Curriculum Vitae for Vinzenz Gregor Eck

Personal information

Address: Hubertusstr. 83   E-mail: vinzenz.eck@expertanalytics.de
           82131 Gauting Germany   Phone: +49/162/7935345
Born: 21.09.1987

Summary

I am a curious, pragmatic and creative problem solver with a PhD in Biomechanics.

I have 12 years experience in professional software development and have worked in the following fields:

on-edge computation, backend systems for data analysis and predictive maintenance, data-driven analysis, asset/domain modelling, 2d/3d visualisations, stochastic and physics based simulators and numerical solvers.

In 2020, I founded Expert Analytics GmbH in Munich together with Ola Skavhaug and Åsmund Ødergård.

Technical skills

Languages	Python, C, C++, Matlab, LaTeX, HTML, XML, Json, Yaml
Frameworks	NumPy, SciPy, Statsmodel, HDBSCAN, Scikit-learn, Chaospy, Flask, REST, Sphinx, DOT, GraphViz, Matplotlib, Bokeh, GTK, VTK, OSG, OpenGl
Tools	Git, Subversion, Linux, Eclipse, PyCharm, VirtualBox, Inkscape, Amazon AWS, Microsoft Azure

Education

2016	Ph.D. in Biomechanics from the Institute of Structural Engineering, Norwegian University of Science and Technology, Trondheim. Title of dissertation: "Uncertainty quantification and sensitivity analysis for cardiovascular applications".
2013	Diplom Engineer in mechanical engineering, Technische Universität München, Germany.

2012	Master of Science in Technology, Norwegian University of Science and Technology, Trondheim, Norway. Conducted within the Double Degree Program T.I.M.E. (Top Industrial Manager for Europe). Title of thesis: "Arterial Flow and Pulse Wave Propagation in one dimensional Arterial Networks with Statistically Distributed Model Parameters".

Professional experience

2020 –	Founder and Managing Director of Expert Analytics Gmbh, Munich
2016 – 2020	Software Engineering Consultant at Expert Analytics AS, Oslo
2012 – 2013	Ph.D. student at the Department of Structural Engineering, NTNU, Trondheim.
2013 – 2012	Department Engineer at the Department of Circulation and Medical Imaging, Faculty of medicine, NTNU, Trondheim. Development of a hemodynamic-simulation tool for one-dimensional arterial networks. [20% Position]
2012 – 2012	Teaching Assistant at the Department of Energy and Process Engineering, NTNU, Trondheim. Elaboration of fluid mechanic exercise in Matlab for master studies in engineering at NTNU.
2011 – 2012	Assistant Researcher at the Department for Petroleum Engineering and Applied Geophysics, NTNU, Trondheim. Set up and conduction of core-flooding experiments under high pressure, to determine the distribution of Oil, Water and CO_2 on a micro scale within a stone sample.
2007 – 2010	Assistant Researcher at the iwb – Institute for Machine Tools and Industrial Management, TUM, Munich. Programming a simulation software of material flow based on physical laws for the virtual commissioning of production systems.

Languages

German	Mother tongue
Norwegian	Fluent
English	Fluent
French	Basic

Personal skills

Communications	I am proficient in presenting difficult contents understandably and tailored to the target audience.
Management	I am experienced in leading groups and managing projects.
Solution Engineering	I am trained in seeing the bigger picture and connecting all the dots to provide feasible and scalable solutions.

Some interests and hobbies

Music	Guitar, Bass, Clarinet, Percussion, Music Production (recording, mixing and mastering)
Physical	Hiking, Bouldering, Dancing

Extended descriptions of selected projects

Activity	ve3 - virtual commissioning software
Role	Developer
Staffing	2 developers
Description	Realtime simulation software for the virtual commissioning of production systems, simulating the material flow based on physical laws. I was working manly with refactoring in addition to adding new features such as fluids based on smoothed-particle hydrodynamics and flexible machine parts and process goods.
Tools	c++, XML, OSG, 3dMax, NVIDIA PhysX, NVIDIA Cuda

Activity	STARFiSh - stochastic arterial flow simulation
Role	Main developer and researcher
Staffing	1-2 researchers
Description	STARFiSh is an open-source simulation program to simulate blood flow in arterial networks with stochastic input parameters. The software combines an advanced one-dimensional fluid-structure-interaction code with methods for uncertainty quantification and sensitivity analysis. I wrote the software as part of my Ph.D. thesis.
Tools	Python, XML, Sphinx, NumPy, SciPy, GTK, OpenGl, ChaosPy, DOT

