



SCMR

**Society for Cardiovascular
Magnetic Resonance**



**International Society for Magnetic
Resonance in Medicine**

SCMR/ISMRM Jointly Sponsored Workshop

New Horizons in High Field Cardiovascular MR: Promises and Progress

presented by SCMR and the ISMRM Cardiac and High Field MR Study Groups

January 30-31, 2013



The Hilton San Francisco Union Square, San Francisco, CA



New Horizons in High Field Cardiovascular MR: Promises and Progress

Welcome

Dear Colleagues and Friends,

On behalf of the Organizing Committee, we extend a very warm welcome to you to San Francisco for the workshop on *New Horizons in Highfield Cardiovascular MR: Promise & Progress* presented by the SCMR in close collaboration with the ISMRM Highfield Systems & Applications and Cardiac Imaging Study Groups. This joint effort of the SCMR and ISMRM is the second of its kind, and we hope it will inspire additional efforts by both societies to combine forces where there is mutual interest in research and education in cardiovascular imaging.

The workshop is designed to provide a forum for vital discussions on highfield and ultrahigh field cardiac MR. For this purpose the workshop features a program of two days of invited and proffered talks plus poster presentations that explore the current state-of-the-art high field cardiovascular MRI. The scientific program comprises 10 sessions, all balancing technical developments and clinical applications. We are honored to present extraordinary speakers including MR technology leaders and distinguished clinical experts, all bridging disciplinary boundaries and stimulating the imaging community to throw further weight behind the solution of unsolved problems and unmet clinical needs. We expect there to be interesting topics presented for physicists and physicians alike.

The program for Day One will focus on unmet needs of clinical cardiovascular imaging, beginning with a keynote lecture by Prof. Warren Manning, a pioneer of cardiovascular MR and editor of the text book on “Cardiovascular Magnetic Resonance” The day will continue with presentations on technical developments and applications of high field cardiac MR including *Assessment of Viability and Myocardial Perfusion*, *Functional and Microstructural Imaging Explorations into Tissue Characterization and Myocardial Mapping*, and *Flow, MR Angiography and Vessel Wall Imaging*.

On Day Two, the program will focus on emerging technologies and applications which make use of the power of high field cardiac MR. The day will kick-off with a keynote lecture by Prof. Kamil Ugurbil, who is highly regarded for over three decades of research into high field and ultra high field MR including his pioneering work on ³¹P spectroscopy of the bioenergetics of the heart. The program will continue with a series of presentations on *Metabolic and Nanomolecular Probing* followed by presentations surveying recent *Advances in Animal CMR* together with progress reports on *Solving the Cardiac Gating/Triggering Conundrum at Higher Fields*. The program will provide further insights into the promises and future directions of high field cardiac MR including *Emerging Technologies* such as MR elastography, interventional and real time cardiac MR imaging, and it will venture a glance on what is *Looming on the Horizon: 7T and Higher*.

The oral presentations will be paralleled by a poster session which is open throughout the entire course of the workshop. Day One will conclude with a wine and cheese reception to provide attendees an opportunity to view the posters and meet with friends, old and new.

We hope that these two days will provide an exciting opportunity for you to explore new aspects of high field cardiovascular MR, and to engage in some fun and interesting discussion of these topics with your colleagues from around the world with the ultimate goal to advance the capabilities of cardiac MR and thereby help improving patient care.

Thank you to all the presenters, organizers and attendees for the effort and support put forth to make this meeting happen. We hope you enjoy the meeting!

Thoralf Niendorf, PhD

Peter Kellman, PhD

Debaio Li, PhD

ORGANIZING AND SCIENTIFIC PROGRAM COMMITTEE:

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Eindhoven, The Netherlands

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University of Minnesota
Minneapolis, MN USA

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Overview

The purpose of the workshop is to educate physicians and clinical scientists about high field MR techniques and methodology with respect to their capabilities for advancing cardiac MR and improving patient care and outcomes. It is expected that the gained knowledge will elevate the application of high field cardiac MR by improving the competence of physicians, clinical scientists, and basic researchers. In addition, the workshop will provide a forum for disseminating information related to state-of-the-art high field and ultra high field MR techniques regarding cardiovascular function, myocardial perfusion, MR angiography, and flow in humans and small animals.

The interdisciplinary faculty and audience will ensure that technologies and methodologies are communicated and shared between physicists, bioengineers, cardiologists, radiologists, physiologists, technologists, and clinical scientists for the purpose of advancing science and improving patient care while balancing technology developments with clinical applications and future directions.

