



TU Delft knowledge valorisation  
**Innovation with  
TU Delft**

Delft University of Technology

# Innovation

Innovation is vital for maintaining or reinforcing a market position, improving processes and developing new products and services. TU Delft has a long history of socially and commercially relevant research. Two excellent examples are the Delta Works flood defences and Glare, a lightweight aircraft material. Partnership between industry, government and universities adds to the Dutch economy's innovative strengths, and contributes substantially to the advancement of society. TU Delft helps shape this partnership through research with and for companies and organisations, by providing postgraduate education, and through the establishment of a science park. TU Delft also fosters its students' and scientists' entrepreneurial skills, and runs a successful Technostart centre for new business ventures. TU Delft stimulates innovation in many ways, and sets the standard in knowledge valorisation.



## TU Delft in figures (2008)

Students:

15,321

Scientists:

2,762

Including Professors:

214

TU Delft was founded in 1842 as the Technische Hogeschool Delft, with the aim of 'educating civil engineers both for the service of the country and for vocations in commerce'.

TU Delft received 30.3 million euros in indirect funding (or the 2nd flow of funds) and 99.5 million euros in contract funding (or the 3rd flow of funds) in 2008. The source of most of the income is national and international research consortia, which in turn are subsidised through European and Dutch government schemes.

TU Delft has a wide range of patents in its portfolio, for which it has an active marketing policy. TU Delft has licensing agreements with Delftship, BAM and Mampaey Offshore Industries. New businesses, such as ReSteel and Inaschco, have been based on other patents, with cofinancing from industry. HCI (Holland Container Innovations), Quintech and Flux are among the Techno start-ups that have been launched with a TU Delft patent.

# Research consortia

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There are benefits for companies and knowledge institutes attached to membership of research consortia. Groupings of this kind frequently cooperate on developing technologies in the precompetitive phase. The participants' collective knowledge and expertise is of mutual benefit as they help shape new opportunities together. The knowledge acquired can be used for product and process innovation in companies. TU Delft collaborates internationally with universities, knowledge institutes and industry, in the European Union Sixth and Seventh Framework Programme and other research projects. TU Delft covers the disciplines of 'science', 'engineering' and 'design' and focuses on issues in the fields of energy, health, environment, infrastructures and mobility.

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## Delft Research Initiatives

Home-work commuting and transport without congestion, sustainable and affordable energy, a safe and clean living environment, and growing old in good health — the major public issues of today are health, energy, environment, infrastructures and mobility. Devising appropriate solutions is vital for future prosperity and wellbeing, and at the same time creates promising economic opportunities. TU Delft is an expert partner for companies and public authorities involved with these themes.

## Increased reuse of plastic

TU Delft is working with several European universities and industrial partners on the W2Plastics project, which receives funding through the EU 7th Framework Programme. The project aim is to use cost-effective clean techniques to recover polymers and plastics from domestic refuse and other complex waste. Currently only 1 million tons of the 14 million tons of polyolefins sold in Europe are recycled.

## Medical Delta

The Medical Delta initiative focuses on the synergy between companies, universities and university medical centres in Leiden, Rotterdam and Delft, with a view to achieving breakthroughs in medical science and medical care. We are jointly developing new technologies for creating health care solutions and economic opportunities. TU Delft has a broad technology base, and is working on this initiative alongside partners in the medical knowledge chain on new research programmes and teaching curricula. The work includes improved diagnostics through the use of imaging techniques, better therapies and medical procedures that involve less intrusive operating techniques, and more effective patient monitoring.



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## Wind energy far offshore

RWE Offshore Wind, Eneco, TenneT, Ballast Nedam, Van Oord, IHC Merwede, 2-B Energy, XEMC Darwind, ECN and TU Delft have drawn up a development plan for large-scale wind energy innovation, known as Far and Large Offshore Wind, or FLOW. The FLOW plan comprises an R&D programme and a demonstration wind farm far off the Dutch coast. Nowhere else in the world do wind farms presently operate at comparable depths and distances from the coast. The FLOW programme will enable Netherlands-based companies to take the lead in the European offshore wind farm market. This initiative will accelerate the achievement of the Dutch government's target for wind farms with a capacity of 6,000 MW by 2020.

# Contract research

Large and small companies and government agencies assign research projects to TU Delft. In many cases the research question is specific, and TU Delft has the required expertise in house. The form and definition of a research project depend on the size and complexity of the issue at hand. Companies and government agencies benefit from contract research through access to TU Delft's advanced research facilities, such as its high voltage laboratory, wind tunnels, materials testing laboratories, flight simulators, serious gaming and chip facilities.

## Research by students

Students may take an internship or perform their final project with a company or government agency, and in the process contribute to current research. There are other ways of working on research questions, and various courses feature a problem submitted by a company that a student project team has to solve or produce a design for.

## Serious Gaming

A serious game is a computer game that is used for teaching, policy support, or training professionals. TU Delft and the gaming company Tygron were engaged by the Port of Rotterdam to develop the Simport game. Simport demonstrates the effect of various layout strategies for the Second Maasvlakte coastal development.

## Active driver assistance

TU Delft is part of a large research consortium with American universities that is working on a haptic accelerator and brake pedal for Nissan. The pedal actively assists drivers by offering tangible resistance if they get too close to the car in front, and automatically applying the brakes. TU Delft has now started work on a haptic steering wheel for Nissan.



