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Adding Value To Society

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*‘You wouldn’t
believe what
you can get out
of a simple
potato.’* Page 6-7

Since its foundation in 1614, the University of Groningen has been adding value to the society that nurtures it. This happens mainly by educating students to prepare them for their future roles, and by conducting research to shift the frontiers of knowledge. But there are many other ways to advance the general interest as well: initiating social reform, stimulating economic activity and facilitating technical innovation, to name but a few. This brochure provides information about ten cases, selected from scores of similar ones. In its four centuries of existence the University of Groningen has never done otherwise. Ten historical examples, presented in short texts, will testify to this.

A WORLD TO VALORIZE

The world is facing enormous challenges, with the global population expected to rise to between 9 and 10 billion by 2050. Feeding this growing population has implications for man, beast and the environment. Roelof Joosten, COO of dairy concern FrieslandCampina, presents his views.



Photo: FrieslandCampina

In some parts of the world, fertile land and clean drinking water are already scarce. But even if the availability of land and water were not a problem, will there be enough farmers to produce our daily food requirements in the future? And will they earn enough to provide for their families? FrieslandCampina wants its activities to help solve these global problems.

Breeding ground for innovation

Obviously no single company can achieve this on its own – you have to work with other parties, such as the University of Groningen and the UMCG. Apart from carrying out fundamental and applied research, universities are also a breeding ground for innovation and talent. This is a function that universities should nurture and expand. A Groningen initiative like the University of Groningen Centre of Entrepreneurship is a

perfect example. Businesses need students who are willing to push back the boundaries and develop their talents outside the bounds of their chosen degree programme, in this case, develop their entrepreneurial spirit.

Better diet

You need the companies to gain access to concrete products. In a way, industry and universities can't do without each other. This has always been the case and if anything, they will probably need each other even more in the future. Take topics such as nutrition and health, food safety and food security, for

example. Our dietary requirements are changing as our life expectancy increases. Practical research is needed to find out which types of food benefit cardiovascular health, for example, and which will combat obesity and malnutrition. In addition, we need companies with the knowledge and expertise to produce these products and bring them onto the market.

Healthy Ageing

We think that we can achieve these goals if we work in public-private partnerships. The Healthy Ageing Cluster and the Carbohydrate Competence Center in Groningen are just two examples. Both institutes are providing industry with a broad platform of high-quality knowledge in the area of nutrition and health, which we simply don't have ourselves. Using and investing in these institutes allows our company to explore new avenues for improving our products. What is also important is that Brussels is investing in the successful Groningen Life Sciences cluster. This gives guarantees for the future.

Golden triangle

'The 'region' no longer exists – the world is our playing field. At the end of 2013, FrieslandCampina set up a new Chinese-Dutch research and knowledge centre to improve Chinese dairy production. Cooperation between industry, government and academia will enable the Netherlands to retain, strengthen and expand its position on the global food and agriculture market. But this does not only apply to us; it applies to other sectors too. The University of Groningen has a golden triangle with its research themes Energy, Sustainable Society and Healthy Ageing, and FrieslandCampina is valorizing milk. But an enterprising spirit is what really counts. This spirit is there for all to see in the investigative entrepreneurs and enterprising investigators featured in this brochure. They each have their own story to tell, and together they can make the world a better place.

Roelof Joosten,

Chief Operational Officer of Koninklijke FrieslandCampina NV
alumnus Chemical Technology and Business Administration,
University of Groningen

UNEXPECTED INNOVATION

How to turn an idea into business

How can you turn one brilliant idea into a business worth millions of euros? **Joop Dalstra**, physics alumnus and former researcher at the University of Groningen, did just that. He is now Chief Scientific Officer of XPAR Vision, a company with a turnover of millions of euros. 'We have branches everywhere, apart from the North and South Poles.'

Dalstra was there at the inception of an invention that caused a revolution in the glass packaging industry, reducing losses during the production process to just 2 to 3 percent. The secret: every hot object emits infrared radiation. Sensors can measure differences in heat radiation, depending on the thickness of the glass. This identifies (and can even prevent) defects. The scanning equipment needed for this process is manufactured by an Italian partner, Bottero Glass Technologies. This equipment has had a massive impact. The glass industry used to accept production losses of up to 40% as 'normal'. Another problem that has been solved is that of splinters or sharp edges. The fact that these can also be identified protects consumer safety.

