

Programme de financement 2013

## **fUltrasound and odor**

### **A new approach for mapping brain regions activated by odors**

| <b>Laboratoire ou site d'accueil</b>                                | <b>Porteur de projet</b> | <b>Institution porteuse</b> |
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| Inserm U1128,<br>Laboratory of Neurophysiology and New Microscopies | Serge Charpak            | INSERM                      |

Functional ultrasound imaging (fUltrasound) is a new imaging technique that can be used to detect functional hyperaemia, i.e. changes in blood flow triggered by local brain activation. It uses plane-wave illumination at a high rate and enables measurements of rapid vascular events with a typical 100  $\mu\text{m}$  spatial resolution and 30 ms time resolution, as opposed to conventional ultrasound or functional magnetic resonance imaging techniques.

We propose to combine fUltrasound and two-photon laser scanning microscopy, a technique which has a micrometer spatial and millisecond temporal resolution, to quantify several parameters of fUltrasound, e.g. the type of vessels implicated in fUltrasound signals and the reliability with which these signals report neuronal activity. Furthermore, we will use the ability of fUltrasound to image in 3D and in depth to establish a dynamic map of all brain regions activated by odor in the rat brain. This interdisciplinary project, carried by neuroscientists and physicists, aims at determining the extent to which fUltrasound can be used to image brain activity in rodents with the midterm goal of its application in human.