# HELMHOLTZ-SYMPOSIUM AACHEN 2017

## ON BIOMEDICAL ENGINEERING AND RELATED FIELDS

**June 9th, 2017**

**Location:**

Uniklinik RWTH Aachen, Pauwelsstrasse 30, Aachen, Germany

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| **- Registration:** | Foyer Uniklinik RWTH Aachen |
| **- All lectures:** | Lecture Hall 2 |
| **- Poster Exhibition Area, Coffee Break, Lunch Break & Get Together:** | Seminar Room (Ground Floor / Corridor D/46 / Room 04). |

**PROGRAM**

**8:15 - 9:00** **On-site Registration and Welcome**

**9:00 – 9:30** **Session I:**

Chair: Prof. Dr. rer. nat. Willi Jahnen-Dechent, Chair of Biointerface Laboratory, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University, FB10

- **"Short Introduction to Biointerface"**
  Prof. Dr. rer. nat. Willi Jahnen-Dechent, Chair of Biointerface Laboratory, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University
- **"Translationszentrum CTC-A - Von der Idee zur Erstanwendung"**
  Dr. rer. nat. Christian Cremer, Center for Translational & Clinical Research Aachen, Uniklinik RWTH Aachen

**9:30 – 10:00** **Session II**

Chair: Prof. Dr. Ing. Klaus Radermacher, Chair of Medical Engineering, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University, FB4

- **"Cell migration and remodeling in cartilage replacement materials"**
  Prof. Dr. Ing. Marcus Stoffel, Institute of General Mechanics, RWTH Aachen University
- **"Statistical shape models and their application to bone surface reconstructions in the knee"**
  Dipl.-Ing. Christoph Hänisch, Chair of Medical Engineering, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University

**10:00 – 10:30** **Session III**

Chair: Prof. Dr. med. Dr. rer. nat. Wolfgang Wagner, Chair of Cell Biology, Devision of Stem Cell Biology and Cellular Engineering, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University, FB10

- **"Short Introduction into iPS cells"**
  Prof. Dr. rer. nat. M. Zenke, Chair of Cell Biology, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University
- **"Induced pluripotent stem cells for research on pain"**
  Dr. J. Meents, Institute for Physiology, Uniklinik RWTH Aachen
- **"StemCellFactory"**
  Prof. Dr. rer. nat. M. Zenke, Chair of Cell Biology, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University

**10:30 – 11:00** **Session IV**

Chair: Prof. Dr. Thomas Schmitz-Rode, Chair of Applied Medical Engineering, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University, FB10

- **"Biofabrication technologies for regenerative medicine: steering cell activity by scaffold design"**
  Prof. Dr. Lorenzo Moroni, MERLN Institute for Technology-Inspired Regenerative Medicine, Maastricht University
- **"fiM – Joint Lab for translation (first in man)"**
  Prof. Dr. Stephan Jockenhövel, Chair of Applied Medical Engineering - Tissue Engineering, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University

**11:00 – 11:30** **Coffee Break & Poster Exhibition**

**11:30 – 12:00** **Session V**

Chair: Prof. Dr. rer. nat. Lothar Elling, Chair of Biomaterials Laboratory, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University FB1

- **"Supramolecular Modular Microgels"**
  Prof. Dr. Andrij Pich, Institute of Technical and Macromolecular Chemistry, DWI - Leibniz Institute for Interactive Materials, RWTH Aachen University

**12:00 – 12:30** **Session VI**

Chair: Prof. Dr. Ing. Dr. med. Steffen Leonhardt, Chair of Medical Information Technology, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University, FB6

- **"Short Introduction to MedIT"**
  Prof. Dr. Ing. Dr. med. Steffen Leonhardt, Chair of Medical Information Technology, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University
- **"Methods for contact-free Monitoring of Vital Signs"**
  Dr. Ing. Daniel Teichmann, Chair of Medical Information Technology, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University

**12:30 – 13:00** **Session VII**

Chair: Prof. Dr. med. Fabian Kiessling, Chair of Experimental Molecular Imaging, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University, FB10

- **"Non-invasive imaging of the tumor microenvironment"**
  Dr. Wiltrud Lederle, Chair of experimental Molecular Imaging, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University
- **"Non-invasive imaging of renal fibrosis"**
  PD Dr. Peter Boor, Institute of Pathology & Department of Nephrology, Uniklinik RWTH Aachen

