EMTP Chile

MR Phase,
Magnetic Susceptibility
and Electrical Properties Mapping

CHAIRED BY:

Carlos Milovic (Chair)
Pontificia Universidad Católica de Chile
Cristián Tejos (Co-Chair)
Pontificia Universidad Católica de Chile

Tuesday 24th September

Venue: Department of Electrical Engineering, Campus San Joaquín, PUC

14:00 - 14:15 **Welcome and introductions**

14:15 - 18:00 **Pre-Workshop discussions and meetings**

Chaired by: **Simon Robinson** and **Patrick Fuchs**

- **Simon Robinson** - QSM for Clinical Research in the Brain: How to move from consensus to clinical adoption?: Methodologists' perspectives

Break and walking tour of Campus San Joaquín

- **Ferdinand Schweser** - QSM for Clinical Research in the Brain: How to move from consensus to clinical adoption?: How to identify what is clinically important?
- **Ashley Stewart** - Extending the continuous Challenge.

18:00 - 18:05 **Closing words**

19:00 - 22:00 **Reception and registration. Welcome event**
Cervecería HBH (brewery and pub). Av. Irarrázaval 3176, Ñuñoa

Wednesday 25th September

Venue: Campus Oriente, PUC

8:30 - 10:30 **Session 1** – *Theater*

Chaired by: **Mauro Costagli** and **Patrich Fuchs**

- **Xu Li** - Introduction to Magnetic Tissue Properties (QSM+STI).
- **Karin Shmueli** - Applications and clinical research.
- **Ulrich Katscher** - MR-based measurements of electric tissue properties at high frequencies.
- **Rosalind Saadleir** - MR-based measurements of electric tissue properties at low frequencies.

10:30 - 11:00 **Coffee break** – *Central Plaza / Ground floor*

11:00 - 13:00 **Parallel Sessions 2 & 3**

QSM parallel Session 2 – *Multipurpose Room*

Chaired by: **Ferdinand Schweser** and **Yi Wang**

- **Yi Wang** - Introduction to the QSM consensus paper.
- **Simon Robinson** -Acquisition (protocols), Coil combination, and Unwrapping.
- **Carlos Milovic** - Masking and Background Field Removal.
- **Pascal Spincemaille** - Dipole inversion.
- **Sina Straub** - Analysis and Presentation.

ETP parallel Session 2 – *R28 Room*

Chaired by: **Ulrich Katscher**

- **HyungJoong Kim** - ETP-related activities at Kyung Hee University, Seoul.
- **Takaaki Nara** - ETP-related activities at University of Tokyo.
- **Axel Thielscher** - ETP-related activities at Technical University of Denmark.
- **Ilias Giannakopoulos** - ETP-related activities at New York University.
- **Luca Zilberti** - ETP-related activities at Instituto Nazionale di Ricerca Metrologica, Torino.
- **Dong-Hyun Kim** - ETP-related activities at Yonsei University, Seoul.

13:00 - 14:00 **Group Photo session & Lunch**

14:00 - 15:30 **Parallel Sessions 4 & 5**

QSM parallel Session 4 – *Multipurpose Room*

Chaired by: **Mauro Costagli** and **Yi Wang**

- **Christian Langkammer** - Clinical challenges in the brain.
- **Marcelo Andia** - Clinical challenges in the body.
- Discussion panel (invited additional panelists: **Sina Straub** and **Ferdinand Schweser**).

ETP parallel Session 5 – *R28 Room*

Chaired by: **Khin Khin Tha**

- **Lindy Rae** - ETP-related activities at UNSW, Sydney.
- **Marta Cavagnaro** - ETP-related activities at Sapienza University of Rome.
- **Oriana Arsenov**- Preliminary Phase-Based EPT in Parkinson's Disease: Effects of Open-Ended Fringe Lines.
- **Philippa Sha** - Optimising EPT to Assess Brain Conductivity in Tanzanian Children with Sickle Cell Anaemia at 1.5T.
- **Pablo Argote** - In vivo measurements of tibiofemoral knee articular cartilage electrical conductivity in a healthy patient cohort by ME-EPT.

