



CENTRE FOR PROCESS ANALYTICS AND CONTROL TECHNOLOGIES

CPACT NEWSLETTER

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APACT
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The next APACT conference will take place on
28-30 April 2010 at the Hilton Deansgate Hotel
in Manchester

The deadline for submitting an abstract is
Monday 14th December 2009,
for more information about the conference please
visit www.apact.co.uk

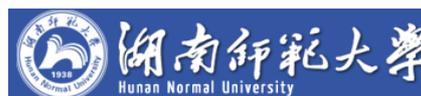
CPACT welcomes two new members!

Camo Software AS is a pioneer in the field of Multivariate Data Analysis software products and offers analytical modelling, prediction and optimisation solutions. The UnscramblerR, CAMO's industry leading, "All-in-One" Multivariate Analysis and Design of Experiment (DoE) Software is used by over 3,000 companies, 300 universities and more than 25,000 users in over 47 countries. CAMO is widely recognised as a dynamic Software Development, testing services and strategic IT staffing provider. The company has its development centre in Bangalore, India and offices in Norway and USA.



(More from CAMO on page 4 of this newsletter)

The State Key Laboratory of Chemo/Biosensing and Chemometrics (CBSC) was formed at Hunan University in 2001. It brings together analytical chemists, physical scientists, biochemists and chemometricians to research solutions to generic problems in the fields of on-line monitoring of chemical and pharmaceutical processes, biochemical & biomedical analysis and environmental monitoring. The Chemometrics group in the CBSC has over 20 years of research expertise in Chemometrics and has developed a number of effective methods for the analysis of complex data sets.



CPACT TEAM



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Happy Retirement to Angela Bott



Angela joined the CPACT team at Newcastle University on Monday 30th March 1998 and has worked closely with the CPACT Steering Committee and Industrial Management Board ever since. At the Steering Committee dinner on Wednesday 23rd September we had a little presentation for Angela and we were delighted that her husband Dick was able to join us in the celebrations.

Angela said " I started work for CPACT back in March 1998 and I have thoroughly enjoyed working with CPACT and meeting you all. I have had a super job and I know it! It has been fascinating to see CPACT evolve from those early days. I do not claim to be an authority on universities and industry but I do know that it is important for industry and universities to work together. CPACT has been a brilliant example of such collaborations.

I have made some good friends during my time with CPACT and would particularly like to thank my friends at Strathclyde - Natalie and David - for their incredible loyalty, and of course Julian for putting up with my nagging for the last 11 years and responding to most of my reminders - well at least 50% of the time!

May I take this opportunity of wishing CPACT great success with the IMRC proposal and my best wishes for the future of CPACT.

Thank you all for the good wishes and presents for my retirement from the University on 1 October 2009. I would also like to thank you on behalf of my husband, Richard, for inviting him along, too. My husband retired from Northumbria University at the end of August - we tried to arrange our retirements as near to one another as possible. I am very much looking forward (as Frank Cottee says) to waking up every morning and saying "which of life's little pleasures shall I do today! Certainly with the garden vouchers I have, my garden will be the best in the neighbourhood! "

On behalf of everyone at CPACT we just want to wish Angela all the best on her retirement!

Ex-CPACT Researchers—Where are they now?

This issue we find out what Chris Wong has been up to!

Chris said: "Being a PhD student in CPACT was really an invaluable experience in life. I was fortunate to have financial and professional support from GlaxoSmithKline throughout my research in particular the great collaboration with their researchers on the innovative but real research challenges. It has given me a great understanding of how academic and industry worked seamlessly together for a common goal. CPACT academics have also created a great network to share ideas and knowledge, for example, the annual APACT conference was not just a fantastic "get-away" trip but also provided a useful learning opportunity through discussions.



Since then, I joined one of the manufacturing sites at GlaxoSmithKline. I had the opportunity to put theory into practice and built a multivariate predictive model to control one of their major products leading to million pounds of savings. I felt proud of myself not just contributing to the company's financial gain but to be able to demonstrate myself the useful learning in a commercial environment. The Return on Investment is now justified with real life example!

I had various roles at GlaxoSmithKline before joining AstraZeneca as the Operational Excellence Coach. My current role focuses on providing effective coaching to the leadership team on the lean policy deployment, Six Sigma and change management so to become a lean and agile organisation".

Katy Ferguson talks about her new job as a Knowledge Transfer Partnership Associate

I graduated with a BSc Mathematics and Statistics from Newcastle University in July 2009. During that time, my interests lied mainly in statistics and applied mathematics. I've just started my job as a Knowledge Transfer Partnership (KTP) associate with Newcastle University based at Sellafield Ltd. The aim of this job is to develop and implement a number of multivariate predictive models and new methodologies/ technologies for process monitoring.



A Knowledge Transfer Partnership (KTP) is a scheme partly funded by the government, partly funded by the company. It can last for a defined length of time between 1 and 3 years. Many different universities offer these schemes; and provide advantages to the company, knowledge base and the associate themselves.

The main advantage for the company is that the associate comes to work within the company and is able to share their knowledge with staff. The main advantage for the knowledge base is that there is a means of additional funding and are able to help implement new methodologies and academic tools into industrial processes. The main benefit for the associate is that they can use the skills they have developed during their degree and use them in industry and also undertake a management diploma and are encouraged to study for a higher degree.

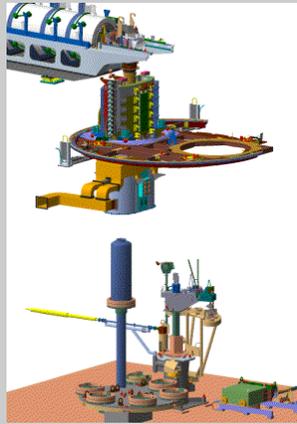
At Sellafield, there are many different processes occurring on the site, some of which are; reprocessing Magnox and Oxide fuels, storage of reprocessed uranium and plutonium, treatment and storage of waste and decommissioning of some of the nuclear facilities.

