

David Haberthür

Vita

Nationality Swiss
Hometown Metzerlen-Mariastein, SO
Birthday 12. September 1976

Current work

07.2010-now **Post-Doc**, *Institute of Anatomy, University of Bern*, Bern, Switzerland.
Since the finish of my Ph.D. I have been working as Post-Doc in the Group of Prof. Dr. Johannes C. Schittny. Applying the methods I developed during my Thesis we are studying the development of the three-dimensional lung structure over the postnatal lung development with the help of ultrahigh resolution tomographic datasets.

Education

09.2006–06.2010 **Doctor of Philosophy in Science**, *Institute of Anatomy, University of Bern*, Bern, Switzerland.
During my Ph.D.-Thesis I worked with synchrotron radiation based ultra-high resolution tomographic lung images for the analysis and visualization of the three-dimensional lung structure. The obtained results permitted new insights into the lung development of mice, rat and primates.

10.2006–08.2008 **Master of Advanced Studies ETH in Medical Physics**, *Swiss Federal Institute of Technology, Department of Physics*, Zürich, Switzerland.
This two-year program designed for M. Sc. or Ph. D.-Students helped me to acquire knowledge in medical physics and to specialize in different fields of medical physics, e. g. biocompatible Materials, Radiotherapy, medical Optics and Acoustics.

05.2001–10.2002 **Master Student**, *Biomedical Photonics, Institute of applied Physics, University of Bern*, Bern, Switzerland.
During my master thesis I studied laser applications in medicine and performed studies on joint cartilage soldering and heart tissue cutting.

01.2000–07.2000 **Exchange Student**, *Department of Physics, Strathclyde University*, Glasgow, Scotland, United Kingdom.
During my exchange term in the United Kingdom I attended lectures in Software Design, Imaging and Laser physics and brushed up my English skills.

Theses

Ph. D.-Thesis **High resolution tomographic imaging of the alveolar region of the mammalian lung – A close look deep into the lung**, *Supervisors: Prof. Dr. Johannes C. Schittny and Dr. Mauricio Reyes*, Online: <http://is.gd/sk6wuy>.
The analysis of the lung development using three-dimensional datasets obtained with high resolution synchrotron radiation based x-ray tomographic microscopy was the main work during my Ph.D.-Thesis. I have developed a workflow for the skeletonization of airway segments to extract quantitative information from the branching pattern in the gas-exchange region of the mammalian lung. Additionally, I stereologically analyzed tomographic images to evaluate the amount of alveoli during the postnatal lung development.

- Post-graduate Master Thesis **Quality guided wide field x-ray tomographic imaging**, *Supervisors: Dr. Christoph Hintermüller and Prof. Dr. Marco F.M. Stampanoni*, Online: <http://is.gd/AVPunR>.
 During my master thesis I implemented the necessary acquisition protocols at the TOMCAT beam line of the Swiss Light Source to increase the field of view of the tomographic imaging process in horizontal direction. This implementation is the base for imaging of samples bigger than the size currently possible, while keeping the resolution at the desired level. Different image acquisition protocols have been implemented for providing the end-user of the beam line the possibility to acquire so called wide field scans of his samples in an unattended, automatic way while minimizing the radiation dose imparted on the sample. This master thesis finally led to a first-author publication in the Journal of Synchrotron Radiation, including a cover image.
- Master Thesis **Use of Lasers in Medicine: Tissue Soldering and Precise Cutting**, *Supervisor: Prof. Dr. Martin Frenz*, Online: <http://is.gd/jD6N2T>.
 During my master thesis I worked with infrared diode-lasers to coagulate a dye-enhanced solder to weld cartilage tissue. The goal of the study was to evaluate the influence of laser parameters and solder ingredients on the tensile strength of the bond between cartilage and implant and the thermally induced cartilage damage. Additionally I worked with a pulsed Er:YAG laser for ablation and cutting of calcified heart tissue.

