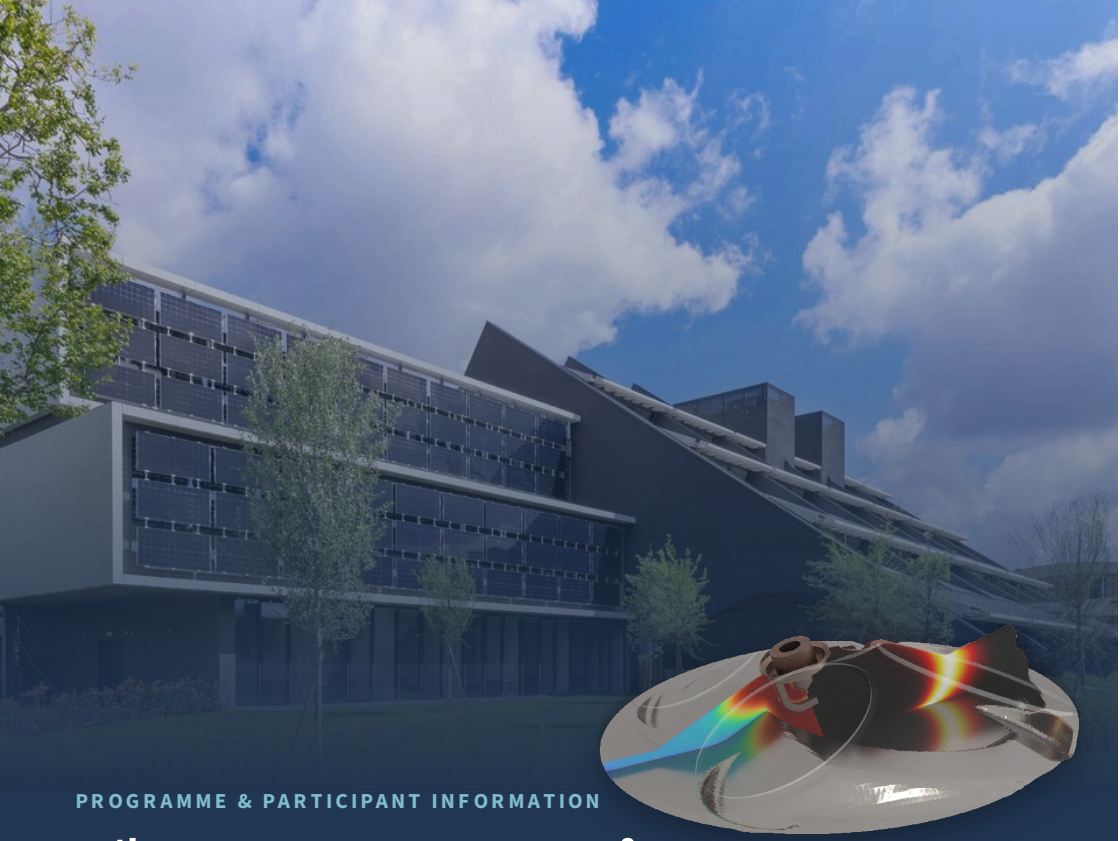

PROGRAMME & PARTICIPANT INFORMATION

7th Two-Day Meeting

on Propulsion Simulations using OpenFOAM® Technology

9–10 November 2026 · Monday – Tuesday
Politecnico di Milano · Department of Energy
EN:lab (BL31), Sala Consiglio · Via Lambruschini 6, Milano

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Sursum-Mi modeling the future

WELCOME

General information

The **Two-Day Meeting** is addressed to engineers and researchers who employ OpenFOAM® technology for the simulation of propulsion systems. In continuity with previous editions, the event focuses primarily on **internal combustion engines**, with particular attention to **alternative and sustainable fuels**, alongside a dedicated session on **fuel cells and battery electric vehicles**.

The meeting is jointly organised by the ICE Group of the Department of Energy, Politecnico di Milano, and the STFS group of TU Darmstadt.

