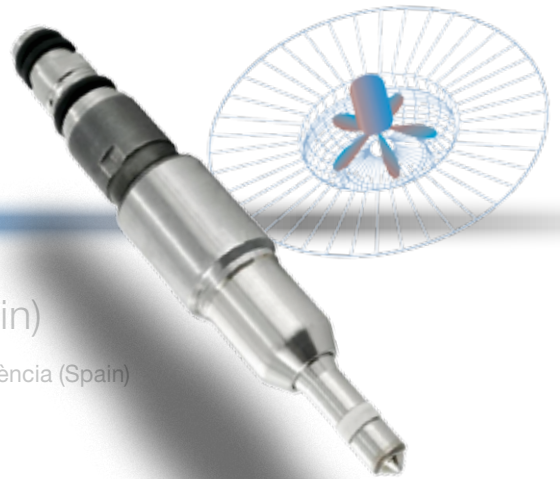


PROGRAMME

# Thermo-and fluid dynamic processes in **direct injection** engines



September 11<sup>th</sup>-14<sup>th</sup> · 2012 · Valencia (Spain)

ORGANISED BY: **CMT-MOTORES TÉRMICOS** · Universitat Politècnica de València (Spain)

# TDI 2012 PROGRAMME



UNIVERSITAT  
POLITÈCNICA  
DE VALÈNCIA



**Prof. Juan Juliá**

Rector de la Universitat Politècnica de València  
Rector of the Universitat Politècnica de València

» Una vez más, un año más, la Universitat Politècnica de Valencia acoge la conferencia THIESEL. Si bien en las ediciones anteriores el temario de la conferencia se cernía entorno a los procesos termofluidodinámicos en motores Diesel, para esta 7ª edición, se ha ampliado a los motores de inyección directa puesto que cada vez más, se van acercando los conceptos que rigen la combustión de los motores Diesel y gasolina.

A pesar de las duras circunstancias económicas que afectan a tantos países y al sector de la automoción, y del contexto que parece favorecer la implantación de la tracción eléctrica en los turismos, esta 7ª edición ha seguido despertando un gran interés tanto en el mundo académico como en el industrial. Se puede por tanto asegurar que el proyecto está consolidado y aparece como cita obligada en el calendario internacional de encuentros científicos sobre motores de combustión interna alternativos.

Y es que los que estamos en este sector, seguimos pensando que los motores térmicos, y en particular el motor de inyección directa, aún tienen mucho camino por recorrer, y buena prueba de ello es la variedad de ideas y novedades que se reflejan en las ponencias de este congreso.

Así pues consideramos un verdadero honor, ser una vez más los anfitriones de la Conferencia Thiesel en su edición 2012, y estamos convencidos que el interés de los temas abordados estimulará las discusiones entre sus participantes contribuyendo a la mejora y al desarrollo de los motores de inyección directa.

Sean pues bienvenidos, y siéntanse acogidos por esta ciudad y esta universidad que estoy seguro les proporcionarán un ambiente de trabajo agradable y prolífico »



» Once more, this year again, the Universitat Politècnica de València is hosting the THIESEL Conference. While in previous editions the conference agenda was restricted to thermo- and fluid dynamic processes in Diesel engines, in this 7th edition the scope has been extended to include any direct injection engines, either spark-ignited or compression-ignited, as the concepts underlying their respective combustion processes are becoming more and more similar.

Despite the economic difficulties affecting many countries and particularly the automotive sector, and regardless of a context which seems to favour the implementation of electric traction in passenger cars, this 7th edition has again attracted great interest from both industry and academia. It can therefore be assured that the conference is by now a well consolidated project and has become a must in the international calendar of scientific meetings on reciprocating internal combustion engines.

All things considered, we who work in this sector, still believe that internal combustion engines, and, particularly direct injection engines, have still a long way to go, and proof of this is the variety of ideas and innovations that are reflected in the papers presented at this conference.