Target Audience

This workshop is designed for:

- Cardiologists, Radiologists, MR Engineers or Physicists, Bioengineers, Physiologists and all fields related to these disciplines
- Medical, Biological and Industrial Researchers with an interest in novel high field MR imaging technology and its implications for clinical cardiac MR
- Cardiac and other MR Applications Specialists who strive to gain a deeper insight into the basics of high field MR and its benefits for cardiac MR
- Experienced researchers seeking to learn about the current state of high field CMR, and actively engaged in research in this or related fields
- Less experienced researchers seeking to understand the capabilities and limitations of high field cardiac MR methods, and those considering getting involved, such as clinicians considering use of these techniques in their practices
- Undergraduate, graduate students, and technologists are highly encouraged to participate

Educational Objectives

At the conclusion of the educational activity, attendees should be better able to:

- Explain the basics of high field cardiac MR; and identify, discuss, and compare novel developments of high field cardiac MR
- Examine and select methods used for assessment of myocardial perfusion and viability, for functional and microstructural imaging of the heart, for myocardial tissue characterization and for MR angiography and vessel wall imaging together with new dimensions in imaging flow at high fields
- Describe and explain challenges and differences of methods used for CMR at higher fields versus the counterparts using lower magnetic field strengths
- Identify and summarize progress and promises of high field CMR in small animals
- Recognize, describe, and select opportunities of emerging high field CMR technologies including early explorations into ultrahigh field CMR and real time imaging of the heart
- Discuss, practice, and disseminate clinical applications of high field CMR

Continuing Medical Education Credits

This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the International Society for Magnetic Resonance in Medicine (ISMRM) and the Society for Cardiovascular Magnetic Resonance (SCMR). The International Society for Magnetic Resonance in Medicine is accredited by the ACCME to provide continuing medical education for physicians.

The International Society for Magnetic Resonance in Medicine (ISMRM) designates this live activity for a maximum of 15.75 AMA PRA Category 1 Credit(s)[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Wednesday, January 30, 2013

8:20 am - 6:30 pm

Plaza A

8:20 am - 8:30 am

Welcome and Introduction

Thoralf Niendorf, PhD, Max-Delbrueck Center for Molecular Medicine

8:30 am - 9:00 am

Keynote Lecture

Moderators: Debiao Li, PhD, Cedars-Sinai Medical Center
Jeanette Schulz-Menger, MD, Charité Medical University and HELIOS
Berlin, Germany

Unmet Needs of Clinical Cardiovascular Imaging: How Can High-field CMR Help to Solve the Conundrum

Warren Manning, MD, Beth Israel Deaconess Medical Center

9:00 am - 10:20 am

Scientific Session I - Technical

Developments for CMR at High Fields

Moderators: Sonia NIELLES-VALLESPIN, PhD, NIH
Thoralf Niendorf, PhD, Max-Delbrueck Center for Molecular Medicine

9:00 am

MR Physics, Opportunities and Benefits of High Field CMR: Is Higher Always Better?

Orlando Simonetti, PhD, The Ohio State University

9:20 am

Enabling Technologies for High Field CMR: Pulse Sequences and Hardware

Michael Schar, PhD, The Johns Hopkins University School of Medicine

9:40 am

Challenges of High Field CMR: Practical and Safety Considerations

Tommy Vaughan, PhD, University of Minnesota

10:00 am

Oral Abstract Presentation W1: Improved Excitation Fidelity in Cardiac Imaging with 2-Spoke Parallel Excitation at 7 Tesla

Sebastian Schmitter, PhD, University of Minnesota

10:10 am

Oral Abstract Presentation W2: Design, Evaluation and Application of a Modular 32 Channel Transmit/Receive Surface Coil Array for Cardiac MRI at 7T

Andreas Graessl, Dipl.-Ing., Max-Delbrueck Center for Molecular Medicine

10:20 am - 11:05 am

Morning Break/Poster Session

Plaza B

11:05 am - 12:35 pm

Scientific Session II - Assessment of Viability and Myocardial Perfusion

Moderators: Victor Ferrari, MD, University of Pennsylvania
Peter Kellman, PhD, NHLBI

