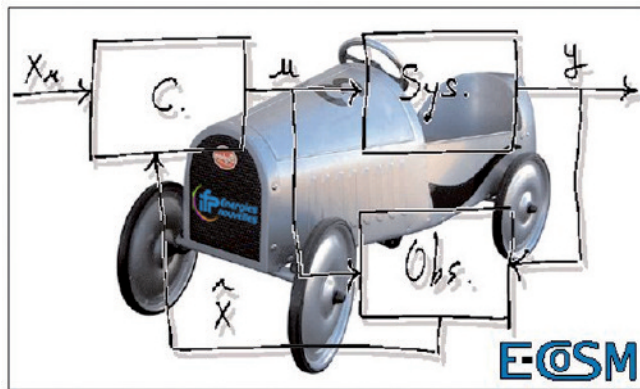


# Les Rencontres Scientifiques d'IFP Energies nouvelles

Rueil-Malmaison, France ■ 23-25 October 2012

## IFAC Workshop on Engine and Powertrain Control, Simulation and Modeling E-COSM'12

First Announcement  
and Call for Papers



Under the auspices of the  
International Federation of Automatic Control (IFAC)



and French Academy of Sciences



# Context

*The Program and Organizing Committees are pleased to invite you to participate in E-COSM'12, the 2012 IFAC Workshop on Engine and Powertrain Control, Simulation and Modeling.*

E-COSM'12 is the third of a conference series begun in 2006 in Paris. As in the 2009 edition, it is organized within the framework of "Les Rencontres Scientifiques d'IFP Energies nouvelles" and sponsored by the IFAC Technical Committee on Automotive Control and by four other IFAC Technical Committees.

E-COSM'12 will examine the most recent developments in the fields of engine and powertrain control and modeling, emphasizing the interplay between control design and validation, on the one hand, and physical modeling and simulation on the other. Our aim is to offer academic and industrial researchers and practitioners working in the automotive control sector an opportunity to meet one another and exchange views and ideas at a relatively small-scale event.

## Scope

In the global quest to move toward cleaner, more fuel-efficient and safer vehicles, control systems play a fundamental role. As a matter of fact, most novel technologies in the field of internal combustion engines, transmissions or alternative propulsion systems could not achieve their full potential without the help of automatic control. In turn, control design and validation definitely need solid support from physical modeling and simulation in order to be effective.

Bearing in mind this strong interplay, this three-day workshop will explore new trends in engine and powertrain control, simulation and modeling. The aim is to bring researchers and practitioners from the worlds of industry and academia together, to present and discuss the latest academic research developments relating to these topics, as well as industrial experience in deploying "real-world" applications.

# Committees

*The International Program Committee (IPC) of E-COSM'12 will be chaired by*

■ **Giorgio Rizzoni**  
*Ohio State University, USA*

■ **Carlos Guardiola**  
*Universidad Politécnica de Valencia, Spain*

■ **Gilles Corde**  
*IFP Energies nouvelles (IFPEN), France*  
*Vice-Chair from industry*

*The workshop proceedings will be edited by **Antonio Sciarretta**, and **Paolino Tona**, IFPEN, France*

## IPC

**Michel Basset**  
*Univ. de Haute-Alsace, France*

**Pandeli Borodani**  
*FIAT Research Center, Italy*

**Yann Chamaillard**  
*Univ. d'Orléans, France*

**Luigi Del Re**  
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*Ricardo, UK*

**Luigi Glielmo**  
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**Lino Guzzella**  
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**Greg Stewart**  
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**Michiel Van Nieuwstadt**  
*Ford Motor Co., USA*

**Francesco Vasca**  
*Univ. del Sannio, Italy*

**Junmin Wang**  
*Ohio State Univ., USA*

## National Organizing Committee

**Paolino Tona**, IFPEN (Chair)

**Sophia Chorazewicz**, IFPEN

**Antonio Sciarretta**, IFPEN

**Lorenzo Serrao**, IFP School

**Janan Zaytoon**, SEE-GdR MACS

# General information

E-COSM'12 will be held at IFP Energies nouvelles (IFPEN), in Rueil-Malmaison (near Paris, France), from **23 to 25 October 2012**, under the auspices of IFAC, the International Federation of Automatic Control.

