

Christian Schulz

Curriculum Vitae

Contact Information

Address: Währinger Str. 29, R. 6.31, 1090, Vienna, Austria

Date of Birth: February 1984

Email: christian.schulz@univie.ac.at

Website w/ publications: <https://schulzchristian.github.io>

University Education

- | | |
|---|--|
| November 2019 | UNIVERSITY OF VIENNA.
Habilitation, Computer Science.
Thesis: <i>Scalable Graph Algorithms</i> |
| March 2010–
May 2013 | KARLSRUHE INSTITUTE OF TECHNOLOGY.
Ph.D., summa cum laude, Computer Science.
Thesis: <i>High Quality Graph Partitioning</i>
Advisor: <i>Prof. Dr. Sanders</i> |
| October 2004–
December 2009
February 2010 | KARLSRUHE INSTITUTE OF TECHNOLOGY.
Diplom, with highest distinction, GPA 1.0/1.0, Mathematics.
Diplom, with highest distinction, GPA 1.1/1.0, Computer Science. |

Professional Experience

- | | |
|---|--|
| January 2017–
present | UNIVERSITY OF VIENNA.
Researcher in the Group of Prof. Dr. Henzinger
Universitätsassistent
<i>Leading Algorithm Engineering Subgroup</i> |
| March 2010–
December 2017
since 2013: | KARLSRUHE INSTITUTE OF TECHNOLOGY.
Researcher in the Group of Prof. Dr. Sanders
<i>Leading Parallel Algorithms & Graph Partitioning Subgroup</i> |
| October 2015–
December 2015 | TU VIENNA / VIENNA PHD SCHOOL OF INFORMATICS.
Visiting Professor |
| September 2015–
February 2016 | TU VIENNA.
Researcher in the Group of Prof. Dr. Träff |

Honors and Awards

2019	PACE IMPLEMENTATION CHALLENGE WINNER – TRACK A
2018	SPP ALGORITHMS FOR BIG DATA: BEST PAPER AWARD
2018	BEST PAPER AWARD IPDPS'18
2017	BEST PAPER NOMINATION GECCO'17
2017	HEINZ BILLING PRIZE FOR THE ADVANCEMENT OF SCIENTIFIC COMPUTING
2014	KIT DOCTORAL AWARD IN THE AREA OF COMPETENCE “INFORMATION, COMMUNICATION AND ORGANIZATION”
2014	UNISERV DISSERTATION AWARD
2012	BEST SCORES IN GRAPH PARTITIONING SUBCHALLENGE OF THE 10TH DIMACS IMPLEMENTATION CHALLENGE
2010	BEST STUDENT OF DEPARTMENT OF INFORMATICS (KIT)
2003	BEST STUDENT OF FRITZ-REUTER-OBERSCHULE

Professional Service

PC Member for SBAC-PAD 2015, HPGDMP 2016, ESA 2017, IC3 2017, IPDPS 2018, IC3 2018, SNAMS 2018, IPEC 2019, IPDPS 2019, ISC 2019, ALENEX'20, CSC'20.

Reviewer for JEA, ALENEX, SPAA, IPDPS, DIMACS, ESA, SEA, Euro-Par, HiPC, TPDS, EGPGV, EAAI, TDSC, JPDC, SODA, CLUS, PARCO, TVCG, JGAA, TOPC, KAIS, SISC, Algorithmica.

Co-organizer:

Shonan Meeting “Parameterized graph algorithms & data reduction: Theory meets practice”

Guest Editor:

Special Issue of Algorithms "Graph Partitioning: Theory, Engineering and Applications".

Grants

- [1] Michael Axtmann, Timo Bingmann, Thomas Balyo, Peter Sanders, Lorenz Hübschle-Schneider and Christian Schulz. Advanced Load Balancing for Complex Problems. JUQUEEN access: Mai/15-April/18 (multiple periods). Total granted compute time: 30.0 Mio Core-H \approx 258T Euro. Juelich Supercomputing Centre (JSC). 2017.
- [2] Michael Axtmann, Timo Bingmann, Peter Sanders, and Christian Schulz. Advanced Load Balancing for Complex Problems. SuperMUC access: Jul/15-Mai/18. Granted compute time: 8.0 Mio Core-H \approx 77T Euro. Leibniz Supercomputing Centre (LRZ). 2015.
- [3] Peter Sanders, Christian Schulz and Dorothea Wagner. Engineering Algorithms for Partitioning Large Graphs. DFG application for continuation of SA 933/10-1, SCHU 2567/1-2 and WA 654/19-1. Funded: 580T Euro.
- [4] Christian Schulz. Algorithm Engineering for Process Mapping. FWF application. Joint project P 31763-N31 between TU Vienna and University Vienna. Funded: 305T Euro.