Worldwide

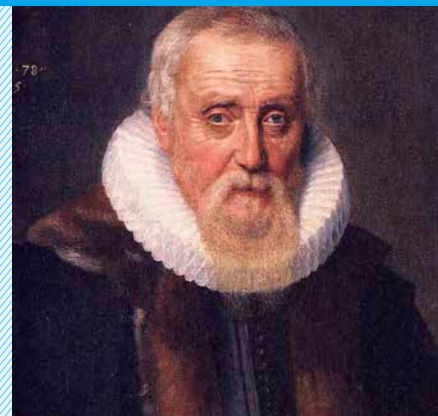
So how did this come about? In 1989, Dalstra started work in a research department in the University of Groningen, which was looking for solutions to technical problems facing commercial companies. The infrared sensor technology was developed for one of their clients. Dalstra recognized the enormous potential, applied for a patent and found an investor. In 2000, he started XPAR Vision as a one-man business. It is now a company employing 22 staff, with a turnover of € 12 million and contacts throughout the world. XPAR Vision still focuses on innovation, such as reducing the consumption of energy and natural resources.

Focused

Dalstra: 'Obviously I was in the right place with the right people at the right time. Having said that, I also learned an awful lot from my university degree programme. We weren't just crammed full of information; we were also taught to solve problems ourselves. And last but not least, we only do what we're good at and outsource the rest. This helps us to stay focused.'



'I learned to solve my problems myself.'



FOR INFINITY (EARLY 17TH CENTURY)

The reason that the Stad en Lande district founded an Academy in 1614 is clearly set out by the institute's first Rector, Ubbo Emmius (1547-1625). He was responsible for writing the 'Eternal Edict', the act proclaiming the foundation. In a poignant description, he praises Groningen as an ideal university: '...the extraordinary comfort of this place that could be considered to be the natural home of the Muses. Its famous setting is beguiling, the air is pure and wholesome, the food sources plentiful and convenient (...) Over the last few months and at considerable expense, we have furnished the school that we call our own with lecture halls and extra buildings.' And, added Emmius, the university is there to serve the common good, as education benefits church and state.

More about innovation at the University of Groningen: www.rug.nl/rv



PUBLIC PRIVATE PARTNERSHIP

The gateway to a new economy

Carbohydrates (e.g. starch, sucrose) are the ideal building blocks for applications in the Agri&Food sector. Modifying carbohydrates at the molecular level may yield new products and applications, a firm basis for innovations. Public-private partnerships between industry and science are the driving force for this new economy. The North of the Netherlands is the epicentre for carbohydrate research.

‘You wouldn’t believe what you can get out of a simple starchy potato,’ says **Hans Leemhuis**, product developer at the international starch co-operative AVEBE in Veendam. Besides developing and selling new starch applications, AVEBE is conducting research into new starches aiming to provide health benefits: Healthy Ageing. ‘Potato starch is easily broken down by the body and so glucose is quickly absorbed into the blood. This may cause health problems. Emphasis is on starch modifying enzymes that would allow the glucose to be released more slowly, this could be an important step in controlling diseases such as obesity or type 2 diabetes.’

Win-win

AVEBE’s research into enzymatic starch modification is carried out in the Carbohydrate Competence Center (CCC) in Groningen, a centre in which the University of Groningen,

Wageningen University, four national knowledge institutes, twenty companies and the government have joined forces to work together on excellent, demand-driven carbohydrate research. CCC research at academic (and non-academic) knowledge institutes provides a strong stimulus for the R&D of the industrial partners. ‘Taking part in CCC introduces these companies to the most recent developments and knowledge available within the universities,’ says **Lubbert Dijkhuizen**, Professor of Microbiology at the University of Groningen and scientific director of the Carbohydrate Competence Center. The University of Groningen gets plenty in return. Dijkhuizen: ‘We carry out in-depth fundamental research in collaboration with our industrial partners, resulting in scientific publications in international journals. Often this collaboration generates follow-up research, for which we can appoint more PhD students: it is a win-win situation.’

Synergy

Leemhuis has experienced the synergy of the best of both worlds at first hand. He obtained a PhD degree at the University of Groningen and entered his current research position within AVEBE via CCC. ‘Cooperation with CCC leads to new products, new employment and in our case, a higher potato price for our farmers. It really is the gateway to a new economy.’



‘You wouldn’t believe what you can get out of a simple potato.’

