



CONVERGE
USER CONFERENCE
— EUROPE —

19-23 March, 2018

✻ Bologna, Italy ✻

 **CONVERGE**
CFD SOFTWARE

WELCOME

2018 CONVERGE User Conference - Europe

WELCOME to the 2018 CONVERGE European User Conference! This is our second annual European User Conference, following our very successful inaugural event in Vienna last year.

This conference features speakers and attendees from Europe and around the globe. Reacting flows are at the heart of what we do, and we are pleased to offer many engine-related presentations, including keynotes by research leaders from Cummins, Groupe PSA, and Porsche Engineering Services. In addition to engine simulations, CONVERGE's truly unique CFD approach is applicable to a wide variety of flow problems. This conference also includes presentations on diverse topics including pumps and compressors, fluid-structure interaction, gas turbines, aftertreatment systems, and fuel injectors.

While we call this event our "User Conference," you're much more than just a CONVERGE user. We believe that each of you is a collaborator, inspiring us to continue to push the limits in a way that best meets your CFD needs. As a way of saying thank you, our goal is to offer a unique, informative, and enjoyable conference. In keeping with CONVERGE UC tradition, we are pleased to offer free training courses after the conference. During the conference itself we have a variety of daytime and evening events so that you can network with colleagues and experience the beautiful country of Italy with a trip to the Ferrari Museum in Maranello and an evening of delicious food and drink in Bologna.

Thank you to all of our speakers for sharing their expertise with the CONVERGE community. Thank you to this year's sponsors—we encourage you to visit their displays to learn more about their exciting products. On behalf of everyone at Convergent Science, thank you for attending the CONVERGE European User Conference and we hope you enjoy the week.







A handwritten signature in black ink, appearing to read 'Rainer Rothbauer'.

Rainer Rothbauer

Co-Owner & General Manager, *Convergent Science GmbH*

OVERVIEW

	MORNING	AFTERNOON	EVENING
MONDAY	Travel		Welcome Reception Garganelli Restaurant
TUESDAY			Gala Dinner Ferrari Museum
WEDNESDAY			Informal Dinner Osteria De' Poeti
THURSDAY			
FRIDAY			

By attending this conference you explicitly express your agreement that photos taken during the event (in which you might be visible) can be used by Convergent Science for marketing purposes. If you disagree please contact the registration desk before joining the event.



**Follow
the leaders
in CFD**

KEYNOTE

20 March, 08:30

Diesel Engine Combustion System Analysis Led Design at Cummins

John M. Deur, *Cummins Inc.*



Dr. John Deur has over 30 years of combustion engineering experience in both R&D and program environments for a wide range of applications including solid rockets, gas turbines, pulse detonation engines (PDE), ramjets, internal combustion (IC) engines, and industrial processes. This includes over 25 years of experience in computational fluid dynamics (CFD), including both code development and application. In these fields, he has authored, co-authored, and/or presented over fifty technical papers. Dr. Deur has also developed and taught continuing education courses in solid rocket combustion instability and IC engine combustion analysis, as well as created and conducted training courses for commercial CFD and grid generation software. For the past nine years, he has been the Director of Combustion Research for Cummins Inc.

21 March, 08:20

How Combustion CFD Makes Design More Robust and Reduces Costs

Carlos Ferreira, *Groupe PSA*



Ing. Carlos Ferreira joined Groupe PSA in 1990 after earning a master's degree in mechanical engineering from the Pierre and Marie Curie University. At Groupe PSA, he has investigated diesel and gasoline engines via CFD, established guidelines for CFD use from simulation setup to analysis of results, optimized 3D engine parts, and led various 1D and 3D CFD simulation groups. Since 2015, Ing. Ferreira has been in charge of the CFD roadmap for the combustion team in the engine design department.

