Rector's Speech for 2 September 2019

University of Groningen

Spoken version takes precedence

Our opportunities lie in data

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It is my great pleasure to welcome you to this celebration to mark the opening of the 2019 Academic year of the University of Groningen.

Today is a very special one for me. It is the first time that I have the honor to lead this annual ceremony, and I will focus on a timely theme: big data, data science and artificial intelligence. The deluge of new data, and the challenges and opportunities that relate to it, have inspired me to focus on this topic. I believe this is one of the areas where we, as a university, have to grow and develop further in order to also be able to face our societal challenges.

This theme requires an interdisciplinary approach for which we, as a broad university, are ideally suited. I would like to repeat the African proverb I stated during my inauguration: *If you want to go fast, go alone, if you want to go far, go together*.

In today's program we will hear three exciting examples of people working with big data and data science: the first from our Ubbo Emmius Medal winner, Prof. Michel Wedel, on the use of big data in predicting consumer behavior; the second from our alumnus of the year, Christiaan Triebert, on the importance of making data openly available; and lastly from our Spinoza recipient; Prof. Amina Helmi, on learning more about our universe by using data collected by the European Space telescope Gaia.

Much as coal was vital for the industrial revolution to flourish in the 18th century, we now live in a knowledge era for which data, data science and artificial intelligence are of crucial importance to the flourishing of society, and these have become part of most people's daily lives.
We use Google Maps to find our way around new cities, we manage our finances online, and we use social media to connect with family, friends and businesses. And this can all be done on our mobile phones! It is hard to imagine that current smartphones are more powerful than all of the computing

power that NASA needed to put the first man on the moon, just 50 years ago. That Apollo mission however, marked a period of exponential growth in more powerful and smarter computers.

In the years after the Apollo mission, IBM worked on developing intelligent computers. In 1997 they succeeded with Deep Blue, a chess-playing supercomputer that beat Garry Kasparov.
It took Google another 20 years to develop AlphaGo, which, in 2016, beat a human competitor in the Chinese board game Go that had been invented more than 2,500 years ago. Why was it so much more difficult to develop a computer able to play and win the strategic game of Go, compared to chess?

Both games are characterized by an unimaginable number of possible moves:
10 to the power of 123 (10^{123}) for chess and 10 to the power of 360 (10^{360}) for Go! Because of the greater complexity of Go, the traditional artificial intelligence methods were not sufficient and a deep learning method was needed that was able to learn from its own performances, very similar to how humans learn, from practicing over and over again.
Big data, machine learning and artificial intelligence have already revolutionized, and sometimes even disrupted, professional business sectors. Widely known examples include the ICT platforms for service companies such as Airbnb and Uber, but also robotics and self-driving cars. Many professions and research activities are becoming more dependent on artificial intelligence, pushed by the large volumes of data that are being collected in the healthcare system, for example, or by insurance companies, through social media, and by radio telescopes and satellites. According to IBM, the vast majority of data available today has been generated in just the past 2 years.

Collecting data is no longer particularly difficult, but translating it into useful information, and knowledge, is often a major challenge. The use of data and computers started back in the 1950s in the humanities, in areas like linguistics and archeology, but it has now become normal practice in fields as far ranging as climate science, psychology, and managing the economy, amongst many others. Its influence and importance within and across our own academic fields will continue to grow. In the next decades, we will see radical and rapid changes, in which some jobs and disciplines will cease to exist, while new and surprising ones will appear. Open data and digitization, and augmented- and artificial intelligence, will bring about significant changes and pose great challenges to both academia and society.

But how can we prepare you, students, for the future, in particular with respect to today's theme?

It is important that you develop your talents, but that you are also be able to cope with the opportunities, challenges and risks associated with big data and data science.

Data science is by definition interdisciplinary, and requires that students can interact widely across academic disciplines and with non-academic partners, since they too are making rapid progress in the field of data science. This requires a new type of education that is future-proof with respect to data science. To achieve this, we also have to adapt the education system, which needs to change from the more classical way of providing education aligned along the traditional academic disciplines.

In the past few months I was pleased to learn that the majority of our faculties are already working in the area of artificial intelligence. This gives us a unique opportunity to bring lecturers and researchers together to share their views, skills and practices. An interdisciplinary approach to education, with an emphasis on big data, data science and artificial intelligence, will prepare you, students, for a future that requires new scientific knowledge, innovations and technology to tackle the societal challenges relating to our changing climate, our ageing population, and the sustainability of our planet. It is important that you learn about the critical problems affecting the world, and that solving them is becoming more and more dependent on combining and interpreting data. I want to give you three examples to illustrate this.

