

Laboratoire d'Informatique, de Robotique  
et de Microélectronique de Montpellier  
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## Internship 2017

### Integration of new Indoor Sensing Technologies in Ambient Assistive Living Platform

#### Supervisors

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#### Context and Objectives:

In the context of the European Project City4Age<sup>1</sup>, our research team and its partners aim at creating an innovative service for ageing people based on:

- early detection of risk related to frailty
- enhanced interventions that can help the elderly population improve their daily life and also promote positive behaviour change

The work is realized through real-life worldwide pilot sites<sup>2</sup> and in close collaboration with IPAL<sup>3</sup> lab in Singapore and DOMUS<sup>4</sup> research lab in Sherbrooke, Canada. We explore how data on individual behaviours captured through indoor and outdoor sensors could be used for the observation and detection of the following parameters:

- Activity of Daily Living (ADL): nutrition, hygiene, sleep activity
- Mobility: physical activity, going-out frequency and going-out length
- Cognition: forgetfulness, early signs of cognitive decline
- Socialization: activities attended, visits in other places of interest

Therefore, we are working on a ambient assistive platform (i.e., Ubismart) that uses Internet of Things technology to ensure assistive services continuity, indoor (houses) and outdoor (cities). The platform is based on ubiquitous technologies (e.g., proximity, presence and contact sensors), wearable technologies (e.g., smartphone, smartwatch), and other outsourced services (e.g., weather) in order to understand a situation (of an ageing person), detect a problem, and intervene if necessary. The platform also allows to create intelligent spaces where sensors are easily and dynamically deployed, and reasoning algorithms are put in place (using semantic web).

Our research team is looking for an intern to advance its research on ambient assisted living for elderly people. The objectives of the internship are **“Integrating new indoor technologies (e.g., humidity, pressure, acceleration and temperature sensors) and**

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<sup>1</sup> [www.city4ageproject.eu](http://www.city4ageproject.eu)

<sup>2</sup> in Montpellier, Singapore, Athens, Birmingham, Lecce and Madrid

<sup>3</sup> [www.ipal.cnrs.fr](http://www.ipal.cnrs.fr)

<sup>4</sup> [domus.usherbrooke.ca](http://domus.usherbrooke.ca)

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## **new communication protocols (e.g., Bluetooth Low Energy, Z-Wave and EnOcean) in our ambient assistive living platform”**

### **Description:**

The work to be made involves the intern to:

- integrate new indoor technologies (e.g., humidity, pressure, acceleration and temperature sensors) in our ambient assistive living platform
- integrate new communication protocols (e.g., Bluetooth Low Energy, Z-Wave and EnOcean) in our ambient assistive living platform
- integrate new indoor technologies' events in the ambient assistive living platform reasoning and decision making process
- participate in real-life deployments in individual houses in Montpellier

### **Keywords:**

Ambient Assisted Living, Public Health, Digital Health, Real life deployment, Sensors

### **Applicant Profile:**

- Master Degree or Engineer Student (last year of studies)
- Mastering at least one of the following language: Python, Javascript/NodeJS
- Experience in Linux system administration
- Ability to take initiatives and communicate effectively
- Any experience or interest in Semantic Web, Internet of Things and Sensors will be appreciated

### **Duration and Location:**

The internship has a 6-month duration and the starting date is from Mid February 2017 onwards.

The internship is based in Montpellier.

### **Gratification:**

554€/ month

### **About LIRMM:**

The Montpellier Laboratory of Informatics, Robotics and Microelectronics (LIRMM) is attached to Montpellier University and the French National Center for Scientific Research (CNRS). Its activity is developed within three scientific research departments (Informatics, Microelectronics, Robotics), 19 team-projects and several common services.