

Report on the COSPAR Capacity Building Workshop on Planetary Science

**July 23 – August 3, 2007
Montevideo, Uruguay**

Organization

The local organization of the Workshop was done by the staff of the Departamento de Astronomía, Facultad de Ciencias and Observatorio Astronómico Los Molinos, Ministerio de Educación y Cultura. Five persons were heavily involved in the organization, but over ten colleagues and students helped at different stages.

The academic activities were held in the Facultad de Ciencias, in one seminar room we held the lectures and a nearby one was especially conditioned for the PC laboratory. It was a hard work to have the PC lab properly working for over 30 computers. Wi-fi connection was also available for the laptops.

The foreign lecturers and students were accommodated in the Hotel-Escuela Kolping, 20 min. by bus from the Faculty. A coach brought them every morning and returned them back at the end of the day.

Lunch was served in the restaurant of the Faculty and dinner was served at the Hotel.

Participants

There were 8 foreign lecturers and 3 local ones, plus two colleagues that acted as software/scientific advisors for the students. Due to regional problems with the flights and airports, we experienced some delay in the arrivals of some of the lecturers, but it did not seriously affect the programme.

There were 28 students at the end. From a list of 43 applicants the latin-american members of the SOC selected in April a list of 27 students (4 from Argentina, 8 from Brasil, 3 from Chile. 2 from Paraguay, 2 from Perú, 6 from Uruguay and 2 from Venezuela). After closing the registration, three students (one each from Argentina, Brasil and Perú) with good qualifications learnt about the Workshop and contacted us. They were added to the list at their own expenses and they were included in the list sent to COSPAR. But a few days before starting the Workshop, 3 students from the original list withdrew; we then decided to fill their places with the three new ones, plus a local student that was not selected in the first list. In total 28 students successfully completed the course: 4 from Argentina, 7 from Brasil, 3 from Chile. 2 from Paraguay, 3 from Perú, 7 from Uruguay and 2 from Venezuela

In the previous weeks there were a lot of interest about the Workshop among the local undergraduate students and high-school astronomy teachers. We decided to let them participate as audience during the oral presentations, but the practical work with the computers was restricted to the selected students. In addition to the selected students, over 30 persons usually came to the lecturers; 21 of them participated in over 75% of the lectures and we issued a participation certificate to them.

Programme

The final programme is attached at the end. The activities were divided in three groups: lectures, practical work oriented by the lecturers, and work in the projects.

Seventeen lectures were given, most of them in the morning sessions. We started with some introductory lectures about our present knowledge of the Solar System and the most relevant

results of the planetary exploration. Some general information about solar system and spacecraft dynamics was also introduced. The purpose of these introductory lectures was to give a general background for those students that have little information about planetary astronomy.

The other set of lectures were devoted to specific targets and space missions. The lecturers generally started with some information about the target and then they presented some results about the planetary mission that they were involved. The topics covered were:

- Rings – Mark Showalter – SETI Institute and PDS/NASA
- Comets – Mike A'Hearn & Jiang-Yang Li – University of Maryland and PDS/NASA
- Asteroids – Makoto Yoshikawa – Japanese Space Agency & – Lucy McFadden – University of Maryland
- Mars – Angelo Pio Rossi – European Space Agency

A full day was devoted to learn and experience with a tool necessary for space missions' data: SPICE – José L. Vázquez – European Space Agency.

I attended most of the lectures and I found all the presentations very interest and in accordance to the objectives of the Workshop.

During the afternoon sessions, the students, under the orientation of the professors, played with the software and data presented in the morning sessions.

The following software was installed in the computers for the Workshop:

- NasaView
- Spice
- miniVicar
- ISIS
- IDL
- IRAF

Due to our limited knowledge about working with data from planetary missions, we did not realize in advance the variety of software and tools that are available. After learning the different alternative software, we realized that it might have been better to reduce the variety of software and concentrate in a few of them. Nevertheless, I think that the students got a general picture of the variety of available tools, and they were able to adapt their previous experience to the new information. Some of them decided to use the soft that they already known with the new data, while some others tried the new software.

The computer connections worked fined in spite of the high traffic during part of the hands on sessions. We were able to turn down a few data servers !! Hopefully the professors were in close connection with other colleagues in their home institutes and they managed to solve some of the problems (I thanks these anonymous collaborators).

The projects proposed by the lecturers were well suited for the time that the students had to accomplish them. Some of the students and the advisors proposed some other projects. A preliminary discussion about the projects was done on Saturday morning, but the main part of the work on the projects was done on the last Wednesday, Thursday and Friday morning.

