

# Mercator NovioTech

Science Meets Business Nijmegen



Queen Máxima:

Opening of the MITeC operating rooms



Prof. Jan van Hest:

Molecule to Business



State Secretary Sander Dekker:

Opening of the FELIX Laserlab and Experimental Garden Radboud University





National Military Museum - research into lighting and indoor climates

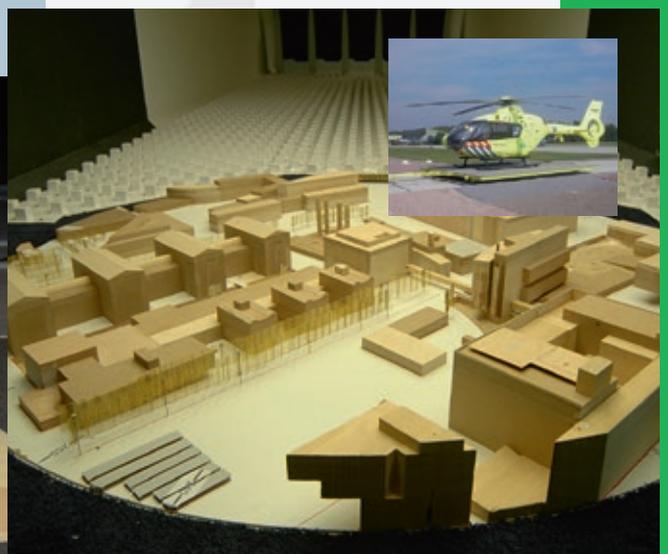
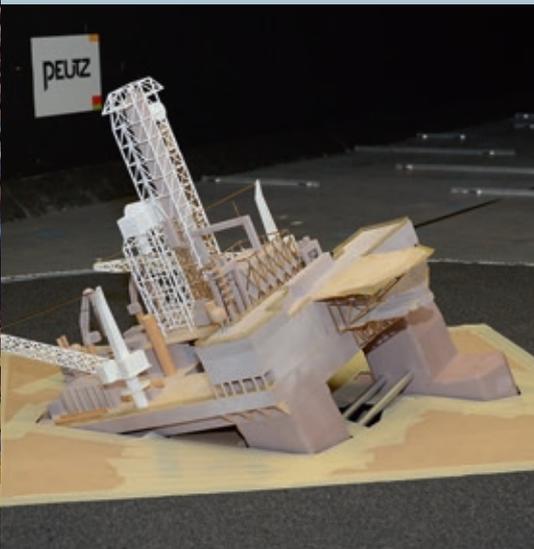


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# Innovation & Entrepreneurship

Science and technology drive many developments in society, economic innovations, new job opportunities, and starting businesses. Universities and other knowledge institutes all want to provide a continued contribution to innovation from their core activities of research and education. Cooperation with other knowledge institutes and social organizations, authorities, and businesses is key, regionally, nationally, and internationally. With the appropriate finances and specific expertise, the right cooperation can be stimulated. After all, innovations do not appear out of thin air. Working on 'societal impact', knowledge applications, and new businesses from science is seldom a case of a straight line from A to B. The preparation and organisation of public-private cooperation and research & innovation projects require a lot of time, expertise, and funds. New initiatives and the joining of forces can help, such as the new university network organisation Radboud Innovation. You can read more about this in the next issue.

In the present issue of Mercator NovioTech Magazine, various examples are discussed where science and business meet and the results become visible. The start and growth of innovative companies from science and technology gets a strong push from collaboration projects such as iLabNijmegen, KERN, Gelderland Valoriseert, SMB Life Sciences, and Red Medtech Ventures. For faster and sustainable growth new means are needed, from parties such as the Province of Gelderland. Executive Dr. Michiel Scheffer is aware of this, as becomes clear from the interview in this magazine. The City of Nijmegen and organisations such as Health Valley and Rockstart also observe that an active incentive policy and extra commitment are necessary to encourage more fast-growing innovative start-ups. Many successful spin-off companies have formed out of Radboud University. In the coming years, the opportunities for growth are unabated thanks to the attention to entrepreneurship in the bachelor and master programmes at various faculties of the university. Supporting facilities and science-to-business-meetings are essential for going from research and student companies to growing businesses. A little further in this issue, researchers Dr. Robert Kok and Drs. Twan Verrijt write about the growth potential in this field. This magazine and its facilitators actively contribute to that growth, together with directly involved entrepreneurs, authorities and knowledge institutes, the Triple Helix and the start-up ecosystem. Innovation and cooperation go together, both in a strong knowledge economy and in focused positioning. Nijmegen has an excellent starting position for this, both nationally and internationally. This most southern city of the east Netherlands and the most northern city of the south is aiming for Dutch-German and Euregional cooperation, and prominent research themes together with knowledge institutes, companies and the authorities in the east and south of the Netherlands. Great opportunities await!

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*Dr. Michiel Scheffer, Executive of the Province of Gelderland*

# Gelderland is heading for 'Global Noaberschap'

Gelderland is highly respected for its research sectors, such as Energy and Environment technology, and Food, Health & High Tech Systems. Gelderland has an excellent starting position in the modern knowledge economy, when it comes to its business climate and competitiveness. Yet, according to Dr. Michiel Scheffer, Executive of the Province of Gelderland, there remains much to gain in the fields of innovation and internationalisation.

## INTERVIEW

"In the east Netherlands we are very successful at launching businesses. In collaboration with HAN, Saxion, and the universities of Nijmegen, Twente, and Wageningen we reached about 6,000 startups over the past ten years. Our German neighbours don't praise our 'Gründerkultur' for nothing. The Province of Gelderland is working on a set of tools that can be used by entrepreneurs from the early beginnings of a business into the continued growth stage. There are quite a few labels attached to these tools, and sometimes this gets confusing. We want to make it simpler, more transparent and more efficient. For example, when some devices have been exhausted and others haven't yet, it is difficult to transfer the money needed from one fund to another. It is good to see that companies taking part in schemes financed by the authorities have a higher chance of success than the

average startup. Unfortunately, too few startups continue to grow. Many remain small with 10 employees at most. We want to see more expanding businesses."

### Juncker Fund

"The Juncker Fund, the Netherlands EFSI Investment Agency (NEIA), is nearly there. There are €14 billion available within the Netherlands, and we will be reviewing the best ways to finance a growth fund for Gelderland. There is currently a gap between the funding provided by PPM Oost and the moment where venture capitalists get involved. The latter are mainly interested in the phase right before a business goes public: companies worth upwards of €50 million. Over the past few years, there have been several foreign takeovers of successful companies in Gelderland. Unfortunately, the patents

often disappear abroad in these cases, and eventually the production processes too. This may be lucrative for the entrepreneur, but our goal is to boost the regional economy and job opportunities, not to guide companies towards takeovers. We have to make sure that there are strong science-to-business connections in place, to anchor businesses in the innovative climate here. In the coming years we will be making use of our financial resources to involve others in the process as well, thus creating a stronger stimulating position.

We will emphasise smaller loans and shares, with increased importance for the assessment function. This assessment phase is relatively expensive for banks and private investors. A loan below €100,000 is not viable, as the operating costs are then too high. Aside from smaller loans and shareholdings, the

added value of PPM Oost will be in the field of screening, file preparation, and the like.”

### Local and global buzz

Michiel Scheffer: “I would like to see more differentiation amongst starters, more with prior entrepreneurial experience, knowledge of management, and marketing. At the moment you mainly see young starters in their twenties, without any of that experience. There are two classic pitfalls to look out for: over-perfecting, and wanting to do it all by yourself. These starters continue to focus on the perfect product and do not see that you first have to earn money to invest in further development. Our message is thus: set a deadline and clear benchmark, and work towards a quick market launch. Starters should not allow themselves to become loners who do not appreciate the value of experienced people looking over their shoulder. Modern companies have more of a knowledge-to-network structure. Such a network determines the resilience of the company. Luckily students get to study entrepreneurship early on these days, through small businesses courses and ‘entrepreneurial education’ at the HAN and Radboud University, as well as in networks of young and experienced spin-offs.”

Internationalisation is one of the focus points of the Province of Gelderland. “Our policy is aimed at stimulating the ‘local buzz’, but at the same time you need to keep your eye on the international contacts, the ‘global buzz’. Another area with clusters of companies and knowledge institutes is Silicon Valley. This spatial concentration is advantageous for the exchange of research and innovation within regional knowledge networks, allowing you to position yourself internationally. I am an advocate of ‘evidence based’ policy: policy based on research. This is why we have used publications, patents and research findings to define what it is that the universities of Nijmegen, Twente, and Wageningen excel in. We carried out a portfolio analysis of our knowledge sectors with the province of Overijssel. This showed that a knowledge sector such as the Food sector performs well on a European level, and ‘Health’ and ‘ICT’ reasonably well, though

they are not particularly remarkable. The Province of Noord-Brabant is working on a similar map, and we aim to join forces to see what the added value of innovation would be. Regional and international networks are essential for innovation. That is why we want to put Gelderland in a stronger position amongst likeminded areas within European networks, comparable to MANUNET for the manufacturing industry. In the future, this may result in a European cluster of regions strong in Food and Health. Specialisation is necessary to excel; Health Valley is already too broad. In order to distinguish ourselves, both the province and research institutes should take their lead from smaller domains such as Healthy Brain or Nanomedicine.”

### International acquisition

Michiel Scheffer believes that conferences, fairs, and trade missions are excellent opportunities for international positioning, network formation, and the acquisition of businesses. “Universities are important partners when it comes to internationalisation. With Oost NV we are continually aiming for the acquisition of foreign business and investments. We already have close ties with Germany and China, and have visited there recently. French companies have shown an interest in our knowledge positions and appreciate our flexibility in working with universities. We also want to promote our buzz factor in the US. Nijmegen and Wageningen are especially interesting business locations for the international map. The presence of an international school, a flourishing expat community, a good expat policy in Nijmegen, and the expat lounge on the Radboud campus have certainly not remained unnoticed abroad. Radboud University boasts top research through the Radboud Research Facilities, and not to forget businesses with their R&D, such as NXP, Synthon, and Heinz Innovation Centre. The cosmopolitan atmosphere of a city like Nijmegen and the fact that 50% of its inhabitants have followed higher education, has turned this area into a business location with international potential. European programmes such as

Horizon 2020, INTERREG, the Juncker Fund EFSI, and EFRO are necessary for realising our goals. Oost NV is active with projects in the Interreg programme. We have a foreign desk in Düsseldorf and we are cooperating with Noordrijn-Westfalen concerning dike safety, transport corridors, and public transport systems. We also want to set our sights on North-East France as a possible partner region for knowledge and innovation.

