

# Rashed Karim

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Google scholar *h*-index: 10+, Citations: 670

## Education

Ph.D. Imperial College London, October 2009.

*Topic:* Image data segmentation of the heart's chambers from cardiac MRI

*Advisor:* Prof. Daniel Rueckert, Department of Computing.

M.Sc. *with Distinction*, Queen Mary, University of London, October 2005.

*Subject:* Advanced methods in Computer science

*Topic:* Automated extraction of pedestrian motion from CCTV images

*Advisor:* Dr. Tao Xiang, Computer vision group.

B.Sc. University of Toronto, September 2002.

*Subjects:* Computer science and Mathematics

## Employment

### *Present*

**Research fellow**, King's College London, September 2010 - present

Design and implement statistical/predictive models with cutting edge algorithms (in C/C++) utilising high volumes of 3D medical image data for segmentation, clinical interpretation and therapy guidance. Drawing appropriate conclusions and report findings in scientific journals and presenting at annual conferences and meetings. Translational research in collaboration with Siemens. Successfully organised three international data segmentation competitions. Supervised nineteen student projects to-date. Promoted to research fellow in 2015.

**Honorary lecturer**, Imperial College London, December 2014 - present

Sharing expertise and tools on techniques for analysing cardiac imaging data with the MR imaging unit at the Royal Brompton Hospital London.

**Consultant**, De Silva Tutors Ltd., January 2007 - present

A keen interest in Web applications (PHP and JavaScript). De Silva tutors Ltd. is an established tutoring agency serving students in central London schools. Working closely with the CEO to identify business challenges and solving these using web applications. Recent works include implementation of a CV search engine with Elasticsearch and revenue data visualisation charts in JavaScript.

### *Past*

**Postdoctoral researcher**, Imperial College London, October 2009 - September 2010.

Develop tools (in C++) for classifying between diseased and healthy tissues in cardiac MRI data for clinical interpretation.

## Teaching

Over 400+ contact teaching hours since 2010, mostly as BSc primary project supervisor. Nineteen projects supervised to-date.

### Example project titles and topics:

1. Model-based image data analysis of cardiac wall thickness using direct measurements from CT data
2. Force estimation from real-time X-Ray imaging data for a robotic catheter
3. Tissue contact force sensing in uni- and multi-directional catheters
4. Analysis of path trajectory data of a robotic catheter inside a phantom synthetic heart
5. Augmented reality system for museum exhibits
6. Flat maps of the heart

## Invited talks

1. Data processing and visualisation in interventional cardiac MRI, technology for interventional cMRI, **Meeting of the Society of Cardiovascular and Magnetic Resonance (SCMR)**, Nice, France, 2015.
2. Quantification algorithms for assessing patients for heart tissue scarring with cardiac MRI data, **Hounsefield lecture parallel sessions**, Imperial College London, London, UK, 2015.
3. Lessons from image segmentation competitions, **Biomedical Engineering: Problem solving using clinical and biomedical application session**, to be held in London on 6th June 2017.

## Journal publications

See also my profile on *Google scholar* and *DBLP*

(† - as first author, ‡ - as second author, IMP - Impact factor)

1. †Evaluation of state-of-the-art image data segmentation algorithms for left ventricle infarct from late Gadolinium enhancement MR images, **Medical Image Analysis**, Vol. 30. pp 95-107, 2016. (IMP=4.5)
2. †Intra-cardiac and peripheral levels of biochemical markers of fibrosis in patients undergoing catheter ablation for atrial fibrillation, **Europace Accepted**. IMP=3.7)
3. Biophysical modelling predicts ventricular tachycardia inducibility and circuit morphology: A combined clinical validation and computer modelling approach, **J. of Cardiovascular Electrophysiology**, *Accepted* (IMP=3.1)
4. ECG imaging of ventricular tachycardia: evaluation against simultaneous non-contact mapping and CMR derived grey zone. **Medical & Biological Engineering & Computing Accepted**, (IMP=1.8)
5. ‡A randomized prospective mechanistic CMR study correlating catheter stability, Late Gadolinium enhancement and 3-Year clinical outcomes in robotically-assisted versus standard catheter ablation. **Europace**, 2015. (IMP=3.7)
6. The effect of contact force in atrial RF ablation: Electroanatomical, CMR and histological assessment in a chronic porcine model, **JACC Clinical Electrophysiology**, 2015.
7. Benchmark for algorithms segmenting the left atrium from 3D CT and MRI data sets. In **IEEE Transactions on Medical Imaging**, 2015. (IMP=3.4)
8. Interventional CMR in electrophysiology - advances towards clinical translation. **Circulation: Arrhythmia & Electrophysiology**, 2015. (IMP=4.5)

