Introducing COMSOL Multiphysics® Version 6.4

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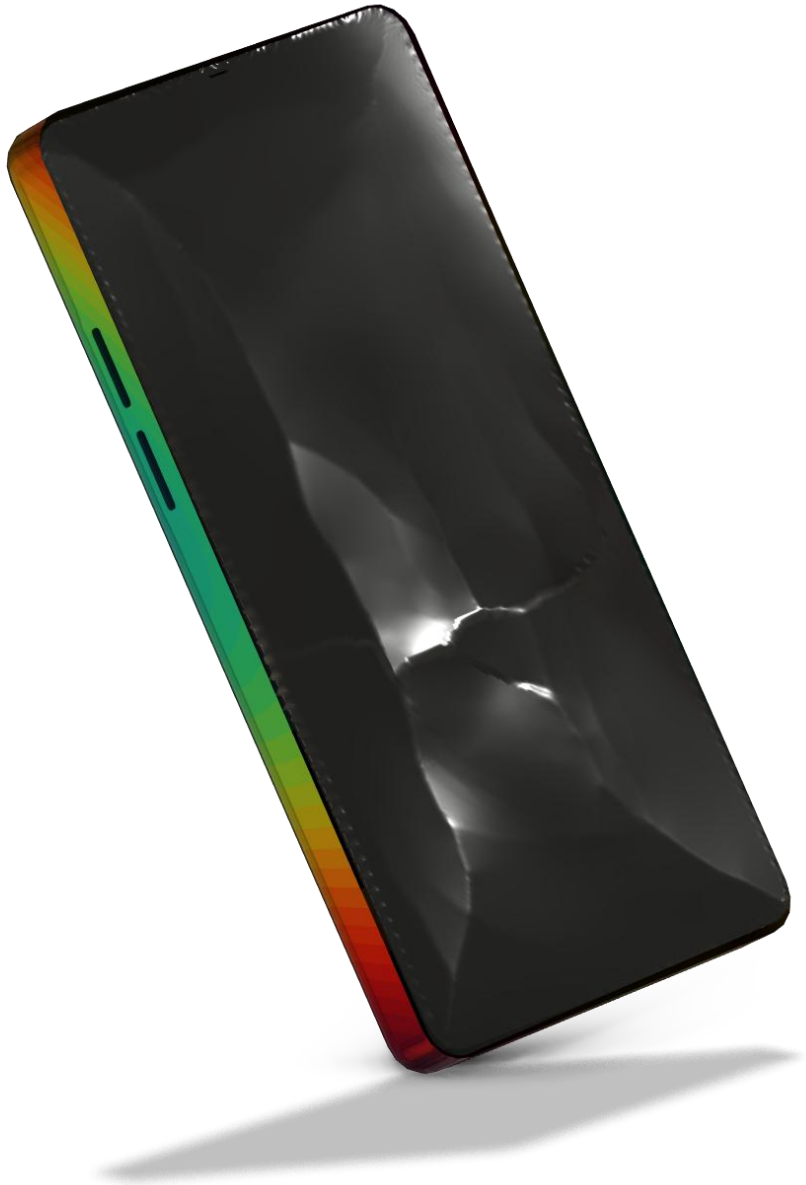
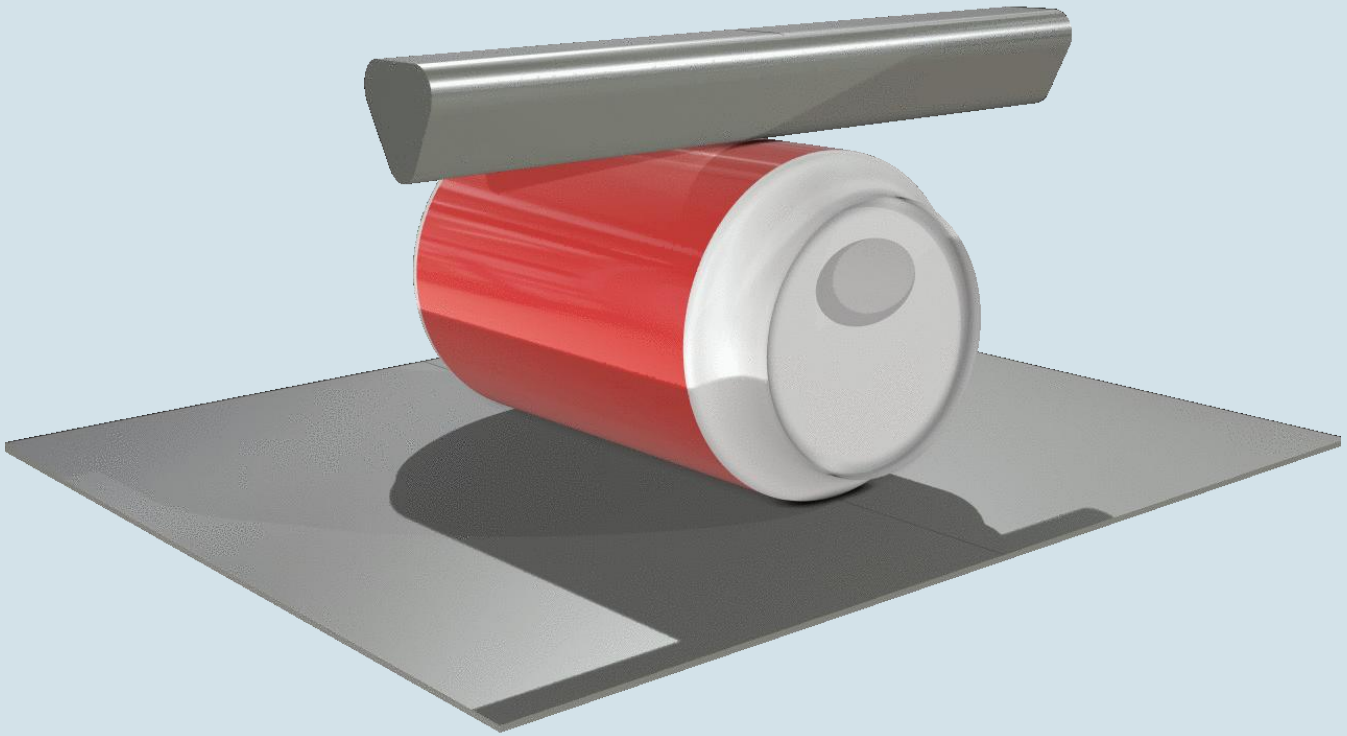


MAJOR NEWS

Explicit Structural Dynamics

- High-speed events
- Support for many material models
- Applications:
  - Drop tests and impact analysis
  - Sheet metal forming
  - Ballistic impact problems



