Curriculum Vitae Olaf Schenk

Full Professor, Institute of Computational Science, USI Lugano, Switzerland, August 2017

Research Interests

My interests are centered around the topic of multicore and manycore algorithms for computational science simulations on emerging high-performance computing (HPC) architectures. To this end, the research connects several relevant subfields of computer science with the needs of computational science and HPC. Typically, I drive research towards extreme-scale simulations in computational algorithms, application software, programming, and software tools. I am currently involved in several HPC and computational science research and simulation projects that develop methods and applications targeted at the next generation of petaflop/exaflop architectures.

Current Position

2016–present **Full Professor of Computational Science** **USI Lugano**
I lead research on computational science and HPC, advising Postdocs, and PhD, MSc, and BSc students in the Advanced Computing Laboratory at the Institute of Computational Science, USI Lugano, Switzerland.

Awards and Honors

2014 **INCITE Award** **Oak Ridge Leadership Computing Facility, USA**
"[...] for researchers to make transformational advances in science and technology through large allocations of computer time and [...] at the Argonne and Oak Ridge Leadership Computing Facility centers, operated by the US Department of Energy Office of Science.", 100,000,000 CPU h. (with J. Tromp, Princeton, USA)

2013 **INCITE Award** **Oak Ridge Leadership Computing Facility, USA**
"[...] for researchers to make transformational advances in science and technology through large allocations of computer time and [...] at the Argonne and Oak Ridge Leadership Computing Facility centers, operated by the US Department of Energy Office of Science.", 100,000,000 CPU h. (with J. Tromp, Princeton, USA)

2008 **SIAM SIGEST Honor** **Philadelphia, USA**
"SIGEST highlights a recent paper from one of SIAM's specialized research journals, chosen on the basis of exceptional interest to the entire SIAM community and revised and condensed as needed for greater accessibility." (with M. Bollhöfer, Braunschweig University of Technology, Germany and R. Römer, University of Warwick, United Kingdom)

2007 **IBM Faculty Award** **Yorktown Heights, USA**
"To qualify for this internationally competitive award [...] candidates must have an outstanding reputation for contributions in their field or, in the case of junior faculty, show unusual promise.", $40,000

1999 **PhD Student Travel Award** **Kyoto, Japan**
Second International Symposium on High-Performance Computing, ISHPC'99, $2,000

Positions and Experience

Current Significant Leadership and Service Positions

2017–present **Conference Co-Chair** **SIAM PP18**
The SIAM Conference on Parallel Processing provides a forum for computational mathematicians, computer scientists, computer architects, and computational scientists to exchange ideas on mathematical algorithms and computer architecture needed for simulations on high-performance computer systems.

2016–present **Program Director** **SIAM Activity Group on Supercomputing**
The SIAM Activity Group on Supercomputing provides a forum for computational mathematicians, computer scientists, computer architects, and computational scientists to exchange ideas on mathematical algorithms and computer architecture needed for simulations on high-performance computer systems.

2016–present **Conference Co-Chair** **ACM PASC17**
The Platform for Advanced Scientific Computing Conference (PASC) Conference is an interdisciplinary conference in HPC that brings together domain science, applied mathematics and computer science - where computer science is focused on enabling the realization of scientific computation.

2014–present **Master Director** **USI Lugano**
Director of the Computational Science Master program.

2013–present **Consulting Position at Swiss National Supercomputing Centre** **CSCS**
Consulting position on scientific computing support and scientific computing engagement.

2013–present **Project Board Member** **SCCER-FURIES**
The Swiss SCCER Future Swiss Electrical Infrastructure (FURIES) joins the competencies of the top Swiss academic and industrial actors in the area of power and energy systems to shape the next generation of the electrical Swiss infrastructure.

2012–present **Associate Editor** **SIAM SISC**
SIAM Journal on Scientific Computing

Research

2016–present **Full Professor of Computational Science** **USI Lugano**
I lead research on computational science and HPC, advising Postdocs, and PhD, MSc, and BSc students in the Advanced Computing Laboratory at the Institute of Computational Science.

2012–2016 **Associate Professor of Computational Science** **USI Lugano**
I led research on computational science and HPC, advising Postdocs, and PhD, MSc, and BSc students in the Advanced Computing Laboratory at the Institute of Computational Science.

2005–2011 **Senior Researcher** **University of Basel, Switzerland**
I independently led several academic and industrial research projects (total financial volume: CHF 3,976,000) on computational science and HPC, advised 3 PhD and 9 MSc students in the Department of Mathematics and Computer Science, and (co)taught 9 courses on the BSc and MSc levels in computer science.

2001–2004 **Postdoctoral Fellow** **University of Basel, Switzerland**
Parallel programming and HPC research. Scientific advisor: Helmar Burkhart

2002–2003 **Visiting Researcher** **IBM Thomas J. Watson Research Center, Yorktown, USA**
Research on parallel programming, sparse matrix algorithms, and HPC. Scientific host: Anshul Gupta

1996–2000 **Research Assistant** **ETH Zurich, Switzerland**
Research on semiconductor device simulation, solver, and HPC. Scientific advisor: Wolfgang Fichtner

Education

2010 **Habilitation in Applied Informatics and Scientific Computing** **University of Basel**
"Venia Docendi" at Department of Mathematics and Computer Science **Basel, Switzerland**

1996–2000 **PhD in Electrical Engineering and Information Technology (Dr. sc. techn.) ETH Zurich**
Committee members: Wolfgang Fichtner, Martin Gutknecht **Zurich, Switzerland**

1990–1995 **Diploma Technomathematik (Computational Mathematics)** **KIT Karlsruhe**
Karlsruher Institute of Technology, Karlsruhe, Germany

Publications

Total: 34 journal papers, 5 book chapters, 21 top conference papers, 36 workshop and conference papers, 1 edited book, 8 edited conference proceedings, **4200+ citations, h-index: 27** (Google Scholar); full publication list available at http://www.ics.inf.usi.ch

Olaf Schenk and his PhD students and postdocs are underlined.

Technical Reports (submitted)

IEEE ISGT O. Malley Conor, G. Hug, D. Kourounis, O. Schenk, *Finite Volume Methods for Transient Modeling of Gas Pipelines*, submitted to 7th IEEE International Conference on Innovative Smart Grid Technologies.

SIAM SISC M. Bollhöfer, A. Eftekhari, S. Scheidegger, O. Schenk, *Large–Scale Sparse Inverse Covariance Matrix Estimation*, submitted to SIAM J. Sci. Comput., under revision.

COMPUT. SCIENCE A. De Coninck, B. Baets, D. Kourounis, F. Verbosio, O. Schenk, S. Maenhout, J. Fostier, O. Schenk, *Enhancing the Scalability of Selected Inversion Factorization Algorithms in Genomic Prediction*, Journal of Computational Science, under revision.

IEEE HiPC B. Reps, S. Donfack, D. Mikushin, P. Sanan, O. Schenk, W. Vanroose, *A High Arithmetic Intensity Krylov Subspace Method based on Data-Centric Complex Stencil Compiler Programs*, June 2017, submitted to 2017 IEEE 24th International Conference on High Performance Computing (HiPC).

IEEE HiPC T. Simpson, O. Schenk, *Load-Balanced Partition Refinement with the Graph p-Laplacian*, June 2017, submitted to 2017 IEEE 24th International Conference on High Performance Computing (HiPC).

CMAME. P. Sanan, M. Bollhöfer, D. A. May, O. Schenk, *Practical ILDL Preconditioning with Symmetric Maximum Weighted Matching Preprocessing, with Applications to the Stokes and Lamè Systems with Heterogeneous Coefficient Structure*, submitted to Journal of Computer Methods in Applied Mechanics and Engineering.

ACM TOMS D. Kourounis, L. N. Gergidis, M. A. Saunders, A. Walther, O. Schenk, *Compile-Time Symbolic Differentiation Using C++ Expression Templates*, submitted to ACM TOMS, under revision.

INVERSE PROBL. D. Kourounis, L. Gaudio, O. Schenk , *Interior-Point Methods and Identifiability for Time-dependent Full Waveform Inversion*, submitted to Journal of Geophysics.

Patent Application (submitted)

European Patent D. Kourounis, O. Schenk, *Processing of Multiperiod Optimal Power Flow Problems using Structure-Exploiting Interior Point Methods*, submitted to European Patent Office.

Peer-reviewed Journal Publications

IEEE Trans. Smart Grids A. Fuchs, D. Kourounis, O. Schenk, *Towards the next generation of multi-period optimal power flow solvers* , IEEE Transactions on Power Systems, accepted, in press.

