

## **Ph.D. in Information Technology:**

### **Di Rienzo Final Dissertation**

**DEIB Seminar Room**

**February 13<sup>th</sup>, 2017**

**10.30 am**

#### **Antonella Di Rienzo – XXIX Cycle**

“Methods, Technologies and Services for Smart Interactive Social Spaces”

Advisor: Prof. Franca Garzotto

#### **Abstract:**

Smart Spaces (defined as environments having sensing and adaptation capabilities, a multiplicity of connected devices and various forms of interaction) open up an enormous potential for new added value services in many domains. Designing applications for Smart Spaces requires a multi-faceted research that explores people's needs with regard to technological feasibility, as well as limitations and opportunities of novel interaction paradigms.

This thesis discusses how novel developments in ubiquitous computing, findings from empirical studies, and a user-centered design approach help to shape new added-value services in Smart Spaces. Our main focus is on novel interaction paradigms across different devices and interfaces (e.g., full-body interaction), exploring how their integration leads to new solutions that benefit the intended user, and how UX can be personalized to the specific needs and preferences of each single person or target group. To this end, various design concepts and alternatives have been defined and analyzed in different domains, and empirical studies have led to explore how users interact with interconnected devices in Smart Spaces. Attention has been paid on the usage of alternative control and interaction mechanisms. A number of technological solutions have been developed to empower control and interaction that (i) encompass design patterns of interaction that address all aspects of the services as perceived by users; (ii) take into account context changing and awareness; (iii) support interface adaptation, exploiting the knowledge about the current user, the interaction flow, and his/her tasks; (iv) master "information overload" by offering the proper content on the right channel at the proper time. To empirically measure the effectiveness of the approach, we have created some domain-

specific technological set-ups, exploiting prototypes built in collaboration with national and international partners, and we have collected data on users' behaviors in ecological settings - public and semi-public spaces: a Department Entrance Hall (the Department of Electronics, Information and Bioengineering at Politecnico di Milano); two fashion stores in Milan; a smart office building (Open House Innovation in Helsinki); a mobile telephony store (TIM Shop in Milan). In this thesis, the results of these studies and the main lessons learned are also reported.

**PhD Committee:**

Prof. Maristella Matera, DEIB

Prof. Nuno Jardim Nunes, University of Madeira

Prof. Carmelo Ardito, Politecnico di Bari