

## CONTENTS

### ■ LETTER TO THE EDITOR

- RF-Induced Heating of Metallic Implants Simulated as PEC: Is There Something Missing?**, Luca Zilberti, Umberto Zanovello, Alessandro Arduino, Oriano Bottauscio, and Mario Chiampi ..... 583  
*Published online 16 September 2020*

### ■ SPECTROSCOPIC METHODOLOGY

#### Full Papers

- In Vivo Characterization of Downfield Peaks at 9.4 T:  $T_2$  Relaxation Times, Quantification, pH Estimation, and Assignments**, Tamas Borbath, Saipavitra Murali-Manohar, Andrew Martin Wright, and Anke Henning ..... 587  
*Published online 11 August 2020*

- A Novel Method to Measure  $T_1$ -Relaxation Times of Macromolecules and Quantification of the Macromolecular Resonances**, Saipavitra Murali-Manohar, Andrew Martin Wright, Tamas Borbath, Nikolai I. Avdievich, and Anke Henning ..... 601  
*Published online 30 August 2020*

#### Note

- Estimating Vertebral Bone Marrow Fat Unsaturation Based on Short-TE STEAM MRS**, Jan Syväri, Stefan Ruschke, Michael Dieckmeyer, Hans H. Hauner, Daniela Junker, Marcus R. Makowski, Thomas Baum, and Dimitrios C. Karampinos ..... 615  
*Published online 11 August 2020*

### ■ IMAGING METHODOLOGY

#### Review

- Probing Myelin Content of the Human Brain with MRI: A Review**, Gian Franco Piredda, Tom Hilbert, Jean-Philippe Thiran, and Tobias Kober ..... 627  
*Published online 16 September 2020*

#### Full Papers

- Free-Breathing Liver Fat and  $R_2^*$  Quantification Using Motion-Corrected Averaging Based on a Nonlocal Means Algorithm**, Huiwen Luo, Ante Zhu, Curtis N. Wiens, Jitka Starekova, Ann Shimakawa, Scott B. Reeder, Kevin M. Johnson, and Diego Hernando ..... 653  
*Published online 1 August 2020*

- Sensitivity to Myelin Using Model-Free Analysis of the Water Resonance Line-Shape in Postmortem Mouse Brain**, Sean Foxley, Gregg Wildenberg, Vandana Sampathkumar, Gregory S Karczmar, Pedro Brugarolas, and Narayanan Kasthuri ..... 667  
*Published online 27 July 2020*

- Universal Nonselective Excitation and Refocusing Pulses with Improved Robustness to Off-Resonance for Magnetic Resonance Imaging at 7 Tesla with Parallel Transmission**, L. Van Damme, F. Mauconduit, T. Chambrion, N. Boulant, and V. Gras ..... 678  
*Published online 4 August 2020*

- Subtractive NCE-MRA: Improved Background Suppression Using Robust Regression-Based Weighted Subtraction**, Hao Li, Shuo Wang, Martin J. Graves, David J. Lomas, and Andrew N. Priest ..... 694  
*Published online 4 August 2020*

- RUN-UP: Accelerated Multishot Diffusion-Weighted MRI Reconstruction Using an Unrolled Network with U-Net as Priors**, Yuxin Hu, Yunyingying Xu, Qiyuan Tian, Feiyu Chen, Xinwei Shi, Catherine J. Moran, Bruce L. Daniel, and Brian A. Hargreaves ..... 709  
*Published online 11 August 2020*

- Impact of Sequence Type and Field Strength (1.5, 3, and 7T) on 4D Flow MRI Hemodynamic Aortic Parameters in Healthy Volunteers**, Stephanie Wiesemann, Sebastian Schmitter, Aylin Demir, Marcel Prothmann, Carsten Schwenke, Ashish Chawla, Florian von Knobelsdorff-Brenkenhoff, Andreas Greiser, Ning Jin, Emilie Bollache, Michael Markl, and Jeanette Schulz-Menger ..... 721  
*Published online 4 August 2020*

