Professional Doctorate in Engineering

Post-MSc programmes

TU Delft Delft University of Technology

TU/e Technische Universiteit Eindhoven University of Technology

UNIVERSITY OF TWENTE.

WAGENINGEN UR For quality of life

4TU. School for Technological Design STAN ACKERMANS INSTITUTE

“Are you ready?”

The two-year post-MSc programmes of 4TU.School for Technological Design, Stan Ackermans Institute, can become your passport to a faster successful career in industry or business. This passport is the degree Professional Doctorate in Engineering (PDEng) which you will be awarded upon the successful completion of the programme.

Innovation is the driving force behind the high tech industry. Close collaboration between industry and universities is crucial for innovation. For this we need excellent engineers.
Our technological designer programmes train the most talented master graduates, engineers who want to further develop their skills in the field of technological design and who want to contribute to the needs of the high tech industry by developing innovative solutions.

As you become an employee of one of our universities of Technology in the Netherlands, you combine learning and earning throughout the programme. During the design project, which is done in and for industry and often takes place in the second year you demonstrate your ability to apply your theoretical knowledge in solving a real-life, complex design problem. Many of our graduated PDEng trainees joined the company where they carried out their design assignment and now fulfill management positions.

Are you ready to join our PDEng community and boost your career?

Professor Jan C. Fransoo
Director 4TU.School for Technological Design,
Stan Ackermans Institute

Professor Stan Ackermans, PhD

Professor Stan Ackermans, PhD, (1936-1995) was professor of Mathematics at TU/e before becoming the university’s Rector (1982-1985). He championed the introduction of the design educational programmes. From 1986 until his death in 1995 Professor Ackermans was the first scientific director of the Institute that coordinated the design programmes within TU/e. Following his death, the institute was renamed Stan Ackermans Institute in his honor. Since 2006 it’s called 4TU. School for Technological Design, Stan Ackermans Institute.

Boost your career!

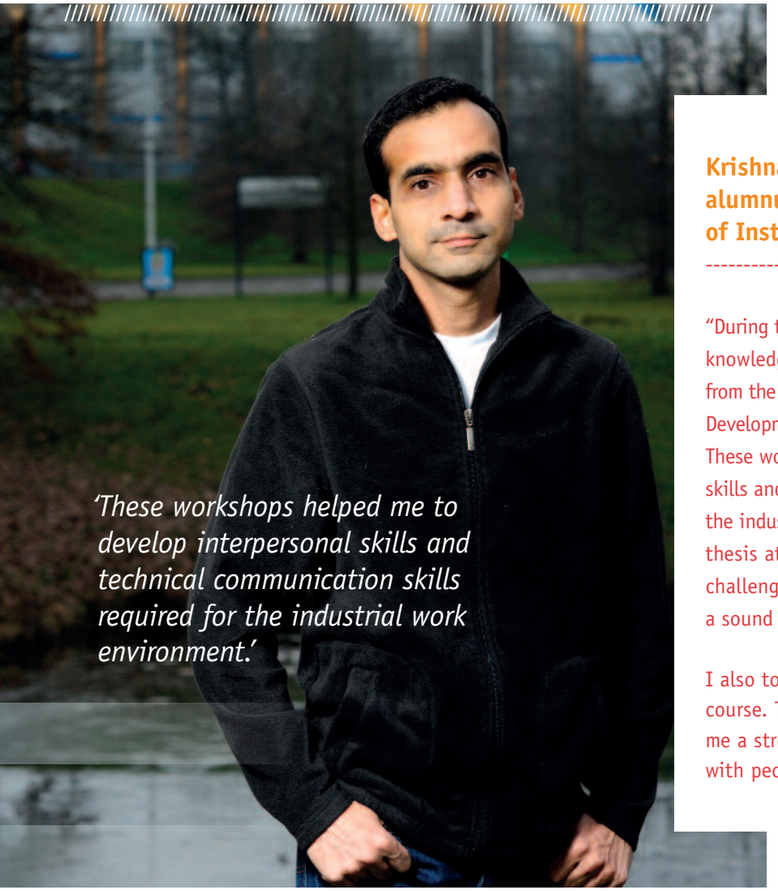
Are you a graduated young professional or currently completing your Master of Science programme at a (technological) university? Are you looking for an even faster successful career in industry or business? Then you should consider applying to one of the technological designer programmes and tracks at the 4TU.School for Technological Design, Stan Ackermans Institute.