It is therefore a real honour for us to be hosting once again the THIESEL Conference in its 2012 edition, and we believe that the interest of the topics addressed will stimulate discussion among participants, thus contributing to the improvement and development of direct injection engines.

Be welcome, and feel welcome by this city and this university, which certainly are willing to provide you with a pleasant and productive working environment »



» Six editions of the THIESEL Conference have consolidated its position as a meeting point between industry, research institutions and academia involved in the Diesel automotive sector; in fact, the international attendance has grown steadily since its first edition in 2000, thus indicating that there was a real need for such a gathering. However, engine science and technology have evolved during these years, with new emerging engine concepts so that the frontiers between spark-ignition and compression-ignition are becoming more and more diffuse. In such a technological context, it seems reasonable to exploit R&D synergies and enhance the exchange of valuable knowledge and experience by extending the scope of the Conference to include also spark-ignited engines. Hence the new name for this 7th edition: THIESEL Conference on 'Thermo- and Fluid Dynamic Processes in Direct Injection Engines'.

It is generally agreed that the internal combustion engine will remain the main propulsion system for vehicles in the next 20 to 30 years and beyond. Therefore, innovative research on combustion engines represents the most promising way to a substantial reduction of pollutant emissions, until new solutions based on hydrogen and fuel cell technologies may reach their maturity.

Innovation, however, calls for important research efforts. On the combustion side, further development for advanced control strategies and hardware able to fully exploit the flexibility provided by modern multiple injection systems will be required. Regarding other engine processes, advances will also be necessary in the thermal and air management of the engine, in response to foreseen demands for a precise control of heat flows, exhaust gas recirculation (EGR) and turbo-charging system operation. Also, it is likely that new and interesting issues to be solved regarding after-treatment technology and engine noise abatement will arise.

The outlook allows for an optimistic view on the potential of clean and silent combustion engine technologies. However, their eventual success depends on the academic researchers' awareness of the automotive industry needs and on the will of automotive industry to invest in medium-to-long term basic research.

The main objective of THIESEL 2012 is to contribute to this success by attracting good quality papers from both Industry and Academia, describing the most recent developments and latest innovations relative to thermo-and fluid dynamic processes in direct injection engines, and by facilitating the exchange of valuable knowledge and experience between the main actors of the automotive R&D sector »

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 Prof. J.M. DESANTES · Universitat Politècnica de València - SPAIN  
 Mr. Ph. PINCHON · IFP Energies Nouvelles - FRANCE

#### ■ OVERSEAS ORGANISING COMMITTEE

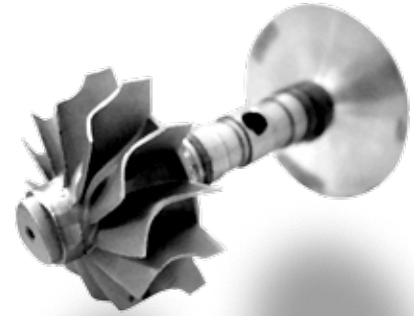
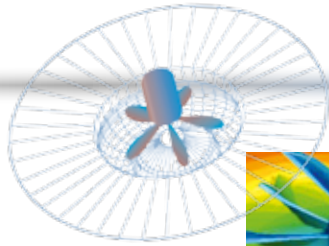
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 Dr. B. VAGLIECO · Istituto Motori - ITALY  
 Dr. T. WINTRICH · Robert Bosch - GERMANY