### Acting as launching customer

Food, Health, Life Sciences/Chemistry, High Tech Systems, ICT, Energy and the Environment are key themes for innovation, positioning the economy of Gelderland and the cooperation between research facilities and the industry. But what about the arts and humanities? Michiel Scheffer: “We have a remarkable number of starters from the arts and humanities, but they remain small and offer few job opportunities. Their need for capital is not huge but we do have a generic starters policy, meaning that they too can make use of various funds and schemes. Research from the arts and humanities can also be involved in provincial schemes outside the economic domain. The Province of Gelderland is a large employer for graduates. For projects in the fields of water management, environmental science, cultural heritage, and ICT, we often act as a launching customer. The creative industry has also become a policy theme, for which we are in close cooperation with ARTEZ Saxion and Radboud University. With relatively little money a lot can be achieved. Our fashion industry enjoys international high acclaim. José Teunissen, Lector at ARTEZ, has been appointed dean at the London College of Fashion for 2016, which speaks for itself.”

Key points in the province’s policy for 2016: education and employment, circular economy, economy and innovation, business locations (including campuses), and internationalisation. “For Gelderland, it is difficult to organise branding from within. We have chosen to approach this from the outside-in: how do others perceive us? In my three-minute pitch during visits abroad I always mention our top sectors, our €3 billion NUON fund, the new instruments we have developed, our 30-year active involvement in European funds, our well-organised finances, and our highly educated population and excellent knowledge institutes. Gelderland has an excellent living and working climate. These competitive advantages are usually appreciated; people are interested in us as a partner region. Simply put, when you act as a good neighbour, you will be received as a good neighbour. ‘Noaberschap’ is a concept term from the east of the Netherlands with an underlying meaning: ‘neighbourship’. It can be a nicely distinctive term to display our key values and to use as an international slogan: Global Neighbourship, focussing on international sustainable cooperation.”





# Molecule to business

On September 24 of this year, Health Valley organised the meeting 'From Molecule to Business' at the NovioTech Campus, in collaboration with SMB Life Sciences and Radboud University. Experts gave presentations on the most recent developments and innovations in the field of nanomedicine concerning personalised health care.

## EVENT REPORT

Keynote speakers were Prof. Dr. Ir. Jan van Hest and Prof. Dr. John Jansen. Jan van Hest is Professor of Bio-Organic Chemistry and an active member of the Institute for Molecules and Materials (IMM), one of the large research institutes of Radboud University. Keynote speaker John Jansen is Professor of Biomaterials and Experimental Implantology at Radboudumc. Both are board members of the Radboud Nano Medicine Alliance (RNA), a cooperation between Radboud University, Radboudumc and the industry.

### Biomedical applications

In his lecture, Jan van Hest discussed research and new developments related to nanoparticles for biomedical applications. The research fits in with the RNA's efforts to develop useful molecules for demand-driven and personal solutions for patients. Van Hest: "Using current techniques, we are able to produce a large variety of nanoparticles with very special features; nanocapsules for carrying biological components such as proteins, for example. Capsules that are properly secured, with good transportation properties and with an adjustable surface. We can also make capsules that are partly porous, keeping larger molecules such as proteins inside the particle whilst smaller molecules can transport in and out. We are further developing this concept into a nanoreactor that can be used to replace an

enzyme that is no longer functional in a cell, replacing it with a working enzyme. In this way you can repair the cellular process."

The way in which particles interact with cells also depends on their shape. In nanomedicine most attention has been given to spherical particles. "Very recently we managed to create well-defined rod-shaped particles, as well as particles that have a strong resemblance to red blood cells. We are now researching the ways in which these particles interact with cells, in order that we can then load the with useful medication or diagnostics. By externally supplying these particles with functional elements, we can have them look for

the right tissue or the right cells on their own and have them cross certain barriers."

Van Hest and his colleagues are working on a number of biomedical applications in cooperation with Radboudumc, including the research group of Jan Smeitink in the field of enzyme therapy and replacing dysfunctional enzymes. Van Hest: "With mitochondrial disease waste accumulates in the cells, causing these cells to malfunction. Injected medicines have to find their way through the bloodstream to the brain and then bridge the blood-brain barrier, which usually blocks everything. We have recently been successful in carrying certain nanoparticles across the

*Prof. Dr. Ir. Jan van Hest*



blood-brain barrier into the brain and are able to prove this in animal models. The subsequent step is to add medication, and to enter the cell using cell-penetrating peptides. Another research project is the development of so-called nanomotors, which we can move through the body in a specific direction at 800 km/h to selectively locate target cells. Apart from the nanoparticles being able to cross cell and tissue barriers, they can also track down a certain cell, move towards it and deliver the transported substance very precisely. We are also working with the research group of Alan Rowan and Carl Figdor, developing particles that train the body to recognise and destroy cancer cells. We attempt to make this process more efficient with smarter particles, and to replace the costly process for something suitable for more generic use. In addition to this we develop synthetic vaccines, for instance working with a group from medical microbiology for a vaccine against whooping cough."

Recently an ITN (Innovative Training Networks) funding grant was awarded for 15 researchers to be trained not only for research into the development of nanoparticles, but to oversee the entire knowledge chain: from development to implementation. Experts from science and the industry decide together which terms these particles have to meet to make sure that nanomedicine has a good chance of success. Apart from Radboud University and Utrecht University, companies such as ChemConnection, Synthon, and PolyVation are involved. According to Van Hest this will embed science even more in business, resulting in molecule to business.

### Regenerative medicine

John Jansen began his lecture by framing the field of nanomedicine as a combination of different sciences: biology, chemistry and nanotechnology. Globally, nanotechnology and nanomaterials have three purposes in nanomedicine: analytical and imaging tools, targeted therapy & drug delivery systems, and regenerative medicine. These applications will lead to improved diagnostics, treatments and prevention.

The interest of his research group is mainly directed at the use of nanotechnology in regenerative medicine. John Jansen: "This has received a lot of interest in the past years, as you make use of the normal physiological healing processes of the body. By stimulating these natural healing mechanisms you can regenerate an anomaly. An aging population is one of the reasons why there is an increased interest in regenerative medicine. Wound healing becomes more difficult as you grow older, and with regenerative medicine this can be positively influenced. We often look at how



Prof. Dr. John Jansen

existing industrial applications in nanotechnology can be used for nanomedicine purposes. An example is the use of a wafer technique from the semiconductor industry for the healing of bone tissue surrounding an implant. Using nanotechnology and nanomaterials a groove structure is imitated, allowing bone tissue to grow against this grooved material in the pattern of collagen bundles (300 nm), thus promoting the healing of bone tissue. Another technology comes from the textile industry. With this technology, a liquid polymer is pumped through a needle under pressure, creating a fibre structure. It is also possible to make a hollow fibre from biodegradable polymer, in which a substance can be enclosed that influences the healing of the wound in a positive way."

Nanomedicine aims to take the pressure of the health care system. Rather than chronic treatment, it aims to focus on regeneration and prevention. The focus is always on cost-effective and targeted treatments, with a shorter hospitalisations and reduced side-effects for the patient.

### Pitches

After the keynote speakers there were three sales pitches by Johan Oosterheer (Biosenz), Juliette van den Dolder (NovioCell) and Jeroen Tonnaer (Cristal Therapeutics).

**Biosenz** developed the ViriChip System, a technology platform for on-the-spot detection and identification of viruses. ViriChip is based on a patented lab-on-a-chip, nanotechnology and biotechnology combined with a so-called atomic force microscopy. The system is the size of a shoe box, is mobile, and has a response time of only 30 minutes. Biosenz is an international network organisation working with partners from the sciences and the industry, and it counts on global market potential.

**NovioCell** is a spin-off of Radboud University. It has developed a polymer nanofibre matrix as a 3D solution for stem cell research. The company uses a polyisocyanopeptide (PIC) hydrogel, a fully synthetic biomimetic extracellular matrix that has the same biomechanical properties as natural matrices. What makes the PIC hydrogel special is the fact that it is liquid at a low temperature, and solid at higher temperatures (including body temperature). NovioCell is convinced that stem cell researchers will benefit greatly from 3D solutions.

**Cristal Therapeutics** is developing the patented CriPec<sup>®</sup> nanotechnology, which encloses existing as well as new medication in polymer nanospheres of 100 nm. These spheres ensure a better distribution in the body and a more targeted delivery, resulting in fewer side effects. CriPec<sup>®</sup> was originally developed at the Bio-pharmacy & Pharmaceutical Technology Department of Utrecht University. The first clinical studies are being run for the cancer medicine CriPec docetaxel (Phase I research).

The meeting was concluded by Johan Tiesnitsch, who gave an update on the **Radboud Nanomedicine Alliance** (RNA) and explained its further plans. RNA opts for an outside-in approach, where research follows the needs of the industry, and five research areas are collectively defined. At the same time, RNA chooses an inside-out approach with the following focus areas: setting up master classes, public awareness, attention for ethics next to research, and anchoring all of this in Health Valley. The goals of RNA are: at least 10 to 25 companies within the alliance; three collaborations between RNA companies; one international cooperation; fund raising worth 15 million Euros; five business cases (preferably start-ups); five master classes; and one conference.

## ScreenPoint Medical improves detection of breast cancer

ScreenPoint Medical is a startup of Radboudumc's department of Radiology, located at the University Business Centre (UBC) at the Mercator Science Park. The company specialises in the automatic recognition of breast cancer through Computer Aided Detection (CAD) technology. We spoke with Professor Nico Karssemeijer, Managing Director of ScreenPoint Medical and Professor in Computer Aided Diagnosis.

In the early nineties, Nico Karssemeijer was employed by the department of Radiology for a research project in the field of medical image processing. Since '95 he has cooperated with R2 Technology, a Silicon Valley based company that was the first to market the technology of automatic detection. "Within Radiology we have been able to build a substantial research group thanks to project subsidies from KWF Fight Against Cancer, NOW, and EU-funding", Nico Karssemeijer begins. "The group was considerably strengthened by the arrival from Utrecht of my colleague Professor Bram van Ginneken, here in Nijmegen. We combined the two groups and we are now the leading global front for automatic detection. At present we employ 35 researchers in a wide variety of areas, including breast cancer, prostate cancer, lung cancer, retinal screening, and digital pathology."

### Assistance in judgemental errors

Practically every company concerning mammography is US-based. The common detection methods developed over there mainly help prevent the radiologist in making perceptive errors, for example failing to observe tumours. He continues: "We follow a different track, as practice proves that most errors are not perceptive but judgemental. Radiologists do observe the tumours, but they do not recognise them or misinterpret them.

The American detection system is hardly used in Europe; here we use a different screening model with a double assessment, where two radiologists view the images independently from one other. Our system is interactive, and allows the radiologist to ask for help in the assessment during a reading. Right now the assessment by a second radiologist adds 10 – 15% sensitivity at the same referral rate. We achieve the same percentage using the computer. We will initially aim for the European market when introducing the system, striving to replace the assessment required by a second radiologist with a computer assessment. This will be less 'threatening' for the first radiologist, will yield considerable savings in expenses, increase efficiency, and save time for radiologists. With this technology, that shall be enhanced even further by means of Deep Learning (DL) technology, we will be able to develop a computer program which could even surpass the role of a radiologist. Ultimately though, the radiologist will be the one who reports the research, and the computer will mainly be means to an end."

