

Curriculum vitae

Name: Dr.-Ing. Andreas Lintermann
Affiliation: SimLab Highly Scalable Fluids & Solids Engineering,
JARA-HPC, RWTH Aachen University
Pillar Computing,
CompSE, RWTH Aachen University
Address: Wüllnerstr. 5a 52062 Aachen
Phone (RWTH): +49 - (0)241 - 80 - 90419
Phone (JSC): +49 - (0)2461 - 61 - 1754
Email: Lintermann@aia.rwth-aachen.de



Education and work

- 11/2016 - today** Group leader / PostDoc, Profile Section Computational Science & Engineering (CompSE), RWTH Aachen University
- 04/2016 - today** Visiting scientist, Complex Phenomena Unified Simulation Research Team, RIKEN Advanced Institute for Computational Science, Kobe, Japan
- 10/2015 - today** Industry Relations Manager, Jülich Supercomputing Centre, Research Centre Jülich
- 11/2014 - today** Group leader / PostDoc, SimLab Highly Scalable Fluids & Solids Engineering, JARA-HPC, RWTH Aachen University
- 03/2009 - 11/2014** PhD studies / research scientist at the Institute of Aerodynamics, RWTH Aachen University
degree: Dr.-Ing.
topic: *Investigations of Nasal Cavity Flows Using Lattice-Boltzmann Methods on High Performance Computers*
- 11/2005 - 11/2014** IT-administration at the Institute of Aerodynamics, RWTH Aachen University
- 11/2005 - 03/2009** Student assistant at the Institute of Aerodynamics, RWTH Aachen University
field of work: web administration and development of web applications
- 10/2001 - 03/2009** Studies of Computer Science, RWTH Aachen University
degree: diploma, Dipl.-Inform.
topic: *Surface-Reconstruction of the Human Nasal Cavity from CT-Data for Fluid Mechanical Analysis of Breathing Problems*
major: Computer Graphics & Multimedia
minor: Biology with major in Genetics

Research activities

- 11/2015 - today** *Efficient Geometry Distribution for Large-Scale CFD computations*
- algorithm development for the treatment of parallel distributed geometries in CFD computations on hierarchical Cartesian meshes
- 11/2014 - today** *Performance Analysis, Tuning, and System-Porting of Engineering Simulation Codes*
- performance tweaking of a *Lattice-Boltzmann* code
- development of highly scalable algorithms for engineering codes
- simulation code porting to IBM BlueGene/Q systems and accelerators

- 12/2013 - today** *Simulation of Aerosol Particle Deposition in the Human Respiratory System*
- development of an Euler-Lagrangian coupled particle/flow solver
 - investigations of the deposition behavior of drugs and fine dust particles in the human lung
- 03/2009 - 11/2014** *DFG-funded project "Rhinomodel"*
- thermal extension of a *Lattice-Boltzmann* flow solver
 - parallel optimization of a *Lattice-Boltzmann* flow solver for the application on HPC systems
 - analysis of the flow in the human nasal cavity and the development of a classification strategy for nasal cavity geometries
- 09/2013 - 11/2013** *Massively parallel grid generation on HPC systems*
- development and parallel optimization of algorithms to generate large scale computational meshes for flow simulations on HPC systems
- 07/2012 - 10/2013** *DFG-funded project "Exhalat"*
- simulation of the steady and unsteady flow in a model of the human lung
- 10/2009** *Visualization of the improvement of nasal flow with Nasonex, Essex Pharma GmbH*
- surface reconstruction and geometry processing from Magnetic Resonance Imaging (MRI)
 - analysis of the flow and particle transport in the human nasal cavity
- 10/2008 - 03/2009** *Surface-Reconstruction of the Human Nasal Cavity from CT-Data for Fluid Mechanical Analysis of Breathing Problems, diploma thesis*
- development and implementation of a pipeline for the surface extraction of nasal cavities from Computer Tomography (CT) images
 - evaluation of reconstruction and smoothing algorithms to obtain realistic geometries from CT images

List of publications

The following scientific papers have been published in peer-reviewed journals, books, conference proceedings, and magazines.

