

# ICMRM 2023 Singapore

The 17th International Conference on  
Magnetic Resonance Microscopy



27-31 August 2023, Singapore



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## WELCOME

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Welcome to Singapore and welcome to the 17th International Conference on Magnetic Resonance Microscopy! We are glad and honoured to host the conference in the Asia-Pacific, a dynamic and culturally diverse region where East meets West. Singapore has been an international hub for centuries and is known for its strengths in trade and technology development. So, it is fitting that it is also a gathering place for international scientists and engineers to exchange new ideas.

Thank you to the sponsors and exhibitors, we are very grateful for your support. This has allowed us to lift the standard of the catering and beverages so we ask all attendees to show their appreciation by visiting the booths.

Most of all, we are grateful to you for travelling all this way to participate and for providing an exciting range of talks and posters. We hope that you will enjoy your stay, the scientific programme, and the discussions after talks or in front of posters. We also hope that you will enjoy the city, the food, and the social programme.

Shaoying Huang and Robin Dykstra  
Conference Co-Chairs

## ORGANIZING COMMITTEE

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## FULL PROGRAM

<b>Aug. 27, 2023, Sunday</b>		
10:30	Arrivals and registration	Campus center
<b>13:00</b>	<b>Educational Talk 1</b> Chair: Konstantin Momot, Queensland University of Technology	
13:00	<i>Meghan Halse, University of York</i> Parahydrogen-induced polarisation in NMR spectroscopy and imaging	Auditorium
14:00	<i>Luisa Ciobanu, NeuroSpin/CEA</i> Opportunities offered by ultra-high field MRI	
<b>15:00</b>	<b>Coffee break</b>	Campus center
<b>15:30</b>	<b>Educational Talk 2</b> Chair: Yi-Qiao Song, Harvard University	
15:30	<i>Michael Johns, University of Western Australia</i> Applications of (LF) Magnetic Resonance in Chemical Engineering	Auditorium
16:30	<i>Hilary Fabich, ABQMR, Inc.</i> Outside the lab: Unique applications of NMR	
17:30	<b>Break</b>	Campus center
<b>17:45</b>	<b>Plenary Lecture</b> Chair: Melanie Britton, University of Birmingham	
	<i>William S. Price, Western Sydney University</i> The Versatility of NMR Diffusion Measurements	Auditorium
<b>18:45</b>	<b>Break</b>	Campus center
<b>19:00</b>	<b>Welcome Reception</b>	Jackie Chan Place/ Campus center

<b>Aug. 28, 2023, Monday</b>		
<b>08:45</b>	<b>Opening</b> Guest of Honor: Prof. Chee Kai Chua, Associate Provost, Research, SUTD	Auditorium
<b>09:30</b>	<b>Session 1 – 28AM: Biomedical I</b> Chair: Bernard Siow, the Francis Crick Institute	
09:30 INV 1	<i>Le Roy Chong, Changi General Hospital</i> 3D MRI With CT-Like Bone Contrast – How I Do It	Auditorium
10:00 O1	<i>Di Zhang, Beijing U. of Posts and Telecomm.</i> Anatomy-guided and point-cloud-based deep learning framework for superficial white matter tractography parcellation	
10:15 O2	<i>Zaimin Zhu, Beijing U. of Posts and Telecomm.</i> Attention-based q-space Deep Learning: Fast Diffusion Magnetic Resonance Imaging with Varied Sampling Strategies	
10:30 O3	<i>Weng Kung Peng, Songshan Lake Materials Lab.</i> NMR-based traits: The Next Generation of Precision Medicine	
<b>10:45</b>	<b>Coffee break</b>	Campus Center
<b>11:15</b>	<b>Session 2 – 28NOON: Diffusion in biology &amp; medical applications</b> Chair: Siegfried Stapf, TU Ilmenau	
11:15 INV 2	<i>Yang Xia, Oakland University</i> The First Study of Biomaterials by Nuclear Magnetic Resonance	Auditorium
11:45 O4	<i>Zofia Schneider, AGH University of Krakow</i> The correlation between healthy aging and DTI metrics of the brain regions	
12:00 O5	<i>Daniel Topgaard, Lund University</i> Double-rotation gradient waveforms and nonparametric distributions of frequency-dependent diffusion tensors	
12:15 O6	<i>Arabella Cox, Francis Crick and UCL</i> Fast Diffusion Exchange Spectroscopic Imaging (fDEXSI) MRI - fast quantification diffusion exchange for cell permeability imaging.	

