Publications, Patents, Talks

2023

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

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

Director:

Univ.-Prof. Dr.-Ing. Dr. med. Dr. h.c.
Steffen Leonhardt

Artikel in Zeitschriften mit anonymem Gutachterwesen 2023 / *Papers in peer-reviewed Journals* 2023

1. Lukas Bergmann, Daniel Voss, Steffen Leonhardt, Chuong Ngo, "Lower-Limb Exoskeleton with Compliant Actuators: Human Cooperative Control", **IEEE *Transactions On Medical Robotics and Bionics***, Vol. 5, No. 3, Aug. 2023, pp. 717-729, DOI 10.1109/TMRB.2023.3290982.
2. Stefan Borik, Micha Keller, Volker Perlitz, Simon Lyra, Holger Pelz, Gero Müller, Steffen Leonhardt, Vladimir Blazek, „On the cardiorespiratory coordination assessed by the photoplethysmography imaging technique", ***Scientific Reports*** (2023), 13 (1), 14645, pp. 1-13, https://doi.org/10.1038/s41598-023-41828-5.
3. Matthias Manfred Deininger, Carl-Friedrich Benner, Lasse Johannes Strudthoff, Steffen Leonhardt, Christian Simon Bruells, Gernot Marx, Christian Bleilevens, Thomas Breuer, "Post-Mortem Extracorporeal Membrane Oxygenation Perfusion Rat Model: A Feasibility Study", ***Animals*** 2023, 13 (22), 3532, pp, 1-13. https://doi.org/-10.3390/ani13223532.
4. Onno Linschmann, Durmus Umutcan Uguz, Bianca Romanski, Immo Baarlink, Pujitha Gunaratne, Steffen Leonhardt, Marian Walter, Markus Lüken, "A Portable Multi-Modal Cushion for Continuous Monitoring of a Driver's Vital Signs", ***Sensors*** 2023, 23 (8), 4002, pp. 1-21, https://doi.org/10.3390/s23084002.
5. Lin Liu, Steffen Leonhardt, Lukas Bergmann, Berno J.E. Misgeld, „Composite performance of variable stiffness actuator for exoskeleton administrated via impedance control and disturbance observer", ***Mechanism and Machine Theory*** 179 (2023), 105096, pp. 1-14, https://doi.org/10.1016/j.mechmachtheory.2022.105096.
6. Arnhold Lohse, Philip von Platen, Carl-Friedrich Benner, Matthias Manfred Deininger, Teresa Gertrud Seemann, Dmitrij Ziles, Thomas Breuer, Steffen Leonhardt, Marian Walter, "Evaluation of electric phrenic nerve stimulation patterns for mechanical ventilation: a pilot study", ***Scientific Reports*** (2023), 13 (1), 11303, pp. 1-11. https://doi.org/10.1038/s41598-023-38316-1.
7. Markus Lueken, Michael Gramlich, Steffen Leonhardt, Nikolaus Marx, Matthias D. Zink, „Automated Signal Quality Assessment of Single-Lead ECG Recordings for Early Detection of Silent Atrial Fibrillation", ***Sensors*** 2023, 23 (12), 5618, pp.1-20, https://doi.org/10.3390/s23125618.
8. Simon Lyra, Arian Mustafa, Jöran Rixen, Stefan Borik, Markus Lüken, Steffen Leonhardt, "Conditional Generative Adversarial Networks for Data Augmentation of a Neonatal Image Dataset", ***Sensors*** 2023, 23 (2), 999, pp.1-20, https://doi.org/10.3390/-s23020999.
9. Chenglin Lyu, Pedro Truppel Morim, Bernhard Penzlin, Felix Röhren, Lukas Bergmann, Philip von Platen, Cornelius Bollheimer, Steffen Leonhardt, Chuong Ngo, „Closed-Loop FES Control of a Hybrid Exoskeleton during Sit-to-Stand Exercises: Concept and First Evaluation", ***Actuators*** 2023, 12 (8), 316, pp. 1-18, https://doi.-org/10.3390/act12080316.
10. Thomas Muders, Benjamin Hentze, Steffen Leonhardt, Christian Putensen, "Evaluation of Different Contrast Agents for Regional Lung Perfusion Measurement Using Electrical Impedance Tomography: An Experimental Pilot Study", ***Journal of Clinical Medicine*** 12 (8), 2751, pp. 1-12, https://doi.org/10.3390/jcm12082751.