11:05 am

How Does Assessment of Myocardial Viability Benefit from Higher Fields

Matthias Gutberlet, PhD, German Heart Center

11:25 am

Clinical Value of High Resolution Rest/Stress Perfusion Imaging

Sven Plein, MD, PhD, University of Leeds

11:45 am

Towards Myocardial Perfusion Imaging Using Arterial Spin Labeling at High Fields

Krishna Nayak, PhD, University of Southern California

12:05 pm

Oral Abstract Presentation W3: ASL Based Myocardial Perfusion in Mice At 7 Tesla

Janaka Wansapura, PhD, Cincinnati Children's Hospital

12:15 pm

Oral Abstract Presentation W4: 3 Tesla Is the Preferred Field Strength for Perfusion Imaging in Coronary Artery Disease - A Comparison to 1.5 Tesla and Fractional Flow Reserve

Peter Bernhardt, MD, University of Ulm

12:25 pm

Oral Abstract Presentation W5: Accurate Quantitative Myocardial Perfusion Using Single Cycle T1 Mapping

David Chen, BS, Cedars-Sinai Medical Center

12:35 pm - 1:30 pm

Lunch (on own)/Posters

1:30 pm - 2:50 pm

Scientific Session III - Functional and Microstructural Imaging

Moderators: Warren Manning, MD, Beth Israel Deaconess Medical Center
Michael Markl, PhD, Northwestern University

1:30 pm

Advances in Cardiac Function and Myocardial Motion Assessment Using High Field MR

James Carr, PhD, Northwestern University

1:50 pm

Imaging the Sometimes Forgotten Right Ventricle

Florian von Knobelsdorff, MD, Charité Medical University

2:10 pm

Quantitative Diffusion Imaging of the Heart: From Basic Research to Clinical Applications

Sonia NIELLES-VALLESPIN, PhD, NIH

2:30 pm

Oral Abstract Presentation W6: Accelerated Fast Spin Echo Diffusion Spectrum Imaging in the Mouse Heart ex-vivo

Irvin Teh, PhD, University of Oxford

2:40 pm

Oral Abstract Presentation W7: Cardiac Diffusion Tensor Imaging: Helix Angle (HA) Healthy Statistical Average Technique for HA Quantification in vivo

Pedro Ferreira, PhD, Royal Brompton Hospital

2:50 pm - 3:15 pm

Afternoon Break/Poster Session

Plaza B

- 3:15 pm – 4:45 pm** **Scientific Session IV - Explorations into Tissue Characterization and Myocardial Mapping**
 Moderators: Katharina Fuchs, Dipl. Phys., Max-Delbrueck Center for Molecular Medicine
 Orlando Simonetti, PhD, The Ohio State University
- 3:15 pm** **Opportunities and Challenges of T1 Mapping and Fat-Water Separation at High Fields**
 Peter Kellman, PhD, NHLBI
- 3:35 pm** **How Bold is T2* /T2 Mapping at High and Ultrahigh Fields**
 Antonella Meloni, PhD, CNR-Pisa
- 3:55 pm** **Do We Need New Reference Values or Can We Use Those Obtained at Lower Fields**
 Jeanette Schulz-Menger, MD, Charité Medical University and HELIOS
- 4:15 pm** **Oral Abstract Presentation W8: Myocardial Iron Quantification Using Modified Look-Locker Inversion Recovery (MOLLI) T1 Mapping at 3 Tesla**
 Gabriel Camargo, CDPI - Clínica de Diagnóstico por Imagem
- 4:25 pm** **Oral Abstract Presentation W9: Continuous Quantitative Mapping of Multi-Organ T1 Relaxation Times with Shmolli to Assess Dose Response in Respiratory Challenges At 3T**
 Stefan Piechnik, PhD, University of Oxford
- 4:35 pm** **Oral Abstract Presentation W10: Optimizing Acquisition Parameters for Myocardial T2 Mapping using T2-prep at 3T**
 Elizabeth Tunnicliffe, PhD, University of Oxford
- 4:45 pm – 6:15 pm** **Scientific Session V - Flow, MR Angiography and Vessel Wall Imaging**
 Moderators: Mirja Neizel, MD, University of Düsseldorf
 Matthias Stuber, PhD, Lausanne University
- 4:45 pm** **New Dimensions of Cardiovascular Flow Imaging**
 Michael Markl, PhD, Northwestern University
- 5:05 pm** **Contrast and Relaxivity at Higher Fields: Potential of Contrast-Enhanced MRA**
 J. Paul Finn, MD, University of California-Los Angeles
- 5:25 pm** **Atherosclerosis MRI and Coronary Artery Imaging at Higher Fields**
 Reza Nezafat, PhD, Beth Israel Deaconess Medical Center
- 5:45 pm** **Oral Abstract Presentation W11: Four-Dimensional Noncontrast-Enhanced MR Angiography at Ultra High Field**
 Gregory Metzger, PhD, University of Minnesota
- 5:55 pm** **Oral Abstract Presentation W12: Improved Depiction of Hemodynamics in Intracranial Aneurysms by 4D Flow MRI at 7T Compared to 3T**
 Pim van Ooij, PhD, Northwestern University