12:30 O7	<i>Yi-Qiao Song, Harvard University</i> Full Diffusion Tensor Distribution to Characterize Tissue Microstructure and Types in Brain Tumors	
12:45 O8	<i>Einar Fridjonsson, The U. of Western Australia</i> Rapid monitoring of cleaning efficiency of fouled hollow fiber membrane module via non-invasive NMR diffraction technique	
13:00 – 14:00	<b>Lunch</b>	Campus Center
<b>14:00</b>	<b>Session 3 – 28NOON: Hardware &amp; Methods I</b> Chair: Evan Mccarney, inMR Measure Ltd	
14:00 INV 3	<i>Volker Behr, University of Würzburg</i> Magnetic Particle Imaging – when negative contrast becomes positive	Auditorium
14:30 O9	<i>Martin Bruschewski, University of Rostock</i> CFD-grade MRV measurements of the mean velocity vector and the Reynolds stress tensor in turbulent fluid flows	
14:45 O10	<i>Guowen Jin, China University of Petroleum</i> Bound and movable fluid microdistribution characterization in porous rocks based on nuclear magnetic resonance	
15:00 O11	<i>Jiali He, Chongqing University</i> Improving the SNR of Unilateral Magnetic Resonance Sensor using LC Resonator	
15:15 O12	<i>Huabing Liu, Beijing Limecho Technology Co., Ltd</i> Emerging progress of portable NMR instrumentation in industrial application	
15:30 O13	<i>Dan Xiao, University of Windsor</i> Adaptive Pulse Sequence Design using Neural Networks	
15:45 O14	<i>Liang Xuan, Chongqing University</i> Magnetic Resonance Fingerprinting applied on a 50mT Ultra-low field MRI scanner	
<b>16:00 – 18:30</b>	<b>Posters I (odd numbers) + Coffee break</b>	



<b>Aug. 29, 2023, Tuesday</b>		
<b>08:45</b>	<b>Session 4 – 29AM: Hardware &amp; Methods II</b> Chair: Martin Bruschewski, University of Rostock	
08:45 INV 4	<i>Pablo Prado, Livivos Inc</i> Single-sided NMR technology to measure biomarkers of liver disease	Auditorium
09:15 O15	<i>Yi-Qiao Song, Harvard University</i> Miniaturized Magnetic Resonance Systems and their Applications	
09:30 O16	<i>Jiangfeng Guo, China University of Petroleum</i> Two-dimensional magnetic resonance data denoising via EMD-SVD	
09:45 O17	<i>Zijian Jia, U. of Shanghai for Science and Technology</i> Application of artificial intelligence on 2D NMR to identify shale components	
10:00 O18	<i>Yuchen Wu, Southeast University</i> A Comparative Study of GSP Prediction Utilizing T2 Relaxation and T1-T2 Correlated Relaxation based on Convolutional Neural Network	
10:15 O19	<i>Yifeng Jiang, Chiba University</i> Trajectory design for Spatial Encoding Magnetic Fields	
10:30 O20	<i>Evan Mccarney, inMR Measure Ltd</i> Automated eating quality measurements on lamb carcasses in a processing plant using unilateral NMR	
<b>10:45 – 11:15</b>	<b>Coffee break</b>	Campus center
<b>11:15</b>	<b>Session 5 – 29NOON: MR Microscopy I</b> Chair: Daniel Clarke, Victoria University of Wellington	
11:15 INV 5	<i>Ye Li, Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences</i> 5 T Human MRI: RF system and initial in-vivo imaging	Auditorium
11:45 O21	<i>Dan Xiao, University of Windsor</i> Iterative Point Spread Function Correction for Fast Spin Echo T2 Mapping	
12:00 O22	<i>Diana Bernin, Chalmers University of Technology</i> MRI methodologies to follow water ingress in pulp-based packaging materials	

