Thomas Höllt

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Education

04/2013 **Ph.D. in Computer Science**
King Abdullah University of Science and Technology, Saudi Arabia.
Visual Workflows for Oil and Gas Exploration.
Advisor: Markus Hadwiger

08/2008 **Diplom Informatiker (M.Sc. Computer Science)**
Universität Koblenz-Landau, Germany.
Direct Processing of Compressed Volume Data.
Advisors: Matthias Raspe, Stephan Müller

Professional Profile

01/2017–today Assistant Professor, Leiden Computational Biology Center,
Leiden University Medical Clinic, Leiden, The Netherlands.

05/2015–today Postdoctoral Fellow, Computer Graphics and Visualization, Dept. of InSy/EEMCS,
TU Delft, Delft, The Netherlands.

01/2014–02/2015 Research Consultant for Visualization, Earth Fluid Modeling and Prediction Group,
King Abdullah University of Science and Technology, Thuwal, KSA.

05/2013–12/2013 Postdoctoral Fellow, GMSV (now Visual Computing Center),
King Abdullah University of Science and Technology, Thuwal, KSA.

03/2010–04/2013 Ph.D. Student, GMSV (now Visual Computing Center),
King Abdullah University of Science and Technology, Thuwal, KSA.

02/2009–02/2010 Researcher, VRVis Research Center, Vienna, Austria.

09/2008–01/2009 Research Assistant, Universität Koblenz Landau, Koblenz, Germany.

Guest Research Stays

07–08/2013 Vienna University of Technology, Vienna, Austria.

07–08/2011 & 2012 SCI Institute, University of Utah, Salt Lake City, UT.

06/2011 & 2012 SimVis GmbH, Vienna, Austria.

06–08/2011 VRVis Research Center, Vienna, Austria.

Awards

Best Paper Award at the Eurographics Workshop on Visual Computing for Biology and Medicine 2017.

Honorable Mention for Best Paper Award at the IEEE Pacific Visualization Symposium 2013.

KAUST Academic Excellence Award, 2013.

KAUST Academic Excellence Award, 2011.

Professional Activities

Conference & Journal Reviewing

IEEE Visualization Conference; Eurographics Conference; Eurographics Conference on Visualization; IEEE Pacific Visualization Symposium; Computers & Graphics; International Workshop on Vision, Modeling and Visualization; International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision; Central European Seminar on Computer Graphics

Other Academic Activities

Abstracts co-chair - biovis Annual Meeting @ ISMB 2018.

Program Committee - VAHC - Workshop on Visual Analytics in Healthcare 2017.

Program Committee - Spring Conference on Computer Graphics (SCCG) 2017.

Session Chair - Visual Analytics and Storytelling in Medical Visualization, EuroRV[3] 2016.

Program Committee - International Symposium on Visual Computing 2013, special track on Visual Computing in Geoscience and Reservoir Engineering program committee.

Teaching Experience

2015–2017	Teaching Assistant, Data Visualization, TU Delft
2011–2012	Student Supervision (Directed Research), King Abdullah University of Science and Technology
2010, 2013	Teaching Assistant, CS 247: Scientific Visualization, King Abdullah University of Science and Technology
2011	Teaching Assistant, CS 380: GPU and GPGPU Programming, King Abdullah University of Science and Technology

Publications

Theses

Thomas Höllt, **Visual Workflows for Oil and Gas Exploration**, Ph.D. Thesis, King Abdullah University of Science and Technology, 2013. HDL:10754/287324

Thomas Höllt, **Direct Processing of Compressed Volume Data**, Masters Thesis, Universität Koblenz-Landau, 2008.