9. Repeat left atrial catheter ablation: MRI data prediction of endocardial voltage and gaps in ablation lesion sets. **Circulation: Arrhythmia & Electrophysiology**, 2015. (IMP=4.5)
10. †A method to standardize quantification of left atrial scar from delayed-enhancement MR image data. **IEEE Translational Engineering in Health and Medicine**, 2014. (IMP=1.0)
11. †Surface flattening of the human left atrium and proof-of-concept clinical applications. **Computerized Medical Imaging and Graphics**, 2014. (IMP=1.6)
12. †\*Quantitative magnetic resonance imaging analysis of the relationship between contact force and left atrial scar formation after catheter ablation of atrial fibrillation. **J. of Cardiovascular Electrophysiology**, 2014 (\* - joint first authorship). (IMP=3.1)
13. A novel skeleton based quantification and 3D volumetric visualization of left atrium fibrosis using Late Gadolinium Enhancement Magnetic Resonance Imaging. **IEEE Transactions in Medical Imaging**. 2014. (IMP=3.4)
14. Multimodality imaging for catheter ablation of atrial fibrillation. Is it still necessary? **The International Journal of Cardiology**, 2014. (IMP=4.0)
15. Cardiac magnetic resonance and electroanatomical mapping of acute and chronic atrial ablation injury. a histological validation study. **European Heart Journal**, 2014. (IMP=15.0)
16. †Evaluation of current algorithms for segmentation of scar tissue from late Gadolinium enhancement cardiovascular MR of the left atrium. **J. of Cardiovascular Magnetic Resonance**. 2013. (IMP=4.7)
17. †A three degree-of-freedom MR-compatible multi-segment cardiac catheter steering mechanism **IEEE Transactions on Biomedical Engineering**, 2013. (IMP=2.3)
18. Automated analysis of atrial late gadolinium enhancement imaging correlates with endocardial voltage and clinical outcomes: a two-center study. **Heart Rhythm Journal** Vol. 10(8), 2013. (IMP=5.0)
19. Native T1 mapping in differentiation of normal myocardium from diffuse disease in hypertrophic and dilative cardiomyopathy. **In JACC: Cardiovascular Imaging** 2013. (IMP=6.7)
20. †Acute pulmonary vein isolation is achieved by a combination of reversible and irreversible atrial injury **Circulation: Arrhythmia & Electrophysiology**, 2012. (IMP=4.5)

## Conference proceedings

(† - as first author, ‡ - as second author)

1. ‡ CardiacNET: Segmentation of left atrium and proximal pulmonary veins from MRI using multi-view convolution neural networks, *Submitted to MICCAI 2017*
2. † Segmentation challenge on the quantification of left atrial wall thickness. **Proceedings of Statistical Atlases and Computational Models of the Heart (MICCAI STACOM) 2016**. Lecture Notes in Computer Science, Volume 10124.
3. † Left atrial segmentation from 3D respiratory- and ECG-gated MRI data, **Proceedings of Functional Imaging and Modeling of the Heart (FIMH 2015)**, Volume 9126, Lecture Notes in Computer Science pp 155-163.
4. ‡ Tension sensing for a linear actuated catheter robot, **Proceedings of Intelligent Robotics and Applications 2015**, Volume 9245, Lecture Notes in Computer Science pp 472-482.
5. Interactive visualization for scar transmuralty in cardiac resynchronization therapy **Proceedings of SPIE Medical Imaging** 2016.
6. ‡ Statistical model of paroxysmal atrial fibrillation catheter ablation targets for pulmonary vein isolation, **Proceedings of Statistical Atlases and Computational Models of the Heart (MICCAI STACOM) 2015**, Lecture Notes in Computer Science pp 221-230.