12:15 O23	<i>Chang Ni, ShanghaiTech university</i> DTI-measured diffusion directionality captures fluctuation in renal water reabsorption induced by water diuresis	
12:30 O24	<i>Maxime Yon, Lund University</i> Massively multidimensional diffusion MRI: from concepts to restriction sensitive and sparsely-sampled acquisition	
12:45 O25	<i>Alfredo Ordinola, Linköping University</i> Effects of geometry and relaxation on diffusion exchange measurements	
13:00 – 14:00	<b>Lunch/Executive Meeting</b>	Campus center/ TT19, 2.304
14:00	<b>Session 6 – 29PM: MR Microscopy II</b> Chair: Diana Bernin, Chalmers University of Technology	
14:00 INV 6	<i>Maxim Zaitsev, University Medical Center Freiburg</i> Towards open-source MR software and hardware with Pulseq and CoilGen	Auditorium
14:30 O26	<i>Yuyue Zhang, National University of Singapore</i> Forward and Inverse Models on the 3-D MRI-Based Electrical Properties Imaging	
14:45 O27	<i>Xin Mu, ShanghaiTech university</i> Precise tracking of calf muscle fiber orientations during plantarflexion with diffusion tensor imaging	
15:00 O28	<i>Nian Wang, Indiana University</i> High-resolution Quantitative Susceptibility Mapping for Beta-amyloid Pathology	
15:15 O29	<i>TBC</i>	
15:30 Bruker	<i>Thomas Oerther, Sarah Mailhot, Wei Liang Wang</i> Application and Helium Recovery Solutions	
16:00 – 18:30	<b>Posters II (even numbers) + Coffee break</b>	Campus center

<b>Aug. 30, 2023, Wednesday</b>		
<b>08:45</b>	<b>Paul Callaghan Young Investigator Competition I</b> Chair: Volker Behr, University of Würzburg	
08:45	<i>Bernhard Blümich, RWTH Aachen University</i> A short speech for Erwin Hahn Lecturer	Auditorium
09:00	<i>Petrik Galvosas, Victoria University of Wellington</i> Introduction to the Paul Callaghan Young Investigator Award sessions	
09:05 PCYIA 1	<i>Neil Robinson, The University of Western Australia</i> When Relaxation Goes Wrong: Unexpected Spin Behaviour in Functional Porous Media	
09:30 PCYIA 2	<i>Feryal Guerroudj, Chalmers University of Technology</i> Investigating synergistic effects between cellulose and lignin for advanced forest carbon fibers: mass transport characterization with magnetic resonance methods	
09:55 PCYIA 3	<i>Qingyuan Zheng, University of Cambridge</i> Operando MR imaging of the products of Fischer Tropsch synthesis within catalyst pores	
10:20 PCYIA 4	<i>Joseph Okeke, University of Birmingham</i> In situ and operando Spectroscopy, Imaging and Tomography of Batteries	
10:45 – 11:15	<b>Coffee break</b>	Campus center
<b>11:15</b>	<b>Paul Callaghan Young Investigator Competition II</b> Chair: Einar Fridjonsson, the University of Western Australia	
11:15 PCYIA 5	<i>Johanna Günther, University of Würzburg</i> Chebyshev nodes-based fingerprinting of magnetic nanoparticles	Auditorium
11:40 PCYIA 6	<i>Tingou Liang, Singapore U. of Technology and Design</i> Optimization Scheme for Single-sided Inward-outward (IO)-ring Permanent Magnet Array	
12:05 PCYIA 7	<i>Devin Morin, University of New Brunswick</i> A Ceramic Magnet for Flow Profiling and Overhauser DNP	