Skills

Academic

Objective.

During my Ph. D.-Thesis I have been working with data obtained with high resolution synchrotron radiation based x-ray tomographic microscopy. I have been studying lung development using three-dimensional datasets and extracted quantitative information from the branching pattern in the gas-exchange region of the mammalian lung. I have developed a skeletonization workflow at our group using the image processing software MeVisLab using multiple visualization pipelines and pre-existing modules.

To support the ongoing effort to study lung samples in their full size, I have developed a method of enhancing the field of view of tomographic imaging as part of my master thesis of the extra-curricular master of advanced studies.

The developed method provides the user with a mean of balancing between fast acquisition time and high quality of images while allowing a fully automated scan at the TOMCAT beamline of the Paul Scherrer Institute in Villigen, Switzerland. To achieve this goal I have written MATLAB-procedures to assess the users' needs, pilot the scanning setup and stitch the resulting images to merged images needed for tomographic reconstruction of the sample with an enhanced field of view.

The most recent work focuses on the extraction of biological data from the three-dimensional tomographic datasets. Adding to data obtained by stereological measurements, I was able to show that the volume of the functional lung units grows to a larger extent than the total lung volume during the postnatal lung development.

Visualization

MeVisLab, Imaris, Amira.

Analysis of tomographic datasets is computationally intensive. I have developed several workflows using MeVisLab, Imaris and Amira for the three-dimensional visualization and analysis of tomographic datasets of mammalian lungs, several GB in size.

OS

Mac OS X, Windows and Linux.

Very good user and good administration experience.

Programming

MATLAB, Python.

I have developed a lot of programs using MATLAB and Python, be it for the processing of multi-GB datasets, the interaction with the TOMCAT beam line or just for efficiently drawing a scalebar in my figures.

Publishing

L^AT_EX, Internet, Microsoft Office.

Nearly all my documents are prepared in L^AT_EX (also the one you're reading here), Manuals for our group are shared on my work wiki website and I have a very good grasp of all Microsoft Office programs.

Languages

German **Mother Tongue**

English **Very Good**

Highly experienced in spoken and written English

French **Fluent**

High-school level

Italian **Fluent, but rusty**

As a kid I lived in Italy for 6 years

Other Interests

- Sports Be it a solitary sport like swimming (since nearly 30 years), biking (I used to work as a bike messenger) and skiing or team sports like ultimate frisbee, I'm up for it!
- Interweb I am a keen blogger, have my own website and am active on several social networks.
- Photography I really enjoy digital photography as a whole, but especially like technical challenges like panorama photography.
- Cooking I am looking forward to the day I have cooked all the recipes in my cookbooks.



References

Will be disclosed on request, just contact me.