SESSION MATRIX

	TUESDAY, SEPT 11 <sup>th</sup>	WEDNESDAY, SEPT 12 <sup>th</sup>	THURSDAY, SEPT 13 <sup>th</sup> 12 <sup>th</sup>	FRIDAY, SEPT 14 <sup>th</sup>
07:30-08:30		CONFERENCE REGISTRATION		
08:30-10:30		SESSION A.1. <b>Fuel Injection &amp; Sprays (I)</b>	SESSION C.1. <b>Combustion (I)</b>	SESSION E.1. <b>Air Management &amp; Turbocharging</b>
10:30-11:00		COFFEE BREAK		
11:00-13:00		SESSION A.2. <b>Fuel Injection &amp; Sprays (II)</b>	SESSION C.2. <b>Combustion (II)</b>	SESSION E.2. <b>Emissions &amp; Aftertreatment</b>
13:00-15:30		LUNCH		
15:30-17:00		SESSION B.1. <b>Spark ignition</b>	SESSION D.1. <b>Downsizing</b>	SESSION F.1. <b>Modelling (I)</b>
17:00-17:30		COFFEE BREAK		
17:30-18:00	CONFERENCE REGISTRATION	COFFEE BREAK	SESSION D.2. <b>Fuels</b>	SESSION F.2. <b>Modelling (II)</b>
18:00-19:00		SESSION B.2. <b>Optimization</b>		
19:00-19:30	WELCOME ADDRESS			CLOSURE ADDRESS
19:30-21:30	WELCOME COCKTAIL			
21:30-24:00				GALA DINNER

CONFERENCE REGISTRATION	7:30 - 8:30
<b>SESSION A.1. Fuel Injection &amp; Sprays (I)</b> Keynote address: J. DEC	8:30 - 10:30

**Increasing the load range and efficiency of HCCI engines using partial fuel stratification**

J. Dec. SANDIA NATIONAL LABORATORIES (USA)

**Effect of injector configurations on the low load operation in a compression ignition engine fueled with gasoline and diesel**

K. Kim, D. Kim, Y. Jung and C. Bae. KAIST (REPUBLIC OF KOREA)

**Improvements to mixture formation and combustion on a HD diesel engine by a 3000 bar injection system**

V. Rajamani, H.-J. Laumen, L. Ruhkamp. FEV (GERMANY) » A. Dhongde. RWTH AACHEN UNIVERSITY (GERMANY) » O. Herrmann, J. Weber. DENSO INTERNATIONAL Europe (GERMANY) » M. Mashida. DENSO CORPORATION (JAPAN)

**Numerical study of the spray inception in direct injection systems**

F. Dos Santos, L. Le Moynes. ISAT UNIVERSITY OF BURGUNDY (FRANCE)

COFFEE BREAK	10:30 - 11:00
<b>SESSION A.2. Fuel Injection &amp; Sprays (II)</b>	11:00 - 13:00

**Development and mixing of diesel sprays at the microscopic level from low to high temperature and pressure conditions**

J. Manin, L. M. Pickett, R. N. Dahms, J. C. Oefelein. SANDIA NATIONAL LABORATORIES (USA) » M. Bardi. UNIVERSITAT POLITÈCNICA DE VALÈNCIA (SPAIN)

**Effects of ultra-high injection pressure, micro-hole nozzle and fuel properties on spray and combustion processes of biodiesel fuel**

O. A. Kuti. FEDERAL UNIVERSITY OF TECHNOLOGY AKURE (NIGERIA) » J. Y. Zhu, K. Nishida. UNIVERSITY OF HIROSHIMA (JAPAN) » X. G. Wang. CHANGAN AUTOMOBILE CORPORATION (PR CHINA) » Z. Huang. XI'AN JIANTONG UNIVERSITY (PR CHINA)

**Effect of ambient pressure on breakup of droplets near diesel injector nozzle**

K. Komada, D. Sakaguchi, H. Ueki, M. Ishida. NAGASAKI UNIVERSITY (JAPAN) » H. Tajima. KYUSHU UNIVERSITY (JAPAN)

**Effect of partial needle lift on the hydraulic and evaporative performance characteristics of a common rail diesel fuel injector**

R. Payri, J. Gimeno, J. P. Viera. UNIVERSITAT POLITÈCNICA DE VALÈNCIA (SPAIN) » A. H. Plazas. GENERAL MOTORS (USA)

LUNCH	13:00 - 15:30
<b>SESSION B.1. Spark Ignition</b> Keynote address: T. SHIRAKAWA	15:30 - 17:30