1. The first is a recent article[1] in Nature Climate Change, directed by the Energy and Sustainability Research Institute Groningen. It uses extensive climate data from the KNMI combined with computational modeling to prove that the reduction of sea ice in the Arctic does not cause severe winters. In fact, it is changes in the atmosphere that are responsible for both the loss of sea ice and the cold winters. This is important information as global warming is expected to lead to an even greater reduction of Arctic ice, although this is not likely to lead to more extreme winter weather.
2. The second example is a big threat for our aging society –it is the increased burden of diseases of the elderly, like diabetes, Alzheimer's disease and coronary artery disease, and the lack of effective treatment modalities. Interestingly, a partnership between a pharmaceutical company and the genetic testing enterprise 23AndMe – a prime example of citizen science – has already produced 6 new drug targets.

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[1] Blackport, R.J.A. Screen, K. van der Wiel, R. Bintanja, 2019. Minimal influence of reduced Arctic sea ice on coincident cold winters in mid-latitudes. Nature Climate Change: https://www.nature.com/articles/s41558-019-0551-4

This is exciting, in particular since drug targets based on genetic knowledge are twice as successful at delivering a product compared to other targets, but it also shows the importance of biobanks in unlocking the new and important knowledge needed to combat the threat of an increasingly aging society.

3. The third example comes from the United Nations: a few years ago they have defined 17 sustainable development goals for a better future for all. These include affordable and clean energy, climate action, life on land and underwater, and good health and well-being. These global challenges partly overlap with our own societal challenges. It was the UN Secretary-General, Ban Ki-moon, who, on accepting an honorary doctorate from this University, addressed you, students, saying you have a duty to act with respect to these goals. Interestingly, the UN has launched several initiatives to capitalize on the digital revolution and availability of big data to reach these goals.

In these three examples, the essence lies not just in the data or in the artificial intelligence, but in combining their powers, while taking social, legal and ethical issues into account.

Working together, beyond the borders of individual disciplines and universities is imperative. We should also encourage you, students, to interact with the wider world to learn how theory and practice go hand in hand.

We collaborate with the New Energy Coalition, which can make connections between important partners, and the municipality and province of Groningen.

We are also in an excellent position because this University has a fantastic biobank, Lifelines, which offers unique opportunities for you to work together on big data and across disciplines on issues related to healthy aging, sustainable health and people's well-being.

Furthermore, in a recently established collaborative agreement, our University has decided to work more closely with Wageningen University in the area of agro-ecological systems and circular agriculture in the north of the Netherlands. This will create opportunities for you to learn about state-of-the-art digital applications to track changes in nature and the environment, for example.

The WaterCampus Leeuwarden, which includes Wetsus, a European center of excellence for sustainable water technology, might also be an interesting partner in this work. Especially since we now have our Campus Fryslân in the beautiful historical Beurs building in Leeuwarden.

And these are just a few examples of the exciting opportunities we have here in Groningen.

Our modern, fast-changing world needs us to deliver open-minded students who will share their knowledge and skills, who recognize the power of data, and who are able to contribute to solving the challenges society is facing. At the same time, this will strengthen Groningen's position as a broad

university, as it will encourage people in the arts, sciences and social sciences faculties to work more closely together.

There are, however, several challenges ahead of us, and these relate to resources and to the ever increasing pressure:

- on our lecturers, researchers and support staff,
- on how we can and should award teamwork,
- on how to make data open access and science transparent,
- on how to motivate our students to develop an open attitude towards their own education,
- and on how to align education and research, while at the same time respecting the ideal of academic freedom.

These all require us to have a clear focus, which will be outlined in our new strategic plan 2020-2025 that will be developed in the coming months. We, the newly formed Board have outlined a plan on how to do this together with you, staff and students of our university.

2019 is a year of celebrations. In June we celebrated the 405th anniversary of our University and just one week later we heard the exciting news of the Spinoza prize awarded to Amina Helmi, and last week the Gravitation grants were announced and we participate in two of them, both on the topic of big data and artificial intelligence.

On the 21st of July, it was 50 years ago that man first set foot on the moon. The Apollo mission was provoked by the Americans' urgency to win the space race against Russia, but the reason for its success were the people and the team who worked together, inspired by a common, challenging goal! As a University we are a great community that, together with our partners and society, can achieve the most challenging and exciting goals. I feel proud of our students for having done extremely well in the past year, and of the staff whose passion for teaching led to a positive assessment for the Institutional Quality Assurance Assessment.

I wish everyone inspiration and success for the academic year ahead and would like to end with the famous words of John F. Kennedy, which summarize the nature of the missions we have ahead of us:
we choose to go to the moon […] not because it is easy but because it is hard.[2]
Thank you.

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[2] The full quote is "We choose to go to the moon. We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win, and the others, too." (Rice Stadium, 1962)