11. Philip von Platen, Philipp A. Pickerodt, Martin Russ, Mahdi Taher, Lea Hinken, Wolfgang Braun, Rainer Köbrich, Anake Pomprapa, Roland C. E. Francis, Steffen Leonhardt, Marian Walter, „SOLVe: a closed-loop system focused on protective mechanical ventilation", ***BioMedical Engineering OnLine.*** 2023 May 16;22(1):47. doi: 10.1186/s12938-023-01111-0.
12. Jöran Rixen, Nico Blass, Simon Lyra, Steffen Leonhardt, "Comparison of Machine Learning Classifiers for the Detection of Breast Cancer in an Electrical Impedance Tomography Setup", **Algorithms** 2023, 16(11), 517; https://doi.org/10.3390/-a1010000.
13. Florian Voss, Noah Brechmann, Simon Lyra, Jöran Rixen, Steffen Leonhardt, Christoph Hoog Antink, "Multi-modal body part segmentation of infants using deep learning", ***BioMedical Engineering OnLine*** (2023) 22 (1), 28, pp.1-20, https://-doi.org/10.1186/s12938-023-01092-0.
14. M.D. Zink, M. Lueken, S. Leonhardt, B. Freedman, A.P. Keszei, K. Mischke, N. Marx, "Factors for incorrect automated atrial fibrillation identification in large-scale screening", ***European Heart Journal,*** Vol. 44 (supplement_2), Nov. 2023, ehad-655.318, pp. 1-2, https://doi.org/10.1093/eurheartj/ehad655.318.
15. L Liu, M Illian, S Leonhardt, B Misgeld, „Iterative learning control for cascaded impedance-controlled compliant exoskeleton with adaptive reaction to spasticity", **IEEE** ***Transactions on Instrumentation and Measurement***, vol. 72, 4008211, 2023. doi: 10.1109/TIM.2023.3286004.
16. J Rixen, S Leonhardt, J Moll, DH Nguyen, C Ngo, „The D-Bar Algorithm Fusing Electrical Impedance Tomography with A Priori Radar Data: A Hands-On Analysis", **Algorithms** 16 (1), 43, 2023. https://doi.org/10.3390/a16010043.
17. A. Rein, C. Ngo, M. van den Berg, S. Böll, L. Lassay, U. Kontny, N. Wagner, S. Leonhardt, K. Tenbrock, E. Verjans, "Evaluation of lung function in a German single center cohort of young patients with sickle cell disease using EIT and standard techniques", ***Frontiers in Medicine*** 2023 Mar 13:10:1100180. doi: 10.3389/fmed.2023.1100180.
18. A. Rein, C. Ngo, M. van den Berg, S. Böll, L. Lassay, U. Kontny, N. Wagner, S. Leonhardt, K. Tenbrock, E. Verjans, "Corrigendum: Evaluation of lung function in a German single center cohort of young patients with sickle cell disease using EIT and standard techniques", ***Frontiers in Medicine*** 2023 Jun 1:10:1210947. doi: 10.3389/fmed.2023.1210947.
19. S.C.A. Kretschmer, M. Paul, N. Heussen, S. Leonhardt, T Orlikowsky, K. Heimann, „Facial thermal response to non-painful stressor in premature and term neonates", ***Pediatr Res.*** 2023 Oct;94(4):1422-1427. doi: 10.1038/s41390-023-02614-1.
20. M.S. Singh, R. Pasumarthy, U. Vaidya, S. Leonhardt, „On quantification and maximi-zation of information transfer in network dynamical systems", ***Sci Rep.*** 2023 Apr 5;13(1):5588. doi: 10.1038/s41598-023-32762-7.

Editorials 2023

1. C. Putensen, L. Gattinoni, S. Leonhardt, „Electrical Impedance Tomography: Is It Ready to Measure Pulmonary Perfusion Distribution at the Bedside?" ***Anesthe-siology*** 139 (6), 722-725, 2023. https://doi.org/10.1097/ALN.0000000000004770.

