Dear reader,

Kodak developed the first digital camera in 1975. It was able to make 0.01 megapixel black and white pictures and utterly useless. In 2003, the sales of digital cameras already exceeded the sales of traditional cameras and later smartphones overtook dedicated cameras. Despite its early inventions, Kodak failed to adapt to this spectacular transition from analog to digital. Digitization resulted not just in digital photos, but also in new business models, new ways of social interaction, and new applications ranging from geotagging to detecting skin cancer. Only organizations that can exploit these new sources of data will survive.

DSC/e researchers are eager to develop novel approaches to analyze such data and use these in their research. However, with great power comes great responsibility! We also need to train students to use the ‘power of data science’ in an effective, but also responsible manner. Several new educational programs (not only at TU/e, but also in Mariënborg, Den Bosch) are lined up to train data scientists considering fairness and privacy issues while using their ‘superpowers’.

In this DSC/e magazine, you will find news and background stories. Enjoy reading!

Wil van der Aalst,
Scientific Director DSC/e
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Calendar

DSC/e Lectures

March 15th, 2016
DSC/e Lecture by
Dian Tjondronegoro
Queensland University of Technology
Location: TU/e, Zwarte Doos
http://dscelecturemarch15.eventbrite.nl

May 19th, 2016
DSC/e Lecture by
Mykola Pechenizkiy
Eindhoven University of Technology
Location: TU/e, Zwarte Doos
https://dscemay192016.eventbrite.nl

June 9th, 2016
DSC/e Lecture by
Alp Akçay
Eindhoven University of Technology
Location: TU/e, Zwarte Doos
www:dscelecturejune9.eventbrite.nl

June 29-30th, 2016
EDF2016
European Data Forum
Location: Evoluon, Eindhoven
www.2016.data-forum.eu
Data Science Center Eindhoven

Data science is here to stay!

The Data Science Center Eindhoven (DSC/e) was founded in 2013 by the Eindhoven University of Technology (TU/e). Its goal is to set up a world leading research program in data science. The center is run as a doctoral school with a scientific research program consisting of seven major research programs:

- Process analytics
- Customer journey
- Smart maintenance & diagnostics
- Quantified self
- Data value and privacy
- Smart cities
- Smart grids

DSC/e research contributes to the challenges of the TU/e Thematic Research Areas: Health, Energy, and Smart Mobility. Each of these areas witnesses a rapidly growing volume of data triggering a variety of scientific and societal challenges.

Currently four university departments work together in close cooperation on the research programs of the DSC/e:

- Department of Mathematics & Computer Science
- Department of Industrial Engineering & Innovation Sciences
- Department of Industrial Design
- Department of Electrical Engineering

Professor Wil van der Aalst is the scientific director of the DSC/e. Given the empirical nature of data science, DSC/e collaborates with a wide range of organizations. Collaborations include larger joint research projects, PhD projects, master projects and contract research.

For more information, visit our website www.tue.nl/dsce. Please contact us via email dsce@tue.nl or telephone the DSC/e program manager Maurice Groten at +31 (0)40 247 8639 with specific questions or remarks.
Prof. dr. Jakob de Vlieg is dean of the Department of Mathematics & Computer Science at TU/e from 1 September 2015. He is also professor of applied data science. De Vlieg has worked as top R&D manager at Bayer, Organon and Schering-Plough. In addition, he was director of the Netherlands eScience Center in Amsterdam, and from 2000 until this year part-time professor of bioinformatics and computational chemistry in Nijmegen. De Vlieg studied biophysics at Groningen University and gained his doctorate in the simulation of DNA-protein interactions in the computer.

“Bring people together to take data science to the next level”
“We need an integrated approach for data-driven research and innovations”

as the new dean of the Department of Mathematics & Computer Science of the TU/e, Jakob de Vlieg has big plans for the further development of the Data Science Center Eindhoven. The dean, who is also a professor of applied data science, states that it is time for ‘the next generation of data science’.

“We have to join hands and bring people from different disciplines and backgrounds together. Only then we can work on solutions. What we need is an integrated approach for data-driven research and innovations in data science.”

