

## Personal Information

Acad. degrees Dr. techn. (Ph.D.), Dipl.-Ing. (M.Sc.)  
ORCID 0000-0002-6500-3531  
Date of Birth 03/01/1981  
Place of Birth Halle (Saale), Germany  
Nationality German

## Recent Professional Positions

2020 - Professor MSO, Head of Centre for Acoustic-Mechanical Microsystems (CAMM), Technical University of Denmark (DTU), Denmark  
2014 - 2019 Senior research associate, manager of additive manufacturing technologies, Inst. f. Microsensors, -actuators and -systems (IMSAS), University of Bremen, Germany  
2010 - 2013 Senior scientist, Austrian Center of Competence in Mechatronics (ACCM), Linz

## Educational Summary

04/2010 Ph.D. degree: Dr. techn. from Johannes Kepler University Linz, Austria  
11/2005 Dipl.-Ing. (M.Sc.) from Otto-von-Guericke-University Magdeburg, Germany

## Recent Academic Activities

2020 – 2021 Tutorial Co-Chair IEEE Sensors 2020 and IEEE Sensors 2021 conferences  
2016 – Technical Program Committee (TPC) member IEEE Sensors conferences  
2016 – 2019 ECI Member, MAPEX Center for Materials and Processes, Bremen  
2012 Organization committee, 13th Mechatronics Forum, Sep. 2012, Linz, Austria  
2010 Organization committee, EUROSENSORS XXIV, Sep. 2010, Linz, Austria  
2007 – Senior Member (SM'20), Institute of Electrical and Electronics Engineers (IEEE)

## Selected Scientific Awards and Honors

2021 Invited speaker at META'21 Warsaw, author and presenter  
2021 Invited paper and "Emerging Leader" in Measurement Science and Technology  
2019 Invited speaker at Phononics'19 Tucson, author and presenter  
2017 Invited talk at Acoustics'17 Boston, co-author and presenter  
2010 Co-author Outstanding Paper Award, IEEE Trans. UFFC, vol. 57

## Teaching and Supervision Activities

2020 – Lecturer in MSc Engineering Acoustics courses, (co-)supervisor of 3 PhD, 1 MSc, 1 BSc students, DTU Electrical Engineering  
2014 – 2019 Supervisor and censor of 13 BSc and 9 MSc students, lecturer in MEMS and Microtechnology, mentor of 6 PhD students, University of Bremen, Germany  
2010 – 2013 Lecturer in graduate courses in electrical engineering and MEMS technology, mentor of 2 PhD students, Johannes Kepler University Linz, Austria  
2006 – 2009 Lecturer in graduate and undergraduate courses, supervisor of graduate (MSc) students, Johannes Kepler University Linz, Austria

## Total Research Output (updated 09/06/2021)

Publications 64  
As first author 37  
ORCID profile <https://orcid.org/0000-0002-6500-3531>  
Researcher ID <https://publons.com/researcher/l-1500-2019/>  
Google Scholar <https://scholar.google.de/citations?user=5zil8PoAAAAJ>  
Citations 765 (Google Scholar, 60 publications listed), 492 (Web of Science, 43 publications listed)  
h-index 15 (Google Scholar), 14 (Web of Science)

## DTU Research Output (publications since 2020)

Gueddida, A. et al. "Tubular phononic crystal sensor." *Journal of Applied Physics*, 2021., 130(10)  
<https://doi.org/10.1063/5.0051660>

Kruse, Carl Sander et al. "Oxygen Saturation as a Strategy to Mitigate User-Induced Variation in Tomographic Volumetric Additive Manufacturing." *Solid Freeform Fabrication 2025: Proceedings of the 36th Annual International Solid Freeform Fabrication Symposium: An Additive Manufacturing Conference*The University of Texas at Austin, 2026, 1214-1227