J. Comp. Physics M. Rietmann, M. Grote, D. Peter, O. Schenk, *Newmark Local Time Stepping on High Performance Computing Architectures*, November 2016, Journal of Computational Physics, DOI: 10.1016/j.jcp.2016.11.012

GENETICS A. De Coninck, B. Baets, D. Kourounis, F. Verbosio, O. Schenk, S. Maenhout, J. Fostier, *Needles: Large-Scale Genomic Prediction with Marker-by-environment Interaction*, January 2016, Journal of Genetics, DOI: 10.1534/genetics.115.179887

COMPUT. SCIENCE J. Brumm, D. Mikushin, S. Scheidegger, O. Schenk, *Scalable High-Dimensional Dynamic Stochastic Economic Modeling*, Journal of Computational Science, 2015, DOI: 10.1016/j.jocs.2015.07.004

COMG D. Kourounis, O. Schenk, *Constraint Handling for Gradient-Based Optimization of Compositional Reservoir Flow*, Journal of Computational Geosciences, October 2015, Volume 16(5), pp 1109–1122, DOI: 10.1007/s10596-015-9524-5

IEEE CiSE C. Petra, O. Schenk, M. Anitescu, *Real-time Stochastic Optimization of Complex Energy Systems on High Performance Computers*, IEEE Computing in Science & Engineering - Leadership Computing (Volume: 16, Issue: 5), pp. 32–42, 2014. DOI: 10.1109/MCSE.2014.53

SIAM SISC M. J. Grote, J. Huber, D. Kourounis, O. Schenk, *Inexact Interior-Point Method for PDE-Constrained Nonlinear Optimization*, SIAM J. Sci. Comput. 36–3, pp. A1251-A1276, 2014. DOI: 10.1137/130921283

SIAM SISC C. Petra, O. Schenk, M. Lubin, K. Gärtner, *An Augmented Incomplete Factorization Approach for Computing the Schur Complement in Stochastic Optimization*, SIAM J. Sci. Comput. 36–2, pp. C139–C162, 2014. DOI: 10.1137/130908737

JPDC G. Kollias, M. Sathe, O. Schenk, A. Grama, *Fast Parallel Algorithms for Graph Similarity and Matching*, Journal of Parallel and Distributed Computing, Volume 75, Issue 5, pp. 2400–2410, May 2014. DOI: 10.1016/j.jpdc.2013.12.010

IJAMT S. Wagner, M. Sathe, O. Schenk, *Optimization for Process Plans in Sheet Metal Forming*, The International Journal of Advanced Manufacturing Technology, Volume 71, Issue 5-8, pp 973–982, March 2014. DOI: 10.1007/s00170-013-5515-7

IEEE Trans. Elec. Devices M. Luisier, O. Schenk, *Gate-Stack Engineering in n-type Ultra-Scaled Si Nanowire Field-Effect Transistors*, IEEE Transactions on Electron Devices, pp. 3325–3329, Oct 2013. DOI: 10.1109/TED.2013.2278573

G^3 P. Basini, T. Nissen-Meyer, L. Boschi, E. Casarotti, J. Verbeke, O. Schenk, D. Giardini, *The Influence of Nonuniform Ambient Noise on Crustal Tomography in Europe*, Geochem. Geophys. Geosyst., 14, 1471–1492, 2013. DOI: 10.1002/ggge.20081

PARCO M. Sathe, O. Schenk, H. Burkhart, *An Auction-Based Weighted Matching Implementation on Massively Parallel Architectures*, Parallel Computing 38, pp. 595-614, 2012. DOI: 10.1016/j.parco.2012.09.001

Math. Prog. F. Curtis, J. Huber, O. Schenk, A. Wächter, *A Note on the Implementation of an Interior-Point Algorithm for Nonlinear Optimization with Inexact Step Computations*, Mathematical Programming Series B, 32(6), 3447-3475, 2012. DOI: 10.1007/s10107-012-0557-4.

JCSRD M. Christen, O. Schenk, H. Burkhart, *Automatic Code Generation and Tuning for Stencil Kernels on Modern Microarchitecture*, Journal Computer Science Research and Development, in Proceedings of the International Supercomputing Conference, ISC11, Volume 26, pp. 205–210, 2011. DOI: 10.1007/s00450-011-0160-6

SIAM SISC F. E. Curtis, O. Schenk, A. Wächter, *An Interior-Point Algorithm for Large-Scale Nonlinear Optimization with Inexact Step Computations*. SIAM J. Sci. Comput. Volume 32, Issue 6, pp. 3447–3475, 2010. DOI: 10.1137/090747634

SIAM SISC M. Bollhöfer, M. Grote, O. Schenk, *Algebraic Multilevel Preconditioning to Helmholtz's Equation for Inhomogeneous Media*, SIAM J. Scientific Computing, Volume 31(5), pp. 3781–3805, 2009. DOI: 10.1137/080725702

JCSRD O. Schenk, M. Manguoglu, A. Sameh, M. Christen, M. Sathe, *Parallel Scalable PDE-Constrained Optimization: Antenna Identification in Hyperthermia Cancer Treatment Planning*, in Proceedings of the International Supercomputing Conference, ISC'09, Journal Computer Science Research and Development, pp. 177–183, 23(3), 2009. DOI: 10.1007/s00450-009-0080-x

SIAM SISC O. Schenk, A. Wächter, M. Weiser, *Inertia Revealing Preconditioning For Large-Scale Nonconvex Constrained Optimization*, SIAM J. Sci. Comput., pp. 939–960 31(2), 2008. DOI: 10.1137/070707233

JPDC O. Schenk, M. Christen, H. Burkhart, *Algorithmic Performance Studies on Graphics Processing Units*, J. Parallel and Distributed Computing, 68, 1360-1369, 2008. DOI: 10.1016/j.jpdc.2008.05.008

SIAM Review O. Schenk, M. Bollhöfer, R. Römer, *On Large-Scale Diagonalization Techniques for the Anderson model of Localization*, SIAM Review, pp. 91-112, 50, 2008, DOI: 10.1137/050637649

COMPUT. OPTIM. APPL. O. Schenk, A. Wächter, M. Hagemann, *Matching-based Preprocessing Algorithms to the Solution of Saddle-Point Problems in Large-Scale Nonconvex Interior-Point Optimization*, Journal of Computational Optimization and Applications, pp. 321-341, 32 (2-3), 2007, DOI: 10.1007/s10589-006-9003-y

GAMM M. Bollhöfer, O. Schenk, *Combinatorial Aspects in Sparse Direct Solvers*, GAMM Mitteilungen, Vol. 29, pp. 342–367, 2006, DOI: 10.1002/gamm.201490037

ETNA O. Schenk, K. Gärtner, *Fast Factorization Pivoting Methods for Sparse Symmetric Indefinite Systems*. Electronic Transactions on Numerical Analysis, 23, 2006, pp. 158–179.

SIAM SISC O. Schenk, M. Bollhöfer, R. Römer, *On Large-Scale Diagonalization Techniques for the Anderson model of Localization*, SIAM J. Sci. Comput., 28 (2006), pp. 963–983. DOI: 10.1137/050637649

SIAM SISC M. Hagemann, O. Schenk, *Weighted Matchings for Preconditioning Symmetric Indefinite Linear Systems*, SIAM J. Sci. Comput., 28, pp. 403–420, 2006, DOI: 10.1137/040615614

COMPUT. STRUCT O. Schenk, M. Hillmann, *Optimal Design of Metal Forming Die Surfaces with Evolution Strategies*, Computer & Structures, 82, pp. 1695–1705, 2004. DOI: 10.1016/j.compstruc.2004.03.055

IEEE TCAD O. Schenk, S. Röllin, A. Gupta, *The Effects of Unsymmetric Matrix Permutations and Scalings in Semiconductor Device and Circuit Simulation*, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, 23, pp. 400–411, 2004. DOI: 10.1109/TCAD.2004.823345

JFGCS O. Schenk, K. Gärtner, *Solving Unsymmetric Sparse Systems of Linear Equations with PARDISO*, J. of Future Generation Computer Systems, 20, pp. 475–487, 2004. DOI: 10.1016/j.future.2003.07.011

PARCO O. Schenk, K. Gärtner, *Two-Level Scheduling in PARDISO: Improved Scalability on Shared Memory Multiprocessing Systems*, Parallel Computing, pp. 187–197., 28, 2002. DOI: 10.1016/S0167-8191(01)00135-1

ISECS O. Schenk, K. Gärtner, B. Schmithüsen, W. Fichtner. *Numerical Semiconductor Device and Process Simulation on Shared Memory Multiprocessors: Algorithms, Architectures, Results*. The Kluwer International Series in Engineering and Computer Science, 515, pp. 141–157, 1999.

JFGCS O. Schenk, K. Gärtner, W. Fichtner, A. Stricker, *PARDISO: A High-Performance Serial and Parallel Sparse Linear Solver in Semiconductor Device Simulation*, J. of Future Generation Computers Systems, 18, pp. 69–78, 2001 DOI: 10.1016/S0167-739X(00)00076-5

BIT O. Schenk, K. Gärtner, W. Fichtner, *Scalable Parallel Sparse Factorization with Left-Right Looking Strategy on Shared Memory Multiprocessors*, BIT Numerical Mathematics, 40, pp. 158–176, 1999.

Speedup Journal K. Gärtner, O. Schenk, W. Fichtner, *Parallel Multigrid Methods for the Continuity Equations in Semiconductor Device Simulation*, Speedup Journal, 12, pp. 67–72, 1999.

Peer-reviewed Conference Publications

Lattice'17 J. Bloch, O. Schenk, *Selected inversion as key to a stable Langevin evolution across the QCD phase boundary*, 35th International Symposium on Lattice Field Theory (Lattice 2017), accepted, in press.

PASC'17 A. Eftekhari, O. Schenk, S. Scheidegger, *Parallelized Dimensional Decomposition for Dynamic Stochastic Economic Models*, in Proceedings of the ACM Platform for Advanced Scientific Computing Conference, PASC'17, pages 38:1–38:11. June 2017, DOI: (acceptance rate: 33%, 13/39).