21 March, 13:30

Challenges and Opportunities for Future Powertrain Development

Vincenzo Bevilacqua,
Porsche Engineering Services GmbH



Ing. Vincenzo Bevilacqua is a senior expert in engine analysis at Porsche Engineering Services. In the last decade his group, aided by CFD simulation, has developed five internal combustion engines. He has published papers and given presentations on a host of topics, including knock tendency in highly-charged spark-ignited engines, combustion engine concepts for use in an electrified powertrain, and methodology for intake air temperature reduction on high-boosted gasoline engines. Ing. Bevilacqua earned a degree in mechanical engineering from Politecnico di Torino, where his final thesis was about fuel-spray injection for GDI engines. Prior to Porsche, Ing. Bevilacqua worked at GM Powertrain Europe, Politecnico di Torino, Fiat Research Center, and FKFS-Universität Stuttgart.

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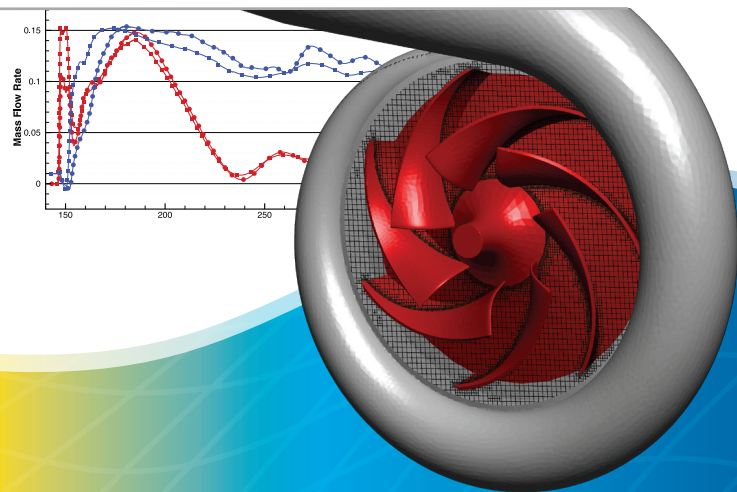


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NETWORK



MONDAY

SAVOIA HOTEL

Join us for complimentary food and drink at the Garganelli Restaurant (adjacent to Savoia Hotel). Unwind from a day of travel and connect with other CONVERGE users!

20:00 Welcome reception at Garganelli Restaurant (Savoia Hotel)

23:30

TUESDAY

FERRARI MUSEUM

Join us for an evening of fun at the Ferrari Museum in Maranello, where you can feel the vibrant passion and history of this storied automotive and F1 brand. The entire museum has been reserved for CONVERGE User Conference attendees. Walk through the history of Ferrari and enjoy an unforgettable evening.