Hans Leemhuis/AVEBE (l) and Lubbert Dijkhuizen/CCC (r)

BERNOULLI’S PRINCIPLE (EARLY 18TH CENTURY)

Bernoulli’s Principle concerns the behaviour of fluids and gases under various flow conditions. It is named after Daniel Bernoulli (1700-1782), who was born in Groningen. His father Johann/Jean was a professor of mathematics here, but the family returned to their home town of Basel in 1705. In an interesting twist of fate, Bernoulli’s Principle describes the behaviour of gases, and Groningen later became a region famous for its enormous natural gas reserves. Revenue from Groningen gas has been filling the Dutch national coffers for decades. As a result, the University of Groningen boasts a long record of energy research, in which it collaborates closely with industry and private enterprise. The University is also noted for developing other forms of energy. All this expertise has led to various Groningen-based initiatives, including the Energy Academy Europe, which specializes in energy education.



More about CCC:
www.cccresearch.nl



CCC is co-financed by the European Regional Development Fund, the Dutch Ministry of Economic Affairs (as part of Pieken in de Delta, the government’s regional economic agenda), the Municipality of Groningen and the Provinces of Groningen, Friesland and Drenthe.

Research that pays for itself

Academic research is vital to society, but it is also expensive. And yet some research actually generates money. A lot of money. In fact so much money that it pays for itself. The research being conducted by Erik Frijlink, Professor of Pharmaceutical Technology and Biopharmacy, and his team is a shining example.

Frijlink and his colleague Anne de Boer work in the area where technology meets pharmacy. They are trying to find more efficient ways of administering drugs to patients. Inhalation is the main focus of their research. Their greatest successes to date are the Novolizer and the Genuair. These two devices are not just inhalers. They have a built-in 'mini-cyclone', which swirls and accelerates the particle cloud formed by the inhaled air plus the pharmacon, enabling the active ingredient to reach deeper regions of the lungs when it is inhaled. The devices are commercially produced by partner companies in Germany, Spain and Ireland.

Applied research

Inhaling drugs has many advantages over other methods, such as swallowing, injecting or sniffing (via the nasal membranes). Frijlink: 'Administering drugs via the lungs (pulmonary) is easiest

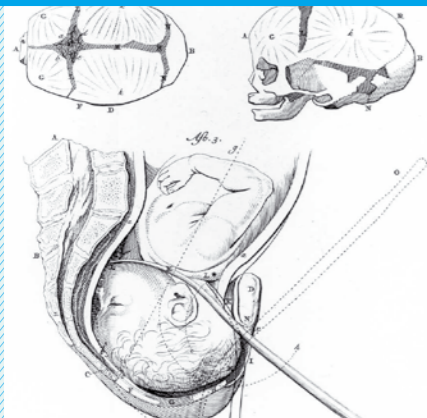
for the patient. It is also the most effective and swift method, and causes the fewest side-effects. It can take some time for an active ingredient in a capsule or tablet to pass through the stomach and gut and reach the bloodstream. Using the Novolizer, this process only takes a couple of minutes. The Novolizer and Genuair are commonly used for classic lung diseases such as asthma and COPD, as they take the drug to its destination immediately. This also applies to the Twincer, another inhaler system we have developed for cystic fibrosis.'

Smart inhalers

Researchers in the Pharmaceutical Technology and Biopharmacy research facility (based in the UMCG) have been working on these 'smart inhalers' for many years. The Novolizer was the first generation to come onto the market, and the Genuair was the second. Frijlink: 'Both inhalers have an effective mechanism for dispersing clumps of powder particles.' Our inhalers have countless applications, from administering a 'super vaccine' for flu (work in progress), to antibiotics for resistant tuberculosis. Frijlink: 'Fundamental research is essential but we must not forget applied research. After all, there won't be much to valorize if we don't develop new products ...'



'There won't be much to valorize if we don't develop new products.'



OBSTETRICAL INSTRUMENTS (MID 18TH CENTURY)

Petrus Camper (1722-1789) was a physician, anatomist, physiologist, obstetrician, zoologist, anthropologist and palaeontologist. In 1763 he was appointed Professor of Medicine at the University of Groningen. He was the first person to open a surgical outpatient clinic, the embryonic form of the current University Medical Center Groningen. He also published on vaccination against smallpox and was an expert in the field of fighting rinderpest. Camper was very concerned about the fate of women in labour in danger of dying due to the baby's head becoming stuck. He researched obstetrical instruments such as levers, spatulas and forceps. His comparative research eventually led to him designing his own lever: a removable wooden handle that ended in a wide hollow spoon, covered in dog or deerskin.

