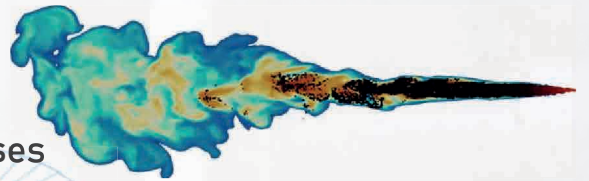


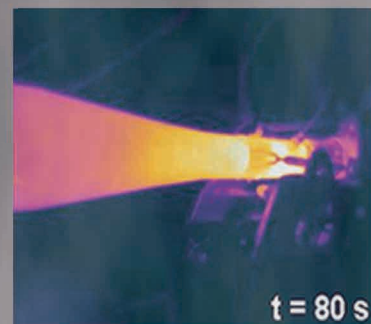
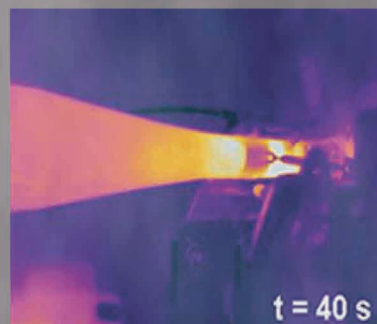
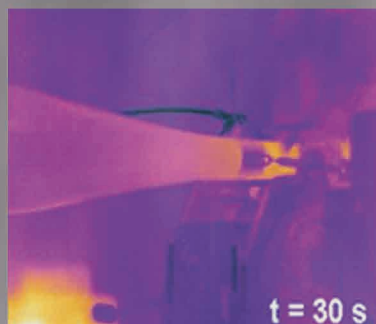
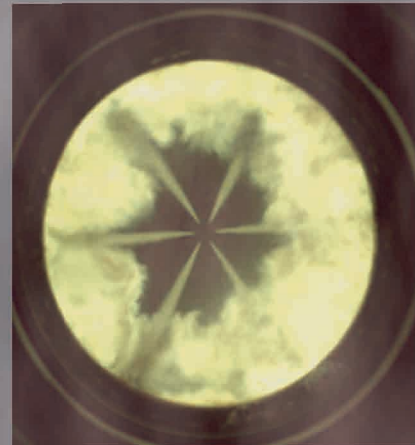
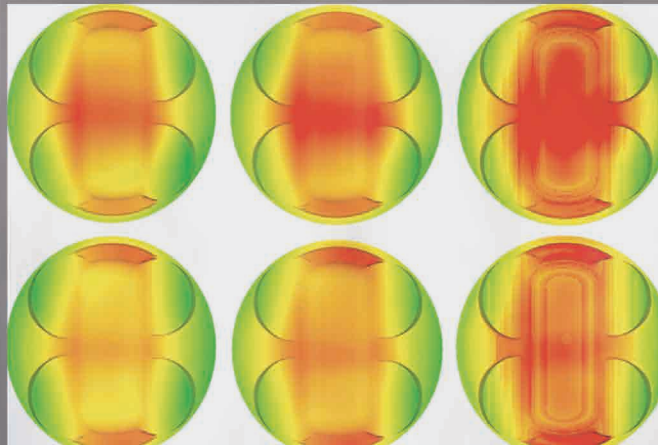
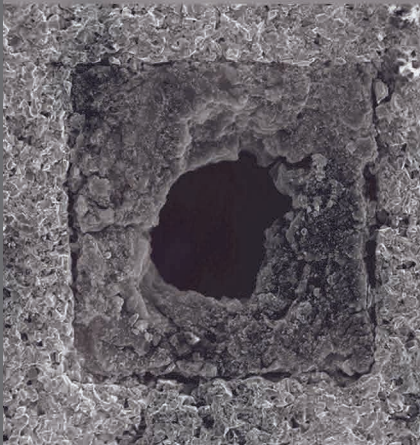
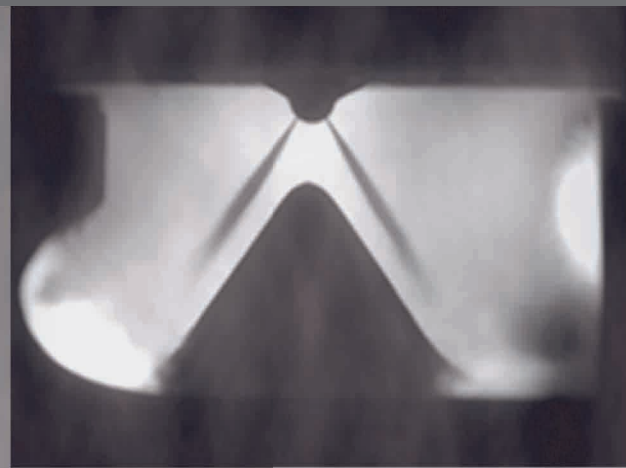
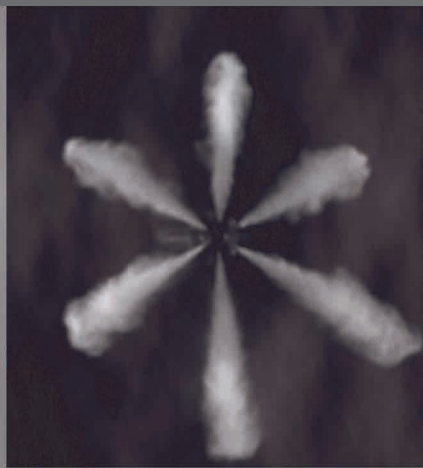
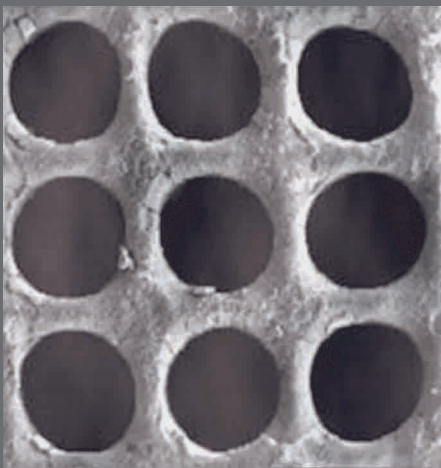
FINAL
PROGRAMME