WHEN	**Mon 9 – Tue 10 November 2026** Registration opens at 08:30 on Monday
WHERE	**EN:lab (BL31), Sala Consiglio** Department of Energy, Politecnico di Milano Via Lambruschini 6, 20156 Milano
FEE	**€200** per participant, presenters included Coffee breaks and light lunch included
REGISTRATION	Mandatory for every attendee, including co-authors attending in person – deadline **1 November 2026**
CONTACTS	**twodaymeeting-deng@polimi.it** Giovanni Gianetti · giovannigaetano.gianetti@polimi.it

THE MEETING

How it works

- **Over 30 presentations** by academic and industrial speakers in **ten thematic sessions**.
- **15-minute slots**: 10–12 min presentation + 3–5 min questions.
- Each session ends with a **10–20 min thematic discussion**.
- A **panel discussion** and an **open discussion** on OpenFOAM, industry and AI.

MAIN TOPICS

What we will talk about

- **In-cylinder flows**: gas exchange, fuel–air mixing, combustion, pollutant formation
- **Intake and exhaust systems**: aftertreatment, unsteady flows, silencers
- **Fuel cells and BEV**: powertrain and cooling modelling

AROUND THE MEETING

Side events

SUNDAY 8 NOVEMBER · 19:00

Welcome aperitivo

Informal get-together the evening before. **Registration required** (option in the registration form). **Deus Cafe Isola**, Via Genova Thaon di Revel 3, Milano.

MONDAY 9 NOVEMBER · 20:00

Social dinner

With speakers and participants. **Registration required** (option in the registration form). **Assaje**, Via Traù 2, Milano.

WEDNESDAY 11 NOVEMBER · 09:30–13:00

Demo session

Our in-house tools: **GASDYN** (1D), **Lib-ICE** (3D CFD on OpenFOAM) and their **GUIs**. **Free**, in person and online, with a dedicated registration form. See the leaflet in this booklet. **Sala Consiglio, building BL25** (Department of Energy), Via Lambruschini 4. Online link by e-mail.

PROGRAMME AT A GLANCE

Monday 9 November

Spray & combustion · Hydrogen & alt. fuels · Moving geometries · Advanced engines · Aftertreatment & 1D-3D · Fuel cells & BEV · Discussion

08:30 **Registration**

09:00 **Welcome greetings**

S1 Spray and Combustion – Part 1 Chair: G. Bracho 09:15–10:50

09:30 09:15 Viglione · Wärtsilä CH
09:30 Alopaeus · Wärtsilä FI
10:00 09:45 Huschka · TU Darmstadt
10:00 Gianetti · PoliMi
10:30 10:15 Duronio · UnivAQ

11:00 COFFEE BREAK · 10:50–11:25

S2 Hydrogen and Alternative Fuels – Part 1 Chair: I. Cozza 11:25–13:00

11:30 11:25 Dotteschini · UniUD
12:00 11:40 Lopez Ruiz · UPV/EHU
11:55 Schenkel · TU Eindhoven
12:30 12:10 Moradi · Univ. Oulu
12:25 Schuh · TU Darmstadt

13:00 LUNCH · 13:00–14:20

S3 Methodologies to handle moving complex geometries Chair: G. Gianetti 14:20–15:35

14:30 14:20 Leponiemi · Wärtsilä FI
15:00 14:35 Sforza · PoliMi
14:50 Gößnitzer · LEC GmbH
15:30 15:05 Jasak · Univ. Cambridge

S4 · Panel discussion Chair: G. D'Errico 15:35–16:35

16:00 **OpenFOAM for propulsion: innovation vs industrial application**
Panel: Beatrice, Hardy, Jasak, Viglione, Gößnitzer, Novella

16:30 COFFEE BREAK · 16:35–17:10

S5 Advanced Engine Concepts Chair: R. Lange 17:10–18:25

17:00 17:10 Gadalla · Wärtsilä FI
17:30 17:25 Ramognino · PoliMi
18:00 17:40 Bracho · CMT-UPV
17:55 Callegaro · UniMoRe

20:00 Social dinner
Registration required · Assaje, Via Traù 2, Milano

Tuesday 10 November

Spray & combustion · Hydrogen & alt. fuels · Moving geometries · Advanced engines · Aftertreatment & 1D-3D · Fuel cells & BEV · Discussion

08:30

09:00 **S6 Hydrogen and Alternative Fuels – Part 2** Chair: M. Gadalla — 09:00–10:00
- 09:00 Baronetto · PoliTO
- 09:15 Capecci · PoliMi
- 09:30 Pinilla-Fernández · CMT-UPV