We decided that the students had not enough time to work in individual projects, and therefore the projects were done in groups of 2-4 members. We tried to form the groups with students of the same institute and country, in order to be able to favor the continuation of the project in their home institute. All the lecturers, including those that were already left in the second week, collaborated very hard with the students.

The list of projects developed by the students is the following:

Deep Impact – NSosa & EAlvarez

Deep Impact – ASosa

Deep Impact – GDiaz & MCañada

Deep Impact – JGomez & VFigueres

Hayabusa – ARibeiro, FJasmim, PHasselmann & TMothe

Hayabusa – SBruzzzone & SRoland

Mars – AMolina, PNowajewski & IBotti

Mars – ASanchez & EMallada

Mars – MSpagnuolo & FPodesta

NEAR – AdeMorais

NEAR – JSanchez & AQuintero
Rings – CArguelles, M. Pajuelo, PBecerra & RSfair
Water – KTorres

Though a formal evaluation of the results of the projects was outside the scope of the Workshop, I think that most of the presentations were more than satisfactory. Some projects include some very interesting results and they were even able to find out some errors in the data sets !!

All the presentations (lecturers + students) as well as some extra material can be accessed at the webpage of the Workshop:

<http://www.astronomia.edu.uy/cospar2007>

In addition to the activities listed in the Programme some of the lecturers participated in several outreach activities. Three sets of two short public lectures were given according to the following programme:

Thursday 26, July

18:30 – “The Cassini mission to Saturn and its rings” – Mark Showalter – SETI Institute

19:30 – “Deep Impact to a Comet” – Mike A’Hearn – University of Maryland

Monday 30, July

18:30 – “Visiting a near by asteroid” – Makoto Yoshikawa – Japanese Space Agency

19:30 – “A rendez-vous to an asteroid” – Lucy McFadden – University of Maryland

Wednesday 1, August

18:30 – “The european planetary missions” – José L. Vázquez – European Space Agency

19:30 – “An Express journey to Mars” – Angelo Pio Rossi – European Space Agency

Each day over 70 people participated in the public lectures. Also Dr . M Yoshikawa, Dr J. L. Vázquez and Dr. A. Pio Rossi visited two high-schools and they gave lectures to the students.

Social events

The social events were crucial to take a break after the hard work. In addition to the opening and closing dinner, we made an excursion to a tourist ranch in the province of Maldonado where we are installing a small observatory. It was a very enjoyable experience in spite of the cold weather we suffered and some further inconvenience, e.g.: the ranch has no electric power that it was good to enjoy the clear sky; due to the low temperatures, the pipes were frozen during the night and we did not have water in the next morning !!

Evaluation

At the closing ceremony we made a short evaluation of the outcomes of the Workshop. From my perspective the two main goals of the Workshop were fulfilled, i.e.:

- Show to the young researchers in the latin-american planetary community the broad set of data archives from planetary missions that are easily and openly accessible, and demonstrate them that these data could be used in their common day projects. Show them some of the tools required to process this data. Put them in contact with people with experience in working with these data sets.
- Strength the collaboration among latin-american researchers in the field of planetary sciences, in particular the young ones, and try to get new researchers in the field in countries where there is no or little development.

The students as well as the more experienced researchers that participated in the Workshop agreed that they were coming back to their home institute with a good knowledge about the possibilities that the planetary data archives offer to them. They have new scientific projects to work in involving data from planetary missions.

There was a close collaboration among the students, lecturers and advisors that will certainly continue when they return home.

During the closing ceremony several other colleagues manifested that they found the Workshop very useful and they were very happy with the outcomes. I received several emails from

lecturers thanking that they were invited and expressing that they were gratefully surprised with the work done by the students.

Future perspective

This Workshop was foreseen as the continuation of the series of Capacity Building Workshops organized by COSPAR, as well as a new step in the collaboration among the Latin American planetary scientists, expressed in the series of "Workshop in Planetary Sciences of the South Cone of America". A new Workshop of this series will be held in San Juan (Argentina) February 2008 (<http://www.casleo.gov.ar/tcp08/>). We decided that a special session during the next Workshop will be devoted to the presentations of more elaborated results of the projects initiated in Montevideo during the COSPAR Workshop.

Furthermore, the enthusiastic participations of small groups of students from countries with little tradition in planetary astronomy like Chile, Paraguay, Perú and Venezuela, opens the possibility to establish new research groups in these places. Several colleagues have manifested their willingness to support the creation of these groups.

