

## Definiens eCognition is the Gold Standard in High Content Analysis Software

### Business Challenges

One of the predominant problems in drug discovery is that only approximately one drug out of one Million is a winner. Development costs of about \$800 million per drug result in the decision of pharmaceutical companies to concentrate on drugs with blockbuster potential instead of drugs for the \$100-million to \$500-million market. "We need to be better in predicting which compounds at the earliest stage will be successful later," says Dr. Ivan Baines, Scientific Coordinator and Director of Services and Facilities at MPI-CBG. "A better prediction reduces costs and makes the development of drugs for smaller markets profitable."

The Max Planck Institute of Molecular Cell Biology and Genetics in Dresden (MPI-CBG), Germany, serves as the hub of perhaps the largest industry-academic collaborations in Europe in the field of high-content screening for drug discovery. It is the coordinating institute for the High-Throughput Technology Development Studio (TDS) project, a collaboration that is funded by the German government through the BioMeT Network. TDS develops phenotypic assays and implements high-content screens with the aid of robotic systems and automated microscopy.

High-content analysis means the measurement of multiple parameters in parallel from the same sample. These types of assays are extremely sensitive and low false positive / false negative rates are observed, thus enabling a better prediction in the primary screening. "Without automating the process of image acquisition and analysis it is not possible to master up to 100.000 images per day, the current throughput of the most rapid automated screening microscopes," explains Dr. Baines, one of the coordinators of the TDS project. "While there are alternative software solutions for processing data rapidly, none of them can extract the wealth and depth of data within each individual image."

### Definiens' Solution

Definiens has become an indispensable technology provider for the TDS project. "eCognition is currently the gold standard in high content analysis software," says Dr. Baines. "In fact, Definiens' software is now embedded in the IT environment of our institute. Our microscopy facility is using eCognition to extract data from microscopy images and in our screening facility eCognition provides image analysis data from screens."

The question that Dr. Baines and his colleagues of the TDS project ask is: Can you improve the prediction in drug discovery if you increase the number of measurements and the resolution? "At the TDS we tackle the problem by developing multiparametric high-content assays and automated microscopy," explains Dr. Baines. Multiparametric assays better mimic the situation in humans; however, in order to validate the output of an assay a phenotype is necessary that is analyzable by microscopy. "The human eye is vulnerable to subjective interpretation while it is essential to achieve complete objectivity of analysis only possible by non-human investigation. If there is a slight difference between two samples this is only detectable by measurement across a large number of samples and will not be visible to the naked eye," says Dr. Baines. "eCognition is currently the most powerful software to extract data from microscopy images and to analyze the results."

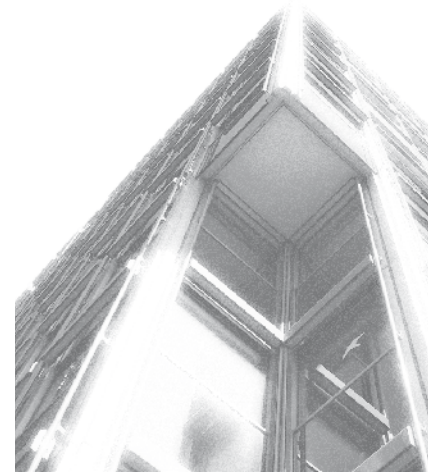
Dr. Baines illustrates the enormous impact that a sophisticated image analysis software and instrumentation technology will have in future drug discovery projects as follows: "If you measure enough parameters with a high-enough level of resolution, you should be able to precisely match an RNAi-induced phenotype to the signature of a compound-induced phenotype. At that point in time, you could screen compounds without knowing their target."

## Benefits

The BMBF project cannot be accomplished with other software products currently on the market, according to Dr. Baines. The reason is "that you can teach eCognition to identify objects you are interested in. This is not possible with the pixel-oriented image recognition of other software products." eCognition changes pixels into objects which are defined by rulesets. "The advantage of eCognition is that you can challenge the software for example to differentiate between cellular components of two microns in size," and he adds: "eCognition has opened up new worlds of opportunities for performing screens utilising assays that have previously been impossible to accommodate in high throughput screens due to the lack of refined software for automated image analysis and data extraction."

# ABOUT DEFINIENS

Definiens is a global leader in providing Enterprise Image Intelligence solutions and services that enable its clients to harness all relevant information from digital image to support fast and accurate decision making crucial to its business process. Definiens' products are built on its Cognition Network Technology that represents a quantum leap in the realms of digital image analysis. Our products are offered across chosen markets, initially focusing on Earth Observation/Remote Sensing (EO/RS) and Life Sciences. Definiens offers advanced and robust image analysis solutions to accelerate the drug discovery, development, and diagnostics processes in life sciences, and perform satellite and aerial image classification more intelligently, more accurately, and more efficiently than traditional methods. Definiens has customers worldwide in the areas of Life Sciences and Earth Observation/Remote Sensing (EO/RS), including leading companies, academic centers, and government agencies. Founded in 1994 by Nobel Laureate Prof. Dr. Gerd Binnig, Definiens is a multi-national organization with headquarters in Munich, Germany and offices in Boulder, Colorado and Boston, Massachusetts. For further information regarding the company and its products please visit [www.definiens.com](http://www.definiens.com).

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