It is sponsored by IFAC, the *Société de l'Électricité, de l'Électronique et des Technologies de l'Information et de la Communication* (SEE - French IFAC NMO), and the *Groupement de Recherche en Modélisation, Analyse et Conduite des Systèmes dynamiques* (GDR MACS).

IFAC Technical Committee main sponsor is the **TC 7.1 Automotive Control**.

Co-sponsoring TCs are:

- TC 1.3: Discrete Event and Hybrid Systems
- TC 2.2: Linear Control Systems
- TC 2.4: Optimal Control
- TC 4.5: Human Machine Systems

## Scientific correspondent

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## Conference organization

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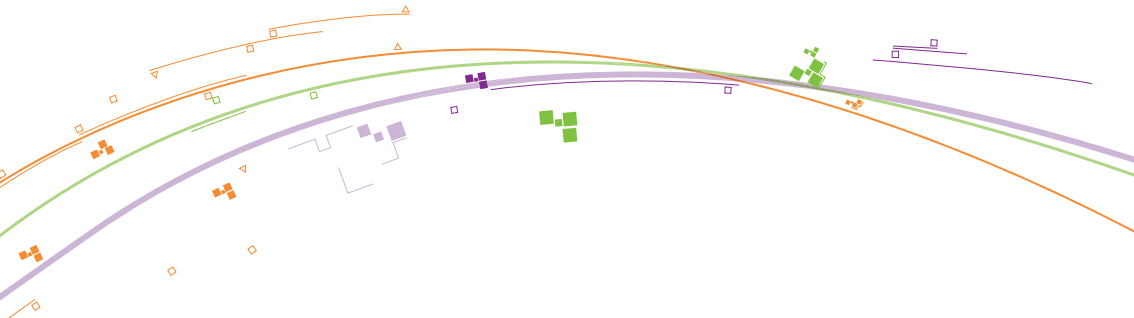
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Tel.: +33 1 41 34 21 43  
Fax: +33 1 41 34 18 67  
[clanglois@le-public-systeme.fr](mailto:clanglois@le-public-systeme.fr)

# Program

## The meeting topics for 2012 will include:

- System modeling and simulation frameworks for engine and powertrain control design, validation and calibration
- Model-based control, estimation and diagnostics for the new generations of CI and SI engines: unconventional combustion modes, high downsizing, turbocharging and supercharging, variable valve technologies and their exhaust gas after-treatment systems
- Modeling, optimization and control for hybrid and electrified vehicles and their components: renewable energy storage systems, electric motors, power electronics, transmissions
- HEV-related vehicle dynamics control
- Thermal management for next generation vehicles
- Applications of information and communication technologies to conventional and advanced vehicle powertrains for supervision, energy management, diagnostics (telematic services, remote sensing, smart grids)



# Call for papers

A call is issued for two types of full draft papers:

- **regular papers** with a maximum of 8 pages and 4 MB
- **short papers**, presenting industrial research projects, with a maximum of 4 pages and 2.5 MB in PDF format.

Papers must comply with IFAC guidelines.

Instructions on how to prepare your paper in the appropriate form are available on:

<http://www.ifac-control.org/events/information-for-ifac-authors>

All papers must be original, written in English, and **submitted in their final form at the paper submission website IFAC Papercept:**

<https://ifac.papercept.net/>

Regular papers presented at E-COSM'12 will be hosted and freely available on-line on the **IFAC-PapersOnLine.net** website and will be citable via an ISSN and a DOI.

The best papers will be considered for publication in **IFAC journals**, IFAC affiliated journals. A further selection of papers will be

also considered for publication in *Oil & Gas Science and Technology-Revue d'IFP Energies nouvelles*, a bi-monthly journal indexed in the major international bibliographical databases.