**13:00 – 14:00** **Lunch Break & Poster Exhibition**

**14:00 – 15:00** **Poster Session**

1-minute Teaser

**15:00** **Poster Session informal part, Discussion & Get Together with refreshments**

## Poster Exhibition

| | Titel | Authors | Institution |
|---|---|---|---|
| 1 | New established human three-dimensional oral mucosa model for pharmacological studies in wound healing | Y. Marquardt, L. Schmitt, P. Amann, R. Heise, T. Steiner, F. Hölzle, J. M. Baron | Department of Dermatology and Allergology, Uniklinik RWTH Aachen |
| 2 | Effects of water-in-oil ointments on skin barrier function and allergen penetration in an IL-31 treated 3D atopic dermatitis skin model | S. Huth, P. M. Amann, L. Schmitt, Y. Marquardt, R. Heise, B. Lüscher, J. M. Baron | |
| 3 | Articulatory modelling in speech production | A. Serrurier, C. Neuschaefer-Rube | Department of Phoniatrics, Pedaudiology and Communication Disorders, Uniklinik RWTH Aachen |
| 4 | Robot-based automation of a cell culture process for the standardized expansion of adipose-derived stem cells | J. Ochs, O. Rippel, M. Kulik, S. Jung, R. Schmitt | Fraunhofer Institute for Production Technology IPT, Aachen |
| 5 | Characterization of Polymer Membranes by MALDI Mass-Spectrometric Imaging Techniques | V. Jankowski, J. Herrmann, J. Jankowski | Institute of Molecular Cardiovascular Research (IMCAR), Uniklinik RWTH Aachen |
| 6 | MediWeCo Physio - Mediengestütztes Lehren & Lernen motorischer Fertigkeiten | D. Dohmen, J. Förster, S. Jonas, M. Jovanovic, M. Lemos, U. Ohnsorge-Radtke, C. Renardy, U. Schemmann | Schule für Physiotherapie, Uniklinik RWTH Aachen |
| 7 | Sleepy Lab: An extendable Mobile Sleeplab based on Wearable Sensors | A.Burgdorf, J. A. Bitsch, S. M. Jonas | Department of Medical Informatics, Uniklinik RWTH Aachen |
| 8 | Mobile EEG for Personal Well-Being | Y. Titgemeyer, E. Kutafina, R. Ramos, S. Jonas | |
| 9 | Biocompatibility and MRI studies on water soluble FePt nanoparticles | K. Wiemer, I. Slabu, J. Steitz, T. Schmitz-Rode, U. Simon | Institute for Inorganic Chemistry, RWTH Aachen University |
| 10 | Innovative small diameter vascular graft with enhanced compliance properties | A. Loewen, K.-M. Kossel, V. Gesché, T. Gries, S. Jockenhoevel | Institute für Textiltechnik (ITA), RWTH Aachen University |
| 11 | Microelectrode Array for Electroporation and Stimulation | F. Waschkowski, S. Diarra, A. Garcia Moreno, S. Johnen, P. Walter, W. Mokwa | Department of Materials in Electrical Engineering 1 -IWE1, RWTH Aachen University |
| 12 | Mechanobiologische Steuerung von Zellfunktionen und Differenzierung | U. Schnakenberg, A. Buchenauer, R. Leube, R. Windoffer, S. Uhlig,A. Ludwig, D. Dreymüller, S. Neuß-Stein, M. Hoss, W. Wagner, T. Pufe, M. Tohidnezhad | |
| 13 | Highly Stretchable Microelectrodes for Electrical Impedance Spectroscopy on extra soft PDMS | S. Bette, C. Zhou, U. Schnakenberg | |
| 14 | Microscale electroplated magnetic tweezers for nanomanipulation inside keratinocytes | A. Omenzetter, U.Schnakenberg | |
| 15 | Translationszentrum CTC-A | S. Isfort, C. Cremer, L. Ernst, C. Fera, J. Wienströer | Center for Translational & Clinical Research Aachen (CTC-A), Uniklinik RWTH Aachen |
| 16 | Non-contact monitoring of detailed breathing activity and lung ventilation using magnetic induction in a neonatal animal model | K. Heimann, C. Platen, P. Vetter, K. Scherer, S. Leonhardt, T. Orlikowsky | Department of Neonatology, University Childrens Hospital, Uniklinik RWTH Aachen |
| 17 | In vitro determination of calcification propensity of biohybrid implants | A. Babler, A. Büscher | Biointerface Laboratory, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University |
| 18 | The Role of Fetuin-A in Endochondral Ossification | S. Köppert, L. Brylka, W. Jahnen-Dechent | |
| 19 | Structure-function analysis of fetuin-B, a plasma protein essential for fertilization | C. Schmitz, J. Floehr, E.Dietzel, E.Van de Leur, K. Karmilin, D. Laaf, T. Fischöder, L. Elling, W. Stöcker, R. Weiskirchen, W. Jahnen-Dechent | |
| 20 | Expression of modified HGF for the tunable release from high strength ceramic implant materials | S. Reinhold, F. Böke, N. Labude, C. Schmitz, I. Lauria, W. Jahnen-Dechent, H. Fischer, S. Neuss | |