I am pretty confident that this COSPAR Workshop is an important milestone in the development of the planetary sciences in Latin America.

FINANCIAL REPORT

<u>COSTS (US\$)</u>	Payment in Cash	Reimbursement
<u>Local expenses</u>		
Hotel costs	9280	
Board	2588	
Coffees	1800	
Local expenses total	13668	
<u>Travel Support</u>		
Lecturers		13519
Students	5528	
Argentinian students		900
Students from INPE		320
Travel total	5528	
<u>Local travel</u>		
Coach to/from hotel	1151	
Fuel and taxis	252	
Local travel total	1403	
<u>Honoraria</u>		
Presents for lecturers	450	
Gifts to persons that collaborate (administrative, drivers, etc)	75	
Honoraria total	525	
<u>Computing</u>		
Computer managers	450	
PCs- setting up lab	2200	
Computing total	2650	
<u>Social events</u>		
Opening dinner	644	
Visit to Maldonado - coach	380	
Lunch Saturday	486	
Visit to Maldonado - room + board	1563	
Lunch Sunday	671	
Closing Dinner	1009	
Translation of open lectures	250	
Social events total	5091	
<u>Material</u>		
Posters	422	
Folders	393	
Programme + Badge	495	
Pens	178	
Office material	157	
Copies of material (papers, CDs)	385	
Material costs total	2030	
Total expected cost	30805	

INCOMES (US\$)

	Income cash	Reinbursement
<u>Sources</u>		
COSPAR + UN/OOSA + IAU grant	26852	13519
<u>Local sources</u>		
Ministerio del Educacion and Cultura	1660	
Universidad de la Republica	1500	
CLAF	493	
UNESCO/Montevideo Office	300	
INPE (Ticket of Bertachini + 1 student)		640
FUPACA (Support for Argentinean students)		900
Total committed funding	30805	15059

Comments

I hereby include some comments about the final list of costs in comparison with the expected budget.

The total cost of the "Local expenses" was smaller than the expected one, because the expected calculation included the meals for all the days, including those for the weekend and the ceremony dinners; and now they are transferred into the costs of the "Social events", therefore this item is larger than before.

The cost of the coffee breaks increased because we served a larger number of coffee to include the new undergraduate students, specially in the morning sessions.

In the "Travel cost" we separate the reimbursement of most of the students respect to the reimbursement of the lecturers (to be done by COSPAR) and other students that were supported by regional grants.

The "Local travel costs" increased a little due to some extra trips of the coach and several taxis that we had to take due to problems with the arrivals.

We had to pay some extra time to the computer managers to install all the software. Though we had some software previously installed in the PCs (IRAF+IDL), the lecturers suggested other software to use that we had to install it during the days of the Workshop. There were also several problems with the software on the student's laptops and we asked the managers to help them.

Most of the costs of the material (folders, badge, pens, copies, etc.) were not included in the expected budget. These materials were also distributed to the undergraduate students.

The budget exactly close because we have the compromise of the Ministerio del Educacion and Cultura to cover all the remaining expenses.

Attached to this file, there are copies of the most relevant receipts as well as copies of the tickets and passports of all the granted students.

List of lecturers

Name	Surname	Institution	Country	E-mail
A'Hearn	Michael	University of Maryland & NASA	USA	ma@astro.umd.edu
Showalter	Mark	SETI Institute	USA	mshowalter@seti.org
McFadden	Lucy	University of Maryland & NASA	USA	mcfadden@astro.umd.edu
Li	Jiang-Yang	University of Maryland	USA	jyli@astro.umd.edu
Vázquez-García	Jose Luis	European Space Agency – ESAC/ESA	Spain	jose.luis.vazquez@sciops.esa.int
Pio Rossi	Angelo	European Space Agency – ESA	The Netherlands	arossi@rssd.esa.int
Yoshikawa	Makoto	Japan Space Agency – JAXA	Japan	makoto@isas.jaxa.jp
Bertachini	Antonio	Instituto Nacional de Pesquisas Espaciais – INPE	Brasil	prado@dem.inpe.br
Roig	Fernando	Observatorio Nacional	Brasil	froig@on.br
Gil-Hutton	Ricardo	Complejo Astronómico El Leoncito – CASLEO	Argentina	rgilhutton@casleo.gov.ar
Tancredi	Gonzalo	Departamento de Astronomía, Facultad de Ciencias, UDELAR	Uruguay	gonzalo@fisica.edu.uy
Gallardo	Tabaré	Departamento de Astronomía, Facultad de Ciencias, UDELAR	Uruguay	gallardo@fisica.edu.uy
Fernández	Julio A.	Departamento de Astronomía, Facultad de Ciencias, UDELAR	Uruguay	julio@fisica.edu.uy

