

## Information

### Dates

School: 5<sup>th</sup> -9<sup>th</sup> of July, 2010 (9-18 h)

Registration deadline: 10<sup>th</sup> June 2010

### Venue

This edition of the School will take place at the *Campus de Montilivi* of the Universitat de Girona, Building P4, Room: Sala d'Actes) in Girona (Catalonia, Spain).

### Accommodation

The organisation offers the possibility to accommodate participants at the "Residència Universitària Campus de Montilivi" (c/ Mercè Rodoreda i Gurgui, 2, 17003 Girona), (approx. 10 min walking from the P4 building).

Conditions: Arrival: 4<sup>th</sup> of July, Departure 10<sup>th</sup> of July. Breakfast not included. Double room.

### Location and Travelling

Girona is 100 km to the NE from Barcelona and 35 km from Costa Brava.

Transport facilities:

By car: N-II, AP-7

Airport: Girona-Costa Brava (15 km) operated by Ryanair.  
El Prat (Barcelona, 120 km)

Train: from Barcelona and France (via Cerbere)

Bus: from Barcelona and both airports

### Additional information and links:

School Info: <http://www.lsi.us.es/~rdiag/index.php/Escuela2010uk/HomePage>

Residence: [http://www.resa.es/eng/residencias/campus\\_de\\_montilivi](http://www.resa.es/eng/residencias/campus_de_montilivi)

Girona: <http://www.girona.cat/>



## Registration form and fees:

Use this form to register to the "IV International Summer School on Fault Diagnosis of Complex Systems" to be held in Girona (Spain) the 5<sup>th</sup>-9<sup>th</sup> July of 2010. Fill it, mark your selection and send a signed copy to the secretariat by Fax (+34 972 418 813) or E-mail ([secre-eeee@eeee.udg.edu](mailto:secre-eeee@eeee.udg.edu)), including a copy of the bank transfer and be sure that any bank extra-cost is charged to you.

Name: ..... Surname:..... Organisation:.....

E-mail: ..... Tel: ..... Fax:..... Bank Transfer Date: .....

### Registration fees (mark only one):

- 450 €** Students from a Research Group integrated in the Spanish Network on Complex Systems Supervision and Diagnosis. It includes lunch and accommodation at *Residència Universitària* in a double room.
- 700 €** Other students and practitioners. It includes lunch and accommodation at *Residència Universitària* in a double room.
- 500 €** Other students and practitioners without accommodation and daily lunch.

### Observations

- (1) Places are limited and will be assigned according to strict order of registration (transfer date).
- (2) Indicate preferences or restrictions, if any, for possible partner sharing the double room:

Signature (name and date):

Bank Transfer info:

Bank Name: **Caixa de Girona** Bank Address: Campus Montilivi s/n, 17003 Girona (Spain)  
Acc. Number (Spain): **2030 0105 65 3110001275** (International): **IBAN: ES75 2030 0105 65 3110001275**  
Acc. holder: Universitat de Girona **SWIFT/BIC: CECAESMM030**  
EPS - Campus Montilivi s/n  
17071 Girona (Spain) VAT: Q6750002E (International VAT number: ESQ6750002E)  
Subject (please, indicate): **FDSS10 + YOUR NAME**

# IV International Summer School on Fault Diagnosis of Complex Systems

Girona, 5<sup>th</sup>-9<sup>th</sup> of July, 2010



## Promoted by:

"Spanish Thematic Network on Complex Systems Supervision and Diagnosis"

## Organised by:

**Universitat de Girona**  
Institut d'Informàtica i Aplicacions  
Dept. Enginyeria Elèctrica, Electrònica i Automàtica  
Escola Politècnica Superior

## Supported by:



DPI2009-06124-E/DPI



## Presentation

The International Summer School on Fault Diagnosis of Complex Systems is a biennial event promoted by the Spanish Network on Complex Systems Supervision and Diagnosis (<http://www.lsi.us.es/~rdiag/index.php/RedSuperv/HomePage>) that aims to promote the research on this challenging field and provoke the interaction among research groups and practitioners in Spain and abroad. The school is organised as an intensive one-week course.

Expected attendants are PhD and master students interested in fault detection and diagnosis topics and practitioners involved in monitoring and supervision projects. The fourth edition of this successful and already established event will take place between the 5<sup>th</sup> and 9<sup>th</sup> of July at the Campus de Montilivi of the Universitat de Girona (<http://www.udg.edu>).

## Organisation

### Organising committee:

Joaquim Armengol (Universitat de Girona) ([joaquim.armengol@udg.edu](mailto:joaquim.armengol@udg.edu))

Joaquim Meléndez (Universitat de Girona) ([joaquim.melendez@udg.edu](mailto:joaquim.melendez@udg.edu))

Belarmino Pulido (Universidad de Valladolid)

### Secretariat:

Joan Bartrina

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## Academic Staff

C. Alonso (U. de Valladolid), J. Armengol (U. de Girona), J. Colomer (U. de Girona),

E. Frisk (Linköping University), R. M. Gasca (U. de Sevilla), M<sup>a</sup> J. de la Fuente (U.

de Valladolid), J. Meléndez (U. de Girona), G. Provan (University College Cork), V.

Puig (UPC), B. Pulido (U. de Valladolid), L. Travé-Massuyes (LAAS-CNRS), C. del

Valle (U. de Sevilla).

## Preliminary Program

### **T1. INTRODUCTION. FUNDAMENTAL CONCEPTS**

T1.1 Definitions: fault, failure, detection, diagnosis, reliability...

T1.2 Foundations for fault detection and diagnosis in FDI and DX: detectability, observability, diagnosability...

### **T2. MODEL-BASED DIAGNOSIS: THE FDI APPROACH**

T2.1 Structural analysis and analytical redundancy.

T2.2 Model-based detection methods: parameter estimation, parity equations, state observers for linear and non-linear models.

T2.3 Fault detection: residual evaluation by consistency tests, and envelope generators.

T2.4 Fault isolation: structured and directional residuals.

### **T3. MODEL-BASED DIAGNOSIS: THE DX APPROACH**

T3.1 Model-based diagnosis from AI Community. Consistency-based diagnosis, CBD: Reiter's approach.

T3.2 GDE: the computational approach to CBD.

T3.3 Constraint-driven fault diagnosis.

### **T4. BRIDGE: INTEGRATION OF FDI AND DX APPROACHES**

T4.1 Theoretical links and comparison.

T4.2 Practical comparison and potential synergies.

### **T5. DATA-DRIVEN FAULT DIAGNOSIS**

T5.1 Data-driven methods overview.

T5.2 Fault diagnosis using statistical methods. Statistical process control.

T5.3 Models for sensor reconstruction.

### **T6. DIAGNOSABILITY ANALYSIS AND RESIDUAL GENERATION**

T6.1 Use of structural analysis in the design and analysis of diagnosis systems.

T6.2 Residual generation. Modelling for diagnosis in Modelica and Simulink.

T6.3 Placement of sensors for isolability. Industrial application examples of diagnosis.

### **T7. MODELING AND ALGORITHMS FOR EMBEDDED DIAGNOSTICS**

T7.1 Approaches to modelling complex diagnostic systems (discrete / continuous, stochastic / deterministic systems).

T7.2 Algorithms for diagnostics inference. Traditional algorithms (LTMS, GDE, ATMS). Local-search algorithms.

T7.3 Embedded-systems and diagnostics.