| | Titel | Authors | Institution |
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| 21 | Increasing biocompatibility of patient specific PEO-coated implants using endothelial progenitor cells and mesenchymal stem cells in bone defects | M. Bienert, L. Jauer, M. Muether, C. Ptock, B. Lethaus, S. Neuss | Institute of Pathology and - Biointerface Laboratory Helmholtz-Institute Aachen, RWTH Aachen University |
| 22 | Novel activation techniques of ceramics for improved and accelerated tissue integration of medical implants | N. Labude, F. Böke, I. Lauria, H. Fischer, S. Neuss | |
| 23 | Mechanical stimulation of human mesenchymal stem cells using an uniaxial cell stretcher | T. Schleypen, M. Hoß, B. Hoffmann, R.Merkel, U. Schnakenberg, S. Stiefel, S. Neuss | |
| 24 | Modeling IRF8 Deficient Human Hematopoesis and Dendritic Cell Development with Engineered iPS Cells | S. Sontag, M. Förster, J. Qin, P. Wanek, S. Mitzka, H. M. Schüler, S. Koschmieder, S. Rose-John, K. Seré, M. Zenke | Cell Biology, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University |
| 25 | Modeling Myeloproliferative Neoplasms with Patient Derived and Engineered iPS Cells | C. Küstermann, S. Sontag, N. Chatain, S.Koschmieder, M.Zenke K. Seré | |
| 26 | Human Induced Pluripotent Stem Cells with KIT D816V Mutation for Modeling Leukemia | M. Förster, M. Szymanski de Toledo, S. Sontag, N. Chatain, K. Gleixner, S. Koschmieder, P. Valent, T. Brümmendorf, M. Zenke. | |
| 27 | The Functional Relevance of DNMT3A Splice Variants in Hematopoietic Differentiation | T. Božić, J. Frobel, A. Raić, S. Heilmann-Heimbach, T. W. Goecke, E. Jost ,W. Wagner | |
| 28 | The Met Tyrosine Kinase Signaling Pathway in the Regulation of Dendritic Cell Migration | Z. Sagi, J. Hübel, Jea-Hyun Baek, C. Birchmeier, A. Barragan, M. Zenke, T. Hieronymus | |
| 29 | Soft Hydrogels Support Differentiation of Induced Pluripotent Stem Cells toward Mesenchymal Stromal Cells | R. Goetzke, J. Franzen, A. Ostrowska, M. Vogt, G. Klein, B. Rath, M. Zenke, W. Wagner | |
| 30 | Human Platelet Lysate versus Fetal Calf Serum: These Supplements Do Not Select for Different Mesenchymal Stromal Cells | E. Fernandez-Rebollo, B. Mentrup, R. Ebert, J. Franzen, G. Abagnale, T. Sieben, A. Ostrowska, P. Hoffmann, P.-F. Roux, B. Rath, M. Goodhardt, J.-M. Lemaitre, O. Bischof, J. Franz, W. Wagner | |
| 31 | Cascade reactions for the synthesis of modified N-acetyllactosamine oligomers and their multivalent presentation for specific galectin recognition | D. Laaf, S. Böcker, H. Pelantová, V. Křen, L. Elling | Biomaterials Laboratory, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University |
| 32 | Exploring synthetic enzyme reaction cascades for tailored milk oligosaccharides by xCGE-LIF | T Fischöder, S Cajic, C Wahl, U Reichl, E Rapp, L Elling | |
| 33 | Fast Optimization of an Enzyme-Module-System for the Synthesis of UDP-GalNAc and subsequent Scale-up and Purification | C. Wahl, C. Zerhusen, L. Elling | |
| 34 | Screening of Enzymatic Glycosylation Reactions of Flavonoids by Multiplexed Capillary Electrophoresis | M. Hoffmann, L. Elling | |
| 35 | Combination of enzyme module systems for the in vitro synthesis of hyaluronic acid | A. Eisele, L. Elling | |
| 36 | Endoscopic Cell Aerosolization for Tissue Engineering and Cell Therapy – A Systematic Study | A. L. Thiebes, M. Bieber, M. A. Reddemann, R. Kneer, S. Jockenhoevel, C. G. Cornelissen | NRW Schwerpunktprofessur Biohybrid & Medical Textiles (BioTex), AME - Helmholtz-Institute for Biomedical Engineering & Institut für Textiltechnik, RWTH Aachen University |
| 37 | Textile-reinforced tissue-engineered cardiovascular implants | F. Wolf, R. Moreira, S. Mulderrig, D. R. Gonzalez, L. Rongen, V. Gesche, C. Donay, M. Kruse, T. Schmitz-Rode, S. Jockenhoevel, P. Mela | |