Two-year programmes

The Dutch universities of technology - Delft University of Technology, Eindhoven University of Technology and University of Twente - offer two-year programmes that will put you on a faster track to a successful career in industry. In addition to broadening your technological expertise, you will learn more professional skills that will enhance your career opportunities. Industry offers graduated designers from our programmes excellent jobs, because of the strong reputation of our graduates.

High-tech industry

The technological designer programmes were initiated at the request of the Dutch high-tech industry. High-tech companies need professionals who can design and develop complex new products and processes and offer innovative solutions. All programmes work closely together with high-tech industry, offering you the opportunity to participate in large-scale, interdisciplinary design projects. With this unique cooperation we provide you with a valuable network of contacts in industry. Over the past twenty-five years more than 3,500 of our graduates have found challenging and exciting jobs with (multi)-national companies, including Philips, ASML, NXP, Océ Technologies, Akzo Nobel, Vodafone, Ericsson, DSM, Unilever, Schiphol Airport and TNO. These companies are united in their praise for the quality of the technological designer programmes and their graduates, and offer them a faster track in their career. To ensure their continued enthusiasm, the programmes employ a strict selection process, accepting only excellent young professionals and graduates.



Krishnan Seetharaman from India is an alumnus of the Design and Technology of Instrumentation (DTI) programme.

"During the DTI programme, I expanded my theoretical knowledge by electing courses of my choice. Apart from the technical courses, there were also Professional Development workshops for all PDEng trainees at TU/e. These workshops helped me to develop interpersonal skills and technical communication skills required for the industrial work environment. My one year design thesis at NXP Semiconductors prepared me to face challenges in design based projects and it gave me a sound footing.

I also took part in an intensive two-weeks Dutch course. This improved my language skills and gave me a strong motivation to socialize and integrate with people here and with the Dutch work culture."

4TU. School for Technological Design, **Stan Ackermans Institute**

As part of their increasing intensive cooperation, the Dutch universities of technology decided in 2006 to combine their technological designer programmes in the 4TU.School for Technological Design, Stan Ackermans Institute.

4TU technological designer programmes

The 4TU technological designer programmes offer you an opportunity to enhance your expertise and project management skills with an extensive hands-on assignment, supervised by experienced professionals. Each programme covers a different technological field, for example managing complex architectural construction projects, designing mechanisms for user interfaces for consumer products or developing high-tech software systems for software-intensive systems. The focus of each programme is described further on in this brochure.

Professional Doctorate in Engineering

The two-year, full-time programmes all lead to a Professional Doctorate in Engineering (PDEng) degree. If you are accepted into one of the programmes, you are appointed as a trainee for the duration of two years and receive a salary. All technological designer programmes are taught in English. The structure of all programmes is basically the same: during the first part of the programme you gain extensive knowledge and experience of the latest design methods and their applications. You also learn to work in interdisciplinary teams and further develop your professional skills. You apply what you have learned during the second part of the programme, when you design an innovative industrial product or process for one of many prominent high-tech companies. The close cooperation between these companies and the technological designer programmes offers exciting career opportunities.

Programmes and tracks

Location
Delft University of Technology

Bioprocess Engineering (BPE)
In the BPE programme, trainees are trained as a multidisciplinary team expert with a strong background in Biosciences and Engineering subjects required for innovative bioprocess design.