THIESEL 2020

Thermo and fluid dynamic processes
in direct injection engines
8th - 11th September 2020



UNIVERSITAT
POLITÈCNICA
DE VALÈNCIA



WELCOME

Welcome to THIESEL 2020

Welcome to the 11th edition of the THIESEL Conference on Thermo-and Fluid Dynamic Processes in Direct Injection Engines.

The COVID19 pandemic has changed many aspects of our lives and obliged us to seek new ways of communicating important novel developments in research. This year the Universitat Politècnica de València (UPV) together with CMT-Motores Térmicos has the pleasure of hosting the digital version of THIESEL 2020 for the first time.

THIESEL is a valuable international platform for the exchange of the most up-to-date developments in engine research and contributes to the dissemination of the latest methods and technologies that offer environmentally friendly solutions.

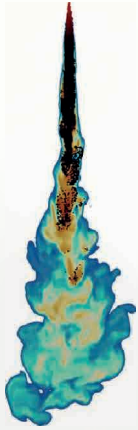
All efforts are made to improve engine efficiency and reduce pollutant emissions, especially because thermal engines will remain an important component in future powerplants. It is therefore important to gather automotive industrialists and researchers in a forum like THIESEL 2020 to share expertise and innovative ideas.

Despite the difficulties linked to the current situation, many experts have agreed to contribute to the success of the conference by presenting their latest advances in R&D. Our warmest thanks to them. UPV and CMT-Motores Térmicos will do their utmost to ensure a smooth running of the virtual conference.

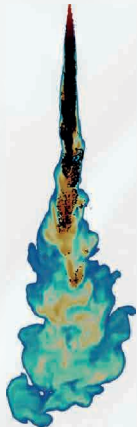
On behalf of the Universitat Politècnica de València, I would like to convey a warm welcome to all those attending Thiesel 2020 from their home country.

Stay safe.

