# Next-gen simulation: CAD-Integrated Isogeometric Analysis, Shell Structures, and Enhanced Visualization Frameworks

This project offers a hands-on opportunity to dive into cutting-edge research in isogeometric analysis (IGA) [1]. The focus will be on extending the Reissner-Mindlin shell model [2] to the nonlinear case and developing advanced techniques for visualization and postprocessing using spline-based methods.

Project Characteristics
Modeling:
Mathematics:
Programming:
Science:
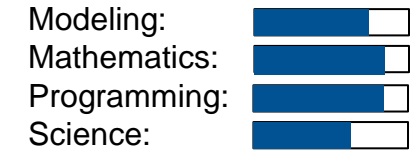
Task

- Literature Review: Familiarize with state-of-the-art methods in IGA, nonlinear shell theory, and spline-based visualization.
- Lightweight Python Frameworks: Start with easy-to-use Python scripts provided by the supervisors to quickly get into the topic.
- Nonlinear Shell Modeling: Extend the existing Reissner-Mindlin shell formulation to the nonlinear regime.
- Visualization and Postprocessing: Use spline-based techniques to visualize and interpret simulation results.
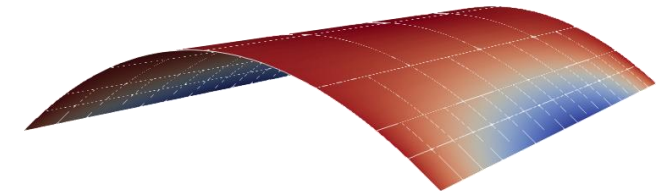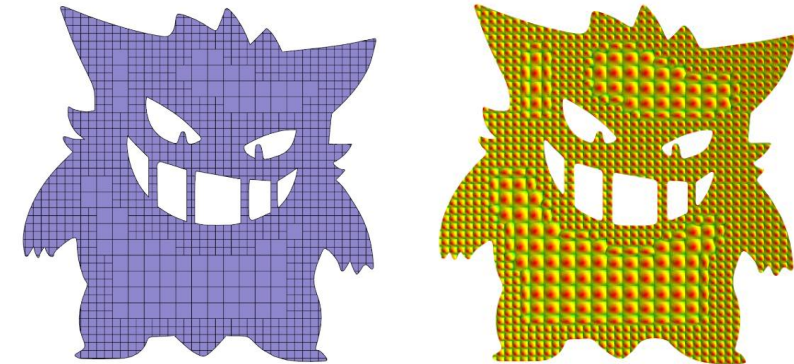
[1] Cottrell, J. A., Hughes, T. J., & Bazilevs, Y. (2009). *Isogeometric analysis: toward integration of CAD and FEA*. John Wiley & Sons.
[2] Benson, D. J., Bazilevs, Y., Hsu, M. C., & Hughes, T. (2010). Isogeometric shell analysis: the Reissner–Mindlin shell. *Computer Methods in Applied Mechanics and Engineering*, *199*(5-8), 276-289.