Chemical Product Design (CPD)
The programme focuses on the design and development of structured materials, formulations, and devices for the specialty chemicals, personal care, healthcare, food, semiconductor, and energy sectors. The extensive and rapid developments in chemical, molecular, materials, and nano engineering have made the development of a hole new range of functionalised and specialised products possible.

Process and Equipment Design (PED)
The PED programme trains MSc graduates to become qualified designers capable of designing 'fit for purpose' and 'first of a kind' (chemical) products, processes, equipment and devices. It encourages trainees to actively look beyond the boundaries of their own discipline, and to creatively aim for ingenious design solutions demanded by society.

Location
Eindhoven University of Technology

Automotive Systems Design (ASD)
ASD focuses on systems architecture and design for modern high tech automotive systems in the context of Smart Mobility. The programme aims at a systems approach to problems around mobility and fuel efficient automotive systems, including communication systems and electrical driving, with emphasis on the multidisciplinary design aspects of project-based research and engineering and the challenges that are faced by the automotive industry.

Clinical Informatics (CI)
The Clinical Informatics programme is geared towards the design of information systems in healthcare. IT knowledge, but also knowledge of clinical and business processes are crucial to the design of optimal solutions, which really support the professionals in healthcare. The programme is carried out in close cooperation with hospitals and other care institutions all over the Netherlands. All trainees in the programme are required to be fluent in Dutch.

Data Science (DS)
Data Science is concerned with the problem of finding patterns and creating value from vast streams of data in the context of a data domain. The programme combines statistics, computer science, mathematics, and design theory with the discernment to explore data sets, gather insights, visualize results, and communicate meaningful findings to stakeholders taking into consideration underlying ethical and legal aspects.

Design of Electrical Engineering Systems (DEES)

Track: Healthcare Systems Design (HSD)
Healthcare industry requires a new generation of professional designers who can design new prototypes of healthcare systems or well-being devices within multidisciplinary teams. The HSD trainees develop in-depth understanding of the technical and user requirements in the health domain so that they are able to bridge the gap between high-tech technology and the health area.

Track: Information and Communication Technology (ICT)
The ICT programme trains designers in specifying, designing, building, testing and evaluating complex multidisciplinary systems in the domain of information and communication technology. The design of innovative consumer products and professional systems that communicate with their (global) environment (e.g. wireless and electro-optical communication) is extremely challenging. This leads to many new solutions, for example embedded software, monolithic integrated (opto-) electronic circuits in the field of telecommunication, medical applications and consumer products.

Design and Technology of Instrumentation (DTI)
Trainees in the DTI programme have a background in physics. They solve problems using sound, physical models, which represent the key parameters of the problem at hand. In the design loop they learn to both solve the problem in the right way as well as to solve the right problem. Projects range from MEMS oscillators at a micron scale to density meters of dredger slurries in pipes of a meter diameter.

Industrial Engineering (IE)
The management of complex business processes and supply chains requires advanced solutions involving state of the art flexible business models, intelligent information systems, efficient and sustainable resource use, and sharp planning, execution and control of the operations in the chain. The PDEng programme IE develops the capabilities needed to innovate business processes and supply chains, based on up-to-date knowledge from science and industry.

Process and Product Design (PPD)
The chemical, food and polymer producing industry demand for an integrated approach of the disciplines chemical engineering, applied physics, mechanical engineering and technology management. PPD focuses not only on process design, but also on the design of novel products. The relationship between the production process and product properties like e.g. functionality and microstructure is the connecting thread in the PPD programme.

Qualified Medical Engineer (QME)
The Qualified Medical Engineer programme trains engineers to become effective designers in the clinical environment. Of course, engineering skills and knowledge of physiology are relevant. But also communication with health care professionals (and patients) is crucial to really get clear what their needs are and to determine how technology can improve patient care. The programme is carried out in close cooperation with hospitals and other care institutions all over the Netherlands. All trainees in the programme are required to be fluent in Dutch.

