Chemistry Innovation
Knowledge Transfer Network

Understanding High Throughput Technologies

High Throughput Technologies (HTT) embrace an advanced range of tools and techniques that help study and develop chemistry with unprecedented speed and accuracy. Widely used in drug discovery, their benefits in saving time and resources offer exciting potential to meet innovation needs across a much wider range of industry sectors. Chemistry Innovation is driving initiatives to broaden and deepen understanding of the potential of High Throughput Technologies – including bespoke training courses for younger chemists in sectors where HTTs are not yet established.

First developed in the mid-1990s HTTs can increase R&D productivity by orders of magnitude - accelerating innovation, moving products to market faster and addressing cost and sustainability issues.

Widely used in the pharma sector to accelerate synthesis and screening of drug candidates, subsequent use in diagnostics, electronic and other advanced materials have seen benefits in research and product formulation.

HTT tools and techniques include laboratory automation, miniaturisation, combinatorial chemistry and parallel synthesis, continuous flow synthesis and processing, effective design of experiments (DOE), data visualisation and mining, modelling and in-silico screening.

HTTs underpin Chemistry Innovation's key priority areas – notably Innovation Leadership, Catalysis & Synthesis for Effect, Measurement Science & Technology and Modelling for Chemistry.

HTT is a powerful ally for the chemistry-using industries and future generations of chemists. However, due to its diversity of subjects, until now, no focused training has been available for this increasingly important topic.

In a demonstration of Innovation Leadership, Chemistry Innovation has answered a clear need for this by gathering information on the skills training needs for HTT users in order to design/co-organise bespoke new interactive **HTT training courses** for chemists.

EXPLOITING THE FULL POTENTIAL OF HIGH THROUGHPUT TECHNOLOGIES

Working with the RSC, Cambridge University and the TopCombi EU HTT Research Project, Chemistry Innovation has created a custom designed training course providing cohesive understanding of the benefits and practicality of HTT for users and potential users alike.

The course aims to appeal to those at an early phase in their chemistry careers. It includes a large number of expert technical speakers, associated practical sessions and state of the art equipment demonstrations.

These elements are combined to present the current picture of what HTTs can deliver for the chemistry-using industry.

The training provides a valuable insight on the basic HTT applications; analysis; testing; data handling, modelling and experimental design.

The first HTT4 chemist course at Cambridge University, in 2007, attracted 20 post-graduate delegates from a broad range of specialisms.

Other Chemistry Innovation activities aimed at building greater understanding and promoting increased awareness of HTT include:

- a 'webinar' - '*Boosting R&D productivity through HTT*'
- creation of a HTT *'Special Interest Group'* within Chemistry Innovation
- HTT lecture material on our website
- editorial on HTT developments in Speciality Chemicals Magazine, Vol 27 - April, 2007

The training and related promotions have introduce HTT to important new audiences and laid key foundations for further learning.

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DRIVING THE INNOVATION POTENTIAL IN HIGH THROUGHPUT TECHNOLOGIES

Chemistry Innovation is committed to widening industry recognition and understanding of HTT potential. Building on the success of the first ***HTT4 Chemists* course**, other activities include meetings and workshops on specific and important technologies and communities using or able to use HTT. Examples include:

- Microfluidics for chemists (2 *Flow Chemistry* workshops have been organised. The first on 13 Nov 2007 involved 50+delegates at The Dolomite Centre, Royston. This will be repeated at Cardiff University on 6 Feb 2008)
- HTT for formulation chemists
- HTT for polymer chemists
- Design of Experiment application within HTT operations
- Solids Handling within HTT operations

Chemistry Innovation has also helped to formulate an EPSRC funded project on 'High Throughput Nanomaterials Discovery'. This is a £1.2m, 3-year project organised through University College London and Leeds University with the aim of discovering new materials with photocatalytic properties. The project commenced in January 2007.

All of this activity/knowledge will be incorporated into the next HTT4 chemists training course at the Centre for Materials Discovery, Liverpool University, in April 2008.

Chemistry Innovation's collaborations with RSC, SCI, ELRIG (European Laboratory Interest Group) and others will further showcase and promote the use and benefits of High Throughput Technologies.