Artikel in Zeitschriften mit anonymem Gutachterwesen 2024 / *Papers in peer-reviewed Journals* 2024

1. Florian Voss, Philipp Grünter, Johannes Wolski, Steffen Leonhardt, Markus Lüken, „Hardware-in-the-loop setup for contactless skin servo control of neonatal incubators", ***Biomedical Signal Processing and Control*** 88 (2024) 105628, pp. 1-11, https://doi.org/10.1016/j.bspc.2023.105628.
2. Gleb Koginov, Lukas Bergmann, Michele Xiloyannis, Neala Rohner, Chuong Ngo, Jaime E. Duarte, Steffen Leonhardt, Robert Riener, "Human-in-the-loop personalization of a bi-articular wearable robot's assistance for downhill walking", **IEEE *Transactions On Medical Robotics and Bionics***, Vol. 6, No. 2, Feb. 2024, pp. 1-12, DOI 10.1109/TMRB.2023.3328654.
3. Philip von Platen, Adel Abdelsamed, Arnhold Lohse, Martin Russ, Celina Wolters, Philipp A. Pickerodt, Roland C.E. Francis, Steffen Leonhardt, Marian Walter, "Robust closed-loop control of systemic oxygenation in acute lung injury", ***Biomedical Signal Processing and Control*** (2024) 87, 105532, pp.1-9, https://doi.org/10.1016/-j.bspc.2023.105532.
4. A. Lohse, M.M. Deininger, J. Loeser, F. Roehren, D. Ziles, T. Breuer, S. Leonhardt, M. Walter, „A physiological model of phrenic nerve excitation by electrical stimulation", ***Biomedical Physics & Engineering Express*** 10 (2), 025017, 2024. doi: 10.1088/2057-1976/ad1fa3.

Editorials 2024

1. W. Wang, C. Shan, S. Leonhardt, R. Mukkamala, E. Nowara, „Guest Editorial Camera-Based Health Monitoring in Real-World Scenarios", IEEE ***Journal of Biomedical and Health Informatics*** 28 (2), 595-597, 2024. doi: 10.1109/JBHI.2023.-3348248.

Konferenzbeiträge mit Beteiligung des Lehrstuhls 2023 / *Conference Proceedings* 2023

AUTOMED 2023 - Automatisierungstechnische Verfahren für die Medizintechnik, March 30 - 31, 2023

1. Bianca Romanski, Steffen Leonhardt, Marian Walter, "Modelling the hepatic glucose production in Type 1 Diabetes during aerobic exercise", Proc. Automation in Medical Engineering, Vol 2, No 1 (2023): Article Ref 750, www.journals.infinite-science.de/automed/article/view/750, 16. Workshop „Automatisierungstechnische Verfahren für die Medizin" (**Automed 2023**), March 30 – 31, 2023, Gießen, Germany.

2. Felix Röhren, Arnhold Lohse, Asena Oetzemel, Steffen Leonhardt, Marian Walter, "Control of the fraction of inspiratory oxygen of a decentralized breathing gas source" , Proc. Automation in Medical Engineering, Vol 2, No 1 (2023): Article Ref 725, www.journals.infinite-science.de/automed/article/view/725, 16. Workshop „Automatisierungstechnische Verfahren für die Medizin" (**Automed 2023**), March 30 – 31, 2023, Gießen, Germany.

3. Fabian Flürenbrock, Luca Krebs, Nico Wertli, Carlos Castelar, Steffen Leonhardt, Melanie Zeilinger, Marianne Schmid Daners, Leonie Korn, "Estimation of ventricular volume changes for hydrocephalus treatment" , Proc. Automation in Medical Engineering, Vol 2, No 1 (2023): Article Ref 738, www.journals.infinite-science.de/automed/-article/view/738, 16. Workshop „Automatisierungstechnische Verfahren für die Medizin" (**Automed 2023**), March 30 – 31, 2023, Gießen, Germany.

4. Carl-Friedrich Benner, Maria-Lenka Wolter, Maike van den Berg, Matthias Deininger, Thomas Breuer, Gernot Marx, Steffen Leonhardt, Marian Walter, "Parameter identification of a model describing the blood glucose metabolism using clinical data" , Proc. Automation in Medical Engineering, Vol 2, No 1 (2023): Article Ref 756, www.-journals.infinite-science.de/automed/article/view/756, 16. Workshop „Automatisierungstechnische Verfahren für die Medizin" (**Automed 2023**), March 30 – 31, 2023, Gießen, Germany.