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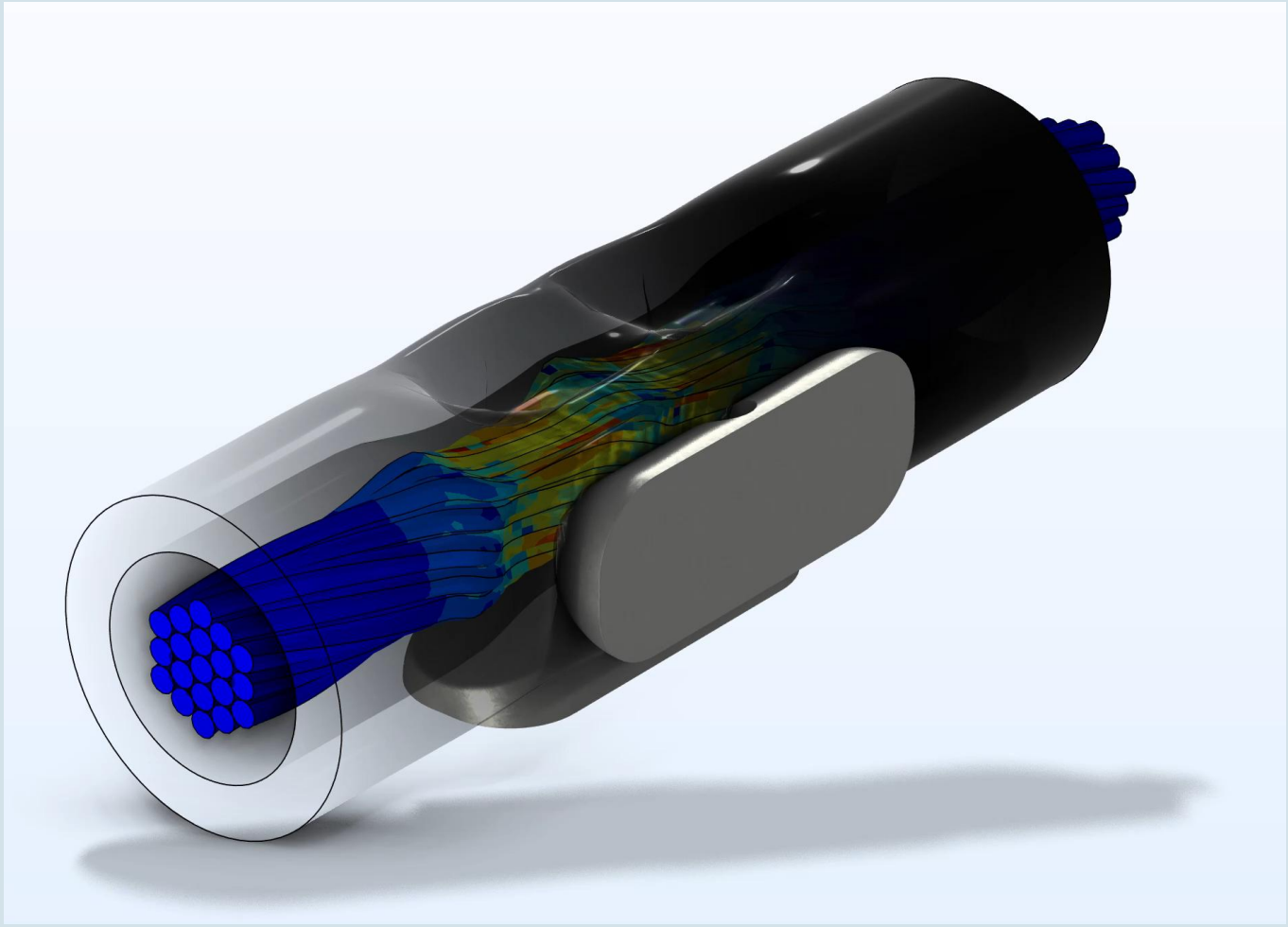
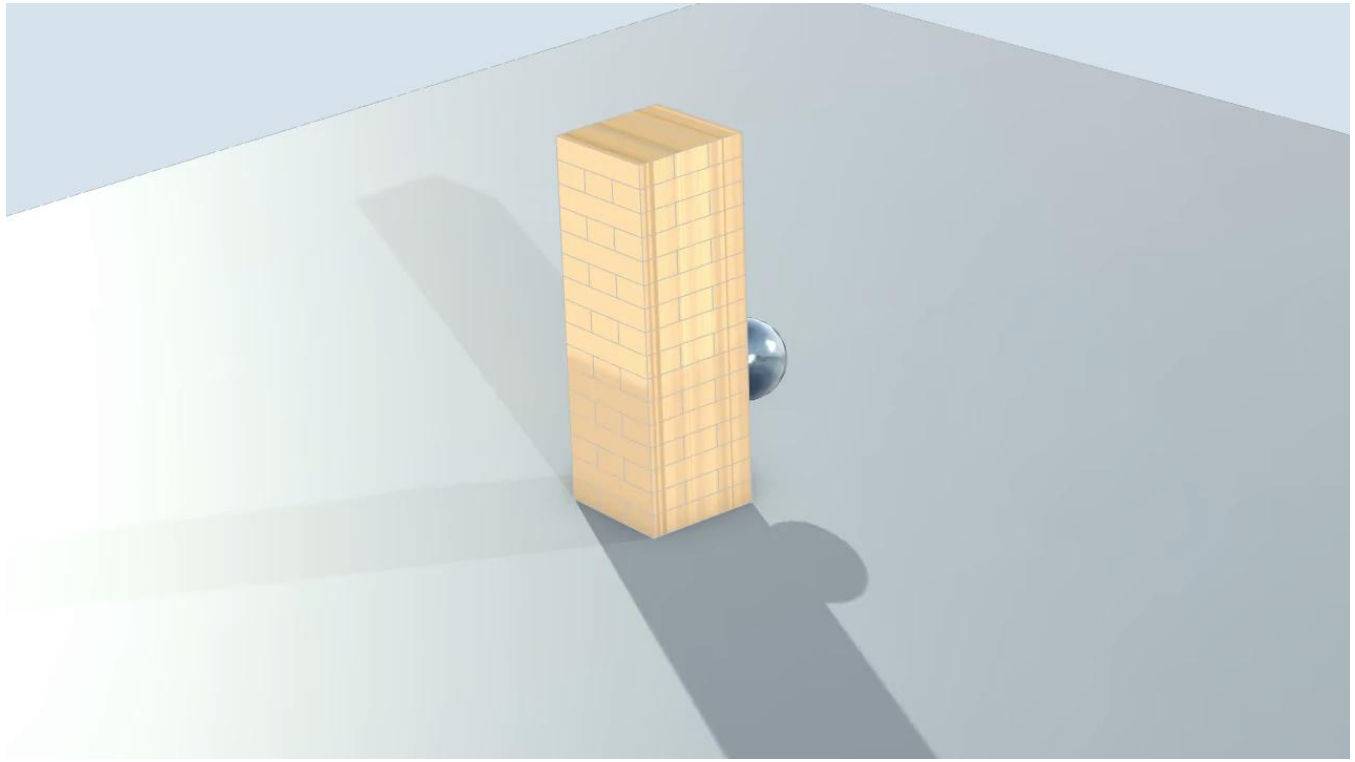


MAJOR NEWS

General Contact

- New pair type
- Automatic contact detection for multiple objects
- Self-contact
- Only Solid Mechanics*

