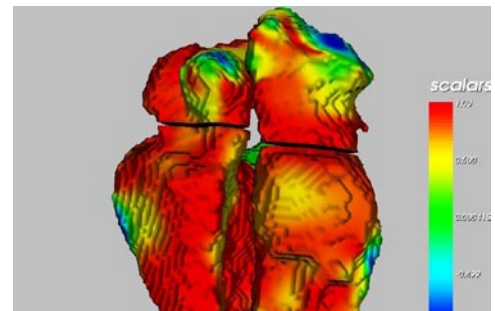


# Success Story

## Does a sick heart move differently?

*It is well known that image-rendering processes provide insight into the human body. Modern devices deliver high-resolution images over time and space. To improve such 4D information for cardiac examinations, scientists at SCCH developed a computer-aided approach that enables comparisons of sequences of three-dimensional magnetic resonance tomography images. This is a significant aid for the physician and will enable diagnostic consideration of changes and abnormalities in heart motion in the course of cardiac diseases. The project was recognized with a Health Technology Cluster Genius Award.*



### OVERVIEW

A human cardiac cycle lasts 0.5 to 0.7 seconds. Modern magnetic resonance tomography (MRT) devices deliver high-resolution 3D images of the heart every 50 milliseconds. Similar quantities of data are produced by other image-rendering medical devices and modern microscopes. SCCH's Biomedical Data Analysis group addresses computer-aided visualization and quantitative analysis of such space/time data. In the realm of an EU cooperation program including multiple European and South American academic facilities, Alfredo Lopez of Chile and Dr. Julian Mattes (both SCCH staff members) in cooperation with the University Clinic of Innsbruck and Austria's Health and Life Sciences University (UMIT) developed a new approach for the comparison of heart image sequences.

The rapid analysis in real time distinguishes the extended LPM system from other video-based analysis systems on the market.

### SOLUTION

In the daily clinic routine, a cardiologist makes decisions about patient treatment based on MRT image sequences. This new computer-aided approach provides medium-range support in the interpretation of image sequences and in the diagnosis of cardiac diseases (e.g., myocardial disorders). A software tool will help a physician in assessing whether the condition of the patient has improved or deteriorated. This motivated the researchers to define criteria that quantify differences in heart motion and visualize these.

### CHALLENGE

Most likely 3D position is determined. Significant challenges are posed by the low resolution of the cameras compared to the playing field, the speed of the ball, and the fact that the ball is often partially or completely hidden by players. The new method developed by SCCH staff meets these challenges and delivers excellent processing speed.

The new approach enables a physician not only to examine global parameters such as changes in volume but also to include differences in motion for each point on the heart surface and in the myocardium. This improves precision by up to 33% over comparable approaches and enables incorporation of differences for each of the seven phases of the cardiac cycle and for each subregion of the heart.

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