

Report on the COSPAR Capacity Building Workshop
"X-ray Astrophysics: an advanced school for Latin-American astronomers" -
San Juan - Argentina - July 2011

I - Introduction

The workshop took place in San Juan, Argentina, from 25 July to 5 August 2011. Primarily organized by COSPAR, it counted with support from several international organizations, like the space agencies ESA, NASA and JAXA, the International Astronomical Union, the United Nations Office for Outer Space Affairs, the Centro Latinoamericano de Física, CONICET and CONAE.

The main aim of the workshop was to introduce young astrophysicists (PhD students and post-docs) to X-ray astronomy and multi-wavelength opportunities and to train them in the use of data and tools of the X-ray missions XMM-Newton (ESA), Chandra (NASA) and Suzaku (JAXA/NASA). Details about the workshop can be found under the COSPAR Capacity Building Program pages: cosparhq.cnes.fr/Meetings/Workshops.htm

II - Participants

A total of 35 applicants from 6 different Latin-American countries were selected out of a total of 46 candidates. Two of the selected students (both from Venezuela) could not make it at the last minute, leaving us with 33 students participating in the school.

The participants were from Argentina (19), Brazil (5), Mexico (3), Chile (2), Colombia (2), Venezuela (1) and Ecuador (1). The geographical distribution showed a strong local component, however diversified regionally within the country. The gender distribution was even, with 16 females and 17 males. It has to be noticed that neither geography nor gender was a criterium for selection in this workshop, but just scientific qualification. The full list of students including filiation and nationality is given in Appendix I.

III - Lecturers

The core of the lecturers participating had already experience with former X-ray COSPAR workshops, 5 of them (K. Arnaud, C. Gabriel, M. Mendez, R. Smith and P. Willmore) had been lecturers in all previous 4 X-ray workshops, a further lecturer (M. Guainazzi) in the last 3. New in the "team" were: Nancy Brickhouse, Javier Lopez-Santiago, Gerardo Juan Luna, Koshi Mukai and Ignazio Pillitieri. There was also support from 3 "local" data analysis experts, Facundo Albacete, Jorge Combi (both from Argentina) and Raymundo Lopes (Brazil). The full list including affiliation is given in Appendix II.

IV - Venue

The venue of the workshop was a hotel located in the surroundings of the city of San Juan, Villa Don Tomas, some 4 km from the city center. It offered full lodging for all students and lecturers during the 2 weeks, as well as a conference room, used both for lectures and as computer lab. The size of the room was just right, and perhaps at the limit for accommodating such a large number of students (and supervisors) at the time of the project work. To reduce costs, the local (San Juan) students were not put up in the hotel, and all the other had to share hotel rooms, some of them were put in rooms of 4 to 5.

V - Program

From the program (Fig. 1) it can be read that the school was structured with approximately 30% of the time dedicated to science lectures, 10% to lectures on missions' specifics

(spacecrafts, instruments and data analysis software) and 60% to the projects the students had to carry on. As in previous occasions, the lecturers have acted also as projects' supervisors.