List of members of the Local Organizing Committee

Gonzalo Tancredi - Departamento de Astronomía, Facultad de Ciencias, UDELAR / Observatorio Astronómico Los Molinos – MEC

Tabaré Gallardo - Departamento de Astronomía, Facultad de Ciencias, UDELAR

Santiago Roland - Observatorio Astronómico Los Molinos – MEC

Rodrigo Sierra - Observatorio Astronómico Los Molinos – MEC

Sebastián Bruzzone - Observatorio Astronómico Los Molinos – MEC


List of students


	Name	Surname	Institution	Country	E-mail
1	Cañada	Marcela	Departamento de Geofísica y Astronomía, UN de San Juan	Argentina	mcanada@casleo.gov.ar
2	Díaz	Gonzalo	Departamento de Geofísica y Astronomía, UN de San Juan	Argentina	siempregonza@hotmail.com
3	Spagnuolo	Mauro	Laboratorio Tectónica Andina, Univ. Buenos Aires	Argentina	mauro@gl.fcen.uba.ar
4	Podestá	Federico	Universidad de La Punta, San Luis	Argentina	fpodesta@ulp.edu.ar
5	Hasselmann	Pedro	Observatorio Nacional / UFRJ / Observatorio do Valongo	Brasil	hasselmann@on.br
6	Jasmin	Flavia	Observatorio Nacional / Universidade do Estado do Rio de Janeiro	Brasil	flavialuzia2000@yahoo.com.br
7	Mothe-Diniz	Thais	Observatorio Nacional	Brasil	thais.mothe@on.br
8	Ribeiro	Anderson	Observatorio Nacional	Brasil	fisicaja@yahoo.com.br
9	Sfair	Rafael	Univ. Estadual Sao Paulo - UNESP - FEG	Brasil	rsfair@gmail.com
10	Torres	Karla	Instituto Nacional de Pesquisas Espaciais	Brasil	karlchen79@gmail.com
11	de Morais	Antonio	Universidade Federal do Rio Grande do Sul (UFRGS)	Brasil	antonioamore@yahoo.com
12	Botti	Ismael	Departamento de Astronomía, Universidad de Chile	Chile	ibotti@das.uchile.cl
13	Molina	Alejandra	Universidad de Chile	Chile	alejandra.mm@gmail.com
14	Nowajewski	Priscilla	Universidad de Chile	Chile	pnowajew@das.uchile.cl
15	Figueres	Vincent	Facultad de Ciencias Exactas y Naturales	Paraguay	vincfig@hotmail.com
16	Gómez	José María	Observatorio Astronómico, Universidad Nacional de Asunción	Paraguay	jhoseghomez@yahoo.es
17	Argüelles	Carlos	Pontificia Universidad Católica del Perú (PUCP)	Perú	a20040356@pucp.edu.pe
18	Pajuelo	Myriam	Pontificia Universidad Católica del Perú	Perú	mpajuelo@pucp.edu.pe
19	Becerra	Patricio	Pontificia Universidad Católica del Perú	Perú	a20020204@pucp.edu.pe
20	Alvarez	Eduardo	Observatorio Astronómico Los Algarrobos, Salto	Uruguay	olasu@adinet.com.uy
21	Bruzzzone	Sebastián	Observatorio Astronómico Los Molinos – MEC	Uruguay	sbruzzzone@fisica.edu.uy
22	Mallada	Esmeralda	Departamento de Astronomía, Facultad de Ciencias, UDELAR	Uruguay	mallada@fisica.edu.uy
23	Roland	Santiago	Observatorio Astronómico Los Molinos - MEC	Uruguay	sroland@fisica.edu.uy
24	Sánchez	Andrea	Departamento de Astronomía, Facultad de Ciencias, UDELAR	Uruguay	andrea@fisica.edu.uy
25	Sosa	Andrea	Departamento de Astronomía, Facultad de Ciencias, UDELAR	Uruguay	asosa@fisica.edu.uy
26	Sosa	Nancy	Departamento de Astronomía, Facultad de Ciencias, UDELAR	Uruguay	nsosa@fisica.edu.uy
27	Quintero	Amilkar	Universidad de Carabobo	Venezuela	aaqs1@yahoo.com
28	Sánchez	Juan	Universidad Central de Venezuela	Venezuela	jsanchez@cida.ve