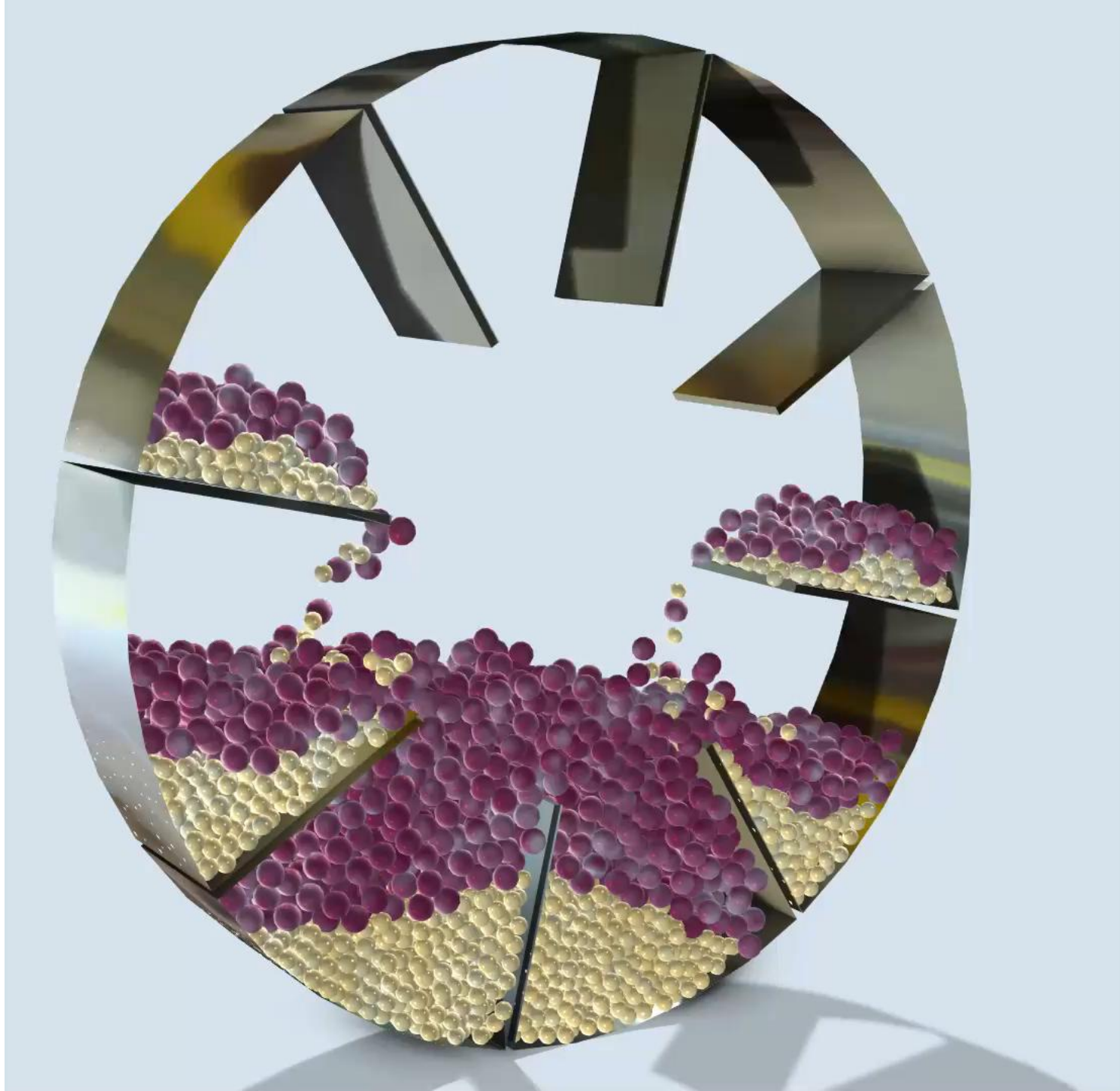


New general contact in the time explicit model

MAJOR NEWS

Granular Flow Module

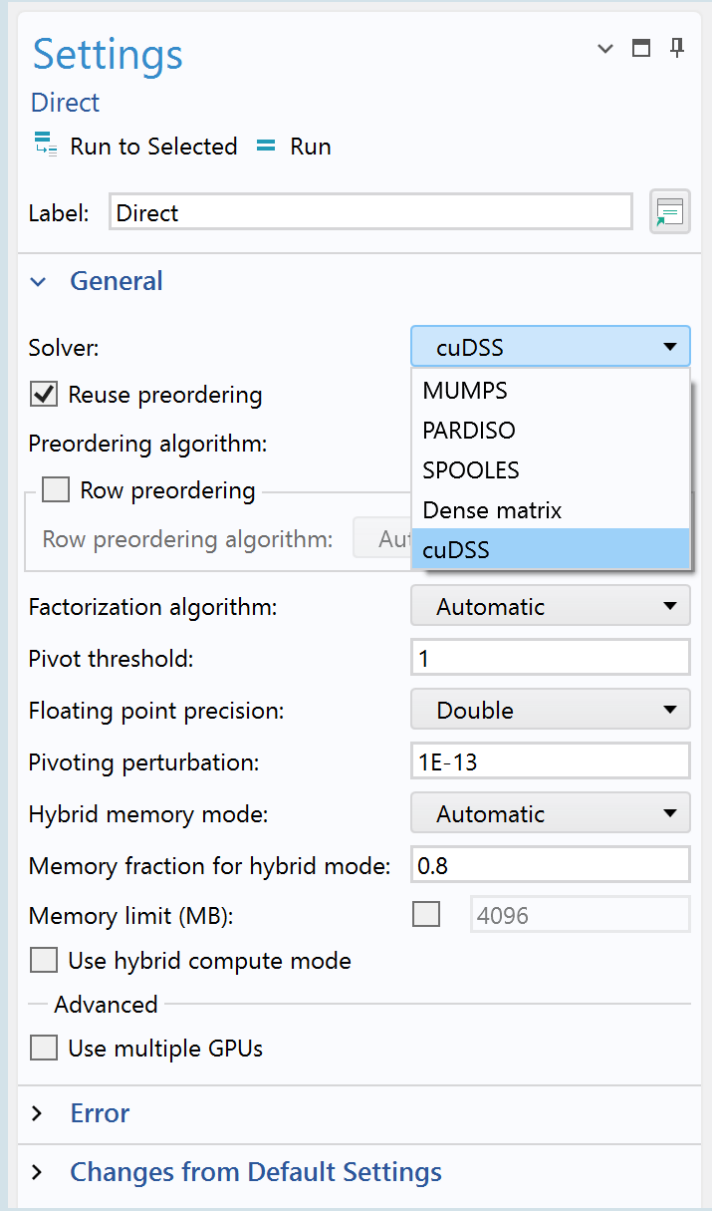
- Grains with contact and friction:
  - Discrete element method (DEM)
- Applications:
  - Conveyers and mixers
  - Ore and coal
  - Powders
  - Grains, seeds, and beans



MAJOR NEWS

GPU Support for All Physics

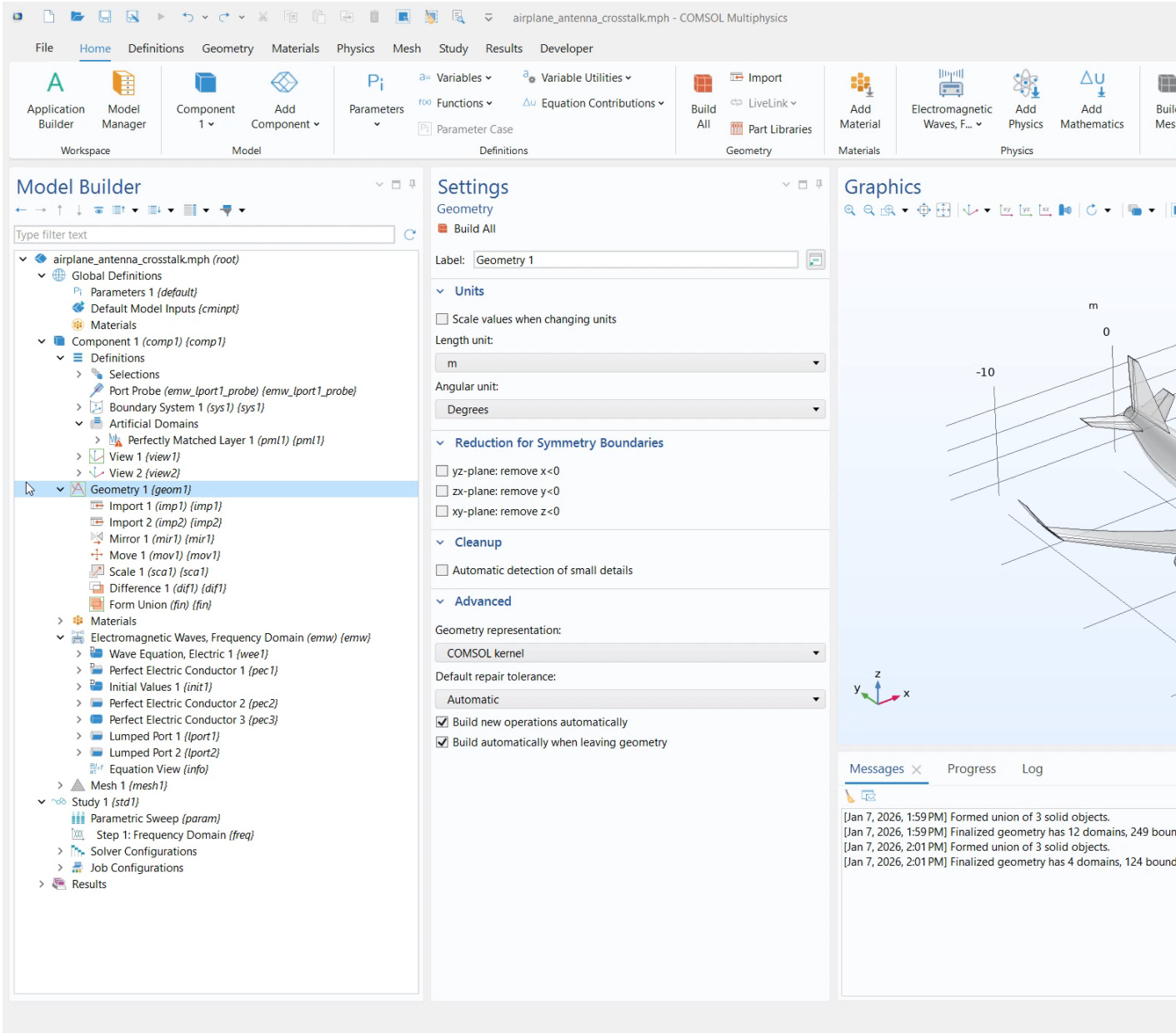
- NVIDIA® cuDSS for one or more GPUs
- cuDSS = The NVIDIA CUDA® Direct Sparse Solver
- "up to 20 times faster than a CPU for complex multiphysics"
  - Floating point precision: Single vs. Double
  - Hybrid compute mode: use both GPU and CPU for solving
  - Multiple GPUs mode
- NVIDIA® GPU with a compute capability of 6.0 or higher is required



