

Industrial Associates Are Our Backbone



More than 140 forward-thinking organizations have sought biofilm solutions as CBE Industrial Associates.

These relationships ensure our scientists seek solutions to real-world biofilm problems.

March 2025

Key Benefits for CBE Industrial Associates

- ❖ Access to world's first and largest biofilm research center
- ❖ Access to training workshops run by leading researchers
- ❖ Reduced-cost testing projects with priority scheduling
- ❖ Personalized consultation with leading biofilm researchers
- ❖ Objective research opportunities targeting specific interests
- ❖ Access to state-of-the-art tools for biofilm analysis

Advancing Science While Serving Industry



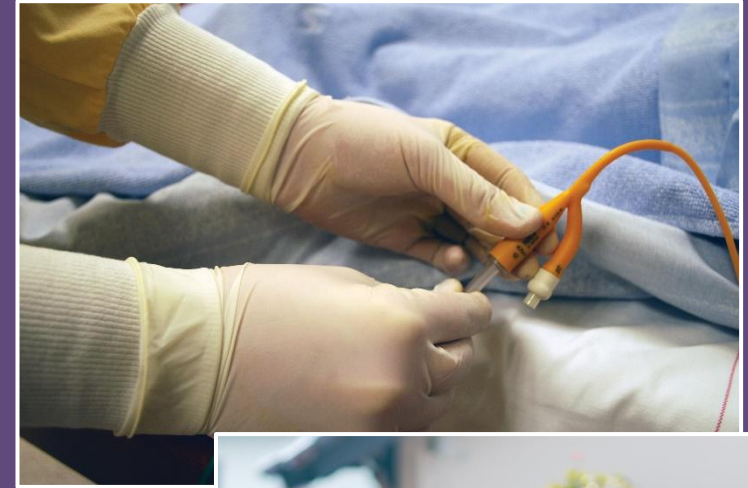
Research Emphasis

- 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



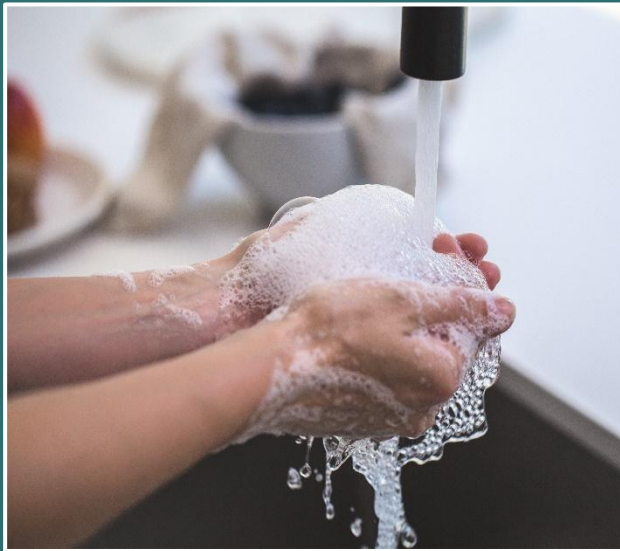
BIOFILM IS THE CULPRIT

There are 296 diabetes-related amputations each day in the U.S.



Why Our Urgency? **BIOFILM CONTROL**

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.

