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Nanotechnology

Nano4Life 6th Annual Conference & Exhibition

Converging Nanotechnology with the Life Science Industry

SPEAKER PROFILES

KEYNOTE: What is Nanomedicine - its Impact on Healthcare
Prof Mike Eaton, Vice Chair Working Group, Nanotherapeutics, Nanomedicine European Technology Platform

Biography: Mike Eaton has worked in research in the Pharma industry for more than 35 years. Initially at GD Searle, where he built the first synthetic gene for Urogastrone and sequenced human fibroblast interferon. He was a founding member of Celltech in 1980; later acquired by UCB. He has worked on a number of marketed drugs - Mylotarg in 2000, the first Antibody drug conjugate and certolizumab pegol in 2009, the first PEGylated antibody. Unusually he has worked with both small molecules and large molecules, including DNA. He built the first automated DNA synthesiser in Europe, which is now owned by the Science Museum in London. This machine was used for the first cloning of pre-prochymosin, a key ingredient in cheesemaking. He has worked on low molecular weight drugs including the first non-emetic PDEIV inhibitor. Mike is a special professor at Nottingham University and has been an executive board member of the European Technology Platform for Nanomedicine, since its inception in 2005. He left UCB in February 2010 and is now a strategic and technical adviser to a number of companies. His particular interest is commercial translation of nanotechnology research to nanomedicines – medicines to help patients.

Abstract: Nanomedicine is coming of age and stakeholders – funders, clinicians and most of all patients are anticipating the promised and exciting new products. Some really innovative nanomedicines are moving steadily through the standard approval process and have attracted commercial interest and significant funding; some of course have delivered and are on the market. Others are now in the clinic and coming closer to the market but a drive focused on the clinic has created some concepts which whilst clinically interesting, are not commercially developable.

The blame for this failure, as has been discussed previously, lies mainly with the researcher at ideation who has no real knowledge of the steps required beyond basic research or sometimes a willingness to acquire it, sometimes claiming academic freedom. Transferring this knowledge has been a leitmotif of the European Technology Platform for Nanomedicine over many years but without a major impact on researchers to date. The supply chain will not provide what is needed or capable of without a major strategic change by funders, who in the most part use research experts and not reviewers with appropriate drug development knowledge. A few do, such as the Technology Strategy Board in the UK; here the level of practical innovation and translation is probably above the European average and it should be noted that measured risk taking is encouraged.

Improvements in Hospital Patient Safety through Ultra-Low Power Wireless, Wearable Vital Signs Monitoring
Dr Alison Burdett, CTO, Toumaz Group

Biography: Dr Alison Burdett is CTO of Toumaz Group, which encompasses

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Sensium Healthcare and Frontier Silicon. Alison obtained her BEng and PhD degrees from Imperial College in 1989 and 1992 respectively, and then worked for GEC Plessey as an integrated circuit (IC) designer before returning to Imperial in 1992 as a lecturer in Analog Integrated Circuit Design, specialising in very low power RF design. In 2001, Dr Burdett left Imperial to co-found Toumaz, a technology company specialised in low power silicon design for ambulatory patient monitoring. She is currently CTO of Toumaz, and is a Fellow of the IET, a Senior Member of IEEE, and European Chair of the Technical Program Committee for ISSCC (IEEE Solid State Circuits Conference).

Abstract: SensiumVitals® is a clinically proven, wearable wireless device that monitors patients' vital signs every two minutes to provide early detection of clinical deterioration between ward rounds. It is a lightweight (15g), unobtrusive, single-use patch, which uses an ultra-low power battery with a five-day life, and allows the patient to move about at will. Information is transmitted directly to the nurses' station or to any web-enabled device. Recently launched in the UK, SensiumVitals® has both CE and FDA (510k) validation. Study results have confirmed the value of continuous vital signs monitoring with SensiumVitals® for the early detection of clinical deterioration in hospitalized patients to provide early intervention, improved patient safety, and cost savings for the hospital. The wireless patch integrates well with existing clinical routines, and is the only product with continuous temperature monitoring (axillar). It has a long battery life of five days, is lightweight, unobtrusive, and comfortable, and allows the patient to move about freely.

This talk will discuss how advances in silicon nanofabrication technology have enabled the core nano-IC components underlying the success of SensiumVitals.