Activity	The Planck Legacy Archive Added Value Interface (European Space Agency)
Role	Profiling of the system performance
Staffing	5 developers
Description	The Planck Legacy Archive is a website aimed at giving the general public the opportunity to access and use data from the ESA Planck satellite. In 2015 ESA started work on implementing an Added Value Interface to this website, which aims to allow users to manipulate and analyse data online before downloading, using various data cleaning and analysis techniques. My role in this project was to profile the memory usage of all analysis and map manipulation algorithms. The analysis results helded to determine the optimal size and type of the asynchronous workers spawned on all virtual machines. As consequence, the system handles all user requests in the most efficient way.
Tools	Python, Docker, ANOVA

Activity	Statkraft - Longterm Power Management - Visualization
Role	Main developer and architect
Staffing	1 developer
Description	In Statkraft, Longterm Power Management is based on numerical simulations of complex water way systems, including reservoirs, power stations, and pumps. For the analysis and usage of these simulation results, visualization tools are needed. The goal was to visualize all data in a convenient and accessible manner via web services based on Bokeh. The projekt resulted in a dashboard suite which enables fast and intuitively creation of web dashboards. Statkaft published the suite as Open Source Software among it's Shyft application. The dashboard suite has an integrated time series viewer to visualized large amount of high frequent data in a fast and effective manner. Also, graph visualization tools are included, which are for example used to auto-generate and visualize the topology of arbitrary water way systems at run time. The visualization tool is now used by several projects in Statkraft.
Tools	Python, DOT, GraphViz, Bokeh, NumPy, XML, Yaml, Json

Activity	Root cause analysis in Windturbines
Role	Main analyst
Staffing	2 analysts
Description	Random failing equipment in windturbines lead to losses in the magnitude of millions for our customer. With the analysis of weather and production data we determined the root cause and could suggest actions to save the remaining equipment and keep the production up. With a lifetime predictor we could estimate the remaining lifetime of each turbine individually. Due to the data driven mitigation action we proposed equipment was saved, and the losses considerably limited.
Tools	Python, NumPy, Statsmodel, ANOVA, ARIMA, Pandas

Activity	Statkraft - Machine learning platform
Role	Main developer and architect
Staffing	2 developer
Description	Statkraft wanted a common platform to scale and facilitate machine learning projects from the explorative phase to production. We designed and implemented a flexible and scalable solution that allows for the integration of all common machine learning libraries into one framework. With our framework machine learning workflows can be defined, run and shared among teams. The unique feature is that its fast and lightweight backend is optimized to run ml-workflows in production on Statkraft's systems. This enables a fast transition from prototypes to validated and tested production code.
Tools	Python, Yaml, Json, HDBSCAN, scicit-learn, keras, tensorflow

Activity	Statkraft - Predictive Maintenance for Hydropower
Role	Main developer and architect

Staffing	2 developer
Description	For Statkraft I developed the backend system for predictive maintenance in hydro power. The backend system includes a versioned domain model, infrastructure to define, test, run and deploy machine learning models, data management and visualisation. In addition, I helped with the data analysis and implementation of the first predictive maintenance model.
Tools	Python, Bokeh, NumPy, Json, REST, Azure

Activity	Arundo - Domain Modelling
Role	Developer
Staffing	4 - 8 developer
Description	In Arundo, I supported the development of the domain model for a data processing engine for predictive maintenance simulations. In addition, I was part of a small team to design and implement the core of a standardized domain modelling language framework which could be applied to many projects. The framework would allow modeling physical domains of customer's assets and track changes over time.
Tools	Python, NumPy, Yaml, Json, networkX, DOT, GraphViz

Activity	Edge Audio Analytics - MVP
Role	Developer
Staffing	8 developer
Description	We in Expert Analytics joined forces with Statkraft to evaluate in an R&D project the usefulness of audio surveillance to measure the health state of heavy machinery in particular hydro power generators. We developed an MVP for an audio analysis system with Siemens industry computers. The edge system was installed at a power plant to record the acoustic emissions of 3 generators and 2 transformers with 8 microphones. The high frequent audio data (48k samples/s) is analysed on side with machine learning models. An edge backend system facilitates data acquisition, data saving, model scheduling, result transfer to the cloud, edge fleet management and code/model deployment to the edge. I was in charge of the backend architecture and design, as well as the audio hardware selection. In addition, I implemented most of the data acquisition, and the edge compute engine which executes the machine learning models. After running for 2 months we already detected 2 concerning malfunctions in different equipment. The project is ongoing until 2022.
Tools	Python, NumPy, Yaml, Docker, AWS, ALSA