

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.

Wearable Technology – Health or Wellbeing?

Andy Baker, CEO, SmartLife

Biography: Generating new development opportunities that focus using the Smart Garment Technology in conjunction with Smart Devices and services. Wearable Technology will allow the remote use of personal medical data, and give us access to increased numbers for research and other developments worldwide. Also Chairman of Omnicom Media Group Company, Exbiheo & Chairman of Userfarm.



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Abstract: SmartLife have developed a comfortable, dry sensor, re-usable and fully flexible sensor system using textiles as opposed to hard form sensors. Avoiding invasive or adhesive applications allows the company to integrate the technology into any next to skin garment for maximum user comfort and thus maximum user compliance. The electronics (brain) is micro electronics with intelligence to read a variety of signals dependant upon the type of garment - and thus the site of the sensor on the body - into which they are ultimately attached. The data collected (ECG / HR, EMG, EEG, EOG, activity, temperature and pressure) is carried within the substrate of the wearable via patented 3D pathways, which allows the siting of the brain to be at the most convenient and suitable position on the body for the specific application. We can monitor multiple subjects at the same time if required.

The brain deploys BT4 - integration with other communications protocols will also be available - and the data interacts with the wearer on Apple, Android, M'soft and O/S.

SmartLife have been designing and engineering textile based sensors since 2003 and now have 23 patents in various regions globally. Emerging from a strictly R&D house into D&C (development and commercialisation); most of our work has been, to date, undertaken under NDA with more than 20 global partners in the sectors of IT, Pharma, Advanced electronics, Healthcare, Wound Management, Hazardous Environments and Sports Performance. We are imminently to launch, under license, a washable, high comfort & high performance sports and wellbeing range. The technology remains available to license in a range of application areas.

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 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.



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Breath Analysis for Diagnosis & Management of Respiratory Disease

Dr Victor Higgs, Managing Director, Applied Nanodetectors Ltd

Biography: Dr Victor Higgs is the founder and current managing director of Applied Nanodetectors, a technology company providing sensor solutions for medical markets. He has more than 25 years' experience successfully leading and directing innovative businesses. He is an innovator with expertise in sales and marketing, business development and hi-tech product development for worldwide markets. He is a business driver and strategist successful in creating vision and building organisations.

Abstract: Nanotechnology-based healthcare technologies are enhancing and improving present day product applications, and they are evolving into the next generation of products with unique features and end-user benefits. Applied Nanodetectors has developed the world's first nanotechnology sensor platform that can be used for a point of care diagnostic test based on breath analysis. Breath analysis is a non-invasive process whereby small quantities of volatile organic compounds can be detected in human breath, and can be used for early disease detection and diagnosis. Dr Victor Higgs will review how a point of care breath test can be used for diagnosis and management of respiratory diseases.

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.

Abstract: The presentation will illustrate the UK performance in the NMP area during the previous European Framework Programme 7, followed by a description of the new funding programme, Horizon 2020, with a special focus on its structure, main characteristics (including funding rates available), and the different areas of interest. The presentation also describes the NCP network existing in the UK and the support provided by NCPs to Horizon 2020 applicants.

Biospray Approaches for Regenerative Biology/Medicine & Therapeutics

Dr Suwan Jayasinghe, 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 damaged and/or ageing tissues/organs to other clinical applications.



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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.

Sol Gel Bioactive Glass in the Dental, Orthopaedic & Wound Care Market; Can it Continue the Success of the Previous Melt Derived Material?

Paul Catherall, CEO, Theraglass

Biography: Paul is a biologist from Imperial College, London and also a qualified Chartered Accountant. Inspired by business applications of scientific developments



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Paul qualified as a Chartered Accountant with Deloitte and specialised in corporate finance. Paul set up his own corporate finance business in 1993 and has been an adviser to companies ever since. Paul is an approved individual by the Financial Conduct Authority. He established Theraglass Limited to take over part of an intellectual property and product development profile which originated from Imperial College. Product development is still undertaken by Imperial. Paul is also finalising a crowd funding platform called Donate2Research allowing direct investment by the public into research projects.