**Challenge and direction of internal combustion engine toward Nissan powersource evolution**

T. Shirakawa. NISSAN MOTOR IBÉRICA (SPAIN)

**An advanced simulation platform to support combustion developments in DISI engines: from engine design to control and calibration**

J. M. Anderlohr, S. Richard, G. Font. IFPEN (FRANCE) » S. Dosda. D2T (FRANCE)

**Evaluation and optimisation of combustion concept for heavy duty gas engines**

I. Magnusson, V. Manente. VOLVO (SWEDEN)

**Laser-optical and numerical study of mixture formation in a GDI engine with high tumble motion**

S. Neumann, C. Hasse. TU BERGAKADEMIE FREIBERG (GERMANY) » S. Grasreiner, A. Kleemann, B. Hussmann, A. Heinisch, B. Durst. BMW GROUP (GERMANY) » P. Koch, T. Mederer, T. Knorsch, M. Wensing. FRIEDRICH-ALEXANDER-UNIVERSITY (GERMANY)

COFFEE BREAK	17:30 - 18:00
<b>SESSION B.2. Optimization</b>	18:00 - 19:30

**Synergistic integration of commercially-available technologies for highly-efficient diesel engines for passenger car application**

M. A. Potter, A. Vassallo. GM POWERTRAIN EUROPE (ITALY)

**Modelling and experimental results on the condensation in engine coolers, impact of sulphur content in diesel fuel**

Z. Soukeur, J. Borges. VALEO ENGINE COOLING (FRANCE) » J. M. Luján, B. Pla. UNIVERSITAT POLITÈCNICA DE VALÈNCIA (SPAIN)

**Knowledge-based design and optimization of engines**

S. Bogomolov, A. Mikulec, J. Macek, M. Valasek, V. Doleček. CZECH TECHNICAL UNIVERSITY IN PRAGUE (CZECH REPUBLIC)

SESSION C.1. <b>Combustion (I)</b> Keynote address: M. LEJEUNE	8:30 - 10:30
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**Every drop counts. Most promising research paths to exceed 50% efficiency with heavy-duty engines**

M. Lejeune. AB VOLVO (FRANCE)

**Review of equivalence ratio measurements in a light-duty diesel engine operating in a light-load partially premixed regime**

B. R. Petersen, D. Sahoo, P. C. Miles. SANDIA NATIONAL LABORATORIES (USA)

**CO emission sources in diesel combustion with multiple injections and reduction techniques**

T. Fuyuto, R. Ueda, Y. Hattori, K. Akihama. TOYOTA CENTRAL R&D LABS (JAPAN) » H. Aoki, T. Umehara. TOYOTA INDUSTRIES CORPORATION (JAPAN) » H. Ito, A. Kawaguchi. TOYOTA MOTOR CORPORATION (JAPAN)

**Comparison of RCCI, HCCI, and CDC Operation from low to full load**

D. A. Splitter, M. L. Wissink, T. L. Hendricks, J. B. Ghandhi, R. D. Reitz. ERC. UNIVERSITY OF WISCONSIN - MADISON (USA)

COFFEE BREAK	10:30 - 11:00
SESSION C.2. <b>Combustion (II)</b>	11:00 - 13:00

**DICO: a new step towards emission free diffusive combustion**

G. Bruneaux, J. Kashdan, L. M. Malbec. IFPEN (FRANCE) » F. Defransure, P. Gastaldi. RENAULT POWERTRAIN (FRANCE) » C. Garsi, E. Topenot. DELPHI (FRANCE) » B. Griffaton, B. Lombard. VOLVO (FRANCE) » J. P. Le Ru, B. Nicolas. CERTAM (FRANCE)

**Stoichiometric compression ignition (SCI) engine for ultra-low emissions**

R. Winsor, E. Thurow, R. Ceausu, K. Baumgard. JOHN DEERE POWER SYSTEMS (USA)

**Characterization of reactivity controlled compression ignition (RCCI) using premixed hydrated ethanol and direct injection diesel in heavy-duty and light-duty engines**