Teaching Experience as Lecturer

2019-20	ADVANCED TOPICS IN ALGORITHMS
2019-20	NUMERICAL ALGORITHMS
2019	PARALLEL AND DISTRIBUTED ALGORITHMS
2018-19	NUMERICAL ALGORITHMS
2018-19	ALGORITHMS AND DATA STRUCTURES II
2018	ALGORITHMS AND DATA STRUCTURES
2018	ALGORITHMS AND DATA STRUCTURES II
2017-18	ADVANCED ALGORITHMS
2016	ALGORITHMS II
2014-17	5xGRAPH PARTITIONING AND CLUSTERING

Open Source Software

2020	DMAX – DATA REDUCTION FOR MAXIMUM CUT
2019	KASVM – KARLSRUHE SUPPORT VECTOR MACHINE
2019	VIECUT – VIENNA MINIMUM CUTS
2018	VIECLUS – VIENNA GRAPH CLUSTERING
2018	KAGEN – KARLSRUHE GRAPH GENERATION
2017	VIEM – VIENNA MAPPING AND SPARSE QUADRATIC ASSIGNMENT
2017	KALP – KARLSRUHE LONGEST PATHS
2015	KAMIS – KARLSRUHE MAXIMUM INDEPENDENT SET
2015	KADRAW – KARLSRUHE GRAPH DRAWING
2013	KAHIP – KARLSRUHE HIGH QUALITY PARTITIONING

Research Interests

Graph Partitioning and Clustering, Parallel Algorithms, Combinatorial Optimization, Big Data

Supervised Theses

M. Schuler (BA), J. Fietz (MA), M. Birn (MA), F. Ziegler (BA), A. Wagner (MA), K. Hübner (BA), M. Wegner (BA), S. Lamm (BA), V. Henne (MA), J. Dahlum (BA), J. Ebbing (BA), S. Lamm (MA), R. Williger (BA), M. Samson (BA), D. Hespe (MA), R. Andre (BA), Y. Kolev (BA), D. Seemaier (BA), S. Biedermann (BA), C. Öhl (BA), T. Ribizel (MA), M. Schmitt (BA), C. Mercatoris (BA), R. Zimmermann (BA), R. Paul (BA), D. Ferizovic (MA), D. Seemaier (MA), K. von Kirchbach (MA), W. Ost (MA), J. Trummer (BA), J. Niedermüller (MA), A. Stockinger (BA), A. Gellner (MA).

Currently running student projects:

D. Seemaier (MA), A. Gellner (MA), J. Niedermüller (MA)

Co-Supervised Phd Students

Y. Akhremstev, M. Fonseca, S. Lamm, A. Noe, S. Schlag, W. Ost

Supervised Student Research Assistants

M. Djurev, S. Lamm, M. Wegner, J. Ebbing, R. Williger, T. Ribizel, S. Biedermann, R. Andre, D. Seemaier, M. Schmitt, R. Paul, K. Kirchbach, Q. Cheng

Book Chapters and Lecture Notes

- [1] David Bader, Andrea Kappes, Henning Meyerhenke, Peter Sanders, Christian Schulz and Dorothea Wagner. Benchmarking for Graph Clustering and Partitioning. In *Encyclopedia of Social Network Analysis and Mining*, 2014. Updated article appeared 2018. DOI: https://doi.org/10.1007/978-1-4614-6170-8_23.
- [2] Christian Schulz and Sebastian Korbinian Bayer, Felli Bernardes-Lima, Jan Jacob, Robert Hangu, Sergey Hayrapetyan, Demian Hespe, Christoph Hess, Sebastian Lamm, Eike Röhrs, Henning Schulz, Christian Steiger, Matthias Stumpp, Marvin Teichmann. Graph Partitioning and Graph Clustering in Theory and Practice. Lecture Notes. Karlsruhe Institute of Technology and Vienna PhD School of Informatics. 2015. PDF.
- [3] Aydin Buluc, Henning Meyerhenke, Ilya Safro, Peter Sanders, Christian Schulz. Recent Advances in Graph Partitioning. Algorithm Engineering: Selected Results and Surveys. Volume 9220 of LNCS. Springer-Verlag. 2016. DOI: https://doi.org/10.1007/978-3-319-49487-6_4.
- [4] Christian Schulz and Darren Strash. Graph Partitioning: Formulations and Applications to Big Data. In *Encyclopedia on Big Data Technologies*, Springer, 2019. DOI: https://doi.org/10.1007/978-3-319-63962-8_312-2.
- [5] Sonja Biedermann, Monika Henzinger, Christian Schulz and Bernhard Schuster. Vienna Graph Clustering. Invited chapter for *Methods in Molecular Biology: Protein-Protein Interaction Networks*, vol 2074, Humana, 2019, DOI: https://doi.org/10.1007/978-1-4939-9873-9_16..

Journal Articles

- [6] Ilya Safro, Peter Sanders, and Christian Schulz. Advanced Coarsening Schemes for Graph Partitioning. *ACM Journal of Experimental Algorithms*. Volume 19, Article No. 2.2, 2015. DOI: <http://doi.acm.org/10.1145/2670338>.
- [7] Heiko Papenfuß, Peter Sanders, and Christian Schulz. Turbo für Graphdatenbanken: Graphpartitionierung mit KaHIP. *JavaSPEKTRUM 01/2015*. PDF.
- [8] Roland Glantz, Henning Meyerhenke, and Christian Schulz. Tree-based Coarsening and Partitioning of Complex Networks. *Invited to special issue of ACM Journal of Experimental Algorithms*. Volume 21, Article No. 1, 2016. DOI: <http://doi.acm.org/10.1145/2851496>.
- [9] Peter Sanders and Christian Schulz. Scalable Generation of Scale-free Graphs. *Information Processing Letters*. Volume 116, Article No. 7, pages 489–491, 2016. DOI: <https://doi.org/10.1016/j.ipl.2016.02.004>.