12:30 PCYIA 8	<i>Julia Lasek, AGH U. of Science and Technology</i> AI-BSD – deep learning based model for DTI systematic error removal	
12:55 PCYIA 9	<i>Junqi Yang, Chiba University</i> An angle selection method for rSEM	
<b>13:20 – 14:20</b>	<b>Lunch/Division Meeting</b>	Campus center/ TT19, 2.304
14:20 – 16:30	Free afternoon	
<b>16:30 – 21:15</b>	<b>Conference Banquet at Mount Faber</b> Buses leave SUTD 16:30	Mount Faber

<b>Aug. 31, 2023, Thursday</b>		
<b>08:45</b>	<b>Session 7 – 31AM: Mobile &amp; Low Field</b> Chair: <i>Velencia Witherspoon, National Institutes of Health</i>	
08:45 INV 7	<i>Konstantin Momot, Queensland U. of Technology</i> Portable NMR for point-of-care clinical applications: in vivo, ex-vivo and phantoms	Auditorium
09:15 O30	<i>Can Liang, Changzhou Institute of Technology</i> Upscaling simulation of NMR surface relaxation in porous media with Lattice Boltzmann method	
09:30 O31	<i>William Selby, University of New Brunswick</i> Characterizing shear properties with portable magnetic resonance – a phase interference technique	
09:45 O32	<i>Siegfried Stapf, TU Ilmenau</i> Depth-dependent brine transport in salt-rich topsoil monitored by the NMR-MOUSE	
10:00 O33	<i>Lei Yang, Chongqing University</i> Active EMI Suppression Method for a 50mT Portable MRI Scanner in NICU	

10:15 O34	<i>Zhengxiu Wu, Southeast University</i> An Rx coil array design for lightweight ultra-low MRI prototype of the breast: proof-of-concept imaging implementation	
10:30 O35	<i>Bernhard Blümich, RWTH Aachen University</i> NMR Depth Profiling of Painted Walls: Ostia Antica	
<b>10:45 – 11:15</b>	<b>Coffee break</b>	Campus center
<b>11:30</b>	<b>Session 8 – 31PM: Engineering &amp; Materials</b> Chair: Andrew Sederman, University of Cambridge	
11:30 INV 8	<i>Daniel Clarke, Victoria University of Wellington</i> MRI for chemical engineering: Case studies in granular flow and porous media	Auditorium
11:45 O36	<i>Rok Peklar, Jozef Stefan Institute</i> MR Imaging and Kinetic Monte Carlo Simulation of Lithium Dendrite Growth	
12:00 O37	<i>Emmanouela Leventaki, Chalmers U. of Technology</i> Evaluation of mixing efficiency in bubble reactors for carbon dioxide capture using MRI	
12:15 O38	<i>Patrick Vogel, University of Würzburg</i> Toroidal and Poloidal Vortex Rotation of Halbach Rings for Determining the Spatial Distribution of Magnetic Nanoparticles – initial results	
12:30 O39	<i>Razyq Nasharuddin, The U. of Western Australia</i> Low field NMR probe of microstructural and mechanical strength evolution of cemented paste backfill prepared using varying salinity water	
<b>12:45 – 14:00</b>	<b>Lunch</b>	Campus center
14:00	General Assembly Meeting	Auditorium
<b>14:30</b>	<b>Session 9 – 31PM: Biomedical II</b> Chair: Weng Kung Peng, Songshan Lake Materials Lab.	
14:30 INV 9	<i>Thu Thao LE, National Heart Centre Singapore</i> Clinical applications of exercise stress-induced cardiac magnetic resonance imaging	Auditorium

