

Carl Werdelin Bergan

Flow Systems Specialist, PhD, MSc

Jeg liker å bruke kompetansen min til å forbedre prosesser, kode, og produkter. Kompetansen min inkluderer programmering, IT, database, data integritet, instrumentering, kretsteknikk, mm. Jeg er en kreativ problemløser, og vet å verdsette en god utfordring.



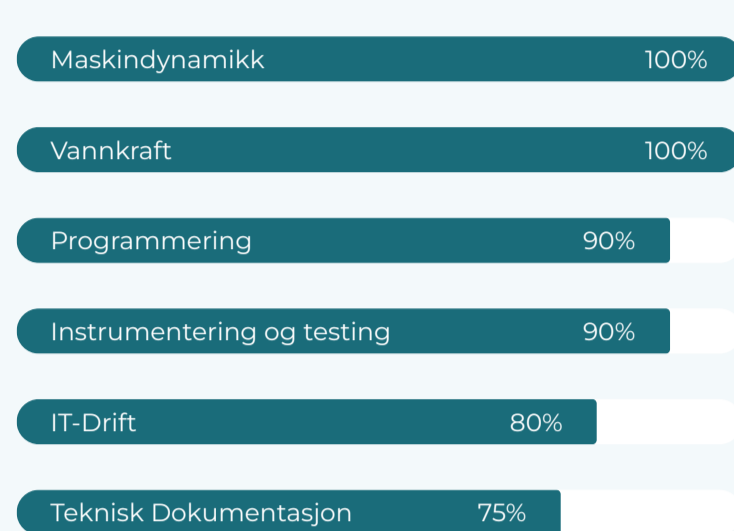
Arbeidserfaring

- > Flow Systems Specialist, Flow Design Bureau, (2019 -> present)
- III Fellowship at NTNU (2014-2019)

Utdannelse

- III PhD – Dynamic Loads on Francis Turbines, NTNU (2019)
- III Master of Science in Mechanical Engineering, NTNU – Part Load Dynamics in Francis Turbines (2014)

Kompetanse



Profesjonell kompetanse

- LabVIEW
- Python
- PostgreSQL
- Grafana
- Linux

Portefølje



Litro

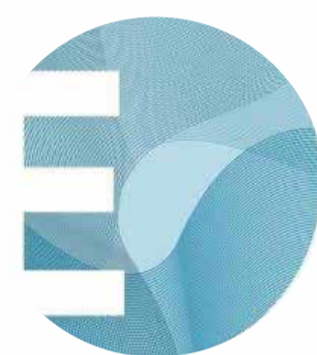
NTNU/FDB, 2019

LITro is a joint research project with the Norwegian University of Science and Technology (NTNU). It consisted of the design and manufacturing of a mobile test rig for investigating the Lifting and Transportation mechanisms of rocks and sand (hence the name: **L**ift and **T**ransportation of **R**ocks).

▲ About the project

The test rig was designed as a closed loop pump system, with a lower reservoir, a surge shaft, and upper reservoir, and a transparent rectangular test-section placing rock and sand specimens. The rig also included a measurement cabinet that monitored and measured rig parameters such as flow rate, pressure, surge shaft level, and valve positions. The rig is built within a large shipping container, with the upper reservoir residing on top of the container when rigged up for use. The surge shaft also protruded from the top of the container, and the pipe section upstream the test section exited and reentered the container, allowing for a long straight section for achieving fully developed flow.

My role in the project was project management, designing the test rig and drawing it up in CAD.



Elvebakken

NTNU/FDB, 2019

Elvebakken is a high school in Oslo that owns and operates a wave tank used for testing ship models. The waves in this tank are generated by a moving plate, controlled by a motor driver.

▲ About the project

The system was cumbersome to use and required key personnel that were no longer available. In our involvement, we replaced the old LabVIEW system with an industrial controller and a touchscreen. The new system interfaces with the same motor driver as the old system, making for an inexpensive solution.

With the new system in place, Elvebakken reports that they now use the wave tank much more in their classes, and that most teachers can use it with minimal instruction.

My role in the project consisted of surveying, programming, testing, installation and deployment, documentation, and post-deployment follow-up.



Nexans + Basefarm

Basefarm, 2019

Nexans is a cable manufacturing company with several factories in Norway. Basefarm (now Orange Business Services) was a data science company with its office in Oslo.

▲ About the project

In this project, we collaborated with Basefarm to deliver a monitoring solution to Nexans with the purpose of providing early warnings when a cable assembly went off track. Specifically, at the point in production where the individual strands are joined into a single cable, there is many opportunities for things to go wrong, and the current solution (prior to our involvement) was having an expert continuously monitor the assembly process.

We set up a Data Acquisition system which consisted of accelerometers on the bearings, microphones along the assembly line, and cameras at the point in production where the individual strands are joined. This data was continuously buffered, and Basefarm provided a Machine Learning algorithm to analyze the live data. If an anomaly was detected, the buffered data was stored as an event for manual processing.

In addition to this, a physical button was made available for the factory workers, such that they may register anomalies manually.

My role in this project was developing FDBs Image Acquisition methods and programming and debugging the entire data acquisition system installed on site. In addition to this, I was responsible for setting up and maintaining VPN access to the installation on site and collaborating with Basefarm in setting up a data sharing system between our data acquisition and their machine learning system, using ZeroMQ.



HydroCord

Sira-Kvina & Statkraft, 2021-present

HydroCord is a holistic data acquisition and monitoring solution for hydro power plants. HydroCord ensures cyber security by utilizing a data diode in data transport from an air-gapped secure zone to a less secure zone. In the Sira-Kvina installation, several power plants are monitored using a range of data acquisition techniques, and all data is made available in a time series database that can be viewed in Grafana.

My role in HydroCord in general consists of software architecture, development of new features, protocol implementation, debugging, benchmarking, and database design and management. For the Sira-Kvina installation specifically, my role also includes data quality follow up, system monitoring, and data dashboard development in Grafana.

[CHECK MORE ABOUT HYDROCORD](#)



HydroCord Vintage

(Grunnåi + Kvilldal)

Statkraft & Skagerak Energi, 2019-2020)

HydroCord Vintage is an early version of the HydroCord system. The vintage version consists of an industrial cabinet with a real-time computer inside, and a touchscreen display for interfacing.

HydroCord Vintage was discontinued due to each installation requiring individual follow-up.

My role in HydroCord vintage consisted of debugging in-office and in-field.