### Pre-selection of screening mammograms

In Europe, screening is usually organised through screening programs organised by the government, whereas some countries are more privately oriented. ScreenPoint Medical can connect its system to an international digital network of various screening organisations. "We can assess all images and use the results in different ways within our model. The radiologist can use the program interactively, but we can also make a useful pre-selection

by determining in which mammograms the chance of the occurrence of breast cancer is minimal. In this way, the screening organisations will be able to deploy the radiologists – already scarce – more efficiently by allowing them to specifically perform only more complicated cases."

ScreenPoint Medical has patented the interactive use of computer results, but plans to elaborate the IP. "We want to market our product Transpara on a global scale, but the first step is Europe. Our system is extremely innovative and unique in comparison with other CAD-systems, which have too many false positives. The Department of Radiology within Radboudumc is important to us as a test environment, for gathering image material and for deliberation with the radiologists. Our licence agreement stipulates that a successful marketing introduction should also benefit the research group in royalties. Radiology and Nuclear Medicine has become an enormous research department: over 100 researchers with various successful spin-offs."

[www.screenpoint-medical.com](http://www.screenpoint-medical.com)



*Prof. Dr. Nico Karssemeijer, Managing Director of ScreenPoint Medical and Professor of Computer Aided Diagnosis*



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*"With passion, determination and perseverance, there is much to gain for both business and leisure"*

Dinali (Alaska)



Text: Dr. Robert Kok, Centre for Innovation Studies, Institute Management Research RU.

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## Entrepreneurship Education & Student Companies

# Increase in education curriculum and innovation research at Radboud University

### ENTREPRENEURSHIP

As the Student Company lectures in the Huygens building on October 20th began, it was apparent that the group of more than twenty attending students came equally from the two organising RU faculties: Management and Physical Sciences, and Mathematics and Computer Sciences (FNWI). This course was provided this year for the second time, as an optional bachelor subject by the beta-faculty in cooperation with management teachers. In this way, beta-students were able to combine their technological grasp with the business and marketing knowl-

edge of full-time management students, and with the expertise of law students concerning matters of patents and non-disclosure agreements.

The organisation and contents of the course were provided by Jan Willem Dijk and Egbert-Jan Sol of FNWI, and management teachers Nanne Migchels and Robert Kok. At the opening session on October 20th the students were also provided information about feedback opportunities for their business plans during the idea stage, by Start Up Mix-Managing Director Vera Spiridonova,



The Management of Start Up Mix centred around Managing Director Vera Spiridonova

a sociology student, and by Hein van der Pasch, Managing Director of Mercator Incubator Nijmegen.

Student Company lectures are looked upon as an example of the zest with which the RU faculties proffer education and coaching in the issue of entrepreneurship within the curriculum of its studies.

### Increase in Startups

With the growing number of startup companies, the demand for business support facilities will increase. Hein van der Pasch: "Earlier this year, for instance, we saw Student Company Silvertones present themselves at the Gelderland Valoriseert Innovation Bootcamp, alongside their colleagues of AeroChem, who also attended an advisory session in Mercator-UBC. On June 10th 2015 the Student Company 'I Love Muesli' from Mijmegen were in the final of 'Dutch Student Company of the Year', held in Utrecht. 'I Love Muesli' is an initiative of RU-students in Management, Computer Sciences and Law.

The expectations of growth amongst student entrepreneurs is exciting. The higher the number of start-up initiatives, the greater the chance of innovative companies continuing to grow. Banking companies, PPM Oost, Rockstart, and the Business Angels organisations target the financing of successful start-ups in the growth stage. They want to participate in their acceleration. On the way there, in the early stages, many start-ups meet with obstacles, which may be resolved by means of direct support through faculties, finances, coaching and advice. Together with Radboud University, Nijmegen Council and the province of Gelderland, we try to fill that gap."

### Research and education

Scientific research is a breeding ground for education in entrepreneurship. Whereas in the last few years great attention was paid to the development of radical innovations in large companies, the emphasis has now changed to the role of the entrepreneur.

Henry Chesbrough has contributed to this development with ideas about Open Innovation in his book: 'Open Innovation: The New Imperative for Creating and Profiting from Technology' (2003, Harvard Business School Press). Entrepreneurs are important to innovation because they are not hindered by rigid routines aimed at efficiency, often experiences by larger companies. Large companies are investigating their part in supporting or taking over these entrepreneurs.

The importance of this is recognised by the Radboud University, not only in research, but also in education. The Management Sciences faculty has recently introduced the key research subject 'Innovation and Entrepreneurship in Ecosystems', in which entrepreneurship is specifically targeted. For example, the course investigates how entrepreneurship can be a breeding ground for innovation and how the business ecosystem can help to contribute. Researchers such as Peter Vaessen are looking for factors that determine why one start-up does better than another. His colleague Caroline Essers is engaged in entrepreneurship in female migrants.

### Increasing Curriculum

The importance of entrepreneurship in education is being recognised more and more within the Radboud University. At both the beta-faculty and the Management Sciences department, students can found a business and focus on the business aspects of start-ups. Entrepreneurship is already present in the curriculum, for instance in the combined bachelor course of Sustainable Business, the optional bachelor electives of Innovation Management and Entrepreneurship in Socio-Cultural Perspective, and



*Team 'I Love Muesli' in the 2015 finals of Dutch Student Company of the Year.*

the courses of Entrepreneurship and Innovation Management in the Mastertrack Science Management & Innovation at the beta-faculty. Plans for further growth in entrepreneurship education are being developed by teachers such as Heleen de Coninck and Egbert-Jan Sol of the beta-faculty, in cooperation with Caroline Essers, Nane Migchels, Paul Ligthart, and Robert Kok of Business Management, who take care of education in innovation and entrepreneurship. Recently, a minor subject ('Entrepreneurship, Innovation and Urban Development') has been developed, and the 'Entrepreneurs Wanted Week' was again staged. People are also brainstorming about the development of a 'Venturelab': a testing ground where students work in teams in order to start up a business.

Master students have indicated their interest in innovation and entrepreneurship. Since September, over forty students now attend the master Science Management & Innovation of the beta-faculty, and some thirty students take part in a free master variant in the field of innovation and entrepreneurship at the department of Business Management. In this master variant, several subjects from Business Management, Literature and the beta-faculty have been integrated under the heading of 'Innovation and Entrepreneurship'. Furthermore, entrepreneurship and innovation are important issues for Ph.D. students at the Radboud University. Ph.D. students distil inspiration and ideas from their Ph.D. research for new products.

Entrepreneurship is also necessary for jobs inside and outside science fields. Starting in September of this year, Radboud University offers the course 'Entrepreneurship and Innovation for Ph.D. Students'. Here Paul Ligthart and Robert Kok take Ph.D. students from various disciplines on the course of developing a new product and starting up a business of their own.

All of these developments in research and education show that Radboud University seriously intends to contribute to innovation, new employment opportunities and the education of young people aiming to start up their own businesses.

# Launch Rockstart Digital Health Accelerator

Rockstart, the global Startup Machine, has announced the 10 participants in the first Digital Health Accelerator programme. The Digital Health Accelerator is the first of its kind in the Netherlands and takes place at Novio Tech Campus in Nijmegen. Rockstart Accelerator Digital Health has been developed in cooperation with partners from the Health Services, investors, and an international group of mentors comprised of over 50 professionals, specialists, and successful entrepreneurs.

The programme is headed by Maarten den Braber, digital health strategist and co-founder of Quantified Self Europe. They are supported by Rune Rheill and Don Ritzen, co-founders of Rockstart, amongst others. These startups, selected from all over the world, will receive an investment of € 20,000, office space, expert workshops, and platforms at (inter)national events combined with considerable (mentor) support. All of this in exchange for an 8% share in their startup. With this investment they can fully focus on building and developing their product or service before Demo Day. On Demo Day, February 25th 2016, the startups will present themselves to a large audience of investors in the health services and technology, partners, and the media. This unique programme is patient-oriented, comprises worldwide ambassadors and mentors, and integrates field labs in order to be able to quickly validate and upscale new ideas.

## 10 startups

The 10 participating startups are from six different countries, with their ideas varying from wearables that help patients with a chronic condition in monitoring the temperature of medicines, to robots that support people with dementia.

**Bruxlab** (the Netherlands) is developing diagnostic aids to track and watch teeth grinding (bruxism). The app recognizes teeth grinding and records the sound. Aside from this, Bruxlab is also working on a wearable.

**Cognilab** (United States) is a research suite for the scientific study of the human brain. Users can compile cognitive tests, collect data, and analyse results in just days instead of months.

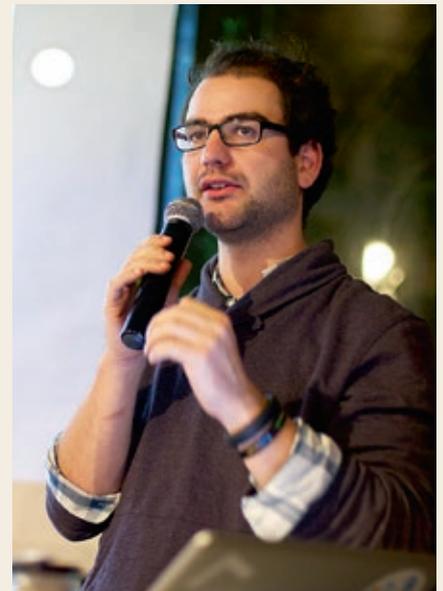
**Dinst** (the Netherlands) is a podium that connects the elderly, disabled, and those confined to their dwelling with providers of home services. With a few mouse clicks people can find, compare, and book reliable professionals.

**Fuelling** (Spain) is a nice and simple made-to-measure app directed at personnel managers, in order to reward employees for physical exercise.

**Fysio 24** (the Netherlands) is an instant online assistant for the prevention of injuries and recovery. Through the app, people will have direct entry to an online physiotherapist, in order to obtain a personal recovery plan and coaching.

**Med Angel** (Germany) allows patients with a chronic condition who are dependent on temperature sensitive medicines (such as insulin or hormones) can monitor their temperature, in transport, in the fridge and during usage.

**MOUNT** (the Netherlands) is a user friendly app linked to an EPF (electronic patient file) offering insight and transparency into the decision making process for patients, doctors, and health facilities.



Maarten den Braber

**Startup Support Picto Connection** (Spain) simplifies communication for people who cannot communicate. The application uses big data, artificial intelligence, and neuropsychological analysis, and is connected to a platform that can be adapted according to the needs of its users.

**Tinybots** (the Netherlands) are small social robots which support elderly people living with dementia by supplying automatic scribbles, personalised music, stories, cognitive therapy, and spoken instructions for daily chores. With the aid of an app, both formal and informal care givers can configure a Tinybot to personal needs and wishes.