7. ‡ Catheter contact force estimation from shape detection using a real-time Cosserat rod model, **Proceedings of IEEE Intelligent Robots and Systems (IROS), 2015**.
8. Left atrial segmentation challenge: A unified benchmarking framework, **Proceedings of Statistical Atlases and Computational Models of the Heart (MICCAI STACOM) 2014**. Lecture Notes in Computer Science, Volume 8330, pp 1-13.
9. † Infarct Segmentation Challenge on Delayed Enhancement MRI of the Left Ventricle, **Proceedings of Statistical Atlases and Computational Models of the Heart 2012**, Lecture Notes in Computer Science, Volume 7746, pp 97-104.
10. † Infarct segmentation of the left ventricle using Markov random field graph-cuts, **Proceedings of Statistical Atlases and Computational Models of the Heart (MICCAI STACOM) 2012**, Lecture Notes in Computer Science, Volume 7746, pp 71-79.
11. ‡ Cardiac Unfold: A novel technique for image-guided cardiac catheterization procedures, **Proceedings of Information Processing in Computer-Assisted Interventions (IPCAI) 2012**, Lecture Notes in Computer Science, Volume 7330, pp 104-114.
12. † Validation of a novel method for the automatic segmentation of left atrial scar from delayed-enhancement Magnetic, **Proceedings of Statistical Atlases and Computational Models of the Heart (MICCAI STACOM) 2011**, Lecture Notes in Computer Science, Volume 7085, pp 254-262.
13. † Automatic segmentation of left atrial scar tissue from delayed-enhancement MRI data, **Proceedings of Functional Imaging and Modeling of the Heart (FIMH) 2011**, Lecture Notes in Computer Science, Volume 6666, pp 63-70.
14. † Mapping Contact Force during Catheter Ablation for the Treatment of Atrial Fibrillation, **Proceedings of Functional Imaging and Modeling of the Heart (FIMH) 2011**, Lecture Notes in Computer Science, Volume 6666, pp 302-303.
15. † Automatic segmentation of left atrial geometry from MRI data with a probabilistic predictive atlas, **In Proceedings of Statistical Atlases and Computational Models of the Heart (MICCAI STACOM) 2010**, Lecture Notes in Computer Science, Volume 6364, pp 134-143.
16. † Left atrium pulmonary veins: segmentation and quantification for planning atrial fibrillation ablation. **Proceedings SPIE Medical Imaging, 2009**
17. † Automatic extraction of the left atrial anatomy from MR for atrial fibrillation ablation, **Proceedings of IEEE International Symposium on Biomedical Imaging (ISBI), 2009**.
18. † Left atrium segmentation for atrial fibrillation ablation, **Proceedings of SPIE Medical Imaging, 2008**.

## Awards and Honours

1. Best poster prize at Medical engineering centres of excellence annual meeting, 2014.
2. Best poster prize at Hamlyn symposium on medical robotics, 2012.
3. University of Toronto scholars award and admission scholarship, 1998.

## Other Activities

1. Reviewer for journals: IEEE Transactions on Pattern Analysis and Machine Intelligence 2017, Journal of Cardiovascular Magnetic Resonance 2016, PLOS One 2016,
2. Reviewer for conferences: MICCAI Statistical Atlases and Modelling of the Heart Workshop 2012, 2013, 2016
3. Member of the editorial board for the Journal of IT in Asia (JITA)