Why Our Urgency? **WATER SYSTEMS**

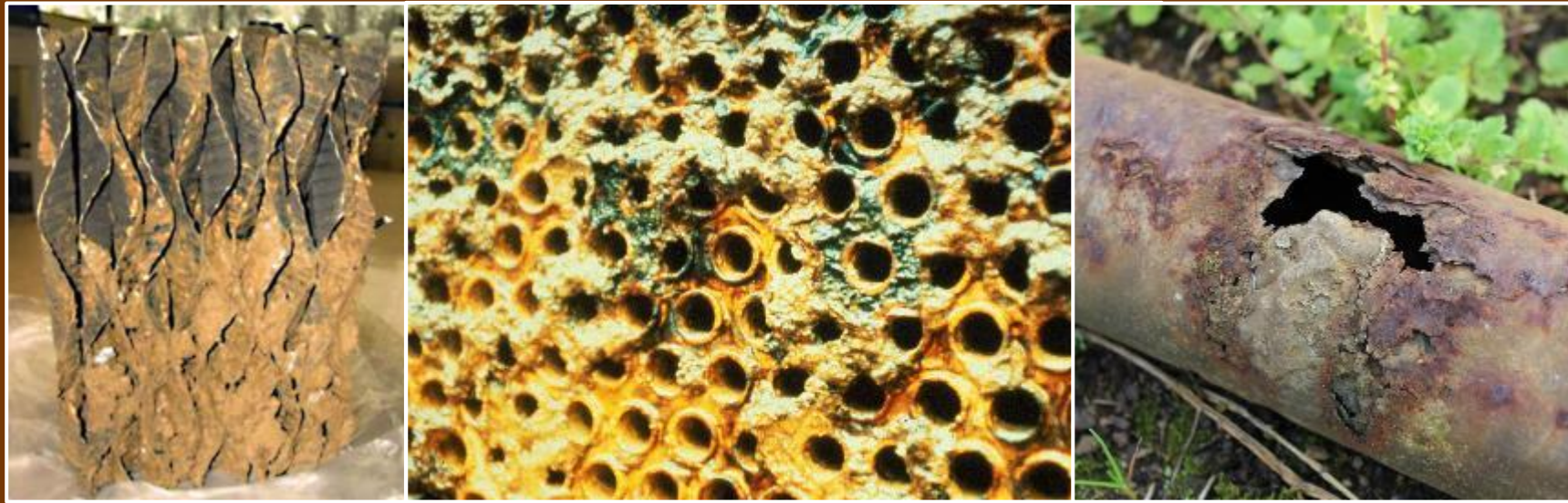


There are 265,000 coliform-based infections each year in the U.S., leading to 3,600 hospitalizations and 30 deaths.

City, state, and federal governments are on pace to spend more than *\$1 trillion* on water and wastewater utilities over the next decade.

Why Our Urgency? **INDUSTRIAL SYSTEMS**

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.

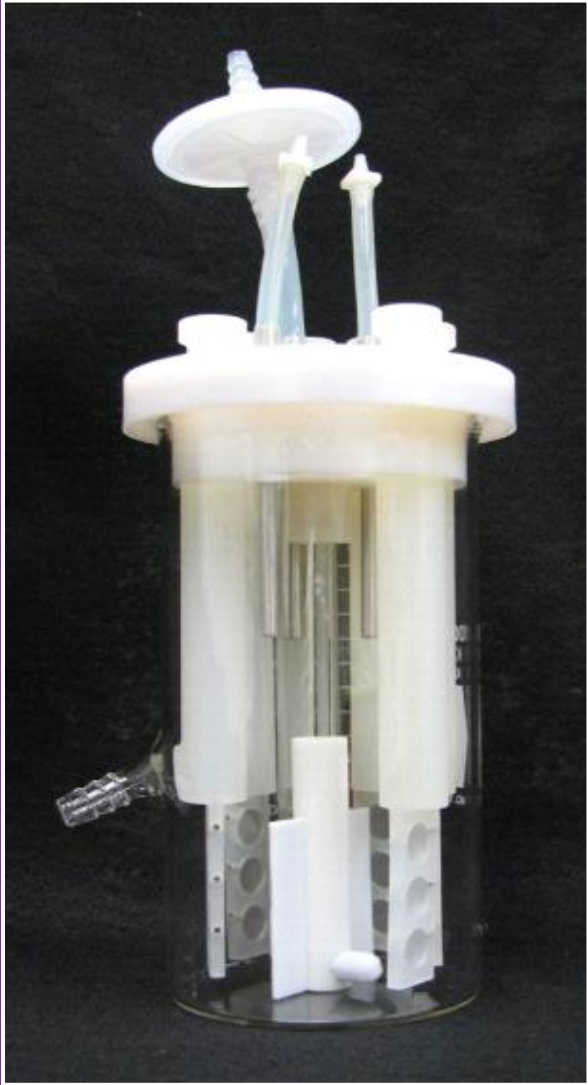
Why Our Urgency? **ENERGY & ENVIRONMENT**

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.



Why Our Urgency? **STANDARDIZED METHODS**



Standardized testing methods ensure results are repeatable and trustworthy.