Journal & Reviewed Conference Publications

Thomas Höllt, Nicola Pezzotti, Vincent van Unen, Frits Koning, Boudewijn Lelieveldt, and Anna Vilanova, **CyteGuide: Visual Guidance for Hierarchical Single-Cell Analysis**, *IEEE Transactions on Visualization and Computer Graphics*, 24(1) (Proceedings IEEE Information Visualization), pp. 739–748, 2018. DOI: 10.1109/TVCG.2017.2744318

Nicola Pezzotti, Thomas Höllt, Jan van Gemert, Boudewijn Lelieveldt, Elmar Eisemann, and Anna Vilanova, **DeepEyes: Progressive Visual Analytics for Designing Deep Neural Networks**, *IEEE Transactions on Visualization and Computer Graphics*, 24(1) (Proceedings IEEE VAST), pp. 98–108, 2018. DOI: 10.1109/TVCG.2017.2744358

Vincent van Unen*, Thomas Höllt*, Nicola Pezzotti*, Na Li, Marcel Reinders, Elmar Eisemann, Anna Vilanova, Frits Koning, and Boudewijn Lelieveldt, **Visual Analysis of Mass Cytometry Data by Hierarchical Stochastic Neighbor Embedding Reveals Rare Cell Types**, *Nature Communications*, 8(1740), 2017. (*equal contribution) DOI: 10.1038/s41467-017-01689-9

Nicola Pezzotti, Boudewijn P.F. Lelieveldt, Laurens van der Maaten, Thomas Höllt, Elmar Eisemann, and Anna Vilanova, **Approximated and User Steerable tSNE for Progressive Visual Analytics**, *IEEE Transactions on Visualization and Computer Graphics*, 23(7), pp. 1739–1752, 2017. DOI: 10.1109/TVCG.2016.2570755

Changgong Zhang, Thomas Höllt, Matthan Caan, Elmar Eisemann, and Anna Vilanova, **Comparative Visualization for Diffusion Tensor Imaging Group Study at Multiple Levels of Detail**, *Proceedings of Visual Computing for Biology and Medicine (VCBM)*, 2017. **Best paper award.** DOI: 10.2312/vcbm.20171237

Changgong Zhang, Matthan Caan, Thomas Höllt, Elmar Eisemann, and Anna Vilanova, **Overview + Detail Visualization for Ensembles of Diffusion Tensors**, *Computer Graphics Forum*, 36(3), (Proceedings EG/VGTC Conference on Visualization), pp. 121–132, 2017. DOI: 10.1111/cgf.13173

Thomas Höllt, Nicola Pezzotti, Vincent van Unen, Frits Koning, Elmar Eisemann, Boudewijn Lelieveldt, and Anna Vilanova, **Cytosplore: Interactive Immune Cell Phenotyping for Large Single-Cell Datasets**, *Computer Graphics Forum*, 35(3), (Proceedings EG/VGTC Conference on Visualization), pp. 171–180, 2016. DOI: 10.1111/cgf.12893

Nicola Pezzotti, Thomas Höllt, Boudewijn Lelieveldt, Elmar Eisemann, and Anna Vilanova, **Hierarchical Stochastic Neighbor Embedding**, *Computer Graphics Forum*, 35(3), (Proceedings EG/VGTC Conference on Visualization), pp. 21–30, 2016. DOI: 10.2312/10.1111/cgf.12878

Vincent van Unen, Ni La, Ilse Molendijk, Mine Temurhan, Thomas Höllt, Andrea E van der Meulen-de Jong, Hein W Verspaget, M Luisa Mearin, Chris J Mulder, Jeroen van Bergen, Boudewijn P. F. Lelieveldt, and Frits Koning, **Mass Cytometry of the Human Mucosal Immune System Identifies Tissue- and Disease-Associated Immune Subsets**, *Immunity*, 44, to appear, 2016. DOI: 10.1016/j.immuni.2016.04.014

Thomas Höllt, M. Umer Altaf, Kyle T. Mandli, Markus Hadwiger, Clint N. Dawson and Ibrahim Hoteit, **Visualizing Uncertainties in a Storm Surge Ensemble Data Assimilation and Forecasting System**, *Natural Hazards*, 77(1), pp. 317–336, 2015. DOI: 10.1007/s11069-015-1596-y

