



Boston Scientific

Open Innovation day with Boston Scientific

Enabling Innovation in Smart Health Solutions together with Boston Scientific

Tuesday November 13th, 2018 from 9:00 am to 5:30 pm
Health House, Leuven (Belgium)

1. Fiber optics (FO)

- **Smart laser technologies** (i.e. the following areas: development of smart fiber optics, integration of light source, detectors and spectrometers, OCT technology as well as Auto-fluorescence and diffuse reflectance spectroscopy)
- **Integration of light source, imagers and other sensing technologies.** in an endoscope like device with the goal to enhance therapeutic visualization and navigation
- **Rotational technology with multiple fibers:** A catheter based optical imaging device typically requires a rotatory joint to couple a rotating component to a stationary processor. It works well for a single fiber like OCT. For a more complex device requiring multiple fibers such as all optical ultrasound, we need a technology to allow coupling of light to two or more optical fibers from independent light sources, while still allowing the assembly of fibers to rotate.
- **Optical Forward scanning** to be used in the vascular system

2. Miniaturization of electronics and electronic packaging (EP)

- Electronic packaging for embedding silicon Asics and sensors within PCBs/Flex.
- Packaging, enabling long term hermetic sealing of flexible electronics.
- Micro-electronic packaging enabling long term hermetic sealing allowing wireless energy charging through the packaging
- Implantable organic bio-degradable electronics
- High density electrodes / better charge transfer to neuronal systems

3. Fluidics (pressure measurement, pumps, valves) (FL)

- Low energy miniature fluid pumps, valves and pressure sensors for long term human implant. Pressure sensors for long-term use in range from 0 to 2.0 PSI and 0-20 PSI These components and the fluid will not be in direct contact with body. Isolation between electrics and fluidics is required.
- Measure/monitor blood flow, blood pressure waveform.
- Vascular pressure sensors for long term applications,
- Micro fluidics Pumps: targeted ranges : (5ml per minute , Pressure : up to 1.7 PSI), (50 ml per minute, Pressure up to 20 PSI)
- Microfluidic valves: targeted leakage of < 500 ul per minute at 0 to 1.7 PSI, Application B: Minimal leakage at < 0 to 20 PSI

These are guidelines only and prospective partners are encouraged to show us their microfluid solutions anywhere near these ranges.

4. Ultrasound technology (US)

- Phased Array Ultrasound systems:
A typical BSC ICE catheter such as Ultra ICE Plus uses a mechanically scanned (rotating) single element ultrasound transducer to produce a circular imaging plane normal to the catheter axis. However, many applications require imaging in a plane parallel to the catheter axis. This is most easily produced using an electronically scanned multiple transducer array. For these applications we need a technology that incorporates the transducer array and electronics to support phase delayed transmitters, individual received signal delays, signal summation and transmission of summed signals to a host imaging system.
- Forward scanning ultrasound systems in the vascular system
- Opto-acoustic technologies

5. IoT applied to smart packaging & supply chain management (IoT)

IoT technology for individual unit level

Currently, the main challenge for obtaining product position and environmental monitoring in a cost effective manner is at the individual unit level, in the context of the end users facility. Some companies can already get us this information for reasonable costs at higher levels (container, pallet, etc.). However, individual unit level management requires unique solutions due to:

- Cost of tagging every product
- Individual Hospital Restrictions (including country specific issues)
- Competing systems i.e. wireless interference
- Concerns over medical device interactions

6. Systematic firmware development for medical devices (FW)

The programming challenge of firmware lies on interfacing with changeable front end signal sensing devices on different applications while providing a homogeneous framework that support different sets of reusable libraries for domain specific application like FFR, Intra-vascular ultrasound, implantable modulators (i.e. neuromodulation) **We are looking for a software approach that is able to provide a mechanism to integrate all supported peripherals seamlessly with configuration management and not rely on code customization.**

7. Energy Technologies (EN)

- Primary energy storage with energy densities in excess of $1\text{W}/\text{cm}^3$, with overall cell volumes less than 1 cm^3
- Ultra-low power electronics
- Micro batteries for wearable sensors

8. Any Other Technologies

Besides the indicated topics, Boston Scientific is very interested and open to discuss about any innovative technologies, contributing to a better solution:

- For monitoring and electronically sensing the chronic patient at home (in particular the chronic heart patients)
- For minimally invasive oncology
- For neurological signal processing