Core Capabilities

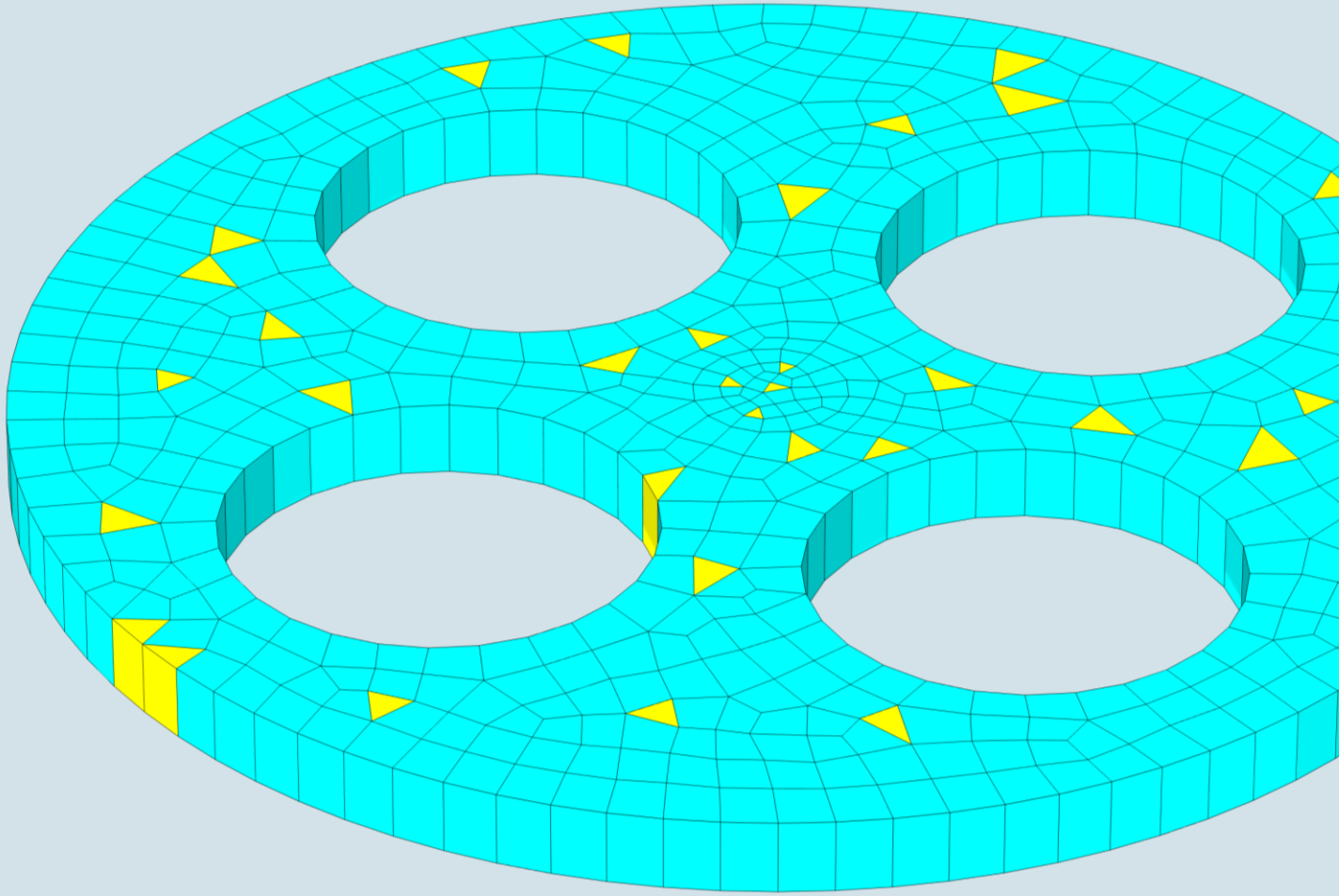
Creating Bounding Geometry

- Useful for defining fluid domains or PML domains surrounding objects
- Primitives such as block, sphere, cylinder bounding the geometry, plus some margin



Quad Dominant Meshing

- Smoother element size transitions
- Allows for a mix of quads and triangles
- Improved quality and robustness compared to previous algorithm



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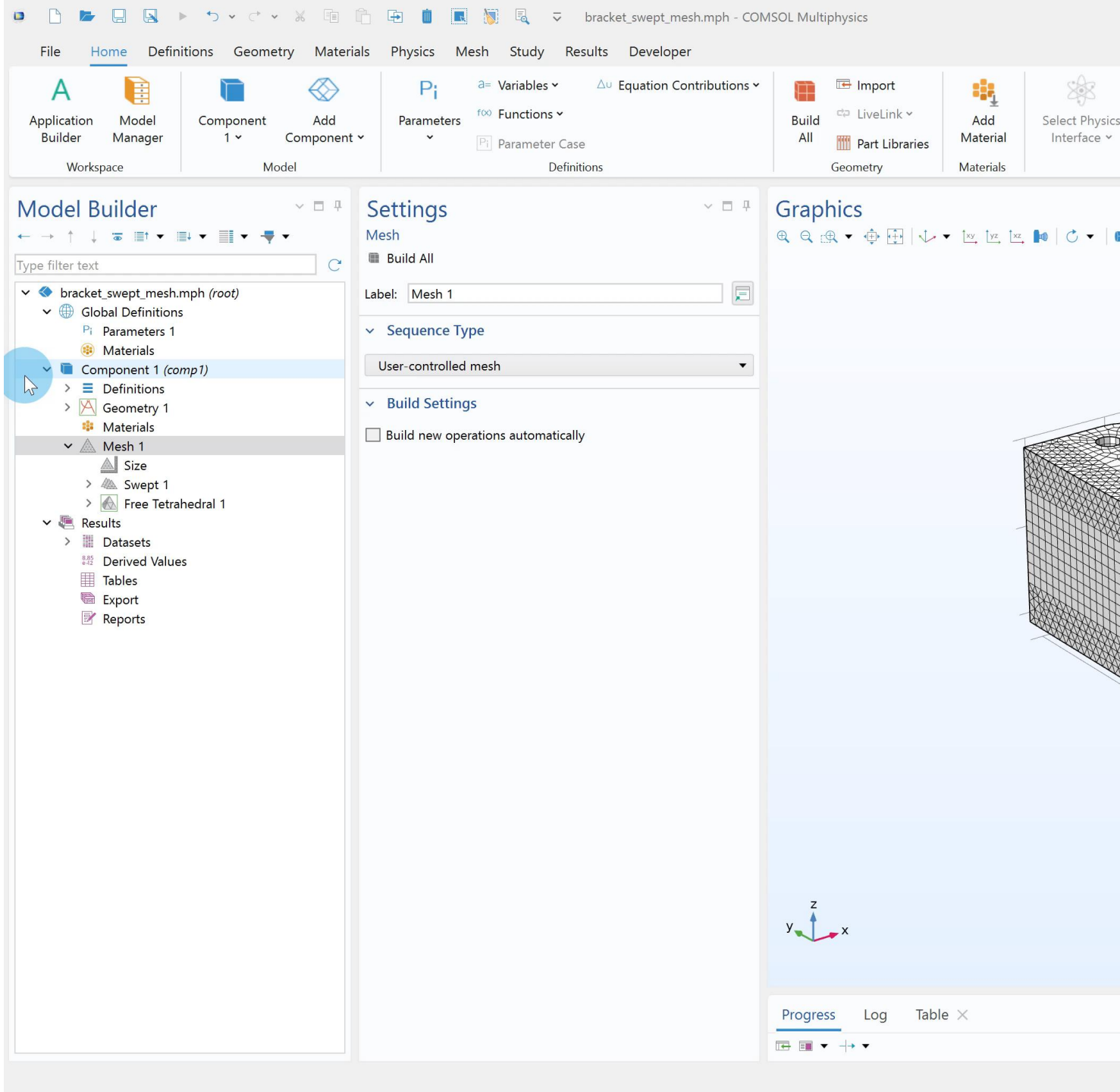
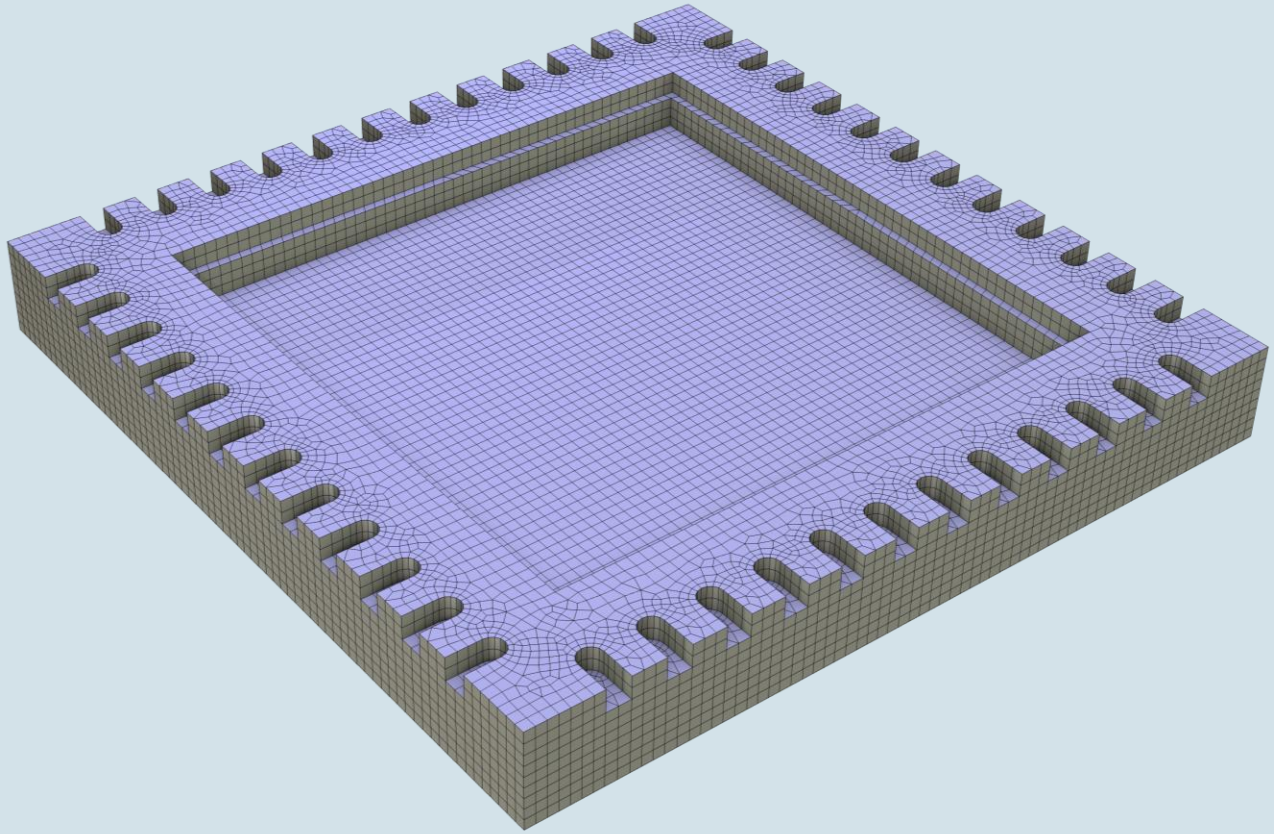