Each registered participant will receive one volume. For all additional orders, please contact:

Editions Technip

27, rue Ginoux

75015 Paris - France

Tel: +33 1 45 78 33 80 - Fax: +33 1 45 75 37 11

Website: [www.editionstechnip.com](http://www.editionstechnip.com)

## Important dates

**15 February 2012**

Full draft papers submission deadline

**15 May 2012**

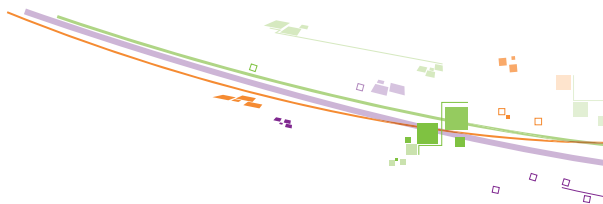
Notification of acceptance

**1 September 2012**

Final version submission deadline

**End of March 2012**

Second circular and registration opening



# IFAC Copyright conditions

The material submitted for presentation at an IFAC meeting (Congress, Symposium, Conference, Workshop) must be original, not published or being considered elsewhere.

Copyright of material presented at an IFAC meeting is held by IFAC. Authors will be required to transfer copyrights electronically. The IFAC journals and, after these, IFAC affiliated journals have priority access to all contributions presented.

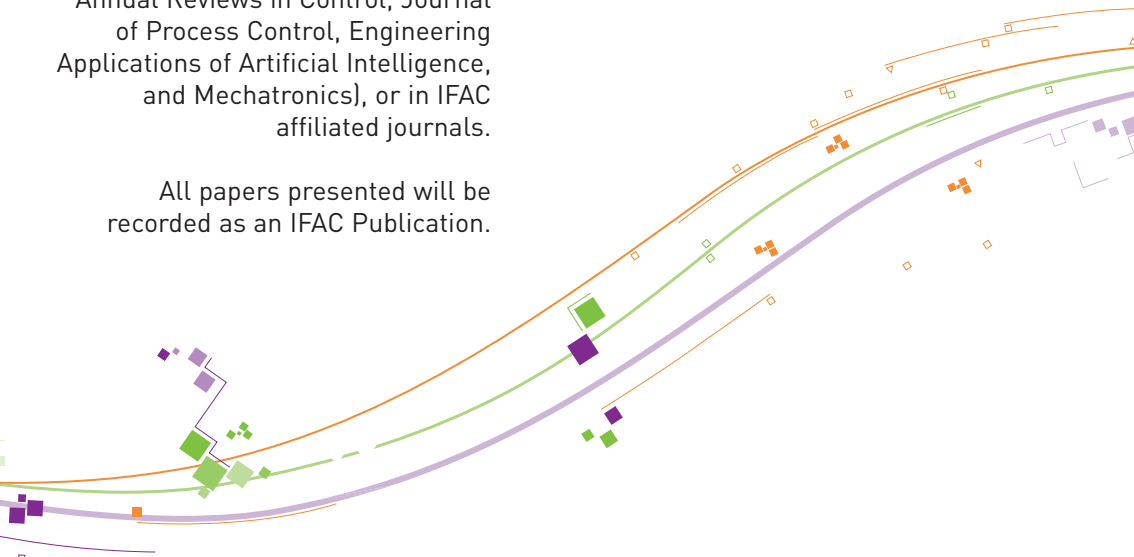
All papers accepted for presentation will appear in the Preprints of the meeting and will be distributed to the participants.

However, if the author is not contacted by an editor of these journals, within three months after the meeting, he/she is free to submit an expanded version of the presented material for journal publication elsewhere. In this case, the paper must carry a reference to the IFAC meeting where it was originally presented and, if the paper has appeared on the website IFAC-PapersOnLine.net, also a reference to this publication.

Papers duly presented at the IFAC Congress, Symposia, Conferences and Workshops will be hosted on-line on the [IFAC-PapersOnLine.net](http://IFAC-PapersOnLine.net) website.

The presented papers will be further screened for possible publication in the IFAC journals (Automatica, Control Engineering Practice, Annual Reviews in Control, Journal of Process Control, Engineering Applications of Artificial Intelligence, and Mechatronics), or in IFAC affiliated journals.

All papers presented will be recorded as an IFAC Publication.



