bolts&bytes

About bolts&bytes

As engineering service provider, I support companies in the development and optimization of their products and components – from the initial concept to series handover.

My focus is on providing solid decision-making foundations through feasibility studies and simulations.

Ideal for MedTech and Tech SMEs that need targeted expertise, want to manage project peaks, or don't have all the capacities in-house.

More information at: http://www.boltsbytes.com/

Digital Engineering

Virtual Prototyping

Where can I support you?

You have a **product idea** and are looking for a **partner for prototype development**

The **product exists** – but there's potential for technical or economic **optimization**

You've got more projects than **capacity** – and need **flexible external support**

I develop and optimize products and components using digital engineering & simulation
– from the first idea to prototyping to the finished product on your desk.

Where can I support you?

You have a **product idea** and are looking for a **partner for prototype development**

✔ **Concept Development**
From ideation and competitor analysis to technology scouting, feasibility studies & first design variants

✔ **Technical implementation**
3D design, engineering calculations, material selection, prototyping

✔ **Everything from a single source**
No back-and-forth between service providers – I take care of it.

From idea to first prototype.

Where can I support you?

The **product exists** – but there's potential for technical or economic **optimization**

✔ **Technical optimization using CAE & FEM**
Better parts through modeling and simulation

✔ **Improve cost-efficiency and sustainability**
Through smarter production processes and optimized material usage

✔ **Leverage new technologies**
Scouting innovative materials, manufacturing methods or smart design strategies

Optimization through simulation and digital tools.

Where can I support you?

You've got more projects than **capacity** – and need **flexible external support**

I jump in exactly where you need me – as an

- ✔ external project manager,
- ✔ technical sparring partner,
- ✔ or simply as an additional resource in your team.

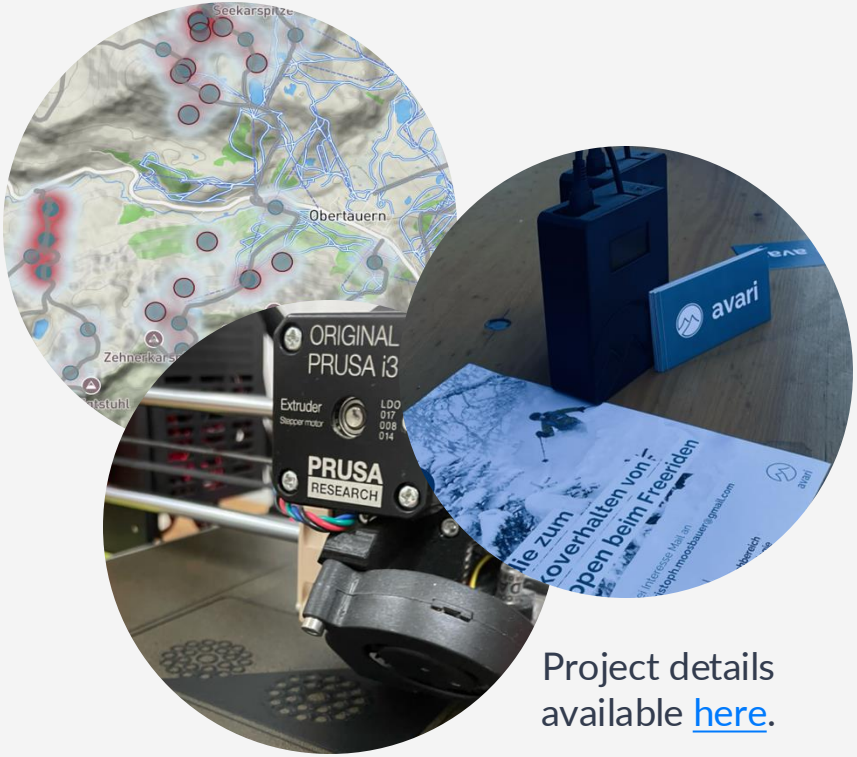
Flexible support for project peaks and bottlenecks.

Examples and references

Digital Engineering

Virtual Prototyping

Prototyping example



Project details available here.

Challenge

Group decision-making in avalanche-prone terrain is subjective and error-prone – even among experienced backcountry skiers.

