

Address on the occasion of the 179<sup>th</sup> Dies Natalis  
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Good afternoon, and welcome to our Dies Natalis 2021.

Welcome, colleagues, students, alumni, and all those who care about TU Delft.

What a difference a year makes. This year, no procession of professors, no filled Auditorium, but as you can see behind me, an almost empty campus. A sight that symbolises the crisis that started early last year. A year on, and the pandemic is far from over.

I am more hopeful, now the rollout of vaccination is under way, but I am also worried about the effects of prolonged online education on students and teachers, and about all the stress a renewed lockdown is bringing. 2020 has been a very tough year for all of us in many ways.

Yet, looking back, it seems to me that we coped quite well under the circumstances. One way or another, we continued our education, our research and most other activities. It was hardly ideal and far from easy, and we all have our own story to tell about 2020. About how we juggled our responsibilities at home and at work, how we worried about our loved ones, and how we tried to stay focused and motivated through it all.

A number of these stories we have collected in our annual Portraits, this year dedicated to our university in times of corona. You can read them online on our story platform. And if there is one thing the heroes of these stories have in common, it is the resilience they show. They do not fall apart under stress, but carry on despite everything and adapt to the new situation. They manage to make a virtue out of necessity: they steer their research in new directions, or speed up the introduction of robot manufacturing in education. They see the positive side of things, for example that forced online education now, lowers the threshold for blended education later on.

All the while, they show remarkable modesty. This is what we do, they say, and: this is just us, engineers being ingenious, and: we were glad to be able to help. In fact, they should be proud of themselves. And so should you. Because these tales are about all of us, and they were written to honour your impressive achievements in the past year.

So on balance, many good things happened even in such a bad year.

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Resilience then, is a great characteristic to possess in a crisis.

Not just the current crisis, but also all of the crises that have seemingly taken a backseat, but are still out there. Ongoing global challenges, like health care and climate change issues, and dwindling natural resources, and threats to the world's ecosystems.

To weather them, societies, with all their interlocking systems, must become much more resilient.

What do we mean by that? A resilient system – or community, or society – has to be able to withstand and recover from unexpected events, like natural disasters, cyberattacks or economic crises. Moreover, it should not just bounce back, it should also be able to learn from the crisis and to adapt.

So how resilient did we prove ourselves to be in the Netherlands during the coronacrisis? We all know the story: our healthcare system was in danger of becoming overwhelmed, and to stop this from happening, life as we knew it ground to a halt. The effects of Covid-19 rippled through our healthcare system, our politics, our social circles, the economy, transport and distribution systems, and so on. It showed the unexpected ways in which all these systems are interconnected.

How can we – as a university, a country, a global community – be better prepared for the next foreseen or indeed unforeseen disaster? How can we safeguard next generations? How can technology help us in this? And how can we design this technology in a way that is ethical and fair, so that it does not infringe our rights, or increase social inequality?

The current situation highlights the urgency, but these are not new questions. A lot of thinking has already gone into these matters, at TU Delft and at our fellow universities. That is why this week we have treated you to a wealth of insights in resilience – with showcases, talks, videos and a daily radio broadcast by BNR.

Society needs Resilience and Resilience needs Technology, that is the central message of it all.

Today we conclude with this live event.

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Now, let me take you back to last year's Dies Natalis celebration, where we announced our plans for increased collaboration with our academic partners: the Erasmus University, the Erasmus Medical Centre, Leiden University and the Leiden University Medical Centre.

It is our strong belief that we must merge our knowledge of the technical, medical and natural sciences with the social sciences and the humanities, in order to find integrated solutions to major societal challenges. This merging of disciplines is called convergence.

The coronacrisis has only reinforced the importance of this. Fighting the pandemic requires not just medical knowledge but also insights from economics, behavioural sciences and ethics. Just like resilience, it requires a holistic approach.

So what has happened in the past year? Within our partnership, researchers have been working in an integrated manner on three focus areas.

Let me give you a quick recap for all three of them.

1) Resilient Delta:

Here, we are looking at the City, the Future of the Port and the Delta in general.