LNCS L. Riha, T. Brzobohaty, A. Markopoulos, T. Kozubek, O. Schenk, W. Vanroose, *Efficient Implementation of FETI Solver for Multi and Many-Core Architectures using Schur Complements*, September 2015, Proceedings of the International Conference on High Performance Computing in Science and Engineering, HPCSE2015, Lecture Notes in Computer Science (LNCS), Vol: 9611, Springer, 2016, DOI:10.1007/978-3-319-40361-8_6

PDP'15 A. De Coninc, D. Kourounis, F. Verbosio, O. Schenk, B. De Baets, S.. Maenhout, J. Fostier, *Towards Parallel Large-scale Genomic Prediction by Coupling Sparse and Dense Matrix Algebra*, in Proceedings of the 23rd Euromicro International Conference on Parallel, Distributed, and Network-Based Processing, 747–750, 2015. DOI: 10.1109/PDP.2015.94

IPDPS'15 M. Rietmann, M.J. Grote, D. Peter, O. Schenk, B. Ucar, *Load-balanced Local Time Stepping for Large-Scale Wave Propagation*, in Proceedings of the 29th IEEE International Parallel & Distributed Processing Symposium, IPDPS'15, IEEE Computer Society, May 2015, DOI:10.1109/IPDPS.2015.10 (acceptance rate: 21.8%, 108/496)

AGU'14 P. Sanan, S. Schnepp, D. May, O. Schenk, *Composite Solvers for Linear Saddle Point Problems Arising from the Incompressible Stokes Equations with Highly Heterogeneous Viscosity Structure*, American Geophysical Union. Fall Meeting, San Francisco, Dec. 15-19, 2014.

Euro-Par'13 A. Kuzmin, M. Luisier, O. Schenk, *Fast Methods for Computing Selected Elements of the Green's Function in Massively Parallel Nanoelectronic Device Simulations*, Euro-Par 2013, LNCS 8097, F. Wolf, B. Mohr, and D. an Ney (Eds.), Springer-Verlag, pp. 533–544, 2013, DOI: 10.1007/978-3-642-40047-6_54

Wave'13 L. Gaudio, M. J. Grote, O. Schenk, *Interior Point Method for Time-Dependent Inverse Problems*, in Proceedings of 11th Internat. Conf. on Math. and Numerical Aspects of Wave Propagation (WAVES 2013), pp. 121-122, 2013.

SC'12 M. Rietmann, O. Schenk, P. Messmer, T. Nissen-Meyer, D. Peter, P. Basini, D. Komatitsch, J. Tromp, L. Boschi, D. Giardini, *Forward and Adjoint Simulations of Seismic Wave Propagation on Emerging Large-Scale GPU Architectures*, in Proceedings of the International Conference on High Performance Computing, Networking, Storage and Analysis, SC'12, pages 38:1–38:11. IEEE Computer Society Press, Nov. 2012, DOI: 10.1109/SC.2012.59 (acceptance rate: 21%, 100/472).

SC'12 M. Christen, O. Schenk, Y. Cui, *PATUS: Parallel Auto-Tuned Stencils For Scalable Earthquake Simulation Codes*, in Proceedings of the International Conference on High Performance Computing, Networking, Storage and Analysis, SC'12, pages 38:1–38:11. IEEE Computer Society Press, Nov. 2012, DOI: 10.1109/SC.2012.95 (acceptance rate: 21%, 100/472)

PGAS'12 H. Burkhart, M. Sathe, M. Christen, M. Rietmann, O. Schenk, *Run, Stencil, Run, HPC Productivity Studies in the Classroom*, 6th Conference on Partitioned Global Address Space Programming Models, October 10-12, 2012, Santa Barbara, USA.

ICCS'12 M. Christen, O. Schenk,*A Performance Study of an Anelastic Wave Propagation Code Using Auto-tuned Stencil Computations*, Proceedings of the International Conference on Computational Science, ICCS 2012, Eds., vol. 9. Elsevier, 2012, pp. 956–965, DOI:10.1016/j.procs.2012.04.102

IPDPS'11 M. Christen, O. Schenk, H. Burkhart, *Patus: A Code Generation and Autotuning Framework For Parallel Iterative Stencil Computations on Modern Microarchitectures*, in Proceedings of the 25th IEEE International Parallel & Distributed Processing Symposium, IPDPS'11, pages 676–687, IEEE Computer Society, May 2011, DOI: 10.1109/IPDPS.2011.70 (acceptance rate: 19.6%, 112/571)

Wave'11 M. Grote, J. Huber, O. Schenk, *Inexact Interior-Point Methods for Time-Harmonic Inverse Medium Problems*, 10th International Conference on Mathematical and Numerical Aspects of Waves, Simon Fraser University Harbor Center, Vancouver, Canada. July 2011.

ICCS'11 M. Grote, J. Huber, O. Schenk, *Towards Interior Point Methods for the Inverse Medium Problem on Massively Parallel Architectures*, Procedia Computer Science Volume 4, 2011, pp. 1466-1474, Proceedings of the International Conference on Computational Science, ICCS 2011. DOI: 10.1016/j.procs.2011.04.159

PARS'11 H. Burkhart, M. Christen, M. Rietmann, M. Sathe, O. Schenk, *Run, Stencil, Run! - A Comparison of Modern Parallel Programming Paradigms*, PARS - Workshop on Parallel Systems and Algorithms PARS 2011, May 26-27, 2011, IBM Research RÃijschlikon, Switzerland.

PARS'11 M. Sathe, O. Schenk, M. Christen, H. Burkhart, *A Parallel PDE-Constrained Optimization Framework for Biomedical Hyperthermia Treatment Planning*, PARS-Mitteilungen (ISSN 0177-0454).

Euro-Par'09 M. Manguoglu, A. Sameh, O. Schenk, *PSPIKE — Parallel Sparse Linear System Solver*, Proceedings of the 15th International Euro-Par Conference on Parallel Processing, Lecture Notes in Computer Science, Volume 5704/2009, pp. 797-808, DOI 10.1007/978-3-642-03869-3.

IPDPS'09 M. Christen, O. Schenk, P. Messmer, E. Neufeld, H. Burkhart, *Parallel Data-Locality Aware Stencil Computations on Modern Micro-Architectures*, in Proceedings of the 23th IEEE International Parallel & Distributed Processing Symposium, IPDPS'09, pages 1–10, IEEE Computer Society, May 2009, DOI: 10.1109/IPDPS.2009.5161031 (acceptance rate: 18.2%, 102/591)

EMO'09 M. Sathe, O. Schenk, and H. Burkhart, *Solving Bi-Objective Many-Constraint Bin Packing Problems in Automobile Sheet Metal Forming Processes*, Proceedings of the 5th International Conference on Evolutionary Multi-Criterion Optimization, Nantes, France, April 2009, Lecture Notes in Computer Science, Springer, 5467, pp. 246-261, 2009, DOI: 10.1109/IPDPS.2011.70

MICRO-41 M. Christen, O. Schenk, P. Messmer, E. Neufeld, H. Burkhart, *Biomedical Hyperthermia Cancer Treatment Planning on Leading Multicore Platforms*, Proceedings of the First International Workshop on New Frontiers in High-performance and Hardware-aware Computing (HipHaC'08). IEEE/ACM International Symposium on Microarchitecture (MICRO-41), pp. 47-54, ISBN 978-3-86644-298-6, November 8, 2008, Lake Como, Italy.

CUDA'07 M. Christen, O. Schenk, H. Burkhart, *General-Purpose Sparse Matrix Building Blocks using the NVIDIA CUDA Technology Platform*, First Workshop on General Purpose Processing on Graphics Processing Units, Boston, Oct 04, 2007.

ICIAM'07 O. Schenk, M. Bollhöfer, R. Römer, *On Large-Scale Diagonalization Techniques for the Anderson Model of Localization*, In Proc. of the 6th International Congress on Industrial and Applied Mathematics, ETH Zurich, Switzerland July 25-29, 2007, DOI: 10.1002 /pamm.200700768

ECCOMAS'06 M. Bollhöfer, M. Grote, O. Schenk, *Algebraic Multilevel Preconditioning for Helmholtz Equation*, In Proc. of Europ. Conf. on Comput. Fluid Dynamics (ECCOMAS CFD 2006), held in Egmond aan Zee, The Netherlands, Sept. 5-8, 2006.

PARA'04 S. Röllin, O. Schenk, *Maximum-Weighted Matching Strategies and the Application to Symmetric Indefinite Systems*, in J. Dongarra, K. Madsen, J. Wasniewski (Eds.): Applied Parallel Computing, State of the Art in Scientific Computing, 7th International Workshop, PARA 2004, Lyngby, Denmark, June 20-23, 2004, Springer 2006, ISBN 3-540-29067-2, Lecture Notes in Computer Science, Springer, 3732 (2006), pp. 808–817. DOI: 10.1007/11558958_97

Euro-Par'04 K. Fürlinger, O. Schenk, M. Hagemann, *Task-Queue Based Hybrid Parallelism: A Case Study*, in Euro-Par 2004 Parallel Processing, 10th International Euro-Par Conference, Pisa, Italy, August 31-September 3, 2004, pp. 624–631, DOI: 10.1007/978-3-540-27866-5_82

CompLife'05 P. Banushkina, O. Schenk, M. Meuwly, *Efficiency Considerations in Solving Smoluchowski Equations for Rough Potentials*, in M. R. Berthold, R. C. Glen, K. Diederichs, O. Kohlbacher, I. Fischer (Eds.): Computational Life Sciences, First International Symposium, CompLife 2005, Konstanz, Germany, September 25-27, Proceedings. Springer, ISBN 3-540-29104-0, Lecture Notes in Computer Science, 3695, pp. 208–216, 2005, DOI: 10.1007/11560500_19

SISPAD'03 O. Schenk, M. Hagemann, S. Röllin, *Recent Advances in Sparse Linear Solver Technology for Semiconductor Device Simulation Matrices*, In Proc. of the 2003 IEEE International Conference on Simulation of Semiconductor Processes and Devices, pp. 103–108, ISBN 0-07803-7826-1, September 3-5, 2003.