More about patenting at the University of Groningen: www.businessgenerator.groningen.nl



CONNECTIVITY

Entrepreneurship in the curriculums

How do you teach experienced entrepreneurs to become even more enterprising? And how can you stimulate business initiative in students and university researchers? The UGCE (University of Groningen Centre of Entrepreneurship), of which Aard Groen has been appointed Dean, knows all about this.

Groen is Professor of Entrepreneurship and Valorization. ‘These days, more and more young people are starting their own businesses. Some of them even take their first steps towards entrepreneurship during or immediately after their studies. We want entrepreneurship to feature on the curriculum of every degree programme. Not because we think that all students should become entrepreneurs, but because we think they should have some basic knowledge of how business works. Knowledge and experience of entrepreneurship is definitely an advantage in the employment market.’

Spin-offs and start-ups

The UGCE focuses on both teaching and research. ‘Research carried out with partners in industry is much more practical. Researchers and companies

can work together to develop new innovative products, for example. We also see a lot of research companies that began life as spin-offs or start-up businesses within universities. Many of these small companies reach a point where they want to accelerate growth, but find they lack experience. This is where our input comes in.’

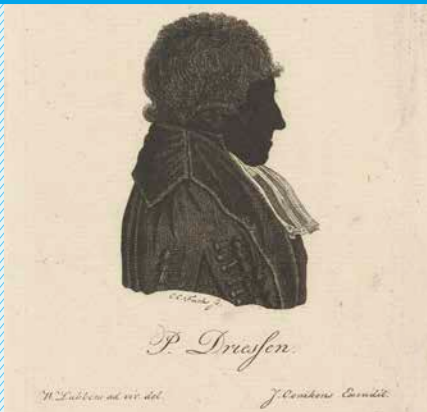
Ambitious plans

Groen is also involved in the Consortium for Valorization and Entrepreneurship (CVO), in which the University works closely with the UMCG, Hanze University of Applied Sciences, Rabobank and the government. ‘Many entrepreneurs have ambitious plans, but lack the knowledge and networks they need to put their ideas into practice. A good product simply doesn’t cut it alone. If you want to survive, you also need strategy, proper organization and a good social network. This is where we can provide help and advice in our Venturelab Northern Netherlands.’ Society needs creative people with drive, nerve and entrepreneurial spirit. People willing to take the initiative and stimulate innovation, whether in their own company (entrepreneurship) or in the organization where they work (‘intrapreneurship’), in that way creating employment and value.’

‘We need people with drive, nerve and entrepreneurial spirit.’



More about entrepreneurship programmes at the University of Groningen: www.rug.nl/ugce



URINE AS A PRESERVATIVE SALT (LATE 18TH CENTURY)

Professor of chemistry Petrus Driessen (1753-1828) made it his mission to understand and improve the chemical processes behind production methods. He soon became an oracle for the industry, and established several practical institutes. He did not believe that the Creator would have created anything without good reason and did his best to find a reason for everything, no matter how unsavoury. One of his most notable plans involved placing large containers in places of worship, orphanages, army barracks and inns to collect urine. The urine was then transported to factories outside the towns, where it would be mixed with soot and peat to form artificial fertilizers and ‘tasty salt’ for preserving meat. A factory of this kind was actually built in Makkum.

ENERGETIC IDEAS AND ENERGY MANAGEMENT

Create your own work

‘We help students to cash in on their ideas and make the world a better place. We show them how to expand their networks and improve their CVs.’ These are the words of **Marit van de Kerkhof**, member of the board of the student energy platform SAMEEN.

SAMEEN is a startup company, initiated and run by students from the University of Groningen and Hanze University of Applied Sciences Groningen. It advises and supports businesses, energy cooperatives and private individuals in realizing their sustainable energy ambitions.

Saving money

An example from the field. One of the customers, a car dealer, was looking for more sustainable business premises, closer to his customers, and more importantly with lower energy costs. In mid-2012, the car dealer came to SAMEEN. The car dealer has now opened his new auto service premises, entirely fitted out with sustainable materials, and featuring under-floor heating and solar panels for generating its own energy. Our customer is now saving hundreds of euros a month on its energy bills thanks to an energy savings plan drawn up by the students at SAMEEN.

From ideology to employment

A satisfied customer means a satisfied student. ‘In this company, students can put their knowledge to use in the business world. Working for us enables them to expand their networks and build up their CVs,’ explains Marit van de Kerkhof, Master’s student of Finance and International Financial Management at the University of Groningen. ‘And more importantly, the experience they gain at SAMEEN gives them a huge advantage on the job market. Our students are actually embarking on a career during their studies.’