- 6:05 pm** **Oral Abstract Presentation W13: Black-Blood Dynamic Contrast-Enhanced Coronary Artery Wall MRI: A Potential Tool for Kinetic-Modeling-Based Wall Inflammation Assessment**
 Zhaoyang Fan, PhD, Cedars-Sinai Medical Center

- 6:30 pm – 7:30 pm** **Meet All Speakers and Poster Session: Wine and Cheese Reception**
 Plaza B

Thursday, January 31, 2013

- 8:30 am - 6:15 pm** **Plaza A**

- 8:30 am – 9:00 am** **KEYNOTE LECTURE**
 Moderators: Rene Botnar, PhD, King's College of London
 Gregory Metzger, PhD, University of Minnesota

Road to High Field and Ultra High Field MR
 Kamil Ugurbil, PhD, University of Minnesota

- 9:00 am – 10:30 am** **Scientific Session VI - Metabolic and Nanomolecular Probing**
 Moderators: Volker Rassche, PhD, University of Ulm
 David Sosnovik, MD, Massachusetts General Hospital

- 9:00 am** **Research Promises of 31P and 13C MR at High Fields**
 Damian Tyler, PhD, University of Oxford

- 9:20 am** **Opportunities for Discoveries: 19F and 23Na MR at High Fields**
 Sonia Waiczies, PhD, Max-Delbrueck Center for Molecular Medicine

- 9:40 am** **Progress in Chemical Exchange Saturation Transfer Imaging**
 Ravinder Reddy, MD, University of Pennsylvania

- 10:00 am** **Oral Abstract Presentation W14: Sodium Imaging of the Heart at 7T: Design, Evaluation, and Application of a Four-Channel Transmit/Receive Surface Coil Array**
 Andreas Graessl, PhD, Max-Delbrueck Center for Molecular Medicine

- 10:10 am** **Oral Abstract Presentation W15: Advantages and Challenges of Cardiac Magnetic Resonance Spectroscopy at 3Tesla - Applications to Studies of Cardiac Steatosis in Obesity and Type 2 Diabetes**
 Lidia Szczepaniak, PhD, Cedars-Sinai Medical Center

- 10:20 am** **Oral Abstract Presentation W16: 3T-MRH1 Spectroscopy for Quantification of Myocardial Steatosis: Relationship to Metabolic Profile and Global Myocardial Function**
 Radwa Nouredin, MD, NIDDK

- 10:30 am – 11:15 am** **Morning Break/Poster Session**

11:15 am – 12:35 pm Scientific Session VII - Advances in Animal CMR

Moderators: Debiao Li, PhD, Cedars-Sinai Medical Center
Kamil Ugurbil, PhD, University of Minnesota

11:15 am High Field Cardiac MRI in Small Rodent Models of Cardiovascular Diseases

Volker Rasche, PhD, University of Ulm

11:35 am High Field Cardiac MRI in Large Animal Models of Cardiovascular Diseases

Edward DiBella, PhD, University of Utah

11:55 am Imaging of Regional Ventricular Function and Myocardial Velocities in Mice

Juergen Schneider, PhD, University of Oxford

12:15 pm Oral Abstract Presentation W17: Accelerated Dual-contrast Quantitative First-pass Perfusion MRI of the Mouse Heart with Compressed Sensing

Nivedita Naresh, M.Eng., University of Virginia

12:25 pm Oral Abstract Presentation W18: Simultaneous LV Pressure-volume Measurement in Mice with MRI and Ventricular Catheterization

Janaka Wansapura, Cincinnati Children's Hospital

12:35 pm – 1:45 pm Lunch (on own)/Posters

Plaza B

1:45 pm – 3:05 pm Scientific Session VIII - Towards Solving the Cardiac Gating/Triggering Conundrum at Higher Fields