Smart Energy Buildings and Cities (SEB&C)
SEB&C trainees are capable of integrating state-of-the-art technology through an integral design process, resulting in innovation for smart energy systems for the built environment. From different backgrounds, a SEB&C trainee contributes to the development of intelligent, energy efficient building components, building designs and urban plans aimed at intelligent reduction, supply and demand of energy with added value for the user.

Software Technology (ST)
The development of software for advanced systems has many different aspects. The ST programme focuses on the project-based design and development of software for software- and data-intensive systems from the High Tech Industry. The trainees get acquainted with the important concepts from diverse knowledge domains such as Data Science, Model Driven Engineering and Networked Embedded Systems, and learn how to use these to solve the actual industrial problems that our industry partners present to us.

User System Interaction (USI)
USI professionals are trained in trans-disciplinary science and techniques for the design and evaluation of user interaction with products and services. The programme focuses on technologically complex systems with high interactivity and high concentrations of information. The user-experience is at the heart of each product design. Technical options related to information and communication technology, cognitive and social psychology and design methodology of user-centered design are key concepts of the programme.

Location
University of Twente

Civil Engineering (CE)
Industry asks for highly qualified designers in the field of civil engineering, with knowledge of the different technical and nontechnical aspects of actual civil engineering issues (such as economics, policy, law and business administration, but also knowledge on project and process management). These designers need to have the skills to play a key role in multidisciplinary design teams that are concerned with solving these complex issues.

Energy and Process technology (EPT)
The technological designer in the field of EPT creates innovative technical solutions for products and processes in the nutrition, energy and process industry. For this purpose a multidisciplinary approach is required starting from functional and market requirements with an accent on quality, environment, safety, sustainability and recycling. Besides deepening and broadening of knowledge during the whole PDEng programme in EPT, several assignments in industry will be carried out.

Healthcare Logistics (HL)
The PDEng programme Healthcare Logistics educates trainees to create highend and innovative designs for complex multidisciplinary logistics problems in healthcare. Graduates are capable of creating designs for complex healthcare logistics interventions, contribute to larger interventions, and are capable to direct the realization of interventions in a team. The programme trains professionals to bridge theory to actual implementation of Operations Research and Operations Management in healthcare, so as to increase the efficiency of logistics.

Maintenance (M)
The PDEng programme Maintenance educates designers who create efficient and effective maintenance processes from a multidisciplinary perspective. The design has to comply to technical, financial, logistics and organizational specifications. A sound understanding of the physical mechanisms is key, as the basis for failing systems and components is in nature physical. By addressing both technical and operations aspects during the programme, a necessary link is established between these two fields of expertise.

Robotics (R)
The technological designer in Robotics creates innovative robotic solutions for medical, industrial and safety purposes, such as rehabilitation robotics, welding robots, and independently operating robots performing inspection tasks. Therefor a multi-disciplinary approach is required with components from mechanical, electrical, computer and control engineering. The PDEng programme in Robotics allows the trainee to deepen and broaden their knowledge and to gain advanced application experience through a challenging assignment in industry.

For more information:
www.4tu.nl/programmes

Roel Truyen is a Principal Scientist at Philips Healthcare. He coaches trainees of the Software Technology programme.

"The nice thing about being a supervisor is the exploratory nature of the assignments. In the programme of a design project the trainee joins us in the search for an answer to the question 'what is it that we actually want?' It is not just about the 'how' but also, and largely, about the 'what'.
The trainee's solution is often surprising. I find it interesting to take that journey together towards a solution."

Application, selection and degree

Are you interested in technological design and looking to enhance your skills and expertise to boost your career in business or industry? Are you ready for a two-year training programme while receiving a salary? If so, the technological designer programmes at the 4TU.School for Technological Design, Stan Ackermans Institute are exactly what you are looking for.

Application

Application is open to university graduates from the Netherlands and other countries. You will at least need a Master of Science degree or equivalent, preferably in the exact sciences. There will be an assessment and selection procedure before you can enter the programme. The programmes of the Stan Ackermans Institute use strict selection criteria to ensure the required high quality. Excellent marks, motivation and a design-oriented attitude are vitally important. You should also have an excellent command of the English language.