**Technology hopping**

‘Technology hopping’ is a term that comes to the deans’ mind while making these strong statements. De Vlieg explains: “When you work with scientists from a different field than your own, it stimulates you to step out of your own comfort zone. By starting up a real dialogue, together you can find new solutions to a problem that you’re focusing on in your scientific research. For example: A while ago I visited Cambridge in the UK. I was working in the pharmaceutical industry at that time, so I met with people that were doing research in that field. At Cambridge, oncologists had started working together with astronomers. A surprising collaboration, at first glance. But: it turned out that both groups of scientists could learn a lot from each other. An astronomer is very good at analyzing small changes and differences in images (such as changes in the stars). Oncologists have to do that as well: in order to detect breast cancer, they have to be able to detect small changes in tissue. It turned out that the algorithms they use in astronomy were also usable in..."
breast cancer research. So you see: when you bring people together, with a shared goal, they can come up with the most beautiful new solutions and innovations. You can find that in the most unlikely places.”

**Broad interest**
What we need in this next level in data science, are people that have a broad interest in many fields, not only in their own field of research. You have to be able and willing to look over the boundaries of your own comfort zone, says De Vlieg. “The ‘new’ scientific researcher is someone who can bring that broad interest with him, and who can work with it. He or she has to have a true interest in others, and has to have behavioral competences, such as storytelling. Because, when you think of it: the most groundbreaking research we have seen over the last few years, was research that was conducted by scientists from different disciplines working together in multidisciplinary teams.”

**Monodisciplines**
Good results in multidisciplinary teams can only be reached if we keep investing in monodisciplines as well, sais De Vlieg. “Currently, multidisciplinary and data-driven research programs are identified in a variety of science and innovation areas including process analytics, logistics, customer journey mapping, predictive maintenance, quantified self, health and well-being, agro-foods, high tech systems and smart cities. These programs build upon on a variety of scientific disciplines including data and process mining, ethical and legal expertise, mathematics, computational sciences, human technology interaction research, advanced visualization and marketing research and so on. Strong investments and fundamental research in monodisciplines are essential for success in multidisciplinary research.

It is the deans’ goal to bring different people and different disciplines together at the TU/e as well. “I want professors and PhD students, young and old, from education and industry, all working together. Innovating together. If we can reach that goal, I think we can be leading in our scientific research.”

**The work of human beings**
That goal cannot be achieved without the people of the TU/e, its partner universities and the companies the university works with. “Data science is the work of human beings. No matter how many great computers you have, or how many perfect algorithms; without people to analyze and innovate, you have nothing of any value. Or, as Picasso once said: ‘computers are useless, they can only give you answers.”
Data are becoming the new raw material of business

Craig Mundie, Senior Advisor to the CEO at Microsoft

Numbers have an important story to tell. They rely on you to give them a voice

Stephen Few, innovator, consultant in fields of business intelligence and information design

Analyzing data is worth the cost. The price of light is less than the cost of darkness

Arthur C. Nielsen, market analyst and founder of AC Nielsen Company

Data beats emotions

Sean Rad, founder, Ad.ly

Hiding within those mounds of data is knowledge that could change the life of a patient, or change the world

Atul Butte, Stanford School of Medicine

Big Data is not about the data

Gary King, Harvard University, making the point that while data is plentiful and easy to collect, the real value is in the analytics

In God we trust. All others must bring data

W. Edwards Deming, statistician, professor, consultant
Eindhoven University of Technology (TU/e) is working on new education programs in data science (bachelor and masters). Many of the founding fathers of the Data Science Center Eindhoven are involved.

To promote the new education programs in data science, the university steps out of the comfort zone of flyers and brochures, and presents an exciting film trailer on data science. Watch the film on tue.nl/datascience
“I’ve been expecting you”
The mathematician in the film trailer is played by Sorin Pop, associate professor at the Department of Mathematics and Computer Science at TU/e: “Mathematics are very important in data science. We need mathematical models, statistics and cryptology. And we need to answer questions like ‘how do I interpret the data that I have at hand?’ or ‘what are the missing links, the flaws in a data set?’. It is very important to involve young people that have an interest in mathematics. They are the future.”

“To change the present, you have to predict the future”
Technological and societal changes have led to an explosion of digitally available data. Exploiting the available data to its fullest extent is one of today’s major challenges. In order to improve decision making, increase productivity, and deepen our understanding of scientific questions, it is important that we explore the data in order to be able ‘to predict the future’. Data science is an emerging discipline that aims to address this challenge.
The ethical dimension of data science

Hospitals, government organizations, social media, companies: they are all collecting data, every day. Sometimes, you know that data about you is recorded, in some cases you even give your consent. The ever-growing amount of data, and the way someone collects it and uses it, raises ethical questions. A conversation with Philip Nickel (assistant professor in philosophy and ethics at TU/e) and Francien Dechesne (university lecturer in philosophy and ethics at TU/e).

