

## CONTENTS

### ■ SPECTROSCOPIC METHODOLOGY

#### *Full Papers*

- Simple and Robust Referencing System Enables Identification of Dissolved-Phase Xenon Spectral Frequencies,** Michael A. Antonacci, Le Zhang, Alex Burant, Drew McCallister, and Rosa T. Branca ..... 431  
*Published online 19 December 2017*

- Non-Water-Suppressed <sup>1</sup>H FID-MRSI at 3T and 9.4T,** Paul Chang, Sahar Nassirpour, Nikolai Avdievitch, and Anke Henning ..... 442  
*Published online 29 December 2017*

- In Vivo Estimation of Transverse Relaxation Time Constant (T<sub>2</sub>) of 17 Human Brain Metabolites at 3T,** Patrik O. Wyss, Claudio Bianchini, Milan Scheidegger, Ioannis A. Giapitzakis, Andreas Hock, Alexander Fuchs, and Anke Henning ..... 452  
*Published online 17 January 2018*

- Characterization of Macromolecular Baseline of Human Brain Using Metabolite Cycled Semi-LASER at 9.4T,** Ioannis-Angelos Giapitzakis, Nikolai Avdievich, and Anke Henning ..... 462  
*Published online 15 January 2018*

#### *Note*

- Simultaneous Editing of GABA and Glutathione at 7T Using Semi-LASER Localization,** Muhammad G. Saleh, Mark Mikkelsen, Georg Oeltzschner, Kimberly L. Chan, Adam Berrington, Peter B. Barker, and Richard A.E. Edden ..... 474  
*Published online 28 December 2017*

### ■ PRECLINICAL AND CLINICAL SPECTROSCOPY

#### *Rapid Communication*

- In Vivo Hyperpolarization Transfer in a Clinical MRI Scanner,** Cornelius von Morze, Galen D. Reed, Peder E. Larson, Daniele Mammoli, Albert P. Chen, James Tropp, Mark Van Criekinge, Michael A. Ohliger, John Kurhanewicz, Daniel B. Vigneron, and Matthew E. Merritt ..... 480  
*Published online 27 February 2018*

### ■ IMAGING METHODOLOGY

#### *Rapid Communication*

- Chemical Exchange-Sensitive Spin-Lock (CESL) MRI of Glucose and Analogs in Brain Tumors,** Tao Jin, Bistra Iordanova, T. Kevin Hitchens, Michel Modo, Ping Wang, Hunter Mehrens, and Seong-Gi Kim ..... 488  
*Published online 23 March 2018*

#### *Full Papers*

- Simultaneous Multi-Slice Combined With PROPELLER,** Ola Norbeck, Enrico Avventi, Mathias Engström, Henric Rydén, and Stefan Skare ..... 496  
*Published online 19 December 2017*

- Double Diffusion Encoding MRI for the Clinic,** Grant Yang, Qiyuan Tian, Christoph Leuze, Max Wintermark, and Jennifer A. McNab ..... 507  
*Published online 19 December 2017*

- Quantitative Assessment of Cerebral Venous Blood T<sub>2</sub> in Mouse at 11.7T: Implementation, Optimization, and Age Effect,** Zhiliang Wei, Jiadi Xu, Peiyong Liu, Lin Chen, Wenbo Li, Peter van Zijl, and Hanzhang Lu ..... 521  
*Published online 21 December 2017*

- Simultaneous Bilateral-Knee MR Imaging,** Feliks Kogan, Evan Levine, Akshay S. Chaudhari, Uchechukwuka D. Monu, Kevin Epperson, Edwin H.G. Oei, Garry E. Gold, and Brian A. Hargreaves ..... 529  
*Published online 17 December 2017*

- Yet More Evidence That Myelin Protons Can Be Directly Imaged With UTE Sequences on a Clinical 3T Scanner: Bicomponent T<sub>2</sub> Analysis of Native and Deuterated Ovine Brain Specimens,** Shu-Juan Fan, Yajun Ma, Yanchun Zhu, Adam Searleman, Nikolaus M. Szeverenyi, Graeme M. Bydder, and Jiang Du ..... 538  
*Published online 21 December 2017*

- A Diffusion-Based Method for Long-T<sub>2</sub> Suppression in Steady State Sequences: Validation and Application for 3D-UTE Imaging,** Lucas Soustelle, Julien Lamy, François Rousseau, Jean-Paul Armspach, and Paulo Loureiro de Sousa ..... 548  
*Published online 19 December 2017*

# CONTENTS

**Self-Gated Golden Angle Spiral Cine MRI for Coronary Endothelial Function Assessment**, Gabriele Bonanno, Allison G. Hays, Robert G. Weiss, and Michael Schär ..... 560  
*Published online 27 December 2017*

