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CEMRACS 2023 - SCIENTIFIC MACHINE LEARNING

The CEMRACS (Mathematical Summer Center for Advanced Research in Scientific Computing) is a flagship scientific event organized by the Society of Applied and Industrial Mathematics (SMAI). Established in 1996 by Yvon Maday and Frédéric Coquel from Sorbonne University, it takes place annually at CIRM in Luminy (Marseille, France), spanning six weeks from mid-July. CEMRACS is designed to foster collaboration between academia and industry on a selected cutting-edge scientific theme. The event consists of two key phases:

- A week-long summer school, featuring introductory lectures by leading experts in the field, aimed at providing doctoral students, postdocs, and researchers with a state-of-the-art overview of mathematical methodologies.
- A five-week research program, where young researchers work on supervised projects guided by senior scientists, tackling real-world challenges through mathematical modeling and computational approaches.

Over the years, CEMRACS has had a lasting impact, fostering long-term collaborations between researchers and industry, leading to new research directions and innovative projects that extend far beyond the summer session.

The CEMRACS 2023 edition was dedicated to Scientific Machine Learning (SciML)—a rapidly evolving field at the intersection of machine learning (ML) and scientific computing. SciML aims to develop robust, reliable, and interpretable methods to solve complex problems such as high-dimensional PDEs, parameter identification, and inverse problems. By naturally integrating data-driven techniques into numerical simulations, SciML is at the forefront of the next wave of scientific discovery in the physical and engineering sciences.

This special issue presents a collection of research projects conducted during CEMRACS 2023, showcasing the latest advances in SciML developed at CIRM from July 17th to August 23rd, 2023 (`http://smai.emath.fr/cemracs/cemracs23/`).

The organizers: Didier Auroux (University Côte d'Azur), Konstantin Brenner (University Côte d'Azur), Martin Campos Pinto (Max Planck Institute), Bruno Després (Sorbonne University), Victorita Dolean (University Côte d'Azur), Emmanuel Frénod (Bretagne-Sud University), Stéphane Lanteri (Inria University Côte d'Azur), Victor Michel-Dansac (Inria Nancy - Grand Est)

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