

# Dr. Sebastian Litzinger

POSTDOCTORAL RESEARCHER · COMPUTER SCIENCE

Parallelism & VLSI Group, FernUniversität in Hagen, Germany

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## Education

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### FernUniversität in Hagen

PHD IN COMPUTER SCIENCE

Hagen, Germany

2023

### FernUniversität in Hagen

MSC IN PRACTICAL COMPUTER SCIENCE

Hagen, Germany

2018

### Eberhard Karls Universität Tübingen

MA IN PHILOSOPHY

Tübingen, Germany

2015

### Heythrop College, University of London

ERASMUS PROGRAMME PARTICIPANT

London, UK

2010-2011

### Universität Hamburg

BA IN PHILOSOPHY

Hamburg, Germany

2009

## Professional Experience

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2018– **Research Assistant**, Parallelism & VLSI Group, FernUniversität in Hagen

2015–2018 **Research Assistant**, Chair of Operations Research, FernUniversität in Hagen

2013–2014 **Teaching Assistant**, Department of Philosophy, Eberhard Karls Universität Tübingen

2008–2009 **Teaching Assistant**, Department of Philosophy, Universität Hamburg

## Publications

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### THESES

**S. Litzinger**. Raising Energy Efficiency and Fault Tolerance with Parallel Streaming Application Scheduling on Multicore Systems. FernUniversität in Hagen. 2023.

### JOURNAL ARTICLES

C. Heßeling, **S. Litzinger**, J. Keller. Archive-based Covert Channel in Sensor Streaming Data. *Journal of Universal Computer Science* 30(8): 1048–1067. 2024.

**S. Litzinger**, J. Keller, C. Kessler. Packing Multiple Types of Cores for Energy-Optimized Heterogeneous Hardware-Software Co-Design of Moldable Streaming Computations. *IEEE Access* 11: 19301–19311. 2023.

J. Keller, **S. Litzinger**, C. Kessler. Integrating Energy-Optimizing Scheduling of Moldable Streaming Tasks with Design Space Exploration for Multiple Core Types on Configurable Platforms. *Journal of Signal Processing Systems* 94: 849–864. 2022.

J. Keller, **S. Litzinger**. Systematic Search Space Design for Energy-Efficient Static Scheduling of Moldable Tasks. *Journal of Parallel and Distributed Computing* 162: 44–58. 2022.

W. Rödder, A. Dellnitz, **S. Litzinger**. Combining efficiency and scaling effects in activity analysis: towards an improved best practice criterion. *RAIRO-Operations Research* 56(2): 795–812. 2022.

- S. Litzinger**, J. Keller. Effects of Continuous vs Discrete Frequency Scaling and Core Allocation on Energy Efficiency of Static Schedules for Moldable Tasks. *Parallel Processing Letters* 2150025. 2021.
- W. Rödder, A. Dellnitz, **S. Litzinger**. Analysing terrorist networks – An entropy-driven method. *Expert Systems* 39(10): e12720. 2021.
- C. Kessler, **S. Litzinger**, J. Keller. Crown-scheduling of sets of parallelizable tasks for robustness and energy-elasticity on many-core systems with discrete dynamic voltage and frequency scaling. *Journal of Systems Architecture* 115: 101999. 2021.
- S. Litzinger**, J. Keller. Code generation for energy-efficient execution of dynamic streaming task graphs on parallel and heterogeneous platforms. *Concurrency and Computation: Practice and Experience*: e6072. 2020.
- C. Kessler, **S. Litzinger**, J. Keller. Static Scheduling of Moldable Streaming Tasks With Task Fusion for Parallel Systems With DVFS. *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems* 39(11): 4166–4178. 2020.
- W. Rödder, A. Dellnitz, I. Gartner, **S. Litzinger**. Weight Prediction on Missing Links in Social Networks – a Cross-Entropy-Based Approach –. *Journal of Applied Logics* 6(1): 83–104. 2019.
- W. Rödder, A. Dellnitz, F. Kulmann, **S. Litzinger**, E. Reucher. Bipartite Structures in Social Networks: Traditional versus Entropy-Driven Analyses. *Entropy* 21(3): 277. 2019.