Over the past few years, the members of this successful cooperative have been rolling out the SAMEEN concept across the nation. The first branch office opened in Amsterdam in May 2014. SAMEEN’s dream is to build a national and international network of branch offices, enabling student from all over to get the same chance students in Groningen get. There is already talk of SAMEEN Vienna! The board of SAMEEN is content, says Van de Kerkhof: ‘We want to make the world a better place by helping organizations become more sustainable, while also increasing students’ chances of employment: it’s a win-win situation.’



‘Making the world a better place and improving chances of employment.’

More about student entrepreneurs in Groningen: www.cube050.nl



Toine Bartelet, Marit van de Kerkhof and Michelle Everett (left to right)

PIONEERS IN AGRICULTURAL EDUCATION (EARLY 19TH CENTURY)

Jacobus Uilkens (1772-1825) studied theology in Groningen, but was fascinated by the ‘catechism of nature’. He taught experimental physics to farmers, schoolteachers and clergymen and published an almanac of rural economics. In 1815, he became Professor of rural economics at the University of Groningen and tried to persuade the local farmers to introduce new farming techniques. He was succeeded by the botanist Herman Christiaan van Hall (1801-1874), whose career also revolved around agricultural education. For many decades, he was head of the Groningen agricultural college, a predecessor of the Dutch agricultural universities.



Adriaan-Getreidemäher.

EXCELLENCE

The Art of Science

'PhD candidates who complete their studies in the Zernike Institute become highly qualified employees capable of conducting top-class independent research. But they also function well in teams working in laboratories. Employers are keen on this combination of flexible skills,' explains Petra Rudolf.

Rudolf is Professor of Experimental Solid State Physics and a member of staff at the University of Groningen's Zernike Institute for Advanced Materials (ZIAM). The proof of this pudding is in the eating: on average, ZIAM PhD graduates find jobs in high-quality industries, such as at Philips, Shell, ASML or another international top institute, within just one month of gaining their PhD.

Selection

The top Master's programme in nanoscience has won the title of best Master's programme in the Netherlands and Flanders. Applications for PhD research are pouring in from the Netherlands and abroad. A strict selection procedure has been introduced. A maximum of 15 excellent students per year are admitted, a little more than half of them from abroad. Rudolf: 'Nearly

all our PhD candidates eventually opt for a job in Dutch society. So the knowledge they acquire from the teaching and research here at the Zernike Institute filters into every layer of the Dutch employment market. We are very proud of this.'

Multidisciplinary

Tatiana Fernández Landaluce is a prime example. She was awarded a PhD by the ZIAM in May 2013 and now works for a high-tech company in Eindhoven, where she conducts innovative research into a new generation of screen technology for e-readers. This Spanish researcher is the pivot in a multidisciplinary team of physicists, IT specialists, materials scientists and chemists.

'Every researcher holds his or her own key to the solution,' says Fernández Landaluce. 'To reach an innovative solution, the team must be able to combine its areas of expertise, speak each other's language, add their keys to the bunch. Working together in a lab in a multidisciplinary setting was everyday practice at ZIAM. We learned from each other and inspired one another. The skills I learned in Groningen feed my initiative when setting up highly complex projects.'



'Our knowledge filters into every layer of the Dutch employment market.'

More about Career Services for students and graduates of the University of Groningen: www.rug.nl/next



INSTITUTE FOR THE DEAF (FIRST HALF OF THE 19TH CENTURY)

Henri Daniel Guyot (1753–1828), who originally came from the Prince-Bishopric of Liège (now part of Belgium), was a clergyman in the Walloon protestant community of Groningen from 1777. Keen to promote education for the deaf, he and some others founded the first Dutch school for the deaf in Groningen in 1790. The initiative was successful. In 1815, King William I officially recognized Guyot's work and he was appointed a member of the Faculty of Arts and Philosophy of the University of Groningen by Royal Decree. This gave him the right to call himself a professor. The Institute for the Deaf opened a boarding school for both boys and girls in 1819. Guyot worked hard for the institute until his death in 1828. He was succeeded by his son Charles, who gained a PhD at the University. Their life's work is still operational and is currently part of Royal Dutch Kentalis.



Plastic without crude oil?

A breakthrough in the transition to a green economy? **Marnix Pool**, director of the RUG Holding, thinks that the development of 'bio-BTX' at the University of Groningen could very well be the breakthrough we have been waiting for.