Selection

You can apply by sending your letter of application with a complete curriculum vitae and at least two letters of recommendation (in English). Suitable candidates will be invited for an interview with the selection committee of the relevant programme. Please note that each programme has different starting dates, as well as its own specific admission requirements and selection procedure. The exact requirements and selection procedure for each programme are listed on www.4tu.nl/sai. Click on 'programmes' and visit the individual website of the programme. You can also contact the coordinator of the programme.

Appointment

If you are selected for the programme, you are appointed as a trainee for the duration of the programme, up to two years. You are a member of the scientific staff and receive a salary in accordance with government regulations. Because you are a trainee, you do not have to pay a tuition fee.

Diploma and degree

On successfully completing the programme, you will receive a certified diploma. You are entitled to use the academic degree Professional Doctorate in Engineering (PDEng) and are registered as a Technological Designer in the Dutch register kept by the Royal Institution of Engineers in the Netherlands (KIVINIRIA). The quality of the programmes is assured by an assessment and certification procedure on behalf of the Dutch Certification Committee for Courses to become Technological Designer (CCTO, Nederlandse Certificatie Commissie voor Opleidingen tot Technologisch Ontwerper).

Chiu-Ling Chen from Taiwan obtained her PDEng degree for the Industrial Engineering (formerly known as Logistics Management Systems) programme. She did her traineeship at ASML.

"ASML has a cooperation programme with TU/e in which people study IE for two years and then work at ASML for three years. The principal project is the in-company design project, for which I compiled a suitable tool kit for maintenance and repair. In addition, I followed Master's courses and special workshops for IE students.

A design education lets you combine academic and practical business experience and gives you a good idea of how you can put your university knowledge to good use within a company."

Universities of technology in the Netherlands

4TU
www.4TU.nl

The four leading universities of technology in the Netherlands - Delft University of Technology, Eindhoven University of Technology, the University of Twente and Wageningen University- have joined forces in the 4TU.Federation. This federation maximizes innovation by combining and concentrating the strengths of all four universities in research, education and knowledge transfer. Wageningen University recently joined the 4TU.Federation and doesn't offer PDEng programmes at this moment.

The Association of Engineering Doctorates (AEngD)

The Stan Ackermans Institute is an affiliate member of the Association of Engineering Doctorates (AEngD) – the UK-based organisation which promotes the value of the Engineering Doctorate (EngD) to government, industry and commerce. The affiliation between Stan Ackermans Institute and AEngD establishes a wider and more strategic industrial research collaboration and builds international links across the engineering research community.

Delft University of Technology
www.tudelft.nl

TU Delft (TUD) is an entrepreneurial university at the forefront of technological development. As such it is constantly involved in furthering technological advances in the interests of society. By means of its fundamental and applied research and educational programmes, TU Delft trains the engineers of tomorrow.

Eindhoven University of Technology
www.tue.nl

Eindhoven University of Technology (TU/e), founded in 1956, is a research-driven, design oriented university of technology, with the primary objective of providing young people with an academic education within the engineering science & technology domain.

University of Twente
www.utwente.nl

University of Twente (UT), founded in 1961, is one of Europe's finest educational resources encouraging research and entrepreneurship in both technology and social sciences. A young and innovative institute, UT is internationally respected in areas ranging from public policy studies and applied physics to biomedical technology.

Wageningen University
www.wageningenur.nl

Wageningen University is the only university in the Netherlands to focus specifically on the theme 'healthy food and living environment'. We do so by working closely together with governments and the business community.

The 4TU.School for Technological Design, Stan Ackermans Institute offers two-year post-master technological designer programmes.

The institute is a joint initiative of the four universities of technology in the Netherlands:

Delft University of Technology, Eindhoven University of Technology, University of Twente and Wageningen University.

sai@4tu.nl
+31 40 247 2452

www.4tu.nl/sai

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