Date											
24-Jul											
Arrival & Registration											
9:30 - 10:30		10:45 - 11:45		11:45 - 12:45		12:45 - 13:45		14:45 - 15:45		15:45 - 16:45	
An Intro to High Energy Astronomy Peter Willmore		The Missions I - XMM S/C & Instruments Carlos Gabriel		The Missions II - Chandra S/C & Instruments Nancy Brickhouse		Data Reduction I - Introduction to SAS Carlos Gabriel		Data Reduction II - Introduction to CIAO Nancy Brickhouse		X-ray Emission Mechanisms I Peter Willmore	
9:00 - 10:00		10:00 - 11:00		11:15 - 12:15		12:15 - 13:15		14:15 - 15:15		15:15 - 16:15	
X-ray Emission Mechanisms II Peter Willmore		X-ray Spectrum Analysis I - CCD Spectra Keith Arnaud		X-ray Spectrum Analysis II - Grating Spectra Nancy Brickhouse		Data Reduction III - A more detailed look at SAS Matteo Guainazzi		Computer Class Start of Project		Computer Class Project	
26-Jul											
Accretion Sources I - Black Holes and Neutron Stars Mariano Méndez		Galaxies, Clusters and Groups I Keith Arnaud		AGNs I Matteo Guainazzi		Cataclysmic Variables / Novae / White Dwarfs Gerardo Juan Luna		Computer Class Project		Computer Class Project	
27-Jul											
Accretion Sources II - Black Holes and Neutron Stars Mariano Méndez		Astrophysical Plasmas Nancy Brickhouse		Young Stars - Stellar Coronal Emission Ignazio Pillitteri		Stars & Time Variability Coronal structure Javier Lopez-Santiago		Computer Class Project		Computer Class Project	
28-Jul											
The Missions III - Suzaku S/C & Instruments Koji Mukai		AGNs II Matteo Guainazzi		Data Reduction IV - FT00LS + Suzaku dedicated S/W Koji Mukai		Statistics Mariano Méndez		ISM & SNR Randall Smith		Computer Class Project	
29-Jul											
				Galaxies, Clusters and Groups II Keith Arnaud		Source Searching Methods Carlos Gabriel		Computer Class Project		Computer Class Project	
30-Jul											
31-Jul											
Future Development in X-ray Astronomy Keith Arnaud		Multiwavelength Astronomy Koji Mukai		Computer Class Project		Computer Class Project		Computer Class Project		Computer Class Project	
1-Aug											
Writing Proposals Randall Smith		Computer Class Project		Computer Class Project		Computer Class Project		Computer Class Project		Computer Class Project	
2-Aug											
On-line Tools and Resources Koji Mukai		Basics of Scientific Presentation Randall Smith		Computer Class Project		Computer Class Project		Computer Class Project		Computer Class Project	
3-Aug											
Computer Class Project		Computer Class Project		Computer Class Project		Computer Class Project		Computer Class Project		Computer Class Project	
4-Aug											
Computer Class Project		Computer Class Project		Computer Class Project		Computer Class Project		Computer Class Project		Computer Class Project	
5-Aug											
Round Table Discussion Project		Computer Class Project		Computer Class Project		Computer Class Project		Project Presentations and Closing Meeting		Computer Class Project	

Fig. 1: Program of the Workshop in San Juan - Argentina - July/August 2011

VI - The projects

The students largely defined their projects themselves. A division in 6 groups was made for assigning the individual supervisors according to the subjects chosen, leaving 2 to 3 supervisors per subject. One of the novelties of this particular workshop was that all students worked on their projects using their own laptops. Working with different operating systems and flavours can be a significant additional burden for a workshop, not only for the installation of the different mission specific tools but also due to eventual problems with specific libraries, etc. We prevented this by asking the students to install and check all the packages needed (SAS, CIAO, FTOOLS, etc) in the weeks before the workshop, offering active support from our side. With few exceptions this was done. The problems found during the workshop in this sense have been minimal and could be promptly solved.

VII - Results

At the end of the workshop each student gave a short presentation (7 minutes + 3 minutes discussion time) summarizing the results obtained. Two different rooms were used in parallel (galactic and extra-galactic) for accommodating all 33 presentations in the final afternoon. A list of the individual projects is given in App. III. The results have been excellent, showing that all the participants understand the methodologies of the work in the field and are able to work with data and tools of at least one of the three missions, in most cases with more than one, after returning to their home institutes.

VIII - General evaluation

We have prepared and distributed among the students an evaluation sheet (App. IV), for getting a feedback concerning the different aspects of the workshop, obtaining twenty-three answered evaluation sheets (almost 70%). A full analysis of the results will be done in the near future for helping us to improve where possible future events. While the analysis can be partly complex, the immediate general impression from the answers shows a large level of satisfaction, with the workshop in general, but especially with the lecturers and supervisors.

The part of the workshop most valued by the students is the project, with a very high ranking for the given support, but also the diverse lectures, both on science and software, are well considered both in level and duration.

The only partial weak points emerging from the questionnaire are some local aspects, especially food. Also the fact that some students were put in rooms of up to 5 to reduce costs was clearly not popular; for comparison, there has never previously been a complaint about two students sharing a hotel room.

Fundamentally, the students found the workshop extremely valuable and are convinced to have benefitted significantly from attending it.

One of the remarkable points of this workshop is that it has been initiated and locally co-organized by Gerardo Juan Luna, a former participant of the first COSPAR workshop held at INPE (Brazil) in 2001, who is now an established X-ray astronomer, coming back to work in Argentina after a long stay in the USA. We would like to thank him but also all the people and organizations who have substantially contributed to making possible this event.

