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## Multiscale Modeling of Nuclear Membrane Sealing

*Tuesday, 3 March 2026 16:00 (20 minutes)*

During mitotic exit, the nuclear envelope seals spindle-microtubule holes in a process mediated via LEM2-ESCRT. Cryo-electron tomography (Cryo-ET) shows LEM2-ESCRT filament architecture but not the sealing mechanism. We built a digital twin by integrating Cryo-ET with multiscale molecular dynamics simulations of filaments in a 90 nm membrane hole, capturing conformational changes, showing how LEM2's disordered domain engages microtubules, and allowing in-silico tests of mechanical stress.

**Presenter:** Dr PALACIO-RODRIGUEZ, Karen (Max Planck Institute of Biophysics)

**Session Classification:** Short Talk