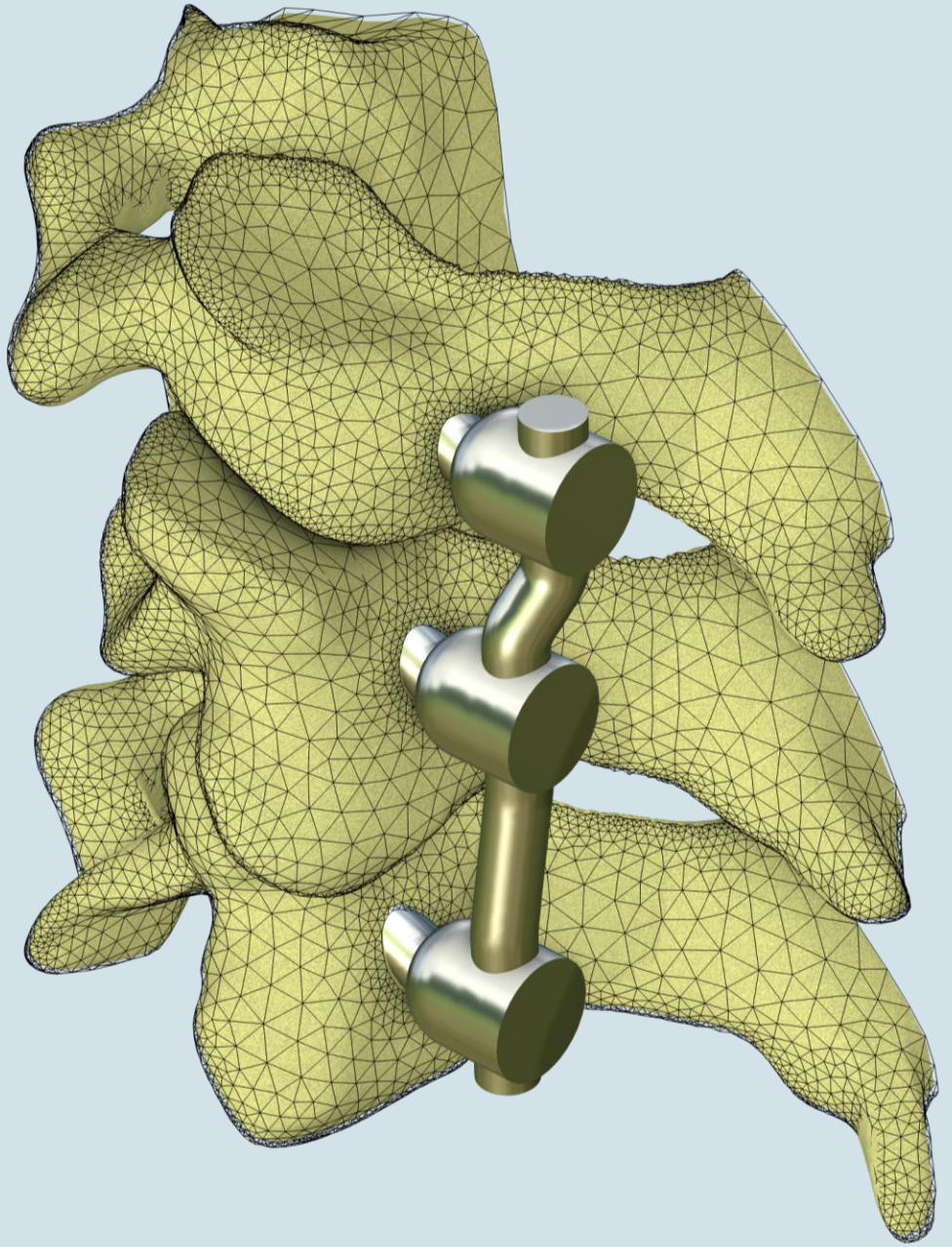
Improved Swept Meshing

- Automatic handling of domains with disconnected source faces
- Eliminates the need for manual partitioning of domains



