

# Biomedical Engineering

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## Core Faculty Profile

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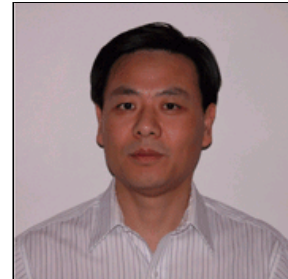
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## Research Interests

Magnetic resonance imaging (MRI) is an emerging technique to evaluate human anatomy and function non-invasively. The goal of our research is to develop new MR imaging methods to detect coronary artery-related heart disease, the No.1 cause of death in the Western world. Our recent research interests include: to develop ultra-fast and real-time MRI techniques to acquire high-resolution images of coronary arteries; to detect the presence and characterize the composition of vascular plaques using MRI; to measure blood flow and blood oxygen level in the heart muscle using MRI; to guide vascular interventional procedures for disease treatments using MRI; to evaluate the utility of MR contrast agents in imaging the anatomy and function of the heart; and MR molecular imaging.

Our research aims to address important clinical questions. New techniques developed by our group have been applied in clinical practice worldwide. We have strong collaborations with our industrial partner, Siemens Medical Solutions, Erlangen, Germany, which have their Cardiovascular MR Research and Development Group (consisting of five senior scientists) stationed at our research facility working with us side by side. This enables us to have fast access to the most advanced hardware and software of MR imaging systems and allows us to implement new techniques on the imaging systems for immediate clinical applications.

## Selected Publications

1. **Li D**, Carr JC, Shea SM, Zheng J, Deshpande VS, Wielopolski P, Finn JP. *Coronary arteries: magnetization-prepared contrast-enhanced, three-dimensional volume-targeted breath-hold MR angiography*. Radiology 2001; 219:270-277.
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6. Omary RA, Green JD, Finn JP, Chung YC, Tang R, Li YZ, Carr JC, **Li D**. *Passive catheter tracking using MRI: comparison of conventional and magnetization-prepared FLASH*. J Magn Reson Imaging 2002; 16:104-109
7. Omary RA, Green JD, Schirf B, Li Y, Finn JP, **Li D**. Real-time magnetic resonance imaging-guided coronary catheterization in swine. Circulation, 2003; 107:2656-2659.
8. Zheng J, Wang J, Nolte M, **Li D**, Gropler RJ, Woodard PK. *Dynamic estimation of myocardial oxygen extraction ratio during dipyridamole stress by MRI: a preliminary study in canines*. Magn Reson Med 2004; 51:718-726.
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12. Green JD, Schirf BE, Omary RA, McCarthy RM, Carr JC, **Li D**. *Projection imaging of the right coronary artery with an intravenous injection of contrast agent*. Magn Reson Med 2004; 52:699-703.
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14. Shea SM, Schirf BE, Bi X, Tang R, Lu B, Omary RA, **Li D**. Myocardial perfusion evaluation with T2-prepared gradient echo blood oxygen level dependent imaging at 3 Tesla. Comput Cardiol 2004; 31:145-148.
15. Park J, Zhang Q, Jellus V, Simonetti O, **Li D**. *Artifacts and noise suppression in GRAPPA imaging using improved k-space coil calibration and optimized variable density sampling*. Magn Reson Med 2005; 53:186-193.
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17. Koktzoglou I, Simonetti OP, **Li D**. *Coronary artery wall imaging: initial experience at 3 Tesla*. J Magn Reson Imaging 2005; 21:128-132.
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- of coronary arteries with a three dimensional magnetization-prepared true fast imaging with steady state precession sequence compared with conventional coronary angiography. *Am Heart J* 2005; 150:530-535.
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## Graduate Students

Vibhas Deshpande  
Steven Shea  
Jordin Green  
Andy Larson  
Xiaoming Bi  
Jaeseok Park  
Ioannis Koktzoglo  
Mark Crowe

## Student awards

Steven Shea, Young Investigator Award, 6th Annual Society of Cardiovascular MR Scientific Sessions, Miami, Florida, Feb, 2003.



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