News Update:
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Industry Highlights

Registration open: Biofilm regulatory meeting February 10, 2016

The Center for Biofilm Engineering is pleased to announce its third annual meeting to engage industry, academia, and US government agencies (FDA & EPA) in a discussion on biofilm technologies—"Anti-Biofilm Technologies: Pathways to Product Development."

Over the past decade, academic research advances and private company R&D efforts have led to the development of innovative anti-biofilm technologies with transformative potential in the consumer products and healthcare arenas. Likewise, advances in methods for studying and assessing biofilms have provided new insights into important biofilm characteristics such as why biofilms are difficult to kill and remove from surfaces.

Anti-Biofilm Technologies: Pathways to Product Development will feature speakers from academia, industry, and regulatory agencies focusing on new anti-biofilm technologies, methods for assessing their efficacy, and how these advances can lead to products for the enhancement of health and safety. The meeting will feature sessions related to products regulated by both EPA and FDA, with panel discussions following the presentations.

Additionally, CBE will be hosting a pre-meeting workshop on beneficial biofilms on Tuesday, February 9, 2016. This workshop will include presentations from industry, academia, and regulatory agencies on current research and commercialization efforts related to situations where the presence of a bacterial or fungal biofilm could be advantageous to humans. The workshop will feature presentations on medical biofilms, industrial biofilms (corrosion prevention, mineral exploitation) and energy-related biofilms. We will also present perspectives on how these products are regulated. (There is a separate fee for the workshop).

View the draft meeting agenda (pdf)

Registration is required for the meeting and workshop.

Registration fees:

	Meeting: Feb. 10, 2016	Workshop: Feb. 9, 2016
CBE Industrial Associate	$300	$100
Non-member	$500	$200

Academic	$300	$100
US Government	n/c	n/c

The workshop and meeting will be held at the Marriott Renaissance Arlington Capital View Hotel, 2800 South Potomac Ave., Arlington, VA 22202. All meals including breakfast, lunch, coffee breaks, and a reception will occur at the Marriott Renaissance Hotel.

A block of discount hotel rooms are reserved at the Marriott until January 14, 2016 for meeting attendees and must be booked through our registration website to receive the discounted rate (website link below). If you plan to attend the meeting, please plan to book lodging prior to January 14, 2016 in order to secure the meeting rate.

Register online now at www.mtnreg.com/biotech

If you have questions about the meeting, please contact Paul Sturman at (406) 994-2102 paul_s@montana.edu

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Research Highlights

Latest Publications

Cattò C, Dell'Orto S, **Villa F**, Villa S, Gelain A, Vitali A, Marzano V, Baroni S, Forlani F
"Unravelling the structural and molecular basis responsible for the anti-biofilm activity of zosteric acid"
PLoS ONE, 2015; 10(7): e0131519.
Read abstract

VanKempen-Fryling RJ, **Stein OR**, **Camper AK**
"Presence and persistence of wastewater pathogen *Escherichia coli* O157:H7 in hydroponic reactors of treatment wetland species"
Water Sci Technol., 2015; 72(1):135–40.
Read abstract

Barnhart EP, McClure MA, Johnson K, Cleveland S, **Hunt KA**, **Fields MW**
"Potential role of Acetyl-CoA Synthetase (acs) and Malate Dehydrogenase (mae) in the evolution of the acetate switch in bacteria and archaea"
Sci Rep., 2015 Aug 3; 5:12498.
Read abstract

Chihara K, **Matsumoto S**, Kagawa Y, Tsuneda S
"Mathematical modeling of dormant cell formation in growing biofilm"
Front Microbiol., 2015 May 28; 6:534.
Read abstract

Sánchez-Gómez S, **Ferrer-Espada R**, **Stewart PS**, **Pitts B**, Lohner K, Martínez de Tejada G
"Antimicrobial activity of synthetic cationic peptides and lipopeptides derived from human lactoferricin against *Pseudomonas aeruginosa* planktonic cultures and biofilms"
BMC Microbiol., 2015 Jul 7; 15:137.
Read abstract

Hommel J, **Lauchnor E**, **Phillips A**, **Gerlach R**, **Cunningham AB**, Helmig R, Ebigbo A, Class H
"A revised model for microbially induced calcite precipitation: Improvements and new insights based on recent experiments"
Water Resour. Res., 2015; 51: 3695–3715.
Read abstract

Jewell S, Zhou X, Apple ME, **Dobeck LM**, Spangler LH, **Cunningham AB**
"Bulk electric conductivity response to soil and rock CO_2 concentration during controlled CO_2 release experiments: Observations and analytic modeling"
GEOPHYSICS, 2015; 80(6): E293-E308.
Read abstract

View Publications database

Education

MSU-CBE undergraduate wins regional Montana Mathematics Modeling Challenge

Miguel Strunk, MSU-CBE undergraduate student in bioengineering, was recently featured by Montana State University for his work on a team that took first place in an essay competition at the Montana Mathematics Modeling Challenge. Fifteen teams from five colleges participated in the competition, which took place October 24–25 at Carroll College in Helena, Montana. Strunk and his teammates—Kelsey Philipsek (civil engineering) and Sarah Juedeman (electrical engineering)—took top honors in the regional contest that challenged competitors to develop a mathematical model to solve real-world problems in just 24 hours.