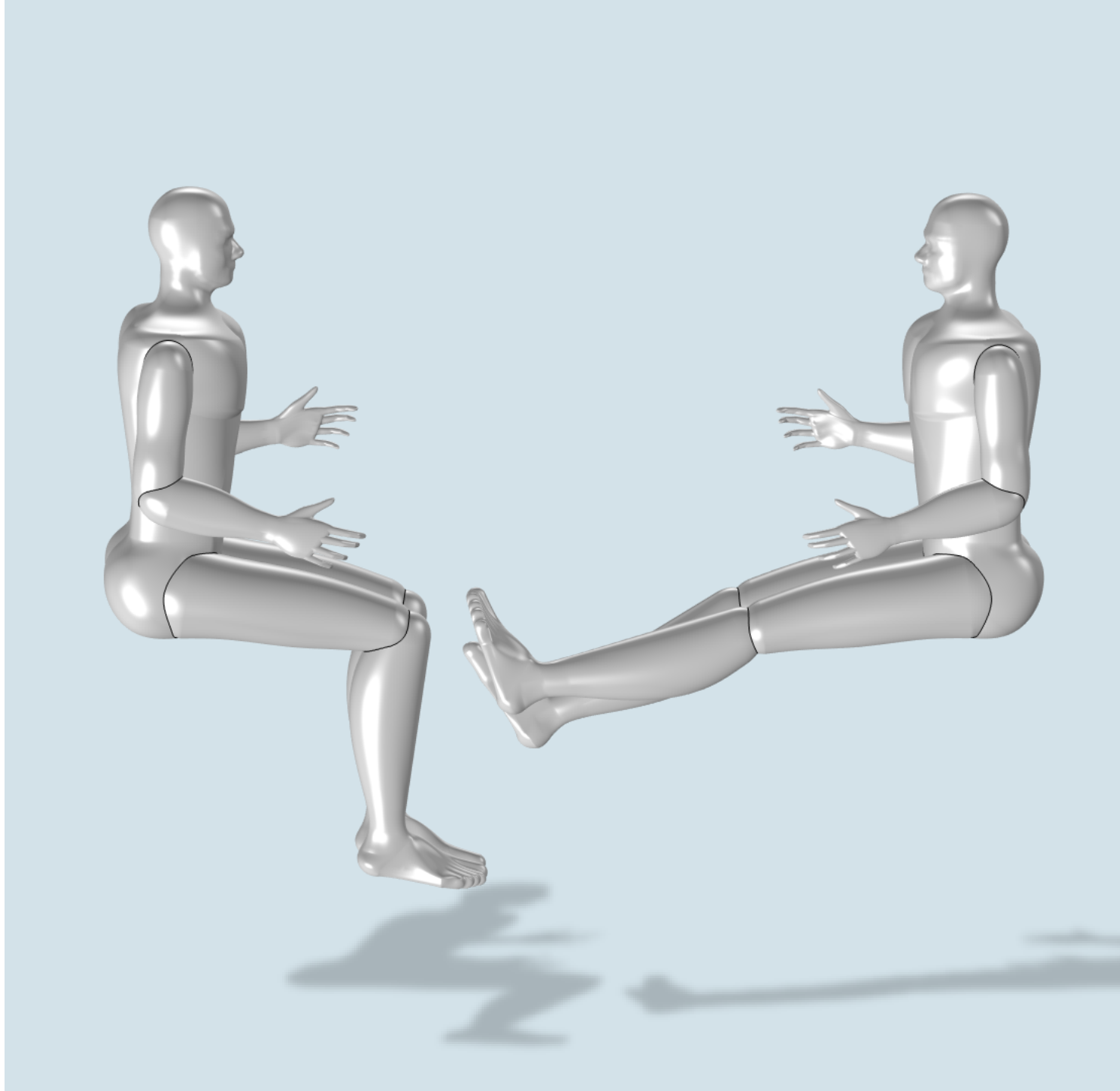
Mesh-Based Geometry

- Streamlined workflow for importing STL data or combining imported surface meshes with CAD
- Direct meshing on the resulting geometry using Mesh features
- Well-suited for topology optimization



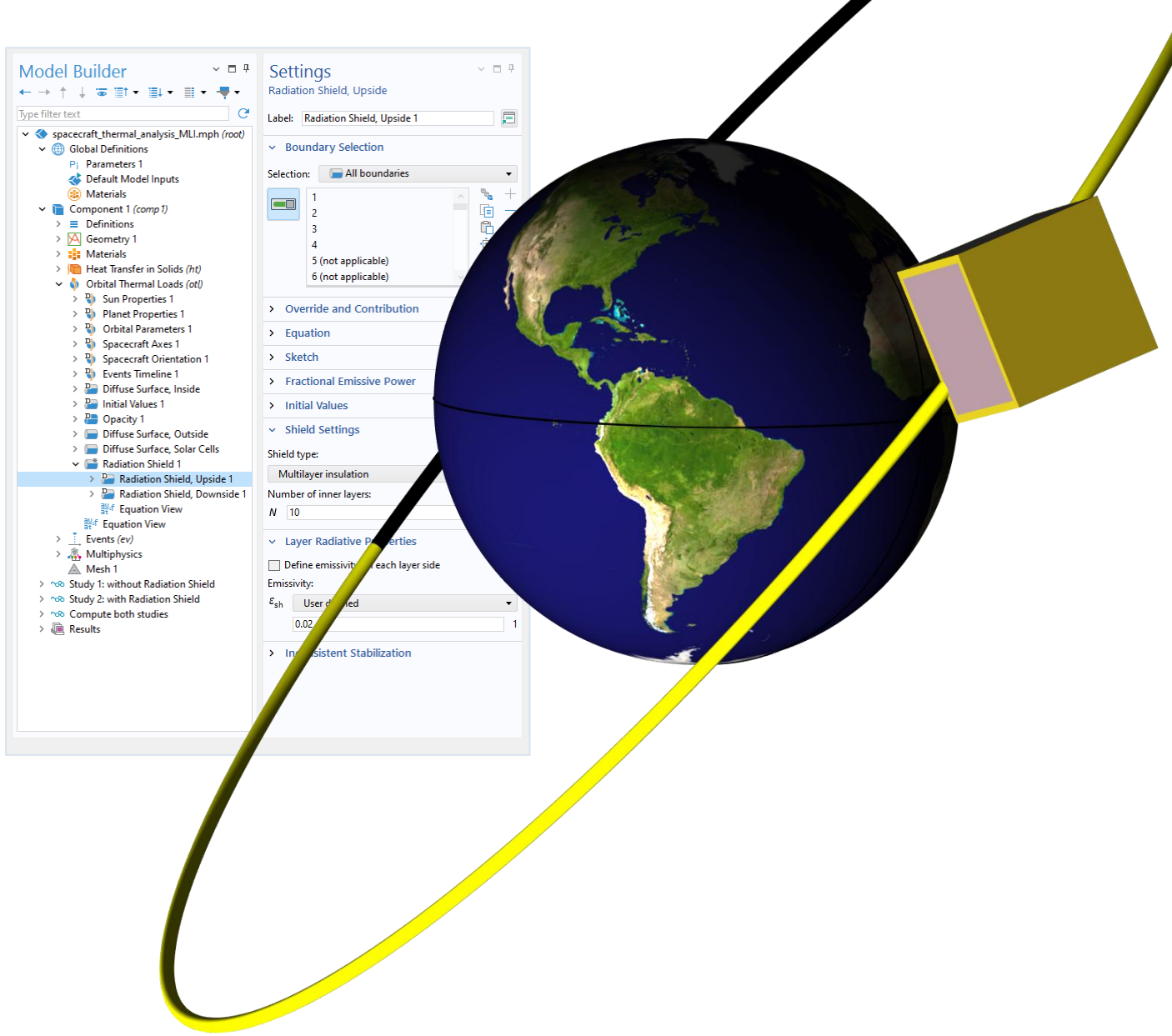
Humanlike Manikins

- Requires *Design Module*
- The Part Library now includes female and male human manikin geometry parts
- Sitting, standing, running, and generic positions



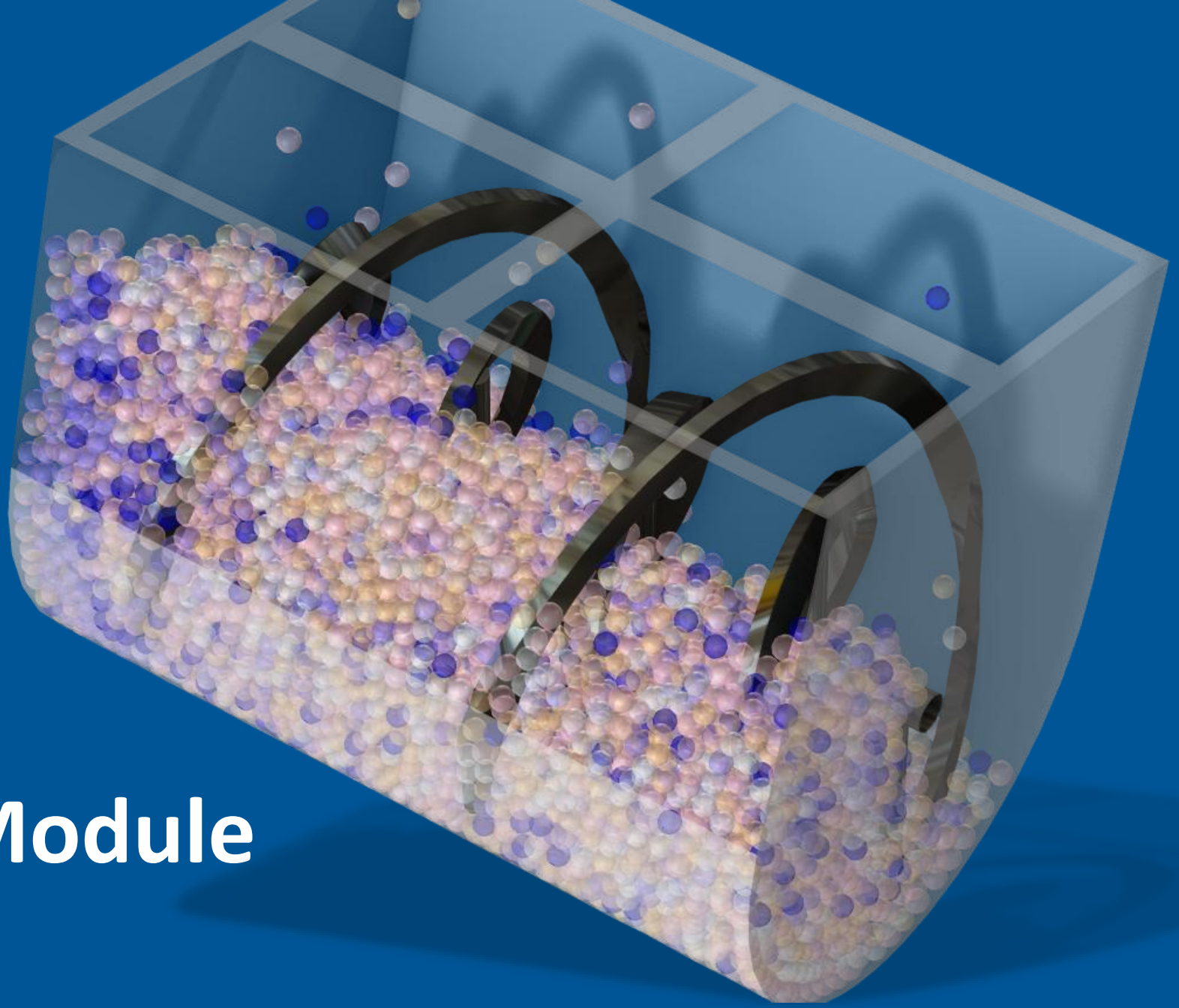
Radiation Shield for Orbital Simulations

