

9th edition of the International Summer School Son et Lumière

18th – 29th August 2025

Observatoire Océanologique
de Banyuls-sur-Mer

<https://sel2025.sciencesconf.org/>

Presentation



**Institut d'Acoustique
Graduate School**

Le Mans Université



Welcome

to the International Summer School Son et Lumière (SEL) 2025. This event brings together emerging researchers and seasoned experts to explore the fundamental principles and recent advancements in the fields of optics, acoustics, solid-state physics, thermodynamics, and more. Through a blend of introductory and specialized courses, participants will delve into theoretical and experimental techniques, gaining insights into the latest innovations such as laser ultrasonics in 3D printing, quantum opto-mechanics, and the applications of 2D materials. The school aims to foster a collaborative atmosphere where attendees can engage with each other and presenters, facilitating knowledge exchange and discussions on future research trajectories.

Set in the inspiring environment of the Oceanological Observatory of Banyuls-sur-Mer, the Summer School promises not only to enhance participants' understanding of sound and light interactions but also to encourage interdisciplinary connections. Participants will benefit from hands-on activities, poster sessions, and opportunities to discuss their research in an informal setting, creating a rich network of collaboration and inspiration. Join us in this unique educational experience that aims to shape the future of research in this dynamic and rapidly evolving field!

Samuel Raetz and Alexey Scherbakov



Objectives & topics

The interactions between sound and light are at the core of numerous current fundamental and applied research issues in disciplines such as physics, materials science, biology, nanotechnology, and engineering. The applications of these phenomena are just as varied, ranging from the characterization and metrology of composite materials and structures, to imaging biological media and diagnostics, to studying and engineering heat transport on the nanoscale, exploring quasi-particles from phonon/photon couplings, and advancing quantum information and communication technologies.

SEL 2025 aims to consolidate these fields towards the following Objectives:

- Provide a detailed state-of-the-art overview of the field, outlining recent advancements and highlighting the most relevant fundamental scientific questions that remain open, as well as new emerging directions and applications.
- Offer a comprehensive survey of the experimental techniques and theoretical approaches currently available.
- Facilitate mutual understanding between different communities by clarifying the techniques and terminology used by each.
- Describe existing or developing applications, particularly for the control or metrology of heterostructures, printed materials, thin films, nanometric structures, and for biological imaging and diagnostics.
- Foster exchanges and collaborations between members of different communities, as well as between experimentalists and theorists.

This Summer School is an excellent opportunity to receive in-depth training across fundamental concepts and experimental techniques, in an informal and beautiful environment which will facilitate networking and international and inter-generational communication for the next generation of researchers and scientists. The following topics will be covered:

- Laser Ultrasound / Non-destructive testing
 - Monitoring of transient processes (chemical reaction, phase transitions)
 - Bio sensing/cells
 - Inelastic scattering of light by phonons (Brillouin/Raman scattering)
 - Fourier Spectroscopy
 - Time-resolved X-ray diffraction
 - THz spectroscopy and techniques
 - Quantum opto- & nanomechanics
 - Polaritons/HF Optomechanics
 - Collective excitations (strong coupling) / Magnetism
 - Dispersion engineering/phononic crystals
 - Surface acoustic waves
 - 2D (vdW) materials/arrays/Moire
 - Extreme conditions
 - Thermal transport
 - Non reciprocity and topological acoustics
 - Tip-assisted light-matter interaction at the nanoscale (TERS, nanoFTIR, SNOM)
 - Machine learning in phononics and metamaterials
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Committees

Organizing Committee

Bertrand Audoin

I2M, Université de Bordeaux, France

Laurent Belliard

INSP, Sorbonne Université, France

Mélanie Fourmon

LAUM, CNRS, France

Salvatore La Cavera

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Daniel Lanzillotti-Kimura

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Samuel Raetz

LAUM, Le Mans Université, France

Alexey Scherbakov

Technische Universität Dortmund, Germany

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University of Basel, Switzerland

Scientific Committee

Andrey Akimov – University of Nottingham, UK

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Peter Burgholzer – RECENDT, Linz, Austria

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Pascal Ruello – IMMM, Université du Mans, France

Paulo Santos – PDI, Germany

Theodosia Stratoudaki – University of Strathclyde, UK

Mariano Trigo – Stanford University, USA

Eva Weig – Technical University of Munich, Germany

Oliver Wright – Osaka University, Japan



Venue

Observatoire Océanologique de Banyuls sur mer,
Sorbonne Université

20 Av. Pierre Fabre, 66650 Banyuls-sur-Mer, France

August 18 – 29, 2025



Contact

SEL 2025

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