- A. Lintermann, Strömende Bits und Bytes - Zusammenspiel von Höchstleistungsrechnern und Medizin. RWTH Themenheft 3/2017 (SS) (2017) 20-28.
- A. Lintermann & W. Schröder, Simulation of aerosol particle deposition in the upper human tracheobronchial tract. *European Journal of Mechanics - B/Fluids*, 63 (2017) 73-89. [doi:10.1016/j.euromechflu.2017.01.008](https://doi.org/10.1016/j.euromechflu.2017.01.008).
- M. Schlottke-Lakemper, H. Yu, S. Berger, A. Lintermann, M. Meinke, & W. Schröder, The direct-hybrid method for computational aeroacoustics on HPC systems, in: E. Di Napoli, M.-A. Hermanns, H. Iliev, A. Lintermann, & A. Peyser (Eds.), *Proceedings of the JARA-HPC Symposium 2016 (JHPCS'16)*, Lecture Notes in Computer Science LNCS, Springer International Publishing (2017). [doi:10.1007/978-3-319-53862-4_7](https://doi.org/10.1007/978-3-319-53862-4_7).
- M. Schlottke-Lakemper, F. Klemp, H.-J. Cheng, A. Lintermann, M. Meinke, & W. Schröder, CFD/CAA Simulations on HPC Systems, in: *Sustained Simulation Performance 2016*, (2016) 139-157. Springer International Publishing. [doi:10.1007/978-3-319-46735-1_12](https://doi.org/10.1007/978-3-319-46735-1_12).
- A. Lintermann, Efficient Parallel Geometry Distribution for the Simulation of Complex Flows, in: M. Papadarakakis, V. Papadopoulos, G. Stefanou, & V. Plevris (Eds.), *VII European Congress on Computational Methods in Applied Sciences and Engineering*. Hersonissos, Crete Island, Greece, (2016).
- V. Marinova, I. Kerroumi, A. Lintermann, J.H. Göbbert, C. Moulinec, S. Rible, Y. Fournier, & M. Bebahani, Numerical Analysis of the FDA Centrifugal Blood Pump, *Proceedings of the 2016 NIC Symposium*, NIC Series, 48 (2016) 355-364. [ISBN: 978-3-95806-109-5](https://doi.org/10.1007/978-3-95806-109-5).
- M.O. Cetin, A. Pogorelov, A. Lintermann, H.-J. Cheng, M. Meinke, & W. Schröder, Large-Scale Simulations of a Non-generic Helicopter Engine Nozzle and a Ducted Axial Fan, *High Performance Computing in Science and Engineering '15* (2016) 389-405. [doi:10.1007/978-3-319-24633-8_25](https://doi.org/10.1007/978-3-319-24633-8_25).
- M.A. Schlottke, H.-J. Cheng, A. Lintermann, M. Meinke, & W. Schröder, A direct-hybrid method for computational aeroacoustics, *21st AIAA/CEAS Aeroacoustics Conference* (2015). [doi:10.2514/6.2015-3133](https://doi.org/10.2514/6.2015-3133).
- G.B. Gadeschi, C. Siewert, A. Lintermann, M. Meinke, & W. Schröder, Towards Large Multi-scale Particle Simulations with Conjugate Heat Transfer on Heterogeneous Super Computers, *High Performance Computing in Science and Engineering '14* (2015) 307-309, Springer International Publishing. [doi:10.1007/978-3-319-10810-0_21](https://doi.org/10.1007/978-3-319-10810-0_21).
- A. Lintermann, *Nasal Cavity Flows Using Lattice-Boltzmann Methods on High Performance Computers* (1st ed.), PhD thesis (2014). Apprimus Verlag, Aachen. [ISBN: 978-3-86359-244-8](https://doi.org/10.1007/978-3-86359-244-8).
- F. Schröder, A. Lintermann, M. Klaas, & W. Schröder, Experimental and numerical investigation of the three-dimensional flow at expiration in the upper human airways, *International Journal of Fluid Engineering*, 6 (1) (2014) 9-28. [ISSN: 0974-3138](https://doi.org/10.1007/978-3-319-10810-0_21).
- A. Lintermann, S. Schlimpert, J. H. Grimmen, C. Günther, M. Meinke, & W. Schröder, Massively parallel grid generation on HPC Systems, *Computer Methods in Applied Mechanics and Engineering* 277 (2014) 131-153. [doi:10.1016/j.cma.2014.04.009](https://doi.org/10.1016/j.cma.2014.04.009).
- A. Lintermann, M. Meinke, & W. Schröder, Fluid mechanics based classification of the respiratory efficiency of several nasal cavities, *Computers in Biology and Medicine* 43 (11) (2013) 1833-1852. [doi:10.1016/j.compbiomed.2013.09.003](https://doi.org/10.1016/j.compbiomed.2013.09.003).
- N. Achilles, N. Pasch, A. Lintermann, W. Schröder, & R. Mösges, Computational fluid dynamics: a suitable assessment tool for demonstrating the antiobstructive effect of drugs in the therapy of allergic rhinitis, *Acta Otorhinolaryngologica Italica* 33 (2013) 36-42. [PMID:23620638](https://pubmed.ncbi.nlm.nih.gov/23620638/).
- A. Lintermann, G. Eitel-Amor, M. Meinke, & W. Schröder, Lattice-Boltzmann Solutions with Local Grid Refinement for Nasal Cavity Flows, in: *New Results in Numerical and Experimental Fluid Mechanics VIII*, Springer (2013) 583-590. [doi:10.1007/978-3-642-35680-3_69](https://doi.org/10.1007/978-3-642-35680-3_69).