Comp-Fluid'03 O. Schenk, M. Selig, *Advancing Crash Forming Capabilities through Solver Technology*, Proc. of the Second M.I.T. Conference on Computational Fluid and Solid Mechanics, 1 (2003), pp. 628–631, ISBN 0-08-044046-0, June 17-21, 2003, Boston, USA.

ICCS'02 O. Schenk, K. Gärtner, *Solving Unsymmetric Sparse Systems of Linear Equations with PARDISO*, in P. M. A. Sloot, C. Jeng, K. Tan, J. Dongarra, A. G. Hoekstra (Eds.), Computational Science - ICCS 2002, International Conference, Amsterdam, The Netherlands, April 21-24, 2002, Proceedings, Springer, ISBN 3-540-43593-X , Lecture Notes in Computer Science, 2330 (2002), pp. 355–363. DOI: 10.1007/3-540-46080-2_37

SIAM SC'01 O. Schenk, K. Gärtner, *Sparse Factorization with a Two-Level Scheduling in PARDISO, Proc. of the Tenth SIAM Conference on Parallel Processing for Scientific Computing*, CD-ROM, held in Portsmouth, Virginia, USA, March 12-14, 2001.

IMACS'00 O. Schenk, K. Gärtner, *Scalable Parallel Sparse LU Factorization with a Dynamical Supernode Pivoting Approach in Semiconductor Device Simulation*, Proc. of the 16th IMACS World Congress 2000, Lausanne, Switzerland, August 21-25, 2000.

HPCN'99 O. Schenk, W. Fichtner, K. Gärtner, *Scalable Parallel Sparse Factorization with Left-Right Looking strategy on Shared Memory Multiprocessors*, in P. M. A. Sloot, M. Bubak, A. G. Hoekstra, L. O. Hertzberger (Eds.): HPC and Networking, 7th International Conference, HPCN Europe 1999, Amsterdam, The Netherlands, Proceedings, Springer 1999, ISBN 3-540-65821-1, Lecture Notes in Computer Science, 1593 (1999), pp. 221–230. DOI: 10.1007/BFb0100583

ISHPC'99 O. Schenk, W. Fichtner, K. Gärtner, *Application of Parallel Sparse Direct Methods in Semiconductor Device and Process Simulation*, in C. D. Polychronopoulos, K. Joe, A. Fukuda, S. Tomita (Eds.): High Performance Computing, Second International Symposium, ISHPC'99, Kyoto, Japan, 1999, Proceedings. Springer 1999, ISBN 3-540-65969-2, Lecture Notes in Computer Science, 1615 (1999), pp. 206–219, DOI: 10.1007/BFb0094923

LNCSE K. Gärtner, O. Schenk, W. Fichtner, *Parallel Multigrid Methods for the Continuity Equations in Semiconductor Device Simulation*, in H. J. Bungartz, C. Zenger (Eds.): High Performance Scientific and Engineering Computing, Lecture Notes in Computational Science and Engineering, 8 (1998), pp. 325–342.

Precon'99 A. Pomp, O. Schenk, W. Fichtner, *An ILU Preconditioners Adapted to Diffusion Processes in Semiconductors*, Proc. of Preconditioning 1999, Conference on Preconditioning Techniques for Large Sparse Matrix Problems in Industrial Applications, June, 1999, Minneapolis, USA.

PDPTA'98 O. Schenk, W. Fichtner, K. Gärtner, *Parallel Sparse LU Factorization in a Shared Memory Computing Environment*, Proc. of the PDPTA98, CSREA Press, pp. 907–914, ISBN 1-892512-05-x, Las Vegas, Nevada, USA, July 13-16, 1998.

Edited Books

CRC Press U. Naumann, O. Schenk (Editors), *Combinatorial Scientific Computing*, book in the Computational Science series from Chapman and Hall/CRC, 2012. DOI: 10.1201/b11644-18

Book Chapters

CRC Press J. Huber, U. Naumann, O. Schenk, A. Wächter, *Algorithmic Differentiation and Nonlinear Optimization for an Inverse Medium Problem*, Chapter in Combinatorial Scientific Computing by U. Nauman and O. Schenk (Editors), pp. 203-232, book in the Computational Science series from Chapman and Hall/CRC, 2012, DOI: 10.1201/b11644-18

CRC Press O. Schenk, M. Sathe, B. Ucar, A. Sameh, *Towards A Scalable Hybrid Linear Solver Based On Combinatorial Algorithms*, chapter in Combinatorial Scientific Computing by U. Nauman and O. Schenk (Editors), pp. 96-127, book in the Computational Science series from Chapman and Hall/CRC, 2012, DOI: 10.1201/b11644-18

CRC Press O. Schenk, M. Christen, H. Burkhart, *Parallel Stencil Computations on Manycore Architectures in Hyperthermia Applications*, Scientific Computing with Multicore and Accelerators by D. Bader and J. Dongarra (Editors), Computational Science series from Chapman and Hall/CRC Press, Taylor and Francis Group. pp. 255–277, 2011. DOI: 10.1201/b10376-10, 2010.

Springer O. Schenk, K. Gärtner, *Parallel Numerical Linear Algebra*, invited book chapter in Encyclopedia of Parallel Computing, D. Padua (Editor), pp. 1458–1464, Springer, 2012, ISBN 978-0-387-09765-7.

Elsevier O. Schenk, H. van der Vorst, *Solution of Linear Systems*, chapter in Handbook of Numerical Analysis, Volume XIII: Numerical Methods in Electromagnetics, Elsevier Science, ISBN 0-444-513752, pp. 755–824, 2005.

Edited Journals

CCPE C. Lengauer, M. Bolten, Robert D. Falgout, O. Schenk, *Guest editorial: Special Issue on Advanced Stencil-Code Engineering*, Journal on Concurrency and Computation: Practice and Experience, 2017, DOI: 10.1002/cpe.4142

PARCO P. Arbenz, L. Grigori, R. Krause, O. Schenk, *Guest editorial: Special Issue on Parallel Matrix Algorithms and Applications (PMAA'14, Part 2)*, Parallel Computing, pp. 135-136, August 2016, DOI: 10.1016/j.parco.2016.08.003

DAGSTUHL C. Lengauer, M. Bolten, R. D. Falgout, O. Schenk, 15161 Abstracts Collection, *Advanced Stencil-Code Engineering*, 15161, Dagstuhl Seminar Proceedings, pp. 56–75, Schloss Dagstuhl - Leibniz-Zentrum für Informatik, Germany, 2015. DOI: 10.4230/DagRep.5.4.56

PARCO P. Arbenz, L. Grigori, R. Krause, O. Schenk, *Guest editorial: Special Issue on Parallel Matrix Algorithms and Applications (PMAA'14, Part 1)*, Parallel Computing, pp. 99-100 (2015) , DOI: 10.1016/j.parco.2015.10.004

PARCO C. Bekas, A. Grama, O. Schenk, Y. Saad, *Guest editorial: Special Issue on Parallel Matrix Algorithms and Applications (PMAA'12)*, Parallel Computing, Volume 40, Issue 7, pp. 159–160, July 2014. DOI: 10.1016/j.parco.2014.06.001

PARCO P. Arbenz, Y. Saad, A. Sameh, O. Schenk: *Guest editorial: Special Issue on Parallel Matrix Algorithms and Applications (PMAA'10)*, Parallel Computing, 37(12):731–732, 2011. DOI: 10.1016/j.parco.2011.10.011

DAGSTUHL U. Naumann, O. Schenk, H. Simon, S. Toledo, 09061 Abstracts Collection, *Combinatorial Scientific Computing*, 09061, Dagstuhl Seminar Proceedings, 1862-4405, Schloss Dagstuhl - Leibniz-Zentrum für Informatik, Germany, 2009

JFGCS P. Arbenz, H. Burkhart, O. Schenk, E. Mähle, *SPEEDUP/PARS Workshop on Modern Algorithms in Computational Sciences and Information Technology*, J. of Future Generation Computer Systems, 21 (8), pp. 1249–1250, 2005, DOI: 10.1016/j.future.2004.09.002

Monographic Thesis

PhD Thesis

Title *Parallel Sparse LU Factorization Methods on Shared Memory Multiprocessors*

Supervisors Professor Wolfgang Fichtner (ETH Zurich) & Professor Martin Gutknecht (ETH Zurich)

Description This dissertation presents new techniques for solving large sparse symmetric and structurally symmetric linear systems on shared memory high performance parallel computers, using Gaussian elimination with complete supernode pivoting. Shared memory multiprocessors have recently attracted considerable interest in scientific and engineering computing and the objective is to increase the parallel performance on these architectures. The efficiencies of the algorithms are demonstrated for matrices from various application fields and for a variety of high performance computers

Place ETH Zurich, 2000, Series in Microelectronics, Volume 89, Hartung-Gorre, ISBN 3-89649-532-1.

doi dx.doi.org/10.3929/ethz-a-003876213

Habilitation Thesis

Title *Scientific Computing - Algorithms, Combinatorics, High-Performance Computing, and Applications*

Place Department of Computer Science and Mathematics, Faculty of Science, University of Basel, Switzerland, March 2010.