Carlos Gabriel - Peter Willmore - Mariano Méndez

Appendix I - List of participants

#	Surname	Name	Institute	Nationality
1	Alonso	Sol	IATE	Argentina
2	Bornancini	Carlos Guillermo	IATE	Argentina
3	Coldwell	Georgina	ICATE	Argentina
4	Collado	Ana	ICATE	Argentina
5	del Valle	María Victoria	IAR	Argentina
6	Duplancic	Fernanda	ICATE	Argentina
7	García	Federico	UNLP	Argentina
8	Maza	Natalia	ICATE	Argentina
9	Mesa	Valeria	ICATE	Argentina
10	Molina	Sol	IAA	Argentina
11	Nuñez	Natalia	ICATE	Argentina
12	Orellana	Mariana	IAR	Argentina
13	Ortega	Martín	IAFE	Argentina
14	Paron	Sergio Ariel	IAFE	Argentina
15	Peri	Cintia	IAR	Argentina
16	Petriella	Alberto	IAFE	Argentina
17	Pichel	Ana Carolina	IAFE	Argentina
18	Reynaldi	María Victoria	UNLP	Argentina
19	Vega	Luis	UNC	Argentina
20	Bronzato de Avellar	Marcio Guilherme	Univ. Sao Paulo	Brazil
21	Elvas	Andre	Observ. Nacional	Brazil
22	Gomes da Silva	Karleyne	INPE	Brazil
23	Rodrigues	Barbara Heliodora	INPE	Brazil
24	Silva	Thais	Univ. Sao Paulo	Brazil
25	Almeida Toro	Andrés	U.N. Andrés Bello	Chile
26	Cartier	Regis	Univ. de Chile	Chile
27	Castro Avila	Manuel Antonio	INPE	Colombia
28	Gonzalez Buitrago	Diego Hernando	UNAM	Colombia
29	López	Ericson	Obs. Quito	Ecuador
30	Castro	Angel	UNAM	Mexico
31	Méndez Hernández	Hugo	UNAM	Mexico
32	Pérez Reyes	Jonnathan	UNAM	Mexico
33	Gatuzz	Efraín	VISR	Venezuela

Appendix II - Lecturers and Supervisors

Lecturers

- Carlos Gabriel, ESA, Spain - Coordinator
- Keith Arnaud, CRESST, NASA, USA
- Nancy Brickhouse, SAO/CfA, USA
- Matteo Guainazzi, ESA, Spain
- Javier Lopez-Santiago, UCM, Spain
- Gerardo Juan Manuel Luna, SAO/CfA & ICATE/Conicet, USA/Argentina
- Mariano Mendez, Univ. of Groningen, The Netherlands
- Koji Mukai, GSFC/NASA, USA
- Ignazio Pillitteri, SAO/CfA, USA
- Randall Smith, SAO/CfA, USA
- Peter Willmore, Univ. of Birmingham, UK

Data analysis & project support

- Facundo Albacete Colombo, Univ. del Comahue, Argentina
- Jorge Ariel Combi, IAR, Argentina
- Raimundo Lopes de Oliveira, IFSC/USP, Brazil

App. III - Projects

Project

Analysis of the AGN Galaxy Interaction NGC3921

Galaxy Clusters of Galaxies in the X-rays

The effect of the host galaxy morphology and environment on the AGN X-ray emission

Binary stellar systems with Wolf-Rayet components

X-ray emission from Eta Carinae

XMM X-Ray Analysis of the Galaxy Cluster A781

X-ray study on Isolated Neutron Stars (INS)

Measuring of flux ratio of the emission lines in an Intermediate Polar

Analysis of UGC 7064

MRK 421: A very bright and variable Blazar

T CrB: A quiescent Nova in X-rays

V615 Ori: a T Tauri star with a resolved X-ray outflow

X-ray study of the SNR 41.1-0.3 (3C397)

X-ray study of the SNR W44 and its PWN

X-ray emission from a laser blade

The SNR G31.9+0.0 (3C391)

Markarian 421: Looking for old friends

X-ray analysis of NGC 1068

Estimation of the BH Mass and accretion rate of the NL-Seyfert 1 Mrk 896 from XMM data

Constraints on the radius of neutron stars

Abell 3571: Physical Characteristics - A Chandra/XMM analysis

XMM-Newton and ASCA data analysis of the polar CP Tuc

Soft state of the microquasar GRS 1758-258

The stellar content of young clusters in CMaR1

X-Ray emissions in Globular Clusters of M31

A Study Of X-ray AGN Variability

Spectral variability in CENTAURUS X-3

Observations of an Intermediate Polar with SUZAKU: AE Aquarii

X-Ray absorption in Mrk766

XMM-Newton EPIC PN Spectroscopy of NGC7469 and 7582

The Importance of Being an HCG

X-ray emission from wind-blown bubbles associated to Wolf-Rayet stars

Modeling oxygen X-Ray absorption in the interstellar medium

Appendix IV - Results from the evaluation form

14th COSPAR Capacity-building workshop, San Juan, Argentina (2011)

Workshop Evaluation Form

Prepared by P. Willmore, July 2011
Filled in by 23 students

General

	5	4	3	2	1	
The website told me all I needed to know about the workshop	9	5	8		1	5=strongly agree
The application form was easy to fill in	14	8	1			4=agree
Applications were efficiently handled	14	9				3=no strong feeling
I had time enough to make my travel arrangements	18	4				2=disagree
						1=strongly disagree

Comments

The website contained very little relevant information regarding not only the workshop, but also lodging. I wish the lecture programation could have been read all in advance.