COSPAR Capacity Building Workshop on Planetary Science - PROGRAMME

Day	9:30 – 10:45	10:45–11:15	11:15 – 12:30	12:30-14:00	14:00 – 15:45	15:45–16:15	16:15 – 18:00
Monday 23	Opening session #	Coffee break	Cont.	Lunch	Cont.	Coffee break	Spacecraft Dynamics
	10:00 - Origin and Evolution of the Solar System		11:45 - Overview of Planetary missions		14:30 - Solar System Dynamics		
	J. A. Fernández		G. Tancredi		T. Gallardo		
Tuesday 24	NASA's Planetary Data System (PDS)	Coffee break	ESA's Planetary Science Archive (PSA) / JAXA Planetary Missions	Lunch	Demonstration of NASA's PDS	Coffee break	Demonstration of ESA's PSA and JAXA archive
	M. A'Hearn & J. Li		J. L. Vázquez / M. Yoshikawa		M. A'Hearn & J. Li		J. L. Vázquez / M. Yoshikawa
Wednesday 25	Saturn's rings and shepherd satellites: General facts	Coffee break	Cassini mission to Saturn	Lunch	Practical work with Voyager & Cassini data on rings and satellites	Coffee break	Practical work with Voyager & Cassini data on rings and satellites
	M. Showalter		M. Showalter		M. Showalter		M. Showalter
Thursday 26	Comets: General facts	Coffee break	Deep Impact mission to Comet Tempel 1	Lunch	Practical work with data from missions to comets	Coffee break	Practical work with data from missions to comets
	M. A'Hearn		M. A'Hearn		M. A'Hearn & J. Li		M. A'Hearn & J. Li
Friday 27	Introduction of SPICE and Reference Frames in planetary science	Coffee break	Asteroids: General Facts	Lunch	Practical work with SPICE	Coffee break	Practical work with Reference Frames in SPICE
	J. L. Vázquez		M. Yoshikawa		J. L. Vázquez		J. L. Vázquez
Saturday 28	Start planning of the research projects with the lecturers	Coffee break	Cont. of planning	12:00 Departure to a tourist ranch, lunch on the way. Barbecue and stay overnight at the ranch			
Sunday 29	Visit to Punta del Este. Return late in the afternoon to the hotel						

Day	9:30 – 10:45	10:45–11:15	11:15 – 12:30	12:30-14:00	14:00 – 15:45	15:45–16:15	16:15 – 18:00
Monday 30	Asteroids: Hayabusa – Itokawa	Coffee break	Asteroids: NEAR – Eros	Lunch	Practical work with data from missions to asteroids	Coffee break	Practical work with data from missions to asteroids
	M. Yoshikawa		L. McFadden		M. Yoshikawa / L. McFadden & J. Li		M. Yoshikawa / L. McFadden & J. Li
Tuesday 31	Mars general facts & planetary geology	Coffee break	Mars Express data analysis	Lunch	Practical work with data from missions to Mars	Coffee break	Practical work with data from missions to Mars
	A. Pio Rossi		A. Pio Rossi		A. Pio Rossi		A. Pio Rossi
Wednes- day 1	Work on the projects	Coffee break	Cont. of work	Lunch	Work on the projects	Coffee break	Cont. of work
Thursday 2	Work on the projects	Coffee break	Cont. of work	Lunch	Work on the projects	Coffee break	Cont. of work
Friday 3	Presentation of the preliminary results of the research projects by the participants	Coffee break	Cont. of presentations	Lunch	Cont. of presentations	Coffee break	Cont. of presentations
							17:30 - Closing ceremony

 Oral presentations open to all the participants (including the audience – *oyentes*)

 Practical work only for the registered participants

 Presentations of the preliminary results of the research projects developed by the participants, open to all the participants

Monday 23, July, 9:30 – Opening session: Words from the organizers and the following representatives:

Dr. Amilcar Davyt - Dirección de Innovación, Ciencia y Tecnología para el Desarrollo – Ministerio de Educación y Cultura, Uruguay

Dr. Luis A. Salicrup - Oficina Regional para América Latina y el Caribe – UNESCO

Prof. Julio A. Fernández – Decano de Facultad de Ciencias – Universidad de la República, Uruguay