**Probing the Microscopic Environment of  $^{23}\text{Na}$  Ions in Brain Tissue by MRI: On the Accuracy of Different Sampling Schemes for the Determination of Rapid, Biexponential  $T_2$  Decay at Low Signal-to-Noise Ratio**, Jonathan M. Lommen, Sebastian Flassbeck, Nicolas G.R. Behl, Sebastian Niesporek, Peter Bachert, Mark E. Ladd, and Armin M. Nagel ..... 571  
*Published online 17 January 2018*

**Investigating the Accuracy of FatNav-Derived Estimates of Temporal  $B_0$  Changes and Their Application to Retrospective Correction of High-Resolution 3D GRE of the Human Brain at 7T**, Frédéric Gretschi, José P. Marques, and Daniel Gallichan ..... 585  
*Published online 22 January 2018*

**Accurate  $T_1$  Mapping of Short  $T_2$  Tissues Using a Three-Dimensional Ultrashort Echo Time Cones Actual Flip Angle Imaging-Variable Repetition Time (3D UTE-Cones AFI-VTR) Method**, Ya-Jun Ma, Xing Lu, Michael Carl, Yanchun Zhu, Nikolaus M. Szeverenyi, Graeme M. Bydder, Eric Y. Chang, and Jiang Du ..... 598  
*Published online 3 January 2018*

**Isotropic Resolution Diffusion Tensor Imaging of Lumbosacral and Sciatic Nerves Using a Phase-Corrected Diffusion-Prepared 3D Turbo Spin Echo**, Barbara Cervantes, Anh T. Van, Dominik Weidlich, Hendrick Kooijman, Andreas Hock, Ernst J. Rummeny, Alexandra Gersing, Jan S. Kirschke, and Dimitrios C. Karampinos ..... 609  
*Published online 29 January 2018*

**Improving Parallel Imaging by Jointly Reconstructing Multi-Contrast Data**, Berkin Bilgic, Tae Hyung Kim, Congyu Liao, Mary Kate Manhard, Lawrence L. Wald, Justin P. Haldar, and Kawin Setsompop ..... 619  
*Published online 10 January 2018*

## Notes

**Cardiac Gating Using Scattering of an 8-Channel Parallel Transmit Coil at 7T**, Sven H.F. Jaeschke, Matthew D. Robson, and Aaron T. Hess ..... 633  
*Published online 11 December 2017*

**Quadrupolar Jump-and-Return Pulse Sequence for Fluid-Suppressed Sodium MRI of the Knee Joint at 7T**, Ding Xia, Jae-Seung Lee, and Ravinder R. Regatte ..... 641  
*Published online 19 December 2017*

**Diffusion Tensor Cardiovascular Magnetic Resonance With a Spiral Trajectory: An In Vivo Comparison of EchoPlanar and Spiral Stimulated Echo Sequences**, Margarita Gorodezky, Andrew D. Scott, Pedro F. Ferreira, Sonia Nielles-Vallespin, Dudley J. Pennell, and David N. Firmin ..... 648  
*Published online 19 December 2017*

**Artifact-Reduced Imaging of Biopsy Needles With 2D Multispectral Imaging**, Hans Weber, Brian A. Hargreaves, and Bruce L. Daniel ..... 655  
*Published online 29 December 2017*

## ■ PRECLINICAL AND CLINICAL IMAGING

### Rapid Communication

**MRI Detection of Bacterial Brain Abscesses and Monitoring of Antibiotic Treatment Using bacCEST**, Jing Liu, Renyuan Bai, Yuguang Li, Verena Staedtke, Shuixing Zhang, Peter C.M. van Zijl, and Guanshu Liu ..... 662  
*Published online 25 March 2018*

### Full Papers

**Millimeter Spatial Resolution In Vivo Sodium MRI of the Human Eye at 7 T Using a Dedicated Radiofrequency Transceiver Array**, Daniel Wenz, Andre Kuehne, Till Huelnhagen, Armin M. Nagel, Helmar Waiczies, Oliver Weinberger, Celal Oezerdem, Oliver Stachs, Soenke Langner, Erdmann Seeliger, Bert Flemming, Russell Hodge, and Thoralf Niendorf ..... 672  
*Published online 12 January 2018*

**Noise Properties of Proton Density Fat Fraction Estimated Using Chemical Shift-Encoded MRI**, Nathan T. Roberts, Diego Hernando, James H. Holmes, Curtis N. Wiens, and Scott B. Reeder ..... 685  
*Published online 10 January 2018*

### Notes

**Hyperpolarized  $^{13}\text{C}$ ,  $^{15}\text{N}_2$ -urea  $T_2$  Relaxation Changes in Acute Kidney Injury**, Christian Østergaard Mariager, Per Mose Nielsen, Haiyun Qi, Steffen Ringgaard, and Christoffer Laustsen ..... 696  
*Published online 28 December 2017*