15:30 - 16:00 **Coffee break** – *Central plaza / Ground floor*

16:00 - 18:10 **Session 6** – *Multipurpose Room*

Chaired by: **Xu Li** and **Cristián Tejos**

Power pitches
2 min each, for all accepted traditional posters

Groundbreaking submissions

- **Jiahao Li** - Stack-of-Spiral Cardiac Quantitative Susceptibility Mapping in One Breath-Hold for Differential Heart Chamber Blood Oxygenation.
- **Alan Wilman** - Feasibility of Thin-slab Susceptibility Source Separation in Human Brain.
- **Lion Muecke** - QSM based characterization of different kidney stone types and sizes: an ex vivo phantom study.
- **Jierong Luo** - Removing the Effect of BOLD Magnitude Signal Changes from Functional Electrical Properties Tomography (fEPT).

18:10 - 18:30 **Traditional Poster set-up & open floor** – *Central plaza / Ground floor*

Thursday 26th September

Venue: Campus Oriente, PUC

8:30 - 10:30 **Parallel Sessions 7 & 8**

QSM parallel Session 7 – *Multipurpose Room*

Chaired by: **Xu Li** and **Simon Robinson**

- **Fahad Salman** - Bi-parametric Joint Label Fusion: A Comprehensive Segmentation Tool for Deep Gray Matter in QSM.
- **Thomas Jochmann** - Orientation dependency of white matter magnetic susceptibility with the QUASAR model.
- **Siyun Jung** - A Deep Learning based Harmonic Field Extension in SMWI with Reduced Spatial Coverage: Feasibility Study.
- **Jiahao Li** - Automatic Chamber Segmentation for Cardiac Quantitative Susceptibility Mapping.
- **Beata Bachrata** - Motion-robust, high-resolution fetal T2*-weighted imaging from 2D EPI.
- **Mert Sisman** - Oxygen Extraction Fraction (OEF) Estimation using U-net Trained with Synthetically Generated Multi Gradient Echo Data.

ETP parallel Session 5 - *R28 Room*

Chaired by: **Stefano Mandija**

- **Stefano Mandija** - Recap of EPT recon challenge design and presentation of results
- **Announcement of winners of EPT recon challenge and presentations from winners about adopted methods.**

10:30 - 11:30 **Poster session 1 & Coffee break** – *Central plaza / Ground floor*

11:30 - 13:30 **Parallel Sessions 9 & 10**

QSM parallel Session 9 – *Multipurpose Room*

Chaired by: **Yi Wang** and **Cristián Tejos**

- **Zhenghan Fang** - DeepSepSTI-R2*: R2-Free Anisotropic Susceptibility Source Separation in Susceptibility Tensor Imaging with Deep Learning.
- **Hyeong-Geol Shin** - Systematic analysis of relaxometric constants in brain tissue using temperature-dependent transverse relaxometry and magnetic susceptibility: Toward 7T chi-separation.

- **Thomas Jochmann** - QSM in the presence of nondipolar phase shifts.
- **Patrick Fuchs** - Comparison of Susceptibility Source Separation Methods without R2.
- **Fábio Seiji Otsuka** - Investigating the correspondence between the paramagnetic component of brain magnetic susceptibility and iron distribution.
- **Tereza Oliveira** - Importance of R2 accuracy for susceptibility separation methods.

ETP parallel Session 10 – *R28 Room*

Chaired by: **Stefano Mandija** and **Dong-Hyun Kim**

- Discussion of corresponding EPT guideline papers planned.
- **Thierry Meerbothe** - A fast method for B1+ predictions from measured data to evaluate Electrical Properties Tomography reconstruction.
- **Christian Findeklee**- Mitigation of artefacts arising from the Transceive Phase Assumption in Electrical Properties Tomography.
- **Rosalind Sadleir** - Low Frequency Electrical Conductivities Predicted by Diffusion Microstructure Methods.

