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Industrial Associates Are Our Backbone

To date, 133 forward-thinking companies have sought biofilm solutions as CBE Industrial Associates. These relationships ensure our scientists seek solutions to real-world biofilm problems.
6 Key Benefits for CBE Industrial Associates

❖ Access to world’s first and largest biofilm research center
❖ Access to training workshops led by leading researchers
❖ Reduced-cost testing projects
❖ Individualized consultation with leading biofilm researchers
❖ Objective research opportunities targeting specific interests
❖ Access to members-only webinars by top CBE researchers
Advancing Science While Serving Industry

Research Emphasis

- Biofilm Control Strategies
- Energy & Environment
- Health & Medical
- Industrial Processes/Systems
- Standardized Methods
- Water Systems
Why Our Urgency? HEALTH & MEDICINE

Urinary-Catheter Infections...

- lead to 13,000 U.S. deaths annually
- cause 30 percent of all hospital infections
- add ~$1 million in treatment costs per day

BIOFILM IS THE CULPRIT

There are 296 diabetes-related amputations *each day* in the U.S.
Biofilms can wreak havoc, especially in home, hospital, food service, and industrial settings, as well as the human body. Physically removing biofilms can be extremely difficult. Antibiotics and topical agents are largely ineffective at controlling biofilms.
There are 265,000 coliform-based infections each year in the U.S., leading to 3,600 hospitalizations and 30 deaths.

City, state, and federal governments are on pace to spend more than $1 trillion on water and wastewater utilities over the next decade.
In 2013, the U.S. government and industries spent $500 billion fighting biofilm-related corrosion.

Product contamination can be deadly for consumers and bring significant financial burden to industry.
The CBE engineered a biofilm to seal leaking gas and oil wells, creating efficiencies while limiting environmental damage.

Other promising areas of biofilm research include algal fuels, bio-remediation, and energy-extraction efficiency.
EPA relies exclusively on a testing method developed at the CBE to evaluate anti-biofilm product claims made by manufacturers.

The CBE principal investigator who developed the testing method used by the EPA is also an officer of ASTM International.
Biofilm Research is Growing Rapidly

BIOFILM PAPERS PUBLISHED HAVE INCREASED FROM 206 TO 83,578 SINCE CBE WAS FOUNDED IN 1990

YEAR

BIOFILM PAPERS PER YEAR

CBE Founded

INSTITUTION          TOTAL CITATIONS 1990-Dec. 2021

CENTER FOR BIOFILM ENGINEERING  85,190
HARVARD UNIVERSITY              65,919
COPENHAGEN (All institutions combined)  38,657
UNIVERSITY OF WASHINGTON        31,814
UNIVERSITY OF CALGARY           15,996
STANFORD UNIVERSITY             14,176

Source: Web of Science

MSU ■ Center for Biofilm Engineering
CBE Leads the World in Biofilm Conferences

The CBE hosts two annual conferences each convenes industry representatives and leading biofilm scientists from around the world.

**Montana Biofilm Meeting, Bozeman, MT**
Explores leading-edge research and best practices.

**Regulatory Meeting, Washington, DC**
Places scientists from regulatory agencies, including the U.S. EPA and FDA, in a featured role.
Interdisciplinary Collaboration Expands Perspectives

Diversity of disciplines strengthens our understanding of broad, real-world biofilm impacts and opportunities

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MSU ■ Center for Biofilm Engineering
## Scientifically Sound, Repeatable Results

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*Members receive discount rates on testing projects*
The CBE has trained 1,605 students and visiting researchers since 1990.

293 Graduate Students

919 Undergraduate Students

330 Visiting Researchers
CBE Bio-Imaging Facility

Specialized hardware serves MSU, Northwest U.S.

- 2 Nikon Eclipse E-800 Research Microscopes
- Leica M 205 FA Stereomicroscope
- Nikon SMZ-1500 Barrel Zoom Stereomicroscope w/Color Camera
- Leica CM1800 Cryostat
- 2 Leica SP5 Confocal Scanning Laser Microscopes
- ThorLabs Ganymede Series 200 Optical Coherence Tomography
- Leica LMD6 Laser Microdissection Microscope
- Horiba Scientific LabRam HR Evolution NIR high resolution Raman microscope
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