

**European Society for Magnetic Resonance in Medicine and Biology
Workshop/
International Society for Magnetic Resonance in Medicine
Endorsed Workshop**

**MRI of Neuromodulation:
Target Engagement, Neural Mechanism, and Biomarker Development**

Altes AKH, Universität Wien,
Vienna, **Austria**
07-09th April 2026

SCIENTIFIC ORGANIZING COMMITTEE

Lucia Navarro de Lara, PhD	Martinos Center/MGH, MA, USA (Co-Chair)
Dogu Baran Aydogan, PhD	University of Eastern Finland, Finland (Co-Chair)
Danny JJ Wang, PhD	University of Southern California, CA USA (Co-Chair)
Martin Tik, PhD	Medical University of Vienna, Austria (host, Co-Chair)
Xiaoqi Juliana Huang, PhD	West China Hospital of Sichuan University, China
Li Min Chen, PhD	Vanderbilt University, TN, USA
Sina Straub, PhD	University of Bern, Switzerland
Hamed Ekhtiari MD PhD	University of Texas Southwestern, TX USA
Patricia Figueiredo, PhD	Instituto Superior Técnico, ULisboa, Portugal

TENTATIVE PROGRAM

DAY ONE

07:30 – 08:15

Registration

08:00 – 08:10

Welcome address and remarks by Organizing Committee and Local Hosts (Dr. Martin Tik and Dr. Lucia Navarro de Lara)

08:15 – 09:45

SESSION 1 Drs. Xiaoqi (Julianna) Huang and Dr. Rosalind Sadleir

ORAL

MRI for Neurophysiological Mechanism of Neuromodulation

Neurophysiology of Brain Stimulation using TMS, Dr. Alex Opitz, Univ. of Minnesota, USA

Introduction to TUS, Dr. Kim Butts Pauly, Stanford, USA

Exploring mechanism of Brain stimulation with MRI, Dr. Qiyong Gong, West China Hospital of Sichuan University, China

09:45 – 10:15

coffee / light snack break

10:15 – 11:15

Introduction: Dr. Lucia Navarro de Lara

KEYNOTE SPEAKER

Prof. Hartwig Siebner.

Head of Research, Center for Functional and Diagnostic Imaging and Research (Includes DRCMR), Copenhagen University Hospital Hvidovre, Denmark

Clinical Professor with special focus on Precision Medicine, Faculty of Health and Medical Sciences, Institute of Clinical Medicine, University of Copenhagen, Denmark

Title: Charting Dose–Response Dynamics of Noninvasive Brain Stimulation in Humans

11:15 – 12:45

SESSION 2 Dr. Christoph Juchem and Dr. Kim Butts Pauly

ORAL

Safety in MRI of Neuromodulation

MRI safety in DBS imaging: a clinical imaging perspective, Dr. Melanie Morrison, UCSF, USA

Safety of concurrent TMS/MRI, Dr. Lucia Navarro de Lara, MGH, USA

Practical Safety Considerations in MR-ARFI, Dr. David Norris, Radboud University, Netherlands

12:45 – 13:45

Lunch – Group photo

13:45 – 15:15

SESSION 3 Dr. Baran Aydogan and Dr. Axel Thielscher

ORAL

MRI in TMS

Integrating multichannel TMS and MRI for causal mapping of brain circuits: concepts, systems, and future trends, Dr. Aapo Nummenmaa, MGH, USA

Noninvasively engaging the hippocampus and human memory network, Dr. Molly Hermiller, Florida State University, USA

Spatiotemporal Mapping in Health and Disease: A Chronometric Interleaved TMS-fMRI Approach, Dr. Martin Tik, MUW, Austria

15:15 – 15:45

coffee / light snack break

15:45 – 17:45

SESSION 4 Dr. Aapo Nummenmaa and Dr. Lucia Navarro de Lara

POWER PITCH

Topic#1: TMS-fMRI on Motor and Cognitive circuits.

1. Interleaved TMS-fMRI using BOLD and diffusion functional contrasts to study motor inhibition
Inès de Riedmatten, Centre Hospitalier Universitaire Vaudois (CHUV) and Lausanne University (UNIL), Switzerland.

2. The role of hemispheric specialization in the immediate response to focal perturbations – A consecutive TMS-fMRI study.

Robin Gerrits, Max Planck Institute for Human Cognitive and Brain Sciences, Germany.

3. Whole-Brain Mapping of Motor Network Responses to M1 Stimulation Using TMS-fMRI with a Flexible RF Cap.

Evgenii Kim, Athinoula A. Martinos Center for Biomedical Imaging / MGH, USA

Topic #2: TMS, fMRI and other methods for Depression.