Prof. Francisco J. Mora
Rector of the Universitat Politècnica de València



Courtesy of CONVERGENT Science



COMMITTEES

EUROPEAN ORGANISING COMMITTEE

- Prof. F. PAYRI
CMT. Universitat Politècnica de València (SPAIN)
- Prof. J.M. DESANTES
CMT. Universitat Politècnica de València (SPAIN)
- Dr. C. ANGELBERGER
IFP Energies Nouvelles (FRANCE)
- Prof. T. KOCH
IFKM. Karlsruher Institut für Technologie (GERMANY)

OVERSEAS ORGANISING COMMITTEE

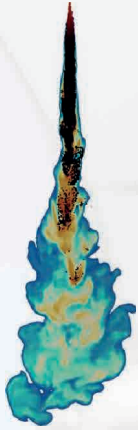
- Prof. R. REITZ
University of Wisconsin - Madison (U.S.A.)
- Prof. J. SENDA
Doshisha University (JAPAN)
- Dr. P. MILES
Sandia National Laboratories (U.S.A.)
- Prof. C. BAE
KAIST (KOREA)

CONFERENCE COORDINATOR

- Dr. X. MARGOT
CMT. Universitat Politècnica de València (SPAIN)

ADVISORY COMMITTEE

- | | |
|---------------------|---|
| Dr. P. ADOMEIT | FEV (Germany) |
| Dr. A. AMER | SAUDI ARAMCO (Saudi Arabia) |
| Prof. O. ARMAS | Universidad de Castilla-La Mancha (Spain) |
| Mr. I. BALLOUL | Volvo Powertrain France (France) |
| Prof. J. BENAJES | Universitat Politècnica de València (Spain) |
| Dr. R. BURKE | University of Bath (U.K.) |
| Dr. P.-O. CALENDINI | Aramco Fuel Research Center (France) |
| Dr. G. COMA | Renault (France) |
| Dr. A. COSTALL | Imperial College London (U.K.) |
| Dr. P. GASTALDI | Aramco Fuel Research Center (France) |
| Dr. N. GUERRASSI | Delphi Automotive Systems (Luxemburg) |
| Dr. S. GUILAIN | Renault (France) |
| Dr. J. KASHDAN | IFP Energies Nouvelles (France) |
| Dr. M. KOIKE | Toyota R&D Labs (Japan) |
| Dr. C. KRUEGER | Daimler (Germany) |
| Prof. M. LAPUERTA | Universidad de Castilla-La Mancha (Spain) |
| Prof. L. LE MOYNE | ISAT (France) |
| Dr. P. LÖFHOLM | Wärtsilä (Finland) |
| Mr. P. MALLET | Renault (France) |
| Dr. X. MARGOT | Universitat Politècnica de València (Spain) |
| Prof. F. MAROTEAUX | Université de Versailles (UVSQ) (France) |
| Prof. F. MILLO | Politecnico di Torino (Italy) |
| Dr. A. MOHAMMADI | Toyota Motor Europe (Belgium) |
| Prof. E. MURASE | Kyushu University (Japan) |
| Dr. H. NAKAMURA | HORIBA Europe (Germany) |
| Prof. H. OGAWA | Hokkaidou University (Japan) |
| Prof. A. ONORATI | Politecnico di Milano (Italy) |
| Prof. H. PITSCH | RWTH Aachen (Germany) |
| Dr. P. PRIESCHING | AVL (Austria) |
| Dr. F. RAVET | Renault (France) |
| Prof. C. ROUSSELLE | Polytech' Orléans (France) |
| Mr. O. SALVAT | PSA Peugeot Citroën (France) |
| Dr. K. SENECAL | Convergent Science (U.S.A.) |
| Dr. C. SOTERIOU | Consulting Engineer (U.K.) |
| Prof. F. TINAUT | Universidad de Valladolid (Spain) |
| Mr. T. TOMODA | Toyota Motor Corporation (Japan) |
| Prof. A. TORREGROSA | Univ. Politècnica de València (Spain) |
| Dr. B. VAGLIECO | Istituto Motori (Italy) |
| Dr. O. VARNIER | Jaguar Land Rover (U.K.) |
| Dr. A. VASSALLO | Punch Torino SpA (Italy) |
| Mr. A. WARD | Ricardo (U.K.) |
| Dr. A. WIMMER | LEC (Austria) |
| Mr. M. WINTERBOURN | Delphi Technologies (U.K.) |



SESSION A ALTERNATIVE FUELS

CHAIRPERSON: Prof. Antonio GARCÍA MARTÍNEZ. UPV (Spain)

KEYNOTE LECTURE

A.0 Meeting EU Transport Carbon Neutrality by 2050 Using e-Fuels.

