

# 2<sup>nd</sup> La Plata International School on Astronomy and Geophysics & 9<sup>th</sup> International IGeS Geoid School

## The Determination and Use of the Geoid

FACULTAD DE CIENCIAS ASTRONÓMICAS Y GEOFÍSICAS  
SEPTEMBER 7-11, 2009. LA PLATA, ARGENTINA

### Organized by:

Facultad de Ciencias Astronómicas y Geofísicas - Universidad Nacional  
de La Plata  
International Geoid Service - International Association of Geodesy

### Topics:

Theory for Geoid Computation  
The Remove Restore Concept and Collocation  
Monitoring Gravity Variations  
The Global Geopotential Models  
The Collocation Method in Geodesy  
Geoid, Gravity and Sea-level from Radar Altimetry  
The Terrain Effect in Geoid Estimation  
Gravity and Geoid in Argentina  
The Fast Fourier Transform (FFT) Methods in Geodesy  
Fitting the Gravimetric Geoid to GPS on Benchmarks

### Faculty:

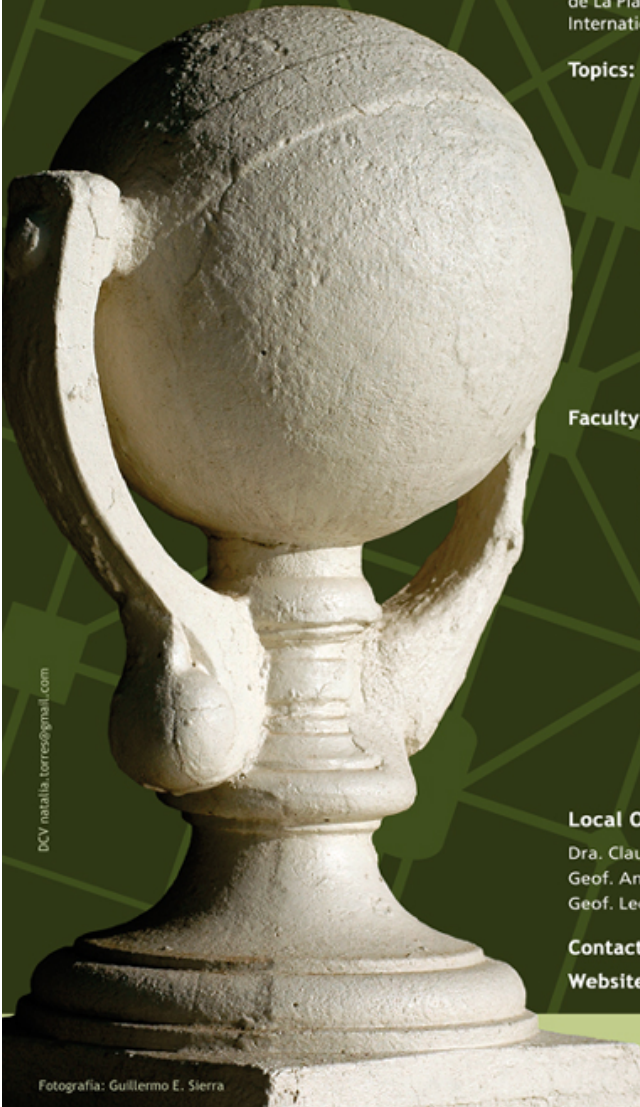
Dr. Fernando Sansó (*Politechnic of Milan - Italy*)  
Dr. Nikolaos K. Pavlis (*National Geospatial-Intelligence Agency - USA*)  
Dra. Claudia Tocho (*National University of La Plata - Argentina*)  
Dr. Luis Guarracino (*National University of La Plata - Argentina*)  
Dr. Christian Tscherning (*University of Copenhagen - Denmark*)  
Dr. René Forsberg (*Danish National Space Center - Denmark*)  
Dr. Michael Sideris (*University of Calgary - Canada*)  
Dr. Daniel Del Cogliano (*National University of La Plata - Argentina*)  
Dr. Georgia Fotopoulos (*University of Toronto - Canada*)  
Dr. Ole Andersen (*Danish National Space Center - Denmark*)  
Dr. Sylvain Bonvalot (*Bureau Gravimétrique International - France*)

### Local Organizing Committee:

Dra. Claudia Tocho (*Chair*) | Geof. Carolina Buffoni |  
Geof. Andrés Cesanelli | Dr. Luis Guarracino | Srta. Virginia Mason |  
Geof. Leonardo Monachesi | Sr. Federico Spath |

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## REPORT

The 2<sup>nd</sup> La Plata International School on Astronomy and Geophysics & 9<sup>th</sup> International IGeS School: *Determination and Use of the Geoid* has been organized at the Faculty of Astronomical and Geophysical Sciences of the University of La Plata, Argentina from 7 to 11 September, 2009.

**Organizing Committee:** Prof.Fernando Sansò (IGeS), Dra.Claudia Tocho (UNLP)

### **Teachers and Lectures**

The school includes both theoretical lectures and computational exercises on local geoid computation, given by Professors: F. Sansò (Politecnico di Milano), R. Forberg (Danish National Space Center), N. Pavlis (NGA), C. Tscherning (University of Copenhagen), M. Sideris (University of Calgary). On the first day, two seminars on *Geoid, Gravity and Sea-Level from Radar Altimetry* and *Monitoring Gravity Variations* were given by Prof. O. Andersen (Danish National Space Center) and S. Bonvalot (BGI). On the third day, there was a seminar given by Prof. G. Fotopoulos (University of Toronto) and during the last day a seminar on *Gravity and Geoid in Argentina* given by professors of the University of La Plata.

