

Publications, Patents, Talks

2015

Philips Lehrstuhl für Medizinische Informationstechnik
Helmholtz-Institut für Biomedizinische Technik
Rheinisch-Westfälische Technische Hochschule Aachen

*Philips Chair for Medical Information Technology
Helmholtz-Institute for Biomedical Engineering
RWTH Aachen University*

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Bücher 2015 / Books 2015

- [1] E. Teschner, M. Imhoff, S. Leonhardt, „Electrical Impedance Tomography: The realisation of regional ventilation monitoring“, 2nd edition, Dräger Booklet, 2015, http://www.draeger.com/sites/assets/PublishingImages/Generic/UK/Booklets/rsp_eit_booklet_9066788_en.pdf

Buchbeiträge mit anonymem Gutachterwesen 2015 / Peer-reviewed book chapters 2015

- [1] M. Ulbrich, M. Czaplík, A. Pohl, M. Zink, S. Leonhardt, „Estimation of blood alcohol content with bioimpedance spectroscopy“, Lecture Notes on Impedance Spectroscopy, Volume 5, pp. 27–35, CRC Press January 2015, Print ISBN:978-1-13-802754-1, eBook ISBN: 978-1-315-71366-3, DOI: 10.1201/b18134-7.
- [2] M. Ulbrich, J. Mühlsteff, H. Reiter, C. Meyer, S. Leonhardt, „Wearable Solutions Using Bioimpedance for Cardiac Monitoring“, Recent Advances on AAL - bridging Assistive Technologies, eHealth and Personalized Health Care, pp. 30-44 IOS press, 2015. Print ISBN 978-1-61499-596-8, DOI: 10.3233/978-1-61499-579-5-30.

Patentanträge und erteilte Patente mit Beteiligung des Lehrstuhls 2015 / *Granted Patents and filed Patent Applications 2015*

- [1] B. Eilebrecht, L. Leicht, J. Lem, S. Leonhardt, H.-J. Lindner, M. Mathissen, R. Vogt, M. Walter, „Sensor zur berührungslosen elektrokardiographischen Messung, Sensorarray und Sitz oder Liege“, DE102013219026A1, veröffentlicht 26. 03. 2015.
- [2] B. Eilebrecht, L. Leicht, J. Lem, S. Leonhardt, H.-J. Lindner, M. Mathissen, R. Vogt, M. Walter, „CONTACTLESS ELECTROCARDIOGRAPHIC SENSOR WITH MOISTURE GENERATOR“, US020150088317A1, veröffentlicht 26. 03. 2015.
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- [4] L. Leicht, T. Wartzek, S. Leonhardt, H.-J. Lindner, M. Mathissen, J. Lem, R. Vogt, „Erste-Hilfe Einheit mit Behandlungsmitteln mit integrierter Sensoreinheit“, DE10-2015210-142.8, eingereicht 02. 06. 2015

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mit anonymem Gutachterwesen 2015 /
*Papers in peer-reviewed Journals 2015***

- [1] K. Lunze und S. Leonhardt, „Reglerbasierte Insulintherapie von Patienten mit Typ-1-Diabetes mellitus“, at – Automatisierungstechnik 2015; 63(1): 32–46.
- [2] A. Pomprapa, D. Muanghong, M. Köny, S. Leonhardt, P. Pickerodt, O. Tjarks, D. Schwaiberger, B. Lachmann, „Artificial intelligence for closed-loop ventilation therapy with hemodynamic control using the open lung concept“, International Journal of Intelligent Computing and Cybernetics, 8(1):50–68, 2015. <http://dx.doi.org/10.1108/IJICC-05-2014-0025>.
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- [4] C. Brüser, J. M. Kortlainen, S. Winter, M. Tenhunen, J. Pärkkä, S. Leonhardt, „Improvement of force-sensor-based heart rate estimation using multi-channel data fusion“, IEEE J Biomed Health Inform. 2015 Jan;19(1):227-35. doi: 10.1109/JBHI.-2014.2311582.
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- [6] T. Schlebusch, W. Fichtner, M. Mertig, S. Leonhardt, “Unobtrusive and comprehensive health screening using an intelligent toilet system”, Biomed Tech (Berl). 2015 Feb 1;60(1):17-29. doi: 10.1515/bmt-2013-0140.
- [7] S. Weyer, T. Menden, L. Leicht, S. Leonhardt, T. Wartzek „Development of a wearable multi-frequency impedance cardiography device”, J Med Eng Technol. 2015 Feb;39(2):131-7. doi: 10.3109/03091902.2014.990161.
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- [20] J. Kühn, A. Stollenwerk, S. Kowalewski, C. Brendle, M. Walter, S. Leonhardt, M. Wardah, R. Rossaint, R. Kopp, „Pulsatile Ansteuerung einer Diagonalblutpumpe – Therapieoptimierung in der extrakorporalen Lungenunterstützung“, *Automatisierungstechnische Praxis (atp edition)*, 57(10):52-59, 2015.
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- [31] C. Brendle, B. Rein, A. Niesche, A. Korff, K. Radermacher, B. Misgeld, S. Leonhardt; "Electrical Bioimpedance-Controlled Surgical Instrumentation", *IEEE Trans Biomed Circuits Syst*, 2014, doi: 10.1109/TBCAS.2014.2363211, [Epub ahead of print].
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Konferenzbeiträge mit Beteiligung des Lehrstuhls 2015 / *Conference Proceedings 2015*