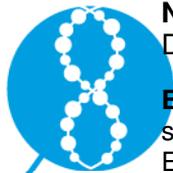
Abstract: Bioactive glass produced by the 'sol gel' method improves on many aspects of the original 'melt derived' bioactive glass currently used in industry for regenerative products within dental, orthopaedic and Cosmeceutical sectors e.g. by GSK and Stryker. The Bioactive glass is classified as a medical device and it actively stimulates protein surfaces such as nails, teeth and bones to heal and promotes vascularisation whilst being harmlessly reabsorbed. The 'sol gel' creates a nano structure which can be readily tailored. This creates several advantages over the traditional melt derived bioactive glass in that the significantly increased surface area, porosity, and resorbability can be utilised for specific applications. Our lead materials have nano silver incorporated into the bioactive glass which does not impact on their regenerative nature and which provides a powerful, yet low dose, time released anti-microbial property preventing infection. We have cosmeceutical skin care products being tested incorporating our powdered silver theraglass, we would welcome a partner to look at an acne healing product; a 3D scaffold artificial bone product which cuts out the need to harness bone or bone marrow from a patient reducing two operational procedures to one, and an exciting new chronic wound application using an electrospun nano fiber for the bed sore, ulcers and military markets, for which we are seeking development partners.

Colorectal Therapies Healthcare Technology Co-operative: The Nanotechnology Theme

Dr Kevin Critchley, HTC Colorectal Therapies & Leeds University

Biography: Dr. Kevin Critchley completed a PhD in 2005 on the photodeprotectable self-assembled monolayers on metallic substrates in collaboration with Seiko-EPSON. He then went on to be a post-doctoral researcher at the University of Leeds where he focused on nanowire fabrication and characterisation. In 2006 he was awarded a EU Marie Curie International Outgoing Fellowship and was a member of in Prof. Kotov's laboratory for two years, working on the assembly and characterisation of nanowires and quantum dots. After his fellowship, he was briefly involved in biosensor device research before being appointed as a Tenure-Track Senior Research Fellow in the School of Physics and Astronomy at the University of Leeds. He leads a research group that works in the translating nano-science and technology into future biomedical applications. He has published over 42 peer-reviewed articles and has two patents. He is a member of the management team for the NIHR Colorectal Therapies Healthcare Technology Centre.

Abstract: The colorectal therapies HTC is focused on looking at the development of novel solutions to both the challenges faced by patients who suffer from colorectal disease and the needs of clinicians in treating these patients. To do this we are building a network of academic, NHS, industry and patient partners to focus on developing solutions in three areas: Engineering, Nanotechnology & Biosensing. The Colorectal Therapies HTC network will build on existing strengths in these areas in order to foster a national and international profile for the HTC and our aim is to serve as the first port of call for individuals, innovators, researchers and organisations involved in the treatment of colorectal disease. I will introduce the centre, the motivation, and the future outlook. Finally, I will give some examples of nano-themed research associated with the HTC.



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Nanocin(Tm), a Flexible and Safe Cell Delivery Platform: A Novel Nanomedicine?

Liam Good, Director, Tecrea Ltd

Biography: Liam obtained a PhD in Canada, studying Molecular Biology and Genetics. Liam then trained at University of Copenhagen, funded by NSERC, and then moved to the Karolinska Institute, Stockholm, funded by Swedish Medical Research Council fellowships, where he became an associate professor. In 2007 Liam became Senior Lecturer at the Department of Pathology and Infectious Diseases, Royal Veterinary College, University of London. Liam is a founding Director of Tecrea Ltd, a scientific advisor to Blueberry Therapeutics Ltd, and has authored >70 publication, 5 approved patents; cited > 2500 times.

Abstract: Nanocin™ is a new cell delivery platform that is based on a clinically safe polymer. Nanocin™ spontaneously forms nanoparticles with a range of cargo molecules, including many biopharmaceuticals and small molecules. The technology has been successfully used to enhance the cell uptake of DNA, RNA, protein, and peptides into bacteria, fungi, parasites and mammalian cells. Relative to alternative technologies, Nanocin™ causes little stress to mammalian cells. Several examples will be presented, with an emphasis on functional effects of the cargo molecule in cells. Finally, our on-going plans to develop Nanocin™ as a nanomedicine will be described.

Business Intelligence for Nanomedicines

NanoScientium

Abstract: The global nanomedicine market is anticipated to grow to \$130.9 billion by 2016, meaning that it will have more than doubled in 6 years. Given the current trends and fluctuating competitive dynamics across the medical technologies, pharma, biotech and chemical industries it is important to support your business with an understanding of this changing landscape.

This talk will address the challenges that companies face in keeping up to date with these emerging technologies and positioning themselves within this ever evolving competitive landscape.



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