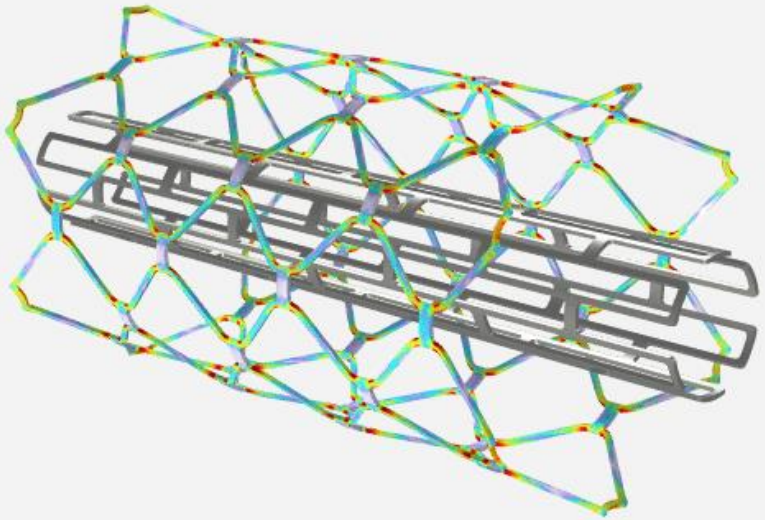
Approach

Full development from scratch of an Arduino-based prototype combining sensor fusion (GPS, map data, API) with field testing in collaboration with the University of Salzburg.

Benefit

Improved data acquisition and processing, enabling faster and more reliable product development through physical prototyping.

Simulation example (1/2)

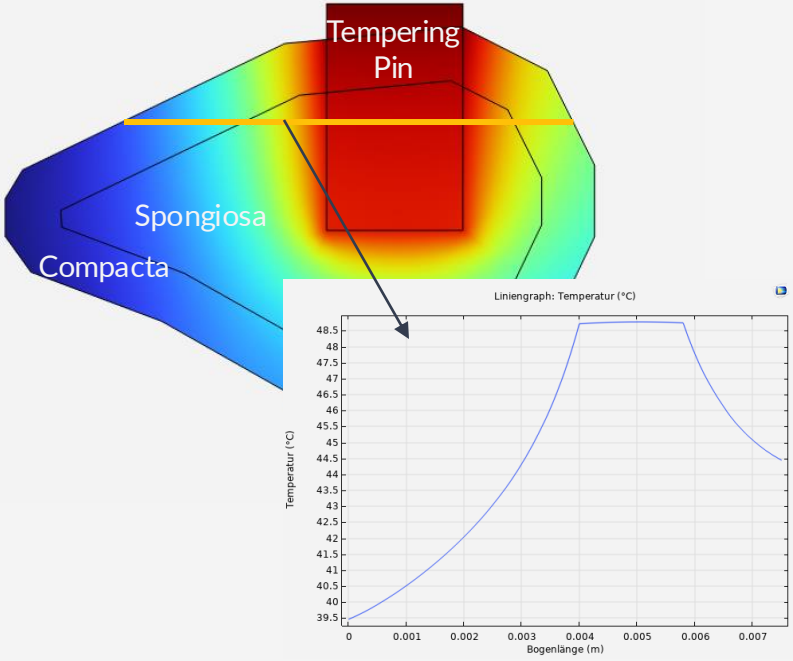


Challenge
A **medical stent** is used to open a coronary artery during angioplasty. Uneven expansion and axial shortening can **cause damage to the vessel wall**.

Approach
A simulation model was developed to optimize the stent geometry and compare commercially available "standard stents" with regard to deformation behavior.

Benefit
Improved treatment quality and **reduced risk of post-operative complications.**

Simulation example (2/2)



Challenge

Removal of osseointegrated implants is often only possible by **causing severe damage** to the surrounding bone structure.

Approach

Based on a study from RWTH Aachen [1], simulations were used to test whether **controlled osteonecrosis** and implant destabilization could allow for a **minimally invasive removal strategy**.

Benefit

Optimized procedure parameters with a **reduced need for animal testing** – and potential future application in **patient-specific surgical planning.**

https://pmc.ncbi.nlm.nih.gov/articles/PMC9789117/pdf/41598_2022_Article_25581.pdf

M.Sc. Mech. Engineering
→ Simulation in
Medical Technologies

R&D | Automotive

R&D | MedTech

Innovation Management

About me

I’m Christoph, founder of **bolts&bytes** – **product developer, mechanical engineer and innovation manager.**