**Teamscope** (Chile) is a multi-platform application directed at medical researchers. With Teamscope, research data can be collected and filed efficiently, safely, and effectively even without being online.

For further information:

[www.rockstart.com/accelerator/digitalhealth](http://www.rockstart.com/accelerator/digitalhealth)



# Novioscan bladder monitor with ultrasound technology

Novioscan recently moved to the Novio Tech Campus in Nijmegen. The company is developing the Urika Bladder Monitor (UBM), based upon ultrasound technology. The UBM warns patients such as those with paraplegia or dementia, or young children with incontinence problems, when the bladder is too full. For the next version of the bladder monitor, Novioscan is using the MEMS technology (Micro Electronic Mechanical Systems) from the semiconductor industry. We spoke with CEO Jeroen Langevoort PhD, who previously worked for Philips Semiconductors and later with NXP, on the development and market potential.

Novioscan was founded in 2014 and currently has eight employees. “The idea for the UBM resulted from a query from hospital practice, after talks with paediatric urologists Dr. Pieter Dik (UMC Utrecht) and Prof. Dr. Wout Feitz, and urologist Dr. John Heesakkers (Radboudumc)”, says Jeroen Langevoort. “They work with children who ignored the urinary function for years, and no longer know how to interpret the signal that their bladder is (too) full. Our monitor is attached above the pubic bone and can be calibrated in such a way that it gives either a vibration signal when the bladder is 80% full or a signal on a mobile device like a smart phone via Bluetooth. In the Netherlands about 10,000 children attend special urinary clinics, after training sessions with the GP have produced too little effect. First they try to train these children at day clinics. If that does not work, they will be admitted for inpatient care for two weeks, to learn how to properly urinate. As opposed to other devices, the UBM gives warning previous to an entirely full bladder, and prevents the traumatic experience of wet trousers. The device therefore has as a monitoring function, and more importantly, an educational function. It teaches the child to recognise body signals, so they will be able to go without the monitor in the long run.”

## Urodynamic research

At present the product is in the prototype phase and Novioscan has just completed the first trials at UMC Utrecht. “We are about to start the second series of research with adults, in the context of urodynamic research at Radboudumc. If the bladder is filled with a defined amount during the research, we can use this data to optimise and calibrate the measuring functions of our device.” Novioscan works in a consortium with a company that develops software for the environment of hospitals or care institutions, linking to various types of equipment. “With this programme you can send data to the cloud and make calculations. This can then send a signal to the care staff, so they can better monitor the patient. Another application of the UBM is unburdening the nursing staff in pre and post operational care. During operations longer than two hours patients are preventatively catheterised; for shorter operations this is not the preferred procedure, partly because of infection risks. After the operation it is necessary to check every 30 minutes whether the bladder is full. Should this be forgotten only once, the patient runs the risk of overstretching the bladder with the risk of lifelong complications. Our device can continuously monitor the bladder content and that way unburden the nursing staff.”



Novioscan CEO Jeroen Langevoort PhD

## Incontinence costs €2 billion

The demand for point-of-care diagnostics will grow substantially in the years to come. According to Jeroen Langevoort, the bladder monitor has good marketing opportunities because it allows for considerable cuts on incontinence materials and nursing. On a yearly basis in the Netherlands alone, about €900 are spent on material per patient with incontinence, which amounts to about €1 billion a year. Adding to this all follow-up costs for nursing staff and such, this comes to a yearly cost of about €2 billion. Besides, all the incontinence material used causes a substantial environmental impact. Novioscan has filed a patent application for the use of MEMS technology, and for the wearability of the product. “We hope to realise the market launch of the first model entirely with our own means; for the rollout of the MEMS product we will need outside capital.”

[www.novioscan.nl](http://www.novioscan.nl)



*Do you have questions or would you like to make an appointment? Please contact Eva Rotte, Intellectual property & ICT lawyer: [e.rotte@hekkelman.nl](mailto:e.rotte@hekkelman.nl) - T. 024 382 83 84*

## One sheet of paper

The best ideas arise spontaneously, without a clear plan as to the further outcome. Young researchers and students from different disciplines regularly come up with an idea for a new product or service. Ideas that freely and spontaneously come to life at a 'round table' full of enthusiasm, can take on unexpected dynamics and complexity during the joint execution. However, unclear agreements about collaboration during the realisation of those wonderful ideas can form a ticking time bomb underneath a great innovation. When is the right time to put things down in writing, for example the intellectual property rights between the different disciplines? And what is the right way to go about it? What is the very least that should be organised?

### Freedom versus restrictions

Young researchers want to maintain flexibility for their future careers. They do not immediately want to commit to seemingly restrictive business structures and large contracts. Contracts are often to be avoided, as they are seen as slowing things down. Young entrepreneurs prefer to work on the content. In my work practice I hear more and more often that people want to work from a place of trust and equality, and that a contract is viewed as a sign of mistrust.

### No contract?

The fact that different forms of contract-free collaborations are developing does not mean that the legal aspects are being ignored. The reasons why partners end up in a dispute remain basically the same. Someone 'runs off' with the idea, misunderstandings arise about each other's tasks and responsibilities, or there is no clear division of the revenue and costs; these matters may have to be dealt with sooner or later in any partnership. This doesn't take away from the fact that, in practice, I often see large contracts and fixed business structures pushed into the background. There is therefore a need for a more innovative way to deal with legal matters. So how do you handle the legal aspects? The answer is really quite simple: start with the basics, and adjust the agreements during the collaboration process. This can be done on a single sheet of paper. Apart from aligning the expectations of those involved concerning the essential points, external parties such as investors value a clear distribution of control, responsibility, and risks. It gives all parties involved, both internal and external, a sense of composure when the key issues are sorted.

### The sheet of paper

At the start of the collaboration, as soon as the ideas are starting to take shape, it should at least be made clear what the input of each participant should be. More and more work is conducted

from the idea of open innovation, knowledge hubs are commonplace, and everyone wants 'lean' collaboration. With all these forms of cooperation, a partner contributes their own knowledge and experience, and all members work towards a common goal. But is this knowledge contributed exclusively for the partnership, or does the partnership receive (temporary) right of use? And how to value each contribution? Are they all equal? It is also wise to talk about the (intellectual property) rights of the newly developed know-how. Is a joint right formed? What if one of the parties leaves the partnership? Are the other partners still allowed to use the information? And how about the departing partner, are they allowed to you it too? Disputes can arise because of a lack of agreement on how to act when a partnership is ended, or in the case of conflict. This could have the effect that arguing partners are stuck with each other for much longer than they would wish, with all the ensuing uncertain and negative consequences should all of the above still need to be arranged.

### The start of a startup

As soon as a partnership develops further, it is best to re-evaluate all agreements. Take, for example, the raising of capital in the start-up phase. When raising capital, larger (financial) interests and risks are created. This is the right time to take another close look at the sheet of paper and to ascertain whether the previous agreements made are still adequate. It is also the time to map out the risks and responsibilities and to make a division of the revenue as well as costs.

In short, forget the hefty contracts and pick up pen and paper together. Even though different kinds of partnerships are formed on a daily basis, and all over the world innovative ideas crop up on how everything can be done differently, some things are better in their basic form: a pen, and a sheet of paper.

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Introducing startups



Neelie Kroes, Special Envoy of StartupDelta

## Neelie Kroes, Special Envoy for StartupDelta, visits Novio Tech Campus

On October 5 Novio Tech Campus in Nijmegen received a visit from Neelie Kroes. As Special Envoy for StartupDelta, she wanted to see with her own eyes why Nijmegen is known for leading in innovation and entrepreneurship in the Life Sciences and Health. Kroes aims to strengthen the international position of start-ups in the Netherlands, and to convince foreign start-ups to establish themselves here. StartupDelta seeks to create links between innovative hubs such as Arnhem/Nijmegen, Wageningen, Eindhoven, Twente, and Amsterdam, and put the Netherlands on the map as the strongest startup ecosystem in Europe.

The Novio Tech Campus houses the head offices of Health Valley, a network of innovative companies and leading knowledge centres in the (bio)medical and health sectors of the East Netherlands (Gelderland, Brabant and Overijssel). During her visit to the Novio Tech Campus, Kroes gave an inspiring lecture at the opening of the Health Valley convention 'eHealth & Business'. The topic of this convention was 'implementation and upscaling'. She spoke about eHealth and the use of ICT applications in health care, as well as the challenges that come with it. Kroes commended the entrepreneurship present in the Nijmegen area as well as the excellent opportunities for startups. Important players in Nijmegen, aside from Radboud University, are Radboudumc, Reshape Center (with its close links with Singularity University in the US), Novio Tech Campus, and startup supporters such as Mercator Incubator, SMB Life Science, Red Medtech Ventures, and Rockstart, with their digital health accelerator programme for international startups.

### One single hub for health & tech

According to Kroes, the Netherlands boast many fantastic inventions, although we are far too modest. She warned of compartmentalisation and spoke up for more out-of-the-box thinking. "We are in a disruptive economy and should really be working between the boxes. It is fascinating to innovate through a process of cooperation, with the joining and sharing of disciplines. Where health and tech meet, the future may take shape! With StartupDelta we try and give this process an extra push. Health Valley should be extended so that the Netherlands can be put forward as 'one single hub for health & tech'. Specialisation and clustering of knowledge can strengthen our international competitive position. It is urgent; we are talking about a world market where we could excel with our knowledge. Health care does not come out of thin air; if you want to compete on a global

scale, you must be aiming to excel. We possess enough knowledge in our country to found the next MIT. Modesty in this case is a delaying factor."

During her visit, Neelie Kroes visited various Health start-ups in the area. She was introduced to a number of companies and their innovative products, such as LeadPharma (marketing innovative medicine), NovioSense (developer of an innovative way to measure glucose with a sensor in the eye), Boomerweb (health care apps), Virtask (developer of Anne, a virtual assistant supporting the elderly and the mentally disabled), and eNose (developing a new diagnostic method based on breath analysis).

Aside from conventions addressing specific topics, Health Valley also organises the annual Health Valley Event. The Health Valley Event 2016 will take place on March 17 of next year, in CineMec Nijmegen. It is the meeting-place for those concerned with innovations in the health and life sciences sectors.



StartupDelta



# Queen Máxima opens the MITeC operating rooms

*Queen Máxima being welcomed at the Radboudumc, for the opening of the MITeC ORs. On the left in the photo is Professor Maroeska Rovers.*

On November 12th the MITeC operating rooms in the Radboudumc were officially opened by Queen Máxima. MITeC (Medical Innovation & Technology Expert Centre), one of the facilities of the Radboudumc Technology Centres, is a unique setting of three advanced operating rooms. Diagnostic, interventional, and surgical disciplines are combined here in order to quantifiably improve surgical treatments and make them more cost efficient. MITeC is a joint venture of Radboudumc, TU Eindhoven, Twente University, Health Valley, and trade and industry. Professor Dr. Maroeska Rovers, Professor of Evidence-Based Surgery at Radboudumc, is investigating whether the new treatments in the MITeC's ORs do indeed provide better results and lower costs.