## Solar powered LED lamp

Groups of Industrial Design Engineering MSc students work on a completely new product design in their six-month Integral Design course project. The project covers everything from strategic analysis and conceptual solutions to detailed design and prototyping, based on a case from a company or agency. A group of four students has designed an affordable solar powered LED lamp for residents of rural Cambodia. They call their invention the Moonlight, and it earned them the 2008 Toon van Tuijl Design Award.



# Courses

Highly qualified professionals and managers can enhance their knowledge and innovative skills with MSc programmes and short courses at Delft TopTech. What they learn will help in their professional development, and will probably represent a career landmark. The Delft TopTech programmes combine business and technical methods, and devote considerable attention to applying these methods in international practice. The lecturers are international leaders in their fields who teach at TU Delft or other leading institutes. Delft TopTech offers MSc courses in the fields of energy, industrial ecology, information technology, infrastructure, retail, aerospace and safety. Delft TopTech also provides tailored in-company professionalisation and innovative capacity enhancement programmes for industry and government agencies. The short courses are oriented to rapidly providing new knowledge and skills in ICT and other areas.



DelftTopTech

## Master's programme

In a nutshell, my main comment on the programme is that it exceeded my expectations. The course material is up-to-date and complete, and I now know so much more about the world of energy. The enthusiasm of my fellow students, teachers and the organisation meant that my motivation never flagged, and I always started the modules with relish. I was also pleased with the modular structure and the consecutive course days each month, which helped me combine the programme with my work and private life. My network is also much bigger now because I got to know many fellow students and teachers.

**Peter Simoës, Master of Business in Energy Systems**  
**Business Development Manager**  
**Waste and Energy Company**

## Masterclasses

Capgemini offers its business analysts masterclasses in aviation, utilities, media & telecom and rail. This brings the analysts up to date on the business and technology issues in these segments, and on the latest regulations. The in-company masterclasses are provided by Delft TopTech in a programme that combines science, trends and professional practice. Every year, some forty Capgemini business analysts take the six-month course, which they conclude with the publication of a paper.

# Science Port Holland

TU Delft, the City of Rotterdam and Delft have started the development of a prestigious science park on sites on either side of the A13 between Delft Zuid and Rotterdam Airport. Science Port Holland is the partners' regional development corporation, and is responsible for initiating the development of this science park. The intention is to bring together experts from leading knowledge institutes, start-ups and international companies in one of Europe's top innovative hot spots.

The focus will be on world-beating knowledge clusters that are strongly developed in the region, such as sustainable energy and climate protection, water and delta technology, industrial biotechnology and life sciences. The Erasmus Medical Centre is an important partner.

The international ICT company Exact Software has selected Science Port Holland for its new head office site. Exact Software develops business software in forty languages, and has branches throughout the world. According to CEO Rajesh Patel: 'The Science Port Holland site meets all our requirements'. Exact is committed to promoting relations with educational institutions. The company plans to continue to invest in its close cooperation with TU Delft and the IT research centre, which involves the exchange of knowledge and making internships available to TU Delft students.



# Entrepreneurship

TU Delft encourages entrepreneurship among its students and scientists. Students are able to follow a variety of entrepreneurship courses in their BSc and MSc programmes. They are inspired to entrepreneurship through lectures and workshops, and can also be coached in writing a business plan. Scientists with a potentially commercial invention are able to start their own spin-off, or assist in setting up a new company. TU Delft rewards the most enterprising scientist with the biennial Delft Most Entrepreneurial Scientist Award. Students starting up a technical company of their own after graduating and scientists venturing into business are able to approach YES!Delft, the entrepreneurs' centre for TU Delft Techno start-ups. Technostart entrepreneurs are provided with office space, access to TU Delft research facilities, and assistance with personal development, the identification of investors and tapping new networks.



## Awards

YES!Delft Techno start-ups are regular award winners.

For example:

- Protension Composites receives New Venture entrepreneurs award for 3D composite products for helmets etc. (2009);
- Flux receives the Philips Innovation Award and the New Venture entrepreneurs award for the foldable design chair (2009); (picture)
- ICT Delta start-up award for aanmelder.nl, for arranging meetings through Internet;
- Senz wins the 2008 iF Gold Award with the storm umbrella;
- Ephicas, a supplier of aerodynamic truck side skirts, wins the 2008 LiveWIRE Young Business Award.

In 2008, YES!Delft assisted 39 companies under 4 years old. These companies attracted 5 million euros of venture capital and had combined revenues of over 9 million euros. Including the founders, these companies have generated 235 FTEs. Nine companies successfully moved on from YES!Delft in 2008 to continue independently. Their business results were not incorporated in the above figures.

## Recycling waste into raw materials

ReSteel is a company founded in October 2008 that focuses on the upward recycling of waste into raw materials. The company is based on a TU Delft invention for mechanically removing copper-rich components from scrap. ReSteel was founded with help from Icos Capital and TU Delft to firmly launch the technology onto the market. ReSteel technology now enables scrap processor Heros to deliver highly pure scrap to steelmaker Corus, starting from the output of waste incineration plants.

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