

Dr. rer. nat. Lara Hauke

Dep. of Pharmacology and Toxicology
University Medical Center Göttingen
Robert-Koch-Straße 40
37075 Göttingen (Germany)
E-mail: lara.hauke@med.uni-goettingen.de



Education

- 2017 - 2020 PhD studies, University of Göttingen
Thesis title: *Multi-parameter assessment of mechano-sensitivity driven differentiation of human mesenchymal stem cells* (mainly funded by CRC 755 B08). Göttingen Graduate School for Neurosciences, Biophysics and Molecular Biosciences: International. Max Planck Research School "Physics of Biological and Complex Systems"
Supervisor: Dr. Florian Rehfeldt
- 2014 - 2017 M.Sc. Biology of Plants, Leibniz University of Hannover
Thesis title: *Characterization of cytokine-dependent effects on MMP-9 expression of human monocytes.*
Supervisors: Prof. Dr. Helge Küster, Dr. Rene Huber
- 2009 - 2013 B.Sc. Biology, Leibniz University of Hannover
Thesis title: *Kite Aerial Photography of crop damages caused by wild boar in the region Kuhstedt/Els*
Supervisor: Dr. Oliver Keuling

Academic Career

- Since 12/2020 Postdoctoral Researcher, Institute of Pharmacology and Toxicology, University Medical Center Göttingen, Germany
- 08/2017 –
03/2021 Research Assistant, DPI-Biophysics, Georg-August University Göttingen
- 09/2012 -
04/2013 Student Research Assistant, Institute for Terrestrial and Aquatic Wildlife Research (ITAW), University of Veterinary Medicine Hannover

Curriculum Vitae

Professional Activities

- Reviewer
 - PLoS One
- Memberships
 - DPG - Deutsche Physikalische Gesellschaft
 - CIDAS - Campus-Institute Data Science
 - DZHK - Deutsches Zentrum für Herz-Kreislauf-Forschung

Teaching

- Coordination of module CVS.101 in master course 'cardiovascular science'
- Supervising doctorate thesis of Emese Zavodszky 'Phenotypic drug screening on engineered human myocardium under application of laboratory automatisisation'
- Developed and instructed course "Introduction to Quantitative Cell Biology for Non-Biologists without Lab experience"
- Tutored and graded master's course "Introduction to biophysics" – Supervised master student Nora Olszok "The Influence of DNA Damage on the Mechanics of the Nucleus"
- Supervised master student Martin Schilling "Rheology of Hydrogels Based on Chemically Modified Hyaluronic Acid"
- Supervised technical assistants in the manufacturing of polyacrylic acid hydrogels
- Instructor for bachelor course "Microbiology 1"

Research Output

- Worked on the classification of mechanical effects on the differentiation of human bone-marrow derived stem cells [Thesis](#)
- Developing the FilamentSensor2.0 software for high-throughput automated analysis of cytoskeletal features filament-sensor.de/
- Developed and published the FAFCK software for high-throughput analysis of correlations between focal adhesions and actin fibers [PLOS](#)
- Collaborated on the development of Metal-induced energy transfer (MIET) microscopy technique and the advancement of the technique to the live-cell application [MIET](#), liveMIET unpublished.
- Collaborated in the development of Metasurface-based total internal reflection microscopy

Research Interests

Mechanics of the cytoskeleton, stem cell differentiation, live-cell imaging, image analysis, software development

Curriculum Vitae

I am currently invested in the development of screening assays using iPSC derived cardiomyocytes. Using micropatterned biomimetic substrates, variations in cell morphology can be reduced and healthy and diseased states simulated. Structure and behavior on sarcomere level of these uniform cells can be used to assess drug effects, morphological effects of mutations, or performance of attempted rescues using CRISPR. Experiments can be designed to allow for single-cell RNA-Seq of specific cells during the experiment or automated RNA-Seq of populations to combine microscopical and translational findings.

Publications

Hauke, Lara and Isbaner, Sebastian and Ghosh, Arindam and Guido, Isabella and Turco, Laura and Chizhik, Alexey and Gregor, Ingo and Karedla, Narain and Rehfeldt, Florian and Enderlein, Jörg. *Metal-Induced Energy Transfer (MIET) for Live-Cell Imaging with Fluorescent Proteins*, ASC Nano, [acsnano.2c12372](#), 2023.

Hauke, Lara and Primeßnig, Andreas and Eltzner, Benjamin and Radwitz, Jennifer and Huckemann, Stefan and Rehfeldt, Florian. *FilamentSensor 2.0: An open-source modular toolbox for 2D/3D cytoskeletal filament tracking*. PLOS ONE 18(2):[e0279336](#), 2023.

Hauke, Lara and Narasimhan, Shwetha and Primeßnig, Andreas and Kaverina, Irina and Rehfeldt, Florian. *A Focal Adhesion Filament Cross-correlation Kit for fast, automated segmentation and correlation of focal adhesions and actin stress fibers in cells*. PLoS ONE, 16(9):[e0250749](#), 2021.

Jayachandran, Christina and Ghosh, Arindam and Prabhune, Meenakshi and Bath, Jonathan and Turberfield, Andrew J. and **Hauke, Lara** and Enderlein, Jörg and Rehfeldt, Florian and Schmidt, Christoph F. *A DNA-based optical force sensor for live-cell applications*. bioRxiv, [10.1101/2021.12.21.473677](#), 2021.

Eltzner, Benjamin and **Hauke, Lara** and Huckemann, Stefan F. and Rehfeldt, Florian and Wollnik, Carina. *A Statistical and Biophysical Toolbox to Elucidate Structure and Formation of Stress Fibers*. Chapter from: *Nanoscale Photonic Imaging*, Springer, Cham, ISBN 978-3-030-34412-2, 10.1007/978-3-030-34413-910, 2020.[onResearchGate](#).

Gortari, Antu Nehuen and Bouchoule, Sophie and Cambriil, Edmond and Cattoni, Andrea and **Hauke, Lara** and Enderlein, Jörg and Rehfeldt, Florian and Yacomotti, Alejandro. *Metasurface-based total internal reflection microscopy*. *Biomedical Optics Express*, 11(4), 2020.

Huber, Rene and Abedalkhader, Rozan and Küper, Daniela and **Hauke, Lara** and Lüns, Bernadette and Brand, Korbian and Weissenborn, Karin and Lichtinghagen, Ralf. *Cellular and molecular effects of high-molecular weight heparin on matrix metalloproteinase 9 expression*. *International Journal of Molecular Science*, 20(7), 2019. [on PMC](#).

Chizhik, Anna and Wollnik, Carina and Ruhland, Daja and Karedla, Narain and Chizhik, Alexej and **Hauke, Lara** and Hähnel, Daniel and Gregor, Ingo and Enderlein, Jörg and Rehfeldt, Florian. *Dual-color metal-induced and Förster resonance energy transfer for cell nanoscopy*. *Molecular Biology of the Cell*, 29(7), 2018. [10.1091/mbc.E17-05-0314](#).

Daim, Andreas and **Hauke, Lara** and Keuling, Oliver. *Field mapping of economic damage in agricultural crops caused by wild boar (*Sus scrofa*) with kite aerial photography (KAP) and GIS support*. *Mammalian Biology*, 78 (special issue): ISBN 1616-5047, 2013.