Thomas Höllt, Ahmed Magdy, Peng Zhan, Guoning Chen, Ganesh Gopalakrishnan, Ibrahim Hoteit, Charles D. Hansen, and Markus Hadwiger, **Ovis: A Framework for Visual Analysis of Ocean Forecast Ensembles**, *IEEE Transactions on Visualization and Computer Graphics*, 20(8), pp. 1114–1126, 2014. DOI: 10.1109/TVCG.2014.2307892

Thomas Höllt, Ahmed Magdy, Guoning Chen, Ganesh Gopalakrishnan, Ibrahim Hoteit, Charles D. Hansen, and Markus Hadwiger, **Visual Analysis of Uncertainties in Ocean Forecasts for Planning and Operation of Off-Shore Structures**, *Proceedings of IEEE Pacific Visualization*, pp. 185–192, 2013. **Honorable mention for best paper award.** DOI: 10.1109/PacificVis.2013.6596144

Thomas Höllt, Wolfgang Freiler, Fritz Gschwantner, Helmut Doleisch, Gabor Heinemann, and Markus Hadwiger, **SeiVis: An Interactive Visual Subsurface Modeling Application**, *IEEE Transactions on Visualization and Computer Graphics*, 18(12) (Proceedings IEEE Scientific Visualization), pp. 2226–2235, 2012. DOI: 10.1109/TVCG.2012.259

Mathias Schott, Tobias Martin, A.V. Pascal Grosset, Carson Brownlee, Thomas Höllt, Benjamin P. Brown, Sean T. Smith, and Charles D. Hansen, **Combined Surface and Volumetric Occlusion Shading**, *Proceedings of IEEE Pacific Visualization*, pp. 169–176 2012. DOI: 10.1109/PacificVis.2012.6183588

Thomas Höllt, Johanna Beyer, Fritz Gschwantner, Philipp Muigg, Helmut Doleisch, Gabor Heinemann, and Markus Hadwiger, **Interactive Seismic Interpretation with Piecewise Global Energy Minimization**, *Proceedings of IEEE Pacific Visualization*, pp. 59–66, 2011. DOI: 10.1109/PacificVis.2011.5742373

Georg Geier, Thomas Pabel, Daniel Habe, Jördis Rosc, Markus Hadwiger, Thomas Höllt, and Laura Fritz, **Computertomographie als zerstörungsfreies Prüfverfahren für Gussteile**, *Druckguss*, 7(8), pp. 171–174, 2010.

Markus Hadwiger, Laura Fritz, Christof Rezk-Salama, Thomas Höllt, Georg Geier, and Thomas Pabel, **Interactive Volume Exploration for Feature Detection and Quantification in Industrial CT Data**, *IEEE Transactions on Visualization and Computer Graphics*, 14(6) (Proceedings IEEE Visualization), pp. 1507–1514, 2008. DOI: 10.1109/TVCG.2008.147

Georg Geier, Markus Hadwiger, Thomas Höllt, Laura Fritz, and Thomas Pabel, **Interaktive Exploration und Quantifizierung von Ungänzen in komplexen Bauteilen**, *Proceedings of Industrielle Computertomografie (CT Tagung Wels)*, pp. 103–108, 2008.

Short Papers & Posters

Thomas Höllt, Fabio Miguel de Matos Ravanelli, Markus Hadwiger, and Ibrahim Hoteit, **Visual Analysis of Reservoir Simulation Ensembles**, *Workshop on Visualisation in Environmental Sciences (EnvirVis)*, 2016, pp. 1–4. DOI: 10.2312/envirvis.20161099

Thomas Höllt, Markus Hadwiger, Omar Knio, and Ibrahim Hoteit **Probability Maps for the Visualization of Assimilation Ensemble Flow Data**, *Workshop on Visualisation in Environmental Sciences (EnvirVis)*, pp. 43–47, 2015. DOI: 10.2312/envirvis.20151090