Description This research introduced some of the many ways in which combinatorial abstractions and numerical algorithms in computer science play a role in computational science. It is explained how these algorithms might be useful in scientific applications. It deals in particular with scientific algorithmic research and high-performance computing architectures to enable large-scale simulations and optimizations. This is a discipline where computing power is a critical issue in almost every application. Complex simulation models containing more degrees of freedom not only require more available space in memory, but also demand faster computing architectures, sophisticated algorithms, and modern HPC technology to compute solutions to these models within an acceptable time frame. In general, the research spans the entire stack, from advanced information technology to scientific algorithmic research.

Selected Invited Keynote or Seminar Talks

Only listing keynote or invited seminar talks since 2012, not counting normal conference or workshop presentations

Semi-Plenary ISC 2017 — **ISC 2017 High Performance Conference, Session on Algorithms for Extreme Scale in Practice** — **Frankfurt, Germany**
Title: Towards Extreme Scalable Selected Inversion Algorithm for Green's Function Calculation in Nanoelectronic Device Simulation, June 2017

Keynote HPCSE17 — **HPCSE17** — **University of Ostrava & IT4Innovations National Supercomputing Center, Czech Republic**
Title: Algorithms for Extreme Scale in Practice, May 2017

Distinguished Lecturer — **Supercomputing Division, Information Technology Center, The University of Tokyo** — **Tokyo, Japan**
Title: Direct solvers for sparse matrices: Introduction, applications and supercomputing, Dec. 2016

Keynote RECS'16 — **1st International Symposium on Research and Education of Computational Science (RECS), University of Tokyo** — **Tokyo, Japan**
Title: PASC, CSCS, ICS - Three initiatives to advance research and education in computational science in Switzerland, Dec. 2016

ZICE'16 — **Zurich Initiative on Computational Economics** — **Zurich, Switzerland**
Applications of Large-Scale Nonlinear Optimization at the Petascale: Achievements and Perspectives in Switzerland, February 2016

Keynote FAAM'15 — **First Annual Meeting of Applied Mathematics: Frontier Aspects of Applied Mathematics** — **National Taiwan University, Taipei, Taiwan**
Extreme-Scale Stochastic Optimizations: HPC, Numerics and Applications, December 2015

Keynote PDSEC-15 — **16th IEEE International Parallel and Distributed Scientific and Engineering Computing Workshop** — **Hyderabad, India**
Performance Engineering for Large-Scale Stochastic Optimizations on Petascale Architectures (declined), May 2015

ZICE'15 — **Zurich Initiative on Computational Economics** — **Zurich, Switzerland**
Applications of Large-Scale Nonlinear Optimization at the Petascale: Achievements and Perspectives in Switzerland, February 2015

distinguished speaker/UBC — **Pacific Institute for the Mathematical Sciences** — **Vancouver, Canada**
Performance Engineering of Seismic Simulations for Future Exascale Architectures, January 2015

SCAIM UBC — **Scientific Computing, Applied & Industrial Mathematics Seminar** — **Vancouver, Canada**
Performance Engineering & Sparse Matrices: Introduction, Applications and Supercomputing, January 2015

Uni Basel — **Numerical Analysis Seminar** — **University of Basel, Switzerland**
Performance Engineering & Sparse Matrices: Introduction, Applications and Supercomputing, Dec. 2014

Keynote ISP2S2 — **JST/CREST International Symposium on Post Petascale System Software** — **Kobe, Japan**
Performance Engineering for Large-Scale Stochastic Optimizations on Petascale Architectures, Dec. 2014

Keynote ExaStencils'14 — **SPPEXA Workshop ExaStencils 2014 Technical University of Dresden, Germany**
High-Level Software Approaches for HPC: Overview and Case Study (declined), March 2014

Keynote ASCETE'14 — **ASCETE Workshop on advanced numerical methods for earthquake and tsunami simulation on modern HPC systems Sudelfeld, Germany**
Seismic Structured Grid Simulations on Many-Core Architectures, May 2014

ZICE'14 — **Zurich Initiative on Computational Economics Zurich, Switzerland**
Applications of Large-Scale Nonlinear Optimization at the Petascale: Achievements and Perspectives in Switzerland, February 2014

Semi-Keynote HPCSE13 — **HPCSE13 University of Ostrava & IT4Innovations National Supercomputing Center, Czech Republic**
Interior Point Methods for Large-Scale Stochastic Optimization on High-Performance Computers, May 2013

Keynote HPCAdvisory Council'12 — **HPC Advisory Council Switzerland Conference Lugano, Switzerland**
Large-Scale PDE-Constrained Optimization on HPC Architectures: Applications, Algorithms and Software, March 2012

Keynote Teratec Forum'12 — **Teratec International meeting for Simulation and HPC Ecole Polytechnique, France**
Exascale Computing Research Challenges, June 2012

Semi-Keynote ACSS'12 — **Accelerating Computational Science Symposium 2012 Washington, DC, USA**
Large-Scale Seismic Imaging on HPC Architectures: Applications, Algorithms and Software, May 2012

CSE Software Impact

Sparse Solvers — **PARDISO Sparse Matrix Solver Software**
The fastest multi-threaded sparse direct matrix solver software for arbitrary matrices. The software has been integrated into the Intel Math Kernel Library, used by > ten thousand users. One paper cited >1300 since 2005. Available from www.pardiso-project.org

Optimization Algorithm — **Parallel Solver and Interior-Point Optimizations**
Proposed algorithms and linear solver reference implementation that are now used in virtually every interior-point implementation, e.g., in IPOPT (Wilkinson Prize for Numerical Software in 2011).

External Funding (accepted)

Total: raised ≈ **CHF 6,490,952** in funding from government and industry; since 2012 (start at USI): raised CHF 3,008,952. Olaf Schenk's portion of the funding in shown in brackets.

2017-2020 — **Platform for Advanced Scientific Computing (PASC) USI Lugano**
CHF 461,500 (USI: CHF 150,000) on "Computing Equilibria in Heterogeneous Agent Macro Models on Contemporary HPC platforms", PI: F. Kubler (University of Zurich), Co-PI: O. Schenk (USI), et. al.

2017-2020 — **Swiss Commission for Technology&Innovation USI Lugano**
CHF 15,702,516 (USI: CHF 390,080) on "Computational Approaches for the Design and Operation of the Energy Management System in Future Electric Power Systems" PI: O. Schenk (USI), Partner: SwissGrid, Laufenburg.

2017-2018 — **Swiss Commission for Technology&Innovation USI Lugano**
CHF 1'145'614 (USI: CHF 242,324) on "Efficient Simulation and Optimization for Reliable Intercoupled Multi-Energy Carrier Systems" PI: G. Hug (ETH Zurich), O. Schenk (USI), Partner: NEPLAN, Zurich.

2016 **Swiss National Science Foundation** **USI Lugano**
CHF 16,000 (USI: CHF 0,000) on 3rd Platform for Advanced Scientific Computing Conference, PI: J. Hesthaven (EPFL), Co-PI: O. Schenk (USI), et. al.

2016-2018 **Swiss National Science Foundation** **USI Lugano**
EURO 660,574 (USI: CHF 178,000) on Dual-Phase Steels – From Micro to Macro Properties (EXASTEEL-2), - **German Priority Programme 1648 Software for Exascale Computing**, PI: A. Klawonn (Coordinator, Cologne, Germany), Co-PI: O. Rheinbach (Freiberg, Germany), D. Balzani (Dresden, Germany), J. Schröder (Essen, Germany), O. Schenk (USI), G. Wellein (Erlangen, Germany)

2015-2017 **Platform for Advanced Scientific Computing (PASC)** **USI Lugano**
CHF 250,000 (USI: CHF 18,000) on Tackling Large Dynamic Stochastic Equilibrium Models with Occasionally Binding Constraints, PI: F. Kubler (University of Zurich), Co-PI: O. Schenk (USI), et. al.

2014-2017 **Platform for Advanced Scientific Computing (PASC)** **USI Lugano**
CHF 80,000 (USI: CHF 80,000) on PASC Conference Series 2014-2017, PI: O. Schenk (USI), Co-PI: 8 additional computational science Swiss faculty members from other Swiss universities.

2013-2016 **Platform for Advanced Scientific Computing (PASC)** **USI Lugano**
CHF 320,000 (USI: CHF 320,000) on HPC Application Support for the PASC Solid Earth Dynamics Community, PI: A. Fichtner (ETHZ), Co-PI: O. Schenk (USI), et. al.

2015-2016 **Platform for Advanced Scientific Computing (PASC)** **USI Lugano**
CHF 655,000 (USI: CHF 200,400) on ANSWERS: Accelerating Nano-Device Simulations with Extreme-Scale Algorithms and Software Co-Integration, PI: M. Luisier (ETHZ), Co-PI: O. Schenk (USI), et. al.

2014-2016 **Platform for Advanced Scientific Computing (PASC)** **USI Lugano**
CHF 759,000 (USI: CHF 282,492) on GeoPC: Infrastructure Development for Hybrid Parallel Smoothers for Multigrid Preconditioners, PI: Tackley (ETHZ), Co-PI: O. Schenk (USI), et. al.

2014-2016 **Swiss Commission for Technology and Innovation** **USI Lugano**
CHF 10,000,000 (USI: CHF 184,000) on Future Swiss Electrical Infrastructure (SCCER-FURIES), PI: M. Paolone (EPFL), Co-PI: O. Schenk (USI) et. al. (32 additional Swiss research partners).

