News Update:
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CBE seeks a new director

As the Center for Biofilm Engineering commemorates its 25th anniversary in 2015, it will also be exploring new opportunities for the future of the Center with a change in directorship. Dr. Phil Stewart has announced that he is stepping down as CBE Director this summer. Stewart, a leading expert on antimicrobials and biofilm control, has been a faculty member with CBE since 1991 and CBE Director for the past 10 years. Under Stewart's tenure, CBE has grown in affiliated faculty numbers, industrial membership, the number of testing and industry-sponsored projects, and the participation of undergraduate and graduate students. The center is one of 24 self-sustaining Engineering Research Centers in the National Science Foundation program. A candidate search is underway and anyone interested should contact Dr. Anne Camper at anne_c@montana.edu

Industry Highlights

Highlights from CBE's regulatory-focused meeting with the FDA and EPA

For the second year, CBE sponsored a regulatory-focused meeting in the Washington D.C. area. On February 11th, 140 industry, agency, and academic representatives attended "Anti-Biofilm Technologies: Pathways to Product Development," in College Park, Maryland. EPA and FDA had a prominent presence at the meeting, with over 35 attendees and 3 speakers on the agenda. The meeting included a morning session on Surface Disinfection Technologies and an afternoon session on Medical Device Technologies. Each session was followed by a panel discussion in which attendees were able to ask questions of panel members, including our EPA and FDA speakers. The format provided for lively discussion and gave attendees an opportunity to understand the challenges that both regulatory agencies and industry scientists face.

Final meeting agenda

CBE's next meeting will be July 14–16 in Bozeman, Montana. To view past meeting agendas and proceedings, go to: http://www.biofilm.montana.edu/documents-reports/index.html

Contact Paul Sturman for information about the Industrial Associates Program or upcoming meetings and workshops.

Research Highlights

CBE 2014–2015 annual report: Twenty-five years and growing

2015 marks the 25th anniversary of CBE's inception as a National Science Foundation Engineering Research Center (NSF ERC). This special edition of our annual report combines highlights of recent activity with retrospectives on CBE's impact since our founding. We are proud that CBE continues to successfully integrate all three of its original NSF missions: cutting-edge interdisciplinary research, innovative education, and effective technology transfer.

Read the annual report online at http://www.biofilm.montana.edu/documents-reports/annual-reports.html

Latest CBE Publications

Brileya KA, **Camilleri LB**, Zane GM, Wall JD, **Fields MW**
"Biofilm growth mode promotes maximum carrying capacity and community stability during product inhibition syntrophy"
Frontiers in Microbiol, Dec 2014; 5:693.

Cunningham A, **Phillips AJ**, **Troyer E**, **Lauchnor E**, **Hiebert R**, **Gerlach R**, Spangler L
"Wellbore leakage mitigation using engineered biomineralization"
Energy Procedia, 2014; 63: 4612–4619.

Mann EE, Mettetal MR, May RM,Drinker MC, Stevenson BC, Baiamonte VL, Marso JM, Dannemiller EA, **Parker AE**, Reddy ST, Sande MK
"Surface micropattern resists bacterial contamination transferred by healthcare practitioners"
J Microbiol Exp, 2014; 1(5):00032.

Oja T, Blomqvista B, **Buckingham-Meyer K**, **Goeres D**, Vuorelac P, Fallarero A
"Revisiting an agar-based plate method: What the static biofilm method can offer for biofilm research"
J Microbiol Methods, Dec 2014; 107:157–160.

Kahrilas GA, Blotevogel J, **Stewart PS**, Borch T
"Biocides in hydraulic fracturing fluids: A critical review of their usage, mobility, degradation, and toxicity"
Environ. Sci. Technol., 2015; 49(1):16–32.

Otter JA, Vickery K, Walker JT, **de Lancey Pulcini E**, Stoodley P, Goldenberg SD, Salkeld JA, Chewins J, Yezli S, Edgeworth JD
"Surface-attached cells, biofilms and biocide susceptibility: Implications for hospital cleaning

and disinfection"
J Hosp Infect., Jan 2015; 89(1):16–27.

Phillips AJ, **Eldring J**, **Hiebert R**, **Lauchnor E**, Mitchell AC, **Cunningham A**, Spangler L, **Gerlach R**
"Design of a meso-scale high pressure vessel for the laboratory examination of biogeochemical subsurface processes"
J Petroleum Science and Engineering, Feb 2015; 126:55–62.

Trentin DS, Silva DB, Frasson AP, Rzhepishevska O, da Silva MV, **de Lancey Pulcini E**, **James G**, Soares GV, Tasca T, Ramstedt M, Giordani RB, Lopes NP, Macedo AJ
"Natural green coating inhibits adhesion of clinically important bacteria"
Scientific Reports, Feb 2015; 5:8287.

Benton HP, Ivanisevic J, Mahieu NG, Kurczy ME, Johnson CH, **Franco L**, Rinehart D, Valentine E, Gowda H, Ubhi BK, Tautenhahn R, Gieschen A, **Fields MW**, Patti GJ, Siuzdak G
"Autonomous metabolomics for rapid metabolite identification in global profiling"
Anal. Chem., 2015; 87 (2):884–891.

Fritz B, **Walker D**, **Goveia D**, **Parker A**, **Goeres D**
"Evaluation of petrifilm aerobic count plates as an equivalent alternative to drop plating on R2A agar plates in a biofilm disinfectant efficacy test"
Curr Microbiol., 2015; 70(3):450–456, 2015.

Kesaano M, **Gardner RD**, **Moll K**, **Lauchnor E**, **Gerlach R**, **Peyton BM**, Sims RC
"Dissolved inorganic carbon enhanced growth, nutrient uptake, and lipid accumulation in wastewater grown microalgal biofilms"
Bioresource Technol., March 2015; 180:7–15.

