

## CAPABILITIES & EQUIPMENT

MSU BI offers collaborative, custom-tailored solutions to accelerate biobased technologies to commercial scale. Our experienced team takes a disciplined, stage-gated approach to remove flawed paths and delivers a vetted, scalable technology. Upon project completion, we provide thorough data packages to aid commercial scale production.



### BIOPROCESS DEVELOPMENT, OPTIMIZATION, AND RECOVERY

Our experts have a long history of developing robust, scalable bioprocesses and a wide range of recovery and purification methods.

In the last six years, we have successfully scaled 27 different technologies from lab to pilot-scale—with a 100% success rate.

### PROCESS DEVELOPMENT AND FERMENTATION

- Strain improvements & media optimization
- Bacteria/yeast/fungi/heterotrophic algae
- Aerobic/anaerobic/microaerobic
- Batch/fed-batch/continuous fermentations
- Product recovery and purification

### PILOT PLANT SCALE-UP

- Biomass processing
- Fermentation
- Purification & recovery
- Instrumentation and automated control systems
- Extensive data capture capabilities to further scale your technology
- In-line mass spectrometer off-gas analysis
- Pressurized, pilot scale reactors up to 3,800L

## APPLICATION TESTING & PRODUCT DEVELOPMENT

MSU BI supports pre-commercial process and product development, application testing, product validation, and routine pilot-scale production.

## SCALE-UP BEYOND MSU BI: TECH TRANSFER

With a 100% technology transfer success rate, you can count on us to successfully transfer your process directly to either your manufacturing team or production partner.



## EQUIPMENT OVERVIEW (NOMINAL VOLUMES)

### FERMENTATION

- Customized, flexible, and automated fermentation control
- Bench-scale 1.5L, 3L, 4.5L, 7L, and 14L fermenters
- Pilot-scale 14L, 30L, 150L, 200L, and 3,800L fermenters

### ANALYTICAL FACILITIES

- HPLC, UPLC, GC, GC/MS
- UV-Vis Spectroscopy
- YSI analysis
- Protein analysis
- Full access to MSU analytical equipment including HPLC/MS, NMR, and LC/MS MS

### PURIFICATION AND RECOVERY CAPABILITIES

- High-speed disk stack centrifugation
- Solid-Liquid, Liquid-Liquid separation
- Filtration, ultrafiltration, microfiltration
- Chromatographic processes
- Ion Exchange
- Cell Disruption
- Vacuum Evaporation
- Solvent Extraction
- Crystallization and Tray Drying
- Additional space and full utilities set-up for client or rental DSP equipment

*Please contact us to discuss your project needs and requirements.*

**CHAD PASTOR**

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