17:15 All meet in the Savoia Hotel lobby

17:30 Bus departs for Ferrari Museum Maranello

18:30 Guest arrival at Ferrari Museum

19:00 Ferrari Museum guided tour

20:00 Cocktails

20:30 Dinner at Ferrari Museum Convention Hall

23:00 Bus departs for Savoia Hotel





W E D N E S D A Y

OSTERIA DE' POETI

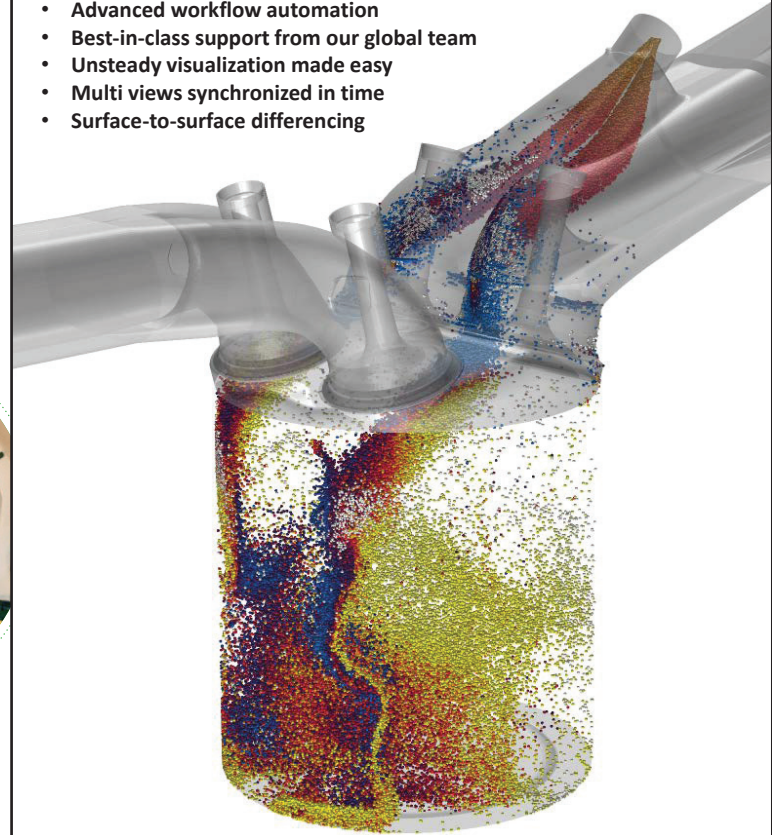
Join us for an evening of delicious Italian food and drink at the famed Osteria De' Poeti in Bologna. Strike up lively conversations with colleagues in this intimate venue.

- 18:30** All meet in the Savoia Hotel lobby
- 18:45** Bus departs for Bologna city center
- 19:15** Informal dinner at Osteria de' Poeti
- 22:30** First bus departs for Savoia Hotel
- 23:30** Second bus departs for Savoia Hotel



FIELDVIEW

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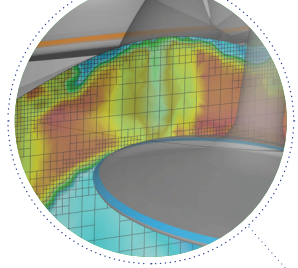


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T U E S D A Y

20 MARCH



07:30 **REGISTRATION OPENS**

08:15 **Welcome**, Rainer Rothbauer, *Convergent Science*

08:30 **KEYNOTE | Diesel Engine Combustion System Analysis Led Design at Cummins**, John M. Deur, *Cummins Inc.*

09:10 **Validation of Numerical Simulation of Hyundai 2.0L Gasoline Engine In-Cylinder Flow**, Minhoo Choi, *Hyundai Motor Company*

09:30 **Using Numerical Simulations to Predict and Understand CCV**, Prithwish Kundu, *Argonne National Laboratory*

09:50 **SPONSOR | BETA CAE Systems International AG**

10:05 **BREAK**

10:35 **Numerical Study of Knock Inhibition with Cooled Exhaust Gas Recirculation**, Max Mally, *RWTH Aachen University - Institute for Combustion Engines*

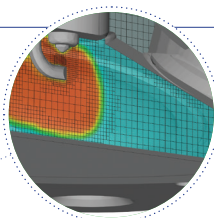
10:55 **Analysis of Water Injection Potential for Knock Mitigation**, Federico Millo, *Politecnico di Torino*

11:15 **Numerical Investigation and Sensitivity Analysis of Knock in Boosted GDI Engines**, Maziar Khosravi, *Ford-Werke GmbH*

11:35 **Computational Methodology for Knocking Combustion Analysis**, Ricardo Novella, *CMT-Motores Térmicos*

