

Profile N° (à remplir par VAS)	Funding Planned MRT Fléché Obtained
Sheet Abstract of thesis 2013 Disciplinary Fields Santé et Autres	
Thesis Title : (1-2 lines) Semantic annotation and data sharing toward supporting research on deep brain stimulation in Parkinson's disease treatment	
Unit/supervising team: (1-2 lines) LTSI, UMR Inserm 1099, Team MediCIS Universté de Rennes1	
Name of the scientific director and co-director : (1 line) Bernard Gibaud (Inserm-Rennes)	
Contact : (1 line) Bernard.gibaud@univ-rennes1.fr	
Socio-economic and scientific context : (10 lines) The context of this project is the general trend toward the wide scale dissemination of research data, in order to encourage comparaisou studies and data reuse. Such data sharing raises many difficulties. Among them, the issue of annotating the resources to be shared is prominent because it is critical to express data content in a meaningful way, as well as the context of their generation, which are both key factors regarding their relevant reuse. Sharing multi-centre data about Parkinson's disease is very appealing. Deep Brain Stimulation (DBS) is a very effective treatment but it is very sensitive to the precise definition and positioning of stimulation. Additionnally, it may cause adverse effects, which need to be better understood, so that the treatment's indication and delivery can be optimized.	
Topic <i>Assumptions and questions (8 lines)</i> The project aims at designing and using domain ontologies covering the domain of Deep Brain Stimulation in the treatment of Parkinson's disease, toward optimizing the definition of stimulation targets, i.e. maximizing improvements at the motor level, and minimizing clinical adverse effects. The basic assumptions underlying this work are : (1) that the use of formal ontologies will facilitate data sharing in federated systems and (2) that the use of a foundational framework will facilitate data reuse in related contexts (e.g. use of DBS in other contexts: obsessive compulsive disorders, depression, epilepsy, comparison with animal models).	
<i>The main steps of the thesis and demarche (10-12 lines)</i> The project involves three main steps : (1) the design of domain ontologies, (2) annotating the resources to be shared and (3) sharing them in the context of federated systems. The design of ontologies aims at modelling the classes of entities and the relationships relating them. The domain to be covered is the one of DBS, which includes the definition of stimulation targets, localizing them in the patients' MR images as well as in anatomical atlases, stimulation parameters, clinical effects (especially UPDRS III motor score) and potential adverse effects. The suggested approach relies on the experience of the NeuroLOG project (ANR), as well as on ontology modules developed in the american NIF project (NIFSTD). Semantic annotations are instances of the classes defined in the previous ontologies and model the entities that concern individual subjects (i.e. patients). Some of them will be derived from the clinical data gathered in the B@BeL database of the Rennes University Hospital, and some will be produced by image processing pipelines set up in the context of the ACOUSTIC project (ANR). These semantic data will then be shared using a federated system whose design is part of a project called SHRINK, currently submitted to ANR.	
<i>Methodological and technical approaches considered (4-6 lines)</i> <i>The design of the ontologies will rely on the OntoSpec methodology already used in the NeuroLOG project as well as on an in-depth assessment of the NIFSTD ontology. We envisage to use DOLCE-CORE as a foundational framework, complemented by a generic ontology module dedicated to the representation of scientific observations and measurements sketched in the context of the CrEDIBLE project.</i>	
Scientific and technical skills required by the candidate (2-4 lines) - Methods and languages of ontology engineering (OWL, RDF) - Description logics - Protégé software, OWLAPI	