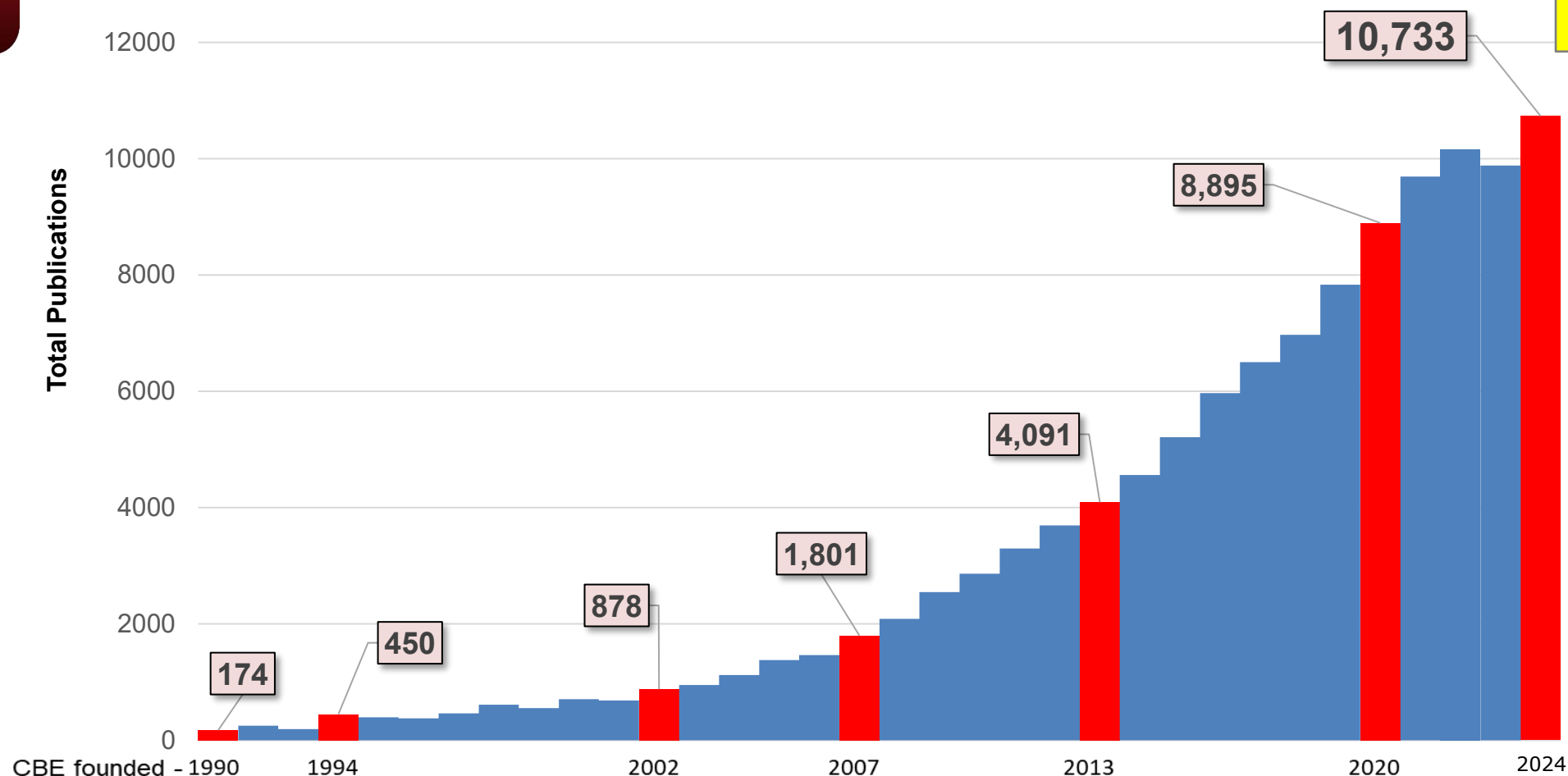
EPA relies exclusively on a testing method developed at the CBE to evaluate anti-biofilm product claims made by manufacturers.