4. Probing Depression Circuits with Lateral Orbitofrontal TMS: Insights from Interleaved TMS-fMRI.

Minyan Huang, MR Center of Excellence, Center for Medical Physics and Biomedical Engineering, Medical University of Vienna, Austria

5. Clinical Response and Neural Effect of ACC-Targeted dTMS Versus dIPFC-Targeted.

Hailong Li, Department of Radiology, Huaxi MR Research Center (HMRRRC), Institute of Radiology and Medical Imaging, West China Hospital of Sichuan University, China.

6. Replication and methodological robustness of a depression circuit relevant to TMS targeting.

Debby Klooster, Eindhoven University of Technology, Netherlands

7. Hippocampal Blood-Brain Barrier Dysfunction in Treatment-Resistant Depression: Regional Impairment, Symptom Coupling, and Target-Dependent Modulation by TMS.

Eric Goldwaser, Weill Cornell Medicine, USA

8. Temporal evolution of heart brain coupling across five days of Stanford Neuromodulation Therapy.

John Philip Coetzee, Stanford University, USA.

9. Stimulation history and psychological state shape prefrontal iTBS connectivity effects.

Stefanie De Smet, Ghent University, Belgium.

Topic #3: Methods for concurrent stimulation with other modalities.

10. Enhancing Detection of Local iTBS Effects Using Concurrent iTBS-fMRI-fNIRS Integration.

Tim T.Z. Lin, Hong Kong Polytechnic University.

11. Real-time Kalman-based ballistocardiogram artifact correction for EEG-fMRI: Phantom validation toward brain-state-dependent neurostimulation inside MRI.

Joonas Laurinoja, University of Eastern Finland, Finland.

12. Fast E-field-based targeting and dosing with real-time navigation guidance for concurrent TMS/fMRI experiments.

Evgenii Kim, Athinoula A. Martinos Center for Biomedical Imaging / MGH, Charlestown, MA, USA

FOLLOWED BY POSTER SESSION

Day 1 Adjournment

DAY TWO

07:30 – 08:00 coffee / light snack

08:00 – 09:30 **SESSION 5** Dr. Sina Straub and Dr. Danny Wang
ORAL MRI in Transcranial Electrical Stimulation (tES)

Deep Learning Applied to Phase Denoising, Current Density, and Conductivity Reconstruction using MRI., Dr. Rosalind Sadleir, Arizona State University, USA
Interactions between tDCS and MR imaging: MR current density imaging and relevance for functional MRI, Dr. Axel Thielscher, Danish Tech. Univ., Denmark
tES-fMRI Combination: From Offline and Concurrent Experiments to Closed-Loop Neuromodulation, Dr. Hamed Ekhtiari, UT Southwestern, USA

9:30 – 10:00 coffee / light snack break

10:00 – 11:00 Introduction: Dr. Baran Aydogan
KEYNOTE SPEAKER
Prof. Helen Mayberg
Founding director of Center for Advanced Circuit Therapeutics at the Icahn School of Medicine, NY, USA
Title: Putting Biomarkers to Practice to Optimize DBS for Depression

11:00 – 12:30 **SESSION 6** Dr. Hamed Ekhtiari and Dr. Maria Vasileiadi
ORAL MRI of implanted stimulation devices

Connectomic DBS for Psychiatric Disorders Dr. Ki Sueng Choi, Icahn School of Medicine, USA
Multi Modal MRI informed High Intensity Focused Ultrasound: From Precision Multi Modal Multi Modal MRI informed High Intensity Focused Ultrasound: From Precision Neuromodulation to Surgical Ablation, Dr. Bhavya R. Shah, UT Southwestern Medical Center, USA
Personalized Adaptive Cortical Electro-stimulation (PACE) for Treatment-resistant Depression, Dr. Ziad Nahas, University of Minnesota, USA

12:30 – 13:30 Lunch

13:30 – 15:00 **SESSION 7** Dr. Li Min Chen and Dr. David Norris
ORAL MRI in tFUS

The Role of MR-ARFI in Transcranial Focused Ultrasound: Principles and Applications, Dr. Morteza Mohammadjavad, Stanford, USA
Effects of Transcranial Ultrasound Stimulation (TUS) of S1 and VPL Nucleus of the Thalamus on Acute Pain Perception, Dr. Samuel Pichardo, Univ. of Calgary, Canada
tFUS Overview and Applications, BrainBox Ltd., UK

15:00 – 15:30 coffee / light snack break

15:30 – 17:30

SESSION 8 Dr. Patricia Figueiredo and Dr. Danny Wang

POWER PITCH

Topic #1 Methods for tFUS

1. An Acquisition, Reconstruction, and Post-Processing Approach for Closed Loop Transcranial Focused Ultrasound Stimulation Navigation.

