



### Welcome to E-COSM'15

E-COSM'15 is the fourth edition of a workshop series created in 2006. It is sponsored by the IFAC Technical Committee on Automotive Control and co-sponsored by other IFAC Technical Committees.

After three successful editions organized and hosted by Institut Francais du Petrole Energies Nouvelles (IFPEN) in France, E-COSM moves to the United States, to be hosted by The Ohio State University's Center for Automotive Research and SIMCenter.

E-COSM'15 examines the most recent developments in the fields of engine and powertrain control and modeling, emphasizing the interplay between control design and validation, and physical modeling and simulation. The 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.

Regular papers presented at E-COSM'15 will be hosted and freely available online 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 affiliated IFAC journals. [For more information visit e-cosm2015.osu.edu.](http://e-cosm2015.osu.edu)



IFAC Technical Committee on Automotive Control, TC 7.1

### IFAC Workshop on Engine and Powertrain Control, Simulation and Modeling

E-COSM'15 will be held at The Blackwell Inn on the campus of The Ohio State University, in Columbus, Ohio, USA. It will be held from August 23-26, 2015, under the auspices of IFAC, the International Federation of Automatic Control.

#### Important Dates

Full draft paper submission - March 15, 2015

Notification of acceptance - May 31, 2015

Final paper submission - June 30, 2015



# E-COSM'15 Context

ECOSM'15 is organized and hosted by the Center for Automotive Research and SIMCenter, two interdisciplinary research centers at The Ohio State University dedicated to automotive research and development.

The Center for Automotive Research (CAR) is the pre-eminent research center in sustainable and safe mobility in the United States and an interdisciplinary research center in The Ohio State University's College of Engineering. CAR research focuses on: energy, safety and the environment. CAR offers state of the art facilities for students, faculty, research staff and industry partners. With a concentration on preparing the next generation of automotive leaders, CAR is recognized for: interdisciplinary emphasis on systems engineering, advanced and unique experimental facilities, collaboration on advanced product development projects with industry and a balance of government and privately sponsored research.  
More: [car.osu.edu](http://car.osu.edu).

The Simulation Innovation and Modeling Center is an interdisciplinary research center for the virtual simulation and modeling of product performance and manufacturing processes in The Ohio State University's College of Engineering. The Simulation Innovation and Modeling Center, or SIMCenter, researches and applies computer aided engineering techniques to the design and manufacturing of advanced product and production concepts. Located in Smith Laboratory, the SIMCenter combines expertise from several College of Engineering departments, including mechanical, aerospace, electrical, industrial, materials science, computer science and integrated systems and partnership with Ohio Supercomputer Center.  
More: [simcenter.osu.edu](http://simcenter.osu.edu).

## Scope

In the global quest to move toward cleaner, more fuel efficient and safer vehicles, control systems play a fundamental role. In 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 need solid support from physical modeling and simulation in order to be effective.

Bearing in mind this strong interplay, this two and one half 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.

## Topics

Meeting topics for 2015 include:

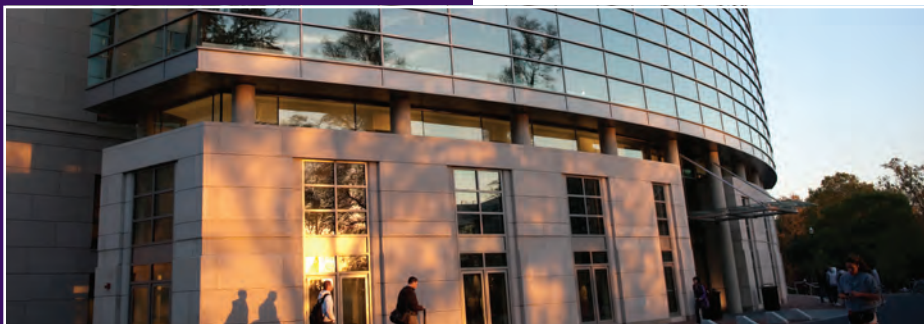
- ✱ System modeling and simulation frameworks for engine and powertrain control design, validation and calibration
- ✱ Model-based control, estimation and diagnostics for the new generations of CI and SI engines (unconventional combustion modes, downsizing, boosting, variable valve actuation technologies,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