## CONFERENCE & WORKSHOP ARTICLES

- S. Khosravi, C. Kessler, **S. Litzinger**, J. Keller. Energy-Efficient Scheduling of Moldable Streaming Computations for the Edge-Cloud Continuum. Accepted at the 9th IEEE International Conference on Fog and Mobile Edge Computing (FMEC). 2024.
- M. Boulasikis, C. Kessler, F. Gruian, J. Keller, **S. Litzinger**. Packet-Type Aware Scheduling of Moldable Streaming Tasks on Multicore Systems with DVFS. *Proceedings of the 39th ACM/SIGAPP Symposium On Applied Computing (SAC)*. 2024.
- S. Litzinger**. Heuristic Scheduling of Streaming Applications for Energy Efficiency on Heterogeneous Multicores. *Proceedings of the 25th IEEE International Conference on High Performance Computing and Communications (HPCC)*. 2023.
- C. Heßeling, J. Keller, **S. Litzinger**. Reversible Network Covert Channel by Payload Modulation in Streams of Decimal Sensor Values. *Proceedings of the 19th IEEE International Conference on e-Science (eScience)*. 2023.
- C. Heßeling, J. Keller, **S. Litzinger**. Network Steganography Through Redundancy in Higher-Radix Floating-Point Representations. *Proceedings of the 17th International Conference on Availability, Reliability and Security (ARES)*. 2022.
- C. Heßeling, J. Keller, **S. Litzinger**. Kleptography in Authentication Protocols: Why is it Still Possible? *Proceedings of the European Interdisciplinary Cybersecurity Conference (EICC)*. 2022.
- J. Keller, **S. Litzinger**. Energy-Efficient Execution of Streaming Task Graphs with Parallelizable Tasks on Multicore Platforms with Core Failures. *Euro-Par 2021: Parallel Processing Workshops*. 2022.
- C. Kessler, J. Keller, **S. Litzinger**. Temperature-Aware Energy-Optimal Scheduling of Moldable Streaming Tasks onto 2D-Mesh-Based Many-Core CPUs with DVFS. *Proceedings of the 24th Workshop on Job Scheduling Strategies for Parallel Processing (JSSPP)*. 2021.
- J. Keller, **S. Litzinger**, C. Kessler. Combining Design Space Exploration with Task Scheduling of Moldable Streaming Tasks on Reconfigurable Platforms. *Proceedings of the 17th International Symposium on Applied Reconfigurable Computing (ARC)*. 2021.
- S. Litzinger**, J. Keller. Generating Energy-Efficient Code for Parallel Applications Specified by Streaming Task Graphs with Dynamic Elements. *Proceedings of the 11th International Workshop on Programming Models and Applications for Multicores and Manycores (PMAM)*. 2020.
- S. Litzinger**, J. Keller, C. Kessler. Maximizing Profit in Energy-Efficient Moldable Task Execution with Deadline. *Proceedings of the 28th Euromicro International Conference on Parallel, Distributed and Network-Based Processing (PDP)*. 2020.
- C. Kessler, **S. Litzinger**, J. Keller. Robustness and Energy-elasticity of Crown Schedules for Sets of Parallelizable Tasks on Many-core Systems with DVFS. *Proceedings of the 28th Euromicro International Conference on Parallel, Distributed and Network-Based Processing (PDP)*. 2020.
- C. Kessler, **S. Litzinger**, J. Keller. Adaptive Crown Scheduling for Streaming Tasks on Many-Core Systems with Discrete DVFS. *Euro-Par 2019: Parallel Processing Workshops*. 2020.
- S. Litzinger**, J. Keller. Influence of Discretization of Frequencies and Processor Allocation on Static Scheduling of Parallelizable Tasks with Deadlines. *PARS-Mitteilungen* 35. 2020.

- S. Litzinger**, J. Keller, C. Kessler. Scheduling Moldable Parallel Streaming Tasks on Heterogeneous Platforms with Frequency Scaling. Proceedings of the 27th European Signal Processing Conference (EUSIPCO). 2019.
- S. Litzinger**, O. Körber, J. Keller. Reducing Energy Consumption of HMAC Applications on Heterogeneous Platforms. Proceedings of the 17th International Conference on High Performance Computing & Simulation (HPCS). 2019.
- J. Keller, **S. Litzinger**, W. Spitzer. Probabilistic Runtime Guarantees for Statically Scheduled Taskgraphs with Stochastic Task Runtimes. Proceedings of the 17th International Conference on High Performance Computing & Simulation (HPCS). 2019.
- S. Litzinger**, A. Klos, W. Schiffmann. Compute-Efficient Neural Network Architecture Optimization by a Genetic Algorithm. Proceedings of the 8th International Conference on Artificial Neural Networks (ICANN). 2019.