Last year, researchers from the Erasmus University, TU Delft and the Erasmus MC, joined forces with the National Programme Rotterdam South. They work on issues related to urban inequality, such as health, debts and housing. Together with social scientists, we look at this from new perspectives. For example, how to design neighbourhoods so it increases opportunities. The ultimate aim is to achieve broad prosperity in the region.

When you look at the future of the Port, the energy transition means great changes for port management, for the chemical industry and for the city and its people. We are working with Erasmus University on the relationship between port and city, in addition to existing initiatives like SmartPort.

Rotterdam, and deltas around the world, also have to be resilient in the face of crises like rising sea levels. Climate action is already a priority at TU Delft, and this offers new opportunities. For example, we are working on new demonstrators for climate monitoring, and we are exploring the links between climate and the spread of mosquito-borne diseases.

## 2) Artificial Intelligence, data and digitalisation.

TU Delft has a strong presence in the domain of AI. Nature – the leading science journal – ranks TU Delft in its top 100 of AI research organisations, as the only Dutch university. Together with Leiden University, Erasmus University and both medical centres, this can grow even stronger. Last year, we formed the AI Hub South Holland, with more than 1200 AI researchers.

We will considerably expand our AI courses and minors in the next 2 years, so all 85.000 students in our region will be able to take part in specific AI courses. A number of these courses will be accessible for alumni as well.

In a joint research agenda with industry and regional partners, we target these themes:

- energy and sustainability,
- health and care,
- port and maritime,
- peace, justice & security,
- and technological industry.

Convergence offers us new directions, such as the opportunity to include economic models into our digital simulation of factories and production processes. Supported by the National Growth Fund and the National AI Coalition, we will see new projects this year. For example on subjects like AI for Law & Justice, or a 24/7 AI controlled renewable energy network. An important aspect is the connection of research *in* AI and research with AI. Over the course of this year we will have established 24 new Delft AI labs for the cross-fertilisation between AI experts and scientists who use AI in their research. Some have already started: like Machina, where machine learning is used to advance new materials, or Aidrolab where AI is used to tackle water problems in the urban environment.

In all of these activities we take a human-centred, responsible and ethical approach, to make sure that complex systems will benefit people and society.

### 3) Health and technology

This is where our convergence activities originally started, even before we put a name to them. As ever, there is great enthusiasm, and ideas for collaborations are coming from all sides. At the first open meeting for interested researchers last year, no less than 500 people showed up.

We're building a Convergence Ecosystem: a community of 30,000 students, researchers, clinicians and entrepreneurs, who work together on research, education and economic impact.

To name a few initiatives: there is Healthy Start, focussing on the years from conception up to adolescence. In Consultation Room 2030, we use a research-by-design approach to develop the consultation room of the future.

All in all, we want to start up at least ten new flagship programmes with a budget of 5 million or more, over the next five years. This year, we are setting up convergence squares, where people can meet up and work together online. We will also increase the number of health- and care related start-ups on campus, and contribute to the new national MedTech programme.

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Now where do we go from here? For many of us, the crisis has been a wake-up call that showed us the things that really matter. We have also seen that if we have to, we can quickly adapt to new situations and learn to live our lives differently. And if we all act together, we can make a change.

So if and when this is over, let us not just bounce back to how things were before, but let us use this crisis as a springboard for the future, a new future. A future where we no longer put short-term economic gain over long-term public health and sustainable development.

Together, we can make this happen. If the past year has shown one thing, it is that we are on the right track with our holistic approach, incorporating all areas of learning.

We have also seen it during this Week of Resilience: success lies in merging different perspectives in a way that goes far beyond a multidisciplinary approach. We need to do this systematically and on a large scale. Big questions need big science. And convergence is our way of achieving that. In fact, it is our responsibility as a university, as academics, as engineers.

However, the success of a lot of what we do, including our convergence initiatives, also depends on physical proximity. By being able to meet up and to exchange ideas. We have worked hard to transform our own campus into an innovative ecosystem, with some 245 businesses at the last count, and a research infrastructure including numerous living labs. New joint research labs and meeting spaces are being created as we speak. That is why it saddens me to look behind me at the emptiness.

Just like you, I can't wait to see our campus come to life again, and I hope to welcome you back soon.