2013-2016 **EU-FP7-Information and Communication Technologies** **USI Lugano**
€3,385,000 (USI: €299,000) for the EXA2CT European Project EXascale Algorithms and Advanced Computational Techniques, PI: Verachtert (Imec), Co-PI: O. Schenk (USI) et.al.

2015 **Schloss Dagstuhl - Leibniz-Zentrum für Informatik** **USI Lugano**
Grant: one week at the Dagstuhl center on Advanced Stencil-Code Engineering, PI: C. Lengauer (Univ. of Passau), Co-PI: O. Schenk (USI), et. al.

2014-2017 **Swiss National Science Foundation** **USI Lugano**
CHF 328,000 (USI: CHF 164,000) on Towards Extreme-Scale Coupled Electrothermal Simulations of Realistic Nano-Devices, PI: O. Schenk (USI), Co-PI: A. Schenk (ETHZ).

2013-2016 **Platform for Advanced Scientific Computing (PASC)** **USI Lugano**
CHF 699,000 (USI: CHF 252,656) on GeoScale: A Framework for Multi-Scale Seismic Modelling and Inversion, PI: A. Fichtner (ETHZ), Co-PI: O. Schenk (USI), et. al.

2013 **Swiss National Science Foundation** **USI Lugano**
CHF 8,000 (USI: CHF 8,000) on 22nd International Conference on Domain Decomposition Methods, PI: R. Krause (USI), Co-PI: O. Schenk (USI), et. al.

2012-2013 **HP2C** **USI Lugano**
CHF 100,000 (USI: CHF 40,000) on PASC Geophysics Community Network, PI: T. Nissen-Meyer (ETHZ), Co-PI: O. Schenk (USI), et. al.

2013-2014 **Swiss National Science Foundation** **USI Lugano**
CHF 339,000 (USI: CHF 200,000) on Seismic Inversion for Waves in Strongly Heterogeneous Media, PI: M. Grote (University of Basel), Co-PI: O. Schenk (USI).

2010-2013 **HP2C** **University of Basel**
CHF 1,105,000 (Univ. of Basel: CHF 785,000) on Large-Scale Nonlinear Optimization for High Resolution 3D-Seismic Imaging, PI: O. Schenk (USI), Co-PI: Burkhart (Univ. of Basel), Grote (Univ. of Basel), Giardini (ETHZ)

2010-2012 **Swiss Commission for Technology and Innovation** **University of Basel**
CHF 550,000 on Automobile Simulation and Visualization on Manycores, PI: H. Burkhart (Univ. of Basel), Co-PI: O. Schenk (Univ. of Basel)

2010 **Schloss Dagstuhl - Leibniz-Zentrum für Informatik** **University of Basel**
Grant: one week at the Dagstuhl center on Combinatorial Scientific Computing, PI: Naumann (RWTH Aachen) , Co-PI: O. Schenk (Univ. of Basel), et. al.

2010 **Industry – IBM** **University of Basel**
$ 7,000 on IBM Academic Visiting Fellowship, Yorktown Heights, NY, USA, PI: O. Schenk (Univ. of Basel)

2010-2012 **Swiss National Science Foundation** **University of Basel**
CHF 160,000 on Multiscale Analysis and Inversion for Waves in Strongly Heterogeneous Media, PI: M. Grote (Univ. of Basel), Co-PI: O. Schenk (Univ. of Basel)

2009 **Industry – IBM** **University of Basel**
$ 7,000 on IBM Academic Visiting Fellowship, Yorktown Heights, NY, USA, PI: O. Schenk (Univ. of Basel)

2008-2010 **Swiss National Science Foundation** **University of Basel**
CHF 160,000 on Multiscale Analysis and Simulation for Waves in Strongly Heterogeneous Media, PI: M. Grote (Univ. of Basel), Co-PI: O. Schenk (Univ. of Basel)

2008 **Industry – IBM** **University of Basel**
$ 7,000 on IBM Academic Visiting Fellowship, Yorktown Heights, NY, USA, PI: O. Schenk (Univ. of Basel)

2007-2010 **Swiss National Science Foundation** **University of Basel**
CHF 147,000 on Large-Scale PDE-Constrained Optimization in Hyperthermia Cancer Treatment Planning, PI: H. Burkhart (Univ. of Basel), Co-PI: O. Schenk (Univ. of Basel)

2006-2011 **Industry – Computer Simulation Technology AG** **University of Basel**
CHF 300,000 on Fast Solvers in Large-Scale Parallel Electromagnetic Simulations, PI: O. Schenk (Univ. of Basel)

2007 **Industry – IBM** **University of Basel**
$ 40,000 on IBM Faculty Award for High Performance Biomedical Simulations on the Cell Processor, PI: O. Schenk (Univ. of Basel)

2007 **Industry – IBM** **University of Basel**
$ 3,000 on SUR Grant for HPC Cell BE Processor Cluster, PI: O. Schenk (Univ. of Basel)

2007-2009 **Swiss Commission for Technology and Innovation** **University of Basel**
CHF 474,000 on Computational Business Intelligence for Automotive Production Lines, PI: H. Burkhart (Univ. of Basel), Co-PI: O. Schenk (Univ. of Basel)

2005-2009 **Industry – Intel** **University of Basel**
$ 270,000 on Research Fellowship Grant, PI: O. Schenk (Univ. of Basel)

2003-2004 **ETH Zurich Strategic Excellence Projects** **University of Basel**
CHF 494,000 (Univ. of Basel: CHF 0,000) on Large-Scale Eigenvalue Problems in Optoelectronic Semiconductor Lasers and Accelerator Cavities, PI: P. Arbenz (ETHZ), Co-PI: O. Schenk (Univ. of Basel), et.al.

2003-2004 **Industry – Intel** **University of Basel**
$ 140,000 on Sparse Solution Methods for Intel's Math Kernel Library, PI: O. Schenk (Univ. of Basel)

2003-2004 **Industry – Integrated Systems Engineering AG** **University of Basel**
$ 50,000 on Recent Advances in Sparse Linear Solver Technology for Semiconductor Device Simulations Matrices, PI: O. Schenk (Univ. of Basel)

2003 **Industry – ZEISS** **University of Basel**
CHF 5,000 on Consulting in the area of Numerical Methods for Optoelectronic Simulations, PI: O. Schenk (Univ. of Basel)

2002-2003 **Swiss Commission for Technology and Innovation** **University of Basel**
CHF 378,000 on Multilevel Peconditioning Techniques for Automobile Finite-Element Simulations, PI: H. Burkhart (Univ. of Basel), Co-PI: O. Schenk (Univ. of Basel)

2002 **Industry – IBM** **University of Basel**
$ 16,000 on IBM Academic Visiting Fellowship, PI: O. Schenk (Univ. of Basel)

2000 **Industry – NEC** **ETH Zurich**
CHF 50,000 on Parallel Direct Solution of Large Linear Equation Systems, PI: O. Schenk (ETH Zurich)

2000 **Industry – INPRO** **ETH Zurich**
CHF 50,000 on Solution Techniques for Sparse Matrices from Sheet Metal Forming Simulations, PI: O. Schenk (ETH Zurich)

2000 **Industry – COMPAQ** **ETH Zurich**
CHF 50,000 on Integration of PARDISO into COMPAQ's Extended Mathematical Library CXML., PI: O. Schenk (ETH Zurich)

External Computing Ressources

2017 **IT4Innovations Directors Discretion** **USI Lugano**
500K CPU h. on PRACE petaflop machine ("Anselm") on Parallelized Dimensional Decomposition for Dynamic Stochastic Economic Models, PI: O. Schenk (USI), Co-PI: S. Scheidegger (Uni Zurich)

2016 **IT4Innovations Directors Discretion** **USI Lugano**
100K CPU h. on PRACE petaflop machine ("Anselm") on Computational Methods for Solving Stochastic Equilibrium Models, PI: O. Schenk (USI), Co-PI: S. Scheidegger (Uni Zurich)

2014 **DOE INCITE** **USI Lugano**
100M CPU h. on DOE petaflop machine CRAY XK7 ("Titan") on Global Seismic Tomography Based on Spectral-Element and Adjoint Method, PI: J. Tromp (Princeton), Co-PI: O. Schenk (USI)

2013 **DOE INCITE** **USI Lugano**
100M CPU h. on DOE petaflop machine CRAY XK7 ("Titan") on Global Seismic Tomography Based on Spectral-Element and Adjoint Method, PI: J. Tromp (Princeton), Co-PI: O. Schenk (USI)

2014 **Director's Discretion project** **USI Lugano**
2M CPU h. on DOE petaflop machine CRAY XK7 ("Titan") on Real-time Stochastic Optimization of Complex Energy Systems on High Performance Computers, PI: O. Schenk (USI)

Teaching Experience

Taught 9 undergraduate courses, 26 graduate courses, 1 tutorial, including (co)organizing 5 CSCS-USI summer schools on HPC; **since 2012:** taught 8 undergraduate courses, 18 graduate courses, and including (co)organizing 5 CSCS-USI summer schools on Simulations and HPC. Detailed evaluations can be obtained upon request.

