Magnetic resonance imaging (MRI) has become an essential tool in modern cardiology, allowing for detailed visualization of the heart and its cardiovascular system. The development of advanced imaging techniques has significantly enhanced our understanding of cardiac function and disease. Among these techniques, MRI tagging has emerged as a powerful method for non-invasive assessment of myocardial deformation.

**Tagging Preparation**

**2007**
- The first Idea of Myocardial Polar Tagging

**2013**
- Practical Implementation of Polar Tagging
  - Selected Article: "Tagging of Cardiac MR images in the Polar coordinate system: Physical Principles and Practical Implementation", MRM 2014
  - Patent: Cardiac MRI Curvilinear tagging, 2013

**2014**
- Non-uniform Polar Tagging
  - ISMRM 2015, ISMRM 2016, SCM 2016
- Complementary Radial Tagging (CRT)
  - ISMRM 2015, ISMRM 2016, SCMR 2016

**Data Acquisition & Reconstruction**

**2014**
- Non-Cartesian Acquisition (Radial & Concentric Rings)

**2016**
- Polar Fourier Transform (PFT) for Under-sampled Radial Acquisition
  - Selected Article: "Efficient Radial Tagging CMR Exam: A Coherent In-space Reading and Image Reconstruction Approach", MRM 2016
  - Patent: Polar magnetic resonance imaging and applications thereof in cardiac magnetic resonance imaging, 2016

**Cardiac Motion Analysis**

**2007**
- Structure and Function Relationship of Human Heart from DENSE MRI
  - SPIE 2007

**2007**
- Strain Quantification Using Circular and Radial Compression Encoding (CIRCOME)
  - Selected Abstracts: "Regional rotation of the left ventricle in healthy and cardiomyopathic subjects measured with radial myocardial tagging", SCMR 2014
  - Patent: Method for obtaining strain from radially-tagged magnetic resonance imaging (MRI), 2011

**2010**
- 3D Strain through Analytical Method
  - JCMR 2010

**2012**
- Rotational Motion using Polar-HARP on Polar Tagging
  - SCMR 2012, SCMR 2016

**2013**
- Twist Measurement using Radial Tagging
  - ISMRM 2013, ISMRM 2014

**2016**
- Myocardial Segmentation using Level-set Algorithm
  - SCMR 2016

**2016**
- Rotational Motion Through Monogenic Signal Method
  - ISMRM 2016, SCMR 2017

**2017**
- Polar-SinMod for quantification of LV rotational Motion
  - SCMR 2017

**Collaboration**

DVision at UCLA<br>Los Angeles, CA, USA<br>California Institute of Technology<br>Pasadena, CA, USA<br>Huntington Medical Research Institutes<br>Pasadena, CA, USA<br>Rajaei Heart Hospital<br>Tehran, Tehran, Iran

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