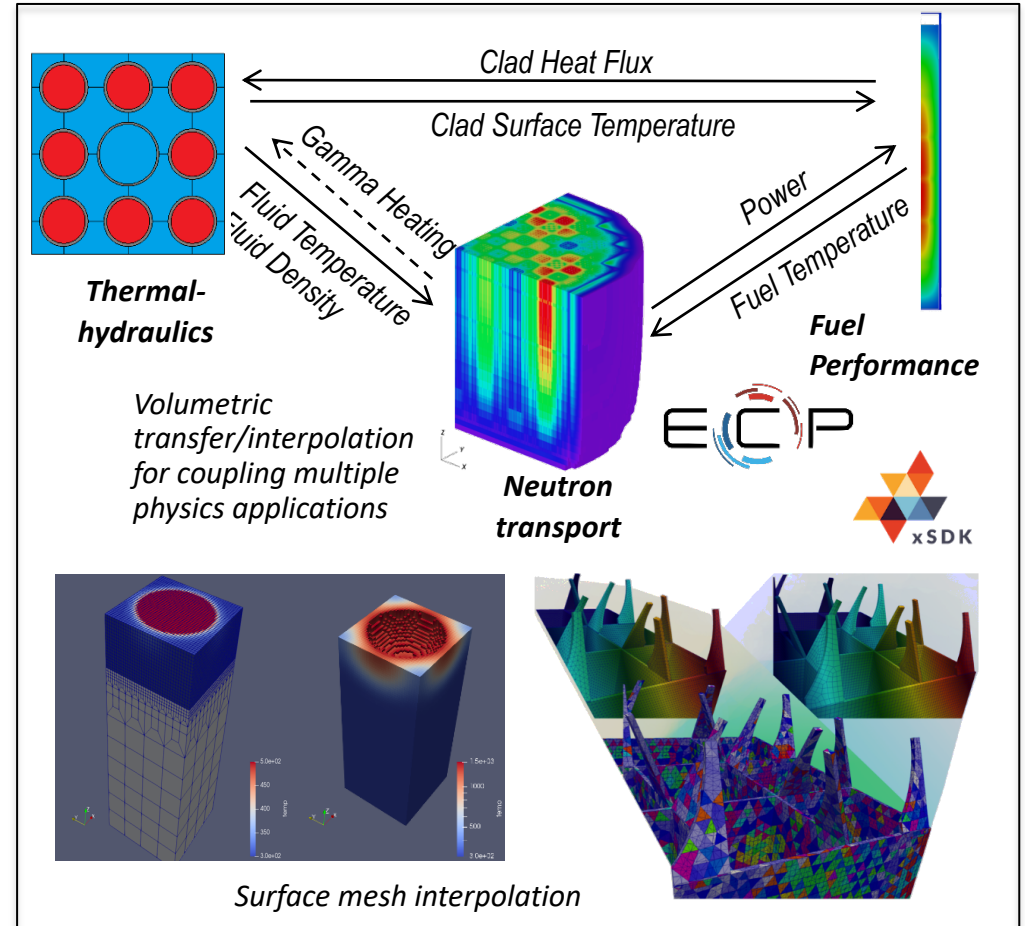# DataTransferKit

Open source library for parallel solution transfer.
Support for grid-based and mesh-free applications.

- **Overview**
  - Transfers application solutions between grids with differing layouts on parallel accelerated architectures
  - Coupled applications frequently have different grids with different parallel distributions; DTK is able to transfer solution values between these grids efficiently and accurately
  - Used for a variety of applications including conjugate heat transfer, fluid structure interaction, computational mechanics, and reactor analysis

- **Capabilities**
  - Support for DOE leadership class machines through MPI+Kokkos programming model
  - Algorithms demonstrated scalable to billions of degrees of freedom
  - General geometric search algorithms
    - Comparable serial performance to Boost r-Tree and NanoFlann
    - Also thread scalable on many core CPU and GPUs and distributed via MPI
  - Grid interpolation operators and mesh-free transfer operators

Clad Heat Flux

Clad Surface Temperature

Gamma Heating

Fluid Temperature
Fluid Density

Power

Fuel Temperature

Thermal-hydraulics

Neutron transport

Fuel Performance

Volumetric transfer/interpolation for coupling multiple physics applications

Surface mesh interpolation

https://github.com/ORNL-CEES/DataTransferKit