11:55 **SPONSOR | Tecplot, Inc.**

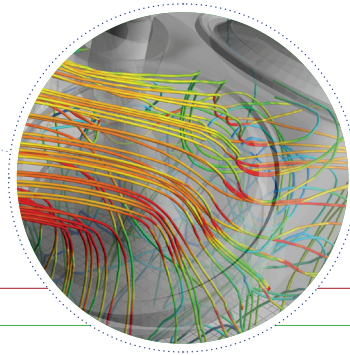
12:10 **LUNCH**



T U E S D A Y

afTERNOON

- 13:30 **VOF-LES Simulations of Primary Atomization and Near-Nozzle Spray Structure**, Michele Battistoni, *University of Perugia*
- 13:50 **Investigation of an Air Compressor Performance with FSI Simulation**, Cem Demirkesen, *Ford Otosan*
- 14:10 **FSI Simulation Study on a Mechanic Gas Stopper Movement at Different Pressures**, Gokhan Coskun, *Sakarya University*
- 14:30 **SPONSOR** | *Intelligent Light*
- 14:45 **BREAK**
- 15:20 **Simulation and Optimization of Flow Inside Claw Vacuum Pumps**, James Willie, *Gardner Denver Schopfheim GmbH*
- 15:40 **Multiphase Modeling: Gearbox Power Losses, Oil Pump Cavitation, and Fuel Tank Sloshing**, David Rowinski, *Convergent Science*



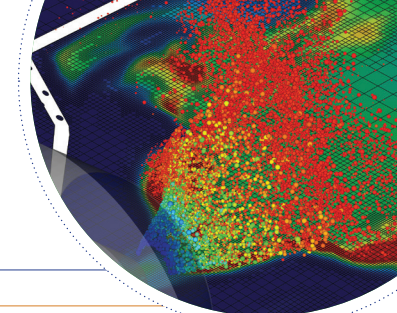
T U E S D A Y

NETWORKING

- 17:15 All meet in the Savoia Hotel lobby
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- 18:30 Guest arrival at Ferrari Museum
- 19:00 **Ferrari Museum guided tour**
- 20:00 **Cocktails**
- 20:30 **Dinner at Ferrari Museum Convention Hall**
- 23:00 Bus departs for Savoia Hotel



21 MARCH

**07:45** REGISTRATION**08:00** Welcome Back + Combustion Modeling Development in CONVERGE, Eric Pomraning, *Convergent Science***08:20** KEYNOTE | How Combustion CFD Makes Design More Robust and Reduces Costs, Carlos Ferreira, *Groupe PSA***PARALLEL SESSION—SALA FAICO + SALA GLORIA****09:00** Low Temperature Dual Fuel Modeling Using Detailed Chemistry In Heavy-Duty Engine, Lorenzo Bartolucci, *University of Rome Tor Vergata***09:20** Consideration of Turbulence-Chemistry-Interaction in Dual Fuel Combustion, Christoph Wieland, *Technical University Munich***09:40** Modeling of Direct Gas Injection in Internal Combustion Engines, Abhishek Y. Deshmukh, *RWTH Aachen Univ. - Institute for Combustion Technology***10:00** BREAK**10:30** Combustion Modeling of a NG Engine Using Detailed Chemistry in CONVERGE, Lorenzo Testa, *Politecnico di Torino***10:50** EGR-Diluted NG Combustion Simulation in a High-Performance SI Engine, Mirko Baratta, *Politecnico di Torino***11:10** A Numerical Study on Charge Motion Effects in Ultra-lean Conditions, Nicolas lafrate, *IFP Energies nouvelles***11:30** Numerical Prediction of Abnormal Combustion in a Turbocharged GDI Engine, Muhammed Fayaz Palakunnummal, *London South Bank University***11:50** Turbulent Combustion Model Development at Argonne National Laboratory, Prithwish Kundu, *Argonne National Laboratory***12:10** LUNCH**PARALLEL SESSION—SALA SAVOIA****Technical Update on Gas Turbine and Aftertreatment Applications,** Scott Drennan, *Convergent Science***Modeling and Simulation of Liquid Film Boiling—A New Feature in CONVERGE,** Chaouki Habchi, *IFP Energies nouvelles***Spray-Wall Interaction and Liquid Characteristics Near the Impingement Location,** Roberto Torelli, *Argonne National Laboratory***BREAK****Numerical Studies of Combustion Recession on ECN Diesel Spray A,** XiaoHang Fang, *University of Oxford***An Efficient Combustion Progress Variable (CPV) Approach for Engine Applications,** Corinna Netzer, *Brandenburg University of Technology***Assessment of Innovative Bowl Geometries Over Different Swirl Ratios/EGR Rates,** Andrea Bianco, *Powertech Engineering***Computational Optimization of DME Combustion using CONGO,** Marius Zobel, *RWTH Aachen University - Institute for Combustion Engines***SMART Optimization of Internal Combustion Models,** Yann Caniou, *Noesis Solutions NV*