10:00 **S7 Exhaust aftertreatment & 1D-3D modelling** Chair: A. Della Torre — 10:00–11:00
- 10:00 Montenegro · PoliMi
- 10:15 Pelosin · PoliMi
- 10:30 Lange · TU Darmstadt

11:00 **COFFEE BREAK · 11:00–11:35**

11:30 **S8 Spray and Combustion – Part 2** Chair: G. Hardy — 11:35–12:50
- 11:35 Pastor · CMT-UPV
- 11:50 Lucchini · PoliMi
- 12:05 Chen · KAUST
- 12:20 Rehman · Univ. Oulu

13:00 **LUNCH · 12:50–14:10**

14:00 **S9 · Open discussion** Chairs: A. Della Torre, F. Ramognino — 14:10–14:55
Innovating propulsion: OpenFOAM meets AI

15:00 **S10 Fuel cells, BEV powertrain modelling** Chair: S. Tosi — 14:55–15:50
- 14:55 Bulgarini · PoliMi
- 15:10 Antetomaso · CNR-STEMS
- 15:25 Tariq · PoliMi

WEDNESDAY 11 NOVEMBER · 09:30–13:00

Demo session: our in-house tools

Demonstrations of **GASDYN** (1D) and **Lib-ICE** (3D CFD on OpenFOAM) with their **GUIs**: Demo 1 09:30–11:00, coffee break, Demo 2 11:30–13:00. Free, in person and online (separate registration form). See the leaflet in this booklet.

Sala Consiglio, building BL25 (Department of Energy), Via Lambruschini 4. Online link by e-mail.

Monday 9 November · morning I

08:30 — **Registration** 08:30–09:00

09:00 — **Welcome greetings** 09:00–09:15

S1 · Spray and Combustion – Part 1

09:15 — **Ludovico Viglione** · Wärtsilä Services Switzerland
OpenFOAM and LibICE methodology application to large 2-stroke marine engines
with T. Lucchini, G.G. Gianetti (Politecnico di Milano)

09:30 — **Jan Alopaeus** · Wärtsilä Finland
Development of a CFD-based virtual extension of an optical spray combustion chamber for advanced spray research using OpenFOAM

09:45 — **Viktoria Huschka** · TU Darmstadt
Numerical aspects of Euler-Lagrange modelling of evaporating alcohol droplets
with A. Scholtissek, C. Hasse

10:00 — **Giovanni Gaetano Gianetti** · Politecnico di Milano
A Conjugate Heat Transfer Methodology for the Thermal Assessment of Two-Stroke Marine Engines in Methanol Dual-Fuel Operation
with M. Pelosin, A. Della Torre (Politecnico di Milano), M. Ioannou, L. Viglione (Wärtsilä Services Switzerland)

10:15 — **Francesco Duronio** · Università dell'Aquila
Towards advanced simulations of under-expanded multiphase jets in propulsion systems: low-dissipation numerics and real-fluid thermodynamics
with A. Di Mascio (Università dell'Aquila), M. Battistoni, J. Zembi (Università di Perugia)

10:30 — **SESSION DISCUSSION** — **Chair** · Gabriela Bracho · CMT-UPV

10:50

Monday 9 November · morning II

10:50 — **COFFEE BREAK** 10:50–11:25

S2 · Hydrogen and Alternative Fuels – Part 1

11:25 — **Enrico Dotteschini** · Università di Udine
OpenFOAM implementation of a novel flame kernel expansion model for lean hydrogen combustion
with P. Giannattasio, M. Pretto (Università di Udine), M. Gadalla (Wärtsilä)

11:40 — **Gontzal Lopez Ruiz** · University of the Basque Country (UPV/EHU)
Parametric study of double-pulse diesel pilot injection strategies in a retrofitted marine diesel–H_2 dual-fuel engine
with N. Romero, Z. Uriondo (UPV/EHU), L. Sforza, T. Lucchini (Politecnico di Milano)

11:55 — **Frank Schenkel** · TU Eindhoven
Modelling of a spark-ignition engine fuelled by ammonia using FGM
with L.M.T. Somers, J.A. van Oijen (TU Eindhoven), T. Lucchini, L. Sforza (Politecnico di Milano)

