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Robot performs virtual autopsies

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### Digital future heralded for forensic medicine

**Virtobot is the name of the forensic high-tech helpmate used at the University of Bern's Institute of Forensic Medicine to perform virtual autopsies. Developed as part of the National Centre of Competence in Research, Co-Me the industrial robot provides forensic doctors with a high precision, three-dimensional image of cadavers. Digitally preserving these allows the causes of death can be established even years later.**



*A high-mobility industrial robot by the name of Virtobot records the contours of a cadaver under examination. Using computed tomography at the same time, forensic doctors are provided with a three-dimensional image and can conserve corpses digitally.*

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Ever since the CSI TV series hit the airwaves, everyone knows that forensic doctors use high-tech tools in their criminal investigations and computers to reconstruct how the crime or accident happened. Less well-known, on the other hand, is that the University of Bern's Institute of Forensic Medicine actively pioneers innovations in forensics. Here in the "Virtopsy" laboratory, forensic autopsy techniques are undergoing further development. The coinage "virtopsy" stands for virtual autopsy and describes post-mortem examinations that are performed without cutting open the body of the deceased and solely on the basis of high definition magnetic resonance imagers (MRI) and computer tomography (CT).

Michael Thali and his team also use a specialised robot in their work. They call this forensic high-tech assistant Virtobot. In the Virtopsy laboratory, it projects a light bar onto the corpse being examined. The imaged body contours are recorded in high definition using a digital stereo camera. At the same time, the Virtobot images the texture of the skin. "Then we harmonise these surface images with the three-dimensional CR data of the entire body", explains Lars Ebert, who programmed Virtobot as part of the National Centres of Competence in Research, Co-Me. Forensic doctors are thus provided with a high-precision, three-dimensional image of the body and can examine it on-screen from all angles, both externally and internally. This combination of medical imaging, surgical navigation and robotics means that for the first time ever cadavers can be digitally preserved and autopsies conducted again, even years later, for instance when new evidence is turned up in an unsolved case.

Digitally captured data have meanwhile been approved as evidence in the courts, but only when validated by a conventional autopsy. In view of the precision and efficiency of the virtual autopsy, Michael Thali is convinced that the future of forensic medicine belongs to the Virtobot.

#### National Centres of Competence in Research "Co-Me"

The National Centres of Competence in Research "CO-ME – Computer-aided and Image-guided Medical Interventions" aims to develop information technologies to improve medical interventions, which will benefit both individual patients and healthcare for society as a whole. In doing so, researchers focus on the development, integration and validation of technologies for computer-aided imaging systems which support the entire supply chain from diagnosis, therapy planning and simulation to the actual operation, post treatment, checks and documentation.

#### On this Subject

[co-me.ch](http://co-me.ch)

#### Contact

Prof. Michael Thali  
Centre of Forensic Imaging and Virtopsy  
Institute of Forensic Medicine  
University of Bern  
Bühlstrasse 20  
CH-3012 Bern  
Telephone: +41 31 631 56 42  
Email: [michael.thali@irm.unibe.ch](mailto:michael.thali@irm.unibe.ch)