## INTERVIEW

Maroeska Rovers read Biomedical Sciences in Nijmegen, and got her Ph.D. for her research into the effects of tympanostomy tubes (grommets) on infants with inflammation of the ear. Previously she worked at Radboudumc, at the MRC Institute for Hearing Research in Nottingham (UK), and as a clinical epidemiologist at UMC Utrecht. There she specialised in evidence-based medicine and gained experience of surgical intervention research. Five years ago she was asked to introduce evidence-based medicine into the intersecting disciplines of the Radboudumc. "All the trials that I was involved with showed me that we were lagging behind the times. We perform trials exploring procedures already implemented long before, and far too often we still

use trial-and-error methods to get to a solution. When I changed to surgery in order to find out what kind of regulations there are, I concluded that there were hardly any; if it is safe, it is allowed. We must investigate much earlier in the process whether something could potentially have added value, whether we must develop it further, or if we had better axe it early on. By using evidence-based surgery, we get to find out which treatments are effective and which are not."

### **One-Day Treatment of Prostate Cancer**

The three operating rooms by MITeC are connected to one another and have been adapted to the combined use of diagnostics, treat-

ment, and check-up in the OR. There is a so-called hybrid OR, where surgeries can be performed under x-ray probes and CT-scans can be made during surgery with a multi-axial robot arm, the Artis Q Zeego: a 'regular' OR and a central room with an MRI-scanner. In the MITeC operating rooms, all hardware and technology are ability tested in order to determine how they contribute to better and more cost efficient health care. Thus, evidence-based surgery in optima forma. "This configuration is really unique in Europe", Maroeska Rovers emphasises. "We are the first to have an MRI in an OR-setting, connected to both a regular and a hybrid operating room. In the regular operating room, there are built-in screens so one can project the images that



*The Artis Q Zeego*

may have been taken previously or in the other operating rooms on to each other. Practically speaking, after tumour surgery one can go through a door to the MRI in order to check if the tumour has been removed completely. One can also perform surgery in the hybrid operating room, where it is easy to map vascular structures in 3D, then go to the MRI and back again. In this unique setting of MRI and hybrid, we can make headway faster. At the MITeC, we are beginning a focal one-day treatment of prostate cancer. At present it is common practice to remove the entire prostate of an oncological patient, resulting in 30 to 40% of the patients becoming impotent or incontinent. If the patient has a clearly defined tumour, we are able to selectively remove the tumour aided by the same robot

used in diagnosis. This can even be performed in the MRI, as the robot designed in Nijmegen is MRI-compatible. For other types of tumours, we hope to be able to quickly make matters clear to the patients through better imaging. Should any malignant tissue remain, the surgeon can still remove it, or begin radio or chemotherapy. Ordinarily, such an operation is performed in two stages; a tissue sample is first sent off to the pathologist, and the patient has an anxious two weeks to wait with the possibility of another operation."

### Interdisciplinary exchange of knowledge

"The gains we are aiming for are better treatment, time saving, less pressure on the patient, and lower costs", according to Maroeska

Rovers. "Naturally, we will have to prove this in practice. In this field, the Netherlands could be the absolute global pinnacle if researchers, specialists, and the industry can cooperate constructively. An additional advantage of MITeC is that it leads to interdisciplinary exchange of knowledge and cooperation. Our specialists have noted that, in the oncological treatment of various organs, they often encounter problems which appear to be universal. This exchange of knowledge and cooperation will bring additional value and accelerate the process."

MITeC is open to any initiative which will contribute to this. For this reason it will be opened as a field lab to companies which are involved in the development, production, and marketing of innovations in health care. These groups can test their innovation, validate it, and have trials performed at the MITeC field lab. A number of businesses have already shown interest. MedValue, a subsidiary of Radboudumc, links hospital and business. In the corporate world they are researching whether their medical innovations have any added value for patients, the hospital, and the business itself. The entrepreneur thus gains a quick insight into the added value of his innovation, and whether there would be any sense in further development.

"Other UMCs that have a good idea and wish to use our operating rooms for it are also warmly welcome", invites Maroeska Rovers. "But first, we now must prove the potential of this setting. There would be no point in installing more of this kind of operating rooms until we are certain that they truly work."

*Jurgen Futterer, intervention radiologist at Radboudumc, demonstrates the MRI.*





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## Takeover of NovioGendix by MDxHealth

BioGeneration Ventures, PPM Oost (East Netherlands Development Agency), and other stakeholders recently reached an agreement on the sale of biotech company NovioGendix, a spin-off of Radboudumc. For the amount of €7.8 million, NovioGendix was taken over by the Belgian-American listed medi-tech company MDxHealth.

In the 1990s, Prof. Dr. Jack Schalken and his colleagues at the Radboudumc developed the PCA3 test for prostate cancer. This test drastically reduces the need for painful and costly biopsies. Dr. Willem Melchers (Medical Microbiology) and Prof. Jack Schalken (Experimental Urology) founded NovioGendix in 2006, and discovered further possibilities for molecular diagnostic tests in the field of prostate, kidney, and bladder cancer. The newly developed prostate cancer test is the first concrete product by NovioGendix. This company is one of the leaders in the field of molecular diagnostics in the Netherlands.

This takeover has made it possible for the prostate cancer test and other molecular diagnostic tests for kidney and bladder cancer developed by NovioGendix to be marketed on a global scale. To achieve this goal, the collaboration with Radboudumc must be intensified. MDxHealth trusts that this acquisition will help them to become the market leader in molecular tests in the field of uro-oncology. The multinational intends to introduce these urine-based tests for prostate cancer to the American and European markets in 2016.

With the takeover of NovioGendix, MDxHealth is now located on the Nijmegen Radboud campus with its current employees as well as extra growth potential. The continuation of this cooperation with Radboudumc and Health Valley is of strategic importance, and formed an important contribution from PPM Oost en Radboudumc during the takeover negotiations with MDxHealth. Venture capital company Oost Nederland NV (PPM Oost) invests money from the central government and the Provinces of Gelderland and Overijssel into upcoming businesses: companies that contribute to the growth and innovation of the economy and employment possibilities in the east Netherlands. With a total fund of over €290 million, PPM Oost has invested in at least 200 enterprises. They financed NovioGendix with funds from

the 'Participatiefonds PPM Oost' and the 'Innovatiefonds Oost Nederland'. With the sale of NovioGendix, PPM Oost is now free to invest in other promising innovative businesses.



At the end of 2009, NovioGendix received the Mercator Award. The Mercator Award for knowledge-based entrepreneurship stimulates spin-off companies that come out of research institutes. The Stichting Gelder-Kennis and Mercator Incubator Nijmegen established this special award for successful R&D intensive companies, founded by persons with a background at Radboud University, the Radboudumc or HAN University of Applied Sciences through their studies or work. In the photo, we see the team of NovioGendix, from left: Willem Melchers, Jack Schalken, Rob Tweehuysen, with Nijmegen alderwoman Hannie Kunst, Bastiaan de Leeuw and Radboud University CvB member Anton Franken at the award ceremony of the Mercator Award. As well as from NovioGendix, spin-off companies Mercachem, Modiquest and Bijlesnetwerk also received the Mercator Award.

## East Netherlands: A joint presentation



Twelve organisations and research institutes from the east of the Netherlands presented themselves through a joint exhibit stall at the 'Technology for Health' fair and conference in Den Bosch, on October 6 and 7. At this event various professionals involved with the development and supply of components, devices and services with applications in health care, all came together. The initiator of this joint presentation was Health Valley. "We think it is important to promote the Health Valley area and all its partners as 'the place to be' for health care suppliers, knowledge institutes, companies and start-ups, during an event such as this." The following organisations were represented at the exhibit stall: Radboud University, Radboudumc, SMB Life Sciences, Oost NV, Novio Tech Campus, Business Cluster Semi Conductors, the City of Nijmegen, Health Innovation Park, Health Valley, HAN University of Applied Sciences, Kadans Science Partner and RedMedTech Ventures.

# Sencio: locating to Novio Tech Campus is a strategic choice

Last November the Nijmegen company Sencio relocated to Novio Tech Campus and put a new cleanroom into operation. Sencio is a global market player in the functional packaging of sensors that need to maintain their special functions under the most extreme circumstances. Novio Tech Campus, where semiconductor related companies are located, is of strategic interest to Sencio for the exchange of knowledge and possible cooperation. Property owner Kadans Science Partner has invested considerably in cleanroom facilities and infrastructure. We spoke with Oliver Maiwald about their backgrounds.

## PRESENTATION

CEO of Sencio Oliver Maiwald is responsible for marketing, sales, and development, and constitutes the Board of Directors along with COO John Pleumeekers, CSO Ignas van Dommelen, and CFO Marigje Floris-Vos. John Pleumeekers is responsible for the entire production process and the transition of high volume production to their Philippine partner location in Cabuyao.

“We call ourselves a packaging centre for functional semiconductors and functional assembly” begins Oliver Maiwald. “No standard packaging, but customised packaging of (MEMS) sensors as well as adding functionality, meaning specific packages per client or application.”

Sencio stems from Elmos Advanced Packaging and has been active as an independent chip packager since 2011. The company and its employees can however boast more than 25 years of knowledge and experience in the functional packaging sector. Functional packaging is a high-tech process during which so-called wafers, a thin slice of semiconductor material, is first attached to a special kind of foil. Next, the wafers are cut into small pieces (dies), to which a function is added. These dies are then put on a framework (lead frame) and with the help of gold wire contact is established (bonding) between the dies and the legs on the lead frame. After a number of quality checks, the next step is the moulding process, a spraying and pouring procedure in which the dies on the lead frame are moulded into a special compound casing under a specific pressure and temperature. Curing of the material takes



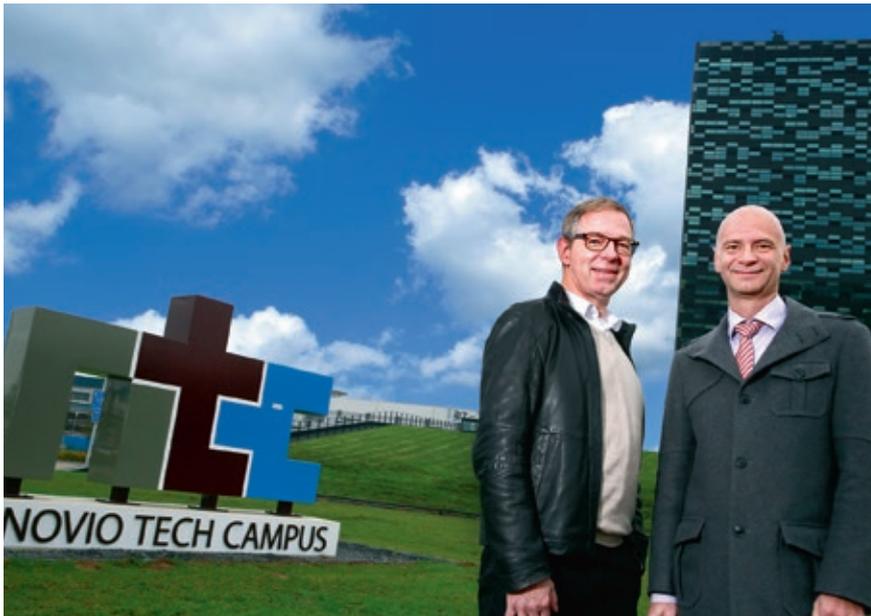
*John Pleumeekers COO at Sencio (links) and Oliver Maiwald CEO*

place in an oven, and after that it is further completed for delivery to the customer.

