**A TU Delft alumnus writes a column and passes the pen to another alumnus of his or her choice.**

My choice of university subject was a bit out of the blue. I'd done mathematics and science at school and, not to put too fine a point on it, I found them fairly easy-going. Even so my careers master's initial advice was to try psychology or educational science. I soon discovered that they were not my cup of tea. A friend of mine went to the THEA event in Eindhoven, which was an information session, organised by the technical universities especially for girls. They only organised them for a couple of years, which is a pity, I think. That's where I immediately became hooked. So it had to be a technological university, and it had to be Delft (of course). My subject was mechanical engineering.

After having spent a few years working for an engineering firm, I got seconded to the Aalsmeer flower auction, where a monorail system was being installed. It was an ambitious and innovative project, something you don't see often in Holland. I became assistant project manager of the construction team. My strength soon turned out to be supervising the general course of a project, finding the right people for the team, and maximising their performance. I don't mind leaving the purely technical side of things to the boffins of the team.

Once the project was completed the auctioneers offered me a job as a technical project manager. I then did a personal development course and after that a management job followed as head of the technical project office within the property department. A great job. I love supervising professionals, and boffins, especially these. In spite of wide-ranging careers, most of them had never had a female supervisor. As a technically-minded woman within a virtually male-only team (hardly surprising) I was really able to add something. But what? You won't believe it but a girl power seminar really did help me identify what it was. I was good at observing and sensing the state of mind of colleagues, of making contact, being relationship-focused, at team-building, facilitating, coaching and giving leadership, creating a growth climate, being intuitive. Yes, even after spending 18 years in a man's world I still had some of that left in me.

Given the imminent shortage of engineers I feel that more women should be persuaded to go for technology. That's why I have been involved in Technika 10 Rotterdam since 2003. It's a foundation that arranges courses at primary schools. Originally it was only for girls, but these days boys can join in too. The purpose of the foundation is to instil an affinity with technology in young children so that they will later go for a technological career. By the way, we're always looking for new sponsors !

At the beginning of this year I started a new and challenging job as Head of Rental & Services. So, goodbye technology. I can't rule out the possibility of returning to a technological job some day, though.

Bianca Lambrechts (37) studied Mechanical Engineering at Delft University of Technology from 1988 to 1995. She is Head of Rental & Services at the Flora Holland flower auction, Aalsmeer. Bianca passes the pen to Civil Engineering alumnus Ir. Marjorie van Breda, department head at Zuid-Holland Provincial Authority.



# Hydraulic squeeze sensor

Photo: Sam Rentmeester/fmax

Connie van Uffelen

Picking up an egg with your fingers is easier than picking one up with a pair of pliers. Touch sensors in our muscles prevent us from inadvertently squashing the egg, but it is difficult to judge the amount of force applied by the pliers. The same goes for minimally invasive surgery, or keyhole operations, in which a surgeon operates through holes in the abdomen or knee, manipulating a camera with one hand, and a pair of forceps with the other. The force the surgeon applies when squeezing the forceps does not follow the force applied to the tissue, because the instrument contains all sorts of joints and hinges affected by friction. Damage from excessive squeezing can be a problem, especially during intestinal surgery. "If the intestine is pierced, its contents can enter the abdominal cavity," John van den Dobbelsteen says, "and that could result in a potentially fatal septicaemia."

Van den Dobbelsteen tried to find a way to measure the pressure exerted on the tissue. "You need a force sensor for this. These devices measure one centimetre square, and they don't fit into the forceps' beak. So, I had to look for another solution. A force sensor needs to be a deformable element, and that is the hardest part to make. It also requires highly miniaturised electronics. Combining the two is virtually impossible."

What put Van den Dobbelsteen on the right track was the technique used in the Dotter method, in which a balloon is inflated to widen a blocked coronary artery to restore the blood flow. "This is a safe method, as the balloon is able to withstand high pressures and can be manufactured in a range of sizes."

Van den Dobbelsteen attached a balloon to the beak of the forceps. As the balloon is pushed against the patient's tissue, it is compressed, forcing liquid inside the balloon out through a small tube leading to the grip of the instrument, where the pressure can be measured, thus revealing the relationship between the force applied to the instrument and the pressure exerted on the tissue. "A balloon like this is relatively easy to make, as it doesn't require any electronics, and compressing water or air is very safe for the patient."

Van den Dobbelsteen has been granted a patent for his invention, and instrument makers of the Biomechanical Engineering department are currently building a prototype. The principle could perhaps be applied to detect tumours as well. "In many cases, tumours will be harder than healthy tissue. This means that you could find tumours you would not normally be able to see, simply by testing tissue for hard spots."

More information:
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