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- [1] S. Lehmann, S. Leonhardt, C. Ngo, N. Wagner, K. Tenbrock, „Ventilations-Monitoring mittels Elektrischer Impedanztomographie (EIT) in unterschiedlichen Positionen bei einer lobektomierten Patientin mit cystischer Fibrose“, 37. Jahrestagung der Gesellschaft für Pädiatrische Pneumologie e.V., Basel , 05.- 07. März 2015.

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- [2] M. Walter, D. Rüschen, F. Prochazka, D. Löschcke, S. Schwandtner, S. Leonhardt, „Modellbildung und iterativ lernende Regelung eines Herzunterstützungssystems“, VDI *Mechatronik* 2015, Dortmund, 12.-13. März; 2015.
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- [22] N. Hochhausen, M. Ritter, M. Köny, R. Rossaint, M. Czaplik, "Support of acute pain therapy by Analgesia Nociception Index (ANI) in Postanaesthesia Care Unit (PACU)", 33rd Congress of the Scandinavian Society of Anaesthesiology and Intensive Care Medicine, Reykjavik, Island, June 10th, 2015.

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DGBMT

- [57] A. Pomprapa, M. Walter, W. Braun, B. Lachmann, S. Leonhardt, „Automated respiratory therapy system based on the ARDSNet protocol with systemic perfusion control”, *49th DGBMT Annual Conference*, Lübeck, 16th – 18th Sep. 2015.
- [58] D. Teichmann, A. Kuhn, S. Leonhardt, M. Walter, “Turning failure into virtue – Motion artifact based classification of motion and posture in magnetic induction measurements”, *49th DGBMT Annual Conference*, Lübeck, 16th – 18th Sep. 2015.
- [59] O. Simanski, Th. Schauer, M. Imhoff, B. Misgeld “Closed loop control in medical technology”, *49th DGBMT Annual Conference*, Lübeck, 16th – 18th Sep. 2015.

IWIS

- [60] S. Weyer, C. Kleeberg, S. Leonhardt, D. Teichmann, "Feasibility of a new therapy device against venous pooling", *International Workshop on Impedance Spectroscopy (IWIS)*, Chemnitz, 23. – 25. Sep. 2015.
- [61] J. Orschulik, R. Petkau, S. Leonhardt, D. Teichmann, "Optimized Electrode Placement for Regional Impedance Measurements in the Lung", *International Workshop on Impedance Spectroscopy (IWIS)*, Chemnitz, 23. – 25. Sept.

Mukoviszidose Tagung

- [62] S. Lehmann, S. Leonhardt, C. Ngo, S. Schradung, N. Wagner, K. Tenbrock, "Regionale Lungenfunktionsdiagnostik mittels Elektrischer Impedanz Tomographie (EIT) bei Patienten mit Cystischer Fibrose (CF)", 18. *Deutsche Mukoviszidose Tagung 2015*, Congress Centrum, Würzburg, 19. - 21. November 2015.

DKPM

- [63] K. Heimann, N. Blanik, C. Pereira, V. Blazek, M. Wester, T. Orlikowsky, „Photoplethysmografie Imaging (PPGI) und Infrarotthermografie (IRT) als kontaktlose Mess-Methoden zum besseren Verständnis des Temperaturverhaltens Frühgeborener ≤ 28 SSW“, 27. *Deutscher Kongress für Perinatale Medizin*, Deutsche Gesellschaft für Perinatale Medizin (DGPM), Berlin, 1. – 3. Dez. 2015; Poster P07_5, Abstract: Zeitschrift für Geburtshilfe und Neonatologie, SO1, Volume 219, doi:10.1055/s-005-30402.

