

Scientific Program

Thursday, March 18, 2010

Reception

Introduction

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| 13:00 | Opening Remarks
T. M. Buzug¹, J. Borgert² ; ¹ Institute of Medical Engineering, University of Lübeck, Lübeck, Germany, ² Philips Research Europe – Hamburg, Germany |
| 13:10 | History of MPI
M. Kuhn¹ ; ¹ Philips Health Care – Hamburg, Germany |
| 13:20 | Keynote: Overview on MPI
B. Gleich¹, J. Weizenecker² ; ¹ Philips Research Europe – Hamburg, Germany, ² Department of Electrical Engineering, University of Applied Science, Karlsruhe, Germany |

Scientific Session – Short Presentations

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| 14:05 | Colloidal Stability of Water Based Dispersions Containing Large Single Domain Particles of Magnetite
N. Buske¹, S. Dutz² ; ¹ Magnetic Fluids, Berlin, Germany, ² Department of Bio NanoPhotonics, Institute of Photonic Technologies, Jena, Germany | 1 |
| 14:08 | Superparamagnetic Iron Oxide Nanoparticles for Magnetic Particle Imaging
K. Lüdtke-Buzug¹, S. Biederer¹, M. Erbe¹, T. Knopp¹, T. F. Sattel¹, T. M. Buzug¹ ; ¹ Institute of Medical Engineering, University of Lübeck, Lübeck, Germany | 2 |
| 14:11 | Investigation of The Magnetic Particle Imaging Signal's Dependency on Ferrofluid Concentration
J.-P. Gehrcke¹, M. A. Rückert^{1,2}, T. Kampf¹, W. H. Kullmann², P. M. Jakob^{1,3}, V. C. Behr¹ ; ¹ Department of Experimental Physics 5, University of Würzburg, Würzburg, Germany, ² University of Applied Sciences Würzburg-Schweinfurt, Schweinfurt, Germany, ³ Research Center Magnetic Resonance Bavaria (MRB) e.V., Würzburg, Germany | 3 |
| 14:14 | Magnetization Harmonics as a Remote Method for Monitoring Endocytosis of Nanoparticles
A. M. Rauwerdink¹, A. J. Giustini^{1,2}, P. J. Hoopes^{1,2}, J. B. Weaver^{1,2,3} ; ¹ Thayer School of Engineering, Dartmouth College, Hanover, USA, ² Dartmouth Medical School, Dartmouth College, Hanover, USA, ³ Department of Radiology, Dartmouth-Hitchcock Medical Center Lebanon, Hanover, USA | 4 |
| 14:17 | Magnetic Particle Spectrometry for the Evaluation of Field-Dependent Harmonics Generation
T. Wawrzik¹, J. Hahn¹, F. Ludwig¹, M. Schilling¹ ; ¹ Institut für Elektrische Messtechnik und Grundlagen der Elektrotechnik, TU Braunschweig, Braunschweig, Germany | 5 |
| 14:20 | Particle Dynamics of Mono-Domain Particles in Magnetic Particle Imaging
J. Weizenecker¹, B. Gleich², J. Rahmer², J. Borgert² ; ¹ Department of Electrical Engineering, University of Applied Science, Karlsruhe, Germany, ² Philips Research Europe – Hamburg, Hamburg, Germany | 6 |

