



## Publications

2020

### Begutachteter Zeitschriftenartikel

**Matri, Pierre; Alforov, Yevhen; Brandon, Álvaro; Pérez, María S.; Costan, Alexandru; Antoniu, Gabriel; Kuhn, Michael; Carns, Philip; Ludwig, Thomas**

*Mission possible: Unify HPC and Big Data stacks towards application-defined blobs at the storage layer*

*In: Future Generation Computer Systems, Elsevier BV, 2020, Bd. 109, S. 668-677*

**Duwe, Kira; Lüttgau, Jakob; Mania, Georgiana; Squar, Jannek; Fuchs, Anna; Kuhn, Michael; Betke, Eugen; Ludwig, Thomas**

*State of the Art and Future Trends in Data Reduction for High-Performance Computing*

*In: Supercomputing Frontiers and Innovations, Publishing Center of South Ural State University, S. 4-36, 2020*

### Buchbeitrag

**Bremer, Daniel; Kuhn, Michael; Heidari, Mohammad Reza**

*ArduPower v2: Open and modular power measurement for HPC components*

*In: The Tenth International Conference on Smart Grids, Green Communications and IT Energy-aware*

*Technologies, ENERGY 2020 - IARIA, 2020 . - 2020, S. 24-29 ; [Konferenz: Tenth International Conference on Smart Grids, Green Communications and IT Energy-aware Technologies, ENERGY 2020, Lisbon, Portugal, September 27, 2020 to October 01, 2020]*

**Squar, Jannek; Jammer, Tim; Blesel, Michael; Kuhn, Michael; Ludwig, Thomas**

*Compiler Assisted Source Transformation of OpenMP Kernels*

*In: 2020 19th International Symposium on Parallel and Distributed Computing (ISPDC), IEEE, 2020*

**Kuhn, Michael; Plehn, Julius; Alforov, Yevhen; Ludwig, Thomas**

*Improving energy efficiency of scientific data compression with decision trees*

*In: The Tenth International Conference on Smart Grids, Green Communications and IT Energy-aware*

*Technologies, ENERGY 2020 - IARIA, 2020 . - 2020, S. 17-23 ; [Konferenz: Tenth International Conference on Smart Grids, Green Communications and IT Energy-aware Technologies, ENERGY 2020, Lisbon, Portugal, September 27, 2020 to October 01, 2020]*

2019

### Begutachteter Zeitschriftenartikel

**Kuhn, Michael**

*Parallele Dateisysteme*

*In: Informatik Spektrum, Springer Science and Business Media LLC, 2019, Bd. 42, Heft 5, S. 360-364*

**Kunkel, Julian; Himstedt, Kai; Hübbe, Nathanael; Stüben, Hinnerk; Schröder, Sandra; Kuhn, Michael; Riebisch, Matthias; Olbrich, Stephan; Ludwig, Thomas; Filingner, Weronika; Acquaviva, Jean-Thomas; Gerbes, Anja; Lafayette, Lev**

*Towards an HPC Certification Program*

**2018**

**Begutachteter Zeitschriftenartikel**

**Lüttgau, Jakob; Kuhn, Michael; Duwe, Kira; Alforov, Yevhen; Betke, Eugen; Kunkel, Julian; Ludwig, Thomas**

*A Survey of Storage Systems for High-Performance Computing*

*In: Supercomputing Frontiers and Innovations, Publishing Center of South Ural State University, S. 31-58, 2018*

**Buchbeitrag**

**Alforov, Yevhen; Ludwig, Thomas; Novikova, Anastasiia; Kuhn, Michael; Kunkel, Julian**

*Towards Green Scientific Data Compression Through High-Level I/O Interfaces*

*In: 2018 30th International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD), IEEE, 2018*

**2017**

**Buchbeitrag**

**Matri, Pierre; Alforov, Yevhen; Brandon, Alvaro; Kuhn, Michael; Carns, Philip; Ludwig, Thomas**

*Could Blobs Fuel Storage-Based Convergence Between HPC and Big Data?*

*In: 2017 IEEE International Conference on Cluster Computing (CLUSTER), IEEE, 2017*

**Kuhn, Michael**

*JULEA: A Flexible Storage Framework for HPC*

*In: Lecture Notes in Computer Science, Springer International Publishing, 2017, S. 712-723, High Performance Computing*