DIVI

- [64] Th. Janisch, S. Weyer, C. Aguado Duchatsch, M. Ulbrich, S. Leonhardt, T. Siekmann, C. Pickmann, R. Kopp, "Messung des Herzzeitvolumens unter hyperbaren Bedingungen mittels Impedanzkardiographie", Abstract A-710-0009-00041, Poster Nr. P/06/05, 15. *Kongress der Deutschen Interdisziplinären Vereinigung für Intensiv- und Notfallmedizin (DIVI 2015)*, 2. - 4. Dez. 2015, Leipzig.

IEEE CDC

- [65] A. Pomprapa, S. Weyer, S. Leonhardt, M. Walter, B. Misgeld, „Periodic funnel-based control for peak inspiratory pressure“, 54th *IEEE Conference on Decision and Control*, Osaka, Japan, Dec. 15th – 18th, 2015.

Eingeladene Vorträge 2015 / Invited Talks and Lectures 2015

- [1] M. Walter, “Closed-Loop Control of Extracorporeal Circulation”, Helmholtz Symposium Aachen 2015, Aachen, 29. Mai 2015.
- [2] D. Teichmann, “**Monitoring of thoracic activity using electromagnetic coupling**”, 10th International Conference on Bioelectromagnetism (ICBEM 2015), 16.-18.6.2015, Tallinn, Estonia.
- [3] S. Leonhardt, “**Why nature closes the loop!**”, keynote lecture, 9th IFAC Symposium on Biological and Medical Systems, 31st August - 2nd September 2015, Berlin, Germany.

Tuesday, 1st of September

Steffen Leonhardt, RWTH Aachen University, Germany

Why nature closes the loop!

Abstract:

This talk will focus on the intrinsic principles behind closed-loop systems in physiology. We will look at the properties of positive and negative feedback loops. Starting at the general concept of homeostasis, we will move from cell physiology and organ level to systemic levels.



- [4] B.J.E. Misgeld, “**Pulsatile cerebrospinal model with cardio-vascular coupling**”, and „**Towards Patient-Oriented Modelling and Identification**“, 9th IFAC Symposium on Biological and Medical Systems, 31st August - 2nd September 2015, Berlin, Germany.
- [5] S. Leonhardt, “**Systems Approaches in Medicine from Engineering Perspective**”, GeneSEES Genetics, Systems Medicine, Environmental Exposures, Economic & Social Settings 2015: Loss of Control as a Slow Health Hazard, BIOKYBERNETIK WORKSHOP at 60th Annual Conference of GMDS, 6-9 Sep 2015, Krefeld.
- [6] D. Teichmann, A. Kuhn, S. Leonhardt, M. Walter, “**Turning failure into virtue – Motion artifact based classification of motion and posture in magnetic induction measurements**”, 49th *DGBMT Annual Conference*, Lübeck, 16th – 18th Sep. 2015
- [7] M. Ulbrich, „**Fundamentals and medical applications of bioelectrical impedance measurements**“, invited tutorial, 8th International Workshop on Impedance Spectroscopy (IWIS'15), 23-25 September 2015, Chemnitz, Germany.
- [8] M. Ulbrich, “**Simulation of bioelectrical properties of human tissue for medical applications**“, invited Keynote, 8th International Workshop on Impedance Spectroscopy (IWIS'15), 23-25 September 2015, Chemnitz, Germany.

- [9] S. Leonhardt, “**Meßtechnik für den Beginn und für das Ende des Lebens**”, EA Kolloquium, European Academy of Technology and Innovation Assessment GmbH, Wilhelmstraße 56, 53474 Bad Neuenahr-Ahrweiler, Germany



#eacolloquia 29 Sept.: Messtechnik am Beginn und Ende des Lebens (Prof. Leonhardt, RWTH Aachen): 29 September ... bit.ly/1Lwr42S



- [10] S. Leonhardt, “**The car as a location for medical diagnosis**”, keynote lecture, **MOBIHEALTH 2015 - 5th EAI International Conference on Wireless Mobile Communication and Healthcare – Transforming healthcare through innovations in mobile and wireless technologies**, October 14–16, 2015 London, Great Britain.