14:23	Noise Within Magnetic Particle Imaging I. Schmale ¹ , B. Gleich ¹ , J. Borgert ¹ , J. Weizenecker ² ; ¹ Philips Technologie GmbH Forschungslaboratorien, Hamburg, Germany, ² Hochschule Karlsruhe – Technik und Wirtschaft, Fakultät für Elektro- und Informationstechnik, Karlsruhe, Germany	7
14:26	A Novel Compensated Coil System with High Homogeneity and low Strayfields R. Hiergeist ¹ , J. Lüdke ¹ , R. Ketzler ¹ , M. Albrecht ¹ , G. Ross ² ; ¹ AG 2.51, Magnetic Measurements, PTB Braunschweig, Braunschweig, Germany, ² Magnet-Physik Dr. Steingroever GmbH, Köln, Germany	8
14:29	A Surveillance Unit for Magnetic Particle Imaging Systems S. Kaufmann ¹ , S. Biederer ¹ , T. F. Sattel ¹ , T. Knopp ¹ , T. M. Buzug ¹ ; ¹ Institute of Medical Engineering, University of Lübeck, Lübeck, Germany	9
14:32	Superparamagnetic Iron Oxides for MR-Visualization of Textile Implants I. Slabu ¹ , T. Schmitz-Rode ¹ , M. Hodenius ¹ , U. Klinge ² , J. Otto ² , G. A. Krombach ³ , N. Krämer ³ , H. Donker ³ , M. Baumann ¹ ; ¹ Applied Medical Engineering, Medical Faculty, Helmholtz-Institute RWTH Aachen University, Aachen, Germany, ² Department for Surgery, Medical Faculty, RWTH Aachen University, Aachen, Germany, ³ Department for Radiology, Medical Faculty, RWTH Aachen University, Aachen, Germany	10
14:35	Detection of Autologous Chondrocytes at Polyethylene Scaffolds in Vivo - Experimental Study I. Schoen ¹ , F. Angenstein ² , K. Neumann ¹ , E. Roepke ¹ ; ¹ Department of Otorhinolaryngology, Head and Neck Surgery, Martin Luther University, Halle-Wittenberg, Halle, Germany, ² Special Lab of non invasive Imaging, Leibniz Institute of Neurbiology, Magdeburg, Germany	11
14:38	Current Iron Oxide Nanoparticles - Impact on MRI and MPI F. M. Vogt ¹ , J. Barkhausen ¹ , S. Biederer ² , T. F. Sattel ² , T. Knopp ² , K. Lüdtke-Buzug ² , T. M. Buzug ² ; ¹ Clinic for Radiology and Nuclearmedicine, University Hospital Schleswig Holstein, Lübeck, Germany ² , Institute of Medical Engineering, University of Lübeck, Lübeck, Germany	12
14:41	The Lack of a Mucosal Glycocalyx as a Potential Marker for the Detection of Colorectal Neoplasia by Magnetic-Particle-Imaging K. Ramaker ¹ , N. Röckendorf ¹ , A. Frey ¹ ; ¹ Division of Mucosal Immunology, Research Center Borstel, Borstel, Germany	13
14:45	Collaboration of Bruker and Philips on MPI H. Post ¹ ; ¹ Bruker BioSpin MRI GmbH, Ettlingen, Germany	
15:00	Break and Poster Session	

Scientific Session – Particles I

16:00	The Effects of Molecular Binding on the Phase of MSB Measurements	14
	J. B. Weaver ¹ , A. M. Rauwerdink ² ; ¹ Department of Radiology, Dartmouth Medical School, Dartmouth-Hitchcock Medical Center, Lebanon, New Hampshire, USA, ² Thayer School of Engineering, Dartmouth College, Hanover, New Hampshire, USA	
16:30	SPIO Nanoparticles Encapsulation into Human Erythrocytes for MPI Application	15
	D. Markov ¹ , H. Boeve ¹ , B. Gleich ² , J. Borgert ² , A. Antonelli ³ , C. Sfara ³ , M. Magnani ³ ; ¹ Philips Research Europe, High Tech Campus 34, Eindhoven, The Netherlands, ² Philips Research Europe, Sector Medical Imaging Systems, Hamburg, Germany, ³ Department of Biomolecular Sciences, University of Urbino, Urbino, Italy	
17:00	Break	

Scientific Session – Particles II

17:15	Use of Resovist in Magnetic Particle Imaging	16
	G. Schütz ¹ , J. Lohrke ¹ , J. Hütter ¹ ; ¹ Bayer Schering Pharma AG, Cardiovascular Imaging & Contrast Media Research, Berlin, Germany	
17:35	Clinical Application of Iron Oxide Nanoparticles in Magnetic Resonance Imaging and Research Perspectives	17
	M. Port ¹ , C. Corot ¹ , I. Raynal ¹ , C. Robic ¹ , P. Robert ¹ , J. M. Idee ¹ , G. Louin ¹ , J. S. Raynaud ¹ , O. Rousseaux ¹ ; ¹ Guerbet Research, Roissy CDG, France	
17:55	Larger Single Domain Iron Oxide Nanoparticles for Magnetic Particle Imaging	18
	S. Dutz ¹ , R. Müller ¹ , M. Zeisberger ² ; ¹ Department of Bio NanoPhotonics, Institute of Photonic Technologies, Jena, Germany, ² Department of Spectroscopy and Imaging, Institute of Photonic Technologies, Jena, Germany	
19:30	Dinner	
	Kartoffelkeller, Koberg 8, Lübeck	