5. Arnhold Lohse, Henning Bommes, Felix Röhren, Steffen Leonhardt, Marian Walter, "Development of a bellow-based test lung for spontaneous breathing", Proc. Automation in Medical Engineering, Vol 2, No 1 (2023): Article Ref 730, www.journals.infinite-science.de/automed/article/view/730, 16. Workshop „Automatisierungstechnische Verfahren für die Medizin" (**Automed 2023**), March 30 – 31, 2023, Gießen, Germany.

6. Lukas Bergmann, Viet Duc Phan, Steffen Leonhardt, Choung Ngo, "Gait Stability Assessment within a Patient-Cooperative Lower Limb Exoskeleton", Proc. Automation in Medical Engineering, Vol 2, No 1 (2023) : Article Ref 715, www.journals.infinite-science.-de/automed/article/view/715, 16. Workshop „Automatisierungstechnische Verfahren für die Medizin" (**Automed 2023**), March 30 – 31, 2023, Gießen, Germany.

89. Jahrestagung der Deutschen Gesellschaft für Kardiologie – Herz- und Kreislaufforschung e.V. (DGK), Mannheim, Germany, April 12 -13, 2023

1. M. Zink, M. Lüken, S. Leonhardt, K. Mischke, A. Keszei, N. Marx, "Patient characteristics prone to incorrect measurement in automated single-lead AF screening", DGK, Mannheim, Germany, April 12 -13, 2023 Clin Res Cardiol (2023) 112:1005, https://doi.org/10.1007/s00392-023-02180-w.

2. M. Zink, M. Lüken, S. Leonhardt, K. Mischke, A. Keszei, N. Marx, "Automated assessment of signal quality by machine learning in single-lead ECG tracings for atrial fibrillation screening", DGK, Mannheim, Germany, April 12 -13, 2023 Clin Res Cardiol (2023) 112:1005, https://doi.org/10.1007/s00392-023-02180-w.

27th International Student Conference on Electrical Engineering (POSTER 2023), Faculty of Electrical Engineering, CTU Prague, May 11th, 2023.

1. Urban Jacobs, "Development and Validation of an Impedance Cardiography System for Integration into a Ventricular Assist Device", 27th International Student Conference on Electrical Engineering (**POSTER 2023**), Faculty of Electrical Engineering, CTU Prague, May 11, 2023.

2. Arnhold Lohse, Philip von Platen," Robust control of oxygen saturation during mechanical ventilation", 27th International Student Conference on Electrical Engineering (**POSTER 2023**), Faculty of Electrical Engineering, CTU Prague, May 11, 2023.

3. Simon Lyra, Christoph Weiss, „Deep Learning-Based Region Extraction for Photoplethys-mography Imaging", 27th International Student Conference on Electrical Engineering (**POSTER 2023**), Faculty of Electrical Engineering, CTU Prague, May 11, 2023.

4. Daniel Voss, Clara Wemmer, „4D Cardiac-Mechanic Ventricle Models for Intra-Cardiac Impedance Analysis", 27th International Student Conference on Electrical Engineering (**POSTER 2023**), Faculty of Electrical Engineering, CTU Prague, May 11, 2023.

5. Christoph Weiss, „Detection of Basic Emotions by Automated Facial Expression Monitoring", 27th International Student Conference on Electrical Engineering (**POSTER 2023**), Faculty of Electrical Engineering, CTU Prague, May 11, 2023.

36th IEEE International Symposium on Computer-Based Medical Systems (CBMS), L'Aquila, Italy, June 22-24, 2023.

1. I Badiola, O Linschmann, L Willms, V Blazek, S Leonhardt, M Lueken, „Monte Carlo simulation-based analysis of unobtrusive PPG monitoring through clothes", 36th IEEE International Symposium on Computer-Based Medical Systems (CBMS), L'Aquila, Italy, June 22-24, 2023.

2. DF Silva, S Leonhardt, “A Real-Time Dual Heart and Respiratory Rate Estimator for Electrical Impedance Tomography“, 36th IEEE International Symposium on Computer-Based Medical Systems (CBMS), L’Aquila, Italy, June 22-24, 2023.

