Fraunhofer IGD

FRAUNHOFER INSTITUTE FOR COMPUTER GRAPHICS RESEARCH IGD

PRESS RELEASE

ICON VirtoFusion

Automated fusion of forensic imaging data for more traceable forensic assessments

How can different types of forensic imaging data be reliably combined and forensic findings made easier to trace? In the ICON VirtoFusion research project, Fraunhofer IGD and the University of Zurich are developing a platform that automatically integrates different imaging modalities, verifies their consistency and visualizes uncertainties. The aim is to provide reproducible and transparent data for forensic documentation and assessment.

(Darmstadt/Zurich) Forensic imaging data is currently often acquired using separate systems and then largely combined manually. The Fraunhofer Institute for Computer Graphics Research IGD and the Virtopsy Research Lab at the University of Zurich (UZH) aim to improve this process. As part of the joint ICON VirtoFusion research project, they are developing a platform that automatically acquires, calibrates, spatially registers and analyzes data from different imaging modalities. The goal is to provide a reproducible and transparent basis for forensic documentation and assessments that can stand up to legal scrutiny.

Automated integration of CT, 3D surface and multispectral imaging
ICON VirtoFusion – Correlation-Validated Sensor Fusion for Reliable Forensic Findings – combines postmortem computed tomography, color-calibrated optical 3D surface documentation and multispectral imaging. The platform is designed to systematically assess the consistency of internal and external findings, make uncertainties visible, and document the origin and processing history of the data in a traceable manner.

At the University of Zurich, the project is led by Prof. Dr. Michael Thali. The Virtopsy Research Lab contributes its many years of expertise in virtual autopsy, postmortem imaging and forensic documentation. Dominic

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Gascho is responsible for key activities relating to the validation of multimodal registration and the correlation of the different imaging data. "For forensic imaging, the quality, reproducibility and traceability of findings are essential," emphasizes Prof. Dr. Michael Thali. "With ICON VirtoFusion, we aim to link internal and external findings more closely at a methodological level and further advance digital forensic documentation."

Consistency across imaging modalities is systematically assessed

Fraunhofer IGD contributes its expertise in autonomous 3D digitization, multimodal sensor fusion, calibration and quality assurance. Hasan Kutlu of Fraunhofer IGD is responsible for key activities relating to technical system integration as well as the automated acquisition and calibration of imaging data. Pedro Santos, project manager at Fraunhofer IGD, coordinates the institute's contribution and the technical collaboration with the University of Zurich.

The planned solution goes beyond simply overlaying data from different imaging modalities. "Their consistency is systematically assessed, while quality, uncertainties and processing steps are documented throughout the entire process chain to ensure traceability," explains Hasan Kutlu.

Forensic expertise meets sensor fusion and 3D digitization

The two partners combine their respective core competencies and resources within the project. The University of Zurich defines the clinical and forensic requirements, validates the solution in a practical setting and contributes its Virtopsy expertise and infrastructure. Fraunhofer IGD develops the technical foundations for automated data acquisition, multimodal registration, sensor fusion and quality assurance.
ICON stands for International Cooperation and Networking and is a Fraunhofer-Gesellschaft funding instrument for strategic international research collaborations. The ICON program supports Fraunhofer institutes in pooling scientific and technological expertise with international partner organizations in joint research projects whose results have significant potential to be translated into new products, services or commercial applications.

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Funding for the Fraunhofer contribution follows the principle of "Matching Effort": the personnel effort contributed by the partner must match that of Fraunhofer.

Interdisciplinary expertise supports the development

An interdisciplinary Advisory Board supports ICON VirtoFusion by providing scientific, application-oriented and strategic input. It brings together perspectives from forensic medicine, radiology, physics, imaging and X-ray technology, healthcare, as well as innovation and technology transfer, thereby covering the different requirements and specialist disciplines involved in the project.

ICON VirtoFusion started on July 1, 2026, and will run for 36 months. The joint research project of the Virtopsy Research Lab at the University of Zurich and Fraunhofer IGD is supported by a Fraunhofer ICON grant.

For more information:

ICON VirtoFusion Virtual Autopsy with Sensor Fusion - Fraunhofer IGD

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Image Caption: Prof. Dr. Michael Thali, Hasan Kutlu, Dominic Gascho and Pedro Santos (from left to right) at the VirtoScan system at the University of Zurich. In the ICON VirtoFusion project, the University of Zurich and Fraunhofer IGD are jointly developing new approaches for the automated and traceable integration of forensic imaging data. (@University of Zurich).

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About Fraunhofer IGD

The Fraunhofer Institute for Computer Graphics Research IGD has been setting standards in visual computing – image- and model-based informatics – for more than 30 years. Its roughly 260-strong staff support companies and institutions across manufacturing and mobility, healthcare, bioeconomy, infrastructure and public services, and maritime economy sectors. Fraunhofer IGD provides specific technological solutions and support for strategic development. Its researchers carry out problem analyses, design hardware and software, develop protypes, and implement interactive visual systems. The focuses are human-machine interactions, virtual and augmented reality, artificial intelligence, interactive simulation, modeling, and 3D printing and scanning. Fraunhofer IGD has been engaged in high-level research since 1987, supporting change in society and the economy with application-oriented solutions developed at its facilities in Darmstadt and Rostock.

About the Virtopsy Research Lab

The University of Zurich (UZH) is internationally recognized as a leading center for the further development of Virtopsy® and forensic imaging. Originally developed in Bern by Richard Dirnhofer and Michael Thali, the Virtopsy concept has been continuously advanced at the Institute of Forensic Medicine at UZH under the leadership of Prof. Dr. med. Michael Thali since 2011.

The research combines computed tomography (CT), magnetic resonance imaging (MRI) and highly precise optical 3D surface documentation for the digital acquisition, analysis and reconstruction of forensic findings. As a long-standing member of the Virtopsy Research Lab, Dominic Gascho plays a key role in the lab's current research activities. He is also a co-founder of the VirtoScan project and has made significant scientific contributions to its development for photogrammetric 3D surface documentation.

The latest developments are documented in the 2026 specialist publication "Virtopsy Update." With ICON VirtoFusion, Virtopsy UZH is continuing this work in collaboration with Fraunhofer IGD.

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