**High Resolution Hyperpolarized  $^{13}\text{C}$  MRSI Using SPICE at 9.4T**, Hansol Lee, Jae Eun Song, Jaewook Shin, Eunhae Joe, Chan Gyu Joo, Young-Suk Choi, Ho-Taek Song, and Dong-Hyun Kim ..... 703  
*Published online 8 January 2018*

# CONTENTS

**Multimodal Assessment of Orbital Immune Cell Infiltration and Tissue Remodeling During Development of Graves Disease by  $^1\text{H}^{19}\text{F}$  MRI,** Ulrich Flögel, Anke Schlüter, Christoph Jacoby, Sebastian Temme, J. Paul Banga, Anja Eckstein, Jürgen Schrader, and Utta Berchner-Pfannschmidt ..... 711  
*Published online 27 January 2018*

**Non-Contrast Enhanced 4D Intracranial MR Angiography Based on Pseudo-Continuous Arterial Spin Labeling With the Keyhole and View-Sharing Technique,** Makoto Obara, Osamu Togao, Gabriele M. Beck, Shuhei Shibukawa, Tomoyuki Okuaki, Masami Yoneyama, Masanobu Nakamura, Hiroshi Honda, and Marc Van Cauteren ..... 719  
*Published online 25 January 2018*

## ■ BIOPHYSICS AND BASIC BIOMEDICAL RESEARCH

### Full Papers

**In Vivo Characterization of Brain Ultrashort- $T_2$  Components,** Tanguy Boucneau, Peng Cao, Shuyu Tang, Misung Han, Duan Xu, Roland G. Henry, and Peder E. Z. Larson ..... 726  
*Published online 1 December 2017*

**Diffusion Sensitivity of 3D-GRASE in Arterial Spin Labeling Perfusion,** Xiang He, Kenneth Wengler, and Mark E. Schweitzer ..... 736  
*Published online 7 January 2018*

## ■ COMPUTER PROCESSING AND MODELING

### Rapid Communication

**Volumetric Segmentation-Free Method for Rapid Visualization of Vascular Wall Shear Stress Using 4D Flow MRI,** Evan M. Masutani, Francisco Contijoch, Espoir Kyubwa, Joseph Cheng, Marcus T. Alley, Shreyas Vasanaawala, and Albert Hsiao ..... 748  
*Published online 7 March 2018*

### Full Papers

**Placenta Microstructure and Microcirculation Imaging With Diffusion MRI,** Paddy J. Slator, Jana Hutter, Laura McCabe, Ana Dos Santos Gomes, Anthony N. Price, Eleftheria Panagiotaki, Mary A. Rutherford, Joseph V. Hajnal, and Daniel C. Alexander ..... 756  
*Published online 11 December 2017*

**Extended Phase Graph Formalism for Systems With Magnetization Transfer and Exchange,** Shaihan J. Malik, Rui Pedro A.G. Teixeira, and Joseph V. Hajnal ..... 767  
*Published online 15 December 2017*

**Nonrigid Active Shape Model-Based Registration Framework for Motion Correction of Cardiac  $T_1$  Mapping,** Hossam El-Rewaify, Maryam Nezafat, Jihye Jang, Shiro Nakamori, Ahmed S. Fahmy, and Reza Nezafat ..... 780  
*Published online 3 January 2018*

**Improved Liver  $R_2^*$  Mapping by Pixel-Wise Curve Fitting With Adaptive Neighborhood Regularization,** Changqing Wang, Xinyuan Zhang, Xiaoyun Liu, Taigang He, Wufan Chen, Qianjin Feng, and Yanqiu Feng ..... 792  
*Published online 15 January 2018*

**Diffusion Kurtosis Imaging With Free Water Elimination: A Bayesian Estimation Approach,** Quinten Collier, Jelle Veraart, Ben Jeurissen, Floris Vanhevel, Pim Pullens, Paul M. Parizel, Arnold J. den Dekker, and Jan Sijbers ..... 802  
*Published online 2 February 2018*

### Note

**Fast Nonlinear Susceptibility Inversion With Variational Regularization,** Carlos Milovic, Berkin Bilgic, Bo Zhao, Julio Acosta-Cabronero, and Cristian Tejos ..... 814  
*Published online 10 January 2018*

## ■ HARDWARE AND INSTRUMENTATION

### Full Paper

**A Rigid, Stand-Off Hybrid Dipole, and Birdcage Coil Array for 7 T Body Imaging,** Jan Paška, Martijn A. Cloos, and Graham C. Wiggins ..... 822  
*Published online 17 December 2017*

### Note

**An Industrial Design Solution for Integrating NMR Magnetic Field Sensors into an MRI Scanner,** Michael Kennedy, Yoojin Lee, and Zoltan Nagy ..... 833  
*Published online 28 December 2017*