

## EMJD ICE EMJD ICE I Cohort Additional Grants Projects

### 1. Biologically-inspired coordination in networks.

Based on expertise on nature-inspired, distributed time synchronization, this PhD thesis should explore new methods for distributed coordination in large networks of mobile entities, such as sensors or devices. Key concepts to be investigated in this interdisciplinary area are self-organization and emergence which often occur in nature.

### 2. Unification in distributed (smart home) user interfaces

The Smart Home, technically a network of distributed embedded systems, can – from a user's point of view – be envisaged as a virtual "unit" or "total system" featuring a distributed user interface (thus, metaphorically, the user interacts with "the house" rather than with its components). Currently, user interactions in such a system are quite heterogeneous, since they stem from the originating subsystems which are not necessarily tuned to yield a well-defined, easy-to-use set of input/output modalities. Therefore, the challenge is to identify as many as possible use cases in a smart home environment, analyze them with respect to their interaction requirements, design a set of possible modalities (e.g., speech, gestures, touch, text input...) and come up with a set of grammars for these modalities that are "compatible" to each other, fulfilling at least two meta-requirements:

- interacting with "the house" becomes logical and the user's impression of the smart home as a unit is supported
- switching between modalities becomes seamlessly possible

Feasibility studies in prototype environments should complement the conceptual work..