Science Lectures

	5	4	3	2	1	
These lectures were for me personally the most useful part of the workshop	1	13	4			5=strongly agree
The time spent on the lectures was too long	1	4	2			4=agree
Or the time spent on the lectures was too short			3			3=no strong feeling
Or the time spent on the lectures was just right	8	3	2			2=disagree
						1=strongly disagree
						Answer only one of these
The lectures were at too high a level	2				1	Answer only one of these
Or the lectures were at too low a level		2				
Or the lectures were just right	9	7	2			
The lectures were well presented	7	14	1			
The lectures were stimulating	8	9	5			
The lecturers responded well to questions	12	9	2			
I found it easy to get on with the lecturers	10	10	1	1		
The lecture room was comfortable	4	5	9	2	2	

Comments

Were there any other topics you would have found espec

I think it could be useful to add another lecture of timing analysis. Maybe my opinion is a little bit biased by my personal interests, but I think it could improve the workshop.

I learned about topics that I didn't have good knowledge. Galactic black holes and AGN's are particularly useful to me.

More lectures on astrostatistics.

Other comments?

The lectures had the right level of difficulty to convey the essential view of high energy astrophysics. They were also stimulating and have opened my mind to a much greater range of possibilities.

A final lecture connecting astrophysical phenomena, for undersanting the importance of each astronomy area and creating projects with different astronomy areas could be joined. There should be a Cosmology, Lambda CDM scenario.

It was my first time of lectures in English, and it was to much information also in a short time. In some cases I have understood everything and in other cases not. Although, I have the feeling that someone that already have knowledge of X-ray astrophysics (not my case) may

The lecture room was ok, but it was too crowded.

Software Lectures

	5	4	3	2	1	
These lectures were for me personally the most useful part of the workshop	5	8	5	2		5=strongly agree
The time spent on the lectures was too long	2	1	1			4=agree
Or the time spent on the lectures was too short	3	4				3=no strong feeling
Or the time spent on the lectures was just right	5	6	1			2=disagree
						1=strongly disagree
						Answer only one of these
The lectures were at too high a level	3		2			Answer only one of these
Or the lectures were at too low a level		1				
Or the lectures were just right	8	6	1			
The lectures were intelligible	8	10	3	1		
The lectures were well presented	6	14	2	1		
The lectures were stimulating	9	9	1	1	1	
The lecturers responded well to questions	12	8	1	1		
I found it easy to get on with the lecturers	9	11	1	1		

Comments

Interactive lectures may be helpful, however may take too long to do that.

I found this kind of lectures are not useful: they presented the software before we use it. They end up being boring

I believe that the software lectures have to be given with other approach. If one have never used the different software

From my point of view these type of lectures should be made using an example to apply the software tools to it.

I would like to remark the good predisposition of all the experts to answer any question

Projects

	5	4	3	2	1	
The project was for me personally the most useful part of the workshop	17	6				
The time spent on the projects was too long			3			
<i>Or the time spent on the projects was too short</i>	2	3				
<i>Or the time spent on the projects was just right</i>	9	5	1			
The instructions received to install software before the workshop were appropriate	10	9	2			
The lectures did not prepare me adequately for the projec		3	5	9	4	
I would have preferred to have a PC provided than using rr		1		5	16	
I had difficulty using Linux			3	6	11	
The help I got with my project was adequate	10	12				
I found the supervisors helpful and easy to get on with	13	9				
I realized too late which the ultimate scope of the project i	2	2	10	6		

5=strongly agree
4=agree
3=no strong feeling
2=disagree
1=strongly disagree
Answer only one of these

Comments

I needed special help to finish installation, there were some softwares missing on my note and libraries conflicts and I didn't know what was happening.

Although this project is an important part of my PhD in Brazil, it is not the most useful by the reasons exposed above. However, the project has the potential to work on real data and discover something new.

Although the help was very valuable and the persons in charge of the soft were very kind, it is hard for me to install it again in another computer, for instance, for my students.