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



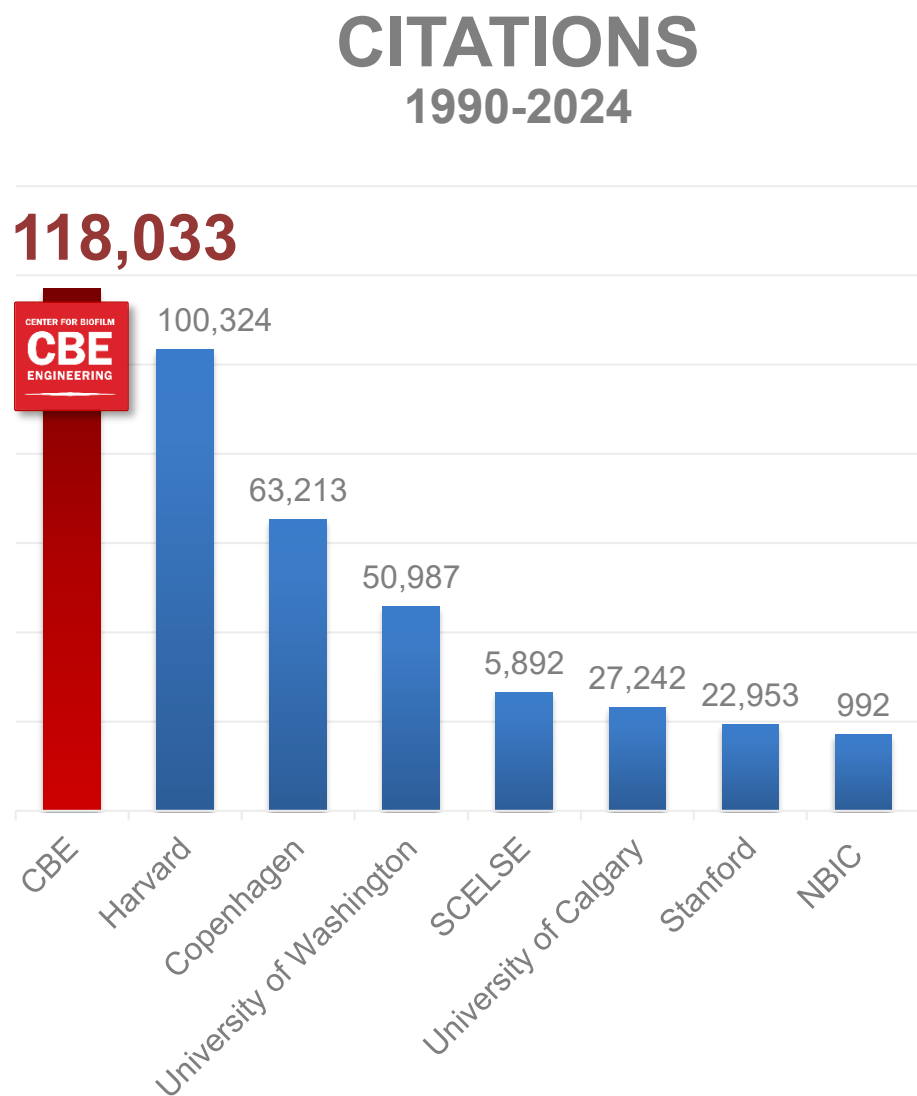
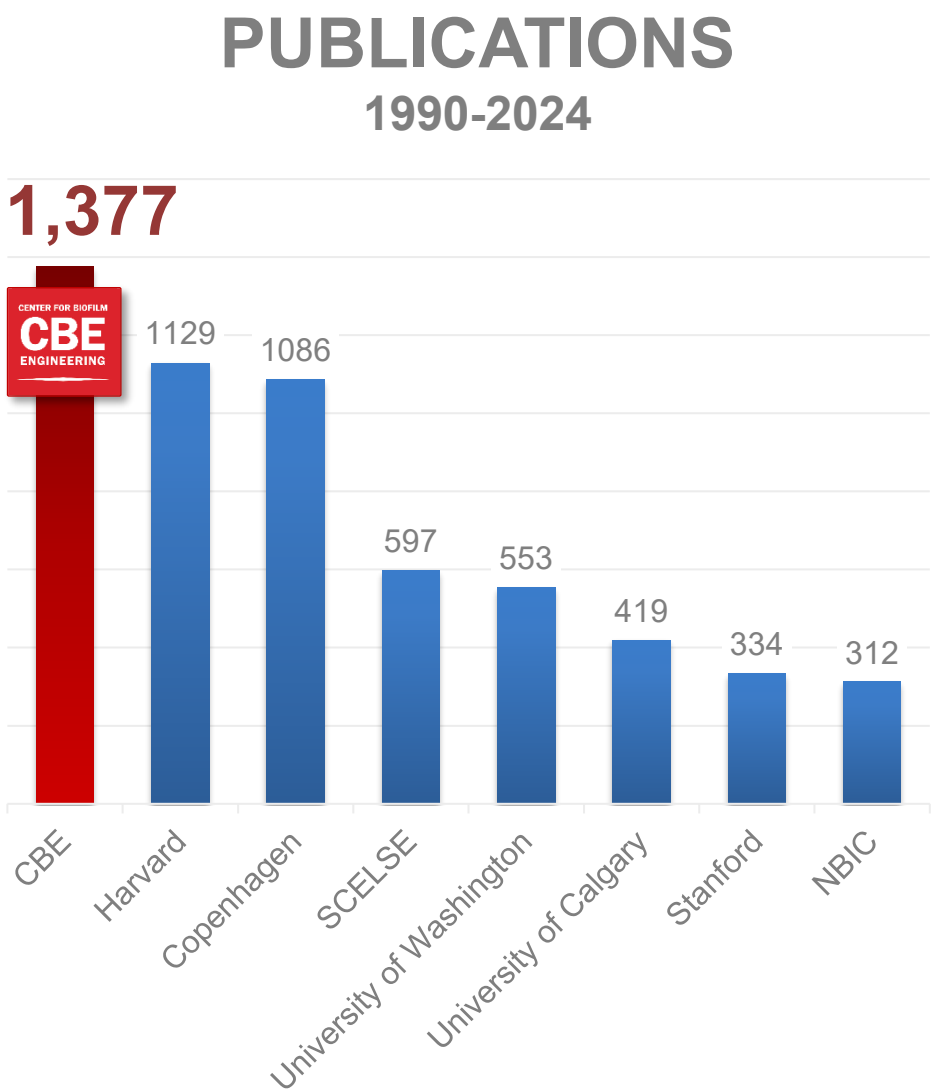
Ignited the Field of Biofilm Research