13:30 - 14:30 **Lunch**

14:30 - 16:00 **Parallel Sessions 11 & 12**

QSM parallel Session 11 – *Multipurpose Room*

Chaired by: **Alan Wilman** and **Ferdinand Schweser**

- **Chunlei Liu** - Beyond bulk susceptibility: Source separation, non-dipole compatible phase contributions, microstructure, and more.
- Discussion panel. Invited additional panelists: **Thomas Jochmann**, **Anders Sandgaard**, **Alexei Dimov**, **Xu Li** and **Hyeong-Geol Shin**.

ETP parallel Session 12 – *R28 Room*

Chaired by: **Ulrich Katscher**

- Late breaking issues in ETP mapping.

16:00 - 17:00 **Poster session 2 & Coffee break** – *Central plaza / Ground floor*

17:00 - 18:30 **Session 13** – *Multipurpose Room*
Chaired by: **Jongho Lee** and **Pascal Spincemaille**

- **Pascal Spincemaille** - QSM state of the art and challenges.
- **Kyu-Jin Jung** - ETP state of the art and challenges.
- **Cludia Prieto** - Deep Learning on cardiac and Low Field applications; experiences at the Millenium Institute for Intelligent Healthcare Engineering (i-Health).
- **Francisco Sahli** - Physics Informed Neural Networks and the future of the field.
- Discussion panel: Invited additional panelists: **Mert Sisman**.

19:00 **Steering committee meeting** – *R28 Room*

Friday 27th September

Venue: Campus Oriente, PUC

8:30 - 10:30 **Session 14** – *Multipurpose Room*

Chaired by: **Sina Straub** and **Khin Khin Tha**

- **Fahad Salman** - On the Sensitivity of Quantitative Susceptibility Mapping in Clinical Brain Research.
- **Oliver Kiersnowski** - Paramagnetic and Diamagnetic Susceptibility as a Novel Possible Biomarker for Assessing Striatal Dopaminergic Pathway Dysfunction in Prodromal Alpha-Synuclein Disease.
- **Giulia Debiasi** - Mapping cell density with DECOMPOSE-QSM in healthy brain tissues and glioblastoma.
- **Andreas Deistung**- Susceptibility- and structure-based investigation of deep gray matter in common types of degenerative cerebellar ataxias.
- **Chao Li** - MRI quantification of liver fibrosis using diamagnetic susceptibility: An ex-vivo feasibility study.
- **Laxmi Muralidharan** - Investigating Prostate Cancer Using QSM In Vivo.

10:30 - 11:30 **Poster session 3 & Coffee break** – *Central plaza / Ground floor*

11:30 - 13:00 **Session 15** – *Multipurpose Room*

Chaired by: **Sina Straub** and **Simon Robinson**

- **Khin Khin Tha** - Overview of ETP-based clinical studies
- **Mitchel Lee** - Haematocrit-Corrected QSM + qBOLD Reveals Globally Elevated Brain Oxygen Extraction Fraction in Sickle Cell Anaemia.
- **Alexei Dimov** - Quantitative susceptibility mapping as a novel biomarker of hemorrhage and renal function decline in autosomal dominant polycystic kidney disease.
- **Ashley Stewart** - Automated Deep-Learning-Enabled Segmentation of Intraprostatic Gold Fiducial Markers in the Presence of Calcification for MR-only Radiotherapy Planning.

13:00 - 13:40 **Talks from Sponsors** – *Multipurpose Room*

- **Dr. Yongquan Ye** - United Imaging Healthcare
- **Ramin Jafari** - Philips
- **Jin Jin** - Siemens

13:40 - 14:30 **Lunch**

14:30 - 16:00 **Session 15** – *Multipurpose Room*

Chaired by: **Dong-Hyun Kim** and **Karin Shmueli**

- **Mauro Costagli** - Impact of Respiratory and Cardiac Physiological Noise Correction on EPI Phase Image Timeseries for functional QSM.
- **Jierong Luo** - Characterizing the Temporal Signal-to-Noise Ratio in Simultaneous Functional MRI, QSM and EPT.
- **Sina Straub** - Feasibility of laminar functional quantitative susceptibility mapping.
- **Kyu-Jin** - Exploring functional MRI, B1 phase, and conductivity changes using phase-based EPT: A Comparative Study with Simulations.
- **Jannette Nassar** - fQSM versus fMRI: A Comparative Analysis of Activations in Veins.