45th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Sydney, Australia, July 24 - 27, 2023

1. Florian Voss, Lennard Tiltmann, Simon Lyra, Steffen Leonhardt, Markus Lüken,” A Physical Phantom for the Simulation of Neonatal Thermoregulation”, 45th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), 979-8-3503-2447-1/23, DOI: 10.1109/EMBC40787.2023.10340820, **EMBC,** Sydney, Australia, July 24 - 27, 2023.

2. Jöran Rixen, Benedikt Eliasson, Simon Lyra, Steffen Leonhardt, “Shape analysis of training data for neural networks in Electrical Impedance Tomography”, 45th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), 979-8-3503-2447-1/23, DOI: 10.1109/EMBC40787.2023.10340254, **EMBC,** Sydney, Australia, July 24 - 27, 2023.

3. Simon Lyra, Jinyi Jin, Steffen Leonhardt and Markus Lüken, “Early Prediction of Neonatal Sepsis from Synthetic Clinical Data Using Machine Learning”, 45th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), 979-8-3503-2447-1/23, DOI: 10.1109/EMBC40787.2023.10341082, **EMBC,** Sydney, Australia, July 24 - 27, 2023.

4. Onno Linschmann, Tim Horstmann, Steffen Leonhardt, Markus Lüken, „Sensor Fusion of Cardiorespiratory Signals Using an Adaptive Kalman Filter“, 45th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), 979-8-3503-2447-1/23, DOI: 10.1109/EMBC40787.2023.10340942, **EMBC,** Sydney, Australia, July 24 - 27, 2023.

5. Marian Walter, Andreas Puschke, Cavan Lübke, Rüdger Kopp, Steffen Leonhardt, “Hardware-in-the-loop simulation of vascular cannula interaction”, 45th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC). 979-8-3503-2447-1/23, DOI: 10.1109/EMBC40787.2023.10340314, **EMBC,** Sydney, Australia, July 24 - 27, 2023.

ESC Congress 2023, Amsterdam, The Netherlands, Aug. 25 – 28, 2023

1. M.D. Zink, M. Lüken, S. Leonhardt, B. Freedman, A.P. Keszei, K. Mischke, N. Marx, “Factors for incorrect automated atrial fibrillation identification in large-scale screening”, ESC Congress 2023, Amsterdam, The Netherlands, August 25 – 28, 2023, https://esc365.escardio.org/presentation/268347.

2023 31st European Signal Processing Conference (EUSIPCO), 4-8 Sept. 2023, Helsinki, Finland. DOI: 10.23919/EUSIPCO58844.2023

1. DF Silva, S Leonhardt, „Hybrid Compartment Model Formulation for Accelerated Bolus Fitting“, 31st European Signal Processing Conference (EUSIPCO), 1120-1124, 4-8 Sept. 2023, Helsinki, Finland.

68. Jahrestagung der Deutschen Gesellschaft für Medizinische Informatik, Biometrie und Epidemiologie e. V. (GMDS), Heilbronn, Germany, September 17 - 21, 2023

1. Markus Lüken, Steffen Leonhardt, “Multimodal Camera Setups for Unobtrusive Extraction of Vital Signs in Clinical Settings”, GMDS, doi: 10.3205/23gmds090, Heilbronn, September 17- 21, 2023.

57th Annual Meeting of the German Society of Biomedical Engineering (BMT), Duisburg, Germany, September 26 – 28, 2023

1. Chenglin Lyu, R. Gupta, Chuong Ngo, Steffen Leonhardt, Philip von Platen, “A Hybrid FES-Exoskeleton with ILC Control for Gait Assistant”, Abstracts of the 57th Annual Meeting of the German Society of Biomedical Engineering, 26 – 28 September 2023, Duisburg, DOI: https://doi.org/10.1515/bmte-2023-2001.