- A. Lintermann, Simulation of Nasal Cavity Flows for Virtual Surgery Environments, Supercomputing at the Leading Edge - Gauss Center for Supercomputing (2013) 16.
- A. Lintermann, M. Meinke, & W. Schröder, Investigations of Human Nasal Cavity Flows Based on a Lattice-Boltzmann Method, in: M. Resch, X. Wang, W. Bez, E. Focht, H. Kobayashi, S. Roller (Eds.), High Performance Computing on Vector Systems 2011, Springer Berlin / Heidelberg (2012) 143-158. [doi:10.1007/978-3-642-22244-3](https://doi.org/10.1007/978-3-642-22244-3).
- A. Lintermann, Simulation of Nasal Cavity Flows for Virtual Surgery Environments, inside, Innovatives Supercomputing in Deutschland 10 (2) (2012) 16-23.
- A. Lintermann, M. Meinke, & W. Schröder, Investigations of the Inspiration and Heating Capability of the Human Nasal Cavity Based on a Lattice-Boltzmann Method, in: Proceedings of the ECCOMAS Thematic International Conference on Simulation and Modeling of Biological Flows (SIMBIO 2011), Brussels, Belgium (2011).
- G. Eitel, R. Freitas, A. Lintermann, M. Meinke, & W. Schröder, Numerical Simulation of Nasal Cavity Flow Based on a Lattice-Boltzmann Method, in: New Results in Numerical and Experimental Fluid Mechanics VII, Springer Berlin / Heidelberg (2010) 513-520. [doi:10.1007/978-3-642-14243-7_63](https://doi.org/10.1007/978-3-642-14243-7_63).
- R. Mösges, M. Meinke, A. Lintermann, K. Henkel, & B. Wein, 3D-visualization Of The Nasal Flow After Allergen Challenge And The Effect Of Mometasone Furoate Nasal Spray (MFNS), Journal of Allergy and Clinical Immunology 123 (2) (2009) S135. [doi:10.1016/j.jaci.2008.12.499](https://doi.org/10.1016/j.jaci.2008.12.499).

List of review activities

Reviews have been provided for the following journals, conferences, and computing time proposals.

- Journal of Aerosol Science
- Journal of Aircraft Engineer and Aerospace Technology
- Annals of Biomechanical Engineering
- Computers in Biology and Medicine
- CFD2015 Conference - Minerals and Process Industries
- JARA Excellence PhD 2015
- JARA-HPC Symposium 2016 (JHPCS'16)
- Technical and scientific review of computing time proposals for the IT Center, RWTH Aachen University, the Gauss Center for Supercomputing, and the JARA-HPC partition

Editorial activities

- Proceedings of the JARA-HPC Symposium 2016 (JHPCS'16), Lecture Notes in Computer Science LNCS, Springer International Publishing

Organizational activities

- ECCM-ECFD 2018 Minisymposium, Jun. 11-15, 2018, Glasgow, UK
- GAMM CSE Workshop 2017, Oct. 19-20, 2017, Jülich, Germany
- JARA-HPC Symposium 2016 (JHPCS'16), Oct. 04-05, 2016, Aachen, Germany
- DLR Workshop 2016, May 25, 2016, Jülich, Germany

Acquired third-party funds

- IraSME 2017, funded by BMWi, *“Implementierung von CFD-Komponenten zur Simulation von Strömungen in der menschlichen Nase”* within *“Morphologische und funktionelle Präzisionsdiagnostik der Nase”*, funding code: ZF4427201CS7, project duration: 09/2017 - 09/2020

Awards

- High Performance Center Stuttgart (HLRS), Golden Spike Award for outstanding project (2014).

List of supervised student theses

The following student theses have been supervised or are still under supervision.

- Y. Seike, Experimental and Numerical Analysis of Horse Shoe Vortices Emanating from Pier Structures, SimLab FSE, RWTH Aachen University, Obi Laboratory, Keio University, Tokyo, Japan, Master thesis (2017).
- K. Krishnamurthy, Computational study of Turbulence characteristics in a Natural Convective Flow, SimLab FSE, RWTH Aachen University, Fire Simulation Team, Civil Security and Traffic, Jülich Supercomputing Centre, Research Centre Jülich (2016).
- F. Farrokhnezhad, Implementation issues and benchmarking of lattice Boltzmann method for moving rigid particle simulation in a viscous flow, SimLab FSE, RWTH Aachen University, GRS, RWTH Aachen University, Simulation Sciences Seminar (2016).
- J. Jiang, Pulsatile Boundary Conditions for a Lattice-Boltzmann Method to Simulate the Unsteady Flow in the Lower Human Respiratory System, AIA, RWTH Aachen University, Bachelor thesis (2013).
- S. Karth, and N. Köpke-Chappele, Integration of thermal induced convection and thermal boundary conditions in a Lattice-Boltzmann flow solver to simulate natural convective flows, AIA, RWTH Aachen University, Project thesis (2012).
- A. Langenfeld, Simulation of particle transport coupled to flow solutions obtained by a Lattice-Boltzmann Method, AIA, RWTH Aachen University, Bachelor thesis (2012).
- S. Dieckmann, Wall shear stress computation with a Lattice-Boltzmann Method, AIA, RWTH Aachen University, Study thesis (2011).