



ERS POSITIONS AND INDIVIDUAL RESEARCH PROJECTS (IRP)

Fellow <i>ESR4</i>	Host institution IT-Lisbon	PhD enrolment Y	Duration <i>36 months</i>
<p>Project Title: PHY/MAC Design of Future SCs adopting Multi-packet Reception and Full-Duplex Communications.</p>			
<p>Objectives: This work plan intends to design PHY/MAC architectures that support a Many-to-Many communication paradigm in decentralized multi-hop WSNs. Efficient coordination is proposed at the MAC sub-layer of Multi-Packet Reception (MPR) techniques considering Full-duplex communications (MPR-FD). Initially the parameterizations adopted in PHY-layer are jointly optimized with MAC sub-layer behaviour, focusing the maximization of network capacity and allowing Many-to-One communications. In a second step, Many-to-Many communications will be achieved through optimal scheduling of multiple Many-to-One comm. Pairs.. The following questions will be addressed: i) How the theoretical capacity of distributed Many-to-Many SCs can be achieved by an adequate PHY/MAC architecture? ii) How far is the proposed solution from the theoretical bound? iii) What are the benefits/disadvantages of using Full-duplex communications in SCs? iv) How the proposed solution performs in a long-range and low power communication scenario?</p>			
<p>Expected Results: The expected results to be achieved are as follows: Formulation of a MPR-FD model for packet receiving error, considering MPR and FD communications; Design of an optimal architecture to coordinate the access of multiple nodes transmitting to a single node (Many-to-One approach) when MPR-FD is adopted; Design of a coordinating scheme responsible for the management of multiple Many-to-One communicating groups, to efficiently achieve Many-to-Many communications; Assessment of the proposed design in a long-rand and low power communication scenario.</p>			
<p>Enrolment in Doctoral degree(s): Universidade Nova de Lisboa</p>			
<p>Main (host) supervisor/Contact: Dr. Rodolfo Oliveira (IT – Lisbon)</p>			