An automated, high-throughput platform for gene assembly, amplification, transformation, strain growth, and metabolite analysis enables the production of bio-based monomers and polymers with precise repeat units, domains and chirality directly from microorganisms. By providing an equipment set focused on automation, control, and high-throughput pathway assembly at the gene level and metabolite detection at the cellular level, the Living Bioreactor will enable biosynthetic manufacturing of commodity monomers and polymers.

A ThermoFisher Laboratory Automation System (LAS) serves as the cornerstone technology for the facility, enabling execution of automated customized synthetic biology and workflows at >500 samples-per-week. The LAS is equipped with over of over 10 functional instrumental components, including: a state-of-the-art SpinnakerTM microplate robot, automated incubators, reagent dispensers, thermal cyclers, plate sealer, and carousels/racks that are seamlessly integrated through the MOMENTUMTM application programming interface that is fully-compatible with laboratory information management systems (LIMS).

The capabilities of the Living Biofoundry Facility are supplemented by: (1) a Thermo Fisher TSQ Altis inline triple quadrupole mass spectrometer coupled with an ultra-high-performance liquid chromatograph (UHPLC/MS/MS) for separation and analysis of synthesized bio-derived monomers, (2) Agilent Technologies 7890A gas chromatography system, and (3) BIOFLO CELLIGEN 310 fermenter/bioreactor for scale-up microbial culture.