12:10 — **Jamshid Moradi** · University of Oulu
OpenFOAM-based investigation of underexpanded hydrogen jets: effects of pressure ratio and ambient gas on jet penetration and mixing
with A. Andwari, J. Könnö (Univ. of Oulu), I. Chitsaz, M. Mikulski (Univ. of Vaasa), J. Hyvönen (Wärtsilä)

12:25 — **Vinzenz Schuh** · TU Darmstadt
Turbulent H_2 combustion modelling – presentation of the latest model developments
with B. Traut, M. Schneider, D. Kaddar, H. Nicolai, C. Hasse

12:40 — **SESSION DISCUSSION** — **Chair** · Ivan Cozza · Dumarey

13:00

Monday 9 November · afternoon I

13:00

LUNCH 13:00–14:20

14:20 — **S3 · Moving complex geometries**

Sakari Leponiemi · Wärtsilä Finland
Multi-region ICE simulations in OpenFOAM 14

14:35

Lorenzo Sforza · Politecnico di Milano
A domain-splitting framework for automatic multi-mesh, multi-solver full-cycle engine simulations in OpenFOAM/LibICE

14:50

Clemens Gößnitzer · LEC GmbH
LEC LEAP – an automated, up-to-date engine and general CFD workflow

15:05

Hrvoje Jasak · University of Cambridge
Propeller modelling approaches in self-propulsion of ships

15:20

SESSION DISCUSSION

Chair · Giovanni Gianetti · PoliMi

15:35

15:35

S4 · PANEL DISCUSSION · 15:35–16:35

OpenFOAM for propulsion: innovation vs industrial application

CHAIR Gianluca D'Errico · PoliMi

PANELLISTS

Carlo Beatrice · CNR-STEMS
Hrvoje Jasak · Univ. of Cambridge / Wikki
Clemens Gößnitzer · LEC GmbH
Gilles Hardy · Accelleron
Ludovico Viglione · Wärtsilä Services Switzerland
Ricardo Novella Rosa · CMT – UPV

16:35

COFFEE BREAK 16:35–17:10

17:10

S5 · Advanced Engine Concepts

Mahmoud Gadalla · Wärtsilä Finland
The OpenFOAM technology for multi-cycle partially premixed SI engines

17:25

Federico Ramognino · Politecnico di Milano
Multi-cycle simulations in Wankel engines: computational methodology and experimental validation
with T. Lucchini (Politecnico di Milano), M. Buttitta (Marmotors)

17:40

Gabriela Bracho · CMT – Universitat Politècnica de València
Assessment of operating conditions and combustion performance in an oxy-fuel compression ignition engine using OpenFOAM: towards NOx-free and carbon-capture-enabled technologies
with M. Bruerre, R. Novella (CMT – UPV), T. Lucchini (Politecnico di Milano)

17:55

Giulio Callegaro · Università di Modena e Reggio Emilia
An open-source 3D-CFD methodology for scavenging–combustion analysis of a hydrogen-fuelled opposed-piston two-stroke engine
with S. Caprioli, C.M. Di Gaetano Iftene, E. Mattarelli, C.A. Rinaldini (UniMoRe), T. Lucchini, G.G. Gianetti (PoliMi)

18:10

SESSION DISCUSSION — **Chair** · Roberto Lange · TU Darmstadt

18:25

20:00 **Social dinner**
Registration required · Assaje, Via Traù 2, Milano

Tuesday 10 November · morning I

09:00

S6 · Hydrogen and Alternative Fuels – Part 2

Carmelo Baronetto · Politecnico di Torino
Implementation and validation of an AUSM-based multispecies solver for hydrogen injection in OpenFOAM
with O. Vento, A. Ferrari

09:15

Marcolucio Capecci · Politecnico di Milano
In-cylinder mixture formation and combustion in H_2-DI engines: a multi-cycle CFD study for different injection strategies
with L. Sforza (Politecnico di Milano), I.F. Cozza, V. Pezza (Dumarey Automotive Italia)