Moderators: Krishna Nayak, PhD, University of Southern California
Roderic Pettigrew, MD, PhD, NIBIB

1:45 pm Alternative Cardiac Gating/Triggering Techniques for High Field CMR

Katharina Fuchs, Dipl. Phys., Max-Delbrueck Center for Molecular Medicine

2:05 pm Update on Self-Gating Techniques

Tobias Schaeffter, PhD, King's College London

2:25 pm Speed Saves: Imaging in Real Time

Jens Frahm, PhD, Max-Planck-Institute

2:45 pm Oral Abstract Presentation W19: Limitations of VCG Based Gating Methods in Ultra High Field Cardiac MRI

Johannes Krug, M.Sc., Otto-von-Guericke University of Magdeburg

2:55 pm Oral Abstract Presentation W20: Improved Cardiac Gating at 3T with the "3D-QRS" Method Utilizing MRI-compatible 12-lead ECGs

Zion Tse, PhD, The University of Georgia

3:05 pm – 3:30 pm Refreshments/Poster Session

Plaza B

3:30 pm – 4:50 pm Scientific Session IX - Emerging Technologies

Moderators: Lidia Szczepaniak, PhD, Cedars-Sinai Medical Center
Tommy Vaughn, PhD, University of Minnesota

3:30 pm Can MR Elastography Benefit from High Fields

Thomas Elgeti, PhD, Charité Medical University

3:50 pm Cardiac Interventions at High Fields

Ergin Atalar, PhD, Bilkent University

4:10 pm High Field MR/PET: The Perfect Marriage for Explorations into Cardiovascular Diseases

Stephan Nekolla, PhD, TU Munich

4:30 pm Oral Abstract Presentation W21: 4D Flow Measurements in the Superior Cerebellar Artery at 7 Tesla: Feasibility and Potential for Applications in Patients with Trigeminal Neuralgia

Sebastian Schmitter, PhD, University of Minnesota

4:40 pm Oral Abstract Presentation W22: Improvement in B1+-Homogeneity of 3T Cardiac MRI in Swine with Dual-Source Parallel RF Excitation

Daniel Herzka, PhD, Johns Hopkins University School of Medicine

4:50 pm – 6:00 pm Scientific Session X - Looming on the Horizon: 7T and Higher

Moderators: John Oshinski, PhD, Emory University
Sonia NIELLES-Vallespin, PhD, NIH

4:50 pm Explorations into Cardiovascular Diseases at 7T

Thoralf Niendorf, PhD, Max-Delbrueck Center for Molecular Medicine

5:10 pm Towards Human CMR at 10.5 T and Higher Fields

Tommy Vaughan, PhD, University of Minnesota

5:30 pm Towards Small Animal CMR at 15 T and Higher Fields

David Sosnovik, MD, Massachusetts General Hospital

5:50 pm Oral Abstract Presentation W23: Potentials and hurdles for human MRI and MRS experiments at 20 T

Victor Schepkin, PhD, National High Magnetic Field Laboratory

6:00 pm – 6:15 pm Workshop Summary

Peter Kellman, PhD, NHLBI
Debiao Li, PhD, Cedars-Sinai Medical Center
Thoralf Niendorf, PhD, Max-Delbrueck Center for Molecular Medicine

SCMR/ISMRM Faculty Disclosures

It is the policy of the International Society for Magnetic Resonance in Medicine (ISMRM), in accordance with the Accreditation Council for Continued Medical Education (ACCME), to ensure balance, independence, objectivity, and scientific rigor in all CME activities. Anyone engaged in content development, planning, or presentation was asked to complete a disclosure form.

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Pettigrew, Roderic: Nothing to disclose

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Schär, Michael: Full Time Employee: Philips Healthcare

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Schulz-Menger, Jeanette: Nothing to disclose

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Graessl, Andreas: Nothing to disclose

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Tunncliffe, Elizabeth: Nothing to disclose