BTX (benzene, toluene and xylene) are chemicals that are commonly used to produce high-quality plastics. They are currently made from fossil raw materials such as crude oil. But producing BTX from biomass, such as organic side streams from the agro-industry, requires less oil and results in fewer CO₂ emissions. Two entrepreneurs from Groningen are now investing in Bio-BTX research at the University of Groningen. Their ultimate aim is to bring this innovative product onto the market.

Cooperation

Pool is the business developer. 'It's my job to bring the partners together. Cooperation between industry and research adds a new national and international perspective to the existing market for the University of Groningen.'

European players

At present, the University is working closely with the Hanze University of Applied Sciences Groningen in the Zernike Advanced Processing (ZAP) Facility. This research and education centre looks into ways of making new products from food, food waste or biomass. The ZAP initiative coincides with the start of Horizon 2020, the new EU research and innovation programme with funding from Brussels. Pool: 'H2020 provides an interesting regional programme (INTERREG) that promotes cooperation between industry and the universities. Here at the University of Groningen, we are looking for industrial partners for the ZAP project in the North of the Netherlands and Northern Germany. I have decided not to concentrate exclusively on the border regions as we want to be an international player in the whole of Northern Europe. This is a good example of an initiative that will not only give an economic boost to the University of Groningen, but also to the entire Northern Netherlands region.'

'It's my job to bring the partners together.'



FIRST ELECTRIC CAR IN THE NETHERLANDS (19TH CENTURY)

Sibrandus Stratingh (1785-1841) was not only a professor of chemistry and technology, but also an inventor and businessman. He founded a white-lead factory, owned farms, was a director of shipping companies and commissioner of a mechanized flax mill. On 22 March 1834, he sent shockwaves through the local population by driving a steam-powered vehicle from the town to De Punt (20 km). He had designed and built the vehicle himself with his assistant, the German instrument maker Christopher Becker. A year later, this duo experimented with an electromagnetic car, which earned them a place in the history of the automobile. Stratingh died a few years later and Becker emigrated to America, where he founded Becker & Sons, a company for the manufacture of analytical balances and weights.

More about cooperation with the University of Groningen: www.holding.rug.nl



SCIENCE SHOPS

Our shop is open!

The Science Shops at the University of Groningen study questions emanating from society. The result: social impact. Free social impact. The research is carried out by students of the University.

In 2011, The North Netherlands Addiction Services (VNN) started training all its staff in solution-oriented working. This client-centred working method starts with the question: what does the client need? Despite all the obvious problems, what is going right in his/her life? Solution-driven working is expected to generate a drop in the no-show rate. No-show affects the quality of treatment and is a drain on the institution's resources. The Science Shop was asked to evaluate the effect of this new way of working.

Free of charge

'It was an important evaluation for VNN. Existing knowledge or Google simply couldn't tell them what they needed to know; innovative research was the best option,' explains **Jolanda Tuinstra**, chair of the Science Shops. 'We had the expertise and resources to carry out this research free of charge.' The VNN eventually decided to introduce

the new working method in all its ambulatory locations, based on the evaluation compiled by a sociology student.

Mindfulness

In the autumn of 2012, the Science Shop was asked by a project group to start a pilot study of informal carers taking a course in mindfulness. The main aim of the course was to reduce stress levels in informal carers and improve their quality of life. Mindfulness teaches you to be aware of certain patterns in the way you think and act. Tuinstra: 'Here too, the project group had no research budget. Our research showed significant improvements in the quality of life of informal carers who had taken the course, and fewer health problems.' On the basis of this research, healthcare insurer Menzis decided to include Mindfulness training in its supplementary insurance policies.

The Science Shops are asked to provide free consult, expertise and research around 140 times per year. Tuinstra: 'We provide low-threshold access to academic knowledge, and we answer every question in true academic style. We're here to help!'



'We provide low-threshold access to academic knowledge.'



MICROSCOPE FOR TRANSPARENT OBJECTS (MID20TH CENTURY)

Already as a student in Amsterdam, Frits Zernike (1888-1966) displayed flashes of brilliance. The famous astronomer Jacobus Kapteyn recognized his talent and took him to Groningen as his assistant. Zernike later became professor of theoretical physics. In his Groningen lab he developed the phase-contrast microscope. Existing microscopes could not give a clear picture of transparent objects such as micro-organisms. Zernike devised a solution that was based on the wave properties of light, permitting the study of internal cell structure without the need to stain and thus kill the cells. In 1953 he received the Nobel Prize for his innovative microscope. The patent went to his instrument maker Caroline Bleeker. In 1945, she started Nedoptifa, a company in Zeist that made optical instruments.

