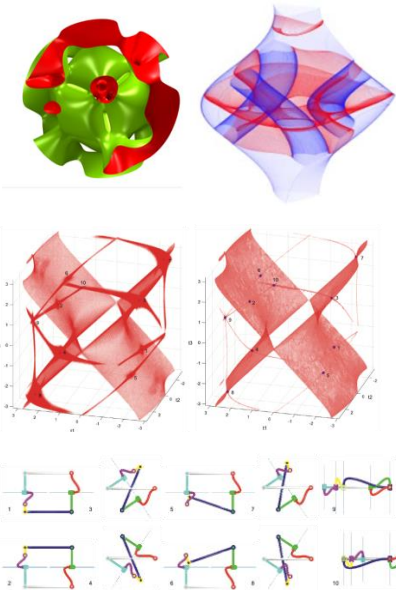# SIMERO 2025

5th Summer School on Singularities of Mechanisms and Robotic Manipulators

Barcelona, Spain, September 15-19, 2025
www.simero.org

The purpose of this school is to introduce key methods, milestone results, and main problems involving singularities of mechanisms and robotic manipulators.

Topics

Given the importance of kinematic singularities and the vast literature on the subject, it may be surprising that one rarely encounters a clear general definition of the phenomenon. These lectures will provide the foundations, a wide overview, and cutting-edge work around singularities.

- Rigorous definition of singularity. Singularity types.
- Mathematical characterization of singularities.
- Local and global topology of the singularity set and configuration space.
- Symbolic and numerical tools for singularity set computation.
- Methods to compute singularity-avoiding motions.
- Applications to illustrative robots and mechanisms.

Lecturers

Sébastien Briot *(LS2N, CNRS and École Centrale de Nantes, France)* - Continuum parallel robots: kinemato-static modeling and singularities.

Marco Carricato *(Università di Bologna, Italy)* – Screw theory and its application to singularity analysis.

Manfred Husty *(University of Innsbruck, Austria)* - Mechanism Constraints and Singularities -The Algebraic Formulation.

Jean-Pierre Merlet *(INRIA Sophia Antipolis, France)* – Physical singularities and relevant numerical methods.

Andreas Müller *(Johannes Kepler University Linz, Austria)* - Topological Analysis of Singularities and Mobility with Screw and Lie Group Theory.

Venue

SIMERO 2025 will take place in the city of Barcelona.

Overlooking the Mediterranean Sea, and famous for Gaudí and other Art Nouveau architecture, Barcelona is one of Europe's trendiest cities in culture, fashion, technology and cuisine. It combines the creativity of its artists and designers with care for local traditions.

The lecture hall is located near the famous Las Ramblas walkway, in the Gothic Quarter.

Registration

The registration fee includes coffee breaks, welcome reception, social event and gala dinner.

		After July 31, 2025
IFToMM attendees:	425 €	475 €
Non-IFToMM attendees:	475 €	525 €

Alba Perez Gracia *(Universitat Politecnica de Catalunya, Spain)* – Clifford algebras for kinematics and geometry.

Mark Plecnik *(University of Notre Dame, USA)* – The purposeful placement of singularities.

Federico Thomas *(Institut de Robòtica i Informàtica Industrial, Spain)* – Pure conditions.

Philippe Wenger *(IRCCyN, CNRS and École Centrale de Nantes, France)* - Identification, classification and trajectory planning of cuspidal robots.

Dimiter Zlatanov *(Università di Genova, Italy)* – Generalized singularity analysis and its interpretation.

Organizing Committee:

Andreas Müller, Alba Perez Gracia, Federico Thomas

Contact / More information

https://www.simero.org
alba.perez.gracia@upc.edu
a.mueller@jku.at