

Open workshop

The Spring School is organized by the M2P2 lab. It promotes the participants and is open for the interested general public. The Spring School is organized as a non-profit event in collaboration with OpenLB.

This year's Spring School venue is the historic building of the Centre International de Rencontres Mathématiques (CIRM) near the city of Marseille, right next to the Mediterranean Sea.

Registration fee includes

Lecture notes (theory lecture part pdf), lectures by invited speakers, software tutorial mentored by ProLB developers, daily lunches, 2x dinner (including Spring School dinner), social excursion, daily two coffee breaks, certificate of participation.

Pricing

	Early registration by 21 April 2025	Regular registration
Academia	450 €	600 €
Industry	1800 €	2000 €

On-site option (recommended): stay at CIRM (SUN to FRI, 5 nights), adds breakfast & dinners, single room (+ 500€) or shared double room (+ 400€ p.p), subject to availability.

Important dates

Spring School 19-23 May 2025
Early registration 21 April 2025

Poster session award

The award is aiming at supporting excellent students working in the field of LBM

SUPPORTED BY AND VENUE



This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101138305.

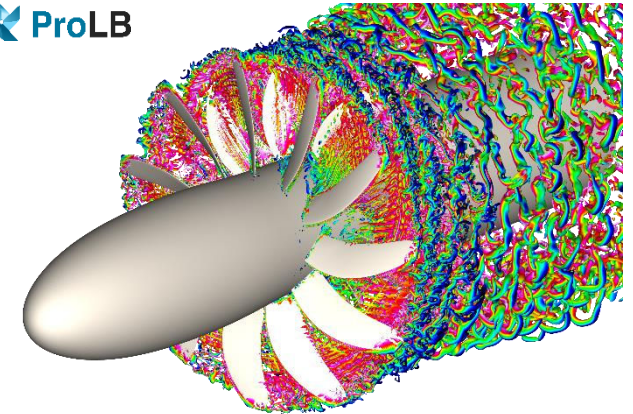


Spring School 2025 venue, CIRM, Marseille, France

SPRING SCHOOL

Lattice Boltzmann Methods
with ProLB Software Lab
19 - 23 May 2025 - Marseille, France

OPEN WORKSHOP



Register at <https://amu.azur-colloque.fr/inscription/en/322/inscription>

Executive committee

Pierre Boivin (M2P2/CNRS), Julien Favier (M2P2/AMU), Denis Ricot (CS Group), Shota Ito (LBRG/KIT), Mathias J. Krause (LBRG/KIT), Stephan Simonis (LBRG/KIT)

Host organization

M2P2 lab, Aix Marseille Université, CNRS,
Centrale Méditerranée

Venue

Centre International de Rencontres
Mathématiques (CIRM), Marseille

Objective

Lattice Boltzmann Methods (LBM) are an established numerical technique for Computational Fluid Dynamics (CFD) and beyond. The simulation of complex multi-physics benefits strongly from the mesoscopic modelling of LBM and positions it next to traditional numerical methods.

The rapid development in LBM – also driven by the emergence of massively parallel computing infrastructure – enables engineers to solve relevant problems for academia as well as for industry.

Target audience

The expected attendees are developers and researchers, from industry and academia interested to learn theoretical and practical aspects of LBM. The spring school addresses, e.g., engineers, computer scientists, mathematicians, and physicists as well as Master and PhD students.

Objective of the Spring School

The first half of the week is dedicated to theoretical fundamentals up to ongoing research on selected topics in kinetic theory, scientific computing, LBM, and Partial Differential Equations (PDE). These classes are shared for both OpenLB and ProLB tracks.

The next days are dedicated to ProLB trainings mentored by CS Group and M2P2 research engineers. Emphasis is placed on the modelling and simulation of particulate, multi-component, and turbulent fluid flows. Mentoring may be requested on setting up a specific case depending on the trainee's application interest.

About the ProLB consortium

ProLB is an innovative Computational Fluid Dynamics (CFD) software solution. Based on the Lattice-Boltzmann method, its successfully validated solver performs inherently transient simulations of highly complex flows with a competitive turnaround time. It handles aerodynamics (low and high Mach flows), aeroacoustics, thermal flows, rotating domains, multispecies and more.

ProLB is supported by a consortium academy-industry whose members are Airbus, Renault, Safran, CS Group (development and integration for commercial versions), Centre National pour la recherche Scientifique (CNRS), Université Aix-Marseille (M2P2 lab) and Ecole Centrale Lyon (LMFA lab).



Speakers (preliminary)

A. Revell (University of Manchester), F. Dubois (Université Paris-Sud), T. Krüger, H. Kusumaatmaja (University of Edinburgh), T. Reis (University of Greenwich), G. Silva (University of Évora), T.N. Bingert, F. Bukreev, S. Ito, M.J. Krause, A. Kummerländer, S. Simonis, D. Teutscher (LBRG/KIT), P. Boivin (M2P2/CNRS), J. Favier (M2P2/AMU), D. Ricot (CS Group)

PROGRAM

MONDAY, 19.05.2025

Morning – Registration, introduction, LBM applications, short introduction by all participants.

Afternoon – Scientific computing, mesoscopic modeling, kinetic theory, PDE, from micro to macroscale, LBM introduction, Chapman–Enskog expansion, boundary conditions, dimensions.

Evening – Poster session and dinner.

TUESDAY, 20.05.2025

Morning – LBM for turbulent flows, reactive flows, optimal control.

Afternoon – Fluid–structure interaction, LBM for multi-phase and multi-component flows, particulate flows, solids, efficient parallel implementation.

Evening – Free. Optional : help desk.

WEDNESDAY, 21.05.2025

Morning – Introduction to *ProLB*.

Afternoon – Social event / excursion.

Evening – Spring School dinner and poster award.

THURSDAY, 22.05.2025

Morning – *ProLB training session 1** : using ProLB graphical interface LBPre. Data tree, inputs, boundary conditions, first calculations with lbsolver.

Afternoon – *ProLB training session 2** : using ProLB graphical interface LBPre. Volume mesh, automation and scripting.

FRIDAY, 23.05.2025

Morning – *ProLB training session 3** : lbsolver overview. Steps, log review, pbd options, on-run interactions, results structure and manipulation.

Afternoon – *ProLB advanced training session 4** : coding a physics scheme inside ProLB (M2P2).

***Attendants do not need to bring their own resources. Computers, software and training material are provided.**