| | Titel | Authors | Institution |
|---|---|---|---|
| 38 | Angiogenesis in agarose-type I collagen blends for in vitro trachea models | F. Kreimendahl, M. Köpf, A.L. Thiebe1, H. Fischer, C. Apel, S. Jockenhoevel | NRW Schwerpunktprofessur Biohybrid & Medical Textiles (BioTex), AME - Helmholtz-Institute for Biomedical Engineering & Institut für Textiltechnik, RWTH Aachen University |
| 39 | MRI investigation of biodegradable implants with incorporated magnetic nanoparticles | B. Mues , T. Schmitz-Rode, I. Sl | Applied Medical Engineering, Helmholtz-Institute, RWTH Aachen University |
| 40 | First Steps towards Recommending Biomedical Experts for Collaborations | M. Bukowski, R. Farkas, N. Hamadeh, T. Schmitz-Rode | |
| 41 | Multimodal optical imaging of ultrasound-mediated blood-brain barrier opening | J.-N. May, S.K. Golombek, R. Pola, M. Pechar, G. Storm, F. Kiessling, T. Lammers | Experimental Molecular Imaging, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University |
| 42 | Noninvasive Assessment of Elimination and Retention using µCT-FMT and Kinetic Whole-body Modeling | W. Al Rawashdeh, S. Zuo, A.Götz, L. Appold, S. Arns, Y. Tsvetkova, N. Beztsennaya, A.Pich, T. Lammers, F. Kiessling, F. Gremse | |
| 43 | Assessment of $\alpha_v\beta_3$-Integrin expression in pig carotids after vessel injury using molecular ultrasound imaging with PBCA-microbubbles | S. Fokong, S. Heringer, R. Pjontek, A. Nonn, B. Theek, M. Wiesmann, F. Kiessling | |
| 44 | In vivo Measurements with UW-tracers in a harmonic 5.5 T/m MPI | M. Straub, V. Päfgen, E. Teeman, K. M. Krishnan, F. Kießling, V. Schulz | Department of Physics of Molecular Imaging Systems, Institute for Experimental Molecular Imaging, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University |
| 45 | Evaluation of the Hyperion IID PET insert for simultaneous PET-MR imaging of rabbits using $^{18}$F-FDG | P. Gebhardt, A. Phinikaridou, B. Lavin-Plaza, J. MacKewn, B. Weissler, D. Schug, A. Salomon, P. Marsden, V. Schulz, R. Botnar | |
| 46 | Arbeitspunktabhängige Durchflussregelung einer rotatorischen Blutpumpe | L. Bergmann, D. Rüschen, O. Nelles, S. Leonhardt, M. Walter | Medical Information Technology, Helmholtz-Institute, RWTH Aachen University |
| 47 | Quantification of Respiratory Sinus Arrhythmia Using The Ipanema Body Sensor Network | M. Lüken, S. Leonhardt, B. Misgeld | |
| 48 | Ein Multisensor Badewannenkissen und RR-Intervallschätzer für Biofeedback-Anwendungen | C. Hoog Antink, M. Bellof, S. Leonhardt, M. Walter | |
| 49 | Camera-based Monitoring of Arterial Oxygen Saturation | N. Blanik, M. Paul, V. Blazek, S. Leonhardt | |
| 50 | Electrode Humidification for Non-Contact ECG Systems | L. Leicht, B. Eilebrecht, S. Leonhardt, T. Wartzek, S. Weyer, D. Teichmann | |
| 51 | Integration, Risk Management and Usability Engineering | A. Janß, B. Strathen, M. Strake, P. Schleer, K. Radermacher | Medical Engineering, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University |
| 52 | Image and Model Guided Surgery | J. Hsu, G. Al Hares, F. Chuembou Pekam, Y. Danylkina, M. de la Fuente Klein, M. Fischer, D. Habor, C. Hänisch, M. Janzen, M. Müller, M. Strake, B. Strathen, K. Radermacher | |
| 53 | Biomechanical Modeling and Simulation | J. Eschweiler, G. Al Hares, W. Alrawashdeh, M. Asseln, A. Benninghaus, M. Fischer, C. Goffin, N. Siroros, M. Verjans, K. Radermacher | |
| 54 | Mechatronics and Robotics | M. Verjans, M. de la Fuente, M. Müller, A. Niesche, P. Schleer, B. Strathen, L. Theisgen, T. Vollborn, M. Vossel, K. Radermacher | |
| 55 | Ultrasound and Shockwaves | M. de la Fuente, K. Dietz-Laursonn, D. Habor, F. Chuembou Pekam, Th. Vollborn, K. Radermacher | |