Horizon 2020 - Funding Opportunities

Dr Octavio Pernas, EU UK National Contact Point for Health

Biography: Octavio has a strong background in Life Sciences, with a PhD in Veterinary Medicine, with specific emphasis in pharmacology developed at the University of Santiago (Spain). He has previous experience as an innovation consultant and has an extensive network of European contacts within the health sector. He has worked for both private and public sector clients, helping them to find the best European research and development funding opportunities, with a special focus in the previous Seventh Framework Programme (FP7) and the new Horizon 2020 programme. Octavio is the National Contact Point for the Horizon 2020 Health, demographic change and well-being challenge, supporting UK entities interested in EU funding.

Biospray Approaches for Regenerative Biology/Medicine & Theraputics

Dr Suwan Jayasinghe, BioPhysics Group, Institute of Biomedical Engineering, Centre for Stem Cells and Regenerative Medicine & Mechanical Engineering, University College London

Biography: Suwan N. Jayasinghe earned his PhD in 2003 in Materials sciences at Queen Mary, University of London. He is currently a group leader in the UCL Institute of Biomedical Engineering, the UCL Centre for Stem Cells and Regenerative Medicine and the Department of Mechanical Engineering. His group has made several discoveries having significance to advanced bioanalysis and diagnostics to tissue engineering and regenerative/therapeutic biology and medicine. These pioneering investigations are currently undergoing intense exploration for their exploitation in the clinic for repairing, replacing and rejuvenating

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damaged and/or ageing tissues/organs to other clinical applications.

Abstract: The ability to manipulate and distribute living mammalian cells with control presents fascinating possibilities for a plethora of applications in our healthcare. These imply several possibilities in tissue engineering and regenerative biology/medicine, to those of a therapeutic nature. The physical sciences are increasingly playing a pivotal role in this endeavour by both advancing existing cell engineering technology and pioneering new protocols for the creation of biologically viable structures. The talk will introduce the leading technologies, which have been fully validated from a physical, chemical and biological stand point for completely demonstrating their inertness for directly handling the most intricate advanced material known to humankind. Hence, each protocol's advantages and disadvantages will be clearly identified, whilst recognizing their future biological and engineering challenges. In conclusion, a few selected biotechnological applications will be presented where these protocols could undergo focused exploration. Successful development of these bio-protocols sees the emergence of unique future strategies within both a laboratory and a clinical environment having far-reaching consequences for our healthcare.

Regenerative Electrospun Scaffolds for Soft Tissue Repair

Dr Mike Raxworthy, CEO, Neotherix Ltd & Operations Director, Regener8

Biography: Dr Mike Raxworthy is a biomedical scientist with over 25 years' experience leading research and translational projects in the medical technology, medical device and pharmaceutical industries. He is the founder and Chief Executive Officer of Neotherix Ltd, a regenerative medicine company based in York, UK which was spun-out from Smith & Nephew in 2007. He is currently also the Operations Director of Regener8 (the N8 Centre for Translational Regenerative Medicine) based in Leeds, UK.

Neotherix develops regenerative scaffolds for tissue repair with a particular focus on soft tissue (skin and oral cavity). The company anticipates launching its first product, EktoTherix™ - a synthetic, bioresorbable scaffold - in 2015 and has been successful in gaining public sector support for the development of its technology.
Regener8 enables the translation of university and industry research in regenerative medicine into commercial products and clinical benefits. Hosted by the University of Leeds and working collaboratively across university and industry, with over 180 senior academic members and over 220 industry partners, Regener8 bridges the early stage innovation gap creating commercial value from academic knowledge.

Abstract: Neotherix develop novel bioresorbable scaffolds that provide 3D architecture for enhanced tissue repair. Healthy tissue cells use the ultra-fine nano- to micron-scale fibres to migrate into and fill the wound space. Using this approach, repair can be enhanced, information on the healing process can be obtained and treatment pathways simplified providing the potential for healthcare cost savings.

Neotherix' approach and pipeline will be described, covering acute and chronic wound therapies due to reach first-in-man clinical investigation within the next year. More recent applications of this technology involving encapsulation of agents within electrospun scaffold fibres and functionalisation of scaffolds will also be reviewed. All such commercialisation activities involve utilising the medical technology route to market – a pathway likely to allow regenerative therapies to reach the clinic and the market in the most timely and cost-efficient manner.