More about the University of Groningen Science shops: www.rug.nl/scienceshops



The changing face of journalism

'Our students find jobs or start their own media or communication businesses soon after graduating,' says Tamara Witschge, lecturer in the Journalism department and Rosalind Franklin Fellow at the University of Groningen. However, journalism as a breadwinner is going through an existential crisis.

The Centre for Media and Journalism Studies at the University of Groningen was set up to monitor changes in the way news is produced and consumed, and analyse the changing role of journalism in society. Some of this work comes from partners in the media industry, in need of the University's specialized knowledge and powers of reflection.

Revenue

How is the news industry responding to current advances in digital and social media, for example? Social media provide consumers with easy access to free news and social discussions. Witschge: 'Changes in consumer behaviour are jeopardizing the existing revenue models in journalism, which traditionally serves as the intermediary between

politics and citizens. New journalists are keenly searching for new revenue models to fund today's high costs of producing news.'

A state of flux

Which skills do media producers look for in young journalists? Witschge: 'In addition to the basic principles of journalism, we also teach our students how to reflect on the changes in the historical function of journalism and the current challenges and digital possibilities. This equips them for a career of high-quality journalism and gives them a business sense that will help them find their niche in a competitive market, whether as an employee or a freelancer.'

Journalism has a very important social function. Journalists are intermediaries between politics and society and as such, they are the guardians of democracy. They work towards the greater good, which also needs to be redefined given the current state of flux. Entrepreneurs from the media sector want to know where they are in order to align their strategy for the future. The Department of Journalism can provide the independent research into modernization that they need.'



'Journalism has a very important social function.'

PLASTICS FROM LACTIC ACID (20TH CENTURY)

Scientists at the University of Groningen have been researching the properties of polylactic acid since 1974. Professor of polymer chemistry Albert Pennings (1932) managed to adapt this biological plastic for surgical use. It was used to make plastic screws and plates for setting broken bones, for example. The material is broken down by the body, dispensing with the need for a second operation to remove it. The base material for lactic acid comes from whey, a by-product from the cheese-making process, which can also be derived from potatoes, grain and sugar beet. Unlike plastics made from oil derivatives, polylactide plastics are biodegradable. They are used in a wide range of products, including disposable cutlery and packaging. The companies Hycail and PolyVation are just two of several spin-offs.



More about top research at the University of Groningen: www.rug.nl/research/our-top-research



Bridge between theory and practice

Searching for a way to bridge the gap between theory and practice, the Department of Sociology at the University of Groningen set up SocioQuest, an interface that takes concrete initiatives to put knowledge into the services provided to organizations.

Their successful initiatives includes the rolling out of KiVa, an anti-bullying programme for primary schools. 'KiVa is a great example of how sociological research can be used to solve problems in society,' explains **Theo van der Zee**, co-founder of SocioQuest. His colleague in this venture is René Veenstra, a professor who has carried out pioneering research into bullying behaviour among children. Veenstra and his research group introduced the Finnish anti-bullying programme, KiVa, into Dutch primary schools to examine its effectiveness in the Netherlands.

Training

The first results of their experiments showed that the incidence of bullying dropped considerably in the KiVa schools. But having established this, what do you do next? Van der Zee: 'Academics are not there to implement knowledge; that is not

their job. Their job is to conduct research. SocioQuest enables a programme like KiVa to be put into practice, in a way that actually works.' In June 2014, teachers in dozens of new schools will be trained in the KiVa method.

ZorgfocuZ

Another SocioQuest initiative is ZorgfocuZ, a research agency that works on assignments from within the care sector. The focus is on the experiences and opinions of clients, staff and other stakeholders. Van der Zee: 'In ZorgfocuZ, we apply research methods that are common in academic research, but rarely or not yet used in practical research. These methods make it easier to interpret the findings of the research, and help in the translation of research into policy.' ZorgfocuZ has helped dozens of customers since it was founded in 2012. Not all of SocioQuest's activities are run under sub-labels such as KiVa and ZorgfocuZ. Van der Zee: 'If a lot of the questions turn out to be similar, we consider pooling them. In the light of the decentralization processes in the social domain, one of the things I'd like to start is a new initiative, with or without cooperation partners, to develop service provision to municipal authorities to help them with the forthcoming changes.'



