

Recent advances in Smart Integrated Biodiagnostic Systems for Healthcare

A Smarthealth User Group Workshop

We are pleased to announce the 4th User Group Workshop in the course of the EC-funded Smarthealth Integrated Project. Driven by key applications in cancer diagnostics, Smarthealth was conceived and constructed to address the development and delivery of the next generation of smart diagnostic devices.

The aim of the Workshop is to interact with the user community and gather expert opinion in order to address real market needs and find the best pathways towards exploitation of our results. We will do this by introducing the technology being developed within Smarthealth and having an open discussion to explore the opportunities and barriers for exploitation/commercialisation in the healthcare arena.

- Date/Time:** Thursday, 25th March 2010, 14:00 - 17:00
- Venue:** Analytica, Munich Fairgrounds, Room A112, Germany
- Registration:** Attendance is free. However, advance registration is necessary.



Workshop Agenda

- 14:00 Welcome and SmartHEALTH Overview
Calum McNeil, Newcastle University, UK
- 14:05 Market trends and perspectives within near patient testing (POCT) with particular emphasis on cancer diagnostics
Olle Nilsson, Fujirebio Diagnostics AB, Sweden
- 14:20 Molecular Diagnostics of Cancer
Mikael Kubista, TATAA Biocenter, Sweden
- 14:35 Integration of an Immuno assay for breast cancer analysis into disposable, microfluidic chips for automatic diagnostics
Daniel Latta, Institut für Mikrotechnik Mainz GmbH, Germany
- 14:50 Break
- 15:00 Biosensors based on MEMS Resonators
Calum McNeil, Newcastle University, UK
- 15:15 An integrated microsystem for the multiplexed detection of breast cancer markers in serum using electrochemical immunosensors
Ciara O'Sullivan, Universitat Rovira i Virgili, Spain
- 15:30 Localized surface plasmon resonance biosensor integrated with microfluidic chip for point of care applications
Liesbet Lagae, IMEC, Belgium
- 15:45 Break
- 15:55 Smart IT for data interpretation and communication
Stephan Kiefer / Jörg Kruse, Fraunhofer IBMT, Germany
- 16:10 Integration of several functionalities in a Lab-On-Chip diagnostic instrument
Alessandro Bellone, Olivetti SpA, Italy
- 16:25 Lab-on-a-chip platforms – Commercialization of collaborative R&D projects
Claudia Gärtner, microfluidic ChipShop GmbH, Germany
- 16:40 Conclusion and Open Discussion
Moderation:
Calum McNeil, Newcastle University, UK, and
Patric Salomon, 4M2C PATRIC SALOMON GmbH / enablingMNT, Germany
- 17:00 End of Workshop



The workshop will take place within the Analytica Exhibition; a ticket will be necessary to enter the fairgrounds and attend the workshop. A limited number of free tickets are available and will be distributed to registered participants on a first-come-first-served basis.

Additional Activities

Presentation within the Analytica Forum Biotech, Hall A3, 24th March 2010, 13:00:
"Smart Integrated Biodiagnostic Systems for Healthcare", Calum McNeil, Newcastle, UK

SmartHEALTH will also have a **booth** within Analytica (Hall A3, booth number #177).

The SmartHEALTH Project (12/2005 – 05/2010) ***- Smart Integrated Biodiagnostic Systems for Healthcare***

Background

Driven by clinical applications and progress in areas such as MicroNano Technology (MNT) and Information and Communications Technology (ICT), the SmartHEALTH project will develop an open integrated architecture for new biodiagnostic systems to support European companies exploiting bioassays or new application concepts.

The initial system has a disposable fluidic cartridge with a desktop base-station linking to the ambient e-Health environment. Ultimately, this system will perform multi-analyte sensing and data/trend analysis for nucleic acids and proteins and will be modular to allow multiple biological sample types to be dealt with.

Results will be interpreted and presented using bio-information analysis based on trained neural networks. Systems will be healthcare "user identity-" and "ambient environment-" aware, respecting confidentiality and information access rights. This concept will be miniaturized and cost engineered into a portable and more available system.

The project will enable enhanced medical diagnosis, leading to earlier and more precise results contributing to an increased quality of life as well as increasing the competitiveness of the European in vitro diagnostics (IVD) sector.

Clinical areas for SmartHEALTH application are in Cancer Diagnostics - breast cancer recurrence monitoring, cervical cancer case-finding, and colorectal cancer diagnostics, prognostics and theranostics. Each application includes clinical instrument evaluation and commercial exploitation partners.

Recent Achievements

The SmartHEALTH project has made significant progress towards developing both desktop and portable instruments with integrated ICT capabilities related to secure data transfer and device interoperability to achieve working, ambient intelligent systems which will be employed in the clinical evaluation studies scheduled for the next period.

Additional progress has resulted in successful development of instrument interface modularity to realize the capability of a plug-and-play type instrument system which will allow sensor-based technologies and fluorescence detection for nucleic acid amplification to be exploited.

In all of this work, particular attention has been paid to system quality, manufacturability and traceability according to international standards for medical devices.

Microfluidic packaged sensor systems have been developed using a combination of injection moulding and milling to achieve the demands of the sensor and PCR systems for the clinical evaluation studies. The project is now in a position to supply sufficient cartridges to the clinical centres involved in the evaluation studies.

Studies on clinical utility of mRNA biomarkers in blood for colorectal cancer have produced highly promising results for a panel of 4 gene markers. If validated in further work, this may be an extremely significant outcome for the project.

Benefits and Impact of the Project

The economic impact of the results of SmartHEALTH is potentially considerable with proposed technologies that will facilitate improved healthcare provision, from improved centralised screening systems, through to fast and flexible point of care systems.

Expenditure for diagnostics generally represents less than 1% of total patient management expenditure, thus increased testing cannot significantly increase healthcare costs but can significantly contribute to the quality of healthcare as it:

- Allows earlier and more appropriate, and therefore less costly, treatment.
- Helps to rule out expensive treatments.
- Reduces costs of treatment of complications.
- Potentially shortens the length of hospital stay by making therapies more effective and therefore more cost-effective. Thus improving overall patient management

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