Cai, Zenong, Vicente Cutanda Henrique, and Frieder Lucklum. "Numerical study of the vibration control performance of Kelvin foam." *Proceedings of INTER-NOISE 2024*International Institute of Noise Control Engineering, 2024, 6909-6913 [https://doi.org/10.3397/IN\\_2024\\_3884](https://doi.org/10.3397/IN_2024_3884)

Lucklum, Frieder. *3D Phononic-Fluidic Systems for Liquid Mixture Analysis and Control*, Deutsche Forschungsgemeinschaft, 2025 <https://doi.org/10.11581/b607d925-c695-4f8b-bb85-3a258c0872a6>

Cai, Zenong et al. "A method to investigate the influence of geometry parameters on the vibroacoustic behavior of Kelvin cell foam." *Journal of Sound and Vibration*, 2025., 619 <https://doi.org/10.1016/j.jsv.2025.119405>

Shen, Weihan et al. "Bayesian method for force identification within transfer path analysis." *Mechanical Systems and Signal Processing*, 2025., 235 <https://doi.org/10.1016/j.ymsp.2025.112874>

Lucklum, Frieder. "3D Acoustic Metamaterial Using Interconnected Helmholtz Resonators." *Proceedings of DAS/DAGA 2025*Deutsche Gesellschaft für Akustik e.V., 2025, 1017-20 <https://doi.org/10.71568/dasdaga2025.414>

Shen, Weihan et al. "A Bayesian Approach to Transfer Path Analysis." *Proceedings of DAS/DAGA 2025*Deutsche Gesellschaft für Akustik e.V., 2025, 1317-1319 <https://doi.org/10.71568/dasdaga2025.544>

Chaudhari, Khyati et al. "Computationally efficient Prediction of Underwater Noise from Offshore Pile Driving using an equivalent line array." *Proceedings of DAS/DAGA 2025*Deutsche Gesellschaft für Akustik e.V., 2025, 882-85 <https://doi.org/10.71568/dasdaga2025.577>

Cai, Z. et al. "Study of the effect of load on the vibro-acoustic behavior of Kelvin-cell foam." *Proceedings of ISMA 2024 - International Conference on Noise and Vibration Engineering and USD 2024 - International Conference on Uncertainty in Structural Dynamics*Katholieke Universiteit Leuven, 2024, 347-352

Shen, Weihan et al. "Exploring the Application of a Bayesian Framework in Transfer Path Analysis." *Proceedings of INTER-NOISE 2024*2024, 7663-7669 [https://doi.org/10.3397/IN\\_2024\\_3990](https://doi.org/10.3397/IN_2024_3990)

Shen, Weihan et al. "Vibroacoustic characterization of small woven fabrics." *Applied Acoustics*, 2025., 228 <https://doi.org/10.1016/j.apacoust.2024.110350>

Belahurau, Yauheni and Frieder Lucklum. "Design optimization of phononic-fluidic resonator systems." *Proceedings of INTER-NOISE 2024*Institute of Noise Control Engineering, 2024.

Ibarias, Martin et al. "Broadband acoustic absorption at low frequencies by slabs and clusters made of hard cylindrical rods." *Journal of Applied Physics*, 2024., 136(4) <https://doi.org/10.1063/5.0208386>

Bække, Birgitte S. et al. "Characterization and modeling of the internal vibrations of a balanced armature receiver." *Acta Acustica*, 2024., 8 <https://doi.org/10.1051/aacus/2024004>

Garza Agudelo, Diana Maria et al. "Metasurfaces for sound absorption over a broad range of wave incidence angles." *Applied Acoustics*, 2024., 220 <https://doi.org/10.1016/j.apacoust.2024.109965>

Bække, Birgitte Steen et al. "An investigation of magnetic and vibroacoustic coupling in the balanced armature receiver." *Proceedings of INTER-NOISE and NOISE-CON Congress and Conference*Institute of Noise Control Engineering, 2023, 144-152 [https://doi.org/10.3397/NO\\_2023\\_0027](https://doi.org/10.3397/NO_2023_0027)

Xia, Yuanxin et al. "Effect of curvature on sound propagation in the ear canal." *Journal of the Acoustical Society of America*, 2024, 155(1), 695-706 <https://doi.org/10.1121/10.0024495>

Belahurau, Yauheni and Frieder Lucklum. *Design of a Phononic-Fluidic Cavity Sensor: Influence of Finite Size Lattice on Sensor Performance*, 6<sup>th</sup> International Conference on Phononic Crystals/Metamaterials/Metasurfaces, Phonon Transport, and Topological Phononics, 12 Jun 2023, Manchester, United Kingdom, Paper, 2023, 2 p.

