Scuola di Dottorato in ICT – PhD School in ICT

Research project for a PhD curriculum in ICT – Computer Engineering and Science

**Tutor**: Prof. Letizia Leonardi

**(\*) Italian Co-tutor:** Prof. Nicola Bicocchi

**(\*\*) Foreign Co-tutor:**

**Proposed Title of the research:** Innovative Signaling Application based on usage of formal/semiformal methods

**Keywords(5):** Signalling, Methodologies, Automata

**Research objectives(max 10 rows):**

The characteristics and expectations required to Interlocking system have changed dramatically in the past few years. The growing of controlled area, of automation level, the complexity of new functionalities required have induced difficulties in terms of system description (difficult to ensure a complete and coherent description of system with a not easy traceability of links existing between different internal functions).

The initial aim of this research work is the study of the emerging methodologies able to describe complex system, identify the methodologies best fitting with Signalling needs and evaluate their applicability.

In this context, an important issue to face is the gap between analysis and design methodologies vs. implementation and Verification.

Starting from these considerations, the research activity will continue trying to propose an innovative methodology that, starting from the current scenarios and needs, provides a concrete support during the Signalling Application Engineering life cycle.

**Proposed research activity(max 10 rows):**

* Signalling training: basic and Scheme principles.
* State of the art in methodologies for complex asynchronous finite state system.
* Evaluation of methodologies best fitting Signalling science with a focus about traceability and verification aspects.
* Evaluation of the applicability of methodologies based on Signalling scenario’s evaluation
* Definition of methods and tools for a concrete support during the Signalling Application Engineering Life Cycle.
* Participation to the Signalling Summer School.
* Application Engineering training on new approach to Signalling.

**Supporting research projects (and Department):**

**Possible connections with research groups, companies, universities..**

ALSTOM, sede di Bologna

Prof. Mike Hinchey, Limerick University, IR

Dr. Emil Vassev, Limerick University, IR

(\*) optional

(\*\*) optional/to be completed on the second year