**Kuhn, Michael; Chasapis, Konstantinos; Kuhn, Manuela; Malka, Janusz; Stibor, Thomas; Nekovi, Gvozden**

*Performance and Power Optimization*

*In: Helmholtz Portfolio Theme Large-Scale Data Management and Analysis (LSDMA), KIT Scientific Publishing, S. 141-160, 2017, 978-3-7315-0695-9*

**2016**

**Begutachteter Zeitschriftenartikel**

**Llopis, Pablo; Dolz, Manuel F.; Blas, Javier Garcia; Isaila, Florin; Heidari, Mohammad Reza; Kuhn, Michael**

*Analyzing the energy consumption of the storage data path*

*In: The Journal of Supercomputing, Springer Science and Business Media LLC, 2016, Bd. 72, Heft 11, S. 4089-4106*

**Kuhn, Michael; Kunkel, Julian; Ludwig, Thomas**

*Data Compression for Climate Data*

*In: Supercomputing Frontiers and Innovations, Publishing Center of South Ural State University, S. 75-94, 2016*

**2015**

**Artikel in Kongressband**

**Llopis, Pablo; Dolz, Manuel F.; García-Blas, Javier; Isaila, Florin; Carretero, Jesús; Heidari,**

**Mohammad Reza; Kuhn, Michael**

*Analyzing Power Consumption of I/O Operations in HPC Applications*

*In:* Proceedings of the Second International Workshop on Sustainable Ultrascale Computing Systems (NESUS 2015), Computer Architecture, Communications and Systems Group (ARCOS), S. 107-116, 2015, 978-84-608-2581-4

#### Buchbeitrag

**Bartz, Christopher; Chasapis, Konstantinos; Kuhn, Michael; Nerge, Petra; Ludwig, Thomas**

*A Best Practice Analysis of HDF5 and NetCDF-4 Using Lustre*

*In:* Lecture Notes in Computer Science, Springer International Publishing, 2015, S. 274-281, High Performance Computing

**Dolz, Manuel F.; Heidari, Mohammad Reza; Kuhn, Michael; Ludwig, Thomas; Fabregat, German**

*ARDUPOWER: A low-cost wattmeter to improve energy efficiency of HPC applications*

*In:* 2015 Sixth International Green and Sustainable Computing Conference (IGSC), IEEE, 2015

**Lautenschlager, Michael; Adamidis, Panagiotis; Kuhn, Michael**

*Big Data Research at DKRZ Climate Model Data Production Workflow*

*In:* Big Data and High Performance Computing, IOS Press, S. 133-155, 2015, 978-1-61499-582-1

**Kuhn, Michael**

*Dynamically Adaptable I/O Semantics for High Performance Computing*

*In:* Lecture Notes in Computer Science, Springer International Publishing, 2015, S. 240-256, High Performance Computing

**Droste, Alexander; Kuhn, Michael; Ludwig, Thomas**

*MPI-checker - static analysis for MPI*

*In:* Proceedings of the Second Workshop on the LLVM Compiler Infrastructure in HPC - LLVM '15, ACM Press, 2015

2014

#### Artikel in Kongressband

**Kuhn, Michael; Chasapis, Konstantinos; Dolz, Manuel; Ludwig, Thomas**

*Compression By Default - Reducing Total Cost of Ownership of Storage Systems*

*In:* Supercomputing, Springer International Publishing, 8488, 2014, 978-3-319-07517-4

**Chasapis, Konstantinos; Dolz, Manuel; Kuhn, Michael; Ludwig, Thomas**

*Evaluating Power-Performance Benefits of Data Compression in HPC Storage Servers*

*In:* ENERGY 2014: The Fourth International Conference on Smart Grids, Green Communications and IT Energy-aware Technologies, IARIA XPS Press, S. 29-34, 2014, 978-1-61208-332-2

#### Begutachteter Zeitschriftenartikel

**Kunkel, Julian; Kuhn, Michael; Ludwig, Thomas**

*Exascale Storage Systems - An Analytical Study of Expenses*

*In:* Supercomputing Frontiers and Innovations, Publishing Center of South Ural State University, S. 116-134, 2014