When you as professors in ethics look at data science, what comes to mind?
“The whole process of data collecting and data analyzing is pretty new. We have to find out what ethical issues come up, and how to deal with them. It’s like when we first started using computers: this new kind of science raises many different issues.”

Can you give an example of privacy issues related to data science?
“We see a shift from research conducted by questionnaires to ‘living lab research’. In Eindhoven, for example, we are doing living lab research at Stratumseind: a famous street in the city center lined with

“For data scientists, personal integrity and taking responsibility are important?"
cafes and restaurants. Our university is involved in the research, together with companies and the city of Eindhoven. In this project, we are collecting data about human behavior. We go out, look at people’s behavior and record that. The people we are observing, haven’t given their explicit consent. So there’s your privacy issue: how do you protect the privacy of the people you are using in your research? There are no widely established rules for that yet in living lab research, although researchers in Eindhoven take these issues seriously. We cannot rely merely on the fact that these kinds of research are ‘projects for the sake of the public good’. We have to conduct the research with respect for citizens.”

**What is important for a data scientist to do concerning the impact that their work has?**

“In these cases, it is important that data scientists are aware of the very broad impact their work has. Data science, or big data, is expected to have a major impact on societal issues like security, health, mobility etcetera. This means personal integrity and taking responsibility are important.

Also, because data science contributes to radical and fast innovations, it would be insufficient to exclusively rely on existing law and jurisprudence to judge whether the innovation is ethically responsible. From an entrepreneurial perspective, it is wise to think about issues around privacy and security in advance.”

“What about companies that collect data from their customers? For example: Mattel introduced ‘Hello Barbie’ this year. In Hello Barbie’s necklace is both a recorder and a microphone. Using wifi, the jewelry will pick up a child’s questions and conversations - and transmit them back to a control center for processing. This way, Mattel can collect data about the child that is playing with Hello Barbie and use it to make better products. The potential for misuse of this private data is a legitimate concern.

Philip: “Certainly. For me, a lot depends on whether the Barbie data can be used to identify or re-identify the child, whether the parents knowingly consent on behalf of the child to have data collected, and whether the data is used to market products directly to children, bypassing parental controls. This new development certainly is something we have to be concerned about. There is still a lot of interesting work to do for us.”

Francien Dechesne and Philip Nickel
Data science as a catalyst: mathematics reinvents itself

They both fully agree: being a mathematician equals having the best job in the world. A strong statement made by Johan van Leeuwaarden and Remco van der Hofstad, full professors of Mathematics at the TU/e. DSC/e Magazine had a conversation with them on mathematics and data science by means of three statements.

Mathematics is the key to the best jobs in the world.

Johan: “Every year, CareerCast makes a ranking of the best jobs based on salary, job opportunities, and job satisfaction. In 2014, mathematicians were on top of the list. This year, the mathematician is in third position. The first place is for actuary, fourth is the statistician, sixth on the list is the data scientist: that makes four mathematics related jobs in the top six! For a mathematician, job opportunities are endless. Companies in all sectors and domains -such as
Mathematics is a key enabling technology

Mathematicians are essential in the process of analyzing the huge amounts of data we have at our disposal. Remco: “In analyzing data, people can easily make mistakes. Applying mathematical methods can avoid making those mistakes, because a mathematician looks at certain patterns and things that other people will overlook. In mathematics, we focus on the things that are really relevant in data sets, where others sometimes stop looking after they have found ‘the obvious answer’. It makes me think of a story about air planes. In the second world war, the Royal Air Force lost many planes to German anti-aircraft fire and wanted to reinforce the planes. A team of engineers investigated the planes that returned to England after having been on the battlefield in Europe. Where were these planes hit and where to reinforce them? An obvious choice is to reinforce those parts that had lots of bullet holes in them. But the math will tell you that this is wrong. Indeed, even though it is not possible, you should actually look at the bullet holes in the planes that did not come back... The returning planes can help you though, and counterintuitively suggest to make the parts where they were not hit stronger. This story is a good metaphor for the role math can play in data science. Are there any flaws in the data? Can I find underlying patterns? Do I focus on the context of the data or the tools I need to analyze them? Do we have all the relevant data, or only a biased sample? Mathematics can help answer those questions.”

