The richness and importance of the information conveyed by data has led to a rapid increase in the influence of data on individuals and society. Data of various kinds, such as the enormous data collections on the internet, has become omnipresent in virtually all aspects of our society. For example, by analysing the data available from past negotiations we can now predict our opponent’s behaviour in future negotiations. Digital data has become the key to innovations that show promise in relation to the progress of humanity in critical societal domains, such as energy, economy, health or climate, as well as in science, such as in bio-informatics or web science.

The TU Delft Master in Computer Science programme offers you the opportunity to become an Engineer in computer science. The Master provides two tracks: the Software Technology track if you are a computer scientist who wishes to design, redesign, build or maintain complex software systems and the Data Science and Technology track if you are a computer scientist who wants to learn how to engineer systems in which (extremely) large data collections are the key component.

A few subject examples of the Data Science and Technology Track are:

Unlocking Medical Data is concerned with discovering important data patterns in huge medical data streams that play a vital role in the diagnosis of diseases, treatments, health care, and healthy living. Examples of these data streams include massive amounts of molecular data based on next-generation sequencing in the life sciences, medical imaging like MRI, X-rays, CT or PET scans, and sensory data measuring health activity like motion or sleeping patterns, and health care sensors measuring heartbeat or body temperature. To unlock this data, you will learn to develop sophisticated pattern recognition algorithms for associating DNA sequence data with diseases, multimedia search and...
My name is Catalin Stanculescu and I’m in my second year of the MSc in Computer Science programme at TU Delft and a one of the university’s student ambassadors. I was drawn to TU Delft by its highly acclaimed computer science research programmes, the number of foreign students attending the university and the good value for money it provides. I chose the MSc in Computer Science because of the mix of subjects the programme offers and my longheld passion for programming combined with my interest in artificial intelligence. As a second-year student, I’m writing my graduation thesis at IBM Netherlands, where I research enterprise gamification as an effective way to encourage learning and social activeness by employees in the community. I got my graduation project with IBM via the Extreme Blue internship. During this programme, my team worked for a governmental client to tackle a Big Data challenge. On an average day, I spend 6–8 hours working on my thesis and go to periodic meetings related to the Ambassadors Programme and occasional meetings related to my assistantship position at TU Delft. Because it’s important to balance work and personal activities, I also spend time visiting new places, running, or going out with friends.

Unlocking Energy-relevant Data deals with gathering and processing relevant data to optimise our usage of energy. Smart Grids are networks of intelligent systems in which smart meters, solar cells, windmills, electric cars, intelligent houses, power plants, and so on, form the essential elements. Appliances such as solar cells have introduced prosumers, i.e., consumers that are also producers. Prosumers need support in optimising their energy usage in such a way that financial, environmental, and personal factors are taken into account. For example, each household becomes a complex system consisting of an energy infrastructure that connects all electrical appliances.

These appliances vary in their capability for storing, producing and consuming energy, as well as in its usage. For example, refrigerators have to maintain a maximum temperature, but don’t need electricity all the time. To unlock the potential of smart grids you need to unlock all energy-relevant data, such as usage data, preference profiles, and personalised data. For this you will learn to develop sophisticated algorithms for pattern recognition, e.g., energy usage patterns, user modelling techniques for personalisation and preference elicitation, and (multi-modal) data fusion algorithms to integrate data into comprehensive information that feeds...
optimisation algorithms for each of the connected electrical appliances and visualisation techniques to inform the human operators.

Unlocking Infrastructure Operation Data concerns collecting, storing, and analysing data on the operation of various infrastructures. These are infrastructures that are vital for today’s society and economy, like transportation infrastructures, infrastructures for utilities and infrastructures that are inherently computer systems in themselves (telecommunications, the internet). The goals of analysing the collected data are to control the infrastructures in real time by guiding traffic or switching on spare components when overload conditions are detected, and to detect patterns of usage of the infrastructures to direct decisions on their future extensions. The challenge of designing computer systems for this data collection and analysis is to make the correct selection of the collected data and the correct architecture of the systems for storing and processing the data, and to design the algorithms for the actual analysis. To meet this challenge you will need to design algorithms for data analysis, for analysing networks to optimise them or to make them more robust, for detecting the behaviours and preferences of infrastructure users, and for recognizing features from surveillance videos. In addition, you will learn how to implement these algorithms in data centres and on multi-core processors.

Unlocking Environment-relevant Data concerns the gathering, storing, enriching, analysing and applying data on the interaction that humans have with their living environment. To get sustainable interaction with the environment, data needs to be turned into valuable knowledge and insights on how humans interact with their environment. This interaction relates to, among others, city planning: with the global trends of urbanisation and climate change, people will actively need to adapt their environment to the changing demographic circumstances, wealth distribution, water management, etc. The goals of analysing data on current and projected behaviour of humans and their environment are to control current aspects of our environment in real time, as well as to design future changes and extensions of the environment.