A. B. Dempsey, N. R. Walker, D. Splitter, M. Wissink, R. D. Reitz. UNIVERSITY OF WISCONSIN - MADISON (USA)

**High EGR rate combustion and its flame temperature observed by a bore scope system in a heavy duty diesel engine**

Y. Aoyagi, H. Osada, K. Shimada, N. Uchida. NEW ACE INSTITUTE (JAPAN) » R. Tare. NAC IMAGE TECHNOLOGY (JAPAN)

LUNCH	13:00 - 15:30
SESSION D.1. <b>Downsizing</b> Keynote address: S. ALLANO	15:30 - 17:00

**How disruptive technologies enable future energy systems for automotive**

S. Allano. PSA PEUGEOT CITROËN (FRANCE)

**Downsizing or cylinder number reduction in Diesel engines: effect of unit displacement on efficiency and emissions**

M. Thirouard, V. Knop, P. Pacaud. IFP Energies Nouvelles (FRANCE)

**Advanced technologies for downsized gasoline engines**

P. Freeland, J. Taylor, D. Oudenijeweme, P. Stansfield, M. Warth. MAHLE POWERTRAIN (UK)

COFFEE BREAK	17:00 - 17:30
SESSION D.2. <b>Fuels</b>	17:30 - 19:00

**Experimental and numerical investigations on compression ignition engines using ethanol in dual-fuel configuration**

V. Fraioli, G. Di Blasio, E. Mancaruso, M. Migliaccio, C. Beatrice, C. Guido, B. M. Vaglieco. ISTITUTO MOTORI (ITALY)

**Tailored surrogate fuels for the simulation of diesel engine combustion of novel biofuels**

B. Kerschgens, T. Lackmann, H. Pitsch, A. Janssen, M. Jakob, S. Pischinger. RWTH AACHEN UNIVERSITY (GERMANY)

**Clean and efficient diesel combustion with butanol + ethanol +diesel fuel blends**

H. Ogawa, S. Hari, K. Hara, T. Ozawa, K. Yamazaki. HOKKAIDO UNIVERSITY (JAPAN)

SESSION E.1. <b>Air management &amp; Turbocharging</b> Keynote address: P. GASTALDI	8:30 - 10:30
<b>The diesel engine: future challenges for both industry and academic research</b> P. Gastaldi. RENAULT (FRANCE)	
<b>Investigation of two-stage turbocharging for a 300 kW diesel engine</b> A. Boemer, H.-C. Götsche-Götze, P. Kipke, R. Kleuser, B. Nork. DEUTZ (GERMANY)	
<b>Divided exhaust period on heavy-duty diesel engines</b> S. Gundmalm, A. Cronhjort, H.E. Ångström. KTH ROYAL INSTITUTE OF TECHNOLOGY (SWEDEN)	
<b>Electric turbo assist: efficient rapid boost for heavy-duty diesel engines</b> A. W. Costall, R. Ivanov, T. P. F. Langley. CATERPILLAR (UK)	
COFFEE BREAK	10:30 - 11:00
SESSION E.2. <b>Emissions &amp; Aftertreatment</b>	11:00 - 13:00
<b>A study on soot emission from diesel engine under transient operation</b> H. Kosaka. TOKYO INSTITUTE OF TECHNOLOGY (JAPAN)	
<b>Strategies for active DPF regeneration based on late injection and exhaust recirculation</b> M. Lapuerta, J. J. Hernández, F. Oliva. UNIVERSIDAD DE CASTILLA-LA MANCHA (SPAIN)	
<b>Experimental investigation on advanced diesel oxidation catalysts with low temperature NOx storage capability for LD diesel applications</b> F. Millo, D.S. Vezza. POLITECNICO DI TORINO (ITALY) » A. De Filippo. GENERAL MOTORS POWERTRAIN EUROPE (ITALY)	
<b>High efficiency SCR for non-road applications</b> K. De Rudder. DONALDSON EUROPE (BELGIUM)	
LUNCH	13:00 - 15:30
SESSION F.1. <b>Modelling (I)</b> Keynote address: M. POTTER	15:30 - 17:00
<b>The road to math: the General Motors approach to an efficient diesel engine technology</b> M. Potter. GENERAL MOTORS POWERTRAIN EUROPE (ITALY)	
<b>Optimum engine and SCR system performance of HDD engines for significantly changing duty cycles</b> E. Schalk. VIRTUAL VEHICLE COMPETENCE CENTRE (AUSTRIA) » C. Poetsch, H. Ofner. AVL LIST (AUSTRIA) » K. Richter. MAN Truck & Bus (AUSTRIA)	