Scientific Program

Friday, March 19, 2010

Scientific Session – Spectrometry

8:00	Size-Optimized Magnetite Nanoparticles for Magnetic Particle Imaging R. M. Ferguson ¹ , A. P. Khandar ¹ , K. R. Minard ² , K. M. Krishnan ¹ ; ¹ Materials Science & Engineering Dept., University of Washington, Washington, USA, ² Biological Monitoring & Modeling, Pacific Northwest National Labs, Richland, USA	19
8:30	A Spectrometer to Measure the Usability of Nanoparticles for Magnetic Particle Imaging S. Biederer ¹ , T. F. Sattel ¹ , T. Knopp ¹ , M. Erbe ¹ , K. Lüdtke-Buzug ¹ , F. M. Vogt ² , J. Barkhausen ² , T. M. Buzug ¹ ; ¹ Institute of Medical Engineering, University of Lübeck, Lübeck, Germany, ² Clinic for Radiology and Nuclearmedicine, University Hospital Schleswig Holstein, Lübeck, Germany	20
8:50	Evidence of Aggregates of Magnetic Nanoparticles in Suspensions Which Determine the Magnetisation Behaviour D. Eberbeck ¹ , F. Wiekhorst ¹ , L. Trahms ¹ ; ¹ Physikalisch-Technische Bundesanstalt, Berlin, Germany	21
9:10	Break	

Scientific Session – Imaging I

9:40	Narrowband Magnetic Particle Imaging in a Mouse P. Goodwill ¹ , S. Conolly ² ; ¹ UC SF / UC Berkeley Joint Graduate Group in Bioengineering, University of California, Berkeley, USA, ² Department of Bioengineering, Berkeley, USA	22
10:10	Two-Dimensional Magnetic Particle Imaging T. Wawrzik ¹ , F. Ludwig ¹ , M. Schilling ¹ ; ¹ Institut für Elektrische Messtechnik und Grundlagen der Elektrotechnik, TU Braunschweig, Braunschweig, Germany	23
10:30	Resolution Distribution in Single-Sided Magnetic Particle Imaging T. F. Sattel ¹ , T. Knopp ¹ , S. Biederer ¹ , M. Erbe ¹ , K. Lüdtke-Buzug ¹ , T. M. Buzug ¹ ; ¹ Institute of Medical Engineering, University of Lübeck, Lübeck, Germany	24
10:50	Break	

Scientific Session – Imaging II

11:00	The Effect of Relaxation on Magnetic Particle Imaging Y. Wu ¹ , Z. Yao ¹ , G. Kafka ¹ , D. Farrell ¹ , M. Griswold ² , R. Brown ¹ ; ¹ Department of Physics, Case Western Reserve University, Cleveland, USA, ² Department of Radiology, Case Western Reserve University, Cleveland, USA	25
11:20	Efficient Field-Free Line Generation for Magnetic Particle Imaging T. Knopp ¹ , S. Biederer ¹ , T. F. Sattel ¹ , K. Lüdtke-Buzug ¹ , M. Erbe ¹ , T. M. Buzug ¹ ; ¹ Institute of Medical Engineering, University of Lübeck, Lübeck, Germany	26
11:40	3D Real-Time Magnetic Particle Imaging: Encoding and Reconstruction Aspects J. Rahmer ¹ , B. Gleich ¹ , J. Borgert ¹ , J. Weizenecker ² ; ¹ Philips Technologie GmbH, Forschungslaboratorien, Hamburg, Germany, ² Fakultät für Elektro- und Informationstechnik, University of Applied Sciences, Karlsruhe, Germany	27
12:00	Lunch Break	

