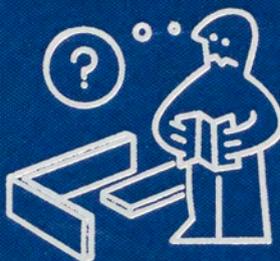


# INNOVATION THE SWEDISH WAY

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MAX STRÖM

# Seeing the invisible

## THE VISUALIZATION TABLE

**S**ometimes an image is more useful than reality. Doctors and medical students can lean over and rotate, zoom in, tap and study an image with their fingertips – the same way as on a small phone screen. It's easy to forget that the three-dimensional image of a human body being displayed is not the real thing.

It's about mathematics and data science. Transforming vast quantities of data into meaningful graphics. The subject has long interested Anders Ynnerman, professor of science visualisation at Linköping University and director of Norrköping Visualization Center C. The 3D visualisation technology his research team developed in the mid-2000s has enabled advances in medical applications for research and education, and provided a tool for science communication and education at museums and science centres.

Before you can visualise anything, you need to obtain data. For example, the data might come from computer tomography, which can create an image of the inside of the human body. This is where Anders Persson, another pioneer, physician and scientist, enters the picture. He is an expert in medical imaging science and visualisation. Like Anders Ynnerman, he is also passionate about finding practical uses for research.

The idea for the Visualization Table emerged as Visualization Center C was being set up. Unlike typical science centres, the concept for Visualization Center C was based on the power of visual images and ways of interacting with digital graphics to learn more about outer space, the human body, historical events and any other fields involving processes, changes, or 'before and after'. The centre was opened in 2010. It is a joint project involving Linköping University, the municipality of Norrköping and RISE Interactive C-studio, headed by Thomas Rydell – another key figure who saw the potential of 3D technology early on.

In parallel with their involvement with Visualization Center C, the Linköping researchers set their sights on the medical market. They teamed up with Sectra, a medical IT company, to license their innovation. In 2011, Linköping University became the first institution in the world to use this brand-new digital tool in its teaching.

Following pages:  
The Visualization Table is used in medical schools all over the world, as well as in museums and science centres.

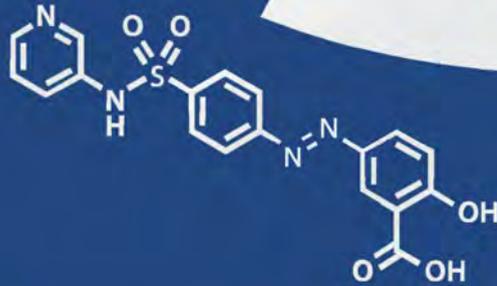
With the creators' revolutionary software, users can create a virtual three-dimensional copy of the body, which they can then turn and rotate and even slice into layers to examine various organs. This is an amazing teaching and learning tool for physicians and medical students. As a virtual model where doctors can try out their interventions before applying them on human patients, it helps physicians provide more precisely targeted treatment. Medical professionals have benefited from studying coronary circulation in detail. New visualisation technology enables them to observe how blood circulates through the atria and ventricles, as well as heart muscle contractions and any leaks.

But the technology works with more than living bodies. It also enables non-invasive, highly detailed examination of the bodies of people who have died as a result of illness, accidents or crimes in order to establish the exact cause of death. In some cases, when religious beliefs preclude a regular autopsy, the virtual autopsy table has provided a solution.

Even long-dead bodies can be examined, with mummies providing the most striking examples. This innovation was used in 2013 to take a closer look at the Gebelein Man, a mummy in the British Museum. The analysis of his remains enabled researchers to establish that the man, who lived some 5,500 years ago, had been murdered. Someone had stabbed him in the back with a sharp implement. After studying similar injuries in recent murder cases, Anders Persson concluded that the attack had slashed through Gebelein Man's pulmonary artery and punctured his lung.

Museum visitors can study a digital copy of a mummy using a Visualization Table located next to the physical mummy. Work on visualising the Gebelein Man mummy led to the establishment of Interspectral as a spin-off company from Visualization Center C in 2014 with Thomas Rydell as the first CEO. Interspectral has developed public 3D visualisation displays into a new Swedish export product. Now millions of children and young people all over the world can explore scientific mysteries in a way that really engages their curiosity.





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