

The school aims to provide an introduction to a very dynamic area of research that lies at the intersection of number theory, p-adic analysis, algebraic geometry and singularity theory. In this area, the local zeta functions (p-adic, archimedean, motivic, etc.) and certain counterparts known as Poincaré series (usual and motivic) associated with filtrations play a central role. The local zeta functions were introduced in the 50s by I. M. Gel'fand and G. E. Shilov. Later, in the 70s, J.-I. Igusa developed a uniform theory for local zeta functions and oscillatory integrals, with a polynomial phase, on fields of characteristic zero. In the p-adic case the local zeta functions are related to the number of solutions of polynomial congruences and to certain exponential sums. There are many (very difficult) conjectures that connect the poles of the local zeta functions with the topology of complex singularities. Recently J. Denef and F. Loeser introduced zeta motivic functions, which constitute a vast extension of the p-adic Igusa zeta functions. Another important object is the Poincaré motivic series introduced by Campillo, Delgado and Gusein-Zade, also involving the topology of complex singularities. This summer school proposes four courses which give an advanced introduction to these topics, proposing exercise sessions (coordinated) as well as four talks that present current related research problems. The school is aimed at doctoral and postdoctoral students working on topics broadly connected to the topics in the school.

#### Civil dislocation and mathematical roots

Open conferences on the work and figure of Lluís A. Santaló Sors

*Tuesday 25th of June*

19.00h Magdalena Palace Exile of Spanish science and its consequences. The mathematical influence of Lluís A. Santaló Sors.

Antonio Campillo

*Wednesday 26th of June*

19.00h Magdalena Palace

Professors of Mathematics in the republican exile. The case of Lluís A. Santaló Sors Luis Español González

*Thursday 27th of June*

19.00h Magdalena Palace

Lluís A. Santaló Sors: His research dimension Sebastià Xambó-Descamps



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#### INFORMACIÓN GENERAL

**Hasta el 14 de junio de 2019**

##### Santander

Campus de Las Llamas  
Avda. de los Castros, 42  
39005 Santander  
Tel. 942 29 87 00 / 942 29 87 10

##### Madrid

C/ Isaac Peral, 23  
28040 Madrid  
Tel. 91 592 06 31 / 91 592 06 33

**A partir del 17 de junio de 2019**

##### Santander

Palacio de la Magdalena  
39005 Santander  
Tel. 942 29 88 00 / 942 29 88 10

alumnos@uimp.es

#### PLAZOS

##### Solicitud de becas

Hasta el día 27 de mayo,  
para los cursos que comiencen  
antes del 5 de julio de 2019

Hasta el día 14 de junio,  
para los cursos que comiencen  
a partir del 8 de julio de 2019

##### Apertura de matrícula

Desde el 6 de mayo de 2019  
(plazas limitadas)

##### Horario general

de 9:00 a 14:00 h  
de 16:00 a 18:00 h  
(excepto viernes)

Código 64A0 / Tarifa: C / ECTS: 1

Organizado en colaboración con:



Real Sociedad  
Matemática Española

# UIMP

Universidad Internacional  
Menéndez Pelayo

SANTANDER 2019



XX SCHOOL  
OF MATHEMATICS  
«LLUIS SANTALÓ»

Research  
Summer School  
2019: p-adic  
Analysis, Arithmetic  
and Singularities

Alejandro Melle Hernández

Del 24 al 28 de junio

[www.uimp.es](http://www.uimp.es)

700-19-002-3

## SANTANDER, 2019 Programa académico

XX SCHOOL OF MATHEMATICS «LLUIS SANTALÓ»

### Research Summer School 2019: p-adic Analysis, Arithmetic and Singularities

Dirección

[Alejandro Melle Hernández](#)

Catedrático de la Universidad Complutense de Madrid

Secretaría

[Carlos Galindo Pastor](#)

Profesor Titular de la Universitat Jaume I de Castellón

#### Del 24 al 28 de junio

Lunes 24

10:00 h | Opening

10:15 h | Introduction to motivic Poincaré series (I)

[Sabir Gusein-Zade](#)

Lomonosov Moscow State University

11:30 h | Coordination-Exercise Session

[Julio José Moyano Fernández](#)

Universitat Jaume I de Castelló

12:00 h | Introduction to the singularities of plane curves (I)

[Francisco José Monserrat Delpalillo](#)

Universidad Politécnica de Valencia

15:30 h | Introduction to p-adic analysis (I)

[Wilson Álvaro Zúñiga Galindo](#)

Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional

16:30 h | Introduction to motivic Poincaré series (II)

[Sabir Gusein-Zade](#)

Martes 25

09:30 h | Introduction to motivic Poincaré series (III)

[Sabir Gusein-Zade](#)

11:00 h | Coordination-Exercise Session

[Julio José Moyano Fernández](#)

11:30 h | Introduction to p-adic analysis (II)

[Wilson Álvaro Zúñiga Galindo](#)

12:30 h | Introduction to motivic Poincaré series (IV)

[Sabir Gusein-Zade](#)

15:30 h | Introduction to local zeta functions (I)

[Willem Veys](#)

University of Leuven (KU Leuven)

16:30 h | Introduction to the singularities of plane curves (II)

[Francisco José Monserrat Delpalillo](#)

Miércoles 26

09:30 h | Introduction to the singularities of plane curves (III)

[Francisco José Monserrat Delpalillo](#)

11:00 h | Coordination-Exercise Session

[Julio José Moyano Fernández](#)

11:30 h | Introduction to p-adic analysis (III)

[Wilson Álvaro Zúñiga Galindo](#)

12:30 h | Introduction to the singularities of plane curves (IV)

[Francisco José Monserrat Delpalillo](#)

15:30 h | Poincaré series and Topology

[Félix Delgado de la Mata](#)

16:15 h | On Archimedean zeta functions and Newton polyhedra

[Edwin León Cardenal](#)

Jueves 27

09:30 h | Introduction to p-adic analysis (IV)

[Wilson Álvaro Zúñiga Galindo](#)

11:00 h | Coordination-Exercise Session

[Julio José Moyano Fernández](#)

11:30 h | Introduction to local zeta functions (II)

[Willem Veys](#)

15:30 h | Introduction to local zeta functions (III)

[Willem Veys](#)

16:30 h | A tour on p-adic string theory

[Juan Manuel Burgos](#)

17:15 h | p-adic electrostatics

[Chris Sinclair](#)

Viernes 28

09:30 h | Introduction to p-adic analysis (V)

[Wilson Álvaro Zúñiga Galindo](#)

10:30 h | Coordination-Exercise Session

[Julio José Moyano Fernández](#)

11:30 h | Introduction to local zeta functions (IV)

[Willem Veys](#)

13:00 h | Closing