BIOFILM PUBLICATIONS



Pubs have doubled approx. every 6 years

'Biofilm' Search: CBE Leads in Publications and Citations

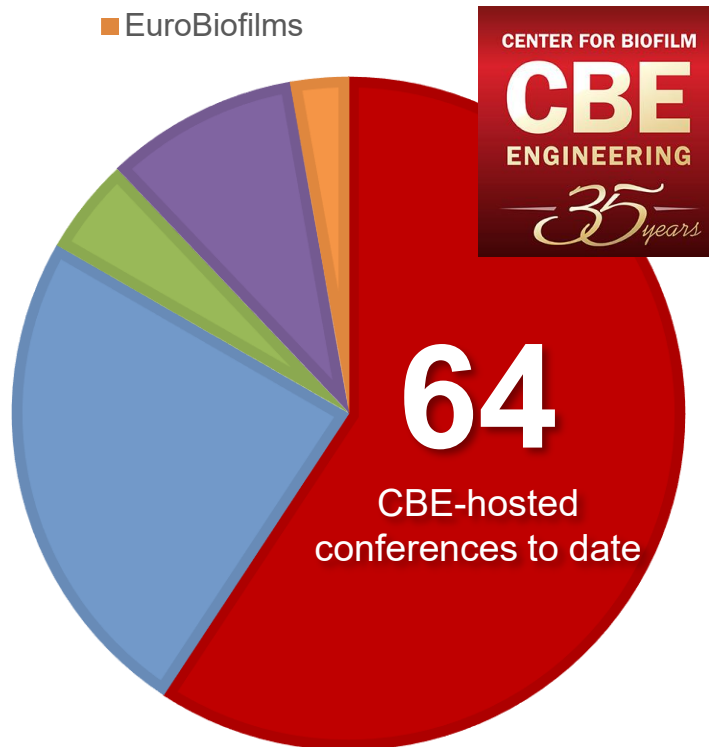


Source: Web of Science

CBE Leads the World in Biofilm Conferences

BIOFILM CONFERENCES

- CBE
- International Water Association
- American Society for Microbiology
- Biofilms
- EuroBiofilms



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

3D Printing	Fluid-Structure Interaction	Molecular Genetics
Biofuels	Geomicrobiology	Physiology & Ecology
Biostatistics	Industrial Systems	Standardized Methods
Bioremediation	Magnetic Resonance Phenomena	Subsurface Biotechnology
Control Strategies	Mathematical Biofilm Models	Water Systems
Electromagnetic Fields	Medical Biofilms	Web-Based Education
Extremophilic Bioprocessing	Microbe-Mineral Interactions	Wetland Treatments
Engineered Living Materials	Microbial Ecology in Cold Temps	