Shota Hodono, Donders Centre for Cognitive Neuroimaging, Radboud University, Netherlands.

2. 3D Displacement Vector Field Imaging for Transcranial Focused Ultrasound Stimulation (TUS) Cross-Beam Localization.

Shota Hodono, Donders Centre for Cognitive Neuroimaging, Radboud University, Netherlands.

3. Quantitative MR-ARFI for Acoustic Dosimetry.

Kristen Zarcone, Case Western Reserve University, USA

4. UTE/ZTE MRI-Derived Synthetic CT for MRI-Only Transcranial Focused Ultrasound Planning: Cross-Species Validation in Humans and Nonhuman Primates.

Dong Liu, Columbia University, USA

Topic #2 DBS and DBS/TMS

5. Reduced white matter integrity in the left STN-vmPFC pathway is associated with pre-surgical apathy in PD.

Jip de Bruin, Icahn School of Medicine at Mount Sinai and Amsterdam University Center, USA/Netherlands

6. Directional derivatives of structural connectivity offer a flexible framework towards precision targeting for neuromodulation.

Simona Leserri, University of Eastern Finland, Finland.

Topic #3 tFUS and tFUS-fMRI clinical applications

7. Focused Ultrasound-mediated Paired Thalamo-Cortical Stimulation Enables Causal Control of Thermal Pain Circuits.

Li Min Chen, Vanderbilt University Medical Center, USA.

8. Online engagement of human subgenual cingulate circuitry using transcranial ultrasound during interleaved fMRI.

Suhas Vijayakumar, Johannes Gutenberg University Medical Center, Germany.

9. Revisiting Baseline-Controlled Lateralized Perfusion and Interhemispheric Coupling After FUS-Mediated BBB Opening in the NHP Striatum.

Dong Liu, Columbia University, USA

Topic #4 tPhotobiomodulation, tDCS and other methods combined with fMRI/MRI

10. Transcranial photobiomodulation both suppresses and amplifies BOLD functional connectivity in a region- and dose-dependent manner.

Hannah Van Lankveld, University of Toronto, Canada.

11. Reinforcement Learning via Brain Feedback for real-time fMRI-based adaptive stimulus generation: software and proof-of-concept.

Giuseppe Gallitto, Department of Neurology, University Medicine Essen, Germany.

12. An automated pipeline to verify electrode positions in concurrent tDCS-MRI studies.

Sina Straub, University of Bern, Switzerland.

FOLLOWED BY POSTER SESSION

Day 2 Adjournment

1830 - 2200

Dinner + Networking

DAY THREE

07:00 – 08:00 Breakfast

08:00 – 09:30 **SESSION 9** Dr. Sina Straub and Dr. Martin Tik and
ORAL Emerging Technologies and Applications I

Concurrent Robotic TMS-EEG-fMRI System, Dr. Chunlei Liu, Berkeley University, USA
Neuromodulation of the vagal interoceptive system — Transcutaneous Vagus Nerve Stimulation, Dr. Mark Tittgemeyer, Max Plank Institute for Metabolism Research, Germany
Interleaved TMS-MRS: Real-Time Neurochemical Mapping During Transcranial Magnetic Stimulation Dr. Maria Vasileiadi, Sunnybrook Health Science Center, Canada

09:30 – 10:30 **SESSION 10** Dr. Baran Aydogan and Dr. Xiaoqi Juliana Huang
ORAL Emerging Technologies and Applications II

Simultaneous fMRI and temporal interference electrical neurostimulation, Dr. Joshua Brown, Indiana University, USA
State-dependent TMS-(EEG)-fMRI in cognition, Dr. Inge Leunissen, Maastricht, Netherlands

10:30 – 11:00 *coffee / light snack break*

11:00 – 12:00 **SESSION 11** Dr. Martin Tik and Dr. Danny Wang
Panel Discussion MRI Biomarker Development in Neuromodulation (Cross-neuromodulation Biomarkers)

Academic representative – Dr. Desmond Oathes, Dr. Hamed Ekhtiari, Dr. Lucia Navarro de Lara

ESMRMB representative – Dr. Patricia Figueiredo

Industry partner – Siemens, Saba Shirvani; Brainbox, TBD

12:00 – 12:30 Future Directions + Open Discussion

12:30-13:00 **Poster Awards Ceremony and Closing Remarks**
Dr. Baran Aydogan and full committee

13:00 *Day 3 Adjournment*

13:00-18:00 **Brainbox satellite tFUS sessions**