<b>A kinetic study of methyl oleate oxidation using a semi-detailed mechanism</b> J. Yang, V. I Golovitchev. CHALMERS UNIVERSITY OF TECHNOLOGY (SWEDEN) » C. V. Naik, E. Meeks. REACTION DESIGN INC. (USA)	
COFFEE BREAK	17:00 - 17:30
SESSION F.2. <b>Modelling (II)</b>	17:30 - 19:00
<b>Role of turbulence for mixing and soot oxidation for an equivalent diesel gas jet during wall interaction studied with LES</b> J. Eismark, M. Hammas, A.Karlsson. VOLVO (SWEDEN) » I. Denbratt, L. Davidson. CHALMERS UNIVERSITY OF TECHNOLOGY (SWEDEN)	
<b>Understanding of low-speed pre-ignition phenomenon in turbo-charged DISI engines</b> C.O. Iyer, B. Van Der Wege, J. Yi. FORD MOTOR COMPANY (USA)	
<b>A study of a prediction formula for heat transfer coefficient on combustion chamber walls in internal combustion engines. Investigation of characteristic of local heat transfer coefficient by three dimensional combustion simulation</b> M. Emi, S. Kimura. NISSAN MOTOR (JAPAN) » Y. Enomoto. TOKYO CITY UNIVERSITY (JAPAN)	
CLOSURE ADDRESS	19:00 - 19:30
GALA DINNER	21:30 - 24:00

The following poster session is planned to enable the presentation of interesting work that could not be included in the Conference presentations. Abstracts of these works are included in the Conference Proceedings. Conference participants are invited to visit the poster session and discuss the issues with their authors.

**Impact of injector flow number and fuel properties on common rail spray evolution and engine combustion**

L. Allocca, E. Mancaruso, A. Montanaro, B. M. Vaglieco. ISTITUTO MOTORI (ITALY)

**A numerical investigation of transient cavitating flow in injector nozzles considering of thermodynamic properties of the fuel**

Z. He, Y. Huang, W. Zhong, Q. Wang. JIANGSU UNIVERSITY (CHINA)

**Characterization of particulate emissions for a light duty euro-5 diesel engine during normal operation as well as dpf-regeneration**

S. Berlenz, M. Skubella, U. Wagner, O. Möhler, H. Saathoff. KIT - KARLSRUHE INSTITUTE OF TECHNOLOGY (GERMANY)

**Fuel injection temperature determination and effect on the injection process for different alternative fuels**

J. Galle, C. Van De Maele, S. Defruyt, S. Verhelst. GHENT UNIVERSITY (BELGIUM)

**Influence of different injection pressures for a new split injection strategy**

A. Binde, U. Wagner. KIT - KARLSRUHE INSTITUTE OF TECHNOLOGY (GERMANY) » D. Dörner. TU DRESDEN (GERMANY)

**Numerical and experimental study of the flow in a diesel engine chamber**

J. Fernández, A. Marcos, J. M. Montanero. UNIVERSIDAD DE EXTREMADURA (SPAIN) »  
A. Castilla. DEUTZ DITER (SPAIN) » R. Barrio. UNIVERSIDAD DE OVIEDO (SPAIN)

**PCCI combustion as NOx reduction measure for marine engines by spray distribution control and LCO fuel**

D. Tsuru, D. Imhof, R. Ishibashi, H. Tajima. KYUSHU UNIVERSITY (JAPAN)

**Optimization of part- homogenized diesel engine combustion by variable injection strategies**

A. Vanegas, H. Pitsch. RWTH AACHEN (GERMANY)



CONFERENCE EXHIBITION

The following prestigious international companies related to the DI engine research and development participate to the Conference exhibition with a stand. Conference participants are encouraged to visit the exhibition throughout the conference duration, especially during the coffee and lunch breaks.