#### Buchbeitrag

**Chasapis, Konstantinos; Dolz, Manuel F.; Kuhn, Michael; Ludwig, Thomas**

*Evaluating Lustre's Metadata Server on a Multi-Socket Platform*

*In: 2014 9th Parallel Data Storage Workshop, IEEE, 2014*

**2013**

#### **Buchbeitrag**

**Kuhn, Michael**

*A Semantics-Aware I/O Interface for High Performance Computing*

*In: Lecture Notes in Computer Science, Springer Berlin Heidelberg, 2013, S. 408-421, Supercomputing*

**2012**

#### **Artikel in Kongressband**

**Janssen, Christina; Kuhn, Michael; Ludwig, Thomas**

*Evaluating the Influence of File System Interfaces and Semantics on I/O Throughput in High Performance Computing*

*In: Proceedings of the Work in Progress Session, 20th Euromicro International Conference on Parallel, Distributed and Network-Based Processing, Institute for Systems Engineering and Automation, 31, 2012, 978-3-902457-31-8*

**Kuhn, Michael; Kunkel, Julian; Tsujita, Yuichi; Muguruma, Hidetaka; Ludwig, Thomas**

*Optimizations for Two-Phase Collective I/O*

*In: Applications, Tools and Techniques on the Road to Exascale Computing, IOS Press, 22, S. 455-462, 2012, 978-1-61499-040-6*

**Schröder, Sandra; Kuhn, Michael; Hübbe, Nathanael; Kunkel, Julian; Minartz, Timo; Nerge, Petra; Wasserfall, Florens; Ludwig, Thomas**

*Scientific Computing: Performance and Efficiency in Climate Models*

*In: Proceedings of the Work in Progress Session, 20th Euromicro International Conference on Parallel, Distributed and Network-Based Processing, Institute for Systems Engineering and Automation, 31, 2012, 978-3-902457-31-8*

#### **Begutachteter Zeitschriftenartikel**

**Kunkel, Julian M.; Minartz, Timo; Kuhn, Michael; Ludwig, Thomas**

*Towards an energy-aware scientific I/O interface - Stretching the ADIOS interface to foster performance analysis and energy awareness*

*In: Computer Science - Research and Development, Springer Science and Business Media LLC, 2012, Bd. 27, Heft 4, S. 337-345*

#### **Buchbeitrag**

**Meister, Dirk; Kaiser, Jurgen; Brinkmann, Andre; Cortes, Toni; Kuhn, Michael; Kunkel, Julian**

*A study on data deduplication in HPC storage systems*

*In: 2012 International Conference for High Performance Computing, Networking, Storage and Analysis, IEEE, 2012*

**Kuhn, Michael; Kunkel, Julian M.; Ludwig, Thomas**

*Simulation-Aided Performance Evaluation of Server-Side Input/Output Optimizations*

*In: 2012 20th Euromicro International Conference on Parallel, Distributed and Network-based Processing, IEEE, 2012*

**Minartz, Timo; Molka, Daniel; Kunkel, Julian; Knobloch, Michael; Kuhn, Michael; Ludwig, Thomas**

*Tool Environments to Measure Power Consumption and Computational Performance*

*In: Handbook of Energy-Aware and Green Computing, Chapman and Hall/CRC Press Taylor and Francis Group, S. 709-743, 2012, 978-1-4398-5040-4*

**2010**

**Begutachteter Zeitschriftenartikel**

**Kunkel, Julian M.; Mordvinova, Olga; Kuhn, Michael; Ludwig, Thomas**

*Collecting energy consumption of scientific data - Energy demands for files during their life cycle*

*In: Computer Science - Research and Development, Springer Science and Business Media LLC, 2010, Bd. 25, Heft 3-4, S. 197-205*

**2009**

**Begutachteter Zeitschriftenartikel**

**Kuhn, Michael; Kunkel, Julian Martin; Ludwig, Thomas**

*Dynamic file system semantics to enable metadata optimizations in PVFS*

*In: Concurrency and Computation: Practice and Experience, Wiley, 2009, Bd. 21, Heft 14, S. 1775-1788*

**2008**

**Buchbeitrag**

**Kuhn, Michael; Kunkel, Julian; Ludwig, Thomas**

*Directory-Based Metadata Optimizations for Small Files in PVFS*

*In: Lecture Notes in Computer Science, Springer Berlin Heidelberg, 2008, S. 90-99, Euro-Par 2008 Parallel Processing*