives of data and in addition use publicly-available processing and analysis software, all easily accessible through the internet.

The participants included 24 “students” and 9 lecturers and demonstrators. Most of the students were either final-year postgraduate students or young post-docs or faculty members but a small number either were more senior scientists working in conditions leading to isolation from the active scientific community or were final-year undergraduates. They came from Argentina, Brazil, Mexico, Chile and Bolivia, but predominantly from the first three countries. The lecturers were almost all actively involved in research with Chandra and/or XMM-Newton. They were

Dr Keith Arnaud (Goddard Space Flight Center, NASA, USA)  
Dr Christian Erd (Space Science Department, Estec, Netherlands)  
Dr Carlos Gabriel (VILSPA, ESA, Spain)  
Dr Francisco Jablonski (INPE, Brazil)  
Mr Ben Maughan (University of Birmingham, England)  
Dr Mariano Mendez (SRON, Netherlands)  
Prof Trevor Ponman (University of Birmingham, England)  
Dr Randall Smith (Center for Astrophysics, Harvard, USA)  
Prof Peter Willmore (University of Birmingham, England).

The time spent in the workshop was about equally divided between lectures and practical computing sessions. The lectures covered not only the cutting-edge science

of the missions and the use of the analysis software but also some necessary background in data processing and analysis theory, insofar as this was specific to the area of science involved.

The practical computing sessions commenced with setting up the analysis system on the participants' computer (each participant was provided with a computer for the duration of the workshop), followed by instruction in initial stages of the data-processing. This was to ensure that when they returned home they would be able to set up a working system with minimal support. Each participant was encouraged to come with a proposed project topic; otherwise one was allocated to them. The remainder of the practical sessions was devoted to carrying out this project, using archival data. One of the workshop lecturers was assigned to each project as an advisor or supervisor for the duration of the workshop—though it is hoped that the links thus forged may endure after it. The final session of the workshop consisted of a poster session at which the outcome of each project was described. The most successful projects were those carried out by teams of two or three people

The computing and networking requirements for these sessions were considerable and here we were fortunate in being located at a well-equipped space centre—which was also on an attractive campus.

Judging both by the on-the-spot impressions of lecturers and the remarks of students and by the evaluation questionnaires, the workshop was a highly successful, though only time will show whether its main objectives have really been met. However students showed good confidence that they would be able to undertake research on X-ray astronomy in the future and clearly were very confident of its potential value for their future research.

Prof Willmore was the workshop organiser and director. Dr Sausen of INPE was responsible for the local arrangements. Drs Braga and Villela, of the Astrophysics Division of INPE, undertook the very considerable task of preparing the two computing laboratories. The selection committee for the participants consisted of Drs Braga (Brazil), Machado (Argentina), Page (Mexico), Reisenegger (Chile) under the chairmanship of Prof Willmore. Grateful thanks are due to all of these, the lecturers and the members of the Organising Committee for the workshop.

Peter Willmore  
23<sup>rd</sup> January, 2002