Printezis, Georgios, Niels Aage, and Frieder Lucklum. "Nonlinear factors in single and double backplate capacitive transducers." *Proceedings of 10<sup>th</sup> Convention of the European Acoustics Association* 2023.

Garza Agudelo, Diana Maria et al. *Phononic Crystal and Resonator-Based Metasurface Combination for Wide-Angle Sound Absorption*, 6<sup>th</sup> International Conference on Phononic Crystals/Metamaterials/Metasurfaces, Phonon Transport, and Topological Phononics, 12 Jun 2023, Manchester, United Kingdom, Conference abstract for conference, 2023, 2 p.

Shen, Weihai, Zenong Cai, and Frieder Lucklum. *Vibration and acoustic behaviour investigation of millimeter-sized porous mesh samples*, Symposium on the Acoustics of Poro-Elastic Materials, 07 Nov 2023, Sorrento, Italy, Conference abstract for conference, 2023, 2 p.

Printezis, Georgios, Niels Aage, and Frieder Lucklum. "A non-dimensional time-domain lumped model for externally DC biased capacitive microphones with two electrodes." *Applied Acoustics*, 2024., 216 <https://doi.org/10.1016/j.apacoust.2023.109758>

Cai, Zenong, Vicente Cutanda Henriquez, and Frieder Lucklum. *Numerical Study of Foam Microstructures and Their Vibration Behavior*, 29<sup>th</sup> International Congress on Sound and Vibration, 09 Jul 2023, Prague, Czech Republic, Conference abstract for conference, 2023, 6 p.

Bække, Birgitte S. et al. *Characterization of the Magnetic Circuit in a Balanced Armature Receiver*, 24<sup>th</sup> International Congress on Acoustics, 24 Oct 2022, Gyeongju, Korea, Republic of, Paper, 2022

Bække, Birgitte S. et al. *Experimental investigation of structural vibrations inside a balanced armature receiver*, 24<sup>th</sup> International Congress on Acoustics, 24 Oct 2022, Gyeongju, Korea, Republic of, Paper, 2022

Printezis, Georgios et al. "Vibration characterization of analog microelectromechanical microphone systems operating in air and vacuum." *Proceedings of the International Congress on Acoustics* International Commission for Acoustics, Proceedings of the International Congress on Acoustics, 2022.

Belahurau, Yauheni et al. "Systematic design of 2D and 3D VibroAcoustic Fluidic Cavity Sensors Using Topology Optimization." *Proceedings of NOVEM 2023* 2023.

Belahurau, Yauheni et al. *Design of a 3D phononic-fluidic sensor using shape optimization*, 48<sup>th</sup> International Conference on Micro and Nano Engineering, 19 Sept 2022, Leuven, Belgium, Conference abstract for conference, 2022, 2 p.

Cai, Zenong et al. "Investigation on the vibration behavior of elastic porous materials for miniaturized systems." *Proceedings of the 24<sup>th</sup> International Congress on Acoustics* International Commission for Acoustics, Proceedings of the International Congress on Acoustics, 2022.

Cai, Zenong, Vicente Cutanda Henriquez, and Frieder Lucklum. "Experimental study of open to closed pore ratio on acoustic absorption of porous materials." *Proceedings the 24<sup>th</sup> International Congress on Acoustics* 2022.

Lucklum, Frieder. *Evolution and Future Perspectives of Phononic Crystal Liquid Sensors*, 48<sup>th</sup> International Conference on Micro and Nano Engineering, 19 Sept 2022, Leuven, Belgium, Paper, 2022, 2 p.

