

# Visual Computing for Medicine

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## Abstract

Medical visualization has been a long way down the road from the first - by today's standard - crude images to the current sophisticated rendering results. However, for a successful application of visualization, we need to look at the whole visual computing pipeline, which includes image processing, visualization, interaction, and in addition into perceptual issues of visual computing. In my talk, I will discuss certain aspects of this pipeline. Starting from early image filtering after image acquisition (which by itself is also part of the medical imaging/image processing stage), segmentation is needed to identify specific organs, in particular if they cannot be identified by standard classification approaches. After the preparation of the potentially multi-value and multi-field (modal) structured datasets, they are visualized using the whole variety of direct and indirect volume rendering approaches. Here, I will demonstrate that both approaches have advantages and disadvantages, and hence their place in medical visualization. Finally, we need to interact with the resulting renderings either pre-(post-)operatively for planning purposes, or in an intra-operative environment during an intervention. At all these stages, the intermediate and final results are interpreted mostly through the visual system of humans. Hence, we also need to consider how perception is not only influencing the interpretation, but also how we can improve it.