- [10] Henning Meyerhenke, Peter Sanders and Christian Schulz. Partitioning (Hierarchically Clustered) Complex Networks via Size-Constrained Graph Clustering. *ACM Journal of Heuristics*, Volume 22, Issue 5, pages 759–782, 2016. DOI: <https://doi.org/10.1007/s10732-016-9315-8>.
- [11] Henning Meyerhenke, Peter Sanders and Christian Schulz. Parallel Graph Partitioning for Complex Networks. *IEEE Transactions on Parallel and Distributed Systems*, Volume 28, Issue 9, pages 2625–2638, 2017. DOI: <https://doi.org/10.1109/TPDS.2017.2671868>.
- [12] Sebastian Lamm, Peter Sanders, Christian Schulz, Darren Strash, and Renato F. Werneck. Finding Near-Optimal Independent Sets at Scale. *ACM Journal of Heuristics*, Volume 23, Issue 4, pages 207–229, 2017. DOI: <https://doi.org/10.1007/s10732-017-9337-x>.
- [13] Henning Meyerhenke, Martin Nöllenburg and Christian Schulz. Drawing Large Graphs by Multilevel Maxent-Stress Optimization. *IEEE Transactions on Visualization and Computer Graphics*, Volume 24, Issue 5, pages 1814–1827, 2018. DOI: <https://doi.org/10.1109/TVCG.2017.2689016>.
- [14] Monika Henzinger, Alexander Noe, Christian Schulz and Darren Strash. Practical Minimum Cut Algorithms. Invited to special issue of *ACM Journal of Experimental Algorithms (ACM JEA) for ALENEX 2018*, Volume 23, pages 1.9:1–1.8:22, 2018. DOI: <https://doi.org/10.1145/3274662>.
- [15] Daniel Funke, Sebastian Lamm, Ulrich Meyer, Peter Sanders, Christian Schulz, Darren Strash and Moritz von Looz. Communication-free Massively Distributed Graph Generation. Invited to special issue of *Journal of Parallel and Distributed Computing for IPDPS'18*, Volume 131, pages 200–2017, 2019. DOI: <https://doi.org/10.1016/j.jpdc.2019.03.011>.
- [16] Demian Hesse, Christian Schulz and Darren Strash. Scalable Kernelization for Maximum Independent Sets. In *ACM Journal of Experimental Algorithms (ACM JEA)*, Volume 24, Issue 1, pages 1.16:1–1.16:22, 2019. DOI: <http://doi.acm.org/10.1145/3355502>.

Conference Articles

- [17] Daniel Delling, Robert Görke, Christian Schulz and Dorothea Wagner. Orca Reduction and ContrAction Graph Clustering. In *Proceedings of the 5th International Conference on Algorithmic Aspects in Information and Management (AAIM)*, volume 5564 of LNCS, pages 152–165. Springer, 2009. DOI: https://doi.org/10.1007/978-3-642-02158-9_14.
- [18] Manuel Holtgrewe, Peter Sanders and Christian Schulz. Engineering a Scalable High Quality Graph Partitioner. In *24th IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, 2010. DOI: <https://doi.org/10.1109/IPDPS.2010.5470485>.

- [19] Vitaly Osipov, Peter Sanders, Christian Schulz and Manuel Holtgrewe. Engineering State-of-the-Art Graph Partitioning Libraries @KIT. In *Proceedings of the Workshop on Computational Methods in Science and Engineering (SimLabs@KIT)*, KIT Scientific Publishing, pages 117–130. 2010. PDF.
- [20] Peter Sanders and Christian Schulz. Engineering Multilevel Graph Partitioning Algorithms. In *Proceedings of the 19th European Symposium on Algorithms (ESA)*, volume 6942 of LNCS, pages 469–480. Springer, 2011. DOI: https://doi.org/10.1007/978-3-642-23719-5_40.
- [21] Peter Sanders and Christian Schulz. Distributed Evolutionary Graph Partitioning. In *Proceedings of the 14th Workshop on Algorithm Engineering and Experimentation (ALENEX)*, pages 16–19, 2012. DOI: <https://doi.org/10.1137/1.9781611972924.2>.
- [22] Ilya Safro, Peter Sanders and Christian Schulz. Advanced Coarsening Schemes for Graph Partitioning. In *Proceedings of the 11th Symposium on Experimental Algorithms (SEA)*, volume 7276 of LNCS, pages 369–380. Springer, 2012. DOI: https://doi.org/10.1007/978-3-642-30850-5_32.
- [23] Vitaly Osipov, Peter Sanders and Christian Schulz. Engineering Graph Partitioning Algorithms. In *Proceedings of the 11th Symposium on Experimental Algorithms (SEA)*, volume 7276 of LNCS, pages 18–26. Springer, 2012. DOI: https://doi.org/10.1007/978-3-642-30850-5_3.
- [24] Jonas Fietz, Matthias Krause, Peter Sanders, Christian Schulz and Vincent Heuveline. Optimized Hybrid Parallel Lattice Boltzmann Fluid Flow Simulations on Complex Geometries. In *Proceedings of the 18th International European Conference on Parallel Computing (Euro-Par)*, volume 7484 of LNCS, pages 818–829. Springer, 2012. DOI: https://doi.org/10.1007/978-3-642-32820-6_81.
- [25] Peter Sanders and Christian Schulz. High Quality Graph Partitioning. In *Proceedings of the 10th DIMACS Implementation Challenge Workshop: Graph Partitioning and Clustering*, pages 1–17, AMS, 2013. PDF.
- [26] Peter Sanders and Christian Schulz. Think Locally, Act Globally: Highly Balanced Graph Partitioning. In *Proceedings of the 12th Symposium on Experimental Algorithms (SEA)*, volume 7933 of LNCS, pages 164–175. Springer, 2013. DOI: https://doi.org/10.1007/978-3-642-38527-8_16.
- [27] Marcel Birn, Vitaly Osipov, Peter Sanders, Christian Schulz and Nodari Sitchinava. Efficient Parallel and External Matchings. In *Proceedings of the 19th International European Conference on Parallel Computing (Euro-Par)*, volume 8097 of LNCS, pages 659–670. Springer, 2013. DOI: https://doi.org/10.1007/978-3-642-40047-6_66.
- [28] Roland Glantz, Henning Meyerhenke and Christian Schulz. Tree-based Coarsening and Partitioning of Complex Networks. In *Proceedings of the 13th Symposium on Experimental Algorithms (SEA)*, volume 8504 of LNCS, pages 364–375. Springer, 2014. DOI: https://doi.org/10.1007/978-3-319-07959-2_31.