# The PHEV Control Benchmark

## Benchmark of control strategies for a Plug-in Hybrid Electric Vehicle (PHEV)

This special benchmark session will consist in the comparison of several control strategies for a PHEV, implemented online on a simulator provided by the organizers.

All teams interested in participating in this benchmark session will be provided with a fully functional simulator of a plug-in hybrid electric vehicle, and will implement a supervisory control strategy to optimize the vehicle fuel consumption.

They will be required to submit their control strategies in the form of a Simulink block with a specific format (inputs/outputs/solver).

All entries will be accompanied by a presentation and a document describing them. They will be tested and evaluated during this special benchmark session.

The simulator is a quasi-static simulator that accounts for longitudinal vehicle dynamics and battery SOC dynamics, while the engine and electric machines are modeled using stationary maps.

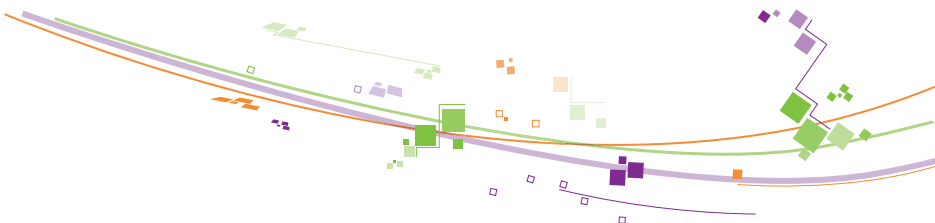
The strategies will be tested using two realistic driving cycles. The battery is completely charged at the beginning of the cycle and a complete recharge is assumed to take place at the end.

The participants will be able to make use of some information about the cycle, namely the (approximate) total distance and average speed, which could be easily retrieved from a GPS device. This information will be included in the simulator.

The evaluation of the strategies will be done on the basis of the fuel and energy consumption for the two cycles, as well as acceleration performance and controller runtime performance.

Complete description of this benchmark session on:

[www.ecosm12.org](http://www.ecosm12.org)



## Signing up and submission

The teams interested in submitting an entry for the benchmark session should contact us at [ecosm12\\_benchmark@ifpen.fr](mailto:ecosm12_benchmark@ifpen.fr)

**You can start signing up immediately.** We will send you the simulator to develop your controller by the **end of December 2011.**

**Sign up until 15 February 2012.** Requests arriving later will not be taken into consideration. The earlier you sign up, the more time you will have to work on your control strategy.

## Deadline for submitting your entry: 30 June 2012.

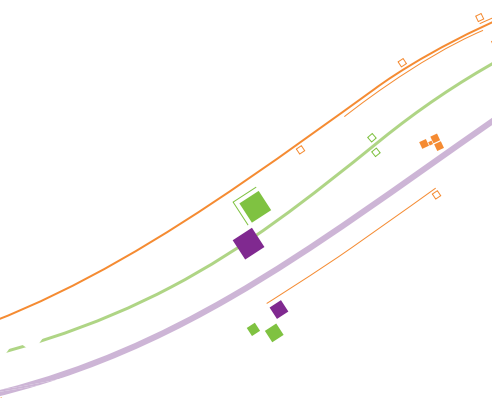
The entry will consist of the Simulink files with the controller and a document outlining the control strategy. The document can be **either:**

- **a short report** (< 3 pages), sent directly to [ecosm12\\_benchmark@ifpen.fr](mailto:ecosm12_benchmark@ifpen.fr), that will not be published in the conference proceedings;
- or
- **a regular paper**, that will be peer-reviewed and published in the conference proceedings if accepted. You can opt for this type of submission if you feel your control strategy is especially innovative.

A special category has been defined in **IFAC Papercept** to accommodate for it.

In addition to the document, we are asking you to prepare a brief presentation to introduce your work during the benchmark session.