Fall 2017	**Numerical Computing** 25 BSc students	**USI Lugano**
Fall 2017	**High-Performance Computing** 10 MSc students	**USI Lugano**
Fall 2017	**Privatissimum** BSc students	**USI Lugano**
Spring 2017	**CSCS-USI Summer School on Effective HPC** $\approx$ 20 MSc and PhD students (evaluation grade: 4.8 out of max. of 5).	**USI Lugano/CSCS**
Spring 2017	**Software Atelier: Supercomputing and Simulations** 5 MSc students (evaluation grade: 8.5 out of max. of 10)	**USI Lugano**
Fall 2016	**Numerical Computing** 21 BSc students (evaluation grade: 8.94 out of max. of 10)	**USI Lugano**
Fall 2016	**High-Performance Computing** 5 MSc students (evaluation grade: 9.0 out of max. of 10)	**USI Lugano**
Spring 2016	**Software Atelier: Supercomputing and Simulations** 5 MSc students (evaluation grade: 9.67 out of max. of 10)	**USI Lugano**
Spring 2016	**CSCS-USI Summer School on Effective HPC** $\approx$ 30 MSc and PhD students (evaluation grade: 4.8 out of max. of 5).	**USI Lugano/CSCS**
Fall 2015	**Numerical Computing** 12 BSc students (evaluation grade: 9.2 out of max. of 10)	**USI Lugano**
Fall 2015	**High-Performance Computing** 7 MSc students (evaluation grade: 9.0 out of max. of 10)	**USI Lugano**
Spring 2015	**CSCS-USI Summer School on Effective HPC** $\approx$ 30 MSc and PhD students (evaluation grade: 4.8 out of max. of 5). Video available at `http://youtu.be/3enmB6hzBGM` (produced by Multimedia Services of ETH Zurich)	**USI Lugano/CSCS**
Spring 2015	**Software Atelier: Supercomputing and Simulations** 6 MSc students (evaluation grade: 8.9 out of max. of 10)	**USI Lugano**
Spring 2015	**Introduction to Computational Science** 26 BSc students (evaluation grade: 7.6 out of max. 10)	**USI Lugano**
Fall 2014	**High-Performance Computing** 7 MSc students (evaluation grade: 10.0 out of max. of 10)	**USI Lugano**
Fall 2014	**Numerical Computing** 2 BSc students (evaluation grade: 9.5 out of max. 10)	**USI Lugano**
Spring 2014	**Special Topics in Mathematics&Computational Science** 7 MSc students (evaluation grade: 9.0 out of max. of 10)	**USI Lugano**
Spring 2014	**Parallel and Distributed Computing Lab** 7 MSc students (evaluation grade: 9.0 out of max. of 10)	**USI Lugano**

Spring 2014 **Computational Science** **USI Lugano**
≈ 20 BSc students, (evaluation grade: 7.1 out of max. of 10)

Spring 2014 **CSCS-USI Summer School on Effective HPC** **USI Lugano/CSCS**
30 MSc and PhD students (evaluation grade: 4.2 out of max. of 5)

Fall 2013 **Parallel and Distributed Computing** **USI Lugano**
cotaught with W. Binder & F. Pedone, ≈ 40 MSc students (evaluation grade: 8.1 out of max. of 10)

Spring 2013 **Special Topics in Mathematics&Computational Science** **USI Lugano**
6 MSc students (evaluation grade: —)

Spring 2013 **Parallel and Distributed Computing Lab** **USI Lugano**
7 MSc students (evaluation grade: —)

Spring 2013 **Computational Science** **USI Lugano**
≈ 20 BSc students (evaluation grade: 6.7 out of max. of 10)

Spring 2013 **CSCS-USI Summer School on Effective HPC** **USI Lugano/CSCS**
30 MSc and PhD students grade: (4.1 out of max. of 5)

Fall 2012 **Parallel and Distributed Computing** **USI Lugano**
cotaught with F. Pedone, ≈ 52 MSc students (evaluation grade: 7.2 out of max. of 10)

Spring 2011 **High Performance Computing** **University of Basel**
cotaught with H. Burkhart, ≈ 15 MSc students

Spring 2010 **High Performance Computing** **University of Basel**
cotaught with H. Burkhart, ≈ 15 MSc students

Spring 2009 **High Performance Computing** **University of Basel**
cotaught with H. Burkhart, ≈ 15 MSc students

Spring 2008 **High Performance Computing** **University of Basel**
cotaught with H. Burkhart, ≈ 20 MSc students

Spring 2008 **Programming Cell Processors and GPUs for High-Performance SimulationsPDCN 2008**
cotaught with Matthias Christen, ≈ 25 participants

Spring 2007 **High Performance Computing** **University of Basel**
cotaught with H. Burkhart, ≈ 15 MSc students

Fall 2006 **Seminar Life Science Informatics** **University of Basel**
cotaught with H. Burkhart, F. Baty ≈ 10 MSc students

Fall 2006 **Seminar Parallelismus** **University of Basel**
cotaught with H. Burkhart ≈ 10 MSc students

Spring 2005 **Programmieren II** **University of Basel**
≈ 20 BSc students

Spring 2002 **Algorithms in Computational Science and Engineering** **University of Basel**
≈ 15 MSc students

Advising and Mentoring

I advise(d) 4 Postdocs, 9 PhD students, 13 MSc students, 5 BSc students, and serve(d) on the committee of 4 PhD students (external member) and 11 PhD students (internal member).

Postdoctoral Research Assistants **USI Lugano**

Simplice Donfack (April 2014 – December 2015); first job: INRIA, Paris.
Drosos Kourounis (January 2012 – present)
Patrick Sanan (May 2014 – September 2017); first job: ETH Zurich, Switzerland.
Matthias Christen (January 2013 – December 2015); first job: Vanamco, Zurich.

PhD students **USI Lugano**

Radim Janalik (September 2015 – present, former Erasmus student at USI)
Juraj Kardos (September 2015 – present, former Erasmus student at USI)
Fabio Verbosio (April 2014 – present)
Aryan Eftekhari (September 2016 – present)
Dmitry Mikushin (May 2012 – present)
Max Rietmann (PhD 2015); first job: ETH Zurich, Switzerland.

PhD students **University of Basel**

Johannes Huber (PhD 2013), coadvised with M. Grote; first job: SAFEmine, Switzerland.
Madan Sathe (PhD 2012); first job: Ernst & Young Consulting, Switzerland.
Matthias Christen (PhD 2011), coadvised with H. Burkhart; first job: USI Lugano, Switzerland.

PhD students (internal committee member) **USI Lugano**

Igor Kaitovic (PhD, in progess)
Dmitri Makarov (PhD, in progess)
Kirill Lykov (PhD, in progess)
Dimitri Igdalov (PhD, in progess)
Murodzhon Akhmedov (PhD, in progess)
Marijn Stollenga (PhD, 2016)
Daniele Sciascia (PhD 2015)
Lea Conen (PhD 2015)
Johannes Steiner (PhD 2014)
Marco Favino (PhD 2014)
Sebastian Schmitz (PhD 2014)

PhD students (external committee member)

Mauro Calderara (PhD 2016), ETH Zurich, Switzerland.
Pierre Jolivet (PhD 2014), Universitè de Grenoble & Universitè Pierre et Marie Curie, France.
Long Qu (PhD 2014), Universitè Paris Sud, Orsay, France.
Johannes Langguth (PhD 2011), University of Bergen, Norway.

MSc students **USI Lugano**

Toby Simpson (MSc 2017, grade: 10.0)
Edoardo Vecchi (MSc 2016, grade: 8.0)
Aryan Eftekhari (MSc 2016, grade: 10.0)
Radim Janalik (MSc 2015, with Brno University, former Erasmus student at USI, grade: 10.0)

MSc students **University of Basel**

Dominique Meyer (MSc 2010), coadvised with M. Grote
Bernhard Egger (MSc 2009)
Matyas Filep (MSc 2008), coadvised with M. Grote
Eric Kreuzer (MSc 2007)
Roman Baier (MSc 2007)
Michael Martinec (MSc 2007)
Johnnes Mittmann (MSc 2004), coadvised with M. Grote
Christian Schenk (MSc 2003)
Elisa Müller (MSc 2002)

BSc students **USI Lugano**

Martin Štrambach (BSc, grade: 9.0), with Czech Technical University (Prague), former Erasmus student at USI

Simon Hrabec (BSc, grade: 9.0), with Czech Technical University (Prague), former Erasmus student at USI

Soleimani Bidhendi Hanieh (BSc, grade: 9.0)

Simone Raimondi (BSc 2015, grade: 10.0)

MSc students (internal committee member) **USI Lugano**

Alena Kopanicakova (MSc 2015)

Service

Current Leadership Service

Steering Committee — **Swiss Platform for Advanced Scientific Computing Core Program, 2017-2020,** Steering Committee Member

Committee Chair — **SIAM SIAG/SC Best Paper Prize, 2016,** Committee Chair for the SIAM Activity Group on Supercomputing (SIAG/SC) Best Paper Prize

SIAG/SC — **SIAM Activity Group on Supercomputing, 2016-2017,** Program Director SIAM SIAG on Supercomputing

SIAM PP18 — **SIAM Conference on Parallel Processing for Scientific Computing, 2018,** Organizing Committee Co-Chairs

ACM PASC — **ACM Platform for Advanced Scientific Computing Conference Series,** Steering Committee & Organizing Committee Co-Chairs

PMAA — **International Workshop Series on Parallel Matrix Algorithms and Applications,** Steering Committee

Former Significant Leadership and Service Positions

SPEEDUP — **The Speedup Society: The Swiss Forum for High-Performance Computing,** Vice-president (2008-2015)

SIAM PP16 — **SIAM Conference on Parallel Processing for Scientific Computing, 2016,** Organizing Committee

PASC Conference — **Platform for Advanced Scientific Computing Conference,** Conference Co-Chair (2014, 2015, 2016)

IEEE CSE 2015 — **IEEE International Conference on Computational Science and Engineering, 2015,** Chair for the conference track on "Scientific and Engineering Computing"

Award Committee Service

PASC17 — **PASC17 PhD Award Committee Member.** PhD Award sponsored by the Swiss Graduate Program FoMICS "Foundations in Mathematics and Informatics for Computer Simulations in Science and Engineering", led by the Institute of Computational Science at USI Lugano.