A. AMER. Saudi Aramco (Saudi Arabia)

A.1 Effect of advanced biofuels on WLTC emissions of a Euro 6 Diesel vehicle with SCR under different climatic conditions.

J.J. HERNÁNDEZ, J. RODRÍGUEZ-FERNÁNDEZ, M. LAPUERTA, A. CALLE-ASENSIO, A. RAMOS, J. BARBA. Universidad de Castilla-La Mancha (Spain)

A.2 Renewable energy to power through net-zero-carbon methanol.

R. DURRETT, M. POTTER. General Motors R&D (USA)

A.3 An optical investigation of combustion and soot formation in a single cylinder optical Diesel engine for different e- fuels and piston bowl geometries.

J.V. PASTOR, A. GARCÍA, C. MICÓ, F. LEWISKI. Universitat Politècnica de València (Spain)
A. VASSALLO, F.C. PESCE. Punch Torino SpA (Italy)

A.4 Influence of the Diesel pilot injector configuration on ethanol combustion and performance of a heavy-duty direct injection engine.

N. GIRAMONDI. KTH Royal Institute of Technology (Sweden)
A. JÄGER, D. NORLING. Scania CV AB (Sweden)
A.C. ERLANDSSON. DTU Technical University of Denmark (Denmark)

A.5 Assessment of auto-ignition tendency of gasoline, methanol, toluene and hydrogen fuel blends in spark ignition engines.

T. FRANKEN¹, L. SEIDEL², L.C. GONZÁLEZ-MESTRE¹, K. P. SHRESTHA¹, A. MATRISCIANO³, F. MAUSS¹.
¹Brandenburg University of Technology Cottbus-Senftenberg (Germany)
²LOGE Deutschland GmbH (Germany)
³Chalmers University of Technology (Sweden)

SESSION B NEW COMBUSTION CONCEPTS

CHAIRPERSON: Prof. José María GARCÍA OLIVER. UPV (Spain)

KEYNOTE LECTURE

B.0 Demonstrating the Potential of LTGC-AMFI to Deliver the Promise of Low-Temperature Combustion.

J. DEC. Sandia National Laboratories (USA)

B.1 Optical investigations on the jet propagation of an actively fuelled pre-chamber ignition system with highspeed Schlieren imaging.

T. RUSSWURM^{1,2}, A. PETER¹, L. WEIB^{1,2}, S. RIEB^{1,2}, M. WENSING^{1,2}.
¹Friedrich-Alexander University Erlangen- Nürnberg FAU, (Germany)
²Erlangen Graduate School in Advanced Optical Technologies (Germany)

B.2 A new concept of active pre-chamber for low CO2 SI engines: a contribution to combustion understanding based on CFD and visualization techniques.

P. GASTALDI. Aramco Fuel Research Center (France)
M. FLAMAND. CORIA (France)
J.P. LE RU, L. KUBEK. CERTAM (France)
V. RABHI. Advisor (France)

B.3 CFD Simulation-based pre-design of an advanced gas-Diesel combustion concept.

H. WINTER¹, K. AßMUS¹, C. REDTENBACHER¹, D. DIMITROV¹, A. WIMMER^{1,2}.
¹LEC GmbH (Austria)
²Graz University of Technology, (Austria)

B.4 RCCI in heavy duty engines.