Scientifically Sound, Repeatable Results

Current industry testing projects

Antimicrobials

Medical Devices

Sinusitis

Cooling Water

Methods Development

Soap Dispensers

Drinking Water

Mining

Well Biofouling

Food Safety

Oil and Gas

Wound Care

Groundwater Contamination

Oral Care

Industrial Process Water

Pharmaceutical Water

*members
receive
discount rates
on testing
projects

Framing the Future of Biofilm Research

The CBE has trained 1,696 students and visiting researchers between 1990 and 2024.

327

Graduate
Students

1,013

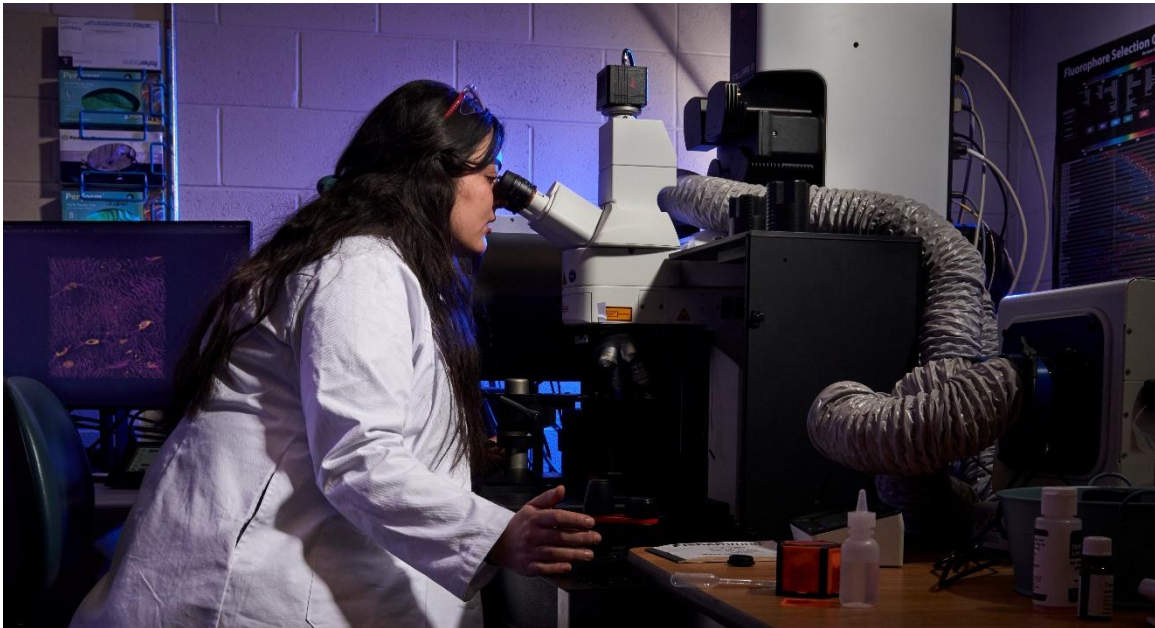
Undergraduate
Students

356

Visiting
Researchers

Upgraded CBE Bioimaging Instrumentation

*Customized for imaging
diverse intact biofilms while
minimizing artifacts from sample
preparation or imaging*



CBE microscopy equipment includes ...

**Dedicated image analysis
computers and software (Imaris)**

**Leica LMD6 Laser
Microdissection microscope**

**Two Leica Stellaris 8 confocals
with incubation environmental
control**

Two new state-of-the-art confocals, Multiphoton
and with Stimulated Raman Spectroscopy

**Stereomicroscopes
(Leica M 205 FA
Stereomicroscope &
Nikon SMZ-1500 Barrel Zoom
Stereomicroscope w/Color
Camera)**

**Leica Live Cell Thunder widefield
microscope**

Generates confocal-like images via
deconvolution, optimally configured for allow
real-time, high-sensitivity, high-throughput
imaging

**Horiba LabRam Raman confocal
microscope**

**Epifluorescence microscopes
(Leica DM6 and Nikon Eclipse
E-800)**

**Thor Labs Optical Coherence
Tomography (OCT) system**

Fluid Imaging FlowCam

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