Forest Science at the GWDG

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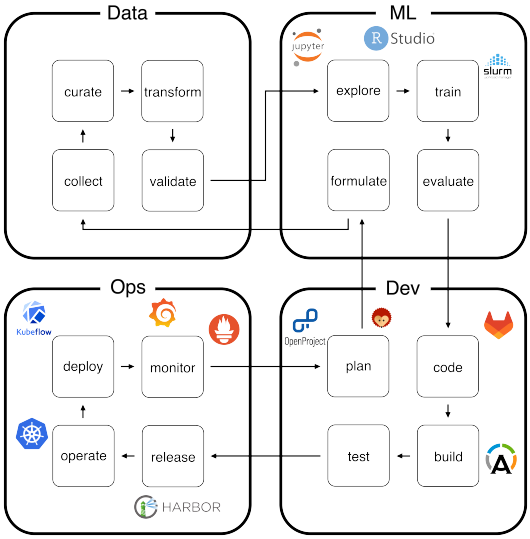
At the Gesellschaft für wissenschaftliche Datenverarbeitung mbH Göttingen (GWDG), we operate a data centre and work with our customers on various projects to optimally meet their technical requirements. We can cover the entire life cycle of a project or product development, from data collection, through numerical experiments, development and deployment (see figure below). Our focus is on the performance, security and usability of our systems, which we can apply and develop in projects such as KISSKI [1] and the NHR [2]. Both are projects where we have various disciplines the forest science community in mind and are looking for more opportunities to expand existing collaborations and build new ones.



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[1] `https://kisski.gwdg.de/`
[2] `https://www.nhr-verein.de/`

Scientific support at the GWDG is organized in several so-called Science Domains [3]. One example for the research within our specialized forest science [4] group was performed in collaboration with the Universities of Göttingen and Freiburg on the ForestCare project [5] to identify individual trees and their vitality. We are also currently supporting the Federal Agency for Cartography and Geodesy (BKG) and the Thünen Institute for Forest Ecosystems to implement a large-scale individual tree detection system using the Digital Twin Germany [6].

Beside scientific support, as a data center we can also provide compute resources funded by two of our projects which can be accessed by the participants of the SmartForest conference. One is the National High Performance Computing Alliance (NHR) [7], where we provide computing resources to academic researchers across Germany. For AI applications, our energy-efficient 'Grete' [8] GPU cluster is particularly noteworthy. We are also one of four AI service centres funded by the BMBF. As part of this "AI Service Centre for Sensitive and Critical Infrastructures" (KISSKI), we work on the accessibility of AI for users with different backgrounds (from chat services to fine-tuning models). In this context, we can offer consulting and computational resources to researchers and commercial companies, such as small and medium-sized enterprises (SMEs), but also larger companies.

By participating in the SmartForest conference, we hope to discuss with people from science and industry about their requirements for data centres, so that we can further optimise our efforts in the field of forest science. We would also like to present existing data analysis and data management services, discuss them with participants and compare them with their existing workflows. These include our interactive computing with JupyterHub [9] [6] or ready-to-use data pools [10] (e.g. we are working on providing access to Sentinel-2 data covering the whole of Germany). Specifically in the context of deployment and scalability of AI workloads, we are developing the Scalable Artificial Intelligence Accelerator (SAIA), which is currently being used to deploy GWDG's AI services and user models.

We believe that we can make a good contribution to the forestry community with our largely free services and look forward to discussing these topics at the conference.

[3] https://docs.hpc.gwdg.de/start_here/science_domains

[4] https://docs.hpc.gwdg.de/start_here/science_domains/forest/

[5] https://gwdg.de/en/projects/forestcare/

[6] https://www.bkg.bund.de/DE/Forschung/Projekte/Digitaler-Zwilling/Digitaler-Zwilling_cont.html

[7] https://gwdg.de/community-pages/nhr-intro/

[8] https://info.gwdg.de/news/en/germanys-most-energy-efficient-supercomputer/

[9] https://docs.hpc.gwdg.de/services/jupyterhub/index.html

[10] https://docs.hpc.gwdg.de/services/datapool/index.html

1 Short Bio

Dr.-Ing. Patrick Höhn ist seit Mai 2023 ein wissenschaftlicher Mitarbeiter an der Georg-August-Universität Göttingen und dabei auch in der AG-Compute der GWDG aktiv. Vorher war er bereits wissenschaftlicher Mitarbeiter an der TU Clausthal, der RWTH Aachen und der Technischen Universität Luleå.

Nach dem Maschinenbaustudium an der Hochschule Coburg, studierte er Luft- und Raumfahrttechnik im Erasmus-Mundus Space-Master-Programm. Nach seiner Masterarbeit an der Utah State University schloss er sein Studim mit einem Master of Science in Physik an der Université Paul Sabatier Toulouse III und einem Master of Science in Space Engineering an der Technischen Universität Luleå ab. Zudem wurde im August 2024 er an der TU Clausthal zum Dr.-Ing. promoviert.