ISC 2017 — **ISC 2017 PhD Forum Award Committee Member.** The International Supercomputing Conference (ISC) is a yearly conference on supercomputing. ICS PhD Forum Program Committee is an international committee of HPC experts and it selected one contribution to receive the "ISC PhD Forum Award".

SIAG/SC 2016 **Chair SIAM SIAG/Supercomputing Award Committee.** The SIAG/SC Best Paper Prize is awarded biennially to authors of the most outstanding paper, as determined by the prize committee, making significant contributions in the field of parallel scientific and engineering computing.

Advisory Service

2017 **Reviewer** **Friedrich-Schiller-University Jena, Germany**
External Reviewer for a W2-Professur on "Skalierbare daten- und rechenintensive Analysen" at Friedrich-Schiller-University Jena

2017 **Proposal Reviewer** **Deutsche Forschungsgemeinschaft (DFG), Bonn, Germany**
Research proposal on graph algorithms asking for €250.000

2016 **Proposal Reviewer** **ETH Grant, ETH Zurich, Switzerland**
Research proposal on Partial differential Solvers for Fluid Simulations asking for CHF 240.000.

2016 **Proposal Reviewer** **Industrial Research Fund KU Leuven, Belgium**
Research proposal on Large-Scale Numerical Computing to the Research Foundation of KU Leuven asking for $ 1400.000.

2014 **Proposal Reviewer** **Research Foundation Flanders, Belgium**
Postdoctoral Fellow application to the Research Foundation Flanders asking for $ 400.000 per proposal.

2013 **Proposal Reviewer** **French National Research Agency, France**
Evaluation Committee of the MN program of the French National Research Agency asking for $ 600.000 per proposal.

2013 **Proposal Reviewer** **Czech Science Foundation, Czech Republic**
Evaluation Committee for individual projects of the Czech Science Foundation.

2012 **Proposal Reviewer** **French National Research Agency, France**
Evaluation Committee of the MN program of the French National Research Agency asking for $ 600.000 per proposal.

Faculty Service

2017 **Promotion Committee Member** **USI Lugano**
Member of a faculty committee for a promotion process from associate professor to full professor.

2015-2016 **Promotion Committee Member** **USI Lugano**
Member of a faculty committee for a promotion process from assistant professor to senior assistant professor.

2014–present **Master Director** **USI Lugano**
Director of the Computational Science Master program at USI.

2013–present **Swiss Competence Center on Energy Research** **USI Lugano**
I am serving as a faculty representative on the project board of the SCCER Future Swiss Electrical Infrastructure (FURIES) project which joins the competencies of the several Swiss academic and industrial actors in the area of power and energy systems.

2012-present **USI–CSCS** **USI Lugano**
I am serving as a faculty contact person to the Swiss Center of Supercomputing (CSCS).

2012-present **PhD Prospectus Committee Member** **USI Lugano**
I am serving on a regular basis on evalution committees of PhD, MSc, and BSc students.

2014 **Exhibition Organizing Committee Member** **USI Lugano**
Member of a faculty committee of the 10 year informatic anniversary exhibition, responsible for the computational science booth.

2008 **Promotion committee member** **University of Basel**
Member of a faculty committee for a faculty position on Biomedical Data Analysis (level: associate professor).

2004-2011 **Committee member** **University of Basel**
Member of a faculty committee for a new BSc program on Computational Science.

Journal Editorial Board

2017 **Guest Editor** **CCPE**
The Journal on Concurrency and Computation: Practice and Experience stresses papers in broad computer and computational science areas with a focus con concurrency and compututation.

2012-present **Associate Editor** **SIAM SISC**
The SIAM Journal on Scientific Computing contains research articles on numerical methods and techniques for scientific computation.

2012, 2014, 2016, 2017 **Guest Editor** **PARCO**
Parallel Computing is an international journal presenting the practical use of parallel computer systems, including high performance architecture, system software, programming systems and tools, and applications.

2004 **Guest Editor** **JFGCS**
Future Generation Computer Systems is an international journal with a focus on new theory and technological progress supporting a better understanding of wide-area, fully distributed computing systems.

Technical Program Committee Member (alphabetically)

CENG **International Symposium on Computer and Information Sciences**, 2010

DAGSTUHL **Dagstuhl Seminars**, 2009, 2015

DD **International Conference on Domain Decomposition Methods**, 2013

ECT **International Conference on Engineering Computational Technology**, 2006, 2008, 2010, 2012

FMC **Facing the Multicore-Challenge Conference**, 2010, 2011, 2012

HipHaC **New Frontiers in High-performance and Hardware-aware Computing**, 2011

HiStencils **International Workshop on High-Performance Stencil Computations**, 2014

HiPC **IEEE International Conference on High Performance Computing**, 2007, 2008, 2013, 2015

HPCS **International Conference on High Performance Computing & Simulation**, 2014

ICPP **IEEE International Conference on Parallel Processing**, 2013

IHPCES **International Workshop on Advances in High-Performance Computational Earth Sciences: Applications and Frameworks**, 2013, 2014, 2016, 2017

IPDPS **IEEE International Parallel & Distributed Processing Symposium**, 2010, 2014, 2016, 2017, 2018

ISC **International Supercomputing Conference**, 2016, 2017

PASC **Platform for Advanced Scientific Computing Conference Series**, 2014, 2015, 2016, 2017

PDCN **International Conference on Parallel and Distributed Computing and Networks**, 2011

PMAA **International Workshop on Parallel Matrix Algorithms and Applications**, 2008, 2010, 2012, 2014, 2016, 2018

PPAM **International Conference on Parallel Processing and Applied Mathematics**, 2013, 2015

PPAA **International Workshop on Parallel Programming for Analytics Applications**, 2016

SBAC-PAD **International Symposium on Computer Architecture and High Performance Computing**, 2009, 2016, 2017

SC **ACM/IEEE Conference on High Performance Computing, Networking, Storage and Analysis**, 2008, 2010, 2013, 2014, 2015, 2016

SPEEDUP **Speedup Workshops on High-Performance Computing**, 2003, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015

Scientific Journal Reviewer

ACM TOMS **ACM Transactions on Mathematical Software,** 2006, 2008, 2009, 2010, 2014, 2015, 2016, 2017

SIMAX **SIAM Journal on Matrix Analysis and Applications,** 2006, 2008, 2009, 2010, 2014

SISC **SIAM Journal on Scientific Computing,** 2007, 2008, 2009, 2010, 2014, 2015, 2016

SIOPT **SIAM Journal on Optimization,** 2010, 2016

IJHPC **International Journal of High Performance Computing,** 2010

JCOA **Journal of Computational Optimization and Applications,** 2010

JCP **Journal of Computational Physics,** 2006

ETNA **Electronic Transactions of Numerical Analysis,** 2005

JFGCS **Journal of Future Generation Computer Systems,** 2005, 2008, 2009

PARCO **Journal of Parallel Computing,** 2003, 2004, 2005, 2006

IEEE TPDS **IEEE Transactions on Parallel and Distributed Computing,** 2008, 2009, 2010

IEEE TCAD **IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems,** 2005

IEEE PCDS **IEEE Proceedings - Circuits, Devices and Systems,** 2003

COMP. STRUC **Journal Computer & Structures,** 2005, 2006

JCCPE **Journal Concurrency and Computation: Practice and Experience,** 2011, 2012

Professional Organizations

IEEE and IEEE Computer Society, Senior Member

Association for Computing Machinery (ACM), Member

ACM Special Interest Group on High Performance Computing (ACM SIGHPC), Member

Society for Industrial and Applied Mathematics (SIAM), Member

Research Visits (> one week)

(not counting normal conference or workshop attendance)

Center of Computational Science, University of Tokyo, Tokyo, Japan, 2016

Center of Advanced Study in Theoretical Sciences (CASTS), Taipei, Taiwan, 2015

IBM Thomas Watson Research Center, USA, 2002, 2003, 2007, 2009, 2010, 2011

IBM Research Lab Austin, USA, 2008

Center of Scientific Computing, University of Warwick, UK, 2008, 2009

Department of Computer Science, University of British Columbia, Vancouver, CA, 2006, 2007, 2008, 2015

Weierstrass-Institute of Applied Analysis and Stochastic, Berlin, Germany, 2004, 2007, 2010

Argonne National Lab, USA, 2008, 2012

Purdue University, USA, 2009, 2010, 2011

Academy of Sciences, Department of Computer Science, Prague, CZ, 2004

Stanford University, USA, 2010

NVIDIA Research, USA, 2010

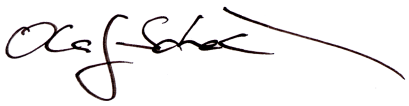
Banff International Research Station of Mathematical Innovation, Canada, 2009

Intel Research Lab Oregon, USA, 2008

ZIB Berlin, Germany, 2007

KTH Stockholm, Sweden, 2006

TU Berlin, Germany, 2006



Olaf Schenk