Examples of the societal challenges that we are facing in our constantly changing world include climate-adaptive buildings and cities, drought and excess water in urban environments, and improved safety in our delta regions combined with nature conservation. The master Track Data Science and Technology challenges you to correctly gather and process the data needed to observe and analyse the environment, to design an adequate architecture for the systems to store and process such data, and to design algorithms and techniques to enrich, integrate and analyse the data to unlock the actual knowledge. To work as a data scientist on these challenges, you will learn techniques and algorithms for the collection, integration and enrichment of data from sensors, humans and infrastructures, and for modelling, simulation and analysis. In addition, you will learn how to design and implement software and information architectures for performing this type of analysis.

Career prospects

TU Delft has close ties with industry. During your studies you will have the opportunity to contact companies and build a network. In addition to internships and thesis projects you can also develop contacts with companies via the EEMCS recruitment days or the TU Delft technical career fair. The job prospects of our computer science graduates are excellent. With their specialised understanding of techniques to collect and analyse data, to present data in a meaningful and transparent format, and to support decision-making, Data Science & Technology engineers are among the most desired employees in leading industries and universities. Due to the growing recognition of our students’ skill sets, TU Delft Computer Science graduates have accepted positions at IT oriented firms such as Philips, TNO, Océ and Logica. Others have been offered positions in the health care industry, as well as with multimedia and gaming companies, including such firms as Lost Boys, Green Dino, Cyclomedia, Code Illusions and Triumph Studios, and life-science support companies.
Admission requirements and application procedures

**Dutch BSc degree**
If you hold a Dutch BSc degree closely related to the Master’s programme, you will be admitted directly. However, if your undergraduate programme is not closely related to the Master’s programme you will be required to take additional courses in what is called a bridging programme. This may be a standard programme or it may be tailored to your specific situation.

To see which master’s programmes are open to you on completion of your bachelor’s degree from a non-technical Dutch university go to www.studychoice.nl If you completed your bachelor’s at a technical university, go to www.doorstroommatrix.nl

**Dutch HBO degree**
An HBO Bachelor’s degree does not qualify you for direct admission to a TU Delft Master’s programme. You will first need to complete a supplementary programme in order to bring your knowledge to the required level. You can do this during your HBO programme by completing a bridging minor, or by means of a bridging programme after completing your HBO diploma. Entrance requirements for mathematics and English (some exceptions) apply for both the bridging minor and the bridging programme.

See www.hbodoorstroom.tudelft.nl for detailed information. Applications through Studielink: www.tudelft.studielink.nl

**International applicants**
To be considered for admission to an MSc programme you will need to meet TU Delft’s general admission requirements.

1. A University Bachelor’s degree (or proof that you have nearly completed a Bachelor’s programme) in a main subject closely related to the MSc programme to which you are applying, with good grades on the key courses.
2. A BSc Cumulative Grade Point Average (CGPA) of at least 75% of the scale maximum
3. Proof of English language proficiency. A TOEFL (Test of English as a Foreign Language) with an overall Band score of at least 90 and a minimum score of 21 for each section. Please note that we only accept the TOEFL internet-based test. Or an IELTS (academic version) with an overall Band score of at least 6.5 and a minimum of 6.0 for each section. Or proof that you have passed the University of Cambridge ‘Certificate of Proficiency in English’ with a minimum grade B or the University of Cambridge ‘Certificate in Advanced English’

For international students, the application period starts October 1 and closes at April 1. To start an MSc application, please complete the online application and pay the refundable application fee of € 100. Next, you will receive an email with the link to upload the required documents.

**For more information about the application procedure and studying at TU Delft in general, go to**
www.admissions.tudelft.nl

**Introduction week**
All international students will be welcomed with the award-winning introduction programme. The introduction consists of a variety of workshops and projects, during which you will get to know other international students, visit the highlights of Delft and learn the ins and outs of the TU Delft campus.

After this very interesting and fun week, you will be introduced to the EEMCS faculty. During the Master Kick Off, you will receive helpful information about the Dutch education system and meet the fellow students from your programme in a variety of social and educational activities.

For further information
Please visit the webpage for all details, complete requirements, deadlines and contact information, please visit:
www.ewi.tudelft.nl

Master’s Coordinator
T +31 (0)15 27 86217
E coordinator-MSc-CS@tudelft.nl

Further information for international applicants
E info-eemcs@tudelft.nl

EEMCS Faculty
Mekelweg 4
2628 CD Delft
www.ewi.tudelft.nl

For further information
Please visit the webpage for all details, complete requirements, deadlines and contact information, please visit:
www.ewi.tudelft.nl

Further information for international applicants
E info-eemcs@tudelft.nl

EEMCS Faculty
Mekelweg 4
2628 CD Delft
www.ewi.tudelft.nl

www.facebook.com/TUDelft.EEMCS
@DelftUniversity
instagram.com/TUDelft
www.campus.tudelft.nl

November 2015