Van Ooij, Pim: Nothing to disclose

Wansapura, Janaka: Nothing to disclose

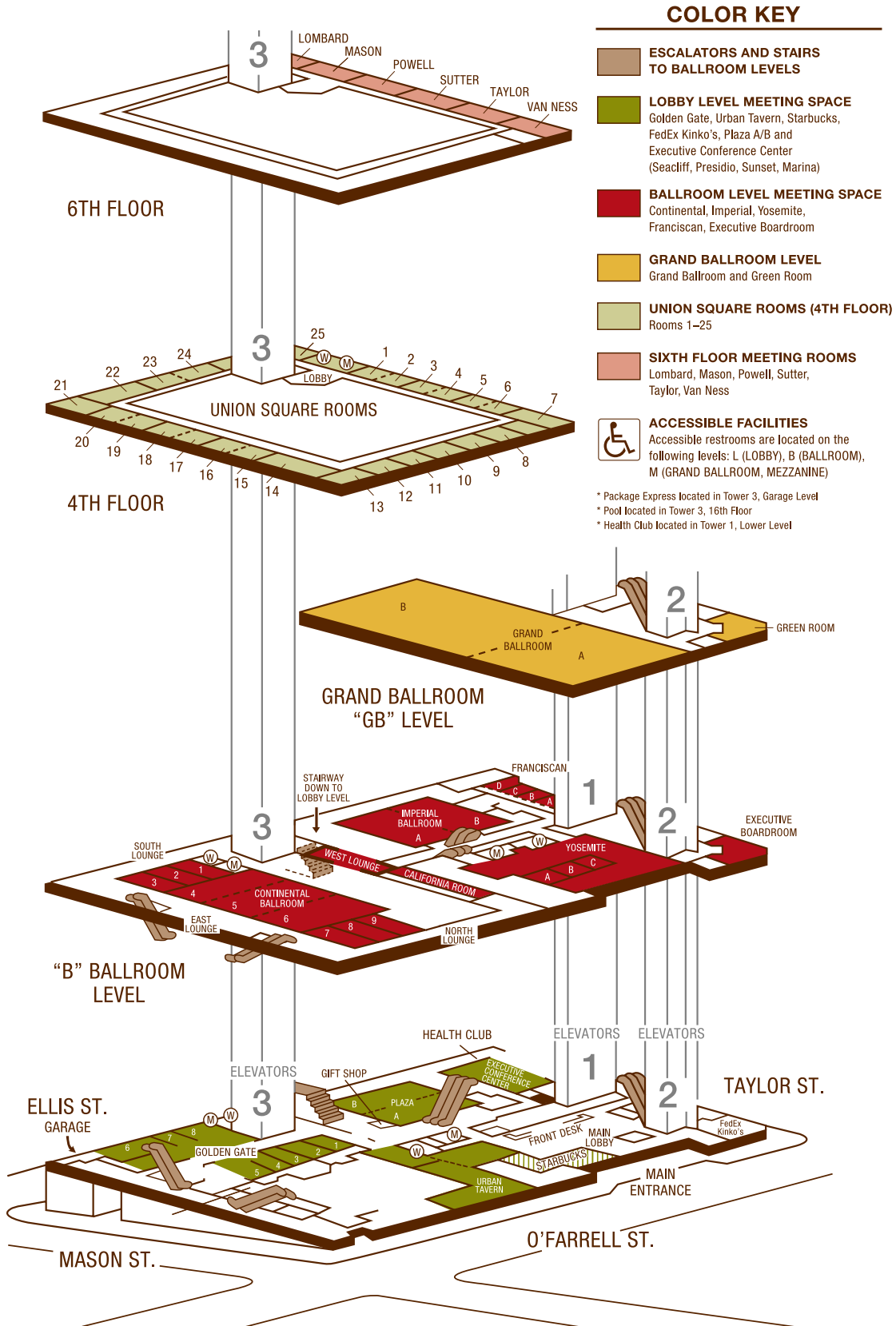
Poster Directory

SCMR/ISMRM Jointly Sponsored Workshop - Posters

- W24** Comparison of Three Multichannel TX/RX Coils for Anatomic and Functional CMR at 7.0T
Lukas Winter, Dipl.-Ing., Max Delbrück Center for Molecular Medicine
- W25** Improved Navigator Based Diffusion Tensor MRI of the Human Heart in vivo
Pedro Ferreira, PhD, Royal Brompton Hospital
- W26** Motion-robust High-resolution 3D Diffusion-weighted Vessel Wall Imaging at 3T
Yibin Xie, Cedars-Sinai Medical Center
- W27** Cardiac MR Imaging and MR Angiography in Pediatric Congenital Heart Disease: A Comparison Between 1.5T and 3.0T
Paul Finn, MD, University of California-Los Angeles
- W28** The Clinical Utility of Contrast Enhanced Whole-Heart Coronary MRA with 32-Channel Coil at 3T Scanner in the Era of 64 and More-Slice CT
Ming-ting Wu, MD, National Yang Ming University
- W29** High Spatial and Temporal Myocardial CINE T2* Mapping at 7.0 T: A Feasibility Study
Fabian Hezel, MDC-Belrin, Dipl.-Inf., Max Delbrueck Center for Molecular Medicine
- W30** Automated Coronary Artery Tracking in Contrast-enhanced Whole-Heart Coronary Magnetic Resonance Angiography at 3.0T
Damini Dey, PhD, Cedars-Sinai Medical Center
- W31** Rapid Functional MRI in the Mouse Heart at 11.7T
Volker Rasche, PhD, Ulm University
- W32** CEMRA in Neonatal and Pediatric Congenital Vascular Diseases at 1.5T and 3.0T: Comparison of an Intravascular Contrast Agent (Gadofosveset) with an Extracellular (Gadopentetate Dimeglumine)
Paul Finn, MD, University of California-Los Angeles
- W33** Improved ECG Based Gating in Ultra High Field Cardiac MRI Using an Independent Component Analysis Approach