### Greenest cleanroom

Oliver Maiwald continues: “An example of a functional packaging solution is an oil fill sensor that measures the oil levels in car engines. These sensors have to do their job for a period of 10 to 15 years, within the harsh environment of motor oil at temperatures of -40 to +150 degrees Celsius. The sensor is moulded into a compound that prevents humidity or oil

contact with the chip and the electronics. About 80% of our revenue comes from the automotive industry, and we also work for aerospace, defence, and the medical industry. We can basically manufacture for all applications that have challenging requirements comparable to those in the automotive industry. Other products include packaging oil pressure sensors or optical sensors, as used for the calibration of medical monitoring systems. We also develop pressure sensors for industrial applications, stream sensors, and medical sensors.



Cleanroom

In Nijmegen we had a running production of 12 million pieces, and for years we worked 24/7. Now, we work with our partner company Atec in Cabuyao (the Philippines) and have moved some production lines to there. For this 'captive assembly process' we provide the equipment and the processes, and Atec takes care of the cleanroom facilities and employees. In this way, our production in Nijmegen has been reduced to 7.5 million pieces and we now mainly focus on the development, installation, and start-up of the production process. Only when production is stable, would we transfer it to the Philippines, of course providing support. As a result, our previous company building had become too big. What's more, we were rather isolated from our customer market and possible cooperation partners. We had been looking for suitable cleanroom facilities for quite some time, but could not find them in Nijmegen or the surrounding area. Moving elsewhere in the Netherlands was not an option, especially as our employees, who have been with us for many years, all live in the area. We started looking for someone to assist

us in building a cleanroom and came into contact with Kadans Science Partner. We discovered by accident that a former AEG cleanroom was for sale in Warstein, Germany. Kadans Science Partner was willing to purchase this cleanroom and rebuild it on the Novio Tech Campus. We may very well have the 'greenest' cleanroom in the world now, with a very small CO<sub>2</sub> footprint, a textbook example of sustainable re-use," emphasises Oliver Maiwald.

### Efficiency driven

Kadans Science Partner invested over €1.5 million in the purchase, dismantling, transportation, and rebuilding of the cleanroom. Sencio in turn entered into a 20-year lease agreement. They added their own facilitating equipment to make the cleanroom operational and relocated all production lines.

"Kadans Science Partner also saw to the connection with the infrastructure of NXP Semiconductors, so we can use this access for the supply of the resources for our production, such as nitrogen, compressed air, electronics, vacuum, and air conditioning. We are very ef-

ficiency driven, yet remain flexible. The equipment in the Philippines can only produce one high volume product, while in Nijmegen we can manufacture several products on one machine in volumes from 1000 to 100.000 pieces or more, thanks to our flexibility and expertise. All automotive developments take place in Europe, which is why it is important to keep our office here."

According to Oliver Maiwald, the move to Novio Tech Campus was mainly a strategic choice. "We already work for NXP Semiconductors, but now we can intensify our contacts on campus. The arrival of companies such as Bruco with their new Radio Frequency laboratory and other high-tech businesses on the Novio Tech Campus also make this location interesting for Sencio, when regarding the exchange of knowledge, cross-fertilisation, and cooperation. And, of course, a new building and an inspiring environment are an extra challenge and stimulant for our employees."

### Sencio - functional packaging centre. More information:

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### Kadans Science Partner:

Partner in housing processes for knowledge intensive companies and institutes

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Chiel van Dijen MRE, Deputy Director at Kadans Science Partner





# Unique food concept: smart high-tech chip machine

*Ir. Bart Jacobs, patent attorney at Arnold + Siedsma and Bastiaan Roest, Director of Caenator.*

High-tech and yet so normal: a fully automatic vending machine that makes chips (French fries). In cooperation with Wageningen University, the company Caenator has developed a unique food service concept. A number of aspects have been cleverly combined: quality, hygiene, ease and speed. Bastiaan Roest, founder of Caenator, employed Arnold + Siedsma for the design rights and patent application. The prototype II was recently presented at the Restaurant of the Future at the University of Wageningen. Prof. Lousie Fresco, chair of the Board of Directors, officially launched the machine into operation. Catering company Sodexo, along with other partners, will test this machine on the public.

## PATENT LAW

Two years ago Caenator started development on a chip vending machine. "In the first instance we travelled to China in order to develop our machine there. We enthusiastically showed the results to experts in the Netherlands upon our return, but they made it very clear they left a great deal to be desired. We then explored further possibilities at the Delft University of Technology, where it had already been attempted to develop a chip vending machine in the 60s. The introduction at the time was a failure. In the end, we started a cooperation with Wageningen University. After all, the machine is mostly food-oriented and Wageningen is the place to be in Food Valley. They assisted us in refining the baking process, but also further developed the hygiene and logistical aspects, with which they have a lot of experience."

The Caenator chip machine had to comply with three things: deliver a high-quality end product, to be odourless, and to be safe. The machine now fries a portion of chips of consistent quality in 110 seconds. These deep-frozen chips have a special 'ice coating' that prevents the chips from sticking together when they go through the patented internal transport system. The machine uses biological oil and the air is made odourless through a patented scrubbing system. After frying, the chips are transported to the dispenser and different sauces may be added. The freezer compartment offers enough room for a supply of about 130 portions of chips, and the entire process takes under 2 minutes. There is a 32-inch touchscreen on the machine with which customers can navigate through the ordering menu and pay without using cash. The large screen also offers room for info-tainment and local based advertising.

## Design right and patent applications

“Our chip machine has a Wi-Fi connection and is fully *smart*,” adds Bastiaan Roest, but he is not yet willing to give any further details. He also talks in general terms about the exact functioning of the scrubbing and dispensing systems, due to the pending patent applications.

Bart Jacobs, patent attorney at Arnold + Siedsma, managed the patent applications. “We mainly looked at the aspects that were worthy of a patent, the core of the invention really. Where the design rights of the machine were concerned, a design attorney at Arnold + Siedsma took care of these. ‘Design’ concerns how the machine looks. Design plagiarism is easier to detect, as one can immediately see when a competitive machine looks too similar to the product that patented. This is more difficult in the case of a patent application. The unique qualities are usually hidden inside the machine and cannot be spotted directly from the way it looks. For the chip vending machine, two inventions are patent-worthy and for those we have registered Dutch patent applications. If we receive a positive outcome for our search report, the patent applications will most likely be carried out abroad. The search report comes in about 9 months after the patent application has been registered.”

Caenator also introduces the machine with a special business model. Director Roest: “We are not going to sell the machines, but will place them on requested locations, free of charge. The entrepreneur only pays a deposit, and we’ll take care of the rest. We install the machines, manage the supply of ingredients and accessories, take care of all back-office facilities and maintenance, stand-by for repairs 24/7, and share the profits with the entrepreneur.”

## Priority right

Caenator financed the development of prototype I entirely through their own means. Prototype II was realised and finan-

cially supported by the incubation programme StartLife. “We are going to produce 20 machines as a beta version and these will be placed as a pilot on various sites throughout the Netherlands. We require a sum of €400K for production, and we are currently looking for funding. PPM Oost will match the amount we receive from investors with a convertible bond.”

At this stage, Caenator would like to keep the entire production process in the Netherlands. “We are aiming for a manufacturing capacity of 19 machines a day, about 5000 a year. Since the very first presentation we have been receiving one to five inquiries per day from the Netherlands and abroad,” says Bastiaan Roest. “Retailers, petrol stations, department stores, public transport services, budget hotels, and catering companies have shown a lot of interest. Catering companies in particular would be able to generate extra turn-over outside regular work hours with our machine. Should we go abroad, we will have to upscale the manufacturing capacity quite a bit and we will also be exploring manufacturing possibilities elsewhere. Then, of course, we will be looking for strategic partners who in time can assist with a more rapid international rollout. A dependable partner such as Arnold + Siedsma, with its knowledge and experience in the field of patent protection, is indispensable when it comes to internationalisation.”

Bart Jacobs concludes on internationalisation: “After registering the first patent application for a country, you create what is known as priority right. Within a year you can apply for patents in other countries with the same date as that first application. This then gives you a year to examine the international marketing possibilities of your product, and in which countries you want to apply for a patent. With the design right and patent applications we currently have a two-fold way to protect intellectual ownership.”

[www.arnold-siedsma.nl](http://www.arnold-siedsma.nl) / [www.caenator.com](http://www.caenator.com)



*Prof. Louise Fresco, Chair of the Board of Directors of Wageningen University, puts the fully-automated chip vending machine in operation at the Restaurant of the Future.*



*Twan Verrijt,  
Senior  
Researcher at ITS*

## Studying and entrepreneurship

Dutch universities can map the labour market position of recent graduates using the WO Monitor (Monitor of University Education) - from 2015 renamed as the National Alumni Survey (NAE). The last three national surveys (2011, 2013, 2014) show that 3% of all alumni are self-employed for a good year after graduating. This is comparable for RU alumni: in 2014, 3% of RU respondents indicated being self-employed. This mainly concerns students with a medical (6%) or beta background (5%); from the other studies less than 2% are self-employed. Most alumni started as an entrepreneur after graduating. During their studies, 4% (nationally) start their own business. At RU the numbers are slightly lower: on average over 2% since 2011, but at the time of the last survey this percentage was significantly higher: 3,8%. It needs to be said that many students (both nationally and at RU) start working for an employer some time after their studies (making use of their entrepreneurial experience). A quarter are still self-employed after a year. That the RU data is generally lower than the national average is linked to the available studies. Many students in the sectors Technology (8%) and Economics (6%), who are less present at RU, found their own businesses after graduating. At Radboud University it is mostly students of Law (4%), Arts (3%), and Management Sciences (3%). Of all companies founded by RU students during their studies, most companies still exist a year after graduation.