- [29] Henning Meyerhenke, Peter Sanders and Christian Schulz. Partitioning Complex Networks via Size-constrained Clustering. In *Proceedings of the 13th Symposium on Experimental Algorithms (SEA)*, volume 8504 of LNCS, pages 351–363. Springer, 2014. DOI: https://doi.org/10.1007/978-3-319-07959-2_30.
- [30] Yaroslav Akhremtsev, Peter Sanders and Christian Schulz. (Semi-)External Algorithms for Graph Partitioning and Clustering. In *Proceedings of the 17th Workshop on Algorithm Engineering and Experimentation (ALENEX)*, pages 33-43, 2015. DOI: <https://doi.org/10.1137/1.9781611973754.4>.
- [31] Henning Meyerhenke, Peter Sanders and Christian Schulz. Parallel Graph Partitioning for Complex Networks. In *29th IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, 2015. DOI: <https://doi.org/10.1109/IPDPS.2015.18>.
- [32] Michael Axtmann, Timo Bingmann, Peter Sanders and Christian Schulz. Practical Massively Parallel Sorting. In *Proceedings of the 27th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 13-23. ACM, 2015. DOI: <https://doi.org/10.1145/2755573.2755595>.
- [33] Sebastian Lamm, Peter Sanders and Christian Schulz. Graph Partitioning for Independent Sets. In *Proceedings of the 14th Symposium on Experimental Algorithms (SEA)*, volume 8504 of LNCS, pages 68–81. Springer, 2015. DOI: https://doi.org/10.1007/978-3-319-20086-6_6.
- [34] Henning Meyerhenke, Martin Nöllenburg and Christian Schulz. Drawing Large Graphs by Multilevel Maxent-Stress Optimization. In *Proceedings of the 23rd International Symposium on Graph Drawing & Network Visualization (GD)*, volume 9411 of LNCS, pages 30-43. Springer, 2015. DOI: https://doi.org/10.1007/978-3-319-27261-0_3.
- [35] Nitin Ahuja, Matthias Bender, Peter Sanders, Christian Schulz and Andreas Wagner. Incorporating Road Networks into Territory Design. In *Proceedings of the 23rd International Conference on Advances in Geographic Information Systems (GIS)*. ACM Press, 2015. DOI: <https://doi.org/10.1145/2820783.2820800>.
- [36] Sebastian Schlag, Vitali Henne, Tobias Heuer, Henning Meyerhenke, Peter Sanders and Christian Schulz. k -way Hypergraph Partitioning via n -Level Recursive Bisection. In *Proceedings of the 18th Workshop on Algorithm Engineering and Experimentation (ALENEX)*, pages 53-67. 2016. DOI: <https://doi.org/10.1137/1.9781611974317.5>.
- [37] Sebastian Lamm, Peter Sanders, Christian Schulz, Darren Strash and Renato F. Werneck. Finding Near-Optimal Independent Sets at Scale. In *Proceedings of the 18th Workshop on Algorithm Engineering and Experimentation (ALENEX)*, pages 138-150. 2016. DOI: <https://doi.org/10.1137/1.9781611974317.12>.
- [38] Jakob Dahlum, Sebastian Lamm, Peter Sanders, Christian Schulz, Darren Strash and Renato F. Werneck. Accelerating Local Search for the Maximum Independent Set Problem. In *Proceedings of the 15th Symposium on Experimental Algorithms (SEA)*, volume