09:30

Daniel Pinilla-Fernández · CMT – Universitat Politècnica de València
From spray dynamics to engine combustion: a CFD numerical study of ammonia-fuelled compression ignition engines
with G. Bracho, R. Novella, D. González-Domínguez (CMT – UPV), T. Lucchini (Politecnico di Milano)

09:45

SESSION DISCUSSION

Chair · Mahmoud Gadalla · Wärtsilä

10:00

S7 · Aftertreatment & 1D-3D modelling

Gianluca Montenegro · Politecnico di Milano
1D-3D coupled simulation for engine simulation: wave action, spray targeting and injection timing
with A. Onorati (Politecnico di Milano)

10:15

Mattia Pelosin · Politecnico di Milano
A CHT-CFD framework coupling spray, wall-film formation and porous-media interactions: application to a heavy-duty Diesel SCR system with an innovative wire-mesh mixer
with A. Della Torre (Politecnico di Milano), R. Bonacina, M. Locatelli, S. Marrazzo, M. Mattei (SDF Italia)

10:30

Roberto Lange · TU Darmstadt
Towards predictive LES of urea deposit formation in a generic SCR channel
with A. Scholtissek, C. Hasse

10:45

SESSION DISCUSSION

Chair · Augusto Della Torre · PoliMi

11:00

Tuesday 10 November · morning II

11:00

COFFEE BREAK 11:00–11:35

11:35 — **S8 · Spray and Combustion – Part 2**

José Manuel Pastor · CMT – Universitat Politècnica de València
Spray combustion LES modelling framework in OpenFOAM: application of an injection model from VOF simulations coupled with finite-rate chemistry
with A. Muñoz-Agulló, M. Carreres, J.M. García-Oliver (CMT – UPV)

11:50

Tommaso Lucchini · Politecnico di Milano
Lagrangian wall film model for spray-wall interaction in high-performance naturally aspirated SI engines
with G. Gianetti (Politecnico di Milano), D. Frigeri, S. Malaguti (RS Engineering)

12:05

Po-Han Chen · KAUST
A compressible geometric volume-of-fluid framework for high-fidelity simulation of diesel injection
with A. Ceschin, M.R. Shakeel, H.G. Im (KAUST)

12:20

Abdul Rehman · University of Oulu
OpenFOAM-based modelling of in-cylinder combustion and gaseous-fuel mixture formation

12:35

SESSION DISCUSSION — **Chair** · Gilles Hardy · Accelleron

12:50

Tuesday 10 November · afternoon I

12:50

LUNCH 12:50–14:10

14:10

S9 · OPEN DISCUSSION · 14:10–14:55

Innovating propulsion: OpenFOAM meets AI

CHAIRS Augusto Della Torre, Federico Ramognino · PoliMi

14:55

Tuesday 10 November · afternoon II

S10 · Fuel cells & BEV powertrain

14:55 — **Margherita Bulgarini** · Politecnico di Milano
A CFD methodology for the design and optimisation of PEM fuel cell flow fields for propulsion applications
with A. Della Torre, G. Montenegro (Politecnico di Milano)

15:10 — **Christian Antetomaso** · CNR-STEMS
Modeling droplet transport and surface adhesion in fuel cell flow channels
with S.S. Merola, A. Irimescu (CNR-STEMS)

15:25 — **Muhammad Hasnain Tariq** · Politecnico di Milano
A comprehensive CFD-driven approach to thermal modelling of batteries and electric motors and their cooling system optimisation
with G. Montenegro (Politecnico di Milano)

15:40 — **SESSION DISCUSSION** — **Chair** · Sergio Tosi · Sinergy Flow

15:50

WEDNESDAY 11 NOVEMBER · 09:30–13:00

Demo session: our in-house tools

Demonstrations of **GASDYN** (1D) and **Lib-ICE** (3D CFD on OpenFOAM) with their **GUIs**: Demo 1 09:30–11:00, coffee break, Demo 2 11:30–13:00. Free, in person and online (separate registration form). See the leaflet in this booklet.

Sala Consiglio, building BL25 (Department of Energy), Via Lambruschini 4. Online link by e-mail.

SPECIAL SESSION

Panel discussion · Mon 9 Nov · 15:35–16:35

OpenFOAM for propulsion: innovation vs industrial application

Despite an increasing need to improve efficiency and develop alternative power generation solutions (powertrain, fuels, concepts), numerical models for propulsion systems rely on consolidated approaches which are well known for their limitations and assumptions. Is this really sufficient to address the emerging challenges?