Thanks to data science, mathematics is reinventing itself in new forms and shapes.
Johan: “Data science is a catalyst for new forms of collaboration between different disciplines and domains. Scientists that didn’t work together before now join forces and mathematics is at the heart of these multidisciplinary initiatives. Data science also stimulates new developments within the field of mathematics. It enables us to ‘reinvent’ ourselves. Data science provides a source of inspiration for developing new mathematical tools that can help understand the new realities we are facing.”
“The EIT master program is much more than a regular master program. Apart from the technical education there is a lot of focus on getting familiar with the entrepreneurial process. One gets a lot of hands-on business education to develop the mindset needed to start a venture. Knowing you have the support of the international EIT network, which includes startups, business coaches, investors etc., is very encouraging. It should be no surprise if many of us start an entrepreneurial adventure of our own, in the near future.”

- Akash Singh
EIT student

EIT Digital: educating the data scientists of the future

The Department of Mathematics and Computer Science of the TU/e is involved in EIT Digital Education: a knowledge and innovation community of the European Institute of Innovation and Technology (EIT). Its mission: to foster digital technology innovation and entrepreneurial talent for economic growth and quality of life in Europe. Farideh Heidari, assistant professor in the Department of Mathematics and Computer Science and program manager of the EIT Digital Master Program in Data Science, coordinates and chairs the program at the European level. She answers a few questions about the EIT Digital master program in Data Science.
How does EIT Digital contribute to the education of the data scientists of the future?
“EIT digital is active in entrepreneurial education as part of its mission in forms of a Master School, a Doctoral School and a Professional School. The Master School provides a master in Data Science, with the mission of educating entrepreneurial data scientists of the future. Besides entrepreneurial education, mobility is a distinctive element of the program. Master School students follow a program where they study one year at an ‘entry’ university and one year at an ‘exit’ university in two EIT Digital’s hot spots in Europe. Upon completion, students receive a double degree from the two universities, recognized by the European Institute of Innovation and Technology.”

What is the EIT Digital Master Program in Data Science about and when was it developed?
“The first intake of students happened in the academic year 2015-2016. We managed to be between the top three masters in terms of number of students (46). The Data Science Master’s offers a unique academic program, whereby students can study data science, innovation, and entrepreneurship at leading European universities. In this program, students will learn about scalable data collection techniques, data analysis methods, and a suite of tools and technologies that address data capture, processing, storage, transfer, analysis, visualization, and related concepts. An important part of the program are the Innovation and Entrepreneurship (I&E) courses. The I&E basics course provides an introduction to business & management. Students participating in Data Science are offered an internship with an industry partner or research centre of the EIT Digital to work on their thesis project.”

Who is involved?
“At this moment, five leading European Universities are involved in this program: Universidad Politecnica de Madrid (UPM) in Spain, Eindhoven University of Technology (TU/e) in the Netherlands-, Université Nice Sophia Antipolis (UNS) in France, Royal Institute of Technology (KTH) in Sweden, and the Technische Universität Berlin (TUB) in Germany. TU/e is chairing and coordinating the program.”

What kind of knowledge and experience does a data scientist have to have, to be able to be successful in the modern times we live in?
“This is a profession in a highly innovative area. The data scientist is a professional who simultaneously possesses breadth and depth in scalable data management, data analysis, and domain area expertise, and who is capable of solving real-world problems. Beyond the boundaries of mathematics, computer science or entrepreneurship is where interesting interaction can take place. That is exactly where a data scientist really can add value because of his various skills.

The EIT program not only provides a competitive world class education, but also trains the students on how to transform their knowledge to innovative solutions tackling tomorrow’s challenges.”

