



## CONFERENCE

**Thursday, October 16th, 2008**

**Pôle Léonard de Vinci - Paris La Défense**

# ***Robust design through simulation***

How to find a cost-effective  
and optimal design as early as possible

## **CONTEXT AND OBJECTIVES**

The challenge faced by automotive designers is to avoid costly "test and error" cycles resulting in products that are neither robust enough nor quick enough to market, mainly because they were insufficiently optimized during the early design stage. With constantly increasing computational performance and modeling efficiency, a number of techniques combining numerical and experimental simulation with robust engineering approaches, have now reached industrial maturity.

- Design of Experiments (DoE) techniques applied to numerical simulation or physical testing,
- Multi-disciplinary optimization techniques,
- Topology optimization,
- Design for Six Sigma (DFSS) approaches,
- Monte Carlo simulation,
- Probabilistic mechanics and structural reliability approaches,
- Functional and dysfunctional behaviour modelling

The main challenge for these methods is to ensure optimal performance whilst reducing its variability. Subsequently, these techniques enable product optimization in terms of cost and reliability, over short design cycles. To provide a forum for debating these methods, their operating modes, their conditions for success and their limits, the SIA's technical committees "Quality and Reliability" and "Simulation & associated Methodologies" have united to organize a day of conference.

## Programme

### 08:30 Registration

#### 08:45 Welcome Speech

Paul SCHIMMERLING – Président of the SIA Technical Committee « Quality - Reliability » - Renault

Remi BASTIEN – Powertrain Engineering VP Deputy to SVP - Renault

#### Session 1 : General presentation of robust design methods and limits

Chairs : Benoît GRANIER – PSA Peugeot Citroën, Jacques DEMONSANT - Renault

09:00 Robust design optimization of a shroud for engine cooling module

Olivier PLANEL – Valeo, France

Jacques MARCHESINI – INTES, France

09:30 Robust design of a vehicle suspension fatigue life using multibody simulation

Naji EL MASRI, Nick TZANNETAKIS - NOESIS Solutions, Belgium

Roberto D'IPPOLITO - LMS Italiana, Italy

Michael HACK - LMS Deutschland GmbH, Germany

10:00 Side door closing effort: a simulink model to estimate closing effort and its robustness

Céline ANIS – Renault, France

### 10:30 Break – Posters session

#### Session 2 : Systems optimization during the early design stage

Chairs : Bruno MAJOT – Tecris, Pascal GARNIER - SIA

11:00 Use of macro models for seat pre-dimensioning

Daniel MARJOUX – Faurecia Automotive Seating, France

11:30 Robust design of semi-active suspension systems by means of simplified physical models and multi-objective evolutionary optimization

Bruno LOYER – Renault, France

12:00 Multi-Disciplinary Design of an Aircraft Landing Gear using Concept Design and Optimization Techniques

Fatma KOÇER – Altair Engineering, USA

### 12:30 Lunch break

#### Session 3 : Parametric optimization of technical definitions

Chairs : Wolfgang SCHWARZ – AVL, Pascal LARDEUR - UTC, Renault

14:00 Design of mechanically welded components based on high quality CAD-integrated FEA

Guy MARTIN BORRET, Fabien DEBARLE - PSA Peugeot Citroën, France

14:30 Multi-disciplinary optimization including direct CAD access – Turbomachinery design applications

I.LEPOT – Cenaero, Belgium

15:00 Optimization of aerodynamic performance of vehicles using response surface models

S. KRAJNOVIC, H. HEMIDA - Chalmers University of Technology, Sweden

B. BASARA – AVL List GmbH, Austria

### 15:30 Break – Posters session

#### Session 4 : Robustness estimation and optimization

Chairs: Anthony HÄHNEL – Renault, Bertrand LETURQ – PSA Peugeot Citroën

16:00 Simulation model optimisation with Robust Engineering Methods

Peter BAUR, Manfred KOLKMAN, Philippe FARAH, Patrick SALEMI - Delphi Powertrain Systems, Luxembourg

16:30 Reducing the scatter of vehicle crashworthiness

Christian WAUQUIEZ, Richard ZEITOUNI - PSA Peugeot Citroën, France

17:00 Example of Robustness Analysis for Reliable Automotive Stamped Parts Production

Mathieu BURLAT, Vincent FERRAGU – Autoform, France

17:30 A methodology to assess the product out tolerancing probability with linear stacks or non linear functional requirements.