- 9685 of LNCS, pages 118–133. Springer, 2016. DOI: https://doi.org/10.1007/978-3-319-38851-9_9.
- [39] Peter Sanders and Christian Schulz. Advanced Multilevel Node Separator Algorithms. In *Proceedings of the 15th Symposium on Experimental Algorithms (SEA)*, volume 9685 of LNCS, pages 294–309. Springer, 2016. DOI: https://doi.org/10.1007/978-3-319-38851-9_20.
 - [40] Peter Sanders, Christian Schulz, Darren Strash and Robert Williger. Distributed Evolutionary k -way Node Separators. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO)*, pages 345–252, 2017. **Best Paper Nominee**. DOI: <https://doi.org/10.1145/3071178.3071204>.
 - [41] Christian Schulz and Jesper Larsson Träff. Better Process Mapping and Sparse Quadratic Assignment. In *Proceedings of the 16th Symposium on Experimental Algorithms (SEA)*, volume 75 of LIPIcs, pages 4:1–4:15, 2017. DOI: <https://doi.org/10.4230/LIPIcs.SEA.2017.4>.
 - [42] Orlando Moreira, Merten Popp and Christian Schulz. Graph Partitioning with Acyclicity Constraints. In *Proceedings of the 16th Symposium on Experimental Algorithms (SEA)*, volume 75 of LIPIcs, pages 30:1–30:15, 2017. DOI: <https://doi.org/10.4230/LIPIcs.SEA.2017.30>.
 - [43] Monika Henzinger, Alexander Noe, Christian Schulz and Darren Strash. Practical Minimum Cut Algorithms. In *Proceedings of the 20th Workshop on Algorithm Engineering and Experimentation (ALENEX)*, pages 48–61, 2018. DOI: <https://doi.org/10.1137/1.9781611975055.5>.
 - [44] Demian Hesse, Christian Schulz and Darren Strash. Scalable Kernelization for Maximum Independent Sets. In *Proceedings of the 20th Workshop on Algorithm Engineering and Experimentation (ALENEX)*, pages 223–237, 2018. DOI: <https://doi.org/10.1137/1.9781611975055.19>.
 - [45] Daniel Funke, Sebastian Lamm, Peter Sanders, Christian Schulz, Darren Strash and Moritz von Looz. Communication-free Massively Distributed Graph Generation. In *32nd IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, pages 336–347, 2018. **Best Paper Award**. DOI: <https://doi.org/10.1109/IPDPS.2018.00043>.
 - [46] Robin Andre, Sebastian Schlag and Christian Schulz. Memetic Multilevel Hypergraph Partitioning. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO)*, pages 347–354, ACM, 2018. DOI: <https://doi.org/10.1145/3205455.3205475>.
 - [47] Orlando Moreira, Merten Popp and Christian Schulz. Evolutionary Multi-level Acyclic Graph Partitioning. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO)*, pages 331–339, ACM, 2018. DOI: <https://doi.org/10.1145/3205455.3205464>.

- [48] Alexandra Henzinger, Alexander Noe and Christian Schulz. ILP-based Local Search for Graph Partitioning. In *Proceedings of the 17th Symposium on Experimental Algorithms (SEA)*, volume 103 of LIPIcs, pages 4:1–4:15, 2018. DOI: <https://doi.org/10.4230/LIPIcs.SEA.2018.4>.
- [49] Sonja Biedermann, Monika Henzinger, Christian Schulz and Bernhard Schuster. Memetic Graph Clustering. In *Proceedings of the 17th Symposium on Experimental Algorithms (SEA)*, volume 103 of LIPIcs, pages 3:1–3:15, 2018. DOI: <https://doi.org/10.4230/LIPIcs.SEA.2018.3>.
- [50] Yaroslav Akhremtsev, Peter Sanders and Christian Schulz. High-Quality Shared-Memory Graph Partitioning. In *Proceedings of the 24th International European Conference on Parallel Computing (Euro-Par)*, volume 11014 of LNCS, pages 659–671, 2018. DOI: https://doi.org/10.1007/978-3-319-96983-1_47.
- [51] Sebastian Schlag, Matthias Schmitt and Christian Schulz. Faster Support Vector Machines. In *Proceedings of the 21th Workshop on Algorithm Engineering and Experimentation (ALENEX)*, pages 199–210, SIAM, 2019. DOI: <https://doi.org/10.1137/1.9781611975499.16>.
- [52] Sebastian Schlag, Christian Schulz, Daniel Seemaier and Darren Strash. Scalable Edge Partitioning. In *Proceedings of the 21th Workshop on Algorithm Engineering and Experimentation (ALENEX)*, pages 211–2225, SIAM, 2019. DOI: <https://doi.org/10.1137/1.9781611975499.17>.
- [53] Sebastian Lamm, Christian Schulz, Darren Strash, Robert Williger and Huashuo Zhang. Exactly Solving the Maximum Weight Independent Set Problem on Large Real-World Graphs. In *Proceedings of the 21th Workshop on Algorithm Engineering and Experimentation (ALENEX)*, pages 144–158, SIAM, 2019. DOI: <https://doi.org/10.1137/1.9781611975499.12>.
- [54] Monika Henzinger, Alexander Noe and Christian Schulz. Shared-Memory Exact Minimum Cuts. In *33rd IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, to appear, 2019. DOI: <http://doi.org/10.1109/IPDPS.2019.00013>.
- [55] Tomas Balyo, Kai Fieger, Dominik Schreiber, Christian Schulz. Finding Optimal Longest Paths by Dynamic Programming in Parallel. In *12th Symposium on Combinatorial Search (SoCS'19)*, pages 61–69, AAAI Press, 2019. DOI: <https://aaai.org/ocs/index.php/SOCS/SOCS19/paper/viewFile/18329/17445>.
- [56] Monika Henzinger, Alexander Noe and Christian Schulz. Shared-Memory Branch-and-Reduce for Multiterminal Cuts. In *Algorithm Engineering and Experimentation (ALENEX)*, accepted, 2020.
- [57] Damir Ferizovic, Demian Hesse, Sebastian Lamm, Matthias Mnich, Christian Schulz and Darren Strash. Engineering Kernelization for Maximum Cut. In *Algorithm Engineering and Experimentation (ALENEX)*, accepted, 2020.