What developments and activities can we expect in the near future?
“There are requests from other European universities to join the program. This will enrich the program in providing more specializations, next to the existing ones: Multimedia & Web Science for Big Data at UNS, Design, Implementation, and Usage of Data Science Instruments at TUB, Process Mining in High Tech Systems, Healthcare, Visual Analytics, or Big Software at TU/e, Distributed Systems & Data Mining for Really Big Data at KTH and Infrastructures for Large Scale Data Management and Analysis at UPM. We had a huge number of applicants in the first round of application for 2016-2017. This number of applicants helps us to select quality students that hopefully contribute positively to the area of data science.”

www.masterschool.eitdigital.eu
Puck Mulders: master student Data Science in Engineering

“I want to build bridges”

She is currently taking the master Data Science in Engineering and she’s loving it: Puck Mulders. With a brand new bachelor in Data Science on the way, she is a bit jealous of the students that can enroll that new education program. But for Puck, a future as a data scientist is also just around the corner.

“No, I certainly am no hero in programming. I’m mostly interested in the abstract side of data science: developing algorithms to analyze and visualize Google data, for example. The possibilities are endless: the amount of data we can work with, is exploding at the moment.

Mathematics and linguistics
What I like most about this Master track I’m taking, is the fact that I can combine my love for mathematics with the love for linguistics. In data mining, language -and the meaning of certain key words- play a big role. Take sentiment analysis on Twitter: how many people tweet in a positive way about elections, for example? You can analyze that by giving certain meaning to key words and key sentences. Filtering those key words and sentences by following a strict procedure will give you interesting insights.

Bright future
Am I jealous of the new generation students in data science? Of course, I would have loved to enroll in the new education program. But I see a bright future ahead of me. Where will you find me in a few years from now? I won’t say no to a job offer from Google, haha. But I would also like to come up with a new and better way to analyze the language and linguistics of children’s books. Building bridges between computer science and linguistics, that is my dream.”
TU/e is involved in ‘living lab research’ at Stratumseind in Eindhoven. The street is famous and loved for its many restaurants and cafes. It attracts many, mainly young, people from Eindhoven and surrounding cities. With the living lab research, the city of Eindhoven records human behavior directly from the ‘place to be’. The data that are collected, are used to make Stratumseind safer, more alive and more attractive. Brainport region Eindhoven is the first in the world to conduct living lab research in a public space.
What do a high school, a computer hard disk, vessel traffic off the Dutch coast and phone calls in the Ivory Coast have in common? Nothing, you would say at first glance. But they do! Professors and students from Eindhoven University of Technology (TU/e) made visualizations of data collected from all these subjects. These visualizations bring the data to life, and that way they can help people to answer questions they have. Information visualization and data science go hand in hand.

Jack van Wijk, full professor in visualization

“Working in information visualization is a dream”
Imagine: you have a thriving business but you want to keep improving what you do. You would like to come up with innovations. In order to be able to do that, you would have to take a closer look at what you are doing. How do your business processes work, how many customers do you have, what does their behavior tell you?

Every organization generates and collects vast amounts of data. In that data, the answers to questions like ‘how do I innovate my product’ or ‘how can I improve the way I’m working’, are hidden. Information visualization can help in analyzing and understanding the data.

**Interactive visual representations**
Information visualization is ‘the use of computer-supported, interactive, visual representations of abstract data to amplify cognition’. Jack van Wijk, full professor in visualization at the Department of Mathematics and Computer Science of the TU/e, explains: “Data comes in different types: text, video, figures, numbers. When you want to analyze vast amounts of data, it is almost impossible to do that by looking at pages and pages of numbers, for example. The human brain can process images much better than vast amounts of numbers. What we do with information visualization, is transform data into images that provide insight to people.”

**Eyes and brain**
Information visualization has a lot to do with how people process visual stimuli. When you look at an image, not just your eyes but mostly your brain is constantly processing. Colors, shapes, sizes: it’s very important to choose them wisely when you create a visualization. Our perception has its limits. If a symbol is too small, then the brain has difficulties to process it and to see what color it has, for example.

Van Wijk: “For me, working in information visualization is a dream. It’s the most fun profession in the world. Solving real-world problems, all with their own challenges, using a mix of computer science, math, psychology, design and art is highly fascinating and rewarding.”

**What’s the problem?**
As a visualization architect, it is important to listen to the people you make a visualization system for. “We don’t ask someone ‘what kind of image would you like to get?’ We try to find out what the problem is someone is dealing with, and then we create an interactive visualization solution”, says Van Wijk. “A visualization system has to be relatively simple, and has to provide the user with the things he needs, to find answers to his questions. Do the users want to reduce maintenance costs on their machines? Then we visualize the data that they need to do so, and we provide interaction to make it possible to focus on what’s relevant. For instance, we give an overview of all their machines, highlight those with issues, show hardware messages per year, month, or day, and on demand the contents of the messages are shown.”

