Brightsite

Transforming industry

Training for the future crucial for successful transition to green chemistry

Brightsite is committed to creating a sustainable and competitive chemical industry. In addition to developing innovative technologies and promoting their commercial application, one of the pillars of the knowledge center is aimed at education. After all, training a new generation of employees who can put innovations into practice is a requirement for the successful transition within the chemical sector.

In Brightsite's 'Education and human capital' program line, Maastricht University is developing new curricula regarding circular engineering and sustainable manufacturing.

Proud partners
Sitech Services
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Maastricht University
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About Brightsite

Brightsite is a partnership between Sitech Services, TNO, Maastricht University and Brightlands Chemelot Campus, and focuses on making the chemical industry more sustainable, at both the Chemelot site and other locations. The climate goals pose significant challenges for the chemical industry, but they also provide opportunities. Sound transition management will result in economic growth and will draw in talent and business. As the development and application of new technology involves much more than just the technical aspects, the work also includes safety aspects, social acceptance, legal and economic feasibility and education.

Training the engineer of the future

To guarantee a successful implementation, the Brightsite activities are subdivided into six mutually strengthening program lines. One of these program lines is the 'Education and human capital line'. “We need to ensure a future in which we have the right people to develop innovative technologies and apply them in practice. Maastricht University (UM) provides academic input on the social aspects of innovation, carries out fundamental research and is launching engineering courses that will supply the next generation of engineers,” says Arnold Stokking, Managing Director of Brightsite.

“Developing the various routes towards the goal of reducing greenhouse gas emissions requires broadly educated graduates who can work on interdisciplinary challenges,” explains Program Manager Bakir Bulic, who is also the Managing Director of the UM Faculty of Science & Engineering. “Education can bridge the gap between various engineering disciplines and the circular economy. The curricula will be closely linked to the activities at Chemelot and on the Brightlands Chemelot Campus.”

Integrating exact sciences and engineering within theme-based research and education

Exact sciences are playing an increasingly prominent role at UM. The Faculty of Humanities and Sciences has been transformed into the Faculty of Science & Engineering (FSE). In recent years, a number of new curricula have been launched and new institutes have been set up. And developments at the Faculty are still in full swing. Prof. dr. Thomas Cleij, Dean of FSE, will further specify these developments. “Our idea is that innovative exact science and engineering education should not be isolated, but combined. Setting up individual universities that focus on a single subfield, as is common practice in the Netherlands, is an outdated concept. We want to work based on themes, in which applied and fundamental research and education take place simultaneously. Collaboration with other parties in the region is also important here,” explains Cleij. In 2011, the Maastricht Science Program (MSP) was launched: a unique exact science program in which Bachelor students compile their own curriculum. FSE currently has a total of 2,000 Bachelor and Master students, two thirds of whom study exact sciences (math, chemistry, biology, physics) and the University College, where the other students (one third) study. The ambition is to double this number within a few years. “It is good to see that many (international) students are interested in our courses and that many of our science students are interested in engineering. In addition to this, our quality is recognized internationally. Regarding the engineering courses, we are on the brink of their actual launch. Our goal is to expand these over the next five years,” says Cleij.

Prof. dr. Thomas Cleij, *Dean Faculty of Science & Engineering:*

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Collaboration within Brightsite

UM and the other Brightsite partners share their vision for improving sustainability and the importance of ensuring that courses provide the skills that employees will need in the future. “The fact that a new breed of technologist and engineer is required, together with the interest in engineering that we see among our science students, has prompted us to join Brightsite as UM. Our collaboration has been organic since the start. In developing the courses we provide, we consider the needs of future professionals. At the same time, the idea of having sparring sessions with people at Chemelot is appealing. This fits in with our DNA: we are the only university with a site as a lab. This ecosystem is special and valuable. Hardly anyone in the world has this luxury, and we need to take advantage of it,” says Cleij. “Human capital plays a key role in the transition to green chemistry. We need new employees to be able to make the transformation to new technologies later on. It is therefore very important for Chemelot and Limburg to ensure that the courses are set up in a sound and futureproof manner,” emphasizes Bulic.

Who is the engineer of the future?

FSE will begin offering a new bachelor program in ‘Circular Engineering’ in September 2021. “We want to offer a course that is in line with the current changes in the industry. It is therefore necessary to understand what is happening in the chain and society. Apart from having engineering skills, the engineer of the future must think in a circular way from the ground up to devise ways of reprocessing used materials and components as raw materials. This engineer thinks in multi-disciplinary terms and is capable of bridging the gap between various disciplines. In addition, the quick-changing nature of the profession requires adaptiveness and flexibility. The ideal engineer should be comfortable in a changing world and should be stubborn. Right now we simply do not know what the sector will look like in the future. However, it is clear that society is changing, and students are as well. You see more and more students with an interest in sustainability and for whom sustainability is important,” says Cleij.

Bakir Bulic, *Managing Director of the UM Faculty of Science & Engineering:*

“We use a combination of hardcore knowledge and theme-based handling of circularity to try and develop critical thinkers.”

Developing critical thinkers

A new Master's program will follow later, once the Bachelor's program is up and running. Sustainable Manufacturing is one area on which UM is focusing. The engineering section of FSE is expected to become about the same size as the science section, with hundreds of new students each year. Both the Bachelor's and Master's programs at FSE not only focus on technical skills and knowledge, but also on softer skills (like communication and a feel for social impact and developments), and they cover methods to ensure intrinsic safety.

"Companies are also involved here. We are specifying the outlines of the curriculum from within the academy, but we are already in talks with parties. True collaboration will follow once these courses are up and running," explains Cleij. "The courses are set up like the rest of the courses in Maastricht: small-scale (12 to 15 students per study group), with an emphasis on research- and problem-based learning, with international classes and a student focus," says Cleij. "We use a combination of hardcore knowledge and theme-based handling of circularity to try and develop critical thinkers," adds Bakir Bulic.

Learning based on case studies

"We are inspired by the technologies from the various Brightsite program lines. One example of this is case studies you can present to students. Among other things, we do this by giving professors a greater role in education. There are few other universities where you see a professor supervise 12 students for an assignment. Brightsite allows us to involve excellent scientists in our education. And these experts, like Prof. dr. Gerard van Rooij, include the interactions with Brightsite on improving sustainability in the education they provide. The collaboration with these kinds of hot-shots ensures that students ultimately choose to specialize in a particular topic," muses Bulic.

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Gerard van Rooij appointed professor of plasma chemistry

On May 1, 2020, Prof. dr. Gerard van Rooij was appointed Professor of Plasma Chemistry at the Faculty of Science & Engineering. The appointment of Van Rooij is UM's first appointment within Brightsite. Based on his role at UM, Van Rooij will participate in various Brightsite program lines, especially in the field of electrification. Van Rooij is an expert in the field of plasma chemistry. Since 2012, he has been researching plasma activation of chemical reactions to support the storage of sustainable energy in chemical potential energy for integration in other sectors, such as transport and the chemical industry. Cleij is delighted with this appointment: "The appointment of Prof. dr. Gerard van Rooij is in line with the Faculty's ambition to apply engineering to improve circularity and sustainability. Van Rooij is an outstanding expert in his field of expertise and brings with him a valuable network that our research programs and curricula can benefit from."