- [58] Kathrin Hanauer, Monika Henzinger, and Christian Schulz. Fully Dynamic Single-Source Reachability in Practice: An Experimental Study. In *Algorithm Engineering and Experimentation (ALENEX)*, accepted, 2020.
- [59] Demian Hesse, Sebastian Lamm, Christian Schulz and Darren Strash. WeGotYouCovered: The Winning Solver from the 2019 PACE Implementation Challenge, Vertex Cover Track. In *Combinatorial Scientific Computing (CSC)*, accepted, 2020.

Workshop Papers and Posters – without proceedings

- [60] Roland Glantz, Henning Meyerhenke, Peter Sanders and Christian Schulz. Improving Coarsening for Multilevel Partitioning of Complex Networks. Workshop Paper, The Sixth SIAM Workshop on Combinatorial Scientific Computing, 2014. PDF.
- [61] Peter Sanders and Christian Schulz. KaHIP – Karlsruhe High Quality Graph Partitioning. Invited Poster, German-American Frontiers of Engineering Symposium, National Academy of Engineering and Alexander von Humboldt Foundation, Potsdam, 2015. PDF.
- [62] Demian Hesse, Sebastian Lamm, Christian Schulz and Darren Strash. WeGotYouCovered. Poster, 14th International Symposium on Parameterized and Exact Computation, Munich, 2019. PDF.
- [63] Johannes Langguth, Sebastian Schlag and Christian Schulz. Load-Balanced Bottleneck Objectives in Process Mapping. Extended abstract, The Ninth SIAM Workshop on Combinatorial Scientific Computing, 2020. PDF..

Technical Reports

- [64] Manuel Holtgrewe, Peter Sanders and Christian Schulz. Engineering a Scalable High Quality Graph Partitioner. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2010. (arXiv:0910.2004)
- [65] Peter Sanders and Christian Schulz. Engineering Multilevel Graph Partitioning Algorithms. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2011. (arXiv:1012.0006)
- [66] Peter Sanders and Christian Schulz. Distributed Evolutionary Graph Partitioning. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2012. (arXiv:1110.0477)
- [67] Ilya Safro, Peter Sanders and Christian Schulz. Advanced Coarsening Schemes for Graph Partitioning. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2011. (arXiv:1201.6488)
- [68] Peter Sanders and Christian Schulz. Think Locally, Act Globally: Perfectly Balanced Graph Partitioning. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2012. (arXiv:1210.0477)

- [69] Marcel Birn, Vitaly Osipov, Peter Sanders, Christian Schulz and Nodari Sitchinava. Efficient Parallel and External Matchings. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2013. (arXiv:1302.4587)
- [70] Peter Sanders and Christian Schulz. KaHIP v0.6 – Karlsruhe High Quality Partitioning – User Guide. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2013. (arXiv:1311.1714)
- [71] Aydin Buluc, Henning Meyerhenke, Ilya Safro, Peter Sanders and Christian Schulz. Recent Advances in Graph Partitioning. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2013. (arXiv:1311.3144)
- [72] Roland Glantz, Henning Meyerhenke and Christian Schulz. Tree-based Coarsening and Partitioning of Complex Networks. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2014. (arXiv:1402.2782)
- [73] Henning Meyerhenke, Peter Sanders and Christian Schulz. Partitioning Complex Networks via Size-constrained Clustering. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2014. (arXiv:1402.3281)
- [74] Yaroslav Akhremtsev, Peter Sanders and Christian Schulz. (Semi-)External Algorithms for Graph Partitioning and Clustering. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2014. (arXiv:1404.4887)
- [75] Henning Meyerhenke, Peter Sanders and Christian Schulz. Parallel Graph Partitioning for Complex Networks. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2014. (arXiv:1404.4797)
- [76] Michael Axtmann, Timo Bingmann, Peter Sanders and Christian Schulz. Practical Massively Parallel Sorting – Basic Algorithmic Ideas. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2014. (arXiv:1410.6754)
- [77] Sebastian Lamm, Peter Sanders and Christian Schulz. Graph Partitioning for Independent Sets. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2015. (arXiv:1502.01687)
- [78] Vitali Henne, Henning Meyerhenke, Peter Sanders, Sebastian Schlag and Christian Schulz. n -level Hypergraph Partitioning. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2015. (arXiv:1505.00693)
- [79] Nitin Ahuja, Matthias Bender, Peter Sanders, Christian Schulz and Andreas Wagner. Incorporating Road Networks into Territory Design. Technical report, ITI Sanders, Department of Informatics, Karlsruhe Institute of Technology, 2015. (arXiv:1504.07846)
- [80] Henning Meyerhenke, Martin Nöllenburg and Christian Schulz. Drawing Large Graphs by Multilevel Maxent-Stress Optimization. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology, 2015. (arXiv:1506.04383)
- [81] Peter Sanders and Christian Schulz. Advanced Multilevel Node Separator Algorithms. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology, 2015. (arXiv:1509.01190)