Coordinated by Prof. Gianluca D'Errico and supported by qualified audience questions, panellists from academia, research institutions and industry will discuss their point of view related to:

DISCUSSION

Themes

- **Current needs of new models** – methodology in the current context of propulsion, dominated by the need to evolve existing solutions towards higher efficiency and the use of new energy vectors;
- **Benefits, drawbacks and bottlenecks** of open-source software solutions used in industry;
- **Supporting and taking benefit from open-source model development** in a variegated scenario where different needs and consolidated contributions are present.

WHO

Chair and panellists

Gianluca D'Errico
Chair · Politecnico di Milano

Carlo Beatrice
CNR-STEMS

Gilles Hardy
Accelleron

Hrvoje Jasak
Univ. of Cambridge / Wikki

Ludovico Viglione
Wärtsilä Services Switzerland

Clemens Gößnitzer
LEC GmbH

Ricardo Novella Rosa
CMT – UPV

Innovating propulsion: OpenFOAM meets AI

AI is changing the way software is developed and used. Due to the strong model-to-model interaction, propulsion simulation still represents one of the most challenging tasks for CFD modelling.

This open discussion is focused on understanding how AI can support development and application of open-source software for propulsion simulations. The presence of OpenFOAM technology and propulsion modelling experts will help to understand better the benefits and limitations of AI regarding the following topics relevant to simulation and model development:

DISCUSSION

Themes

- assisted, error-free pre-processing
- development of dedicated pre- and post-processing interfaces
- support in physical and numerical model development
- improving models supported by analysis of simulation results
- post-processing of results

WHO

Chairs

Augusto Della Torre
Chair · Politecnico di Milano

Federico Ramognino
Chair · Politecnico di Milano

7TH TWO-DAY MEETING · SIDE EVENT

Demo session

See our in-house simulation tools at work, live – from the engine map to the full-cycle 3D CFD case.



Wednesday 11 November 2026 · 09:30–13:00 · Politecnico di Milano

FREE

09:30 · DEMO 1

Gasdyn

From simple engines to full-system integration, co-simulations and advanced combustion modelling

09:30–10:00	**Pre- and post-processing, engine map generation** Set up an engine model and turn it into performance maps.
10:00–10:15	**Gasdyn–Simulink® co-simulation** Link the engine model to your Simulink® system model.
10:15–10:40	**1D–3D co-simulation** 1D gas dynamics and 3D CFD working together.
10:40–11:00	**0D–3D combustion model consistency** One combustion model, consistent from 0D to 3D.

11:00 · COFFEE BREAK

11:30 · DEMO 2

LibICE

GUI-assisted mesh generation and case setup for full-cycle, direct-injection engine simulations

GUIFOAM LIB-ICE GUI

11:30–11:50	**Surface preparation** Get the engine geometry ready for meshing with GuiFOAM.
11:50–12:20	**Mesh generation** Moving meshes for the whole cycle, guided by the GUI.
12:20–12:50	**Simulation setup** From mesh to a ready-to-run direct-injection case.
12:50–13:00	**Outlook for Lib-ICE** Combustion modelling, TabICE (tabulated chemistry), utilities – and our vision.

TabICE

Register for the demos
Scan the QR code to fill out the form.
Free · in person and online
Sala Consiglio, building BL25 · Via Lambruschini 4, Milano