Scientific Session – Technology and Safety

13:00	Concept for a Digital Amplifier with High Quality Sinusoidal Output Voltage for MPI Drive Field Coils C. Loef ¹ , P. Luerkens ¹ , O. Woywode ² ; ¹ Philips Research Laboratories Aachen, Aachen, Germany, ² Philips Healthcare, GTC Development, Philips Medical Systems DMC GmbH, Hamburg, Germany	28
13:20	Calculation and Evaluation of Current Densities and Thermal Heating in the Body During MPI J. Bohnert ¹ , O. Dössel ¹ ; ¹ Institute of Biomedical Engineering, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany	29
13:40	JFET Noise Modelling for MPI Receivers I. Schmale ¹ , B. Gleich ¹ , J. Borgert ¹ , J. Weizenecker ² ; ¹ Philips Technologie GmbH Forschungslaboratorien, Hamburg, Germany, ² Hochschule Karlsruhe – Technik und Wirtschaft, Fakultät für Elektro- und Informationstechnik, Karlsruhe	30

Scientific Session – Magneto-Relaxometry

14:05	Cancer Therapy with Magnetic Nanoparticles Visualized with X-Ray-Tomography, Magnetorelaxometry and Histology S. Lyer ¹ , R. Tietze ¹ , L. Trahms ² , S. Odenbach ³ , C. Alexiou ¹ ; ¹ Section for Experimental Oncology and Nanomedicine (Else Kröner-Fresenius-Foundation-Professorship) at the ENT-Department of the University Erlangen-Nürnberg, Erlangen, Germany, ² PTB, Berlin, Germany, ³ Institute of Fluid Mechanics, Technische Universität Dresden, Dresden, Germany	31
14:25	Localization and Quantification of Magnetic Nanoparticles by Multichannel Magnetorelaxometry for Thermal Ablation Studies H. Richter ¹ , F. Wiekhorst ¹ , U. Steinhoff ¹ , L. Trahms ¹ , M. Kettering ² , W. A. Kaiser ² , I. Hilger ² ; ¹ Physikalisch-Technische Bundesanstalt, Berlin, Germany, ² Institute of Diagnostic and Interventional Radiology, University Hospital Jena, Jena, Germany	32

- 14:45 **Imaging of Magnetic Nanoparticles Based on Magnetorelaxation and Minimum Norm Estimations** 33
D. Baumgarten^{1,2}, Jens Haueisen¹; ¹Institute of Biomedical Engineering and Informatics, Ilmenau University of Technology, Ilmenau, Germany, ²Biomagnetic Centre, Clinic of Neurology, University Hospital Jena, Jena, Germany

15:05 **Break**

Scientific Session – Medical Applications

- 15:35 **Developing Cellular MPI: Initial Experience** 34
J. W. M. Bulte¹, P. Walczak¹, S. Bernard¹, B. Gleich², J. Weizenecker², J. Borgert², H. Aerts³, H. Boeve³; ¹Departments of Radiology, Biomedical Engineering, and Chemical & Biomolecular Engineering; Cellular Imaging Section, Institute for Cell Engineering, Johns Hopkins University School of Medicine, Baltimore, MD., ²Philips Research Europe, Hamburg, Germany, ³Philips Research Europe and Philips Medical Systems-, Eindhoven, The Netherlands
- 16:05 **Sentinel Lymphnode Detection in Breast Cancer by Magnetic Particle Imaging Using Superparamagnetic Nanoparticles** 35
D. Finas¹, B. Ruhland¹, K. Baumann¹, T. Knopp², T. Sattel², S. Biederer², K. Luedtke-Buzug², T. Buzug², K. Diedrich¹; ¹Department of Obstetrics and Gynecology, University Clinic of Schleswig-Holstein, Lübeck, Germany, ²Institute of Medical Engineering, University of Lübeck, Lübeck, Germany
- 16:25 **Magnetic Sensing Methods and Materials for Medical Applications** 36
B. Ten Haken¹, M. Visscher¹, M. Sobik¹, A. H. Velders²; ¹MIRA Institute for Biomedical Technology and Technical Medicine, University of Twente, Enschede, The Netherlands, ²MESA Institute for Nanotechnology, Supramolecular Chemistry and Technology, University of Twente, Enschede, The Netherlands

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- 16:45 **Wrapping UP**
T. M. Buzug¹, **J. Borgert**²; ¹Institute of Medical Engineering, University of Lübeck, Lübeck, Germany, ²Philips Research Europe – Hamburg, Germany

17:00 **Visit Lab Lübeck**
- 18:00