### *Self-employed alumni (more than a year after graduation)*

	2011	2013	2014
<i>nationally</i>	3,0%	2,9%	2,7%
<i>RU</i>	2,1%	2,7%	2,8%

### *Started a company during studies*

	2011	2013	2014
<i>nationally</i>	3,6%	3,9%	3,8%
<i>RU</i>	1,1%	1,9%	3,8%

## InScience 2015 big success

InScience is a new film festival focusing on the intersection of science, society and art. This festival is an initiative of Radboud University and film theatre LUX, and is supported by the municipality of Nijmegen, the HAN University of Applied Sciences, the Province of Gelderland, and the industry, including companies such as Synthon and NXP. The extensive film programme was complemented with talks, debates and an exhibition. The first edition of the festival took place at LUX Nijmegen from November 4 to 8. Festival director Johan van Woestijne looks back on a successful InScience: "This first edition proves the great amount of support for this festival. The initial goal was 2500 festival visitors. The fact that 6000 people actually visited the festival proves that InScience has a future. The ambition to expand InScience 2016 into an event with national importance and international renown can be pursued."

4000 people went to see at least one of the 73 films, of which 15 were feature films, 40 were documentaries, plus various short films. Nine films had their Dutch premiere at the festival. Among the visitors were scientists, filmmakers, scriptwriters and artists from the Netherlands, wider Europe and America. The art exhibition was seen by over 1300 people. The educational programme was visited by 800 students from primary and secondary schools as well as vocational students. On the Sunday, the educational programme was concluded with a Junior Science Quiz and a Junior Big Ideas by Diederik Roest. The big winner of the first edition of InScience was 'That Sugar Film'. This is a scientific documentary showing the effects of sugar on the human body through an experiment. Aside from the winner of the NTR audience award, awards such as the Student Jury Award (for 'Sleepless in New York') and the Youth Jury Award ('The Last Man on the Moon') were also given out. InScience 2016 is planned for 2 to 6 November 2016.



*(Photographer: Ted van Aanholt)*



Facility Manager Dr. Britta Redlich shows State Secretary Dekker around the FELIX Lab. Photographs: Joeri Borst



## Sander Dekker opens FELIX Laserlab and Experimental Garden

On October 30th, the Experimental Garden and the FELIX (Free Electron Lasers for Infrared eXperiments) Laboratory on the Radboud University campus was officially opened by Sander Dekker, State Secretary of Education, Culture and Science. The Experimental Garden consists of a greenhouse complex where botanical and ecological research may be carried out. One of the projects investigated here is underground root development in open field circumstances, without the influence of stress factors. The facility occupies a niche in fundamental and applied research, for which it cooperates with the industry and the government. The Experimental Garden also houses the Nijmegen gene bank, with the world's largest collection of non-tuberous wild plants, a family to which the tomato, bell peppers, peppers and the aubergine belong. In the FELIX Laboratory, very intense laser

radiation in the infrared band of the electromagnetic spectrum is produced, which in turn is used by physicists, chemists, biologists, and astronomers, for spectroscopic research. The FELIX Laboratory is an international user facility that has three free-electron lasers: FLARE, FELIX and FELICE. Together these lasers cover a unique wavelength in the infrared and terahertz band. Free electrons are repeatedly sent back and forth past magnets via a system of mirrors. The laser beam then escapes through holes in some of the mirrors. The three free-electron lasers contribute to insights into new materials and the fundamental properties of molecules. The FELIX-light is linked to the high magnetic fields laboratory HFML, another large research facility in Nijmegen. Sander Dekker performed the official opening with an entertaining biometric hand scan followed by a laser show.



The Experimental Garden on the Radboud University campus



Sander Dekker admiring the Experimental Garden

# Sustainability is part of the Nijmegen DNA

Nijmegen is a green and sustainable city, ambitious about a better environment. The municipality is trying to make a difference by stimulating businesses and sustainable initiatives. It is inspired by excellent examples in the city, of which there are plenty. Alderwoman Tiemens: "Sustainability is part of the Nijmegen DNA."

## SUSTAINABLE ENERGY



*Alderwoman Environment & Energy Harriet Tiemens  
(photo: Jacqueline van den Boom)*

It is Nijmegen's ambition to be an energy neutral city by 2045. This means that the city will use the same amount of energy as it generates (sustainably). The interim targets for the municipality are 12% energy savings in 2015 and 22% energy savings in 2020, compared to 2008.

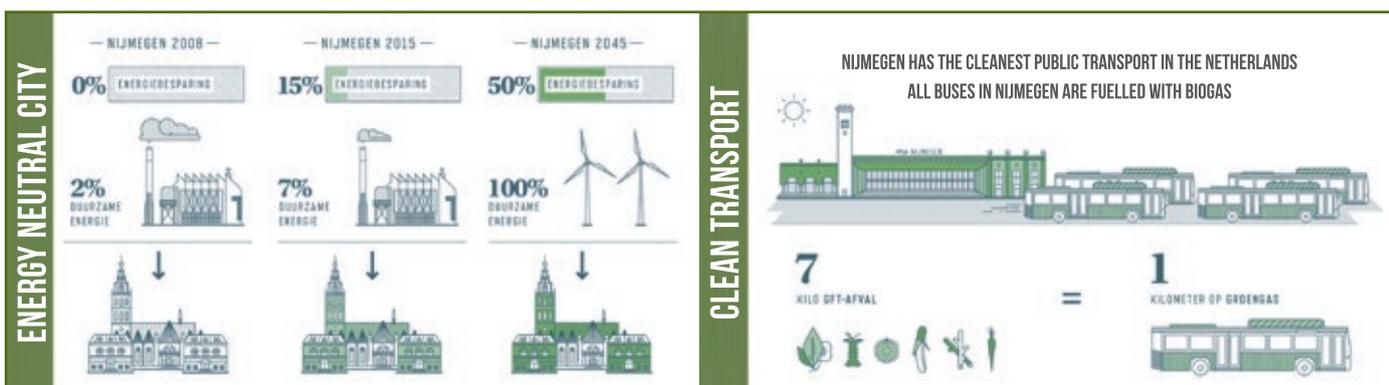
Nijmegen is on the right track. Calculating from the current technological possibilities and speed, Nijmegen will actually be energy neutral before 2045. The city's aim is to realise yearly energy savings of 2.5%. Alderwoman Environment & Energy Harriet Tiemens: "In 2014 we exceeded this big time, with savings of 7%. So we are moving faster, but... we can go even quicker." Tiemens: "I don't view the authorities as the solitary promoter of sustainability. I want to cooperate with businesses, institutes, and inhabitants. The green doers! Use the strength of the city, the enthusiasm, the innovation and the creativity. The authorities have their place in that, preferably modest and helpful. As a government you have to be certain the knowledge can be found within businesses, universities and other institutes. And Nijmegen is brimming with sustainability. It is in the DNA of the inhabitants. This can be seen from the initiatives present in the city, which is why we have been in the finale of the European Green Capital Award twice."

### Four tracks

The tasks of the municipality of Nijmegen are initiating, motivating, rewarding, and enforcing. This takes four tracks:

#### – The municipality helps with classic tools

This means clear zoning plans, clear licence application procedures, and sometimes strong enforcement. A good example is the project Green Delta GDF Suez. It is a project where an old



coal-fired power plant makes room for a green delta with biomass and solar panels. Tiemens: "With such a large project, both the authorities and the company GDF Suez need to work hard to shape new innovative developments from the older frameworks. This requires patience, but we have the will to make it succeed."

#### - The municipality stimulates a good business climate

It is important for the region to have an attractive environment. Nijmegen already has lovely green surroundings and a varied cultural programme. Next to that the city offers good accessibility, an attractive residential environment for employees, good schools, shops, highly educated inhabitants, and excellent medical care. And very importantly: innovative companies that develop new concepts want to do so at a location where their concepts can be valorised. In Nijmegen, various partners are working on a Novio Tech Campus where those parties can meet.

#### -The municipality contributes to meetings and innovation

Bringing together the right parties is essential. Does the government have to do this? No, but the municipality can help where needed. A good example is the Nijmegen Energy Covenant (NEC). NEC is a partnership of large companies and institutes in Nijmegen, with a nod to our local pride: football club NEC. A few years ago they agreed to put some serious effort into sustainable goals. Is this possible without firm guidance from the government, was one of the questions in our city hall. Yes, this turned out to be possible! In the period 2012-2014 the participants managed to produce 19% less CO<sub>2</sub>. This cut equals the CO<sub>2</sub> that 16,000 Nijmegen households produce on a yearly basis. Partly as a result of this the energy use of the entire city dropped with 7% in the past year. "In order to bring together the right players, the authorities need to be aware of the playing field. This means leaving your desk and meeting entrepreneurs, scientists, green thinkers. That is the only way to stimulate the right meetings," says Tiemens.

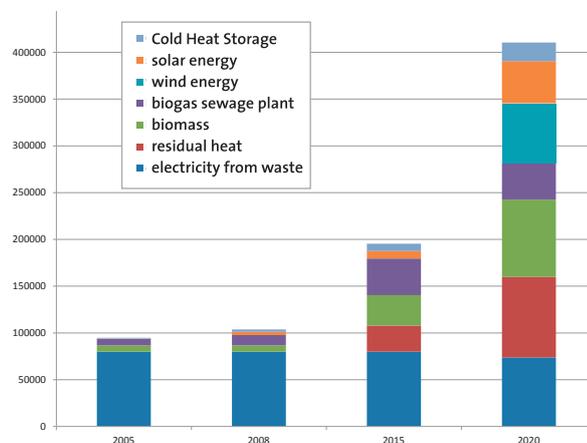
#### - Make the occasional difference as government

If you want to speed up sustainable change, take a risk now and again. The municipality of Nijmegen does just that, for example by taking on the responsibility for the unprofitable top of a sustainable investment. A good example is the regional district heating system, where the municipality has entered on a public-private partnership. A contract has been signed with the Province, the network operator, and energy providers to finance and realise this project. 4000 households are already reaping the benefits, soon to be 90,000. Another example: the green Public Transport Concession (OV Concessie). Bus transport in the area is the greenest in the Netherlands with 17 grams of CO<sub>2</sub>

emission per travelled kilometre (5 times less than the second cleanest). The buses are fuelled with biogas. This was made possible because the authorities signed a contract in which the supply of organic waste has been determined for a period of 10 years. This long-term contract was necessary to enable all parties, the fermenter and the bus company, to finance innovations. "We are now investigating whether we can also apply this trick to the purchasing of our own electricity consumption. Nijmegen and 20 regional partners are going to tender the energy procurement for 2018 in such a way that the energy consumption (gas and electrics) is generated in the region. This will stimulate the green economy and employment in the local area. We calculated that €1.2 billion is spent on the purchasing of our electricity, with this money disappearing from the region. Imagine what would be possible if the money stayed here! But, in all fairness, a regional energy supply will be more expensive, although we would be boosting employment opportunities. That is an important argument!" says Tiemens. "A lot still remains to be done. But there are many opportunities as long as we work together!"