I work within the Waste Vitrification Plants (WVP) technical department. Vitrification involves taking a waste by-product, Highly Active Liquor, HAL,

and heating it to large temperatures and through thermal decomposition it is turned into a calcine. This then fed into the melter along with glass frit and heated up to even greater temperatures with the calcine mixing into the glass. After two pours the lid is welded on, the surface contaminated and after swabbing, it is taken to the Vitrified Product Storage (VPS) for storage. A schematic description of the vitrification process is shown below.

All aspects of the process are performed remotely to protect against the radioactivity and along with the corrosive and hazardous materials means that it is a challenging environment.

The techniques I will be looking at in order to create new models will mainly be multivariate statistical methodologies. There will be an application of already established techniques to industrial control issues.



There is also a need for development of predictive process models which could improve process control. The aim is small incremental improvements which deliver added value by improving safety and control of process, improving hazard reduction and throughput

and reduce unit cost and the amount of secondary waste.

The KTP is for 3 years, in which time I would love to have developed a model which saves Sellafield Ltd a considerable amount of money and improves safety. Also personally, I want to complete my diploma in management through the Chartered Managers Institute (CMI) and obtain an MPhil in "Multivariate predictive models in the nuclear industry" from Newcastle University, both to a high standard. After the project, my aim is to be offered a job at Sellafield Ltd, so I can continue developing new predictive models and approaches.



Katy Ferguson

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CAMO Software joins CPACT

Centre for Process Analytics and Control Technology

CAMO Software joins CPACT - Centre for Process Analytics and Control Technology

CAMO Software partners with CPACT – A strategic alliance that will benefit both Scientists and Engineers through enhanced multivariate process analysis and monitoring.



CAMO Software is pleased to become member of the Centre for Process Analytics and Control Technology – CPACT. This is a strategic commitment CAMO Software has entered into with the aim of advancing research and industrial awareness of multivariate data analysis methodology.

Multivariate Analysis (MVA) is a mature methodology, extensively used in disciplines such as psychology and agriculture. In more recent times and coinciding with the rapid rise of Process Analytical Technology (PAT) in the petrochemical and pharmaceutical sectors, the value of MVA is only now starting to realize its long awaited potential.

Industry has utilized the benefits of Statistical Process Control/Monitoring (SPC) for detecting trends in well understood processes for many years now. In more recent times, initiatives such as Six Sigma have put the need for statistical analysis and Design of Experiment (DoE) back on the radar of many companies. However, while the principles of these methodologies are sound and have helped companies to minimize some of the variability of their processes, they don't encompass the entire picture, rather they break down a process into single parts, most often considered "independent" of each other. This works when the process variables are, in fact, independent, but what if they are not?

This is where MVA is most important for analysing complex, highly intricate processes, typically encountered in pharmaceutical, biopharmaceutical and chemical processes. MVA looks at the whole, top down, picture, providing the most useful data output; visual displays. MVA is the language of pictures and as the old saying goes, "a picture tells a thousand words".

Typically, a six sigma initiative will isolate measurement variabilities that need better monitoring and control. From there DoE can be employed, as the measurement systems are now deemed to be reliable. DoE can be used to isolate process variables and most importantly, their interactions, which are usually undetected by simple univariate methods and are the main cause of most process failures. The final piece in the puzzle and the critical step is the overall monitoring of all process variables in one analysis. This is where MVA comes in.

25 years of multivariate analysis experience – The Unscrambler GenerationX



Coinciding with 25 years of excellence in providing multivariate data analysis products and solutions, CAMO software is implementing a massive redevelopment project to maintain its long standing respect in the chemometrics and multivariate analysis market. The UnscramblerX has been designed to further build on the well established features of its current product range, but with a greater focus on a wider range of applications and domains. Bringing the user experience to a new level of professionalism, The Generation X family of products is set to provide far superior visualization of results through advanced graphics and intuitive workflow. This will help our customers achieve their goals in a flexible and adaptive environment.

"The GenX family of products is also process focused, with development being driven by initiatives such as Quality by Design (QbD). Not compromising on adaptability and flexibility which has always been the key." says [Brad Swarbrick](#), Product Manager, The Unscrambler GenX, CAMO Software AS. "CAMO Software has renewed its commitment to Design of Experiments (DoE), with a comprehensive overhaul of the existing module. The new Unscrambler OnlineX will also provide a user friendly approach to Multivariate Statistical Process Monitoring (MSPM). Combining the power of The UnscramblerX, the Online product uses generated models for real time quality applications and advanced data visualization" explains Brad.

Online applications and latest developments



CAMO Software is actively partnering with third party instrument vendors, control systems and system integrators in a number of industrial sectors to facilitate ease of data importation and transfer, compatibility with the widest range of systems and providing outputs, based on state-of-the-art multivariate data analysis routines.

CAMO Software's latest development is the integration of our Online Unscrambler Predictor (OLUP) module into the ABB FTSW100 process software system. In addition, there is an on-going integration project with the ABB xPAT system, which will bring added value to our customers.

The UnscramblerX is also compatible with OPC, for offline modeling and calibration applications. Through such protocols, Unscrambler OnlineX will make data integration even easier and allow our users to apply the benefits of multivariate statistical process monitoring tools within their current quality management environment. All of this will be done in accordance with the philosophy and guidance of the Quality by Design (QbD) initiative and the ISPE GAMP5 and ICH Q10 guidance documents.

