



EUROPEAN DOCTORATE SCHOOL OF  
DIFFERENTIAL GEOMETRY

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## Introduction

This project aims to create the European Doctorate School of Differential Geometry (ESDG). The realization of this type of event is essential to maintain the vitality of Differential Geometry in Europe. Differential Geometry is a field of Mathematics with a plethora of progress in recent years (to name only a few, we mention the solutions to the Lawson, Poincaré and Willmore conjectures), and which has helped to project Europe in the International Mathematics scenario.

The ESDG target audience is focused on young researchers, as well as Master and Doctoral students involved in the area of Differential Geometry. The ESDG will encourage the cohesion of the different research groups in Europe, having significant effects on the development of Mathematics on the continent. This project aims to emphasize the creation of a school that effectively counts on the participation of the European scientific community in the area and foreign researchers of the highest level. The motivation is that the ESDG will be a memorable event due to the quality of the organization, the high scientific level, and the clear expansion of benefits to participants. The ESDG will attract the interest of a significant number of European students and researchers from all over the world. To do so, the commitment of as many European countries as possible is important for the success of an event of such magnitude.

The idea is to create a solid and resilient event, with a clear projection in the future and became one of the most important traditional events in the European Mathematics scene.

The ESDG will take place every two years, each occasion in an European country.

## Objectives

Among the general objectives of the ESDG, we mention the following:

- I. Promote a significant advance in research, scientific exchange and improvement of doctoral programs in Europe.
- II. Aggregate research groups all over Europe with groups from other national and international institutions present at the event.
- III. Bring together young researchers and students of Differential Geometry in Europe to stimulate interest in advanced studies and research in Mathematics in the area of Differential Geometry.

As for the specific goals of the ESDG, we highlight:

- I. Foster the integration of Europeans and foreign researchers working in the field of Differential Geometry.
- II. Provide scientific exchange.
- III. Stimulate the training of new researchers in Differential Geometry.
- IV. Promote recent results in Differential Geometry.
- V. Promote the study of current topics in this area through mini-courses, conferences, problem/working sessions and poster sessions.
- VI. Improve and expand the mathematical culture in Europe.
- VII. Awakening young people to scientific research and initiation into research in mathematics.

As an important long-term objective, we would like to stand out:

- I. Creating a Doctoral Network under the umbrella of the EU Marie Skłodowska-Curie Actions.

<https://marie-sklodowska-curie-actions.ec.europa.eu/actions/doctoral-networks>

## Parameters: when and who

The duration of each ESDG event will be of two weeks, to be developed preferably in June or July. The frequency will be every two years, starting in 2024.

Each school expects to receive around 60 people, including students and professors/researchers in the area of Mathematics interested in advances in research in Differential Geometry, from various countries of Europe and abroad.

## Countries and partner institutions

This project has been already embraced by prestigious institutions in Europe as Universidad de Granada (Granada, Spain), Université Gustave Eiffel (Paris, France), Università Degli Studi Dell'Aquila (L'Aquila, Italy), Eidgenössische Technische Hochschule Zürich (Zürich, Switzerland), Warwick University (Warwick, United Kingdom), Instituto Superior Tecnico (Lisbon, Portugal), Technische Universität Berlin (Berlin, Germany), University of Ioannina (Ioannina, Greece), KU Leuven (Leuven, Belgium) and Cyprus University (Nicosia, Cyprus).

The school intends to expand this list to as many institutions and countries with relevant research groups in Differential Geometry within Europe as possible.

Any other country interested in participating, please, get in touch with:

José M. Espinar: [jespinar@ugr.es](mailto:jespinar@ugr.es)

# Organization

Each school will be organized by a Host Country (HC) and Participant Countries (PC) that must commit to bringing students/young researchers to the event. The main body of organization of each school is the **Board**, which will be composed of 2 **Delegates** from the HC and 1 **Delegate** from each PC.

## **Board**

The Board's duties are:

- Elect the HC for the next ESDG among the proposals.
- Validate the Scientific Committee proposed by the HC.
- Recommend Plenary Speakers or Mini-Course to the Scientific Committee of the Host Country
- During the ESDG, the Board for the next ESDG will be elected by the Delegates among the proposals

## **Host Country (HC)**

The duties of the HC are:

- Organize the event and provide competitive prices for accommodation and meals for the participants.
- Provide a Scientific Committee (not necessarily all the members from the HC), together with a tentative program and schedule of the ESDG.
- Provide an Organizing Committee for the ESDG.
- Support the scholarships of 6-10 students.
- Apply for EU support/grant
- Encourage the Board members of the HC to participate as the Scientific and Organizing Committee of the ESDG.

## **Participant Countries (PC)**

Each PC is committed to:

- Provide a Delegate, who is the person in charge of the necessary actions in his/her country regarding the ESDG, such as diffusion of the event, electing students that will attend the ESDG, suggesting speakers to the Scientific Committee, supporting his/her attendance to the ESDG.
- Guarantee funds for 2-3 students of the PC to the ESDG.

## Activities

The following activities will be scheduled at every school:

- I. **Mini-Courses:** Each week will have around 4 mini-courses of 4/5 hours each.
- II. **Plenary Talks:** Each week will have at least 3 plenary talks of 1 hour each.
- III. **Poster Sessions:** Each week will have at least 1 poster session to encourage student participation

Also, the following activity might be scheduled at every school:

- IV. **Problem/Working Sessions:** Each week will have at least 1 problem/working session of 1 hour each.