Soleimani, Hossein et al. *Contact dynamics for micro acoustic devices*, DCAMM Symposium 2022, 09 Mar 2022, Sønderborg, Denmark, Poster, 2022

Belahurau, Yauheni, Jacob Søndergaard Jensen, and Frieder Lucklum. "Numerical and Experimental Study of a Phononic-Fluidic Sensor Using a Cubic Unit Cell with Spherical Void." *Proceedings of 2021 IEEE Sensors* IEEE, Proceedings of IEEE Sensors, 2021. <https://doi.org/10.1109/SENSOR47087.2021.9639587>

Lucklum, Frieder. "Experimental investigation of defect modes in tubular phononic crystals." *Proceedings of 11<sup>th</sup> International Conference on Metamaterials, Photonic Crystals and Plasmonics*.2021.

Lucklum, Frieder. "Phononic-fluidic cavity sensors for high-resolution measurement of concentration and speed of sound in liquid solutions and mixtures." *Measurement Science and Technology*, 2021., 32(8) <https://doi.org/10.1088/1361-6501/abfde0>

Gueddida, A. et al. "Numerical Analysis of a Tubular Phononic Crystal Sensor." *Proceedings of 2020 IEEE Sensors* IEEE, I E E Sensors. Proceedings, 2020. <https://doi.org/10.1109/SENSOR47125.2020.9278673>

Aravantinos-Zafirios, Nikos, Frieder Lucklum and Mihail M. Sigalas. "Complete phononic band gaps in the 3D Yablonovite structure with spheres." *Ultrasonics*, 2021., 110 <https://doi.org/10.1016/j.ultras.2020.106265>

## Selected Publications 2005-2020

### Journal Papers

M. Oellers, F. Lucklum, M. J. Vellekoop, "On-chip mixing of liquids with swap structures written by two-photon polymerization", *Microfl. Nanofluidics* **24**, p. 4, 2020. doi: 10.1007/s10404-019-2309-8

F. Lucklum, M. J. Vellekoop, "Bandgap engineering of three-dimensional phononic crystals in a simple cubic lattice", *Appl. Phys. Lett.* **113**, p. 201902, 2018. doi: 10.1063/1.5049663

S. v. d. Driesche, F. Lucklum, F. Bunge, M. J. Vellekoop, "3D Printing Solutions for Microfluidic Chip-To-World Connections", *Micromachines* **9**, p. 71, 2018. doi: 10.3390/mi9020071

F. Lucklum, M.J. Vellekoop, "Design and Fabrication Challenges for Millimeter-Scale Three-Dimensional Phononic Crystals", *Crystals* **7**, p. 348, 2017. doi: 10.3390/cryst7110348

F. Lucklum and M. J. Vellekoop, "Realization of complex 3-D phononic crystals with wide complete acoustic band gaps", *IEEE Trans. Ultrason. Ferroelectr. Freq. Control* **63**, p. 796, 2016. doi: 10.1109/TUFFC.2016.2543527

F. Lucklum, A. Schwaiger, B. Jakoby, "Highly insulating, fully porous silicon substrates for high temperature micro-hotplates", *Sens. Actuators A* **213**, p. 35, 2014. doi: 10.1016/j.sna.2014.04.004

B. Jakoby, R. Beigelbeck, F. Keplinger, F. Lucklum, A. Niedermayer, E. K. Reichel, C. Riesch, T. Voglhuber-Brunnmaier, and B. Weiß, "Miniaturized sensors for the viscosity and density of liquids—performance and issues," *IEEE Trans. Ultrason., Ferroelectr., Freq. Control* **57**, pp. 111–120, 2010. doi: 10.1109/TUFFC.2010.1386

F. Lucklum and B. Jakoby, "Non-contact liquid level measurement with electromagnetic-acoustic resonator sensors," *Meas. Sci. Technol.* **20**, p. 124002, 2009. doi:10.1088/0957-0233/20/12/124002

