

## Newsletter 03/2024

Welcome to the newsletter of the dtec.bw project hpc.bw. If you want to subscribe to the newsletter, please send a message with subject line “Subscription hpc.bw Newsletter” to [info-hpc-bw@hsu-hh.de](mailto:info-hpc-bw@hsu-hh.de).

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### Seminar Series Computation & Data in HT24

We warmly invite you to the upcoming talks in our seminar series Computation & Data at the HSU in the autumn trimester (HT24) and look forward to exciting discussions on the topic! In addition to attending in presence at the HSU, it is also possible to participate digitally via MS Teams.

Date	Room	Speaker	Title of lecture
30.10.2024 16:00-18:00	seminar room 110	Katharina Goldberg (HSU)	Legal Introduction to the AI Act
		Felix Gehlhoff (HSU)	Working on the Edge: Harnessing AI at the Frontier of Professional Innovation
27.11.2024 16:00-18:00	seminar room 110	Daniel Wolff (UniBw M)	Optimal design through learning-based approaches: Harnessing reinforcement learning and physics-informed neural networks for optimizing flow channels in profile extrusion dies
		Sebastian Zühl (HSU)	Efficient Data Integration and Pre-Processing for Migration Studies Using the German Socio-Economic Panel (GSOEP)
18.12.2024; 16:00-18:00	t.b.a.	Michael Hohmann (HSU)	Design Automation: A Conditional VAE Approach to 3D Object Generation under Conditions
		René Heesch (HSU)	'A Lazy Approach to Neural Numerical Planning with Control Parameters'

To subscribe to the seminar mailing list, send an e-mail to [info-hpc-bw@hsu-hh.de](mailto:info-hpc-bw@hsu-hh.de), subject line „Subscription Seminar Computation & Data”. For more information, [click here](#).

## hpc.bw @dtec.bw annual conference, 17.09.-18.09.2024 @UniBw M



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hpc.bw was represented at the [first annual dtec.bw conference](#), held from 17.09.-18.09.2024, at the University of the Federal Armed Forces Munich (UniBw M). The theme of the conference, "Research with Added Value in All Dimensions," underscored how the Digitalization and Technology Research Center of the Bundeswehr (dtec.bw is driving collaborative research projects at both Universities of the Armed Forces, UniBw M and HSU. Attendees from the military, government ministries, authorities, industry, and the start-up community gathered to explore the latest research activities. hpc.bw showcased its contributions within the "Cyber" dimension, offering comprehensive in-

sights into project-related research and performance engineering initiatives, as well as details on the operation and utilization of the supercomputer HSUPER. The presentation also introduced the [HPC Portal](#), featuring interactive learning and teaching materials aimed at building HPC competences. Dual-use projects, such as the "Submarine Design using Hybrid SciML and FEM HPC," along with another dtec.bw project from the Chair of Computational Materials Design, were also represented. The hpc.bw booth was further enriched by models and demonstrations, including a scale model of the Class 212 A submarine, a compute node from the supercomputer HSUPER, and a soft catch system developed in the field of materials science.

## hpc.bw @EURO, Copenhagen, 30.06.-03.07.2024

hpc.bw was presenting its research in the field of logistics and optimization at the 33<sup>rd</sup> European Conference on Operational Research (EURO 2024), which took place 30.06.-03.07.2024 in Copenhagen at the Technical University of Denmark. The EURO 2024 conference had around 3000 participants from 68 countries and a rich conference program. Our presentation "Performance Analysis of MIP Software on Various Hardware Architectures" was part of the session Parallel Optimization and Scalability. We had several fruitful discussions and networked with researchers and practitioners. For more information on the conference program, [click here](#).

## Publication: Poster abstract @Adult Education and Sustainability

We are happy to announce that our short article about the poster "Competence Development for High Performance Computing (HPC): Mechanical Engineering meets Humanities and Social Science?!" has now been published. The article can be found in the publications series "Adult Education and Sustainability: Explorations and Research between Aspirations and Reality" from the Division of Adult Education as part of The German Educational Research Association (GERA).

[Here](#) you can find the publication (German only), and you can have a look at the poster [here](#).

## HPC Portal: Content Update – Gurobi & IBM ILOG CPLEX Optimization Studio

We've recently added two new *training modules* to the HPC Portal:

### [Gurobi on HSUPER](#)

This training provides comprehensive guidance on obtaining, installing, and running Gurobi software on HSUPER. It covers essential steps for software installation, job submission using SLURM scripts, parameter configuration, and performance tuning.

### **[IBM ILOG CPLEX Optimization Studio on HSUper](#)**

This training provides similar guidance for IBM ILOG CPLEX Optimization Studio software on HSUper. It includes instructions for software installation, job submission using SLURM scripts, running the software via `oplrn`, `cplex`, or `cpoptimizer`, and parameter configuration.

Both trainings are now available on the [HPC Portal](#) for you to use. If you have any questions or feedback, please don't hesitate to reach out.

### **Project Update: Opheo**

Within `dtec.bw`, Opheo plays a critical role in identifying the most efficient strategies for balancing workload distribution, optimizing resource management, and enhancing overall performance. As a logistic tool designed to address tour planning, a complex scheduling problem, it processes large data sets and executes a sequence of operations within the `ixOptimizer`. The Task Parallel Library (TPL) has been integrated to enable precise control over task scheduling and resource allocation. However, benchmarking results have indicated a need for more efficient parallel data processing, which can be addressed by leveraging Parallel LINQ (PLINQ) to automatically parallelize query execution. Ongoing efforts to integrate both TPL and PLINQ aim to expand the system's capacity by enabling more threads to operate concurrently across a broader search space, thereby improving the performance of optimization tasks.

### **Outlook: preCICE Workshop 2025 @HSU**

preCICE is an open-source, multi-physics coupling software that is in worldwide use. HSU will host the next preCICE Workshop on 09.09.-12.09.2025. If you're interested in preCICE, multi-physics coupling or specific coupled problems solved with preCICE, such as fluid-structure interaction problems: save the date 😊