- Design and Evaluation of Quantitative MRI Phantoms to Mimic the Simultaneous Presence of Fat, Iron, and Fibrosis in the Liver**, Ruiyang Zhao, Gavin Hamilton, Jean H. Brittain, Scott B. Reeder, and Diego Hernando ..... 734  
*Published online 12 August 2020*

- MRI-Cytometry: Mapping Nonparametric Cell Size Distributions Using Diffusion MRI**, Junzhong Xu, Xiaoyu Jiang, Sean P. Devan, Lori R. Arlinghaus, Eliot T. McKinley, Jingping Xie, Zhongliang Zu, Qing Wang, A. Bapsi Chakravarthy, Yong Wang, and John C. Gore ..... 748  
*Published online 16 September 2020*

# CONTENTS

**MR Electrical Properties Imaging Using a Generalized Image-Based Method,** Paul Soullié, Alexia Missoffe, Khalid Ambarki, Jacques Felblinger, and Freddy Odille ..... 762  
*Published online 11 August 2020*

**An Optimal Acquisition and Post-Processing Pipeline for Hybrid IVIM-DKI in Head and Neck,** Nienke D. Sijtsma, Steven F. Petit, Dirk H. J. Poot, Gerda M. Verduijn, Aad van der Lugt, Mischa S. Hoogeman, and Juan A. Hernandez-Tamames ..... 777  
*Published online 31 August 2020*

**A 3D Hybrid-Shot Spiral Sequence for Hyperpolarized <sup>13</sup>C Imaging,** Andrew Tyler, Justin Y. C. Lau, Vicky Ball, Kerstin N. Timm, Tony Zhou, Damian J. Tyler, and Jack J. Miller ..... 790  
*Published online 7 September 2020*

**Recovery Kinetics of Creatine in Mild Plantar Flexion Exercise Using 3D Creatine CEST Imaging at 7 Tesla,** Dushyant Kumar, Ravi Prakash Reddy Nanga, Deepa Thakuri, Neil Wilson, Abigail Cember, Melissa Lynne Martin, Dan Zhu, Russell T. Shinohara, Qin Qin, Hari Hariharan, and Ravinder Reddy ..... 802  
*Published online 15 August 2020*

**Adaptive Slice-Specific z-Shimming for 2D Spoiled Gradient-Echo Sequences,** Martin Soellradl, Johannes Strasser, Andreas Lesch, Rudolf Stollberger, Stefan Ropele, and Christian Langkammer ..... 818  
*Published online 10 September 2020*

**Development and Validation of 3D MP-SSFP to Enable MRI in Inhomogeneous Magnetic Fields,** Naoharu Kobayashi, Ben Parkinson, Djaudat Idiyatullin, Gregor Adriany, Sebastian Theilenberg, Christoph Juchem, and Michael Garwood ..... 831  
*Published online 6 September 2020*

**Extracting Diffusion Tensor Fractional Anisotropy and Mean Diffusivity from 3-Direction DWI Scans Using Deep Learning,** Eric Aliotta, Hamidreza Nourzadeh, and Sohil H. Patel ..... 845  
*Published online 18 August 2020*

**Prospective Correction of Patient-Specific Respiratory Motion in Myocardial T<sub>1</sub> and T<sub>2</sub> Mapping,** Michael A. Bush, Yue Pan, Ning Jin, Yingmin Liu, Juliet Varghese, Rizwan Ahmad, and Orlando P. Simonetti ..... 855  
*Published online 27 August 2020*

**T<sub>1</sub>-FLAIR Imaging During Continuous Head Motion: Combining PROPELLER with an Intelligent Marker,** Ola Norbeck, Adam van Niekerk, Enrico Avventi, Henric Rydén, Johan Berglund, Tim Sprenger, and Stefan Skare ..... 868  
*Published online 1 September 2020*

