2010 Award Winner:
Oliver Kripfgans, Ph.D. | Cardiac Imaging

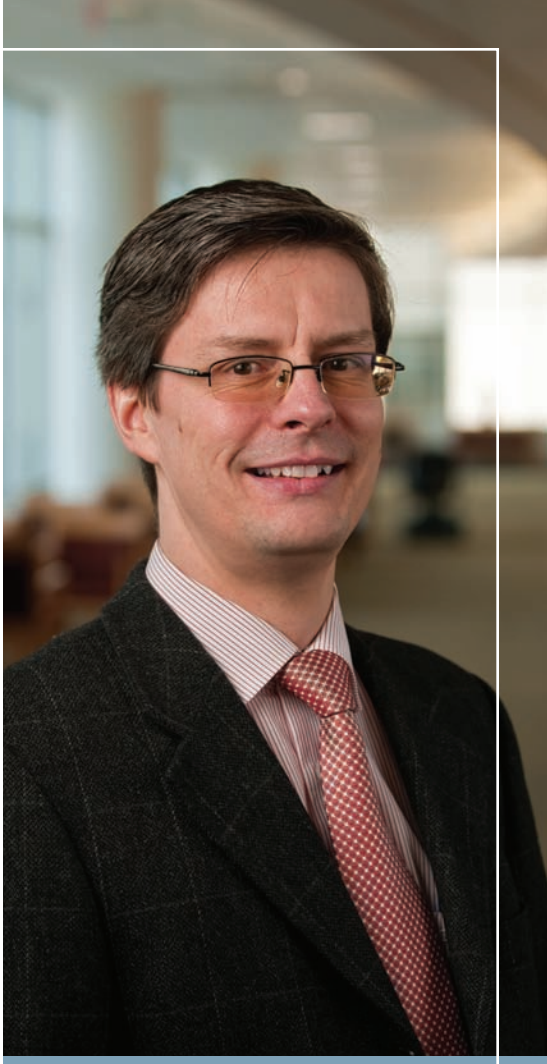
Physicist Oliver Kripfgans came to U-M 13 years ago as a visiting scholar from Germany. What initially attracted him to Michigan is the reason he has stayed: an environment that fosters collaboration. Now an Assistant Professor in the Department of Radiology, Dr. Kripfgans' work applies physics to medicine, partnering with investigators in fields as diverse as engineering, applied physics and basic science. His position allows him to be in regular contact with clinicians, whose input is vital to his understanding of how the discoveries he makes may someday impact patients.

Among Dr. Kripfgans' current projects is an ambitious attempt to improve methods of measuring cardiac output. Currently, the best option for measuring blood flow through the heart is a procedure based on pulmonary artery catheterization. It involves injecting a catheter into the internal jugular, subclavian, or femoral veins and advancing it to the pulmonary artery. In addition to being highly invasive, the technique is only an indirect measure of the actual flow. Dr. Kripfgans believes it may be possible to reinterpret a conventional technology—one not previously considered viable for transcutaneous cardiac imaging—to better observe the workings of the heart: ultrasound.

Ultrasound is familiar to most of us, having either undergone an ultrasound test ourselves or know someone who has. It offers a non-invasive way to generate images of internal organs. Although it is useful for imaging many parts of the body, the heart presents a unique set of challenges for current ultrasound protocols; it is situated deeper in the body cavity than organs like the liver or kidneys; it is surrounded by the ribcage, making it next to impossible to sweep with a traditional ultrasound wand; and, perhaps the greatest challenge, it is in constant motion.

The next-generation ultrasound expands from the familiar two-dimensional images to a three-dimensional output. Dr. Kripfgans is interested in finding a way to leverage the benefits of 3-D ultrasound in cardiac medicine; improving on the quality of information it can deliver while overcoming the challenges presented by the heart's features. In addition to his academic collaborators, other partners on this journey include an Ann Arbor-based technology firm and General Electric, both of whom are providing state-of-the-art equipment and expertise.

As a pioneer in his field, Dr. Kripfgans represents the quintessential Heart of a Champion Research Fund recipient. He is the only academic investigator actively pursuing 3-D ultrasound for use in non-invasive, real-time cardiac output measurements. To move this technology forward, he must show that the images generated by 3-D cardiac ultrasound can result in measurements of cardiac activity that can be precisely calibrated and proven accurate. Extensive work with pre-clinical models is required to demonstrate that the approach is viable. The Heart of a Champion Research Fund award is providing critical support at this early stage. With this support, Dr. Kripfgans hopes to publish findings and apply for the major grant funding needed to move the project into clinical studies with patients.



The Heart of a Champion Research Fund is providing critical support, allowing Dr. Kripfgans to publish findings and apply for the major grant funding needed to move his project into clinical studies.

The opportunity for early-career investigators to strike out in uncharted territory requires visionary investment. The Heart of a Champion Research Fund has made that possible for Dr. Stein and Dr. Kripfgans. With the support of others who share Bo Schembechler's vision, the Fund will continue to invest in the talent of scientists and the potential of their ideas for years to come.