Nicolas GAYTON, E. DUC, M. LEMAIRE - LaMI - Laboratoire de Mécaniques et Ingénieries, France

L. GAUVRIT – Radiall, France

### 18:00 Conclusion Speech

Christoph GÜMBEL – General Manager Virtual Vehicle, Porsche, Germany

### 18:30 End of the Conference

# ROBUST DESIGN THROUGH SIMULATION

October 16, 2008 – Pôle Léonard de Vinci – Paris La Défense

Ref: 2008-09

## REGISTER ON LINE:

[www.sia.fr](http://www.sia.fr)

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### • Registration fees (Tick as appropriate)

454,48€ TTC (380€ HT) Members of SIA N° \_\_\_\_\_

526,24€ TTC (440€ HT) Non Members

358,80€ TTC (300€ HT) Researchers and laboratories

FREE Speaker (1 per conference), Session Chairmen

Preferential rates for students and retired • For further information, contact us

### • Payment

**By check** in Euros made payable to: "Société des Ingénieurs de l'Automobile"

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## REGISTRATION CONDITIONS

- Registration fees include participation in the conference, CD of proceedings, book of abstracts, refreshment breaks, lunches
- Where it is not possible to send the payment together with the form, each registration should be accompanied by an official purchase order. Failing reception of an official purchase order or payment on the day of the symposium, we regret that you will not be allowed entry to the symposium.
- When we have received the registration form, we will send you a confirmation letter and an invoice. Please indicate the accounts department address where necessary.
- In case of cancellation before September 16, 2008, 30% of the registration fees will be retained by the organisers. After this date, the entire registration fee will be retained. Registered participants not able to attend may nominate a substitute. Written notice must be provided.

# GENERAL INFORMATIONS

## OFFICIAL LANGUAGE:

English, no simultaneous translation

## REGISTRATIONS AND INFORMATION

### Société des Ingénieurs de l'Automobile

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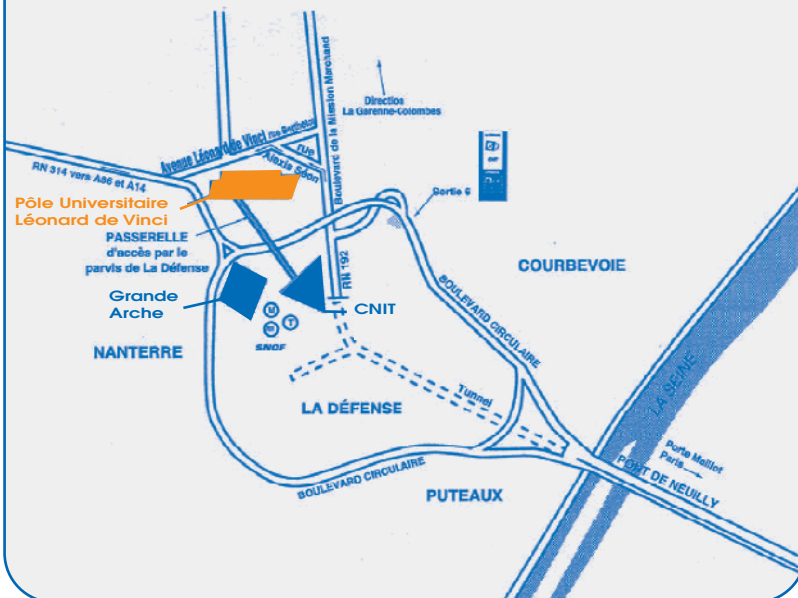
## HOW TO GET THERE

### Pôle Universitaire Léonard de Vinci

2, Av Léonard de Vinci - Paris la Défense, France

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www.devinci.fr



### • Public transport (Underground, Train, RER):

- RER A, Metro ligne 1 : station Grande Arche de La Défense
- SNCF: station La Défense  
Exit « Grande Arche de la Défense ».  
On the main hall take exit E to the CNIT, direction « Place Carpeaux ».  
Take the footbridge towards University Léonard de Vinci at the Mona Lisa Place.

### • By Car from Paris (N13):

- After the Neuilly's bridge (Pont de Neuilly) take the tunnel under la Defense and exit 2 on the right to follow direction la Garenne-Colombes.
- After the tunnel keep on the right and after the 4th traffic light turn on the left, Alexis Séon street.
- Then 1st left, avenue Léonard de Vinci.  
The car park is located at the 8 av. Léonard de Vinci.

### • By Car from the circular road (boulevard circulaire):

- Take exit « La Défense 6 », towards la Garenne-Colombes. After the 2nd traffic light turn right, boulevard de la Mission Marchand
- Then take the 1st left, rue Alexis Séon, and again 1st left, avenue Léonard de Vinci.  
The car park is located at the 8 av. Léonard de Vinci.

## ORGANISING COMMITTEE

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Pascal GARNIER, SIA  
Benoît GRANIER, PSA Peugeot Citroën  
Anthony HAHNEL, Renault  
Cécile IDE, SIA  
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The Société des Ingénieurs de l'Automobile (the French Society of Automobile Engineers) is a society officially considered as serving the public interest. Its purpose is to represent technical excellence in the automobile industry through its expert and knowledge sharing networks. The SIA draws its members from the ranks of automobile engineers and technicians and all those active in promoting automotive engineering. SIA has 2 000 members and a network of over 8 000 engineers, technicians and research workers behind it.

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