- Requires *Heat Transfer Module*
- The multilayer insulation simulates a radiation shield
- One new Application Library model: *Spacecraft Thermal Analysis with Multilayer Insulation*
  - Radiation Shield consists of 12 layers: 10 inner layers, 1 innermost and 1 outermost layers



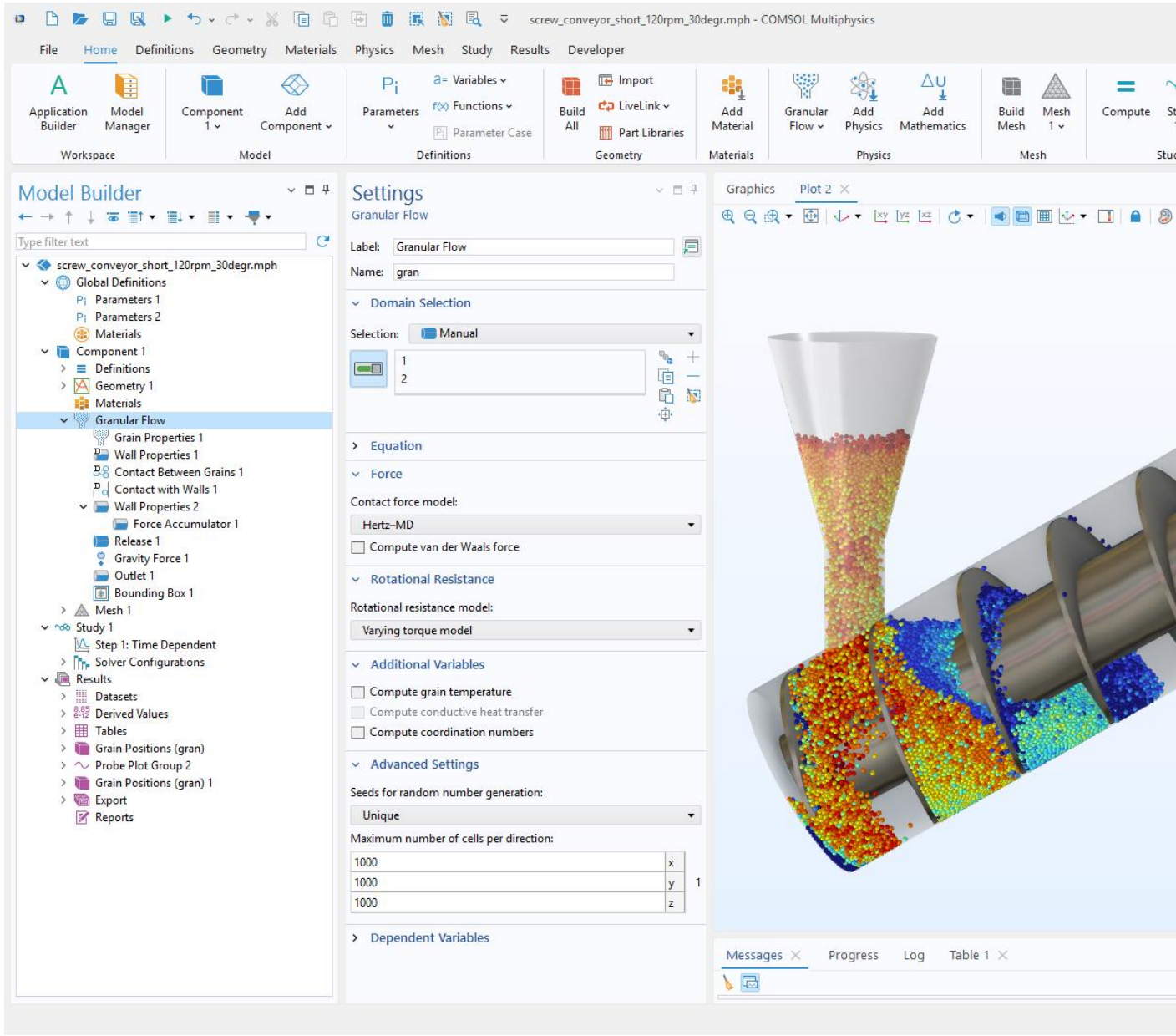
https://www.comsol.com/model/spacecraft-thermal-analysis-with-multilayer-insulation-144541