- [82] Sebastian Schlag, Vitali Henne, Tobias Heuer, Henning Meyerhenke, Peter Sanders and Christian Schulz. *k*-way Hypergraph Partitioning via *n*-Level Recursive Bisection. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology, 2015. (arXiv:1511.03137)
- [83] Sebastian Lamm, Peter Sanders, Christian Schulz, Darren Strash and Renato F. Werneck. Finding Near-Optimal Independent Sets at Scale. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology, 2015. (arXiv:1509.00764)
- [84] Jakob Dahlum, Sebastian Lamm, Peter Sanders, Christian Schulz, Darren Strash and Renato F. Werneck. Accelerating Local Search for the Maximum Independent Set Problem. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology, 2016. (arXiv:1602.01659)
- [85] Peter Sanders and Christian Schulz. Scalable Generation of Scale-free Graphs. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology, 2016. (arXiv:1602.07106)
- [86] Peter Sanders, Christian Schulz, Darren Strash and Robert Williger. Distributed Evolutionary *k*-way Node Separators. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology and Faculty of Computer Science, University of Vienna, 2017. (arXiv:1702.01692)
- [87] Christian Schulz and Jesper Larsson Träff. Better Process Mapping and Sparse Quadratic Assignment Problems. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology, Faculty of Computer Science, University of Vienna and Technical University of Vienna, 2017. (arXiv:1702.04164)
- [88] Tomas Balyo, Kai Fieger and Christian Schulz. Optimal Longest Path Search by Dynamic Programming. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology and Faculty of Computer Science, University of Vienna, 2017. (arXiv:1702.04170)
- [89] Monika Henzinger, Alexander Noe, Christian Schulz and Darren Strash. Practical Minimum Cut Algorithms. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology, Faculty of Computer Science, University of Vienna and Colgate University, 2017. (arXiv:1708.06127)
- [90] Demian Hespe, Christian Schulz and Darren Strash. Scalable Kernelization for Maximum Independent Sets. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology, Faculty of Computer Science, University of Vienna and Colgate University, 2017. (arXiv:1708.06151)
- [91] Robin Andre, Sebastian Schlag and Christian Schulz. Memetic Multilevel Hypergraph Partitioning. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology and Faculty of Computer Science, University of Vienna, 2017. (arXiv:1710.01968)

- [92] Orlando Moreira, Merten Popp and Christian Schulz. Evolutionary Acyclic Graph Partitioning. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology, Faculty of Computer Science, University of Vienna and Intel Corporation, Eindhoven, The Netherlands, 2017. (arXiv:1709.08563)
- [93] Yaroslav Akhremtsev, Peter Sanders and Christian Schulz. High-Quality Shared-Memory Graph Partitioning. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology and Faculty of Computer Science, University of Vienna, 2017. (arXiv:1710.08231)
- [94] Daniel Funke, Sebastian Lamm, Peter Sanders, Christian Schulz, Darren Strash and Moritz von Looz. Communication-free Massively Distributed Graph Generation. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology and Faculty of Computer Science, University of Vienna, 2017. (arXiv:1710.07565)
- [95] Alexandra Henzinger, Alexander Noe and Christian Schulz. ILP-based Local Search for Graph Partitioning. Technical report, Stanford and Faculty of Computer Science, University of Vienna, 2018. (arXiv:1802.07144)
- [96] Sonja Biedermann, Monika Henzinger, Christian Schulz and Bernhard Schuster. Memetic Graph Clustering. Technical report, Faculty of Computer Science, University of Vienna, 2018. (arXiv:1802.07034)
- [97] Sebastian Schlag, Matthias Schmitt and Christian Schulz. Faster Support Vector Machines. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology and Faculty of Computer Science, University of Vienna, 2018. (arXiv:1808.06394)
- [98] Sebastian Schlag, Christian Schulz, Daniel Seemaier and Darren Strash. Scalable Edge Partitioning. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology and Faculty of Computer Science, University of Vienna, and Hamilton College, 2018. (arXiv:1808.06411)
- [99] Sebastian Lamm, Christian Schulz, Darren Strash, Robert Williger and Huashuo Zhang. Exactly Solving the Maximum Weight Independent Set Problem on Large Real-World Graphs. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology and Faculty of Computer Science, University of Vienna, and Hamilton College 2018. (arXiv:1810.10834)
- [100] Monika Henzinger, Alexander Noe and Christian Schulz. Shared-Memory Exact Minimum Cuts. Technical report, Faculty of Computer Science, University of Vienna, 2018. (arXiv:1808.05458)
- [101] Kathrin Hanauer, Monika Henzinger, and Christian Schulz. Fully Dynamic Single-Source Reachability in Practice: An Experimental Study. Technical report, Faculty of Computer Science, University of Vienna, 2019. (arXiv:1905.01216)
- [102] Damir Ferizovic, Demian Hespe, Sebastian Lamm, Matthias Mnich, Christian Schulz and Darren Strash. Engineering Kernelization for Maximum Cut. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology, University of Bonn,

