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How the combination of new X-ray techniques with new algorithms can support 3D imaging in medicine

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Combining new x-ray techniques with new algorithms can support the imaging procedure in medicine. They allow using additional information channels like X-ray energy or X-ray refraction and diffraction to improve the image contrast and highlight interesting objects over the background. Ever faster computers enable furthermore complex reconstruction and filtering techniques in the clinic which were only used for special offline cases so far. Novel developments like spectral CT or iterative reconstructions help to improve the sensitivity and the contrast of medical imaging. With such tools, it might once be possible to image challenging objects like cartilage or to segment cancerous and normal tissue. The diagnosis of diseases like chronic pain or early cancer, which is difficult today, will profit from such developments. But also established methods will gain from these developments. Iterative reconstructions reduce noise and artefacts; and spectral CT permits an easier rendering of interesting features in the image. Together with micro-CT and diffraction based analytics, these tools have the potential to advance X-ray techniques also into fields where they are not used today.

Biography

Alex Dommann is Heading the Department Materials meet Life at Empa. He has received his PhD in Solid State Physics in 1988 from ETHZ in Switzerland. His research concentrates on the surface analysis, bio surface interactions, structuring, coating and characterization of thin films. He is member of different national and international committees and teaches Biomaterials, Crystallography and MEMS technology at different Swiss universities and has published more than 150 papers. He is Member of the Swiss Academy of Engineering Science (SATW) and Adjunct Professor at the University of Berne.

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