selected Publications

- [1] Nenad Filipovic, David Haberthür, Frank S. Henry, Danko Milasinovic, Dalibor Nikolic, Johannes C. Schittny, and Akira Tsuda. Recirculation Identified In A 3D Alveolar Duct Reconstructed Using Synchrotron Radiation Based X-ray Tomographic Microscopy. *Am. J. Respir. Crit. Care Med.*, 181(1-MeetingAbstracts):A2192–, 2010. URL http://ajrccm.atsjournals.org/cgi/reprint/181/1_MeetingAbstracts/A2192.pdf. Poster: <http://is.gd/fzBpU>.
- [2] David Haberthür. *High resolution tomographic imaging of the alveolar region of the mammalian lung*. PhD thesis, University of Bern, Switzerland, May 2010. URL <http://is.gd/fxGN3>.
- [3] David Haberthür, Christoph Hintermüller, Johannes C Schittny, and Marco Stampanoni. Quality Guided Synchrotron Radiation Based X-Ray Tomographic Microscopy of Large Lung Samples. *Am. J. Respir. Crit. Care Med.*, 179(1-MeetingAbstracts):A1060–, 2009. URL <http://is.gd/fxGOX>.
- [4] D Haberthür, C Hintermüller, A Tsuda, M Stampanoni, and JC Schittny. Generation of Acinar Skeletons after Synchrotron Radiation Based X-Ray Tomographic Microscopy of the Lung Parenchyma. *Am. J. Respir. Crit. Care Med.*, 179(1-MeetingAbstracts):A3531–, 2009. URL <http://is.gd/fxGQN>.
- [5] David Haberthür, Manuela Semmler-Behnke, Shinji Takenaka, Wolfgang G. Kreyling, Marco Stampanoni, Akira Tsuda, and Johannes C. Schittny. Multimodal imaging for the detection of sub-micron particles in the gas-exchange region of the mammalian lung. In *Journal of Physics: Conference Series*, volume 186 of *Conference Series*, page 012040 (3pp). Journal of Physics, IOP Publishing, 2009. URL <http://dx.doi.org/10.1088/1742-6596/186/1/012040>.
- [6] David Haberthür, Christoph Hintermüller, Federica Marone, Johannes C. Schittny, and Marco Stampanoni. Radiation dose optimized lateral expansion of the field of view in synchrotron radiation X-ray tomographic microscopy. *Journal of Synchrotron Radiation*, 17(5):590–599, Sep 2010. doi: 10.1107/S0909049510019618. URL <http://dx.doi.org/10.1107/S0909049510019618>.
- [7] Rajmund Mokso, Federica Marone, David Haberthür, Johannes C. Schittny, Gordan Mikuljan, Andreas Isenegger, and Marco Stampanoni. Following dynamic processes by x-ray tomographic

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microscopy with sub-second temporal resolution. In *AIP Conference Proceedings: XRM2010, Tenth International Conference on X-ray Microscopy*, 2010. in Press.

- [8] S. Rausch, D. Haberthür, M. Stampanoni, J. Schittny, and W. Wall. Local strain distribution in real three-dimensional alveolar geometries. *Annals of Biomedical Engineering*, pages 1–9, 2011. ISSN 0090-6964. URL <http://dx.doi.org/10.1007/s10439-011-0328-z>. 10.1007/s10439-011-0328-z.
- [9] M. Sausbier, C. Dullin, C. Kabagem, K. Flockerzie, D. Haberthuer, J. Wessels, F. Alves, J. C. Schittny, W. Neuhuber, P. Ruth, and U. Sausbier. Enhanced cathepsin k release from osteoclasts is linked to idiopathic osteoporosis in mice with BK channel ablation. *Naunyn-Schmiedeberg's Archives of Pharmacology*, 379(Suppl. 1):147, APR 2009. ISSN 0028-1298. URL <http://dx.doi.org/10.1007/s00210-009-0404-1>. 50th Annual Meeting of the Deutsche-Gesellschaft-fur-Experimentelle-und-Klinische-Pharmakologie-und -Toxikologie, Mainz, GERMANY, MAR 10-12, 2009.
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- [11] Johannes C. Schittny, David Haberthür, Manuela Semmler-Behnke, Shinji Takenaka, Marco Stampanoni, Wolfgang G. Kreyling, and Akira Tsuda. High Resolution 3-dimensional Imaging Of Ultrafine Particles In The Lung Parenchyma. *Am. J. Respir. Crit. Care Med.*, 181(1-MeetingAbstracts):A3643–, 2010. URL http://ajrccm.atsjournals.org/cgi/reprint/181/1_MeetingAbstracts/A3643.pdf. Poster: <http://is.gd/fzBba>.
- [12] A. Tsuda, N. Filipovic, D. Haberthür, R. Dickie, Y. Matsui, M. Stampanoni, and J. C. Schittny. Finite element 3D reconstruction of the pulmonary acinus imaged by synchrotron X-ray tomography. *J Appl Physiol*, 105(3):964–976, 2008. URL <http://dx.doi.org/10.1152/jappphysiol.90546.2008>.