## WORKING PAPERS

- J. Keller, **S. Litzinger**. Influence of Incremental Constraints on Energy Consumption and Static Scheduling Time for Moldable Tasks with Deadline. Presented at the 13th International Workshop on Programmability and Architectures for Heterogeneous Multicores. 2020.

## Awards

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- 2024 **Award for best scientific achievement of a junior researcher in 2023 (for my PhD dissertation)**, Faculty of Mathematics and Computer Science, FernUniversität in Hagen

## Presentations

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### CONFERENCE & WORKSHOP TALKS

- Heuristic Scheduling of Streaming Applications for Energy Efficiency on Heterogeneous Multicores*, HPC2023, Melbourne, Australia.
- Reversible Network Covert Channel by Payload Modulation in Streams of Decimal Sensor Values*, eScience 2023, Limassol, Cyprus.
- Network Steganography Through Redundancy in Higher-Radix Floating-Point Representations*, CUING @ ARES 2022, Vienna, Austria.
- Energy-Efficient Execution of Streaming Task Graphs with Parallelizable Tasks on Multicore Platforms with Core Failures*, Resilience @ Euro-Par 2021, Lisbon, Portugal (online).
- Temperature-Aware Energy-Optimal Scheduling of Moldable Streaming Tasks onto 2D-Mesh-Based Many-Core CPUs with DVFS*, JSSPP @ IPDPS 2021, Portland, USA (online).
- Energy-Efficient Execution of Streaming Task Graphs with Parallelizable Tasks on Multicore Platforms with Core Failures*, DKFT Workshop 2021 (online).
- Maximizing Profit in Energy-Efficient Moldable Task Execution with Deadline*, PDP 2020, Västerås, Sweden (online).
- Generating Energy-Efficient Code for Parallel Applications Specified by Streaming Task Graphs with Dynamic Elements*, PMAM @ PPOPP 2020, San Diego, USA.
- Influence of Incremental Constraints on Energy Consumption and Static Scheduling Time for Moldable Tasks with Deadline*, MULTIPROG @ HiPEAC 2020, Bologna, Italy.
- Fault-Tolerant and Energy-Efficient Static Schedules for Multi-Variant Programs*, DKFT Workshop 2019, Dortmund, Germany.
- Energy-efficient scheduling of stream processing applications with dynamic tasks*, 4th German-Russian Summer School 2019, Saarbrücken, Germany.
- Adaptive crown scheduling for streaming tasks on many-core systems with discrete DVFS*, Auto-DaSP @ Euro-Par 2019, Göttingen, Germany.
- Probabilistic Runtime Guarantees for Statically Scheduled Taskgraphs with Stochastic Task Runtimes*, HiPMiC @ HPCS 2019, Dublin, Ireland.
- Reducing Energy Consumption of HMAC Applications on Heterogeneous Platforms*, APPMM @ HPCS 2019, Dublin, Ireland.

*Influence of Discretization of Frequencies and Processor Allocation on Static Scheduling of Parallelizable Tasks with Deadlines*, 28th PARS Workshop 2019, Berlin, Germany.

#### OTHER TALKS

*Challenges in Scheduling Parallel Streaming Applications on Multicore Systems*, Faculty Award Ceremony 2024, FernUniversität in Hagen, Germany.

*Energy-efficient Task Scheduling for Parallel Systems*, Science Spring 2023, Leibniz-FH Hanover, Germany.

#### POSTER PRESENTATIONS

*Kleptography in Authentication Protocols: Why is it Still Possible?*, EICC 2022, Barcelona, Spain.

*Compute-efficient neural network architecture optimization by a genetic algorithm*, ICANN 2019, Munich, Germany.

### Service to the Scientific Community

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#### REVIEWING AND SUBREVIEWING

The Journal of Supercomputing

APADeMaL 2022

Applied Sciences

Petri Nets 2021

Journal of Ambient Intelligence and Humanized Computing

Future Generation Computer Systems

EUSIPCO 2019

Journal of Universal Computer Science

ESORICS 2024

#### CONFERENCES AND WORKSHOPS

*Web Chair*, AsHES @ IPDPS 2021