W E D N E S D A Y

AFTERNOON

- 13:30** | **KEYNOTE** | **Challenges and Opportunities for Future Powertrain Development**, Vincenzo Bevilacqua, *Porsche Engineering Services GmbH*
- 14:10** | **SPONSOR** | *POWERTECH Engineering Srl*
- 14:25** | **Recent Progress in Simulations of Nozzle Flow and Ensuing Spray at Argonne**, Roberto Torelli, *Argonne National Laboratory*
- 14:45** | **SPONSOR** | *Microsoft Azure*
- 15:00** | **BREAK**
- 15:30** | **Pre-Mixed Combustion Model for PFI Gasoline Engine**, Chetan Tulapurkar, *Robert Bosch Engineering & Business Solutions Private Limited*
- 15:50** | **LES of a Premixed Burner Using Thickened Flame Model and AMR**, Cédric Mehl, *IFP Energies nouvelles*
- 16:10** | **Scavenging Efficiency of Semi-Open Ignition Chamber**, Fabio Ciccateri, *Firno Energy Oy Ltd.*
- 16:30** | **What to Expect in CONVERGE Version 3.0**, Keith Richards, *Convergent Science*
- 17:00** | **Closing Statements**, Kelly Senecal, *Convergent Science*



W E D N E S D A Y

NETWORKING

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TRAINING

T H U R S

Winter Garden**Sala Romanov****Sala Sydney****Sala Borbone+Bonaparte+Tudor****08:00–10:00**Advanced Topics in Internal
Combustion Engine ModelingInternal Combustion Engine
Modeling in CONVERGEFluid-Structure
Interaction Modeling

Steady-State Modeling

10:00–12:00

User-Defined Functions

Advanced Surface Preparation
Tools in CONVERGE Studio**12:00****LUNCH****13:00–15:00**

Gas Turbine Engine Combustion

Internal Combustion Engine
Modeling in CONVERGE

Sealing

Post-Processing Tools in
CONVERGE Studio**15:00–17:00**Optimization and
Model Interrogation

Heat Transfer Mapping

F R I

Winter Garden**Sala Romanov****Sala Sydney****Sala Borbone+Bonaparte+Tudor****08:00–10:00**

Emissions Modeling

Compressor and
Pump Modeling

Conjugate Heat Transfer Modeling

Turbulence Modeling

10:00–12:00

Spray Modeling

Personalized Case
Setup Assistance

Tools for SAGE Detailed Chemistry

12:00**LUNCH****13:00–15:00**

Premixed Combustion Modeling

Volume of Fluid Modeling

Engine Aftertreatment Modeling

Personalized Case
Setup Assistance**15:00–17:00**Non-Premixed
Combustion Modeling

CONVERGE + GT-SUITE Coupling

Personalized Case
Setup Assistance

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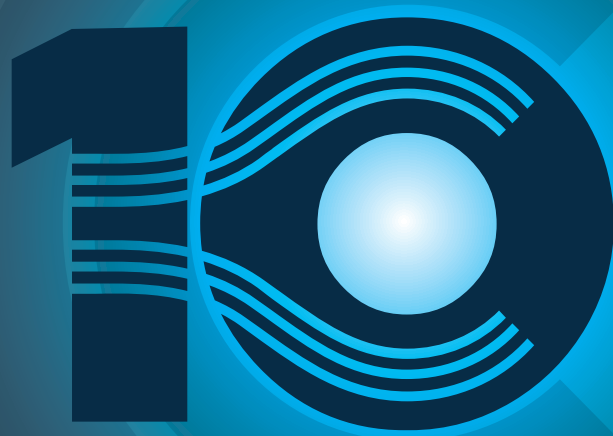
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SEPTEMBER 24-28, 2018 / **CONVERGE USER CONFERENCE-NORTH AMERICA** / MADISON, WI



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