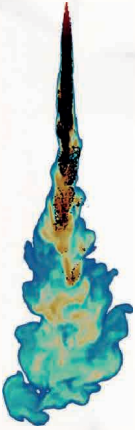
F. EISE, L. HEINZ, U. WAGNER, T. KOCH. Karlsruhe Institute of Technology (Germany)

B.5 Numerical investigation of homogenous charge compression ignition operating range using onion-skin multizonal model.

J.M. GARCIA- GUENDULAIN¹, J.M. RIESCO-ÁVILA², A.E. MENDOZA-ROJAS³, O. RODRÍGUEZ-ABREO¹, F. ELIZALDE-BLANCAS².
¹Universidad Politécnica de Querétaro (Mexico)
²Universidad de Guanajuato (Mexico)
³Universidad Autónoma de Querétaro (Mexico)

B.6 Fuelling our future with Diesel alternatives.

R. MORGAN. University of Brighton (United Kingdom)
A. ATKINS. Ricardo UK Ltd (United Kingdom)



SESSION C INJECTION + COMBUSTION

CHAIRPERSON: Dr. Gabriela BRACHO. UPV (Spain)

KEYNOTE LECTURE

C.0 Why Diesel? The Contribution of CI Engines to Future Sustainable Mobility.

A. VASSALLO. Punch Torino SpA (Italy)

C.1 DNS and experimental investigation of ignition and transition to premixed flame propagation in operating conditions representative of modern high efficiency spark ignition engines.

D. JIKADIA, A. DULBECCO, C. MEHL. IFPEN (France)

F. FOUCHER. Université d'Orléans (France)

C.2 A study of cyclic combustion variations at lean SI engine operation using high-speed in-cylinder CO₂ measurements.

A.U. BAJWA¹, T. LINKER¹, M.A. PATTERSON^{1,2}, G. BESHOURI², T.J. JACOBS¹.

¹Texas A&M University (USA)

²Advanced Engine Technologies Corp. (USA)

C.3 Advanced measurement techniques for the characterization of GDI injector tip wetting and a phenomenological model of the wetting process.

G. DOBER, K. KARIMI, B. LEMAITRE, C. MAJERUS, N. GUERRASSI. Delphi Technologies (Luxemburg)

C.4 Application of deep neural networks to the prediction of the ignition delay time of gasoline PRF and TRF surrogates with the addition of oxygenates for CFD engine simulations.

L. PULGA, G.M. BIANCHI, G. CAZZOLI, V. MARIANI. University of Bologna (Italy)

C. FORTE. Nais s.r.l (Italy)

SESSION D1 CO2 REDUCTION (I)

CHAIRPERSON: Prof. Antonio TORREGROSA. UPV (Spain)

KEYNOTE LECTURE

D1.0 Global Challenge on GHG Reduction.

H. NAKAMURA. Horiba Europe GmbH (Germany)

D1.1 Achieving higher brake thermal efficiency under existence of peak firing pressure constraint with a HD Diesel engine.

N. UCHIDA, K. WATANABE. New A.C.E. Institute Co., Ltd. (Japan)

K. ENYA. Isuzu Advanced Engineering Center Ltd. (Japan)

D1.2 Mechanism of thermal efficiency improvement in twin shaped semi-premixed Diesel combustion.

K. INABA, Y. ZHANG, Y. KOBASHI, G. SHIBATA, H. OGAWA. Hokkaido University (Japan)

D1.3 Predictive thermal load analysis of an IC engine under transient operating condition.

A. POREDOS, S. GOMBOC, M. KOLARIC. AVL d.o.o. Slovenia (Slovenia)

P. SAMPL. AVL List GmbH (Austria)

D1.4 Experimental investigation of wall heat transfer due to spray combustion in a high pressure/high temperature vessel.

K. KESKINEN, W. VERA-TUDELA, Y.M. WRIGHT, K. BOULOUCHOS. ETH Zurich (Switzerland)

SESSION D2 CO2 REDUCTION (II)

CHAIRPERSON: Prof. Benjamin PLÁ. UPV (Spain)

D2.1 Performance of direct injected propane and gasoline in a high stroke-to-bore ratio SI engine: Pathways to Diesel efficiency parity with ultra low soot.