Johannes Krug, M.Sc., Otto-von-Guericke University of Magdeburg
- W34** Diffusion Tensor Imaging of Formalin Fixed Infarcted Porcine Hearts: A Comparison between 3T and 1.5T
Ria Maxumder, B.Tech., The Ohio State University
- W35** Reduced Chemical Shift-Induced Phase Errors at 3T Using Novel PC-MRI Encoding Gradients
Matthew Middione, MS, University of California-Los Angeles
- W36** Contrast Enhanced Magnetic Resonance Angiography in Children: Initial Experience at 3.0 Tesla
Paul Finn, MD, University of California-Los Angeles
- W37** Compressed Sensing Accelerated 4D-Flow MRI in the Murine Aorta
Jacob Fluckiger, PhD, Northwestern University
- W38** Comparing Analysis Methods in Assessing Dynamic Dual Bolus Cardiac Magnetic Resonance Perfusion Flow
Bernd Muller-Bierl, PhD, Flemish University Hospital Brussels
- W39** Feasibility and Benefit of Using a Cryogenic Radiofrequency Coil for Functional Cardiac Magnetic Resonance Imaging of Mice at 9.4 T
Katharina Fuchs, Dipl. Phys., Max Delbrueck Center for Molecular Medicine

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Ayad, Ihab.....	W 27, W 32, W 36	Keegan, Jennifer.....	W 7, W 25	Schneider, Jurgen E.....	W 6, W 37
Barker, Alex J.....	W 12	Kellman, Peter.....	W 2, W 24	Schuhbaeck, Annika.....	W 30
Berman, Daniel S.....	W 13	Khan, Sarah N.....	W 27, W 32, W 36	Schulz-Menger, Jeanette.....	W 24, W 29, W 39
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Buls, Nico.....	W 38	Li, Xiufeng.....	W 11	Smith, Laura.....	W 15
Butts Pauly, Kim.....	W 20	Lima, Joao A.....	W 8	Sosnovik, David E.....	W 7, W 25
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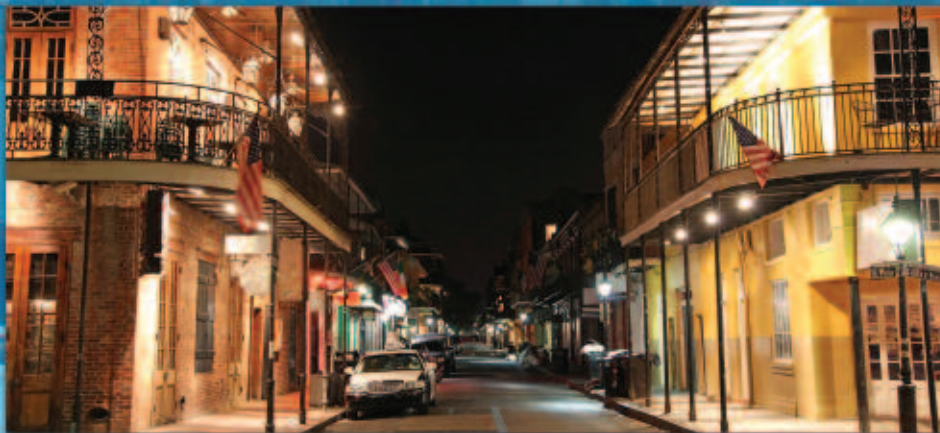


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