### **Final program**

1st day: Monday 7 September

**8:30 – 9:00**    **Registration**

**9:00 – 13:00**    **Lecture 1:** *Theory for Geoid Computation. The Remove Restore Concept and Collocation.* Prof. F. Sansò.

**14:30 – 18:30**    **Seminar 1:** *Geoid, Gravity and Sea-Level from Radar Altimetry.* Prof. O. Andersen.

**Seminar 2:** *Monitoring Gravity Variations.* Prof. S. Bonvalot.

2nd day: Tuesday 8 September

**9:00 – 13:00**    **Lecture 2:** *The Global Geopotential Models.* Prof. N. Pavlis.

**14:30 – 18:30**    **Lecture 3:** *The Collocation Method in Geodesy.* Prof. C. Tscherning.

3rd day: Wednesday 9 September

**9:00 – 10:30**    **Computational Exercises:** *Gravity Field Determination by Global Geopotential Models.* Prof. N. Pavlis.

**Seminar 3:** *Fitting the Gravimetric Geoid to GPS on Benchmarks.* Prof. G. Fotopoulos.

**14:30 – 18:30**    **Computational Exercises:** *Geoid Determination by Least-Squares Collocation.* Prof. C. Tscherning.

4th day: Thursday 10 September

**9:00 – 13:00**    **Lecture 4:** *The Terrain Effect in Geoid Estimation.* Prof. R. Forsberg.

**14:30 – 18:30**    **Computational Exercises:** *Terrain Effects in Geoid Estimation.* Prof. R. Forsberg.

5th day: Friday 11 September

**9:00 – 13:00**    **Lecture 5:** *The Fast Fourier Transform (FFT) Methods in Geodesy.* Prof. M. Sideris.

**14:30 – 18:00 Seminar 4:** *Gravity and Geoid in Argentina*. Prof. C. Tocho, L. Guarracino, D. Del Cogliano.  
**Computational Exercises:** *Geoid Determination by FFT*. Prof. M. Sideris & Prof. C. Tocho.

Coffee breaks: 10:30 – 10:50 // 16:30 – 16:50

Lunch breaks: 13:00 – 14:30

### Participants

Following the preliminary contacts (40 people roughly), the school started with 23 participants coming from Argentina, Denmark, Germany, Brazil and Uruguay.

**List of participants**

Name	Country	Mail
<b>Arecco</b> , María Alejandra	Buenos Aires, Argentina	ma_arecco@yahoo.com.ar
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<b>Carozzi</b> , Fernanda	La Plata, Argentina	fer_carozzi@hotmail.com





**School sites**

Morning theoretical lessons: 9-13.00. Salon Meridiano, Faculty of Astronomical & Geophysical Sciences.

Afternoon computer exercise sessions were held in the computer room of the Faculty of Astronomical & Geophysical Sciences.

The computer room is equipped with 25 new computers working with Linux, on which Fortran compilers and Python interface have been installed to use fortran programs usually run under Unix systems.

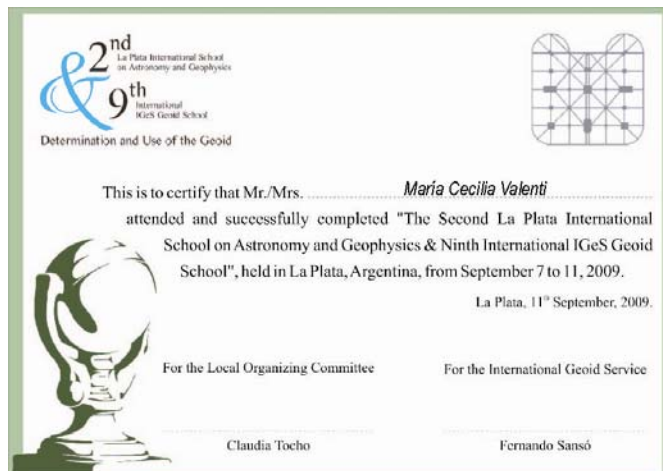


### Distributed documents

Students have been given some printed Lecture Notes, IGeS CD with software and data for exercises, the GRAVSOFT manual, and users guide for FFT exercises.

Moreover a final CD has been given with all the lectures presented during the week.

Each student received a participation certificate.



### Social Program

#### 1st day: Monday 7 September

18:00 – 18:30 Guided Tour: Astronomical Observatory

18:30 Welcome reception

Meta Swing Concert (Gipsy Swing)

Facultad de Ciencias Astronómicas y Geofísicas

#### 3rd day: Wednesday 9 September

21:00 Social dinner

#### 4th day: Thursday 10 September

17:00 – 18:30 Guided Tour: Natural Science Museum



### **Feedback questionnaire**

A questionnaire (taken from the Brazil School edition) has been filled up by 10 students. Syntheses of answers are as follows (marks range from

1: Very poor, 2: Poor, 3: Sufficient, 4: Good, 5: Very Good).

		Very poor	Poor	Sufficient	Good	Very Good	Total
1)	Length of School		1		4	5	10
2)	Scientific Level				1	9	10
3)	Quality of Lecture Notes		1		4	5	10
4)	Quality of teachers/ lectures				1	9	10
5)	Quality of computer exercises			2	8		10
6)	Overall School evaluation				7	3	10

Most of the added comments were positive remarks, with some requests or suggestions for the next editions like:

- distribute in advance (via e-mail, or through the website) notes, lectures, exercise guides, to allow people to be prepared.
- give more time for practical exercises.

I personally, think that the school has been a successful event.



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For more details about the school and the interviews with professors and students, please visit the following web-site: <http://www.fcaglp.unlp.edu.ar/extension-y-difusion/boletin-de-noticias-1/boletin-276.-18-de-septiembre-de-2009/boletin-276.-18-de-septiembre-de-2009>

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