**A Novel Sequence to Improve Auditory Functional MRI with Variable Silent Delays,** Manoj Shrestha, H. Sean Lee, Ulrike Nöth, and Ralf Deichmann ..... 883  
*Published online 4 September 2020*

**Calibrationless Parallel Imaging Reconstruction for Multislice MR Data Using Low-Rank Tensor Completion,** Yilong Liu, Zheyuan Yi, Yujiao Zhao, Fei Chen, Yanqiu Feng, Hua Guo, Alex T. L. Leong, and Ed X. Wu ..... 897  
*Published online 23 September 2020*

**3D Phase-Resolved Functional Lung Ventilation MR Imaging in Healthy Volunteers and Patients with Chronic Pulmonary Disease,** Filip Klimeš, Andreas Voskrebenez, Marcel Gutberlet, Agilo Luitger Kern, Lea Behrendt, Robert Grimm, Hendrik Suhling, Cristian Gonzales Crisosto, Till Frederick Kaireit, Gesa Helen Pöhler, Julian Glandorf, Frank Wacker, and Jens Vogel-Claussen ..... 912  
*Published online 14 September 2020*

**AZTEK: Adaptive Zero TE k-Space Trajectories,** Tanguy Boucneau, Brice Fernandez, Florent L. Besson, Anne Menini, Florian Wiesinger, Emmanuel Durand, Caroline Caramella, Luc Darrasse, and Xavier Maître ..... 926  
*Published online 16 September 2020*

**Notes**  
**A Retrospective Physiological Noise Correction Method for Oscillating Steady-State Imaging,** Amos A. Cao and Douglas C. Noll ..... 936  
*Published online 27 August 2020*

**TURBINE-MRE: A 3D Hybrid Radial-Cartesian EPI Acquisition for MR Elastography,** Yi Sui, Arvin Arani, Joshua D. Trzasko, Matthew C. Murphy, Phillip J. Rossman, Kevin J. Glaser, Kiaran P. McGee, Armando Manduca, Richard L. Ehman, Philip A. Araoz, and John Huston III ..... 945  
*Published online 1 August 2020*

**Cerebral Oxygen Extraction Fraction: Comparison of Dual-Gas Challenge Calibrated BOLD with CBF and Challenge-Free Gradient Echo QSM+qBOLD,** Junghun Cho, Yuhan Ma, Pascal Spincemaille, Gilbert Bruce Pike, and Yi Wang ..... 953  
*Published online 11 August 2020*

**Chemical Shift-Based Prospective k-Space Anonymization,** Hendrik Mattern, Martin Knoll, Falk Lüsebrink, and Oliver Speck ..... 962  
*Published online 6 August 2020*

**Simultaneous QSM and Metabolic Imaging of the Brain Using SPICE: Further Improvements in Data Acquisition and Processing,** Rong Guo, Yibo Zhao, Yudu Li, Tianyao Wang, Yao Li, Brad Sutton, and Zhi-Pei Liang ..... 970  
*Published online 18 August 2020*

# CONTENTS

**Dynamic Volumetric Hyperpolarized  $^{13}\text{C}$  Imaging with Multi-Echo EPI,** Kofi Deh, Kristin L. Granlund, Roozbeh Eskandari, Nathaniel Kim, Arsen Mamakhanyan, and Kayvan R. Keshari ..... 978  
*Published online 15 August 2020*

**Evaluation of Fluorine-19 Magnetic Resonance Imaging of the Lungs Using Octafluorocyclobutane in a Rat Model,** Yurii Shepelytskyi, Tao Li, Vira Grynko, Camryn Newman, Francis T. Hane, and Mitchell S. Albert ..... 987  
*Published online 12 August 2020*

**Measurements of Venous Oxygen Saturation in the Superior Sagittal Sinus Using Conventional 3D Multiple Gradient-Echo MRI: Effects of Flow Velocity and Acceleration,** Chou-Ming Cheng, Chih-Che Chou, Tzu-Chen Yeh, and Hsiao-Wen Chung ..... 995  
*Published online 20 August 2020*

