Structural ingenuity and a collaborative team approach led to the successful completion of the new Orange Coast College Planetarium, designed as a focal point on campus and providing a destination for STEM students and enthusiasts throughout Southern California.

The Planetarium consists of a 70-foot diameter central concrete dome designed as an anchor for the vertical loads imposed by the projecting roof wings and serving as a creative shear-wall core to resist lateral loads. The dome was constructed with an inflated PVC balloon serving as the formwork and a waterproofing membrane with reinforced shotcrete providing the structure. The Planetarium’s exhibit gallery and covered exterior pre-function patio extend as wings to the east and west, reminiscent of a spiral galaxy when viewed from above.

A steel-framed, truncated and leaning conical tower projects 36-feet above the roof to suspend the Planetarium’s Foucault pendulum display, a device that depicts the Earth’s rotation. The roof structure supports the pendulum tower without columns penetrating the exhibit space below while accommodating the out-of-sync dynamic period of the tower under seismic loading.

To address a critical skylight that disconnected the main roof diaphragm from the dome, MHP designed a curved horizontal truss with steel pipe sections and cast steel pin connectors that enhance this key architectural feature. MHP navigated several other structural irregularities, including re-entrant corners, cantilevered diaphragms, extreme torsion, diaphragm discontinuity, and non-parallel lateral elements to complete the structural design.

The OCC Planetarium showcases the ability of the structural engineering profession to convert challenges into opportunities through effective collaboration between designers, reviewers, and builders, while preserving the client’s intent to create an iconic, celestial-inspired campus activity hub.