2. Florian Voss, Markus Lüken, Steffen Leonhardt, “Regression-based Correction for Infrared Thermographyin Neonatal Incubators”, Abstracts of the 57th Annual Meeting of the German Society of Biomedical Engineering, 26 – 28 September 2023, Duisburg, DOI: https://doi.org/10.1515/bmte-2023-2001

3. Daniel Blase, Thea Laurentius, Markus Lüken, Steffen Leonhardt, “Measurements of the Pressure Loading Response of the Gluteal and Sacral Skin Tissues when Lying in Bed Using Camera-based Techniques”, Abstracts of the 57th Annual Meeting of the German Society of Biomedical Engineering, 26 – 28 September 2023, Duisburg, DOI: https://doi.org/10.1515/bmte-2023-2001

4. Christoph Weiss, Steffen Leonhardt, Markus Lüken, “Facial responses to physiological stress in thermal infrared imaging”, Abstracts of the 57th Annual Meeting of the German Society of Biomedical Engineering, 26 – 28 September 2023, Duisburg, DOI: https://doi.org/10.1515/bmte-2023-2001

5. Idoia Badiola, Chenglin Lyu, Arne Ferchland, Fabian Comes, Vladimir Blazek, Steffen Leonhardt, Markus Lüken, “Muscle stimulation for peripheral venous oxygen saturation estimation using photoplethysmography: a proof-of-concept”, Current Directions in Biomedical Engineering 2023;9(1):146-149, Proceedings of the 57th Annual Meeting of the German Society of Biomedical Engineering (26 – 28 September 2023, Duisburg), https://doi.org/10.1515/cdbme-2023-103

6. Maurice Rohr, Zhaolan Huang, Durmus Umutcan Uguz, Rosalia Dettori, Andreas Napp, Marian Walter, Steffen Leonhardt, Christoph Hoog Antink, “Limitations of Pacemaker Spike Detection inCapacitive ECGs via Deep Learning”, Current Directions in Biomedical

Engineering 2023;9(1):182-185, Proceedings of the 57th Annual Meeting of the German Society of Biomedical Engineering (26 – 28 September 2023, Duisburg), https://doi.org/10.1515/cdbme-2023-1046

7. Diogo Filipe Silva, Steffen Leonhardt, “Fast 4D FEM Model for EIT Source Separation Benchmarking, Current Directions in Biomedical Engineering 2023;9(1): 387-390, Proceedings of the 57th Annual Meeting of the German Society of Biomedical Engineering (26 – 28 September 2023, Duisburg), https://doi.org/10.1515/cdbme-2023-1097.

25. Hauptstadtkongress der DGAI für Anästhesiologie und Intensivtherapie (HAI 2023), Berlin, Germany, Oct. 12 – 13, 2023

1. Matthias Manfred Deininger, D. Ziles, T. Seemann, A. Borleis, A. Lohse, C.-F. Benner, G. Marx, S. Leonhardt, M. Walter, T. Breuer, „Mandatorische versus Phrenicus-stimulierte Beatmung im Schweinemodell: Eine Vergleichsstudie“, 25. Hauptstadtkongress der DGAI für Anästhesiologie und Intensivtherapie (HAI 2023), Berlin, Germany, October, 12 – 13, 2023

Eingeladene Vorträge 2023 /

Invited Talks and Lectures 2023

Physical Talks

1. S. Leonhardt, „**Introducing RWTH Aachen University and MedIT**“, Indian Institute of Technology, Madras, Jan. 6th, 2023.

2. S. Leonhardt, „**Unobtrusive Driver State Estimation – Berta meets Medicine**“, Indian Institute of Technology, Madras, Jan. 6th, 2023.

3. S. Leonhardt, „**Electrical Impedance Tomography – history and perspectives for medicine**“, Indian Institute of Technology, Madras, Jan. 10th, 2023

4. S. Leonhardt, **“Physical and Technical Basics of Electrical Impedance Tomography“,** 23rd International Conference on Biomedical Applications of Electrical Impedance Tomography (EIT2023), Aachen, Germany, 12th – 14th June 2023.

5. S. Leonhardt, C. Putensen, „**“Colour me beautiful” - The Aachen-Bonn EIT colormap proposal**“, 23rd International Conference on Biomedical Applications of Electrical Impedance Tomography (EIT2023), Aachen, Germany, 12th – 14th June 2023.

6. S Leonhardt, **“Motion Analysis and Motion Assist - Body Sensor Networks and Exoskeletons“**, Workshop CCPS, IAT, Friday, 01 December 2023, TU Darmstadt.

7. S. Leonhardt, “**Unlocking the secrets of vital signs in your car seat – A Journey into unseen monitoring techniques**”, INCABIN.SENSING - Next-Gen In-Cabin Monitoring & Interior Sensing Systems, Plenary Talk, The Henry, Dearborn, MI, USA, Dec. 8th, 2023.