D. SPLITTER, J. STOREY, V. BORONAT, F. CHUAHY. Oak Ridge National Laboratory (USA)

D2.2 Why can Miller cycle improve the overall efficiency of gasoline engines?.

M. PERCEAU^{1,2}, P. GUIBERT², S. GUILAIN¹, F. SEGRETAINE², T. REDLINGER¹.

¹Renault (France)

²Sorbonne Université (France)

D2.3 Experimental investigation on an innovative additive manufacturing-enabled Diesel piston design to improve engine-out emissions and thermal efficiency beyond Euro6.

G. DI BLASIO, R. IANNIELLO, C. BEATRICE. Istituto Motori - CNR (Italy)

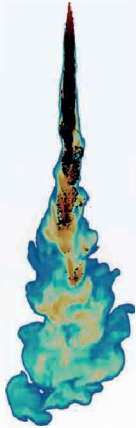
F.C. PESCE, A. VASSALLO, G. BELGIORNO. Punch Torino SpA (Italy)

D2.4 Assessment and design of real world driving cycles targeted to the calibration of vehicles with electrified powertrain.

S. DOULGERIS¹, Z. TOUMASATOS¹, M.V. PRATI², C. BEATRICE², Z. SAMARAS¹.

¹Aristotle University of Thessaloniki (Greece)

²Istituto Motori - CNR (Italy)



SESSION E1 EMISSION ABATEMENT (I)

CHAIRPERSON: Dr. Joaquín DE LA MORENA. UPV (Spain)

KEYNOTE LECTURE

E1.0 Improving Fuel Economy Through Connectivity and Automation - the NEXTCAR Project.

G. RIZZONI. The Ohio State University (USA)

E1.1 Prediction of gaseous pollutant emission from a spark-ignition direct-injection engine with gas-exchange simulation.

S. ESPOSITO, L. DIEKHOFF, S. PISCHINGER. RWTH Aachen (Germany)

E1.2 Sub-23 nm particle emissions from internal combustion engines for future certification and evaluation of calibration methods.

P. KREUTZIGER, Y. OTSUKI, L. JAPS, M. RIEKER. Horiba Europe GmbH (Germany)

A. PÉREZ MARTÍNEZ, S. PAZ ESTIVILL. IDIADA Automotive Technology (Spain)

E1.3 Exhaust gas recirculation combined with regeneration mode in a compression ignition Diesel engine operating at cold conditions.

J. GALINDO, V. DOLZ, J. MONSALVE-SERRANO, M.A. BERNAL. Universitat Politècnica de València (Spain)

L. ODILLARD. Valeo - Systèmes Thermiques (France)

E1.4 Model-based calibration: using machine learning algorithms and virtual control unit approaches.

J. JULIÀ, M. ALONSO. Nissan Technical Center Europe (Spain)

SESSION E2 EMISSION ABATEMENT (II)

CHAIRPERSON: Dr. Pedro PIQUERAS. UPV (Spain)

KEYNOTE LECTURE

E2.0 Challenges from the Measurement of Automotive Exhaust Particles Down to 10 nm.

Z. SAMARAS. Aristotle University of Thessaloniki (Greece)

E2.1 Neutral air quality impact vehicle for urban areas: NMHC and NH₃ adsorption during cold start for ICE based power-trains.

C. NORISIC. EMC France (France)

G. BOURHIS, M. LECOMPTE, K. BARBERA-ITALIANO. IFPEN (France)

E. LAIGLE, C. CHAILLOU. Aramco (France)

E2.2 Real-time NO_x estimation in light duty Diesel engine with in-cylinder pressure prediction.

Y. LEE, S. LEE, K. MIN. Seoul National University (South Korea)

E2.3 Effect of active regeneration on time- resolved and size-resolved particle emissions from Euro6 Medium Duty Diesel engine.

E. MANCARUSO, B.M. VAGLIECO. Istituto Motori - CNR (Italy)

SESSION P POSTERS

P1 Electrical modelling and mismatch effects of thermoelectric modules for energy recovery in Diesel exhaust systems.

