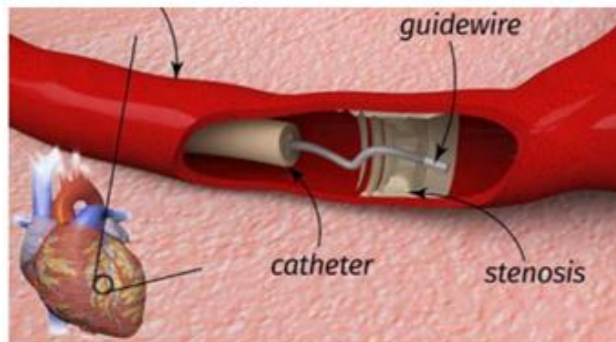


## Device and patient safety

Interacting device-tissue digital twins

Healthcare Use Case

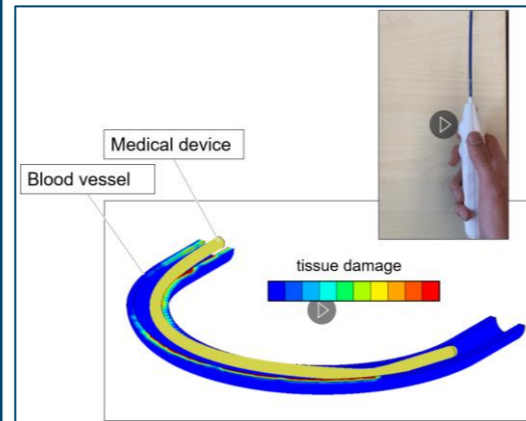


This use case focusses on decreasing the time to market of safe medical devices.



UPSIM Solutions: Development of credible and accurate interacting device-tissue digital twins by embracing modeling & simulation as strategic capability including V&V and optimization.

## Device-tissue interaction



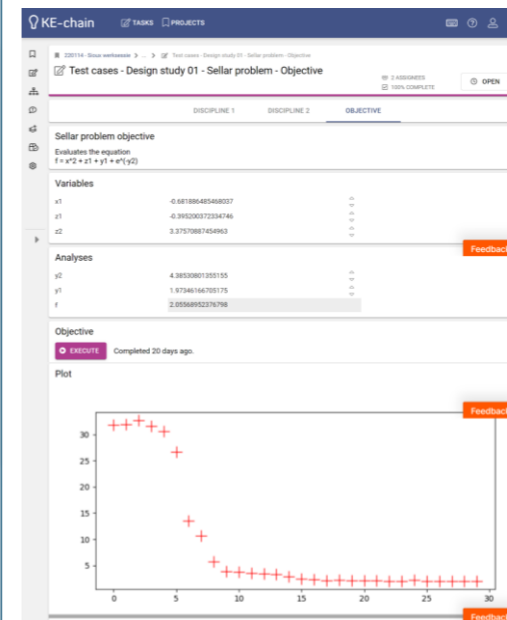
Simulations:

- Tissue damage model (not real-time)
- Functional real-time device simulator

Characterization and validation experiments on phantom and porcine tissues:

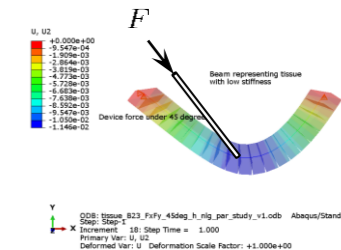
- Puncture threshold force
- Tissue damage characterization

## MDO environment

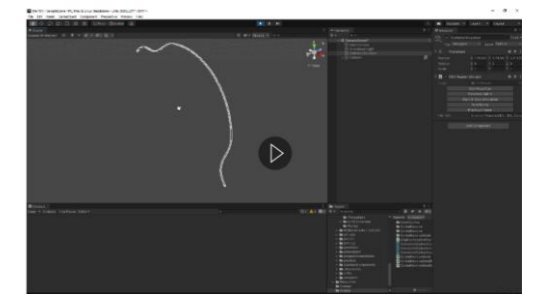


First proof-of-concept template of KE-chain MDO environment for the healthcare use case workflow, in coop with Sioux optimizer

## Reduced order models



## DT visualization



Real-time visualization using FMU in Unity engine