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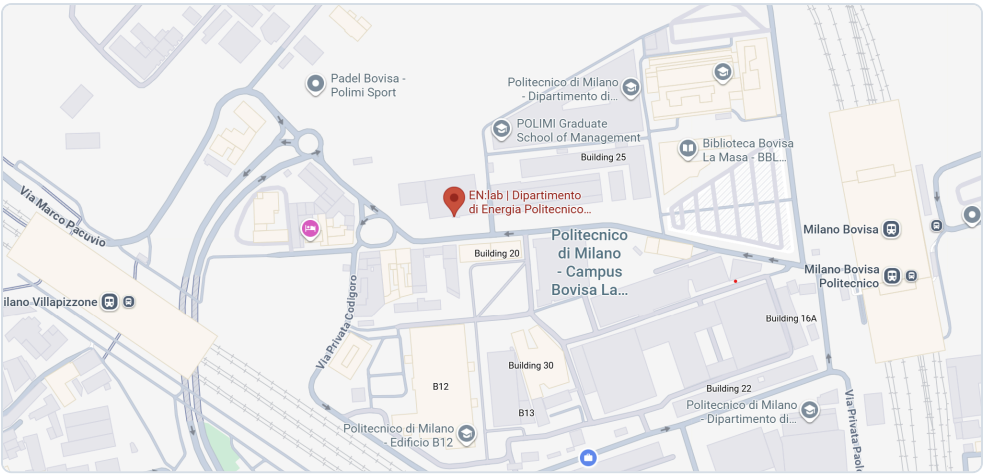
VENUE

Getting there



EN:lab (BL31) – Sala Consiglio

Department of Energy, Politecnico di Milano

Campus Bovisa · Via Lambruschini 6 · 20156 Milano, Italy

TRAVEL

How to reach us

- **By train**: Milano Bovisa-Politecnico station (Trenord suburban S-lines and Malpensa Express), a short walk from the venue.
- **From Malpensa airport**: Malpensa Express, direct to Milano Bovisa-Politecnico.

NEED HELP?

Contacts

twodaymeeting-deng@polimi.it

Giovanni Gianetti · giovannigaetano.gianetti@polimi.it

STAY CONNECTED

Useful links

Event webpage
energia.polimi.it

Registration form
Microsoft Forms

ICE Group on LinkedIn
Follow us for updates

ICE Group website
engines.polimi.it

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Sursum-Mi
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Sursum-Mi – spin-off of Politecnico di Milano: high-fidelity simulation services and software for engines and fluid machinery.

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sursum-mi.com
info@sursum-mi.com

WHO THEY ARE

About Sursum-Mi

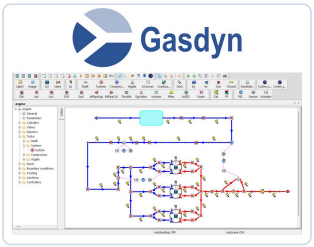
Sursum-Mi is a spin-off of Politecnico di Milano specialised in fluid-dynamic simulation (1D and 3D CFD), born from the experience of the ICE (Internal Combustion Engines) group. The results of a decade of cutting-edge research are made available to the needs of the industrial market through proprietary software and advanced simulation methodologies.

WHAT THEY OFFER

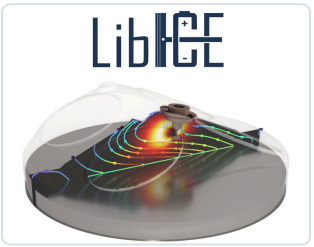
Products and services

Sursum-Mi offers CFD computational models for the optimisation of sustainable propulsion systems, fluid machinery and other components. The spin-off is engaged in:

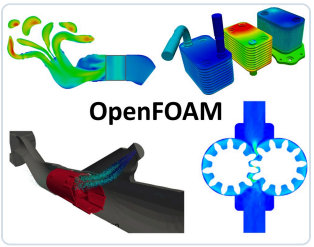
- **Commercialisation of GASDYN**, the in-house developed 1D simulation software, for modelling propulsion systems and system components;
- **Development of 3D CFD simulation methodologies** for internal combustion engines based on OpenFOAM, through the **LibICE** library;
- **Development of OpenFOAM-based 3D CFD simulation methodologies** and related services.



GASDYN · 1D



LibICE · 3D engines



OpenFOAM · 3D-CFD services

NOTES

Your notes

NOTES

Your notes

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Your notes

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Your notes

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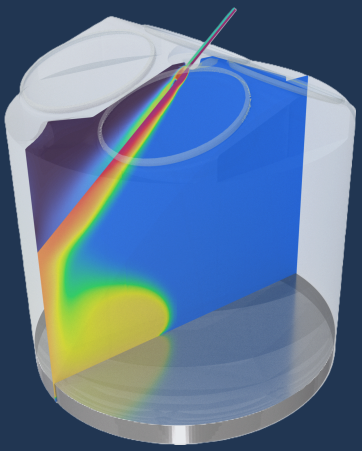

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