S. EZZITOUNI, P. FERNÁNDEZ-YAÑEZ, L. SÁNCHEZ, O. ARMAS. Universidad de Castilla - La Mancha (Spain)

P2 Engine and Fuel co-optimization platform using a stochastic reactor model with tabulated chemistry.

L.C. GONZÁLEZ-MESTRE, T. FRANKEN, K. SHRESTHA, F. MAUSS. Brandenburg University of Technology Cottbus-Senftenberg (Germany)

L. SEIDEL. Loge Deutschland GmbH (Germany)

A. MATRISCIANO. Chalmers University of Technology (Sweden)

P3 Experimental and numerical analysis of flow distribution and NO_x sensors layout sensitivity in close-coupled SCRoF systems.

G. BUITONI, M. TABARRINI. STSE SRL (Italy)

L. POSTRIOTI. Università degli Studi di Perugia (Italy)

F. FELICIANI, I.F. COZZA. Punch Torino SpA (Italy)

P4 Cryogenic fluids for future transportation systems.

K. VOGIATZAKI¹, M. JAYA VIGNESHA¹, G.TRETOLA¹, R. MORGAN¹, G. DE SERCEY¹, A. ATKINS², M. HEIKAL¹.

¹University of Brighton (United Kingdom)

²Ricardo Innovations (United Kingdom)

ORGANISED BY



UNIVERSITAT
POLITÈCNICA
DE VALÈNCIA



SPONSOR

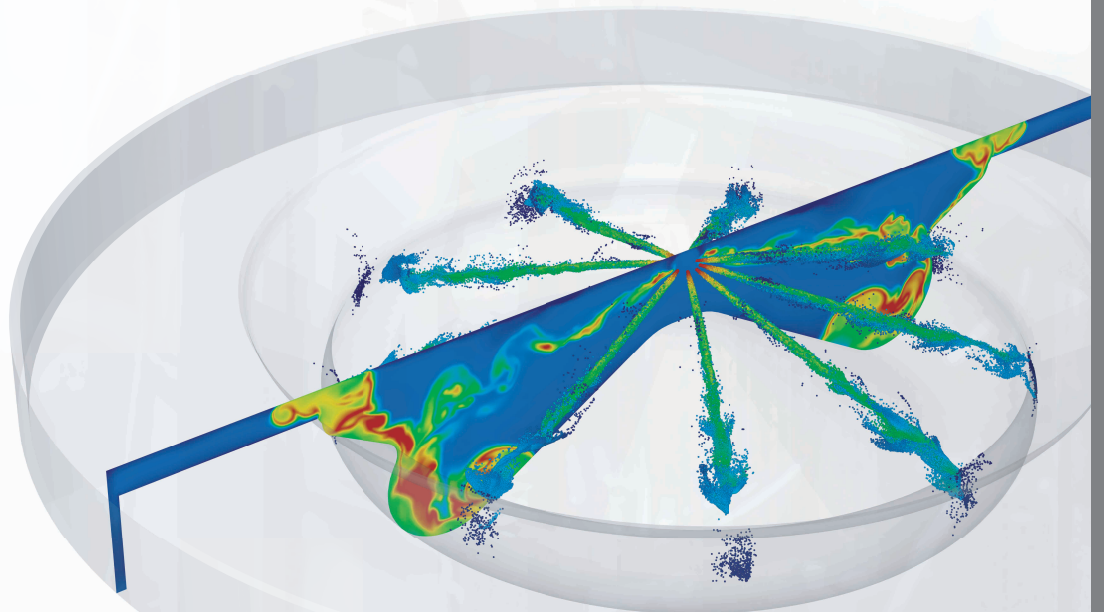


CONVERGENT SCIENCE GmbH

HAUPTSTRASSE 10 · 4040 LINZ (AUSTRIA) · TEL: +43 720 010 660 0

WEBSITE: <https://convergecf.com/>

CONVERGE is a revolutionary CFD software that eliminates all user meshing time through fully autonomous meshing. With state-of-the-art physical models, a fast chemistry solver, and the ability to accommodate complex moving geometries, CONVERGE is fully equipped to help you solve the hard problems.



Courtesy of CONVERGENT Science