



Avantium offers technology transfer in strategic collaborations

In the four years we've been in existence, Avantium has grown rapidly. Our contract research services have been taken up by the life sciences and chemicals industries, and in the past years over 40 companies around the world have taken advantage of our research methodologies. We've come a long way, initially thanks to the financial and technical backing of a range of chemical and pharma companies and universities and later by venture capitalists.

Our experimental programs are designed to discover more information about processes and how they work, and our rational design approach ensures we gain as much information as possible from a limited number of experiments. When high-throughput screening is combined with this rational approach we enable innovations to be made in a more effective way, and processes can be optimized earlier on in the development cycle. Our approach can also help to eliminate expensive late-stage failures in pharmaceutical and chemical development.

Evolving business model

Many of the large companies we've worked with have wholeheartedly embraced the rational screening approach, and are now looking to integrate these methodologies, alongside our high-throughput technologies, with their own in-house capabilities for selected areas. To support this, Avantium is evolving, too. Rather than just selling services, we are now actively supporting technology transfer, to enable the smooth implementation of our research methods in our customers' own laboratories.

We don't just provide equipment – we also provide full support to our customers, and technology transfer is an integral part of our strategic collaborations. Our staff has a combined experience in excess of 300 man-years in high-throughput experimentation and rational design. We offer guidance in reshaping R&D programs, and some customers will find that the ultimate result will be a partial or full technology transfer from Avantium to their in-house R&D departments.

Clearly, customers want to be sure that a new technology is going to work – and to be right for them – before they take the plunge and implement it in their own labs. So, as well as outsourcing R&D projects to us, they can use our facilities to run experiments, evaluate data and the data's reproducibility, and see the equipment in use on our site in Amsterdam.

Because we know our R&D methods best, we now offer consulting services to customers to help them use our equipment and software, and to facilitate the integration of the new technology with their current infrastructure and methods. We offer full support when the technology is being implemented – and training of our customers' staff to bring them up to speed in its implementation.

We also work with an extensive network of technology suppliers, to provide the best, most effective equipment for running our high-throughput techniques.

MiniMax

Many of our technologies are ideally suited for transfer into customers' labs. A good example is the MiniMax parallel crystallizer. We developed the MiniMax to carry out small-scale crystallization experiments as part of a high-throughput R&D program. It is specially designed to verify the optimum conditions for crystallization processes, without using up large amounts of precious material. It can also be used to make crystalline materials for analytical purposes, determine solubility, and to generate single crystals that can be used for further X-ray analysis and crystal structure determination.



Quick Catalyst Screening platform

Our Quick Catalyst Screening platform is another example of equipment that is available for technology transfer into customers' labs. The QCS parallel reactor station was created to study gas-liquid batch reactions, such as the industrially important asymmetric hydrogenation, both quickly and reproducibly. The QCS is also well suited for studying air- and moisture-sensitive homogeneous catalysts. Typical application areas in which this equipment has been proven successful include (asymmetric) hydrogenations, oxidations, hydroformylations, oligomerizations, polymerizations, etc. The reactors were designed to investigate an expanded set of parameters using small amounts of starting materials, and the platform is particularly suitable for conducting explorative screens early on in the chemical development process. The reactor station can also be integrated with an automated solid and liquid dispensing and sampling system, which simplifies and speeds up the entire process.

Nanoflow

For customers that need the capability to screen heterogeneous catalysts under flow conditions, Avantium has developed a fixed-bed screening platform, called the Nanoflow. It has been designed to carry out catalyst testing under isothermal conditions, plug flow conditions, and with a low pressure drop. The reactions carried out have been proven to be scaleable for many application areas, which means the catalysts identified can be rapidly and reliably implemented in pilot and commercial production plants. The Nanoflow platform can be operated under gas phase, trickle phase and liquid phase conditions, and can feed up to 8 different gases and vapors and up to 2 liquids simultaneously. The reactor platforms are typically operated using on-line analytical devices such as MS and GC.

Next to high-throughput catalyst screening systems, Avantium has also developed high-throughput catalyst preparation units, such as automated platforms for catalyst impregnation and catalyst precipitation. These systems have been carefully designed to study catalyst preparation under controlled conditions.

Conclusion

These are just a few examples of the technologies that Avantium has developed, and which our customers are already benefiting from. We believe that our methods are ideally suited to speeding up research and development across the board in the pharmaceutical and chemical industries, and the results that our customers have achieved bear this out. Now, with our technology transfer capabilities, it will be easier for them to implement our high-throughput techniques in their own labs, saving even more time – and money.