CENTRE FOR PROCESS ANALYTICS AND CONTROL TECHNOLOGY

CPACT Newsletter **September 2008**

New Innovative Manufacturing Centre for the process industries

Chemistry Innovation is leading an important programme of work to define the industry need and scope for a new Innovative Manufacturing Centre to serve the UK process industries.

Detailed consultation with industry, academia and technology providers to the chemistry-using sector, was undertaken during the first quarter of 2008 via a series of telephone interviews. This activity culminated in an open interactive workshop attended by over 30 organisations in April.

The consultation process provided strong endorsement and support for a new Innovative Manufacturing Centre with a clear focus and strategy to ensure that relevant industry challenges are pursued and that deliverables are truly innovative. Stakeholder feedback also stressed the need for significant investment (from both industry and government) to ensure that the Centre is 'world class' and globally networked.

Based on this mandate, Chemistry Innovation has now established a steering group - consisting of senior and influential figures from industry, academia and technology providers - that will scope the detailed concept, strategy and operating model as well as the research challenges and funding opportunities for the proposed new Centre. In carrying out this activity, the steering group will continue to engage widely with industry, learned societies, professional bodies and funding organisations over the coming months to ensure the right output is achieved.

Chemistry Innovation's project manager Matthew Tidmarsh said: "From our initial consultation and early discussions within the steering group, it is clear that this project will result in something beyond a traditional Innovative Manufacturing Research Centre (IMRC). Our first task, therefore, is to ensure that we develop a very clear understanding and positioning of what the proposed Centre will be and how it can best serve the needs of the UK process industries in driving improved innovation performance".

It is anticipated that the project will move into a full business planning and implementation phase towards the end of 2008 with an aspiration to secure the appropriate funding and launch the proposed new Innovative Manufacturing Centre in 2009.

Environmental Monitoring & Process Enhancement using Diode Laser Technology

The diode laser for monitoring trace levels of iodide species in the flare stack in one of BP's Hull Acetyls manufacturing plants has recently been approved by the Environmental Agency for IPPC auditing. The analyser was commissioned in October 2002 and we believe is a world first application of the technology for this analysis. The analyser and its flowcell, which was designed and built at Hull, has proved to be very reliable and has had almost no maintenance since its installation. This technology has supported BP's environmental agenda by reducing iodide emissions from the flare stack to record low levels, whilst simultaneously enhancing operation of the manufacturing plant.

The success of this in-house technology development has allowed BP to provide this technology as a potential option to other Acetyls manufacturing plants operated by BP and its Joint-Venture partners around the world.

Raimundas wins top award!

Raimundas Steponavicius (CPACT Newcastle) won the Best Junior Chemometrician Award at the CAC2008 Conference (June 30 - July 4, 2008).

The prize was awarded for his presentation describing a novel approach which utilises light propagation theory in combination with multiple measurements to effectively remove multiple scattering effects . Studies with polystyrene-water systems showed the PLS calibration model built after removing light scattering effects in this manner demonstrated significant improvement over traditional methods in predicting the concentration of polystyrene.

Congratulations to Raimundas!

Jie Zhang, CPACT Newcastle receives UK/China Fellowship

Jie Zhang received a UK/China Fellowship for Excellence from the Department for Innovation, Universities & Skills to carry out seven months research at the Department of Automation, Tsinghua University, China, from March to September 2008. Tsinghua University is the best university in science and technology in China and recruits the most elite students in China. The Department of Automation at Tsinghua University was ranked No. 1 in the subject area of Control Science and Engineering at the most recent national university assessment. Jie's work at Tsinghua University is carried out in collaboration with the Process Control Engineering Research Institute at the Department of Automation. The Department of Automation at Tsinghua University is well known for its research in computer integrated manufacturing systems, advanced process control, intelligent systems, bioinformatics, and process monitoring and fault detection. They hosted the IFAC International Symposium on Fault Detection, Supervision and Safety of Technical Processes in 2006. During his time at Tsinghau University, Jie has been working on the integrated performance monitoring and optimal control of batch processes. He is also co-supervising some research students on a Chinese National 863 Program in the area of inferential estimation and integrated modelling, optimisation and scheduling in refineries. Research funding at Chinese universities comes mainly from four sources: the National Natural Science Foundation of China (NSFC) which is equivalent to the research councils in UK, the national 863 and 973 programmes for the Ministry of Science and Technology which are equivalent to programmes funded by the UK, provincial/muncipal funding bodies, and funding from industry. NSFC funded projects focus more on theoretical research while projects under the 863 and 973 programmes focus more on applied technology and are typically large in scale involving several universities. It is interesting to note that a large proportion of research at Chinese universities is directly funded by companies. Due to the rapid economic development in China, research funding at Chinese universities has increased several fold during the past decades.

DATES FOR YOUR DIARY

CPACT Research Day, Monday 22 September 2008, Hull University. Programme available to view at: www.cpact.com/events.htm

APACT 09 conference will be held in Glasgow on 5-7 May 2009.
The Call for Papers will be issued shortly.

Hot Article Published in The Analyst

Zeng-Ping Chen and Julian Morris from CPACT have recently received the accolade of having their latest paper rated as being a highly significant contribution and classed as a 'Hot Article'. Congratulations to both of them.

Improving the linearity of spectroscopic data subjected to fluctuations in external variables by the extended loading space standardization
Zeng-Ping Chen and Julian Morris, Analyst, 2008, 133, 914 DOI: 10.1039/b800104a

In process analytical applications, spectral measurements can be subject to changes in process temperature, pressure, flow turbulence and sample compactness as well as other external variations. Generally, the variations of external variables influence spectral data in a non-linear manner which leads to the poor predictive ability of bilinear calibration models on raw spectral data. A new chemometric method, Extended Loading Space Standardization, has been developed to explicity model these two kinds of influential modes. The new approach was evaluated on a benchmark ternary mixture data set and on an industrial problem and demonstrated a significant improvement in calibration robustness to both temperature-induced spectral variations and multiplicative effects caused by the fluctuations of other measurement conditions.

New Projects with CPACT Members

Four new PhD projects will be starting at the University of Strathclyde in the autumn on 2008, supervised by David Littlejohn, Alison Nordon and Jan Setcik (from Chemical Engineering). GSK and Clairet Scientific are collaborating on one of the projects which concerns the monitoring of powder drying. The project started in August 2008 and involves Peter Hamilton who recently graduated with an MSci in Forensic and Analytical Chemistry at Strathclyde. One of Peter's class mates, Allyson McIntyre, will be starting a project with new members, Fibre Photonics in October 2008. This project aims to develop and apply new probes for in-line MIR and NIR spectral measurements. David Wilsdon, who graduated from Strathclyde in 2006, will be starting a project with Fujifilm in November. This project will investigate in situ characterisation of polymer-stabilised pigment dispersions using spectroscopic techniques. Another Strathclyde graduate, Melissa Black, will be starting a project with Bioinnovel in the autumn. This project will investigate use of a novel ultrasound probe for on-line measurement of the rheological properties of biotechnology processes.

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