15:00 O40	<i>Velencia Witherspoon, National Institutes of Health</i> 3D-printed micro-anisotropic, macro-isotropic, susceptibility-matched diffusion phantoms	Auditorium
15:15 O41	<i>Bernard Siow, The Francis Crick Institute</i> Towards replacing 2D Inverse Laplace Transforms with Deep Neural Networks for processing Diffusion Exchange Spectroscopy data	
15:30 O42	<i>Rosie Zhou, University of Posts and Telecomm.</i> Tract-specific Microstructural Alterations in Intermittent exotropia identified by Fiber Quantification and Effect Size Analysis	
15:45 O43	<i>Qiji Shi, Beijing University of Posts and Telecomm.</i> Cerebral White Matter Dynamic Functional Connectivity in Patients with Brain Arteriovenous Malformations (AVM) using Multi-modal MRI	

## LIST OF POSTERS

NUMBER	PRESENTER	TITLE
P01	<i>Weichao Yan</i> Ocean University of China	A Study on Evaluating Shale Oil Reservoir Parameters Using 2D Nuclear Magnetic Resonance Technology
P02	<i>Xiao Liang</i> China University of Geosciences	Effect of oil-based mud (OBM) invasion to nuclear magnetic resonance (NMR) responses in tight glutenite reservoirs
P03	<i>Siegfried Stapf</i> TU Ilmenau	The ExoMOUSE – detecting liquids on solar system bodies
P04	<i>Emanuel Bertizzolo</i> The University of Western Australia	Low field NMR as an optimization tool for mechanical dewatering of anaerobic digestate
P05	<i>Einar Fridjonsson</i> The University of Western Australia	Investigation of Spacer-induced Combined Organic-Inorganic Fouling inside SWRO element via portable Earth's field NMR
P06	<i>Paul Teal</i> Victoria University of Wellington	Use and overuse of deep learning in NMR
P07	<i>Shin Utsuzawa</i> SLB	Towards Deep-Look NMR Well Logging
P08	<i>Nicholas Ling</i> The University of Western Australia	Impact of Microplastics on Fouling of Hollow Fiber Membranes: Insights from Magnetic Resonance Imaging
P09	<i>Nicholas Ling</i> The University of Western Australia	Automated Solid-Phase Extraction and NMR Analysis for Accurate Assessment of Oil and Per-/Polyfluoroalkyl Substances (PFAS) Content in Water

P10	<i>Maria Anikeeva</i> Christian-Albrechts-Universität zu Kiel	Optimizing parameters for MR studies of packed beds using ethane
P11	<i>Abel Worku Tessema</i> Ulsan National Institute of Science and Technology	Robust Resolution Improvement of UTE-MR Angiogram using 3D Super-Resolution Generative Adversarial Network
P12	<i>Pak Shing Kenneth Or</i> Lund University	Frequency optimization in multidimensional diffusion-relaxation correlation MRI on a fixed mouse brain
P13	<i>Wei Liu</i> Institute of Geology and Geophysics, Chinese Academy of Sciences	Design of Ultra-low Noise NMR Logging While Drilling
P14	<i>Maria Anikeeva</i> Christian-Albrechts-Universität zu Kiel	MR based magnetic susceptibility measurements of 3D printing materials at 3 Tesla
P15	<i>Devin Morin</i> University of New Brunswick	An Optimized Unilateral Magnet with a Large Homogeneous Region
P16	<i>Xi Wang</i> Nanyang Technological University	Deep Learning Approaches for Estimation of Specific Absorption Rate of High-Field MRI via HDMR-Generated Surrogate Models
P17	<i>Bernhard Blümich</i> RWTH Aachen University	Asymmetry in Three-Site Relaxation-Exchange NMR
P18	<i>Dion G. Thomas</i> Victoria University of Wellington	Temperature stability for diffusion measurement in single-sided NMR systems
P19	<i>Meghan Halse</i> University of York	Parahydrogen-enhanced benchtop NMR spectroscopy for analytical applications
P20	<i>Andy Sederman</i> University of Cambridge	Velocity and turbulent kinetic energy imaging of gas in packed



		beds at industrially relevant conditions
P21	<i>Tran Duc Khang &amp; Yap Yuan Xi</i> NUS High School of Math. and Science	Shielding-Free Signal Noise Suppression in Portable Low-Field MRI