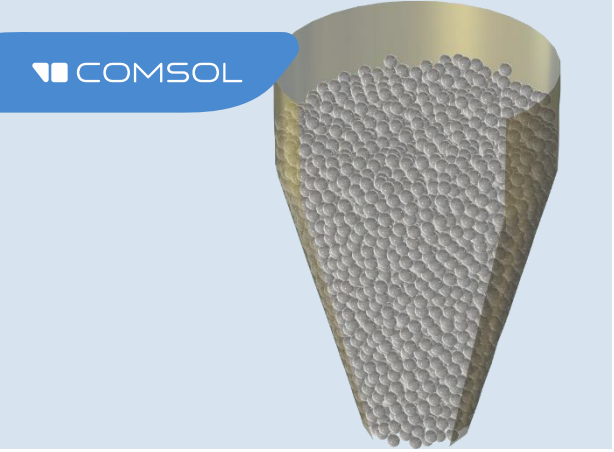
Granular Flow Module

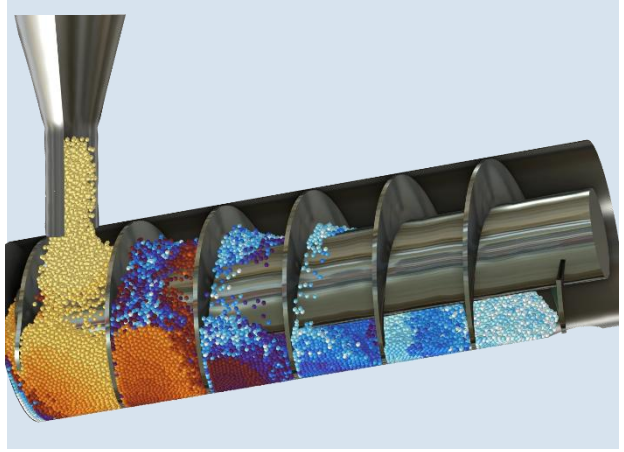
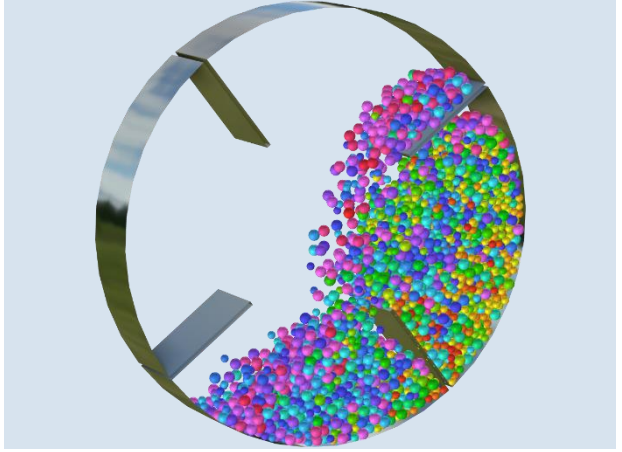
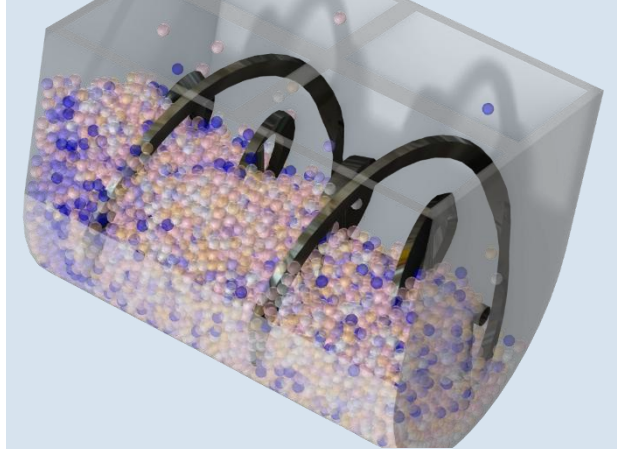
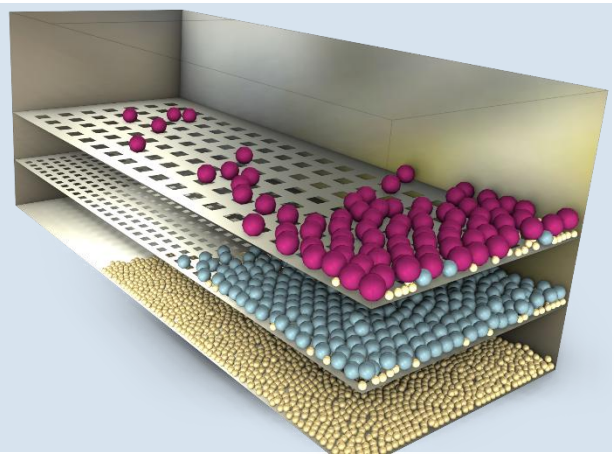
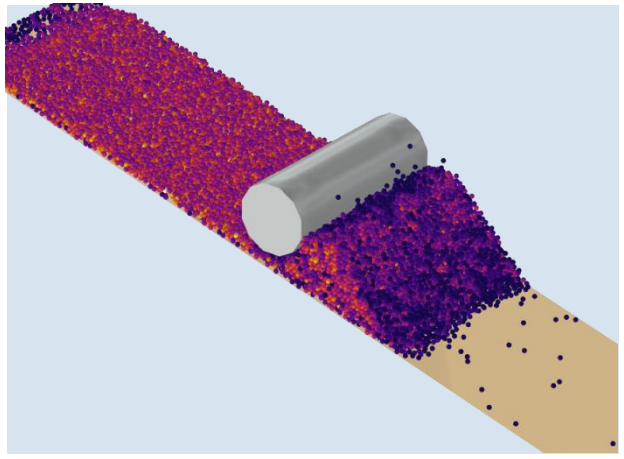
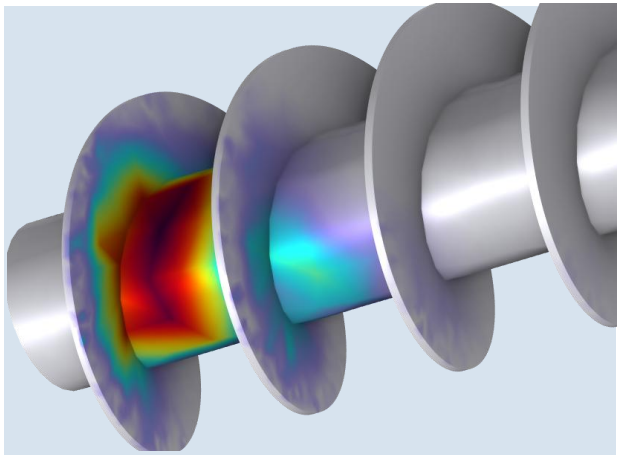
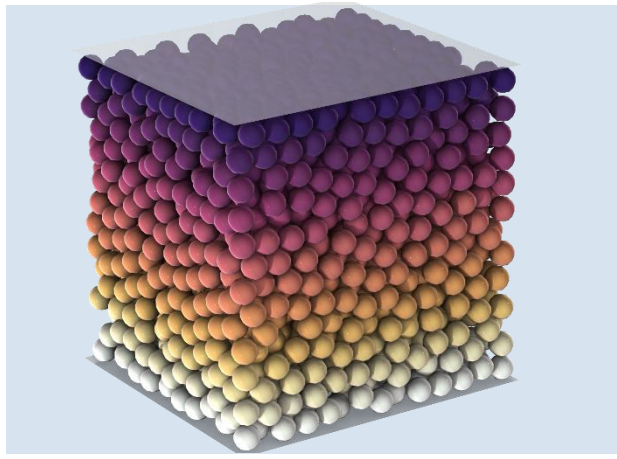


Granular Flow Module

- Simulate the bulk flow of granular materials
- Grains are discrete entities with finite size and shape
- Track position and velocity of individual grain in an external force field
- Compute contact forces between grains and between grains and walls using discrete element method (DEM)
- Track orientation, angular velocity and tangential displacement due to torque





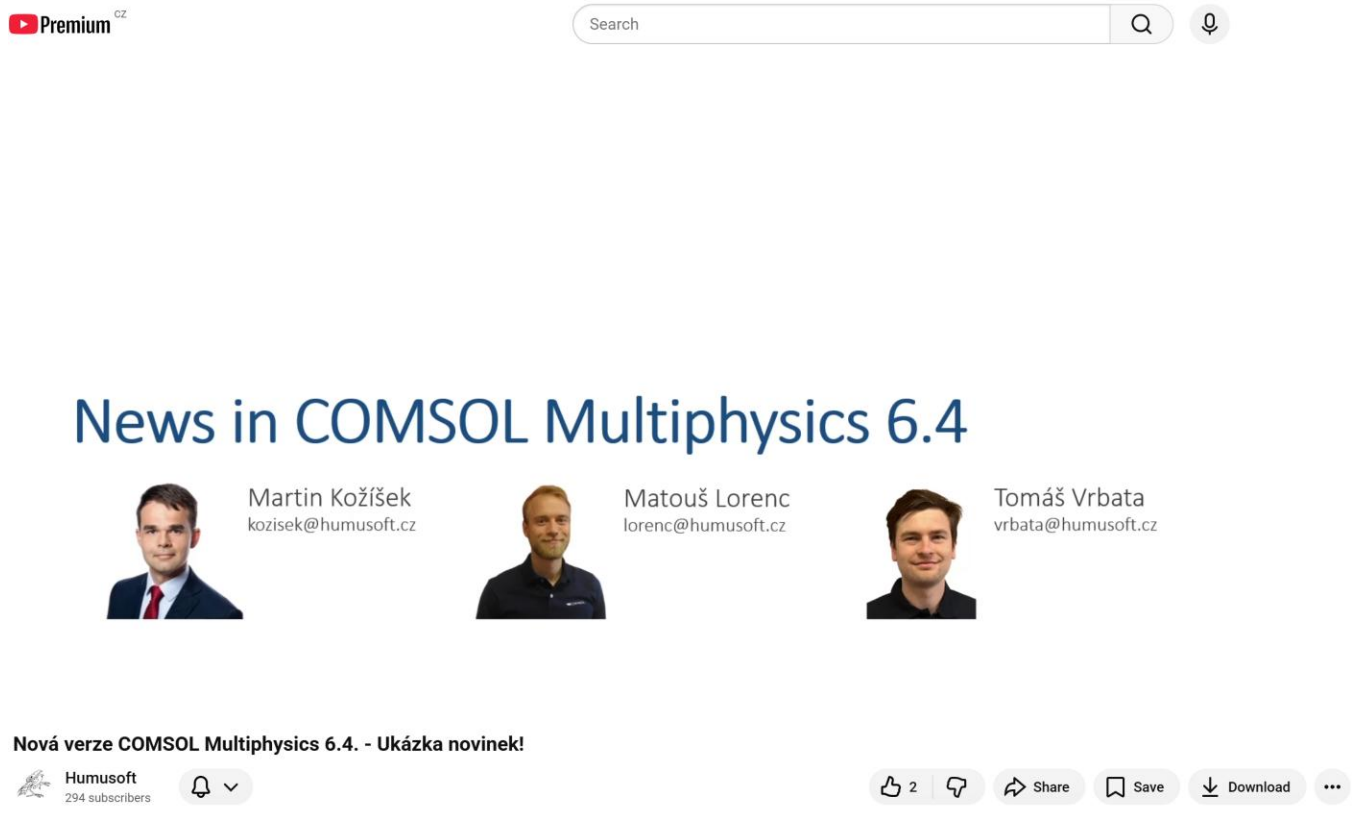








Application Areas

Some of the common application areas are filling/packing, emptying, transporting, mixing, separating and filtering, heat transfer.

For More 6.4 News Watch our Webinar!

- https://www.youtube.com/watch?v=DLtcY_BAyIk



Do you want to learn how you can use new COMSOL features and add-on pr!ducts? Find HUMUSOFT on Youtube!

Next Events

- 10.-11.9. Technical Computing Camp
  www.humusoft.cz/event/technical-computing-camp-2026/
- 23.-25.9. COMSOL Conference Cambridge
  www.comsol.com/conference

Thank you for your attention!