View Publications database

Education Awards

2015 MSU Faculty Awards

MSU-CBE faculty member **Abigail Richards**, associate professor in chemical and biological engineering, was among the winners of the top 2015 faculty awards at Montana State University. The annual awards honor achievement in faculty research, teaching, outreach, and creative

projects. This year's awards were presented in January at the 4th annual MSU Spring Convocation.

Richards was the recipient of MSU's inaugural Spirit of Discovery Award. This award is for faculty members who have excelled in teaching and mentoring students in the Honors College. The awards were made possible by support from Dr. Lew and Liane Vadheim of Miles City. The Vadheims' son, Bryan, was MSU's first Marshall Scholar. The award provides a $1,400 honorarium.

Read more about Richards and her award

2015 MSU Awards for Excellence

Forty of Montana State University's top seniors and their faculty and staff mentors were recognized Tuesday, February 17th at the 33rd annual Awards for Excellence banquet held on the MSU campus.

The event is co-hosted by the MSU Alumni Association and the Bozeman Chamber of Commerce. Honored students were nominated by faculty in their college or department. Qualified seniors must have at least a 3.5 grade point average on a 4.0 scale, as well as demonstrated campus leadership and community service. The award-winning students each selected a mentor who will be honored with them at the event.

CBE undergraduate student **Varsha Rao**, chemical and biological engineering, was honored at the ceremony. Rao's mentor is CBE affiliated faculty member **Joseph Seymour**, professor in chemical and biological engineering.

View the full list of recipients at MSU News: http://www.montana.edu/news/15367/annual-awards-for-excellence-to-honor-40-msu-students-and-their-mentors

2015 WG Characklis Award

The CBE is proud to announce the 2015 W.G. Characklis Outstanding Student Award recipient—**Chris Allen**.

Allen, a PhD candidate in civil engineering, received his award in recognition of his exceptional management of his PhD program to improve the quality of his research, leadership on wetlands projects and mentoring of other students, and his commitment to service projects through Engineers Without Borders—all handled with gentlemanly generosity. Allen is an outstanding representative of the aims of the CBE.

The W.G. Characklis Award is presented annually to CBE doctoral students for their contributions to research and education. The award honors Center Founder Bill Characklis, who envisioned students working in interdisciplinary teams, participating in innovative educational programs, interacting with industry, and assuming leadership roles.

View past WG Characklis award recipients

Employee News

Faculty Appointments

Dr. **Connie Chang**, former assistant research professor, has been appointed to an assistant professor faculty position. Chang's research interest is in droplet-based microfluidics, which is the creation and manipulation of tiny drops of fluid that range from picoliters to nanoliters in volume. These drops are created at rates of thousands per second and can be used in applications such as biomaterials, ultra high-throughput screening of bacterial biofilm formation, single cell genomics, and directed evolution in biology. Chang joined MSU's chemical and biological engineering department in November 2013 from a postdoctoral position in the David Weitz laboratory at the School of Engineering and Applied Sciences at Harvard University. Read more about Chang on her bio page: http://www.biofilm.montana.edu/people/faculty/chang-connie.html

Dr. **Lisa Kirk**, former CBE postdoctoral researcher, was recently appointed to an assistant research professor position. Kirk's research areas are: biofilms in mine waste rock, tailings, post-mine pit lakes and underground workings; biofilms in treatment of mine-affected water; in situ biological stabilization of nitrogen, sulfur, and metals including selenium. Read more about Kirk on her bio page: http://www.biofilm.montana.edu/people/faculty/kirk-lisa.html

Dr. **Kelly Kirker**, former CBE research scientist, was recently appointed to an assistant research professor position. Kirker's research interests are: Exploring how biofilms contribute to wound chronicity; developing new in vitro wound/biofilm models; evaluating antimicrobial properties of biomaterials; investigating anti-biofilm technologies for the health care field. Read more about Kirker on her bio page: http://www.biofilm.montana.edu/people/faculty/kirker-kelly.html

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Outreach

Visiting Researchers

Dominik Ausbacher is a visiting postdoctoral researcher from the Department of Pharmacy, UiT—The Arctic University of Norway. Ausbacher is investigating the anti-biofilm potency and mechanism of action of antimicrobial β2,2-amino acid derivatives. He is working in collaboration with **Darla Goeres**, manager, CBE standardized biofilm methods laboratory, **Phil Stewart**, CBE director, and the Anti-Infective Research Laboratory, University of Helsinki, Finland. For more information on Ausbacher and his research, go to: http://en.uit.no/ansatte/dominik.ausbacher

CBE Tours

On February 4, 2015 CBE hosted a tour for twenty administrators and technicians from the University of Tokyo. Their visit was sponsored by MSU's Office of International Programs. Dr. **Shinya Matsumoto**, CBE visiting researcher, led the tour.

People in Action

The following CBE researchers presented the following research at the American Geophysical Union (AGU) Conference, December 12–18, 2014 San Francisco, CA:

Adie Phillips, assistant professor, civil engineering, as an invited speaker presented "Microbially induced calcite precipitation (MICP)—A technology for managing flow and transport in porous and fractured media."
Katie Davis, master's student, civil engineering, presented the poster, "Microbially-enhanced coal bed methane: Strategies for increased biogenic production."

Benjamin Jackson, PhD candidate, mathematical sciences, as an invited speaker presented "Estimating parameters in a bacterial community using inverse methods," American Mathematical Society and Mathematical Association of America (MAA-AMS) Joint Meeting, January 9–15, 2015 San Antonio, TX.