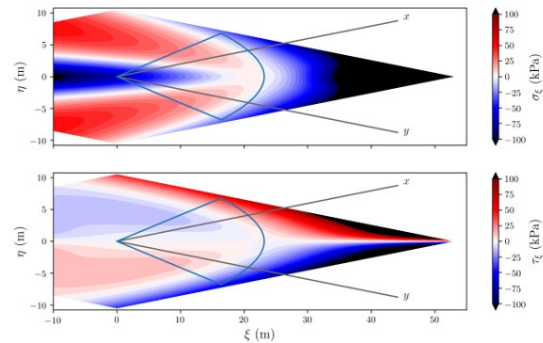


# Lehrstuhl für Statik – TUM

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## Smart visualization of surface stresses



Candela's shell in Valencia and a 2D representation of shell stresses

## Motivation

Visualizing complex information is nowadays crucial to communicate technical and scientific results. The computational tools to perform mechanical and structural simulations are highly developed, and in research environments, accurate results of simulations can be generated in the form of datasets. Visualizing the results in a meaningful way requires sometimes 3<sup>rd</sup> party software that does not always provide the desired intuitive understanding of how the structure or material is working.

## Vision

Our vision is a web-based tool to have 3D representations of given stress states on curved surfaces by combining the different parameters and their magnitudes: stress components, principal stresses, principal directions, force flow...

## Challenge details

You will be provided algorithmic rules to generate parameter-based datasets defining a 3D surface and the corresponding stress states in the form of stress components. Your goals are:

- Develop a concept to visualize stress states on a surface in meaningful ways (several alternative visualization modes are encouraged).
- Select a web-based framework to work with 3D data.
- Implement your concept to achieve an interactive tool where changing the parameters, different 3D surfaces and their stress states can be visualized and interacted with.

## Background knowledge you bring to the team

Different students may have different skills to complement the team. Among them are:

- Programming skills
- 3D modelling/development
- Web development
- Linear elasticity / structural mechanics
- Some experience with structural analysis is desired but not mandatory