Faculty of Computer Science, University of Vienna, and Hamilton College, 2018. (arXiv:1905.10902)

- [103] Tomas Balyo, Kai Fieger, Dominik Schreiber, Christian Schulz. Finding Optimal Longest Paths by Dynamic Programming in Parallel. Technical report, ITI, Department of Informatics, Karlsruhe Institute of Technology and University of Vienna, Faculty of Computer Science, 2019. (arXiv:1905.03645)
- [104] Monika Henzinger, Alexander Noe and Christian Schulz. Shared-Memory Branch-and-Reduce for Multiterminal Cuts. Technical report, Faculty of Computer Science, University of Vienna, 2019. (arXiv:1908.04141)
- [105] Demian Hespe, Sebastian Lamm, Christian Schulz and Darren Strash. WeGotYouCovered: The Winning Solver from the 2019 PACE Implementation Challenge, Vertex Cover Track. Technical report, Karlsruhe Institute of Technology and Faculty of Computer Science, University of Vienna and Hamilton College, 2019. (arXiv:1908.06795)
- [106] Marcelo Fonseca Faraj, Alexander van der Grinten, Henning Meyerhenke, Jesper Larsson Träff and Christian Schulz. High-Quality Hierarchical Process Mapping. Technical report, University of Vienna, Faculty of Computer Science, Humboldt Universität zu Berlin, and Technical University of Vienna, 2020. (arXiv:2001.07134)
- [107] Johannes Langguth, Sebastian Schlag and Christian Schulz. Load-Balanced Bottleneck Objectives in Process Mapping. Technical report, Simula Research Laboratory, Karlsruhe Institute of Computer Science and University of Vienna, Faculty of Computer Science, 2020. (arXiv:2001.09645)
- [108] Kathrin Hanauer, Monika Henzinger and Christian Schulz. Faster Fully Dynamic Transitive Closure. Technical report, University of Vienna, Faculty of Computer Science, 2020.

Currently in Submission

- [109] Orlando Moreira, Merten Popp and Christian Schulz. Evolutionary Multi-Level Acyclic Graph Partitioning. In *ACM Journal of Heuristics*, submitted, 2018.
- [110] Alexandra Henzinger, Alexander Noe and Christian Schulz. ILP-based Local Search for Graph Partitioning. In *ACM Journal of Experimental Algorithms (ACM JEA)*, submitted, 2019.
- [111] Christian Schulz, Jesper Larsson Träff and Konrad von Kirchbach. Better Process Mapping and Sparse Quadratic Assignment Problems. In *ACM Journal of Experimental Algorithms (ACM JEA)*, submitted, 2019.
- [112] Yaroslav Akhremtsev, Peter Sanders and Christian Schulz. High-Quality Shared-Memory Graph Partitioning. *IEEE Transactions on Parallel and Distributed Systems*, submitted, 2019.

- [113] Marcelo Fonseca Faraj, Alexander van der Grinten, Henning Meyerhenke, Jesper Larsen Träff and Christian Schulz. High-Quality Hierarchical Process Mapping. In *Symposium on Experimental Algorithms (SEA)*, submitted, 2020.
- [114] Kathrin Hanauer, Monika Henzinger and Christian Schulz. Faster Fully Dynamic Transitive Closure in Practice. In *Symposium on Experimental Algorithms (SEA)*, submitted, 2020.
- [115] Sebastian Schlag, Matthias Schmitt and Christian Schulz. Faster Support Vector Machines. In *Journal of Machine Learning*, submitted, 2020.
- [116] Gramoz Goranci, Monika Henzinger, Dariusz Leniowski, Christian Schulz, Alexander Svozil. Fully Dynamic k -Center Clustering in Doubling Metrics. In *International Conference on Machine Learning*, submitted, 2020.

Currently in Preparation (to be submitted within the next 3 months)

- [117] Merten Popp, Sebastian Schlag, Christian Schulz and Daniel Seemaier. Multilevel Acyclic Hypergraph Partitioning. In *Genetic and Evolutionary Computation Conference (GECCO'20)*, 2020.
- [118] Monika Henzinger, Alexander Noe, Christian Schulz and Darren Strash. Finding All Global Minimum Cuts In Practice. In *European Symposium on Algorithms (ESA'20)*, 2020.
- [119] Ulrik Brandes, Michael Hamann, Sebastian Lamm, Ulrich Meyer, Manuel Penschuck, Ilya Safro, Peter Sanders, and Christian Schulz. Recent Advances in Scalable Network Generation. Book chapter for Massive Graph Analytics, 2020.
- [120] Wolfgang Ost, Christian Schulz and Darren Strash. Reduced Nested Dissection. In *European Symposium on Algorithms (ESA'20)*, 2020.
- [121] Monika Henzinger, Shahbaz Khan, Richard Paul, Christian Schulz. Dynamic Matching in Practice. In *European Symposium on Algorithms (ESA'20)*, 2020.
- [122] Tobias Heuer, Peter Sanders, Sebastian Schlag, Christian Schulz. High-Quality Hypergraph Partitioning. In *ACM Journal of Experimental Algorithms (ACM JEA)*, 2020.