## Workshop outline, August 23-26

**Sunday, August 23:** evening reception

<b>Monday, August 24</b>	<b>Tuesday, August 25</b>	<b>Wednesday, August 26</b>
plenary lecture	plenary lecture	plenary lecture
two parallel sessions	parallel technical sessions	industry panel sessions
lunch	lunch	lunch
industry presentation	industry presentation	industry presentations
parallel technical sessions	parallel technical sessions	conference ends
student poster session	student poster session	
industry student reception	industry student reception	
open evening	conference banquet	

Thompson Library at The Ohio State University



# E-COSM'15

## Venue and lodging



### The Ohio State University

The Ohio State University's campus is one of America's largest and most comprehensive. More than 56,000 students select from 14 colleges, 175 undergraduate majors and 240 masters, doctoral and professional degree programs. As Ohio's best and one of the nation's top 20 public universities, Ohio State is further recognized by a top-rated academic medical center and a premier cancer hospital and research center.

The university's total research expenditures, 2012-2013, topped \$934 million. The university's innovative prowess attains world class status, particularly in critical areas such as global climate change, cancer, infectious disease, advanced materials and ag-bio products that feed and fuel the world.

The College of Engineering is creating new discoveries across a broad range of applications and scientific disciplines. In fiscal year 2013, this research was supported by more than \$113 million in externally-sponsored research expenditures. Ohio State is first nationally among public

universities in industry sponsored research. Industry research and development expenditures for the College of Engineering in fiscal year 2013 totaled \$34.4 million. Additionally, more than 40 research centers and laboratories provide students with access to state of the art facilities for research and teaching.

### Lodging

The Blackwell Inn at The Ohio State University offers convenient and comfortable accommodations for visitors, while the campus community provides elegant facilities and superb catering services, making it the perfect location and atmosphere for the conference.

Together, The Blackwell and Ohio State provide an intimate setting where attendees can collaborate, attend conference events and relax all in one place.

Please make reservations by the specified dates, as the number of rooms available are limited. Reservations: [theblackwell.com](http://theblackwell.com)

All reservations should be made by Friday, July 24, 2015 in order to receive the conference rate (plus taxes and parking charges). After this date, the hotel will release rooms not sold from the group block for general sales and all subsequent hotel reservations will be taken on an availability basis. Conference rate: \$135/night.

Address: 2110 Tuttle Park Place, Columbus, Ohio 43210

Directions: [go.osu.edu/ECOSM4](http://go.osu.edu/ECOSM4)



The Blackwell Inn



### Columbus, Ohio

The number one surprise first-time visitors express? "What a great city!" Columbus is a major metro area (the 15th largest city in the U.S.) with lively arts and music scenes; great parks and greenways; cool historic neighborhoods; major and minor league sports teams; and fun and trendy restaurants and shopping.

Columbus was recently named a "city of the future" in New Geography's list of "cities best positioned to prosper in the next decade." A strong tie to the university means great research, internship, service and job opportunities for Ohio State students. Abercrombie & Fitch, Battelle, Nationwide Insurance, Limited Brands and Wendy's International are just a few of the corporations headquartered in Columbus. For more information, please visit Experience Columbus ([experiencecolumbus.com](http://experiencecolumbus.com)).

# E-COSM'15

## Organizing committees

We look forward to welcoming you to Columbus!

Lars Eriksson, IPC Chair, Linköpings Universitet, Sweden  
Giorgio Rizzoni, NOC Chair, The Ohio State University, USA  
Shawn Midlam-Mohler, NOC co-Chair, The Ohio State University, USA  
Simona Onori, Proceedings Editor, Clemson University, USA

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Ford Motor Company, USA

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Netherlands

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Toyota Motor Corporation, Japan

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Universidad Politécnica de Valencia, Spain

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The Ohio State University, USA

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The Ohio State University, USA

**Simona Onori**

Clemson University, USA

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The Ohio State University, USA

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The Ohio State University, USA

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