16:00 - 16:30 **Coffee break & Voting on Presentation Awards**
Central plaza / Ground floor

Use QR code on display in the Multipurpose room!

16:30 - 18:30 **Closing Session** – *Theater*

Chaired by: **Mauro Costagli**

- **Stefano Mandija** - EPT Challenge.
- **Ferdinand Schweser** - QSM consensus. Report on publications and discuss future goals and challenges.
- **Ashley Stewart** - QSM-CI: An automated continuous QSM challenge.
- **Cristián Tejos** - Awards.
- **Carlos Milovic -** Workshop balance and next location announcement.

19:00 **Closing event & Farewell party** – *Central plaza / Ground floor*

Traditional Posters Schedule

Each poster session is divided into two 30-minute blocks (A and B).

Session

1A / 3B **Fahad Salman** - Impact of Regularization Parameter Choice on Real-World Sensitivity of QSM.

2B / 3B **Simon Graf** - Exploiting the polysemic nature of the voxel aspect ratio for dimensionality reduction in deep learning based QSM dipole inversion with adaptive convolution.

2B / 3A **Hayeon Lee** - Transformer-Based Super-Resolution of χ-separation Maps with Anisotropic Voxel Leveraging In-Plane High-Resolution Information and Uncertainty Estimation.

2A / 3A **Chungseok Oh** - Comparison of χ-separation results for different methods for obtaining R2'.

2B / 3A **Thomas Jochmann** - Single-Orientation Susceptibility Anisotropy Imaging.

1B / 3A **Anders Sandgaard** - Predicting Mesoscopic Larmor Frequency Shifts in White Matter with Diffusion MRI - An In-Silico Monte-Carlo Study.

1A / 1B **Taechang Kim** - Exploring flow-induced displacement artifacts for vessel artifacts in χ-separation.

2A / 3B **Hangwei Zhuang** - Single-training physics-informed u-net for dipole inversion.

3A / 3B **Sutatip Pittayapong** - Synthesized Histology Images of Myelin and Iron Stainings from 7T Multi-Contrast MRI.

1A / 2B **Sooyeon Ji** - χ-separation (chi-separation) toolbox v1.0: updates compared to the beta version and advanced functionalities.

2A / 2B **Patrick Fuchs** - Multi-Echo Multi-Volume Field Mapping for Computationally Efficient Structural QSM.

1A / 2A **José Monteiro -** Susceptibility source separation algorithms in postmortem human brain: A comparison study.

1B / 2A **André Avanzine -** Temperature Effects in the Magnetism of Paramagnetic Species in Brain Tissue Sample: An EPR Study.

1B / 2B **Alexandra Roberts -** Radiomic Prediction of Parkinson's Disease Deep Brain Stimulation Surgery Motor and Nonmotor Outcomes using Quantitative Susceptibility Mapping.

Traditional Posters Schedule

Each poster session is divided into two 30-minute blocks (A and B).

Session	
1A / 3A	**Matthew Cherukara** - Magnetic Susceptibility Source Separation in the Head and Neck: Comparing Gradient Echo Methods.
1B / 3B	**Carly Skudin** - Using Quantitative Susceptibility Mapping (QSM) as a biomarker for neurodegeneration after repeated Traumatic Brain Injury (rTBI).
2B / 3A	**Pamela Franco -** Interpretable Machine Learning Model for Characterizing Magnetic Susceptibility-based Biomarkers in First Episode Psychosis.
1A / 3B	**Fábio Seiji Otsuka -** Evaluation of the diamagnetic and paramagnetic maps of the Locus Coeruleus.
2A / 3B	**Javier Silva** - On the validity of the QSM-specific Structural Similarity Index Measure (XSIM) for abdominal QSM.
1B / 3B	**Mathias Lambert** - Conformal Quantitative Susceptibility Mapping. (Pontificia Universidad Católica de Chile).
1A / 2A	**Nestor Muñoz** - Impact of angulated acquisitions in QSM reconstructions. Nestor Muñoz (Pontificia Universidad Católica de Chile).