Thomas Höllt, Guoning Chen, Charles D. Hansen, and Markus Hadwiger, **Extraction and Visual Analysis of Seismic Horizon Ensembles**, *Proceedings of Eurographics 2013 Short Papers*, pp. 69–72, 2013. DOI: 10.2312/conf/EG2013/short/069-072

Thomas Höllt, Markus Hadwiger, Laura Fritz, Philipp Muigg, and Helmut Doleisch, **Seismic Horizon Tracing with Diffusion Tensors**, *Poster Presentation IEEE Visualization 2009, Atlantic City, NJ*, 2009.

Invited Talks

Exploration of large single-cell data with Cytosplore and HSNE. Seminar, Sanquin, Amsterdam, September 28th, 2017.

Visualizing large single-cell data with HSNE. BioSB HotTopics Meeting on Single Cell Analysis, Leiden, September 21th, 2017.

Visual Analytics in Biology - A Single-Cell Analysis Case Study. Guest Lecture, NanoBiology Master Class, TU Delft, June 26th, 2017.

Interactive Visual Analysis of Large CyTOF Single-Cell Data. Visual Computing Forum Seminar, University of Bergen, May 22nd, 2017.

Cytosplore and HSNE for Singe-Cell Exploration. Molecular Epidermology (MOLEPI) Seminar, Leiden University Medical Center, Leiden, December 13th, 2016.

Cytosplore and HSNE for Singe-Cell Exploration. Laboratorium voor Klinische en Experimentele Beeldverwerking (LKEB) Seminar, Leiden University Medical Center, Leiden, December 5th, 2016.

Cytosplore: Interactive Immune Cell Phenotyping for Large Singe-Cell Datasets. VieVisDays 2016, Vienna Symposium on Visualization, TU Wien, Vienna, June 29th, 2016.

Interactive Visual Phenotype Specification for Large Single Cell Datasets. Seminar Bioinformatics Lab, TU Delft, Delft, February 23rd, 2016.

Interactive Phenotype Specification for Large Single Cell Datasets. Netherlands eScience Center Symposium: The Science of Big-Data Analytics & Visualization, Utrecht, November 23rd, 2015.

Ovis: A Framework for Visual Analysis of Ocean Forecast Ensembles. Seminar Computer Graphics and Visualization, TU Delft, Delft, February 10th, 2015.

Visual Workflows for Oil and Gas Exploration. Earth Sciences and Engineering Seminar, Physical Sciences and Engineering Division, King Abdullah University of Science and Technology, Thuwal, February 12th, 2013.

Interactive Seismic Interpretation. VRVis Forum, VRVis, Vienna, July 22nd, 2010.

Conference Talks

CyteGuide: Visual Guidance for Hierarchical Single-Cell Analysis. IEEE Information Visualization, October 5th, 2017.

Cytosplore: Interactive Immune Cell Phenotyping for Large Single-Cell Datasets. EG/VGTC Conference on Visualization (EuroVis), June 8th, 2016.

Visual Analysis of Reservoir Simulation Ensembles. Workshop on Visualisation in Environmental Sciences (EnvirVis), June 6th, 2016.

Probability Maps for the Visualization of Assimilation Ensemble Flow Data. Workshop on Visualisation in Environmental Sciences (EnvirVis), May 26th, 2015.

Extraction and Visual Analysis of Seismic Horizon Ensembles. Eurographics, May 8th, 2013.

Visual Analysis of Uncertainties in Ocean Forecasts for Planning and Operation of Off-Shore Structures. IEEE Pacific Visualization, February 28th, 2013.

SeiVis: An Interactive Visual Subsurface Modeling Application. IEEE Sciientific Visualization, October 18th, 2012.

Interactive Seismic Interpretation with Piecewise Global Energy Minimization. IEEE Pacific Visualization, March 2nd, 2011.