



Every heart beat counts when it comes to pediatric cardiac MRI imaging

Advancing pediatric cardiac MRI at TUM University Hospital German Heart Centre

At TUM University Hospital German Heart Centre, one of Europe's most respected cardiac centres, a team of pediatric cardiologists, radiographers, and anesthesiologists has spent nearly two decades pushing the boundaries of what cardiac MRI can achieve in pediatric care. Dr. Christian Meierhofer, Deputy Director of Congenital Heart Disease and Pediatric Cardiology, has dedicated 18 years to a single question: how do we see the heart of a child, precisely and safely, every time? Congenital heart

disease affects nearly 8 in every 1,000 children born worldwide¹, many of which require not just one surgery, but several over the course of their life. Each intervention is guided by imaging that must be fast, reproducible, and diagnostically dependable across a lifetime. This is the story of how advanced MRI technology, clinical expertise, and an uncompromising commitment to image quality are redefining what is possible in pediatric cardiac care.



A career built on complexity

Prof. Dr. Dr. Meierhofer did not plan to spend 18 years at TUM University Hospital German Heart Centre. “Originally, the plan was to stay for only one year,” he says. “But I get excited every day when I come to work.” What keeps him there is both the complexity of the cases and the tools that have evolved around them — tools that now allow him and his team to see things in the heart of a child that were simply invisible a decade ago.

Congenital heart disease is, at its core, a structural problem: vessels that emerge from the wrong position, ventricles that are reversed or underdeveloped and heart valves that fail before their time. These are conditions present from birth — and they require imaging not once, but repeatedly, across a patient’s entire life.



“You have to imagine that these are heart defects that have often been operated on in infancy — not corrected only once, but two or three times, until the patient is in the condition they are in after all these operations.”

Prof. Dr. Dr. Christian Meierhofer, TUM University Hospital German Heart Centre, Munich

The technical challenge of pediatric cardiac MRI

The challenge of cardiac MRI in a pediatric population is well known. “The problem with cardiovascular MRI is that the heart is constantly beating, the patient is breathing, and I have to bring all of this into harmony in order to get

good image quality,” says Prof. Dr. Dr. Meierhofer. In adult patients, this is demanding. In a child weighing 2.5 kilograms, it is an entirely different challenge. Patients are smaller, hearts beat faster, and voice-over guidance is more complicated.



3.0T cardiac scanning with SmartSpeed Precise

For Prof. Dr. Dr. Meierhofer and his team, the turning point came with the adoption of SmartSpeed Precise on the Philips Elition X 3.0T system. “We have had SmartSpeed for a relatively long time, which has given us a huge advantage — simply in terms of time [efficiency], or if we don’t want to use the time, in image resolution and image quality, where we can take much nicer pictures in the same time.” With the latest update, the imaging team has experienced

time reductions of between 20 and 40 percent depending on the sequence.²

The visual impact has been striking, even for colleagues from other centres. “When colleagues see pictures here on the 3.0T device, many do not believe it is a 3.0T device — because over the last few years we have gotten rid of an incredible number of image defects via SmartSpeed and Precise, and the images look phenomenal.”



From image quality to clinical decision

Speed and sharpness, Prof. Dr. Dr. Meierhofer emphasizes, are not ends in and of themselves. They are the foundation of something more

consequential: the confidence to make the right clinical decision at the right moment.

“Due to the new possibility of using SmartSpeed Precise to achieve significantly better resolutions, I have the advantage of better differentiating structures in congenital heart defects — and thus making diagnostics much better.”

Prof. Dr. Dr. Christian Meierhofer, TUM University Hospital German Heart Centre, Munich

A partnership that made the difference

The role of Philips in reaching this level of performance has been significant. “The support we had from Philips was decisive. A lot of the sequence optimization simply worked much faster with their technicians and specialists. We might have managed

somehow — but not in time.” Today, Prof. Dr. Dr. Meierhofer’s vision for the future is clear; a center where the MRI room is the first stop for every cardiac patient — delivering anatomy, volume, and flow before anything else is decided.



"We are away from 90 minutes of examinations. We are now at 30 minutes routine. And we will certainly get to the point where we can take less than ten minutes. That can be it."

Prof. Dr. Dr. Christian Meierhofer, TUM University Hospital German Heart Centre, Munich

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1. van der Linde D et al. Global birth prevalence of congenital heart defects 1970–2010: a systematic review and meta-analysis. J Am Coll Cardiol. 2011;58(21):2241–7.
2. SmartSpeed Precise enables the decrease of scan time up to 30% with equal or better image quality. Compared to SENSE imaging, for Cardiac imaging. SmartSpeed Precise enables the increase of resolution up to 30% within similar scan time with equal or better image quality. Compared to SENSE imaging, for Cardiac imaging.

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