To read about their quick-thinking assignment, go to *MSU News Service*: "MSU team wins regional Montana Mathematics Modeling Challenge"

Thesis Alert

"Operation and optimization of a two-stage, vertical-flow treatment wetland in an alpine environment," successful thesis defense by **Jefferson Moss**, masters candidate, civil engineering, Montana State University, November 17, 2015.
Read abstract

View thesis abstracts

Outreach

CBE Industrial/Agency Visits

Matthew Fields (CBE director), **Darla Goeres** (manager, CBE Standardized Biofilm Methods Lab), **Al Parker** (CBE bio-statistician), and **Kelli Buckingham-Meyer** (CBE research assistant) visited Baxter Healthcare on October 27, 2015. Baxter, a CBE industrial member, invited the group to present their research on biofilms to the entire company. Presentations included:

"What is a biofilm?" Matthew Fields
The value of CBE's industrial membership, Matthew Fields
Standard methods and disinfectant efficacy testing, Darla Goeres
Microscopy and treatment flow cell, Al Parker and Kelli Buckingham-Meyer

MSU-CBE affiliated faculty member **Phil Stewart**, professor, chemical & biological engineering, visited Lonza Specialty Products on November 10, 2015. Stewart was invited to present "The science of biofilm control with antimicrobial agents," to about twenty-five employees as well as others who connected remotely from Lonza's offices in New Jersey, South Africa, and Switzerland. Stewart's visit coincided with a twice-yearly meeting of the company's Research & Technology Council so all of the technical leaders of Lonza (including Pharma), and the CEO were in the audience. During his visit, Stewart met with leadership from the water treatment group and other departments to discuss activity related to swimming pools, endoscope disinfection, paint preservation, cooling water systems, and anti-biofilm coatings. Lonza has been a member of CBE's industrial associates program since June 2015.

CBE Tours

On November 24, 2015, the Center hosted "Talks and Tours" for middle school students who were on MSU's campus participating in the Montana Science Olympiad competition. CBE graduate students **Ashley Beck**, **Lauren Franco**, **Laura Camilleri**, and **Katie Davis** led the tours through the following CBE labs—soft materials, wound biofilms, and confocal microscopy. Volunteers **Jim Wilking**, **Connie Chang**, **Michael Vigers**, **Neerja Zambare**, **Sarah Mailhiot**, **Makayla Eickelberg**, **Erika Avera**, and **Jonas David** demonstrated their research to the students.

Science Olympiad is a national non-profit organization dedicated to improving the quality of K-12 science education, increasing male, female and minority interest in science, creating a technologically-literate workforce and providing recognition for outstanding achievement by both students and teachers. These goals are achieved by participating in Science Olympiad tournaments and non-competitive events, incorporating Science Olympiad into classroom curriculum and attending teacher training institutes. Locally, 1,031 Montana students from 71 different schools and 88 different teams competed for spots in the national competition held in

spring 2016 in Orlando, Florida.

People in Action

Mari Eggers, CBE research scientist, as a speaker presented "Investigating sources of water to Chief Plenty Coups Spring near Pryor, Montana: Water chemistry and microbial communities reveal seasonably variable contamination pathways," Montana Section-American Water Resources Association 2015 Conference, Missoula, MT, October 7–9, 2015.

Darla Goeres, associate research professor, chemical & biological engineering, presented the poster "Data from a recent inter-laboratory study and methods to efficacy test treated surfaces," at the International Biodeterioration Research Group (IBRG) Methods Meeting, Prague, Czech Republic, October 18–23, 2015.

The following CBE faculty and staff presented research at the 7th ASM Conference on Biofilms, Chicago, IL, October 24–29, 2015:

Pre-meeting workshop:
Darla Goeres, **Al Parker**, CBE biostatistician, **Kelli Buckingham-Meyer**, research scientist, and **Diane Walker**, research engineer, facilitated a pre-meeting workshop "Standardized biofilm methods: Development and application of biofilm methods."

Poster presentations:
Garth James, associate research professor, chemical & biological engineering: "Shockwave disruption of biofilms."

Elinor Pulcini, assistant research professor, chemical & biological engineering: "In vitro analysis of *Clostridium difficile* biofilms: Imaging and antimicrobial treatment."

Phil Stewart, professor, chemical & biological engineering: "Spatial patterns in biofilm infections."

Robin Gerlach, professor, chemical & biological engineering: "Biofilm-mediated mineral precipitation technology: From the microscale to the field-scale."

Mike Franklin, professor, microbiology: "Characterization of the *Pseudomonas aeruginosa* PAO1 biofilm matrix by fluorescence-based imaging."

Darla Goeres, associate research professor, chemical & biological engineering, attended the ASTM subcommittee E35.15 meeting, Tampa, FL, October 28–30, 2015. Goeres was there to discuss various microbial methods under development. ASTM subcommittee E35.15 studies antimicrobial agents and ASTM main committee E35 studies pesticides, antimicrobials, and alternative control agents.

Mari Eggers, CBE research scientist, presented "Community-based cumulative risk assessment of exposure to waterborne contaminants on the Crow Reservation," at NIEHS Conference on

Traditional Ecological Knowledge (TEK) Workshop, Bethesda, MD, December 1–5, 2015. Co-presenters: Lefthand M, **Doyle J**

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Job Opportunities

Newcastle University (Newcastle upon Tyne, United Kingdom): Lecturer in Geology
Job posting: http://bit.ly/1TUgcNf (posted: 12/18/2015)

Newcastle University (Newcastle upon Tyne, United Kingdom): Lecturer in Geochemistry/Geomicrobiology
Job posting: http://bit.ly/1OATwhc (posted: 12/18/2015)

CareFusion (Vernon Hills, IL): Senior Scientist, Microbiologist