**General Gradient Delay Correction Method in Bipolar Multispoke RF Pulses Using Trim Blips,** Redouane Jamil, Franck Mauconduit, Vincent Gras, and Nicolas Boulant ..... 1004  
*Published online 27 August 2020*

## ■ PRECLINICAL AND CLINICAL IMAGING

### Full Papers

**Ultrahigh-Resolution Quantitative Spinal Cord MRI at 9.4T,** Ole Geldschläger, Dario Bosch, Nikolai I. Avdievich, and Anke Henning ..... 1013  
*Published online 12 August 2020*

**Comparison of Single Breath Hyperpolarized  $^{129}\text{Xe}$  MRI with Dynamic  $^{19}\text{F}$  MRI in Cystic Fibrosis Lung Disease,** Andrew McCallister, Sang Hun Chung, Michael Antonacci, Margret Z. Powell, Agathe S. Ceppe, Scott H. Donaldson, Yueh Z. Lee, Rosa Tamara Branca, and Jennifer L. Goralski ..... 1028  
*Published online 8 August 2020*

### Note

**Passive Needle Guide Tracking with Radial Acquisition and Phase-Only Cross-Correlation,** Andreas Reichert, Simon Reiss, Axel Joachim Krafft, and Michael Bock ..... 1039  
*Published online 7 August 2020*

## ■ BIOPHYSICS AND BASIC BIOMEDICAL RESEARCH

### Full Papers

**Investigating Cardiac Stimulation Limits of MRI Gradient Coils Using Electromagnetic and Electrophysiological Simulations in Human and Canine Body Models,** Valerie Klein, Mathias Davids, Lothar R. Schad, Lawrence L. Wald, and Bastien Guérin ..... 1047  
*Published online 19 August 2020*

**Influence of Phosphate Concentration on Amine, Amide, and Hydroxyl CEST Contrast,** Jingwen Yao, Chencai Wang, and Benjamin M. Ellingson ..... 1062  
*Published online 16 September 2020*

## ■ COMPUTER PROCESSING AND MODELING

### Full Paper

**The Impact of Segmentation on Whole-Lung Functional MRI Quantification: Repeatability and Reproducibility from Multiple Human Observers and an Artificial Neural Network,** Corin Willers, Grzegorz Bauman, Simon Andermatt, Francesco Santini, Robin Sandkühler, Kathryn A. Ramsey, Philippe C. Cattin, Oliver Bieri, Orso Pusterla, and Philipp Latzin ..... 1079  
*Published online 6 September 2020*

### Notes

**Global and Peak Local Specific Absorption Rate Control on Parallel Transmit Systems Using  $k$ -Means SAR Compression Model,** Xianglun Mao, Sumra Bari, David J. Love, and Joseph V. Rispoli ..... 1093  
*Published online 18 August 2020*

**A Comparative Study of Gradient Nonlinearity Correction Strategies for Processing Diffusion Data Obtained with Ultra-Strong Gradient MRI Scanners,** Umesh Rudrapatna, Greg D. Parker, Jamie Roberts, and Derek K. Jones ..... 1104  
*Published online 3 October 2020*

**An Investigation into the Minimum Number of Tissue Groups Required for 7T In-Silico Parallel Transmit Electromagnetic Safety Simulations in the Human Head,** Matthijs H. S. de Buck, Peter Jezzard, Hongbae Jeong, and Aaron T. Hess ..... 1114  
*Published online 26 August 2020*

## ■ HARDWARE AND INSTRUMENTATION

### Full Paper

**Frequency-Adjustable Magnetic Field Probes,** Niklas Wehkamp, Philipp Rovedo, Elmar Fischer, Jürgen Hennig, and Maxim Zaitsev ..... 1123  
*Published online 3 August 2020*