F. Lucklum and B. Jakoby, "Novel magnetic-acoustic resonator sensors for remote liquid phase measurement and mass detection," *Sens. Actuators A* **145/146**, pp.44–51, 2008. doi: 10.1016/j.sna.2007.10.031

A. Homsy, V. Linder, F. Lucklum and N. F. de Rooij, "Magnetohydrodynamic pumping in nuclear magnetic resonance environments," *Sens. Actuators B* **123**, pp. 636–646, 2007. doi: 10.1039/b417892k

F. Lucklum, P. Hauptmann, and N. F. de Rooij, "Magnetic direct generation of acoustic resonances in silicon membranes," *Meas. Sci. Technol.* **17**, pp. 719–726, 2006. doi:10.1088/0957-0233/17/4/017

A. Homsy, S. Koster, J. C. T. Eijkel, A. van den Berg, F. Lucklum, E. Verpoorte and N. F. de Rooij, "A High Current Density DC Magnetohydrodynamic (MHD) Micropump," *Lab on a Chip* **5**, pp. 466–471, 2005. doi: 10.1039/b417892k

### Conference Papers

S. Reede, M. J. Vellekoop, H. Müller-Landau, N. Matscheko, U. Rant, F. Lucklum, "Single Cell Immobilization at High Flow Rates Using 2PP-Traps in a Microfluidic Channel", *SMSI – Sensor and Measurement Science International 2020*. doi: 10.5162/SMSI2020/A5.3

F. Lucklum, M.J. Vellekoop, "Ultra-Sensitive and Broad Range Phononic-Fluidic Cavity Sensor for Determination of Mass Fractions in Aqueous Solutions", *TRANSDUCERS'19 and EUROSENSORS XXXIII*, Berlin, Germany, Jun. 2019. doi:10.1109/TRANSDUCERS.2019.8808509

F. Lucklum, N. Mukhin, M. J. Vellekoop, R. Lucklum, "Phononic Crystal Sensors: 2D, 2.5D and 3D Designs and Realizations", *Proc. Phononics 2019*, Tucson, AZ, USA, Jun. 2019

F. Lucklum, F. Bunge, M. J. Vellekoop, "Experimental and numerical analysis of complete acoustic bandgaps in three-dimensional phononic crystals", *TRANSDUCERS'17*, Kaohsiung, Taiwan, Jun. 2017.  
doi:10.1109/TRANSDUCERS.2017.7994209

F. Lucklum, M.J. Vellekoop, "3D phononic-fluidic cavity sensor for resonance measurements of volumetric fluid properties", *IEEE SENSORS 2016*, Orlando, FL, USA, Nov. 2016. doi:10.1109/ICSENS.2016.7808613

F. Lucklum, M.J. Vellekoop, "Rapid prototyping of 3D phononic crystals using high-resolution stereolithography fabrication", *Procedia Engineering 120, EUROSENSORS XXIX*, Freiburg, Germany, Sep. 2015.  
doi:10.1016/j.proeng.2015.08.783

F. Lucklum and B. Jakoby, "Thermal wave propagation and reflection modeling in porous silicon membranes," *IEEE SENSORS 2011*, Limerick, Ireland, Oct. 2011, pp. 857-860, doi:10.1109/ICSENS.2011.6126938

F. Lucklum and B. Jakoby, "Multi-mode excitation of electromagnetic-acoustic resonant sensor arrays," *Proc. IEEE Int. Freq. Control Symp.*, Honolulu, HI, USA, May 2008, pp. 53–57. doi: 10.1109/FREQ.2008.4622955

F. Lucklum, B. Jakoby, P. Hauptmann, and N. F. de Rooij, "Remote electromagnetic excitation of high-Q silicon resonator sensors," *Proc. IEEE Int. Freq. Control Symp.*, Miami, FL, USA, Jun. 2006, pp. 139–144. doi: 10.1109/FREQ.2006.275366