'We help with the translation from research into policy.'

BIOMOLECULAR SIMULATION (LATE 20TH CENTURY)

Since 1976 the Groningen research groups headed by Herman Berendsen and Wilfred van Gunsteren have focused on dynamic simulation techniques, especially with respect to biomolecular systems. Their acquired knowledge was distilled into a computer software program package called GROMOS, an acronym for GRONingen MOlecular Simulation. The package has been distributed to hundreds of non-profit research groups all over the world and is used to calculate and predict the properties of biomacromolecular and macromolecular systems. Due to the growing size and interest in the package, Van Gunsteren, Berendsen and Foundation Science Park Groningen of the University of Groningen founded the BIOMOS company to take care of the distribution, maintenance and updates of GROMOS. In 1990 it moved to the ETH (the Swiss Federal Institute of Technology) in Zürich.



More about SocioQuest:
www.socioquest.nl
www.kivaschool.nl
www.zorgfocuz.nl



A RIGHTEOUS SOCIETY

Universities have an honourable and rewarding mandate: they help to shape a society that offers citizens a decent existence, regardless of their origins and individual talents. Our job is to train the leaders of the future, equipping them with the knowledge and skills they need to design and shape a just society, not only in academia, but also in industry and politics. This is why the University of Groningen was founded, four hundred years ago.



One of our primary tasks as a twenty-first-century University is to implement fundamental research to identify new and optimum solutions. We must generate more added value from natural resources and raw materials. Take oil, for example. Instead of simply burning it, we can investigate prudent, sustainable ways of using it to produce plastics and other materials. We shouldn't be generating energy from oil, but from renewable sources so that humankind can rely on the energy indefinitely and not burden the living environment or restrict opportunities for future generations. In some ways, you could say the same about dairy production (milk). I say this in jest: the worst thing we can do with milk is drink it. We can do so much more with it – proteins and sugars from milk can be converted into ingredients and products of far greater value. This is innovation.

Our University is a modern, internationally oriented research institute. We focus on cooperating with government and industry, partly to share knowledge and partly to generate new investment in research. In an ongoing trend, more and more top research is being used to resolve major problems in society. Here at the University of Groningen, we have formulated three societal themes in which we excel: Healthy Ageing, to ensure a healthy old age, Energy, to help with the transition to a sustainable and green society, and Sustainable Society, in which we are adding value to create a society where people can develop their potential, irrespective of their origins and education, both now and for the next four hundred years.

The examples in this brochure about entrepreneurship and the social impact of academic practice are merely a selection, but they convey the same mission as numerous other untold stories: to work alongside the University of Groningen is to invest in a better world. Let's do it together!

Prof. Sibbrand Poppema,

President of the Board of the University of Groningen

Facts and Figures

Main Facts

- > founded in 1614
- > 29,400 students
- > 6,300 first-year students
- > 4,151 international students
- > 6,500 staff
- > 10 faculties covering all disciplines
- > 110,000 alumni

Intellectual Property

Patent applications by the University of Groningen and the University Medical Centre Groningen:

- > 2013: 15
- > 2012: 13
- > 2011: 9
- > 2010: 9

International Position 2013

- > 92: Academic Ranking of World Universities
- > 92: National Taiwan University Ranking
- > 97: QS World University Rankings
- > 98: Times Higher Education University Rankings

Start-ups

- > total number since 2004: over 50
- > creation of jobs: over 300

Incubators

- > Consortium for Valorization and Entrepreneurship (CVO): combining innovative knowledge and entrepreneurship in the region
- > Business Generator Groningen: transferring knowledge generated at the UMCG and the University to companies and society

Annual Turnover 2013

- > total: € 614 million
- > contract research: € 175.8 million
- > contract education: € 7.9 million

Prominent Corporate Alumni

- > Annemiek Fentener van Vlissingen, President of the Supervisory Board of SHV Holdings
- > Caroline Gehrels, CEO Arcadis Big Urban Clients Europe
- > Paul Polman, CEO Unilever
- > Chris Vogelzang, Member of the Board of ABN Amro
- > Marlies van Wijhe, CEO Van Wijhe Verf
- > Marcel Wubbolts, CTO Royal DSM

healthy ageing > su
energy > food > indu
entrepreneurship
conomy > future
y > energy manage
energy transition >
ities > social inter
business developme
sustainable society
ustrial engineering
nnovation > new eco
connectivity > en
excellence > energ
ainable humanities