

Nano Innov Seminars

Tuesday January 30th 2014 at 13h30

Nano-Innov, Building 862, Amphi 33

SADDEK BENSALEM¹, SIMON BLIUDZE², J. COMBAZ³ & D. SOCCI⁴

¹Professor & head of DCS group at Verimag Lab - UJF

²Scientific Collaborator at RISD Lab - EPFL

³CNRS Research Engineer at Verimag Lab – UJF

³Phd Student at Verimag Lab - UJF

Rigorous Design of Component-Based Systems — The BIP Component Framework

BIP (Behavior, Interaction, Priority) is a general framework encompassing rigorous design. It uses the BIP language and an associated toolset supporting the design flow. The BIP language is a notation which allows building complex systems by coordinating the behavior of a set of atomic components. Behavior is described as a Petri net extended with data and functions described in C.

The description of coordination between components is layered. The first layer describes the interactions between components. The second layer describes dynamic priorities between the interactions and is used to express scheduling policies. The combination of interactions and priorities characterizes the overall architecture of a component. It confers BIP strong expressiveness that cannot be matched by other languages.

BIP has clean operational semantics that describes the behavior of a composite component as the composition of the behaviors of its atomic components. This allows a direct relation between the underlying semantic model (transition systems) and its implementation.

More info : <http://www-verimag.imag.fr/Rigorous-Design-of-Component-Based.html?lang=en>

Everybody is welcome!

The speakers:

DCS Team at Verimag Lab - UJF

Complex and distributed systems cover hard and soft real-time applications, security protocols and security applications as well as programs. The common feature of these systems is that their behaviour is logically and combinatorially complex, involving functional and extra-functional properties (real-time constraints, performance, security...).

DCS team develop languages and methods for the study of fundamental problems derived from real-life issues, aiming at developing rigorous solutions that yield tools.

The DCS team revolves around four research themes:

- Formal Methods for Computer Security
- Rigorous Design of Component-Based Systems
- Specification Languages and Validation
- Program Verification.

RISD Lab – EPFL (Rigorous System Design Laboratory)

Today, system design techniques are mostly empirical and lack scientific foundations. We need to formalize system design as a process leading from application software and a model of its execution infrastructure, to an implementation meeting given requirements. Design should be sound, accountable and scalable, and supported by methods and tools for enhanced productivity.

These needs raise challenging problems such as:

- Building complex systems as the composition of heterogeneous components;
- Ensuring correctness-by-construction of essential system properties to reduce development costs entailed by correctness-by-checking techniques such as verification and testing;
- Automatic generation of implementations which are optimized with respect the resources of the computing infrastructure;
- Evaluating trustworthiness of the designed systems.

Our work program embraces all these problems and endeavors integration of the obtained results in domain-specific system design flows. Application domains include critical systems, multimedia systems and networked embedded systems.

Program:

13h30-14h15: Rigorous flow design of BIP (Saddek BENSALÉM, Professor, Verimag-UJF)

14h25-14h55: A General Framework for Architecture Composability (simon BLIUDZE, RISD-EPFL)

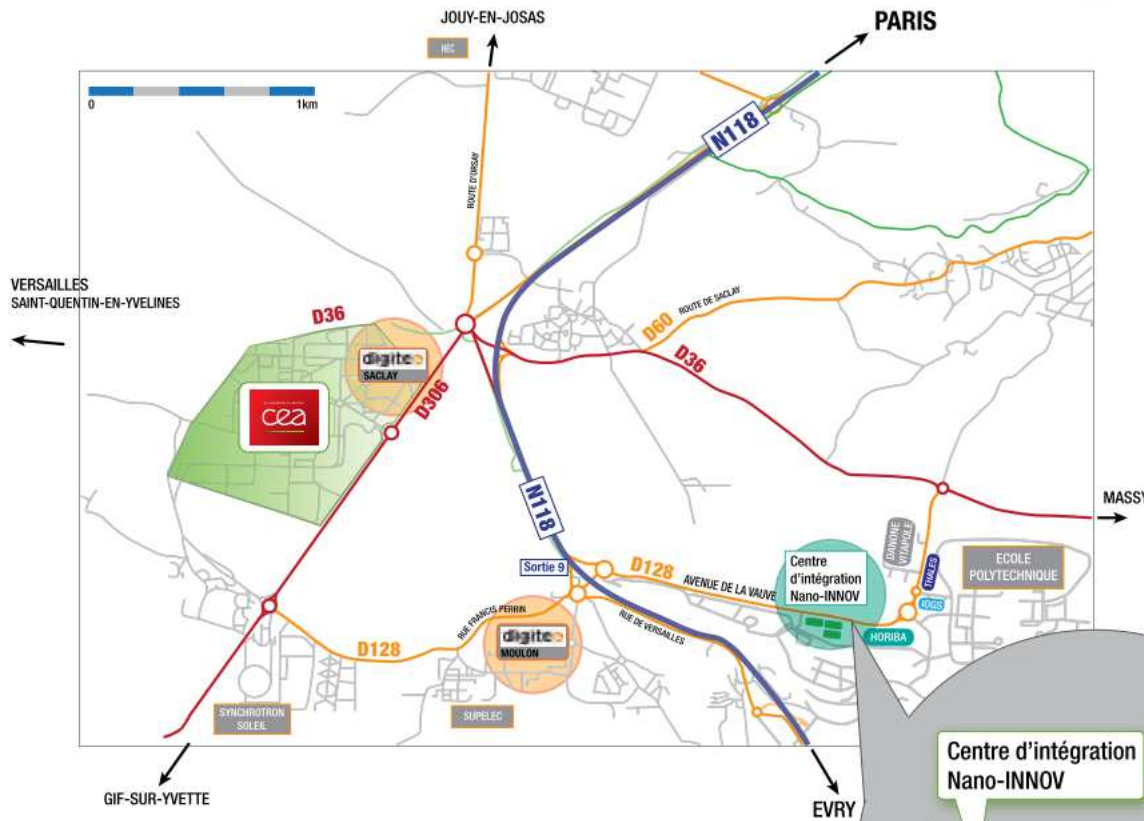
15h-15h15: Pause café

15h15-15h45: BIP real-time (Jacques COMBAZ, Research Engineer, Verimag-CNRS)

15h55-16h25: Mixed-critical scheduling (Dario SOCCI, Phd, Verimag-UJF)

Local Contact : Belgacem BEN HEDIA (DACLE/LaSTRE) belgacem.ben-hedia@cea.fr

Nano-Innov access (GPS N 48°42,736' - E 02°11,708')



Nano-INNOV Integration Center

“Next to HORIBA building”

Avenue de la Vauve

91120 PALAISEAU

Tel : +33 (0)169082501

Public transport:

- RER B (direction: Saint-Remy-les-Chevreuse) : *Massy-Palaiseau* or *Le Guichet* stations, RER C or TGV : *Massy-Palaiseau* station
- From *Massy-Palaiseau*, bus line 91.06 (Massy ↔ Saint-Quentin-en-Yvelines) *Thomson-Corbeville* stop.
- From *Le Guichet* : pedestrian itinerary ≈ 15 minutes (300 steps)

The amphitheater is located in N2 building, In front of the reception desk.