**DSC/e**
Information visualization at TU/e is now also involved in the Data Science Center Eindhoven (DSC/e). Van Wijk and his students take part in the flagship project with Philips. And the professor also participates in the development of the new education programs in data science. “Working together in DSC/e is very rewarding. It opens doors to working on new research programs with people from many different disciplines.”
Stef van den Elzen, visualization architect

“SynerScope extends human analytic capability”

Founded as a high tech spin-off company of the Information Visualization group of Eindhoven University of Technology, SynerScope now is a successful company that provides advanced data analysis software. It allows companies and organizations to make sense of their data. Or, as SynerScope puts it: ‘As a telescope or microscope extends human vision, we extend human analytic capability.’

Stef van den Elzen, visualization architect at Synerscope, who recently obtained his PhD at TU/e, explains: “we allow our customers to show, analyze, and understand relational data visually by using visualizations. The product we offer is based on ‘multiple coordinated view’. It allows users to find correlations between the data they have at hand, and its context. They can discover patterns, and instantly verify them.”

Helping to detect fraud
The company mainly works for organizations in the financial sector, such as banks and insurance companies. The visualizations can, for example, help to detect fraud. “The data of those companies is often heterogeneous with many interconnections and dependencies (relations). It is important that our customers can leverage the valuable and often unknown information contained in this data, so they can extract actionable patterns from it.”

Making sense of data
The human brain has far more processing power available for making sense of a visualization of data than of tables of numbers. SynerScope uses software to present massive amounts of data in a way that is easy to understand and to work with. Stef: “It’s very nice to see that our customers discover things about their business in our visualizations. It really helps them in their research and in improving their work.”

Simple yet high tech
What Stef likes most about his job, is the creative process he has to go through in order to be able to find the perfect visualization for a certain data set. “I spend my time exploring what’s the most suitable image I can provide my customers with.”
DSC/e and Vanderlande join hands in research program

The Data Science Center Eindhoven (DSC/e) and Vanderlande are working together in a joint research program. The two partners are now looking for two PhD students interested in Process Mining in Logistics Processes and Automated Material Handling Solutions.

Vanderlande is the global market leader in baggage handling systems for airports and sorting systems for parcel and postal services, and also a leading supplier of warehouse automation solutions. The company recognizes the emerging trend of more data driven business models and addressed ‘big data’ a key topic on the technology roadmap. Therefore, under the umbrella of the Data Science Impuls program, the DSC/e and Vanderlande joined forces in a research project. The aim is to bring holistic fact-based process analytics to logistics processes and automated material handling solutions.

Vanderlande wants to lift process mining to this multi-dimensional space, and to allow analyzing logistics processes and systems from all relevant angles and viewpoints. By having thorough and fast insight into logistics and business processes, improvements can be found, predicted, and implemented at Vanderlande delivered logistics solutions. The two new PhDs will join the Architecture of Information Systems group (AIS) at TU/e and will work for Vanderlande for four years.

For more information about Vanderlande: www.vanderlande.com
For information about the PhD positions, go to http://bit.ly/1KWliJs

European Data Forum (EDF) hosted by TU/e

The Eindhoven University of Technology will host the European Data Forum (EDF) on June 29 and 30th. The conference will consist of several parallel lecture series with executive level leaders speaking, an exhibition and poster presentations. The EDF2016 is organized by the Data Science Center Eindhoven in cooperation with Amsterdam Data Science. The (EDF) is an annual meeting for industry professionals, researchers, policy makers, and members of community initiatives to discuss the challenges and opportunities of data in Europe, especially in the light of recent developments around Data Driven Business Growth and Data Privacy. The aim is to bring together all stakeholders involved in the data value chain to exchange ideas that address the challenges and opportunities, in order to strengthen the European data economy and its positioning worldwide.

Big step towards new education programs on data science

An inspection committee of the Dutch-Flemish accreditation organization (NVAO) will deliver a favorable opinion on the new data science educations by TU/e and Tilburg University. The committee visited Eindhoven and Tilburg in January and was very impressed by the efforts of both universities. “We sense a lot of enthusiasm and see the innovative power of this initiative. The conditions have been met: good teachers, an excellent network and a lot of dynamism.”