**AVL**

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## ■ CONFERENCE LOCATION

» The conference will take place in the Conference Building at the Universitat Politècnica de València, Valencia (Spain) on September 11<sup>th</sup> - 14<sup>th</sup>, 2012.

## ■ CONTACT DETAILS

### » CONFERENCE SECRETARIAT

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 Fax: +34 96 387 76 59  
 E-mail: secrecon@mot.upv.es  
<http://www.cmt.upv.es/Thiesel.aspx>

### » REGISTRATION AND HOTELS:

Pacific World (Meetings & Events Spain SLU)  
 Gran Vía Marqués del Turia, 49, 7<sup>o</sup>, 3<sup>a</sup>  
 46005 Valencia, Spain  
 Tel.: +34 96 352 81 61  
 Fax: +34 96 394 11 58  
 E-mail: registration-thiesel2012@pacificworld.com

## ■ REGISTRATION FEES

» Registration should be made through the Conference website. The registration fee is:

- € 700 (payment in national currencies will also be accepted)
- € 850 for late registrations received after 8<sup>th</sup> July 2012.

The fee will include:

- Attendance to the Conference sessions
- Conference Proceedings
- Coffee breaks and lunches during the Conference
- Welcome reception and closure gala dinner

Would-be participants are encouraged to fill in the on-line registration form which may be found on the Conference website ([www.cmt.upv.es](http://www.cmt.upv.es)) and submit it on-line or send it together with the payment form by post, fax or e-mail to the Congress Office Pacific World (address given above).

## ■ VECOM FELLOWSHIPS

» This conference is especially open to PhD students whose research activity is linked to Vehicle Concept Modelling, centred on powertrain. Some fellowships are available through the EC-funded ITN VECOM project (Marie Curie Actions). Information is available by sending an e-mail to [xmargot@mot.upv.es](mailto:xmargot@mot.upv.es).

## ■ ACCOMMODATION

» Accommodation at special preferential rates is available when booking through the on-line facility offered on the Conference website ([www.cmt.upv.es/Thiesel.aspx](http://www.cmt.upv.es/Thiesel.aspx)), in the following hotels:

HOTEL	Double Room for single use	Double Room
<b>Hotel Tryp Oceanic 4*</b> C/ Pintor Maella, 35. · 46023 Valencia	80 €	80 €
<b>Hotel Barceló 4*</b> Avda. de Francia, 11 · 46023 Valencia	66 €	78 €
<b>Hotel NH Ciudad de Valencia 3*</b> Avenida del Puerto, 214 · 46023 Valencia	64 €	75 €
<b>Hotel Renasa 3*</b> Avenida de Cataluña, 5 · 46010 Valencia	68 €	78 €
<b>CM Galileo Galilei</b> Hall of Residence on the University Campus Avenida de los Naranjos s/n · 46022 Valencia	41 €	54 €

Prices are per room and night and include breakfast and taxes. Early booking is recommended to ensure availability of a room in the hotel of your choice. Due to accommodation problems in the city of Valencia where many events and fairs take place, no room will be guaranteed after August 9<sup>th</sup>, 2012. If you intend to bring an accompanying person, please indicate so in the registration form. For more information about hotels or planned social activities, consult the Conference website.



❶ Paraninfo - Conference Building    ❷ CMT - Motores Térmicos    ❸ C.M. Galileo Galilei

» By plane: Valencia has an international airport, Manises, located at approximately 4 kms. from the city centre. There are regular scheduled national and international flights from several European airlines. A regular bus line links the airport to the Central train station of Valencia, located in the heart of the city. In addition, the new metro line links the airport to all major city points in Valencia.