The screenshot shows a website navigation bar with links: Home, Committees, Calls, Author Instructions, Special Sessions, Program, Workshops, Registration, Practical Information, Sponsorship, Contact Us. Below the navigation, there is a breadcrumb trail: Home > Keynotes >. The main content area features a profile for Univ.-Prof. Dr.-Ing. Dr. med. Steffen Leonhardt, including a portrait photo, his title as Chair for Medical Information Technology at the Helmholtz Institute for Biomedical Engineering, RWTH Aachen University, and the title of his keynote: "The car as a location for medical diagnosis". An abstract follows, describing the talk's focus on driver state assessment and non-contact monitoring techniques. A biographical note (Bio) provides details on his education and professional experience. To the right of the main content, there are three promotional banners for EAI, IoT360, and SmartCity360, along with an 'Important dates' section listing the start (14 October 2015) and end (16 October 2015) of the conference.

- [11] B.J.E. Misgeld, “Rückgekoppelte medizintechnische Systeme”, 61. Biometrisches Kolloquium, Dortmund, 2015

- [12] B.J.E. Misgeld, „Monitoring of Biomechanical Variables Using Body Sensor Networks”, Initiative Biokybernetik, 2nd Annual Meeting, Großkarlbach, Germany.

Organisation von Konferenzen / eingeladenen Sitzungen im Jahr 2015

Organisation of Conferences or Invited Sessions in 2015

- [1] S. Leonhardt (Conference Chairman) and the Philips Chair of Medical Information Technology at RWTH Aachen University: **Organisation of the 11th Russian German Conference on Biomedical Engineering**, Aachen, June 17th - 19th, 2015. Ca. 75 attendants. <http://rgc2015.hia.rwth-aachen.de/>.
- [2] B. Misgeld, J. Mau, S. Leonhardt, „Towards Patient-Oriented Modelling and Identification“, **9th IFAC Symposium on Biological and Medical Systems**, 31st August - 2nd September 2015, Berlin, Germany.
- [3] B. Misgeld (Conference Editor): **9th IFAC Symposium on Biological and Medical Systems**, 31st August - 2nd September 2015, Berlin, Germany.

Organisation von eingeladenen Zeitschriften-Ausgaben im Jahr 2015

Organisation of invited special issues in peer-reviewed journals in 2015

- [1] S. Leonhardt, D. Teichmann (eds.), Special Issue on „Noninvasive Biomedical Sensors“, 2015. http://www.mdpi.com/journal/sensors/special_issues/noninvasive-biomedical-sensors.

The screenshot displays the MDPI Sensors journal website. At the top, there is a navigation bar with links for MDPI, Journals A-Z, Information & Guidelines, About, Editorial Process, Submit to Sensors, Login, and Register. Below this is a search bar with fields for Title/Keyword, Author, Article Type, Journal (set to Sensors), Section (Physical Sensors), Special Issue (Noninvasive Biomedical), Volume, Issue, and Page. A yellow badge on the right indicates an Impact Factor of 2.245.

The main content area is titled "Special Issue 'Noninvasive Biomedical Sensors'". It includes a "Quicklinks" section with links to Special Issue Editors, Special Issue Information, and Published Papers. A text block states: "A special issue of *Sensors* (ISSN 1424-8220). This special issue belongs to the section 'Physical Sensors'." Below this, a "Deadline for manuscript submissions: 28 February 2016" is displayed.

The "Special Issue Editors" section lists two guest editors:

- Guest Editor**
Prof. Dr. Steffen Leonhardt
Philips Chair for Medical Information Technology, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University, Pauwelsstr. 20, D-52074 Aachen, Germany
Website: www.medit.hia.rwth-aachen.de; <http://tc.ifac-control.org/8/2/members/steffenleonhardt>
Fax: +49 241 80-623211
Interests: physiological measurement techniques; personal health care systems and feedback control systems in medicine
- Guest Editor**
Dr. Daniel Teichmann
Philips Chair for Medical Information Technology, Helmholtz-Institute for Biomedical Engineering, RWTH Aachen University, Pauwelsstr. 20, D-52074 Aachen, Germany
Website: www.medit.hia.rwth-aachen.de
Fax: +49 241 80-623211
Interests: biomedical monitoring; signal processing and data analysis

On the left side, there is a sidebar with a "Sensors" menu, an "E-Mail Alert" section with a "Subscribe" button, and a "Journal Browser" section with a "Go" button and a list of volumes: "Forthcoming Issue", "Current Issue", "Vol. 15 (2015)", and "Vol. 14 (2014)".