For any inquiry or comment regarding the organization or the simulator: [ecosm12\\_benchmark@ifpen.fr](mailto:ecosm12_benchmark@ifpen.fr)



# What is IFP Energies nouvelles ?

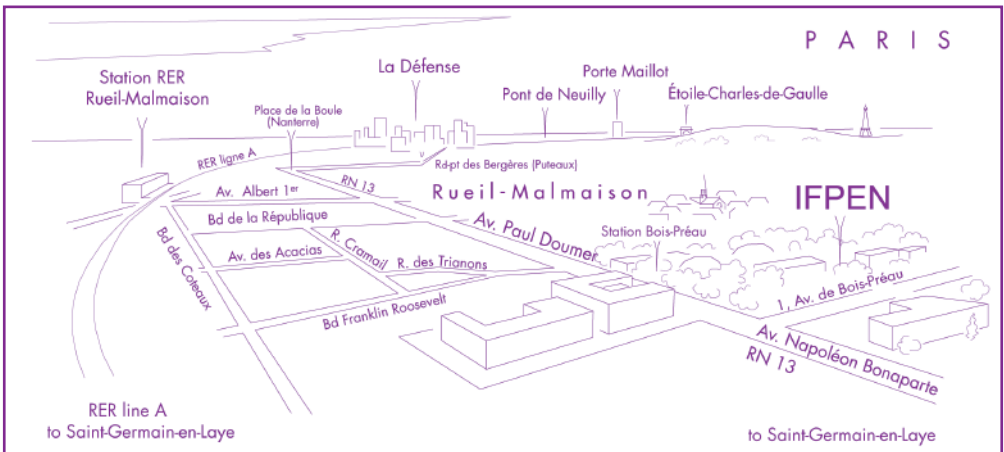
IFP Energies nouvelles is a public-sector research, innovation and training center active in the fields of energy, transport and the environment. Its mission is to provide public players and industry with efficient, economical, clean and sustainable technologies to take up the three major challenges facing society in the 21<sup>st</sup> century: climate change and environmental impacts, energy diversification and water resource management. It boasts world-class expertise.

IFP Energies nouvelles sets out 5 complementary, inextricably-linked strategic priorities that are central to its public-interest mission:

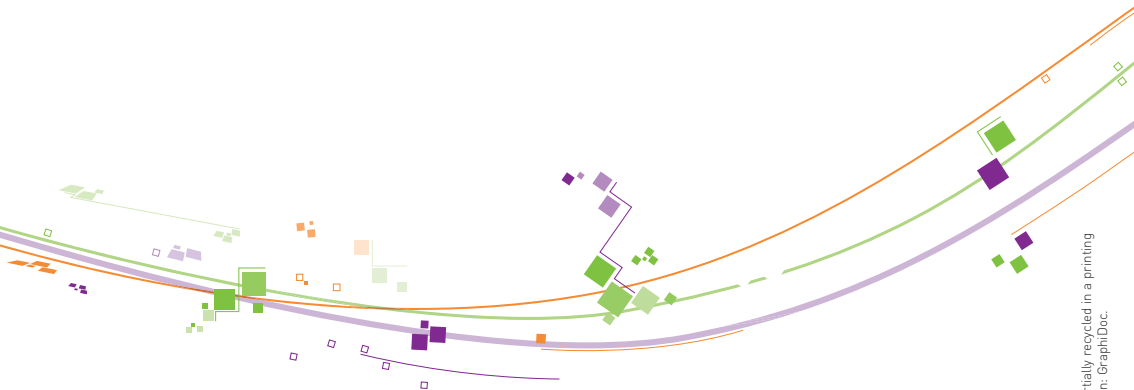
- **renewable energies:** producing fuels, chemical intermediates and energy from renewable sources,
- **eco-friendly production:** producing energy while mitigating the environmental footprint,
- **innovative transport:** developing fuel-efficient, environmentally-friendly transport,
- **eco-efficient processes:** producing environmentally-friendly fuels and chemical intermediates from fossil resources,
- **sustainable resources:** providing environmentally-friendly technologies and pushing back the current boundaries of oil and gas reserves.

An integral part of IFP Energies nouvelles, its graduate engineering school prepares future generations to take up these challenges.

For more information, [www.ifpennergiesnouvelles.com](http://www.ifpennergiesnouvelles.com)







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