EMPT Chile - Steering Committee

Beata Bachrata, Carinthia University of Applied Sciences
Carlos Milovic, Pontificia Universidad Católica de Chile
Christian Langkammer, Medical University of Graz
Chunlei Liu, University of California, Berkeley
Cristian Montalba, Pontificia Universidad Católica de Chile
Cristián Tejos, Pontificia Universidad Católica de Chile
Dong-Hyun Kim, Yonsei University
Emma Biondetti, University of Chieti-Pescara
Ferdinand Schweser, University at Buffalo
Hongjiang Wei, Shanghai Jiao Tong University
Jongho Lee, Seoul National University
Karin Shmueli, University College London
Khin Khin Tha, Hokkaido University
Luca Zilberti, INRIM, Turin
Mauro Costagli, University of Genoa
Pascal Spincemaille, Cornell University
Patrick Fuchs, University College London
Rosalind Sadleir, Arizona State University
Simon D Robinson, Medical University of Vienna
Sina Straub, Mayo Clinic, USA
Stefano Mandija, University Medical Center Utrecht
Ulrich Katscher, Philips Healthcare
Xu Li, Johns Hopkins University, Baltimore
Yi Wang, Cornell University

Local Organizing Committee

Carlos Milovic (Chair), Pontificia Universidad Católica de Chile
Cristián Tejos (Co-Chair), Pontificia Universidad Católica de Chile
Claudia Prieto, Pontificia Universidad Católica de Chile
Marcelo Andia, Pontificia Universidad Católica de Chile
Pablo Irarrázabal, Pontificia Universidad Católica de Chile

Abstract Evaluation Committee

Beata Bachrata, Carinthia University of Applied Sciences
Emma Biondetti, University of Chieti-Pescara
Giulia Debiasi, University of California
Hongjiang Wei, Shanghai Jiao Tong University
Hyeong-Geol Shin, Johns Hopkins University
Ilias Giannakopoulos, New York University
Luca Zilberti, INRIM, Turin
Marta Lancione, IRCCS Stella Maris Foundation, Pisa
Matteo Cencini, National Institute for Nuclear Physics (INFN), Pisa
Mauro Costagli, University of Genoa
Ming Zhang, Shanghai Jiao Tong University
Oliver Kiersnowski, IRCCS Ospedale Policlinico San Martino
Pablo Argote, University of Colorado Boulder
Pascal Spincemaille, Cornell University
Patrick Fuchs, University College London
Thomas Jochmann, Technische Universität Ilmenau
Xu Li, Johns Hopkins University, Baltimore

UNITED IMAGING

uAiFI
AI FOR IMAGING

uMR®
Jupiter 5T

UNITED IMAGING

Comprehensive Portfolio

Covering from clinical to pre-clinical, from middle field to ultra-high field

MAGNETIC RESONANCE

uMR® 670[5]
uAIFI Wide-Bore 1.5T MR

uMR® 680[4]
uAIFI Wide-Bore 1.5T MR

uPMR® 790
HD TOF PET/MR

uMR® Sagitta[2]
Summit-level whole-body 3T research MR

uMR® Jupiter 5T[1]
World's First Whole-Body UHF 5T

uMR® NX Frontier[3]
Ultra-high-gradient Head-only MR

uMR® 9.4T[3]
Ultra-High Field Preclinical MR

uMR® Omega[4]
75cm Ultra-Wide-Bore 3T

uMR® 780
Clinical 3T

1 Not CE marked, not commercially available in the EU.

2 Not submitted to FDA or CE marked, not commercially available in the U.S. or EU.

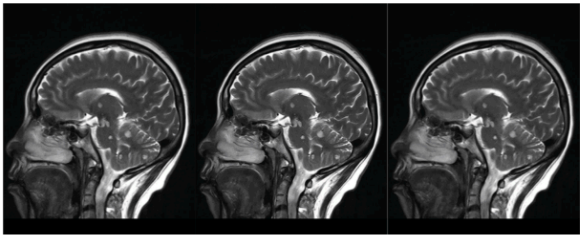
3 Research only, not commercially available for clinical use in the US.