#### Energy situation, development and energy supply mixture

At the moment 7% of the energy consumed in the urban environment of Nijmegen is locally generated. In 2020 this will rise to 15%, thanks to the realisation of Windpark Nijmegen (2016) and eventually their solar park (2018). GDF Suez will close their coal-powered energy plant by the end of 2015 and is going to build a sun park, wind turbines and biomass plants (Green Delta 2015-2020).



Sustainable energy mix of Nijmegen between 2005 and 2020



## SOLAR PARK NIJMEGEN OPENED

On the grounds of the coal-powered energy plant in Nijmegen at the mouth of the Maas-Waal channel, a transition is taking place towards a sustainable power plant. On these grounds, with a size of about 1,5 hectares, GDF SUEZ began building a solar park with 4000 solar panels in the spring of 2015. The solar park will produce enough energy to supply about 300 households with electricity. On November 6, the solar park was officially opened. The solar park is one of the largest in the Netherlands, and is part of the project "The Green Delta". It will be followed later on by a biomass plant, wind turbines and an LNG petrol station (liquefied natural gas) for ships and lorries. GDF SUEZ offers inhabitants of Nijmegen the possibility to purchase locally generated sustainable energy through a green energy contract. [www.gdfsuez.nl](http://www.gdfsuez.nl) - [www.electrabel.nl](http://www.electrabel.nl)

# Working visit from the Belgian Ambassador and the King's Commissioner of the Province of Gelderland

On September 23rd, the Belgian Ambassador Chris Hoornaert and the King's Commissioner of the Province of Gelderland Clemens Cornielje paid a working visit to Radboud University and Radboudumc. They were accompanied by honorary consul Louis de Bouter and Michiel Scheffer, Executive of the Province of Gelderland. The working visit started at the UBC Mercator building, the first incubator on the Radboud campus.

Prof. Dr. Gerard Meijer, Chair of the Executive Board of Radboud University, welcomed the delegation and gave an introduction on the historical origins and current position of Radboud University. The institution is a multi-functional, internationally orientated, and student-focussed research university. RU is not only classed highly in leading national and international rankings for research, education, reputation and student satisfaction; Radboud University has received the predicate of best general traditional university of the Netherlands on multiple occasions. The concentration of high-quality research institutes and facilities on one campus stimulates researchers to work in a multidisciplinary way. Gerard Meijer emphasises the importance of innovation and valorisation as key points in the strategic policy plan. Prof. Dr. Stefaan Bergé welcomed those present on behalf of the Board of Directors of Radboudumc, and briefly explained the four cornerstones of Radboudumc's policy: cooperation through

networking, personalised health, distinction in quality, and maximum efficiency for permanently upgrading this quality.

Antoine Fraaij, recently appointed Director of Radboud Innovation, emphasised the inspiring surroundings of the Mercator Science Park. Here, the four Mercator buildings house about seventy companies, amongst which are many start-ups and spin-offs of Radboud University. American research shows that almost half of this kind of companies do not make it past the first two years. On the Nijmegen campus, this number is much more positive thanks to the available support and facilities. Radboud Innovation will also be stimulating and facilitating scientists, for example with valorisation activities and grant application. Cooperating in national and international projects is crucial, both with social and corporate organisations, including spin-offs who are already part of the first cycle of the network.

Mercator Science Park and Mercator Incubator Nijmegen offer innovative companies, such as the many Radboud spin-offs, an excellent starting point and gateway for their business activities, and for contacts with Radboud University and Radboudumc. This can also include the coordination of valorisation and facilities at Radboudumc, the HAN University of Applied Sciences, and NovioTech Campus Nijmegen. Antoine Fraaij briefly talked about the wide range of research and incubator facilities on campus, and soon gave the floor to Ed Koster, project leader of Radboud Research Facilities (RRF), a collaboration between Radboud University and Radboudumc, supported by the Province of Gelderland. Researchers from different institutes as well as new and established innovative companies may use the equipment, facilities, and expertise available on the Radboud campus. RRF is a real asset, especially for start-ups who do not yet have the means to purchase expensive and advanced equipment. By making these facilities available, RRF aims to contribute to the next generation of innovations.



From left, Executive Michiel Scheffer, Belgian Ambassador Chris Hoornaert and the King's Commissioner of the Province of Gelderland Clemens Cornielje.

Both Ed Koster and Hein van der Pasch, Director of Mercator Incubator, addressed the growth of the number of spin-offs and their contributions to research cooperation, innovations, and new employment opportunities in the region. Many young researchers and (under)graduates have their first work experience at spin-offs. Of the many well-known successful examples of beta and medical spin-offs, currently providing more than 2000 jobs, three were mentioned: the largest, Synthon, and the first winners of the Mercator Award for growing spin-offs, Mercachem and Novioendix. All three are still closely connected to research at the Radboud campus. Novioendix, a spin-off of Urology at Radboudumc, will continue this cooperation after the recent acquisition by the listed Belgian-American medi-tech company MdxHealth.



*Prof. Dr. Gerard Meijer, Chair of the Executive Board of Radboud University.*

Hein van der Pasch also emphasised the importance of the numerous, often smaller spin-offs from the alpha and gamma faculties. Since the establishment of the University Business Centre (UBC), the oldest Mercator building, over 25 years ago, more than 700 Nijmegen academics took a business initiative. Over half of these remain smaller than ten employees or a self-employed entrepreneur. They provide services to other companies and make connections between knowledge from the university and innovations in the social environment, such as SMEs who find it difficult to gain access to universities. Hein van der Pasch recalled that the objectives of knowledge application and more employment opportunities for the higher educated, e.g. graduates, were the primary goals when preparations for UBC and Stichting Gelderkennis were being made at the end of the 1980s. Back then, the university was actively involved, through Rector Magnificus Jan Giesbers and CvB Chair Willy van Lieshout. Executive of the Province of Gelderland Oege Feitsma was one of the promoters in the area to work on knowledge application and spin-offs from the university. Researchers proved themselves able to become entrepreneurs and cooperate well with businesses. Support from the Province was crucial in those first years, as well as for later science-to-business projects. After the success of UBC bigger plans were possible, and Mercator Science Park and Mercator Incubator were formed. Hein van der Pasch notes that with all those supporting activities it must not be forgotten that the great results of the Nijmegen spin-off developments have only been made possible by the commitment of the numerous devoted researchers and entrepreneurs. Before the delegation continued their visit to researchers elsewhere on campus, there was the opportunity to get to know business initiatives based on research:

**NovoLanguage** was founded in 2013 by Dr. Martijn Enter (CEO) and Dr. Helmer Strik (CSO) and currently has 21 employees and 8 different nationalities distributed over two locations in Nijmegen and Singapore. At the beginning of this year the company won the Gelderse Start-Up of the year Award, which Martijn Enter received from Clemens Cornielje. The company specialises in interactive personalised speech training using technology suitable for any device. NovoLanguage does business with companies such as hotel chains, training institutes and publishers. The company is a spin-off of the Arts Faculty and maintains close working relations with Radboud in'to Languages and the Centre for Language & Speech Technology of Radboud University. The goal is to open offices in Indonesia, Vietnam and China by 2016.

**Screenpoint Medical** was founded in 2014 and is a spin-off of Radboudumc. Prof. Dr. Nico Karssemeijer is the founder, Chairman of the

Board and Professor at Radboudumc. The company developed new Computer Aided Detection (CAD) technology for the automated analysis of digital mammography images and digital breast tomosynthesis. The algorithms and programmes used for this automatic breast cancer detection are based on a combination of machine learning, large digital mammography files, and image analysis technology. CAD technology was developed about 25 years ago in the US, and is used in 95% of all mammography assessments. The technology developed by Screenpoint Medical offers more opportunities for interaction by the radiologist and is more effective at detecting tumours. The company first wants to acquire a large share in the European market and will then consider the US.

A start-up in an early stage is **Marbelous Minds**, founded by Dr. Frank Leone of the Donders Institute. He developed a 'playful & brainful learning' method (MindGlot) for learning foreign languages faster. With 'traditional' learning methods, it is assumed that languages are stored separately in the brain, with separate glossaries. According to Leone, however, there is no distinction between languages such as Dutch, English, German, and French, and all the words are jumbled together. Not at random, but based on equality; words that look alike (such as appel, appelle, or appél) are classed together. These words are enriched with information from the entire brain that is again stored in folders. Next to that there is information on visual characteristics, sounds, associated movements, memories. All these aspects join forces to support our understanding of words. Marbelous Minds aims to support the learning of languages in a way that matches the way our brain learns a language.



*From left, Dr. Martijn Enter (NovoLanguage), Prof. Dr. Nico Karssemeijer (Screenpoint Medical), Dr. Helmer Strik (NovoLanguage) and Dr. Frank Leone (Marbelous Minds)*



## Inaugural speech Prof. Dr. Joan Daemen

On November 11<sup>th</sup> 2015, the newly inaugurated Endowed Professor Dr. Joan Daemen delivered his speech on 'Symmetrical Crypto 2.0'. This is an essential part of the discipline 'Digital Security' at Radboud University Faculty of Science. Prof. Dr. Daemen is part-time Endowed Professor at the RU, next to his position in IT company ST Microelectronics. This chair was made possible by the

Faculty of Science, and partners of Stichting Gelder-Kennis, stimulating innovations in the field of Digital Security. Prof. Dr. Joan Daemen will be participating in research and education at Radboud University, contributing expertise to the field of IT Security Architecture, Design and Symmetric Cryptography.

**50<sup>ste</sup> JAAR**  
GEFUNDEERD  
IN DE BOUW  
1915 - 2015

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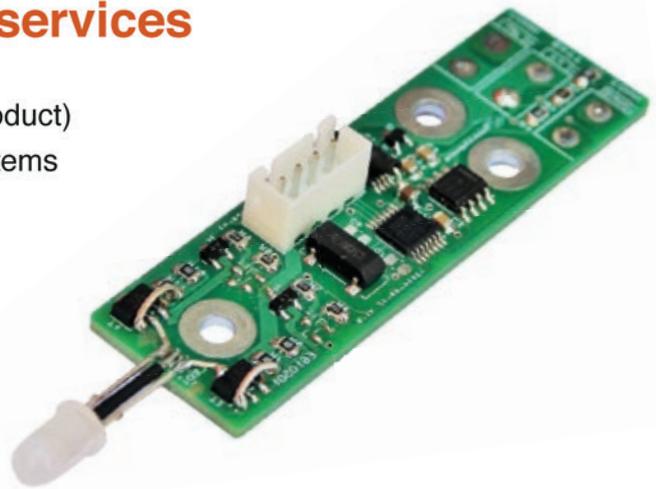
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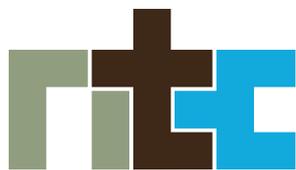
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