» By road: The city of Valencia also offers excellent communication by road. The A-7 Mediterranean Motorway that runs north to south provides easy connection to Catalonia and France in the north and to Alicante, Murcia and Andalucía in the south. There are also good road connections to the rest of Spain, in particular the A-3 dual motorway to Madrid.

» By rail: Valencia has also very good train connections. The high speed train Euromed links several times a day Barcelona to Valencia in approximately 3 hours. The journey between Madrid and Valencia by the regular high speed link Alaris takes little over 3 hours and 30 min.

Valencia is a cosmopolitan and lively city on the East Coast of Spain, within easy access to some splendid holiday resorts such as those on the Costa Blanca and Costa de Azahar, and not far from the Balearic Islands. Valencia itself is a fascinating place, with a characteristic blend of historical tradition –with interesting examples of Middle Age and Renaissance architecture– and modern architecture –the City of Arts and Science. It has a varied cultural offer (Oceanographic museum, museum of Modern Arts,...) and an exciting nightlife, excellent weather and world– renowned festivals and regional cuisine. Taste some of the typical ‘tapas’ in one of the numerous restaurants outside tables and the traditional ‘Paella Valenciana’ or one of the dozen rice dishes that Valencian people have invented.

Valencia’s beach is an ideal place to spend time sunbathing and swimming. You may also enjoy a nice walk in the shadow of the palm trees of the ‘Paseo Marítimo’ that lines the sea, or along the new harbour, built for the 32nd America’s Cup, and further improved to respond to the high technical demands made by the new Formula 1 urban circuit of the world championship.

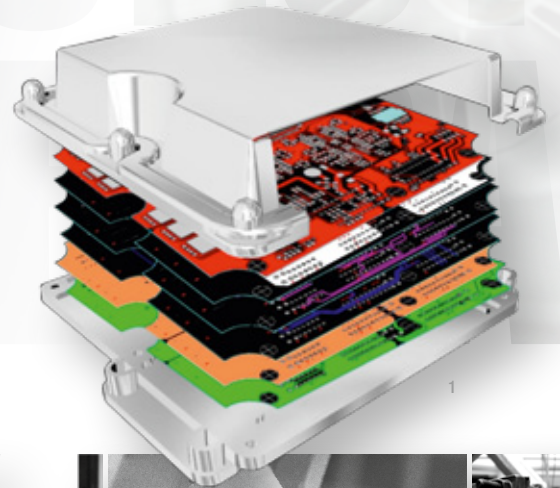
We hope that you will enjoy your stay in this Mediterranean city.



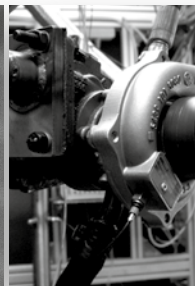
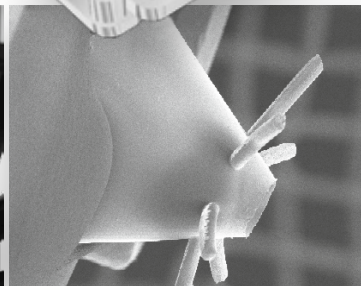
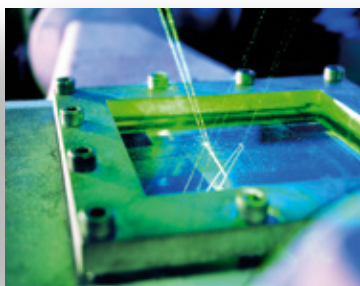


► CFD applied to IC engines

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1 Evaluation of commercial ECU, 2 Climatic chamber for cold-starting tests with simulated altitude conditions, 3 Diesel spray characterization by Laser Doppler Anemometry, 4 Impulse test rig, 5 Silicon mould of injectors to define accurate geometry, 6 Turbochargers test rig

## CMT-MOTORES TÉRMICOS

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For updated information on the organisation of the Conference please visit the web site: [http:// www.cmt.upv.es](http://www.cmt.upv.es)

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