4 Detachable table is not CE marked, not commercially available in the EU.

5 Not submitted to FDA, not commercially available in the U.S.

About Us

RadioDynamic Medical is an AI-driven medical imaging company dedicated to enhancing image quality and optimizing diagnoses through state-of-the-art deep learning and image reconstruction technologies. Our innovative products transform traditional, low-quality, high-radiation medical exams into more efficient, high-quality, and safer medical services. We have introduced the RaDyn reconstructuion and enhancement product line, which includes **RaDynMR, RaDynPET, RaDynSPECT, and RaDynCT**, covering a wide range of medical imaging modalities. Our core team is composed of experts from prestigious universities, including Stanford, UC Berkeley, Duke, Tsinghua and Peking University.



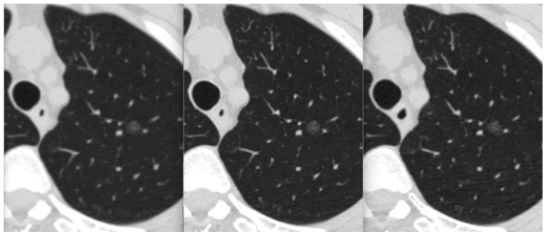
Accelerated Scan | Accelerated Scan + RaDynMR | Conventional Scan

RaDynMR

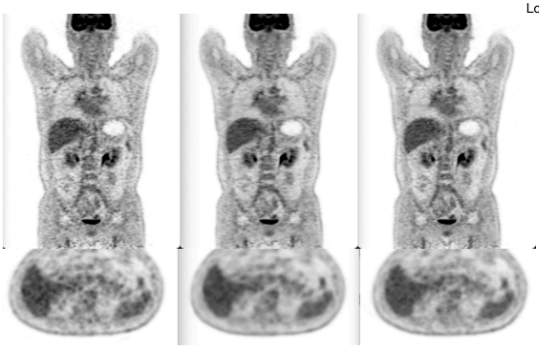
Enhances MRI image quality by boosting signal clarity and reducing noise, resulting in shorter scan times and improved patient comfort and safety. Compatible with any scanner and field strength.

RaDynCT

Provides CT denoising and super-resolution capabilities, delivering ultra-high-resolution images and significantly improving diagnostic accuracy.



Low Resolution CT | Low Resolution CT + RaDynCT | High Relolution CT



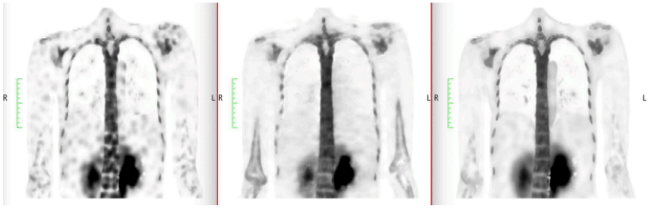
Lowdose | Lowdose+RaDynPET | Standard

RaDynPET

Enhances PET scan image quality by reducing noise, enabling faster scans and lower tracer doses(tracer amounts) while maintaining clinical standards.

RaDynSPECT

Improves image quality and resolution in fast or low-dose SPECT exams.
It enables ultra-fast SPECT/CT imagings while maintaining comparable image quality and diagnostic value.



5min/bed | 5min/bed+RaDynSPECT | 20min/bed

Notes

Notes

Notes

Endorsed by

Pontificia Universidad Católica de Chile
School of Engineering

iHEALTH
Millenium Institute for Intelligent Healthcare Engineering

Sponsored by