I think that providing Pcs for the students that have no laptop is very important, but if the students have laptops, to work on themis fundamental in order to come back to your research institutes with all your work and software in your own PC.

For those who have never used this software before was a little bit difficult understanding and getting used to however as time goes bye, everything worked out well.

I think 2 weeks is too short to understand all this and apply. It not enough time to mature what we learned

It was very useful to me all the work on the specific object that I have chosen. All the lecturers were very kind and helpful. It was a VERY good School, with a few things to improve (that I have writen above).

I have learned very much, not only about the software, but also X-ray astrophysics.

I strongly believe that using our laptops is better because we go back home with the software running and ready to use.

Accommodation

	5	4	3	2	1	
The airport transport was efficiently done	4	7	2	1		
The rooms at Don Tomas were good	6	6	5	2	1	
The food at Don Tomas was good		4	8	9	2	
Generally, the workshop environment was good	8	10	4	1		
Don Tomas was a good place to hold this workshop	3	9	8	3		
San Juan was an appropriate venue	4	7	7	3	1	

5=strongly agree
4=agree
3=no strong feeling
2=disagree
1=strongly disagree

Comments

Ok, that is a point. I understand the problem of the costs and budget, of course. But I had problems with the hot water twice. Besides, five persons per room is a bit too much...

The food was not nutritional equilibrated at the beginning, I

San Juan was a good pick, there are no distractors.

I would prefer a bigger town with better transport facilities, including a big airport.

The Future

	5	4	3	2	1	
I will be able to use X-ray data in my future research	17	5	1			
I have learned enough to do this without much extra help	4	14	5			
If I have problems, I know where to go for help	14	8	1			
I have benefitted significantly from attending the worksho	19	4				

5=strongly agree
4=agree
3=no strong feeling
2=disagree
1=strongly disagree

General Comments (on anything whatever to do with the workshop)

Although I had a good time, and have learned lots of things, I think the time spent inside the hotel was too long, I felt like a bird in a cage, and started to be very uncomfortable the last days. It's so much time away from your everything, confined with so many strangers, no privacy at room.

The workshop was excellent for me. The lecturers really know the subject and are among the best in the world and they are very accessible. To meet the persons who have written the softwares everybody else use is a privilege. In general the workshop was well designed and the idea of the play Copenhagen was great: I say it because I participated as a volunteer.

The workshop was really usefull to me. I like to thank the organizers for the oportunity.

I found it easy to get on with the lecturers

I've learned a lot. I think it will be very useful for my future research. I made friends and met excellent people. I also contacted first level researchers which gave me the opportunity to discuss and learn about many topics. I think it was an excellent workshop from almost every point of view.

I understand that it is impossible to make such courses with more time, but I think it would be more productive more time to mature knowledge, and a little rest, as fatigue was also felt in the second week. The rest was great, the teachers were excellent! thanks

Like I've said before, it was a very good Workshop. The lecturers are very accesible people, and very kind. I also take with me some new friends. We have done a lot of work and have a lot of fun too. Some especific themes were not very useful to me, but all the general themes, on the contrary. About the software lectures, I think that can be improved, maybe with examples.

In general, I can say that this Workshop has a excellent level, and that is what I am going to remember about it, and that the lecturers were very kind and helpful with all of us. The LOC also has made a very good job, and the few little things that have gone not so well, were casual.

Thanks for everything, we can see how much work this Workshop mean to all of you. Congratulations! It has been succesfull!

I am pleasantly surprised with the lecturers and supervisors of the workshop (many of the students are surprised either) because all of them are friendly, willing to help patiently and willing to share their knowledge with us. They are good teachers, and good teachers are very hard to find, specially in science. I'm very grateful to all of them.

I came here to learn and I've learned a lot; and I've worked a lot too, with enthusiasm and highly motivated (and I also had fun!). I am going back home with projects and ideas to work in X-rays astronomy. My comments may sound a bit obsequious, but this is how I actually feel. I believe that the accommodation and food are insignificant details. I will highly recommend this workshop to a friend.

The workshop was very good. The lectures were very interesting to me, because I learned others research topics in high energy astrophysics and this event prepare me to analize x-ray data. The city was good, the hotel was good but the room distribution was not very good. Thanks so much for the opportunity of attending this event. THANKS COSPAR

Appendix V - Some pictures



a lecture ...



another lecture ...



working on the project ...



working harder on the project ...



time for a walk in the garden ...



we need to rest sometimes... both, students AND lecturers / supervisors



The official WS group picture



A collage with impressions from the workshop