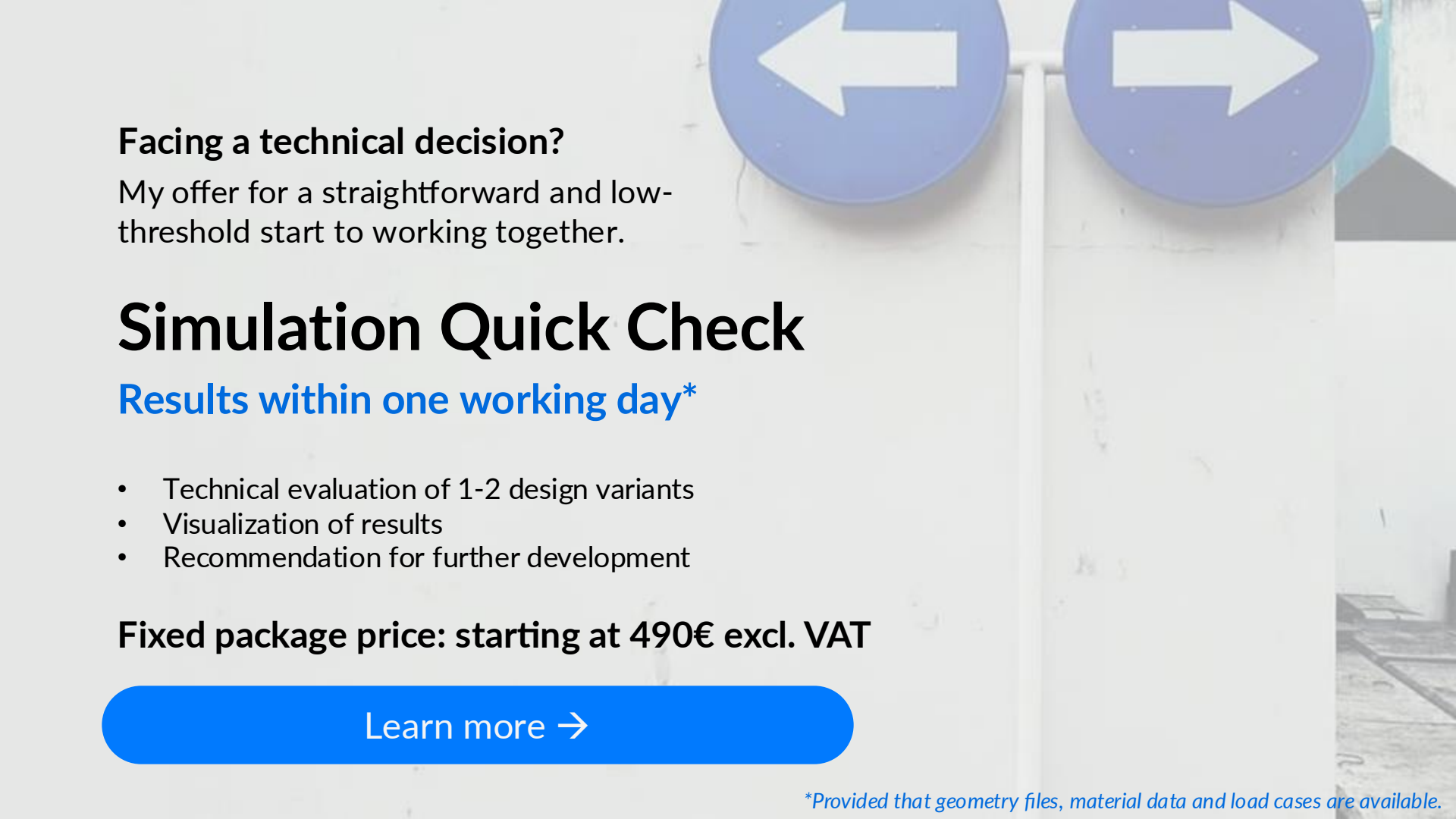
With over 10 years of industry experience in innovation-driven environments, I’ve led complex R&D projects, brought products to market, and supported collaboration between research and industry.

At **bolts&bytes**, my core focus is on simulation methods and virtual prototyping – especially in regulated sectors such as **medical technology, automotive and sports tech**.

Services and Contact

Digital Engineering

Virtual Prototyping



Facing a technical decision?

My offer for a straightforward and low-threshold start to working together.

Simulation Quick Check

Results within one working day*

- Technical evaluation of 1-2 design variants
- Visualization of results
- Recommendation for further development

Fixed package price: starting at 490€ excl. VAT

Learn more →

**Provided that geometry files, material data and load cases are available.*

Tech Stack

CAD & 3D Design	Autodesk Fusion, Solid Works, Solid Edge
FEM & simulation	ANSYS Workbench, SimScale, COMSOL Multiphysics, Fusion Simulation Extension
Machine elements	mechanicus, KISSsoft (→ Particular experience with non-standard gear geometries)
Modelling & data	Octave / MATLAB, Python
Core expertise	Early-phase product innovation & simulation in regulated industries Technology scouting and technology radar for engineering-driven topics Technical project management (agile & classic, IPMA Level D) Industry focus: **Medical Technology, Automotive, and Sports Tech**

Contact details

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