## I ESDG: Granada 2024

The first ESDG will be held at IMAG, the Institute of Mathematics of the University of Granada (Spain), from June 24 to July 5th, 2024, as a satellite event of the European Congress of Mathematics 2024 to be held in Sevilla (Spain) from July 15 to 19. Its main topic will be the Geometry of Surfaces.

### **Board**

For the first edition of the ESDG, the Board is composed by:

**Spain (HC):** J. Pérez (UGR), J. M. Espinar (UGR)

**France (PC):** L. Hauswirth (Université Gustave Eiffel)

**Italy (PC):** B. Nelli (Università Degli Studi Dell'Aquila)

**Switzerland (PC):** T. Rivière (ETH)

**UK (PC):** F. Schulze (Warwick University)

**Portugal (PC):** R. Sena-Dias (Instituto Superior Tecnico)

**Germany (PC):** A. I. Bobenko (Technische Universität Berlin)

**Greece (PC):** T. Vlachos (University of Ioannina)

**Belgium (PC):** J. Van der Veken (KU Leuven)

**Cyprus (PC):** E. Samiou (Cyprus University)

**Austria (PC):** V. Branding (Vienna University)

**Denmark (PC):** N. M. Møller (University of Copenhagen)

### **Scientific Committee**

- Joaquín Pérez (UGR), Chair.
- Rosa Sena-Dias (Instituto Superior Tecnico)
- Francisco Martín (UGR)
- Barbara Nelli (Università Degli Studi Dell'Aquila)
- Laurent Hauswirth (Université Gustave Eiffel)

### **Organizing Committee**

- José Espinar (UGR)
- José A. Gálvez (UGR)
- Francisco Torralbo (UGR)
- Magdalena Rodríguez (UGR)

## Tentative Program

**First Week (June 24th - 28th)**: Proposed mini-courses:

- I. **Geometric PDEs I (GP I, 4 hours)**, by Connor Mooney, UC Irvine
- II. **Stability of minimal hypersurfaces of Euclidean space I (MS I, 4 hours)**, by F. Urbano, UGR.
- III. **Introduction to min-Max theory I (mMT I, 4 hours)**, by Dan Ketover, Rutgers University.
- IV. **Geometric Flows I (GF I, 4 hours)**, by Vicente Miquel, Universidad de Valencia

**Plenary Talks (PT)**: Tentative program of Confirmed Speakers

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| I. G. Tarantello, University of Rome Tor Vergara | VI. F. Schulze, Warwick University       |
| II. M. Traizet, University of Tours              | VII. T. Bourni, University of Tennessee  |
| III. C. LeBrun, Stony Brook University           | VIII. T. Vlachos, University of Ioannina |
| IV. A. Menezes, Princeton University             | IX. L. Mazet, University of Tours        |
| V. A. Seppi, Université Grenoble Alpes           | X. R. Petrides, Université Paris Diderot |

**Poster Sessions (PS)**: To encourage student participation, the school will offer Poster sessions. Wednesday (Organizer: Espinar & Gálvez)

	Monday	Tuesday	Wednesday	Thursday	Friday
9-10	GP I	GP I	GP I	GP I	
10-11	MS I	MS I	MS I	MS I	Vlachos
	Break				
11:30-12:30	Tarantello	LeBrun	PS	Schulze	Mazet
12:30-13:30	Traizet	Menezes	Seppi	Bourni	Petrides
	Lunch				
17-18	mMT I	mMT I	mMT I	mMT I	
18-19	GF I	GF I	GF I	GF I	



**Second Week (July 1st - 5th):** Proposed mini-courses:

- I. **Isoperimetric Problems I (IP I, 6 hours)**, by G. Antonelli, Courant Institute.
- II. **Stability of minimal hypersurfaces of Euclidean space II (MS II, 4 hours)**, by F. Urbano, UGR.
- III. **Introduction to min-Max theory II (mMT II, 4 hours)**, by Dan Ketover, Rutgers University.
- IV. **Geometric Flows II (GF II, 4 hours)**, by Vicente Miquel, Universidad de Valencia

**Plenary Talks (PT):** Tentative program of Confirmed Speakers

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| I. A. Ros, Universidad de Granada             | VI. N. Kapouleas, Brown University               |
| II. A. Bobenko, Technische Universität Berlin | VII. D. Wiygul, Università degli studi di Trento |
| III. T. Rivière, ETH                          | VIII. G. Franz, MIT                              |
| IV. L. Ambrozio, IMPA                         | IX. R. Buzano, Università degli studi di Torino  |
| V. P. Laurain, Université Paris Cité          | X. G. Besson, Institut Fourier                   |

**Poster Sessions (PS):** To encourage student participation, the school will offer Poster sessions. Wednesday (Organizers: Espinar & Gálvez)

	Monday	Tuesday	Wednesday	Thursday	Friday
9-10	IP I	IP I	IP I	IP I	
10-11	MS II	MS II	MS II	MS II	Franz
	Break				
11:30-12:30	Ros	Rivière	PS	Kapouleas	Buzano
12:30-13:30	Bobenko	Ambrozio	Laurain	Wiygul	Besson
	Lunch				
17-18	MmT II	MmT II	MmT II	MmT II	
18-19	GF II	GF II	GF II	GF II	